Plan for Biodiversity Management and Sustainable Development around Turks & Caicos Ramsar Site

Version 1.00



This plan is an output from the Darwin Initiative project "Developing Biodiversity Management Capacity Around the Ramsar Site in Turks & Caicos Islands". The Darwin Initiative, which part-funded the work, is run by the UK Department of Environment, Food and Rural Affairs.

The organisations running the project were:

Turks & Caicos National Trust UK Overseas Territories Conservation Forum CABI Bioscience

The project was undertaken under a Memorandum of Understanding between the project partner organisations and the Government of the Turks & Caicos Islands



The organisations running the project were:

Turks & Caicos National Trust (represented by Executive Director, Mrs Ethlyn Gibbs Williams, Turks & Caicos National Trust, PO Box 540, Butterfield Square, Providenciales, Turks & Caicos Islands, West Indies; tc.nattrust@tciway.tc; www.tcmall.tc/nationaltrust)

UK Overseas Territories Conservation Forum (represented by Chairman, Dr Mike Pienkowski, 102 Broadway, Peterborough PE1 4DG, UK; pienkowski@cix.co.uk; www.ukotcf.org)

CABI Bioscience (represented by Co-ordinator, Characterisation & Conservation of Biodiversity, Dr Oliver Cheesman, Ecological Applications Section, CABI Bioscience, Silwood Park, Ascot, Berkshire SL5 7TA, UK; o.cheesman@cabi.org; www.cabi-bioscience.org)

The locally recruited and based Project Officer was Bryan "Naqqi" Manco

This plan was edited by Dr Mike Pienkowski.

Specialists responsible for the various taxa and other aspects were:

Satellite imagery analysis, ground-truthing, and mapping: Frederic J Burton (formerly Program Director, Cayman Islands National Trust), with some assistance in mapping by Dr Mike Pienkowski (UKOTCF)

Plants: Dr Gerald "Stinger" Guala and Jimi Sadle (Fairchild Tropical Gardens, Florida) and Frederic J Burton, with further information from Bryan "Naqqi" Manco and Dr Kathleen Wood (Providenciales)

Insects, particularly butterflies and beetles, respectively: Dr Oliver Cheesman (CABI Bioscience) and Dr Roger Booth (Natural History Museum in London), with additional material from Richard Ground

Reptiles and amphibians (herpetiles): Dr Glenn Gerber and Tandora Grant (Zoological Society of San Diego Centre for the Reproduction of Endangered Species), supported by Bryan "Naqqi" Manco for both observations and drafting for this plan

Bats: Dr Tony Hutson (UK, the joint chairman of the IUCN/SSC Chiroptera Specialist Group and conservation advisor to The Bat Conservation Trust) and Tim McCarthy (Carnegie Museum of Natural History, Pennsylvania)

Birds: Dr Mike Pienkowski, with help from Mrs Ann Pienkowski and Bryan "Naqqi" Manco in field work, and complementary work in dissemination and public awareness by Richard Ground (Turks & Caicos Islands' Chief Justice).

Several people commented and drafted sections of this draft outside their named specialisms; these include particularly Dr Oliver Cheesman, Dr Dace McCoy Ground, Dr Tony Hutson and Bryan Naqqi Manco.

The following have served on the Project Committee:

Ethlyn Gibbs Williams, TCNT, Executive Director (Co-Chair) Dr Mike Pienkowski, Chairman, UK Overseas Territories Conservation Forum (Co-Chair) Bryan Naqqi Manco, TCNT, Darwin Project Officer (Secretary) Norman Hamilton, TCNT, Council Vice-Chairman Kathleen Wood, Biologist, TCI Mark Day, Director, and Michelle Fulford-Gardiner, Deputy Director & Chief Scientific Officer, TCI Dept of Environmental & Coastal Resources Dottis Arthur, District Commissioner, Middle Caicos Cardinol Arthur, Conch Bar, Middle Caicos Alton Higgs, Lorimers, Middle Caicos Hormel Harvey, Conch Bar, Middle Caicos Clyde Robinson, TCI Planning Dept Sara Cross, Director for Development, UK Overseas Territories Conservation Forum

Dr Oliver Cheesman, Co-ordinator, Characterisation and Conservation of Biodiversity, CABI Bioscience

The project partners would like to acknowledge the support of the Governor H.E. Mr Mervyn Jones, Chief Minister the Hon Mr Derek H. Taylor, Ministers for Natural Resources, initially the Hon Mr Larry Coalbrooke and subsequently the Hon Mr. Hilly Ewing, Permanent Secretary for Natural Resources, Mr Terry Smith, and Government Economist in the Department of Finance, Mr Delton Jones.





The project partners are grateful for substantial contributions of unpaid time by both visiting specialists and local residents, for additional financial support from the Environment Fund for Overseas Territories of the UK Foreign & Commonwealth Office, assistance with some flights from British Airways, assistance with GIS software from ESRI, help with accommodation by the Norbellis Foundation, Mr & Mrs Witt of Blue Horizon, George Gibbs, and Mr Telford and Mrs Mary Outton.

The project is grateful to the following who participated in the consultative workshops on this plan in Middle Caicos or Grand Turk: Delton Jones & Peter Poulsen (Department of Economic Planning & Statistics); Arlene Dixon (Department of Planning); Michelle Fulford Gardiner & Rob Wild (Department of Environmental & Coastal Resources); Mr Charles (Department of Land & Surveys); Nigel Sadler (National Museum); personnel from the Tourist Board and from the Governor's Office; Leila Robinson; Dace McCoy Ground; Ann Pienkowski; and members of the Middle Caicos community.

The project partners would also like to thank the UKOTCF member organisations and others in the Forum network for their advice and support, as well as staff and Council members of TCNT.

Most importantly, the project partners would like to acknowledge the support and help of the people of Middle and North Caicos (as well as elsewhere in TCI) in inviting the Trust and the Forum to initiate this study to work with them on helping plan the future of their islands.



Part 0. Contents and Plan Summary

0.1. Contents

Part 0	. Contents and Plan Summary	. 4
0.1	. Contents	. 4
0.2	2. Summary	10
	0.2.1. Part 1: Introduction	10
	0.2.1.1. Background	10
	0.2.1.2. Objectives	11
	0.2.1.3. Structure of this plan	11
	0.2.2. Part 2: Description	11
	0.2.3. Part 3: Assessment of Opportunities and Threats	11
	0.2.3.1. Flora and Fauna	12
	0.2.3.1.1. Plants	12
	0.2.3.1.2. Insects	12
	0.2.3.1.3. Reptiles and amphibians	12
	0.2.3.1.4 Bats	13
	0.2.3.1.5. Birds	13
	0.2.3.2. Habitats	14
	0.2.3.2.1. Wetlands	14
	0.2.3.2.2. Terrestrial areas	15
	0.2.3.3. Historical and archaeological sites	15
	0.2.3.4. Field Roads	16
	0.2.3.5. Traditional Crafts	16
	0.2.3.6. Bush-medicine (or Ethnobotany)	16
	0.2.3.7. Local food production	16
	0.2.3.8. Small business development	16
	0.2.3.9. Native plants in landscaping	16
	0.2.3.10. Institutions	17
	0.2.3.10.1. The National Trust	17
	0.2.3.10.2. The Department of Environmental & Coastal Resources and the Coastal Re-	
	sources Management Project	17
	0.2.3.10.3. The Conservation Fund	17
	0.2.4. Part 4: The Plan	17
	0.2.4.1. Field Roads (Trails) and trips	18
	0.2.4.2. Hides/Blinds, viewing platforms, etc	18
	0.2.4.3. Publications	19
	0.2.4.3.1. Interpretation for field roads etc	19
	0.2.4.3.2. Birds	19
	0.2.4.3.3. Butterflies and other animals	19
	0.2.4.3.4. Plants	19
	0.2.4.4. Information Centres	19
	0.2.4.4.1. Middle Caicos Eco-centre	19
	0.2.4.4.2. Middle Caicos Eco-centre Native Plants Nursery	20
	0.2.4.4.3. Wade's Green	20
	0.2.4.4.4. Cheshire Hall	20
	0.2.4.4.5. Equipping and manning centres	20
	0.2.4.5. Training and Environmental Education	20
	0.2.4.6. Specific sites	21
4 v	Jersion 1.00 October 2002	

0.2.4.6.1. Conch Bar Caves	21
0.2.4.6.2. Other caves	21
0.2.4.6.3. Middle Caicos Woodland	21
0.2.4.6.4. Crossing Place Trail	22
0.2.4.6.5. Fish Ponds	22
0.2.4.6.6. Other ponds	22
0.2.4.6.7. Man o'War Bush	22
0.2.4.6.8. Flamingo Pond, North Caicos	23
0.2.4.6.9. Western woodlands, North Caicos	23
0.2.4.6.10. East Caicos	23
0.2.4.6.11. Extensions to the Ramsar site	23
0.2.4.6.12. Other sites of historic and cultural importance	24
0.2.4.6.13. Safeguarding the Ramsar site itself	24
0.2.4.7. Socio-economic aspects, Awareness and Marketing	25
0.2.4.7.1. Enhancement for local people and their employment	25
0.2.4.7.2. Small businesses	25
0.2.4.7.3. Tourism	25
0.2.4.7.4. Turks & Caicos National Trust: membership, awareness, imprint	25
0.2.4.7.4. Dissemination	25
0.2.4.7.6. Wetland awareness	26
0.2.4.8. Other aspects	26
0.2.4.8.1. Input to national plan (Sustainable Development Planning Initiative)	26
0.2.4.8.2. Enhancement for wildlife	27
0.2.4.9. Forward processes	27
0.2.4.9.1. Biological monitoring	27
0.2.4.9.1. Evaluation and revision procedures	27
0.2.4.9.3. Management	27
0.2.4.9.4. Implementing the Plan	28
Part 1. Introduction	29
1.1. Background	29
1.2. Meeting international responsibilities	30
1.3. The views of the local community	30
1.4. Formula for success	30
1.5. Objectives	31
1.6. Plan approach	31
1.7. Geographical coverage	32
1.8. Structure of this plan	32
Part 2. Description	34
2.1. Geography	34
2.1.1. Geology	34
2.1.2. Tides and Currents	37
2.1.3. Climate	37
2.1.4. Wetlands background	38
2.1.5. Map features and place names	39
2.1.6. General topography and walking conditions	39
2.2. Biodiversity description	40
2.2.1. Mapping and vegetation classification	40
2.2.2. Plants	43
2.2.3. Insects	46
2.2.3.1. The insect fauna of the Turks & Caicos Islands	47
2.2.3.2. The butterflies of the Turks & Caicos Islands	48
2.2.3.3. A preliminary checklist of the butterflies of the Turks & Caicos Islands	49

2.2.3.4. Ecological groupings of Turks & Caicos butterflies	51
2.2.3.5. The beetles (Coleoptera) of the Turks & Caicos Islands	51
2.2.3.6. Other insects of the Turks & Caicos Islands	53
2.2.4. Reptiles and Amphibians	54
2.2.4. 1. Amphibians	54
2.2.4. 1.1. Frogs	54
2.2.4. 2. Reptiles	54
2.2.4. 2.1. Lizards	54
2.2.4. 2.2. Snakes	55
2.2.4.2.3. Turtles	56
2.2.4.3. Habitat usage by herpetiles	56
2.2.4. 4. Threats to herpetiles	56
2.2.5. Bats	57
2.2.5.1. Introduction and background	57
2.2.5.2. Historical review of bats of TCI and findings of 2001 study	57
2.2.5.2.1. Family Phyllostomidae (spear-nosed bats)	58
2.2.5.2.2. Family Natalidae (funnel-eared bats)	59
2.2.5.2.3. Family Vespertilionidae (vesper or plain-nosed bats)	59
2.2.5.2.4. Molossidae (free-tailed bats)	60
2.2.5.2.5. Summary of known bat fauna	60
2.2.5.3. 2001 survey	60
2.2.5.3.1. Caves	60
2.2.5.3.2. Buildings	62
2.2.5.3.3. Bat detector survey	62
2.2.5.3.4. Mist-netting	63
2.2.5.3.5. Talking to people	63
2.2.5.3.6. Data from bats found	63
2.2.5.3.7. Other observations	64
2.2.5.3.8. Recordings of bat sounds	64
2.2.5.3.9. Training	64
2.2.5.3.10 Additional information	65
2.2.6 Birds	66
Part 3. Assessment of Opportunities and Threats	77
3.1. Confirmation of important features of biodiversity	77
3.1.1. Plants	77
3.1.2. Insects	78
3.1.2.1. Endemicity amongt Turks & Caicos Islands butterflies	78
3.1.3. Reptiles and Amphibians	79
3.1.4. Bats	80
3.1.5. Birds	80
3.1.6. Ecosystems	81
3.1.6.1. Wetlands	82
3.1.6.2. Terrestrial areas	83
3.1.6.3. Marine areas	83
3.2. Related opportunities and threats	85
3.2.1. Historical and archaeological sites	85
3.2.2. Visitor sites and interest	85
3.2.3. Protected and other important sites	85
3.2.4. Built development activities	87
3.2.5. Visitor centre	87
3.2.6. Local communities	87
3.2.7. Field-roads	88

3.2.8. Traditional crafts	. 88
3.2.9. Bush-medecine (or Ethnobotany)	. 89
3.2.10. Local food production	. 90
3.2.11. Education and school relations	. 91
3.2.12. Small business workshops	. 91
3.2.13. Native plants	. 92
3.2.14. Turks & Caicos National Trust (TCNT)	. 92
3.2.15. Specialist expertise	. 94
3.2.16. Department of Environmental & Coastal Resources and the Coastal Resources Managen	nent
Project	. 94
3.2.17. Conservation Fund	. 94
3.2.17.1. Some specific experiences	. 95
3.2.17.2. Applying this to TCI	. 96
3.3. Conclusions	. 98
Part 4. Prescription: Management Plan proper	101
4.1. Introduction	101
4.2. Field-roads (Trails) and Hides/Blinds	101
4.2.1. Background	101
4.2.2. Overview (including integration, funding, guides, stakeholders)	101
4.2.3. Field Roads	102
4.2.3.1. Introduction	102
4.2.3.2. Crossing Place Trail	102
4.2.3.3. Haulover Plantation Field-road	107
4.2.3.4. Nanny Pond Field-road	107
4.2.3.5. Field-road from Lorimers to Big Pond, Middle Caicos	108
4.2.3.6. Increase Road	109
4.2.3.7. Armstrong Pond Field-road	109
4.2.3.8. Duck Pond Field-road	110
4.2.3.9. Washing Pond and Corry Pond Field-road	110
4.2.3.10. Old (sometimes "King") Road, Middle Caicos	111
4.2.3.11. Short field-roads in Bambarra – Flamingo Pond area	112
4.2.3.12. Buttonwood Pond Field-road	112
4.2.3.13. Boat trip to East Caicos	113
4.2.3.14. Boat trip to Man o'War Bush and Ocean Hole	113
4.2.3.15. Cottage Pond, North Caicos	113
4.2.3.16. Wade's Green, North Caicos	113
4.2.3.17. North Caicos Dump Field-road	114
4.2.3.18. Flamingo Pond, North Caicos	114
4.2.3.19. Pineyards Field-road, North Caicos	114
4.2.4. Hides (blinds), platforms and shelters	114
4.2.4.1. Introduction	114
4.2.4.2. Flamingo Pond, Middle Caicos	117
4.2.4.3. Kitty Pond, Middle Caicos	117
4.2.4.4. Village Pond in Conch Bar, Middle Caicos	118
4.2.4.5. Fish Ponds, Middle Caicos	118
4.2.4.6. Montpeller Pond, Middle Caicos	118
4.2.4.7. Turnup Pond	118
4.2.4.8. Washing Pond, Middle Caicos	118
4.2.4.9. Duck Pond, Middle Caicos	118
4.2.4.10. Nanny Pond, Middle Caicos	118
4.2.4.11. Big Pond, Middle Caicos	118
4.2.4.12. Cottage Pond, North Caicos	119
Plan for Biodiversity Management and Sustainable Development around the Turks and Caicos Ramsar Site	7

4.2.4.13. Wade's Green, North Caicos	119
4.2.4.14. Flamingo Pond, North Caicos	119
4.2.4.15. Other locations, North Caicos	119
4.2.5. Publications	119
4.2.5.1. Interpretation for field roads etc	119
4.2.5.2. Identification and awareness-raising	120
4.2.5.2.1. Birds	120
4.2.5.2.2. Butterflies, Mammals, Reptiles & Amphibians	120
4.2.5.2.3. Plants	120
4.3. Information centres	120
4.3.1. Bambarra environmental centre	120
4.3.1.1. Renovation	120
4.3.1.2. Exhibits	121
4.3.1.3. Native plant nursery	121
4.3.2. Wade's Green	123
4.3.2.1 Assets	123
4.3.2.2 Problems	124
4.4.2.3 The Future	125
4.3.3. Cheshire Hall	126
4.3.4. Equipping and manning centres	126
4.3.5. Craft sales	126
4.3.6. Reference collections	127
4.3.7. Educational facility	127
4.4. Training and Environmental Education	127
4.4.1. Staff	127
4.4.2. Guides	127
4.4.3. Environmental education	127
4.4.4. Local communities	128
4.5. Management Considerations for important sites	128
4.5.1. Introduction	128
4.5.2. Conch Bar Caves Protected Area	129
4.5.2.1. The CBCPA Management Plan: summary	129
4.5.2.2. Background	129
4.5.2.3. Oversight of Management Plan for CBCPA	130
4.5.2.4. Cave access arrangements	131
4.5.2.5. Tour Guides for the caves	131
4.5.2.6. Research in the caves	132
4.5.2.7. Management for bats of habitat surrounding the caves	132
4.5.2.8. Management, viewing and access arrangements for surface parts of the protected ar	rea
	132
4.5.2.9. Interpretative material	134
4.5.2.10. Monitoring	134
4.5.2.11. Charges	135
4.5.2.12. Conservation work	135
4.5.2.13. Revision of CBCPA Management Plan	136
4.5.2.14. Annex I. Map of Conch Bar Caves Protected Area; and Annex 2. Map of Caves .	136
4.5.2.15. Annex 3 Health and Safety Regulations	136
4.5.2.16. Annex 4. Conservation Code of Practice	139
4.5.3. Indian Cave	139
4.5.4. Other Middle Caicos Caves	140
4.5.5. East Calcos Caves	140
4.5.0. North Calcos Caves	140

4.5.7. Middle Caicos woodland	141
4.5.8. Crossing Place Trail	142
4.5.9. Fish Ponds	143
4.5.10. Other Ponds	143
4.5.11. Man o'War Bush	144
4.5.12. Flamingo Pond, North Caicos	144
4.5.13. Western woodlands. North Caicos	144
4.5.14. Extensions to the Ramsar site	144
4.5.15. Other historical sites and locations of traditional cultural uses of natural resources	146
4.5.16. Safeguarding of the Ramsar site itself	146
4.6. Socio-economic aspects, Awareness and Marketing	148
4.6.1. Enhancement for local people and their employment	148
4.6.2. Small businesses	148
4.6.3. Tourism	149
4.6.4. Turks & Caicos National Trust: membership, awareness, imprint	149
4.6.5. Dissemination	149
4.6.6. Wetland awareness	150
4.7. Other aspects	150
4.7.1. Input to national plan (Sustainable Development Planning Initiative)	150
4.7.1.1 Unprotected important heritage areas	151
4.7.1.2 North Caicos	151
4.7.1.3 East Caicos	151
4.7.1.4 Middle Caicos	155
4.7.2. Enhancement for wildlife	156
4.7.3. Biodiversity databases	157
4.8. Forward processes	157
4.8.1. Further studies	157
4.8.1.1. Bats and other mammals	157
4.8.2. Biological monitoring	159
4.8.2.1. Bats	159
4.8.2.2. Birds	159
4.8.3. Evaluation and revision procedures	159
4.8.4. Management	160
4.8.5. Partnerships	162
Appendix 1. References	. 163
Appendix 2: Environmental Charter agreed between Turks & Caicos Islands and the United I	King-
dom	. 166
Appendix 3: Ramsar Convention	. 174
Wetlands	174
The Convention	175
Guidelines for Ramsar site selection	178
The Ramsar concept of "wise use"	179
Application in TCI	180
Appendix 4: Turks & Caicos National Trust	. 195
Appendix 5: Logical framework for next stages of work	. 198
Appendix 6: Statutory protected areas in Turks & Caicos	. 212
Appendix 7: Consultations and Recruitment for the project on Biodiversity management and s	sus-
tainable development around Turks & Caicos Ramsar site [centred on Middle Caicos]	. 213
Appendix 8: Extract from the National Parks Ordinance and subsidiary legislation, noting pro	tected
areas only within the plan area	. 217

0.2. Summary

Plan for Biodiversity Management and Sustainable Development around Turks & Caicos Ramsar Site

0.2.1. Part 1: Introduction

0.2.1.1. Background

The Turks & Caicos Islands are rich in environmental and historic treasures on which a thriving tourism business is being built, but we must find a way to continue to build the industry without destroying the resources on which it is based. This plan, which covers the Ramsar Comvention Wetland of International Importance in North, Middle and East Caicos with adjacent areas, lays out the means to develop an appropriate-scale eco-tourism industry which will preserve both the environmental resources and the human communities which have lived there for the last two centuries.

This plan results from a joint project between the local communities, the Turks and Caicos National Trust, the UK Overseas Territories Conservation Forum, and one of the Forum's member organisations, CABI Bioscience. The work was carried out under a Memorandum of Understanding with the Turks and Caicos Islands Government, and with financial support from UK Government and others.

The purpose is to provide means by which the internationally important biodiversity and cultural heritage of the Caicos Islands can be treasured by local people and experienced by visitors, without damage. The plan works through wide-ranging co-operative action with the local people, local Government and other institutional stakeholders, and deploys biodiversity and other heritage information for the long-term benefit of the Islands and their inhabitants. This will enable the local people to protect the area by generating sustainable usage involving eco-tourism-based activities, as well as education. This will be accomplished through (1) this shared, regularly reviewed management plan; (2) trained local personnel working as wardens, guides and educators; and (3) integrated programmes to develop tourism resources such as trails, hides, an eco-centre, displays, courses, booklets etc.

Implementation of this plan would fulfil many of the UK & TCI Government commitments under the Ramsar



Convention, the Convention on Biological Diversity and the Environmental Charter.

The wishes of the local community have been sought and integrated throughout the development of this plan; this will continue in the implementation phase. The central theme which came out in every community meeting was sustainable management and the conservation of environmental resources in a way that enhances the lives of the people

living there, and that is what implementation of this plan will achieve.

0.2.1.2. Objectives

To provide a practicable means to conserve the rich biodiversity and cultural integrity of the Caicos Islands, including the Ramsar Wetland of International Importance, through enabling the local people to protect the area by generating sustainable usage involving eco-tourism-based activities, as well as educating both visitors and the next generation of citizens.

More specifically:

1. To provide a means by which the rich biodiversity and cultural heritage of the area can be treasured by local people and experienced by visitors without damage to these internationally important ecosystems

2. To facilitate the development of the capacity of local people to establish small businesses based on eco-tourism and traditional crafts, so as both to provide the economic incentive for item 1 above and employment for local people so that they no longer need to leave the islands to find work, thereby maintaining the communities and cultural integrity.

3. To provide means of coordinating the work, educating local children (and where appropriate adults) and visitors and integrating the work into the National Physical Plan and the implementation of the Environmental Charter.

4. To use this experimental approach to provide an example to the widely spread small island communities which are searching for ways of maintaining biodiversity and local culture while generating an income so that these can be maintained rather than surrendering to intensive development models imposed and driven by external investment replacing local culture and control by North American/European systems.

0.2.1.3. Structure of this plan

The plan is divided into four main parts: (1) an introduction; (2) a detailed description of what the site contains in terms of flora, fauna, geology, etc, which will serve as a baseline against which to measure change in future; (3) an assessment of the most significant elements of the site and the features which provide opportunities for meeting the plan's objectives; and (4) the actual management plan which lays out all the activities and projects which will be employed in managing this site.

0.2.2. Part 2: Description

This summary will not cover section 2, as it is largely a compilation of the scientific research, and the key findings are covered in the summary of Part 3, below. Part 2 summarises the main results of the Darwin Initiative project studies, together with a collation of relevant material from other sources. This serves to describe the main features of the area, as a basis for later parts, which analyse the work needed. Analysis of much of the Darwin Initiative material continues, and future editions of the Plan will incorporate this and other material as it becomes available.

An accurate map showing the distribution of different habitats and ecosystems within a site is fundamental to effective management planning. The Darwin Initiative project produced such a map for the Turks & Caicos Islands Darwin Project, and this is used throughout the Plan. The starting point was a satellite image, which was classified and ground-truthed. Roads, trails and boundaries were added subsequently.

0.2.3. Part 3: Assessment of Opportunities and Threats

The plan lists sites, cultural features, certain flora and fauna within the plan area which provide opportunities for meeting the plan's objectives:

0.2.3.1. Flora and Fauna

0.2.3.1.1. Plants

Processing of the plant material collected under the Darwin Initiative project continues, and the botanical data compiled to date cannot be regarded as comprehensive. However, even on the basis of the specimens and observations collected thus far, a number of priorities for sensitive conservation management are becoming apparent. A

number of individual species recorded by the Darwin Initiative study (or reported elsewhere as occurring in the Turks & Caicos) are worthy of particular attention. For example, the status of the palm *Pseudophoenix sargentii* should be evaluated and studied; this has been recorded in cultivation, but if an indigenous population could be located, this would be important in conservation terms. The orchid *Encyclia caicensis* is also notable, as an apparent Turks & Caicos endemic; biosystematic work is required to clarify the taxonomic status of this species. As well as species-level interest, the habitats of the Turks & Caicos are also of conservation importance in botanical terms. The presence of disjunct pineland of *Pinus caribea* var. *bahamensis* (Griseb.) is notable; the Gallery forest adjacent to Wade's Green Plantation (North Caicos) is also a botanically interesting area, worthy of further investigation; and the limited fresh water habitats support locally rare botanical communities, the value of which should be recognised in conservation planning.

0.2.3.1.2. Insects

At present, we have more information on butterflies than any other insects. There are four butterflies, subspecies of which are endemic to the TCI and Southern Bahamas: the Turk Island Leaf Butterfly Memphis intermedia intermedia, Chamberlain's sulphur Eurema chamberlaini mariguanae, Tho-

mas' Blue *Cyclargus thomasi clenchi*, the Dusky Swallowtail *Heraclides aristodemus bjorndalae*. In addition, a skipper *Wallengrenia* sp. may also show this limited pattern of distribution. Most importantly, a subspecies of Drury's Hairstreak *Strymon acis leucosticha* (pictured), is found in the TCI only. Preservation of endemic species is a high conservation priority, and the area in Middle Caicos between Conch Bar Village and the northern shore has been identified as important habitat for this endemic butterfly, giving that area higher conservation value than previously understood.

0.2.3.1.3. Reptiles and amphibians

The Turks & Caicos appear to support no indigenous amphibians, but reptile surveys indicate that the Islands



Trope Boa *Tropidophis greenwayi*) and four endemic species of lizard (Curly Tail *Leiocephalus psammodromus*, Caicos Islands Reef Gecko *Sphaerodactylus caicosensis*, pygmy gecko *Sphaerodactylus underwoodi* and the gecko *Aristelliger hechti*). The last of these was thought to be extinct until it was rediscovered by the Darwin Initiative project. In addition, three further lizards (Turks & Caicos Bark Anole *Anolis scriptus scriptus*, Turks & Caicos Rock Iguana *Cyclura carinata carinata* and Mabuya Skink *Mabouya mabuya sloanei*) and one snake (Bahaman Rainbow Boa *Epicrates chrysogaster chrysogaster*) represent Turks & Caicos endemic sub-

support one endemic species of snake (Caicos Islands



species. Certain reptiles, whilst not confined to the Turks & Caicos, are very narrowly distributed. For example, the only subspecies of *Cyclura carinata* found outside the Turks & Caicos Islands is confined to the small island of Booby Cay off nearby Mayaguana, and *Sphaerodactylus mariguanae* is also restricted to Mayaguana and the Turks & Caicos. A number of Turks & Caicos reptiles are protected, or have recognised conservation status, internationally. Reptiles occur throughout the scrub habitats of the Islands, but moist microsites within these areas are particularly important for these animals.

0.2.3.1.4 Bats

Four species were found in caves (one of them also occurs in small rock shelters and houses). Of these, the Big-eared Bat *Macrotus waterhousii* feeds on large insects, such as

cockroaches and katydids and even the giant Erebus moth; the bat lives singly or in small groups near the entrance to the caves or in disused houses. The Buffy Flower Bat Erophylla sezekorni and Leach's Long-tongued Bat Monophyllus redmani form larger groups deeper into the cave, and both have long noses and tongues to feed on nectar from flowers; both species will also eat pollen and some insects. The fourth cave species, the Cuban Fruit-eating Bat Brachyphylla nana feeds mainly on fruit. The latter three species are all endemic to the Caribbean and are probably very important for the pollination and seed dispersal of many plants. The fruit-eating bat has quite a restricted range and the large colony on Middle Caicos marks the northern limit of its distribution. These bats have been recorded in TCI before, but a fifth species (initially heard on a bat detector, and finally trapped with a mist-net) proved to be a new record for the islands: the Red Bat Lasiurus borealis. This species feeds on small insects. Four further species have been recorded from TCI, two from fossil material, and two from Providenciales (a widespread species seen there in the 1970s, and a single record of a wellknown North American migrant).



0.2.3.1.5. Birds

The area covered by this plan is vitally important to a wide variety of both native and migrant birds. It has long been known that the wetlands are extremely important for the continued survival of several migrant and native species.



Birds move around more freely than most animals. It is often thought that they can go somewhere else if something goes wrong with their habitat in a particular place. However, recent ecological studies indicate that bird populations survive only because the birds have a network of habitats available to them – none of these is surplus to their requirements. Fieldwork on wetland birds before and during the Darwin Project has shown that the TCI study area is very important to waterbirds and that usage is very variable. This variability is seasonal and year-to-year, and probably relates largely to weather conditions. It is important that human intervention does not make things yet more complicated. West Indian species of waterfowl (ducks, flamingos, herons, and shorebirds) are also losing habitat as tourism-related development expands in the region. Among species of particular concern that are found in the Turks and Caicos are the Reddish Egret, West Indian Whistling Duck and American Flamingo. Recent study shows that the dry woodlands are far more important to both native and migratory birds than previously known (including the provision of wintering grounds for one of the rarest song-birds breeding in USA); they should be accorded much higher conservation priority.

0.2.3.2. Habitats

0.2.3.2.1. Wetlands

The habitats of TCI have especially great value because in many cases they are as close to the natural state as any to be found on similar island systems in the American tropics. Within the wetlands, coastal mangroves are now recognised as one of the most productive systems in the world, providing rich nursery grounds for many commercial species. The important local fisheries for conch, lobster and bonefish depend on organic food material produced in mangrove areas. Mangrove swamps and salt-ponds also serve to reduce flooding and trap sediments which would otherwise enter the coastal waters during heavy rainfall, and smother corals and seagrass beds that depend on clear water. Mangroves also serve to protect coastlines against erosion especially during heavy storms.

Freshwater formations make up 10% of the wetlands on the islands and represent the watershed system of the Turks and Caicos Islands. They thus form a vital resource which, if degraded, affects every sphere of land use, especially in this dry climate. Pollution or depletion of the watershed can affect agriculture and water supplies linked through the porous limestone rock, and can eventually affect offshore marine habitats such as coral reefs.



In addition, the areas already given protection, the wetland areas covered by this plan which are of the highest conservation priority under the Ramsar Convention are:

- o Nanny Pond & Trail
- o Long Bay, Middle Caicos

- o The creeks and flats at Lorimers and Increase, Middle Caicos
- o Duck Pond, Middle Caicos
- o Turnup & Montpeller Ponds, Middle Caicos
- o Joe Grant's Cay and the adjacent channels
- English Pond, Middle Caicos
- o Jack Pond, Middle Caicos
- o East Caicos flats and marshes
- o Fish Ponds/ Blowing Hole / Juniper Hole, Middle Caicos
- East Caicos ponds
- Small cays for iguanas etc
- The reef off the north & east shore of East Caicos
- o The reef off the north shore of Middle Caicos
- o East Caicos caves

0.2.3.2.2. Terrestrial areas

Whilst the importance of the wetlands is increasingly well known, the terrestrial areas had not previously been surveyed systematically. Some key terrestrial areas (for reasons indicated later) are:

- Woodland and scrub areas between Lorimers and Bambarra
- Crossing Place Trail west of Conch Bar, Middle Caicos
- North-western woodlands, North Caicos



0.2.3.3. Historical and archaeological sites

Long-term archaeological work has been carried out on the Arawak sites within the area. A site (MC6, or *Ia góra*), within the Ramsar site on the south side of Middle Caicos, is considered to have been a major regional centre of pre-Columbian society, as were the caves on both Middle and East Caicos. Several other Lucayan settlement sites on the north shore of Middle Caicos have also been excavated, with important finds.

The Trust and the National Museum have both worked on the historic plantations, and this material will also be incorporated in trails and displays. Some of the more important plantation features include:

- o Wades Green, North Caicos
- o Haulover Plantation Ruins and Field, Middle Caicos
- o Dustry Plantation Ruins, Middle Caicos
- o Dr John Lorimers tomb & surrounds, Middle Caicos
- o Jacksonville ruins, East Caicos

All of these sites are both important elements of the TCI national heritage and potentially valuable educational and eco-tourism resources for which this plan proposes various uses.

0.2.3.4. Field Roads

These are the traditional paths across the islands, most of which have fallen into disuse in the last few years, subsequently becoming overgrown and impassable. Because they link interesting places, through valuable habitat, which allows demonstration of wildlife, culturally important plants, and historic features, these field-roads are potentially valuable bases for interpreted and guided trails.

0.2.3.5. Traditional Crafts

One of the most positive aspects of the traditional crafts of the Turks and Caicos Islands is that the undertaking of the majority of them are sustainable practices. "Straw" craft products, made of fanner grass and palmetto fronds are especially important, and both materials are traditionally collected in a sustainable manner. Local materials are also used in potentially important craft areas such as building Caicos sloops. These crafts, if done in the traditional sustainable manner, have great potential for income to the residents of these islands.

0.2.3.6. Bush-medicine (or Ethnobotany)

Many plants which occur in the study area have medicinal uses, and given that 80% of the world's medicines are plant-derived, the study of traditional "bush medicine" is highly relevant today.

0.2.3.7. Local food production



Middle and North Caicos were once intensively farmed, but that has largely stopped. The farming operations at the prison in Grand Turk have provided fresh and wholesome food for that island, and an increase in farming activity in the study area would provide similar benefits. The land, when treated appropriately, can yield a great deal. Fishing continues to be of great importance to the local diet and economy. Good conservation practices on land and in the wetlands are essential to the health of the local fisheries.

0.2.3.8. Small business development

A recent TCI Government-commissioned study of poverty highlights the urgent needs of these islands. The Trust and the TCI Government are working to address these needs. The Trust, with part funding from CANARI Caribbean Natural Resources Institute, has been conducting a series of well-received small business workshops in Middle Caicos. The TCI Government's agency TCInvest has established, with UNDP assistance, projects on the Development of Small-scale Enterprises for Income and employment Creation, and The Small Enterprise Development Centre. There is close contact between the Trust and TCInvest, and this integrated approach will be developed further in this project.

0.2.3.9. Native plants in landscaping

The TCI Government is concerned about the disappearing scrub forest, and wishes to work with the Trust and other botanical authorities to draw up guidelines for the replacement of native vegetation on sites cleared for development. Currently, native plants are used by some of the landscapers because they are adapted to the climate: they need little or no irrigation; they do not interrupt the low profile of the scrub forest; and they have countless benefits to the native fauna. Unfortunately, the majority of the "native" species sold and used here are imported from South Florida, where the native plant industry is thriving. This, of course, creates the problem of the inadvertent introduction of non-native animals and possibly harmful weed species. Foreign snails, lizards, amphibians, and insects have been introduced to the islands in this manner.

The Trust could use its already established native plant nursery to train interested people in native plant propagation,

which would create opportunities for agricultural professions. The Trust is also working towards labelling plant specimens at its sites so that visiting residents can make selections of native plants for their own properties based on what they see in these settings.

0.2.3.10. Institutions

0.2.3.10.1. The National Trust

The Trust was created by ordinance in 1992, and given special powers to enable it to carry out conservation of TCI's historic and environmental heritage. The Trust Ordinance enables the Trust to own conservation properties and make them inalienable, so that they will be protected and held in trust for the people of the TCI forever. It also gives the protection of the criminal law to all Trust properties. These special powers make the Trust an ideal organisation to manage conservation lands, and its partnership with the Forum gives it an international resource base on which to draw.

0.2.3.10.2. The Department of Environmental & Coastal Resources and the Coastal Resources Management Project



The Department of Environmental & Coastal Resources (DECR), within the Ministry of Natural Resources, is the TCI Government Department responsible for nature conservation, fisheries and related matters. Limited resources had prevented much progress on the management of protected areas by official bodies. Because of this, UK's Department for International Development (DFID) have funded for several years a project (CRMP) with TCI Government to develop and implement management plans for three of TCI's marine National Parks, in the seas adjacent to Providenciales and West Caicos, as well as building an environment centre on Providenciales and funding some interpretative work. (In TCI usage, National Parks implies a strong element of recreational activity in the protected area.) With the ending of the project, CRMP is developing into a protected areas department within DECR. It is to be hoped that this official protected areas service will be able successfully to implement these three plans and extend to other TCI marine national parks and some other protected areas.

This work is complementary to TCNT's expertise in terrestrial and wetland conservation, and the management of nature reserves and historic sites. There is considerable potential for collaboration and sharing of the major needs for conservation work in TCI.

0.2.3.10.3. The Conservation Fund

The TCI benefits from having a newly established Conservation Fund, funded by a 1% addition to the existing 8% tax on visitors, charged mainly on accommodation and meals. This Fund provides a mechanism for ongoing funding for management of protected areas. The ways of implementing these intentions are still being developed, and it is crucial that, as guidelines for the uses of this fund are developed, it be used to protect the most critically important environmental and historic resources of the TCI. Access to this fund for carrying out elements of this management plan is essential.

0.2.4. Part 4: The Plan

This plan is a work-in-progress, and should continue to be so for the duration of the management programme. It details in specific terms the elements that could be developed to allow access to these areas while affording protection to the environment.

Several factors need to be taken into account in developing a system of facilities for experiencing the heritage of the Caicos Islands. These include:

- The development of the system should be modular, so that some elements can become fully operational at an early stage.
- Even though modular, the scheme should fit a wider plan, so that the various elements will be integrated at later stages when more are in place.
- o Trails and hides should cover a range of ecosystems and other interests.
- Wherever possible, historical and cultural features should be included as well as biological ones.
- Trails should incorporate a range of distances and challenges.
- Throughout, damage to the biological, historic and cultural heritage should be avoided. Indeed, the object is to conserve these.
- Usage should be monitored.
- Schemes to generate income should be implemented as early as possible, so as to support maintenance of existing facilities and the addition of more modules (following the example of TCNT's successful Little Water Cay trails).
- Wherever possible, facilities should be related to Information Centres or other TCNT facilities, so as to enhance interpretation, aid supervision and provide a range of opportunities for visitors.

0.2.4.1. Field Roads (Trails) and trips

The plan identifies the following trails, boat trips, and other sites which have potential for visitors, describes each and details the work needed to make each usable or to improve usage:

- Crossing Place Trail (Middle Caicos)
- Haulover Plantation Field Road (Middle Caicos)
- Nanny Pond Field Road (Middle Caicos)
- Field Road from Lorimers to Big Pond (Middle Caicos)
- o Increase Road (Middle Caicos)
- Armstrong Pond Field Road (Middle Caicos)
- Duck Pond Field Road (Middle Caicos)
- Washing Pond and Corry Pond Field Road (Middle Caicos)
- Old Road (sometimes called King Road) (Middle Caicos)
- Short field roads in Bambarra/Flamingo Pond area (Middle Caicos)
- o Buttonwood Pond Field Road (Middle Caicos)
- o Boat trip to East Caicos
- o Boat trip to Man o' War Bush and Ocean Hole
- Cottage Pond (North Caicos)
- Wade's Green (North Caicos)
- o North Caicos Dump Field Road (North Caicos)
- o Flamingo Pond (North Caicos)
- o Pineyards Field Road (North Caicos)

0.2.4.2. Hides/Blinds, viewing platforms, etc

The plan details how such facilities are used and built, what considerations guide the choice of facilities and locations, and the benefits to both visitors and the environment of such facilities. It describes fourteen sites at which such facilities could be used and the conditions and concerns of each. Although priorities have not been decided, the current stage of knowledge and of related interpretative developments suggest that the following might be the most appropriate priorities in the short-term:



- Hides at Village Pond, Nanny Pond, Turnup Pond and, if trails are developed, at Duck Pond and Corry Pond;
- o Platform at Flamingo Pond, Middle Caicos;
- Repairs and interpretation at shelters at Flamingo Pond, North Caicos.

0.2.4.3. Publications

A variety of publications have been created, are in process or should be considered to help visitors understand the environment that they are experiencing:

0.2.4.3.1. Interpretation for field roads etc

It is planned to develop and implement a programme of integrated leaflets, signs and displays matched to the opening of each trail or facility.

It is envisaged that signage for field-roads will normally consist of a prominent entrance sign with logo(s), together with numbered feature posts. This will minimise costs and intrusion, while allowing changes to be made relatively easily and cost-effectively to the information content. It is anticipated that the guide leaflet to each field-road will serve as the ticket. The basic concept for format would be a single sheet printed on both sides, and incorporating sketch map, notes on numbered locations, illustrations and notes on the natural, historical and cultural features. Notes on mobile species likely to be seen will need to be worked into the text. It is planned that the sheet be laminated or be produced of a comparable standard.

0.2.4.3.2. Birds

The Darwin Initiative project was pleased to collaborate in the production of a major new book by Richard Ground, *The Birds of the Turks and Caicos Islands*, published by the Trust. It serves both to identify the birds and to make the reader aware of the beautiful habitat in which they are found.

In addition, Forum member organisation the RSPB is seeking funding for a series of plastic cards which would illustrate the birds a visitor is likely to see. The cards will be organised around the habitats, so the visitor would take the card on woodland birds down a woodland trail, and perhaps the card on shore birds for a boat trip.

0.2.4.3.3. Butterflies and other animals

The extensive research on butterflies carried out for this plan is in process of being turned into a small book. Dr. Oliver Cheesman is writing the book, and it will be illustrated by Richard Ground, who did the book on birds. One or more booklets on bats, reptiles and amphibians will probably follow.

0.2.4.3.4. Plants

We understand that Kathleen Wood has nearly completed a book to be published by Macmillan Press on the plants of these islands. It is expected to be comprehensive and authoritative, and will be of great use to visitors.

0.2.4.4. Information Centres

0.2.4.4.1. Middle Caicos Eco-centre

The TCI Government has donated the old school building at Bambarra, Middle Caicos, and its land to the Trust for the development of an eco-centre. Plans are at an early stage, but the plans include exhibits such as:

 o outdoor exhibits dealing with traditional farming, medicinal plants, heirloom crops, ornamental displays of native plants, heirloom livestock exhibits, traditional building techniques, and traditional outdoor cooking demonstrations.

- indoor exhibits with information about traditional crafts, showing the materials "from Bush to Basket" and the entire process of producing the fanner-grass and palmetto baskets and hats, animals and plants in ecosystems.
- a comprehensive trail map
- o display cases holding items of cultural, natural, and historical interest.
- a mangrove aquarium
- o a reptile exhibit

0.2.4.4.2. Middle Caicos Eco-centre Native Plants Nursery

The Turks and Caicos National Trust aims to encourage the use of native plants for landscaping ventures, while creating a locally produced stock of such plants for sale and distribution around the islands. The proposed native plant nursery is to be situated on the former Bambarra School grounds. The plan details the benefits of such a nursery and the costs of setting it up.

0.2.4.4.3. Wade's Green

Government is in the process of transferring this historic site, probably the most important plantation in the country, to the Trust. It is being developed as a premier eco-tourism resource and will complement the activities within the area covered by this plan. Initial work has been done on trails and ruins, and the current activity is the development of a working farm, to demonstrate the small-scale swidden agriculture used in the TCI, and to display an heirloom breed of fowl, introduced by the Loyalists.

0.2.4.4.4. Cheshire Hall

Whilst its development is not directly within the programme of work for North, Middle and East Caicos, the historic site of Cheshire Hall Plantation, Providenciales, relates closely to this conservation project because it will provide an important first point of contact in the major population and visitor island in TCI.

0.2.4.4.5. Equipping and manning centres

This will be phased, partly in accordance with the rate of fund-raising. The first phase will be the Bambarra Centre, for which partial funding has already been secured. The timing of the other two phases will be adjusted during the project. For each centre, an analysis will be made of user needs. The Bambarra Centre will probably house an office, basic accommodation for researchers, the national herbarium, the information database on biological resources in the islands, a visitor centre including displays, locally produced refreshments, gift shop promoting local craft products and native plants, and a base for trails and outdoor educational and visitor activities. Wades Green will provide a comparable centre for North Caicos with additional complementary specialisms.

0.2.4.5. Training and Environmental Education

Training will be organised for personnel recruited in a phased manner relating to resources available to implement those elements of the plan requiring staffing. This will involve identifying the nature and level of skills required, evaluating existing competencies of recruits, assessing training needed to reach required levels, and organising this. In addition, there is a need to identify training needs of existing local tour guides and develop in consultation with them integration of these into the system. A register of guides currently trained and approved for operating in each Trust facility should be maintained.



More general environmental education work will centre on expand-

ing the highly successful modular curriculum course in environmental education *Our Land, Our Sea, Our People*, developed by the Trust in consultation with the TCI Education Department. Subject to resourcing, this will be

developed further using the nature reserves as living class-rooms. Trust-managed sites will be made available as living class-rooms for school-children throughout Turks & Caicos. Junior conservation programmes will be developed for school-children to participate in conservation work in their communities. The potential for post-school education will be explored with the developing Community College curriculum.

Training will be provided for local people in skills needed to support this work, including trail-management, guide work, and the establishment and operation of small businesses compatible with, and supportive of, maintenance of the heritage and way of life. This will build on previous programmes run by the Trust and TCInvest, and collaboration will be explored further.

0.2.4.6. Specific sites

The plan lays out detailed management criteria for a few sites within the plan area:



0.2.4.6.2. Other caves

0.2.4.6.1. Conch Bar Caves

A complete management plan for Conch Bar Caves National Park has been developed which gives detailed guidelines for allowing access to the Caves while protecting the delicate geological features as well as the bat colonies. It entails limiting access to the caves only to people who are in the company of a trained, certified guide, making certain areas within the caves "off-limits". The plan details the physical improvements needed, and recommends that the designation be changed to Nature Reserve, and that it be transferred into conservation ownership to prevent any future development of the site.

The plan lays out in general terms the things to be taken into consideration for management of the other cave systems in the plan area, Indian Cave and other smaller systems in both Middle and East Caicos.

0.2.4.6.3. Middle Caicos Woodland

A major result of the 1999-2002 Darwin Initiative project has been the identification of the importance of some of the woodland and scrubland areas, especially between Lorimers and Bambarra. The importance of this has been somewhat undervalued in the past as conservation and other interest in the wildlife centred first on the coral reef areas and more recently also on the more terrestrial wetlands. Although the woodlands include many wetland habitats, little of it was included in the Ramsar site, nor indeed the other protected areas, many of which resulted from a survey of wetlands only. This group of habitats therefore remains under-represented in areas of statutory or other protection. Some aspects of the importance include:

- Vital wintering and migration habitat for some North American breeding populations, including one of the rarest song-birds breeding in North America
- Small pools with breeding records of the West Indian whistling duck, a vulnerable species, for which major conservation efforts are required internationally.
- Extremely high densities of characteristic local birds, some widespread but others found in no or few other places
- Important habitat for certain bats
- One of the most important habitats for reptiles.
- One of the areas in which re-establishment of woodland towards forest has moved furthest in places, so that there is a good range of scrub and woodland types represented.
- o Correspondingly wide range of invertebrate and plant species.

- o Additionally there are some important plantation ruins in this area.
- It is also an important area for plants still used for traditional purposes; this is important both for local people using these resources and for the potential interest to visitors.

This great importance and interest is reflected in the fact that several of the field-roads re-opened by the Trust for development of interpretative trails run through these areas. Many parts of this area are in private ownership, and it is recommended that the Trust enter negotiations with appropriate owners to ensure awareness of the value of these areas, their conservation, and appropriate access for visitors. Some parts of this area are in Crown ownership. It is recommended that suitable parts of this important area be transferred to conservation ownership and management as soon as possible.

0.2.4.6.4. Crossing Place Trail

Crossing Place Trail is the traditional route along the Caicos Islands, in particular the Middle Caicos section. As such, it is of great cultural importance. The trail is also of great scenic value, and along its route are important sites for wildlife, such as breeding tropic-birds and a range of herons and egrets in the western part, as well as an endemic butterfly.

The Trust, in conjunction with the local community, have re-established the trail, with a programme of signage, interpretation and publicity. Not surprisingly, this is rapidly becoming a major tourism feature for the islands. However, the site lacks effective protection. This needs to be put in place in order to ensure the conservation of this important natural and cultural heritage, and its availability as an essential resource in support of the developing eco-tourism economy. The plan follows the route of the Trail and details ownership, development and other problems, with recommendations that as much as possible of the trail be transferred to conservation ownership.

0.2.4.6.5. Fish Ponds

Fish Ponds comprise some of the most important wetlands in the area not included within the Ramsar site. The area is rich in fish and invertebrate life and provides habitat for a range of conservation-sensitive birds including herons, egrets (including reddish), terns, gulls, flamingos and shorebirds – in some cases and seasons in large numbers.

Recent construction has caused flow problems which are damaging the wildlife in Fish Ponds, and the plan offers a simple solution. Notwithstanding this problem, the Ponds retain high value, and would benefit from transfer to conservation ownership.

0.2.4.6.6. Other ponds

The plan lists all the ponds on Middle Caicos, notes than only a few of them have environmental protection, and makes recommendations for that.

0.2.4.6.7. Man o'War Bush

Man o'War Bush is a mangrove bush on Caicos Bank a few metres off the southern peninsula of mangroves on Middle Caicos. It is within the Ramsar site and is an important and well-known breeding colony for magnificent frigatebirds. Visits are made by boats owned by local boatman/guides. No harm has been identified from these visits, but it would be sensible to monitor bird numbers, especially if human visits increase, and consider a minimum limit on approach distance.



0.2.4.6.8. Flamingo Pond, North Caicos

Flamingo Pond of North Caicos is a very large pond complex forming part of the Ramsar site. It is well known for its flamingo flock and is important also for other waterfowl. Local residents have drawn attention to their concerns about certain problems including low aircraft approaches and some shooting activity. They considered that the presence of a warden would improve the situation considerably, and this is planned in the current proposals from the Trust when funds allow.

0.2.4.6.9. Western woodlands, North Caicos

There is increasing evidence that the woodland in the general vicinity of Wades Green and other parts of northwestern North Caicos may be of particular importance to rare and vulnerable species of a wide range of taxa. Further investigation is needed, and has commenced. This has shown that this area hold the best example of tall dry tropical forest.

0.2.4.6.10. East Caicos

The East Caicos/Middle Caicos/North Caicos wetland forms probably the best example of its type in the Caribbean and also perhaps the most natural wetland amongst the 160+ wetlands listed under the Ramsar Convention by the UK Government. A core unspoilt area is East Caicos. This is a superb complex of natural coral reefs, tidal flats, mangroves and marshlands which provide a haven for wildlife, as well as the natural basis of the fisheries and tourism industries. It is clear to us that the whole of this uninhabited island should be included in the Ramsar site.

However, there is currently a proposal for one of the largest cruise-liner ports in the world, able to take 660 cruise liner visits and 1.6 million tourists a year. This would take most of the uninhabited island of East Caicos, including its many natural lakes and marshes, as well as potentially having major effects on the Ramsar site, the coral reefs and the fisheries. The scheme, backed by a Canadian property developer, would lead to nearly half of the island being turned into docks, roads, leisure centres, shops, golf courses, hotels and luxury flats for wealthy North American and European visitors. An eight-mile main road and bridge would link East Caicos with South Caicos. This would bring in low-paid staff and workers to the port and complex, most of them from Haiti and the Dominican Republic, as the number of workers required would equate to about half of TCI's existing population. Visitors could outnumber the local population in TCI.

The importance of East Caicos as the most unspoilt wetland complex in the region seems to be completely undervalued. This has huge potential for the future development of TCI by local people but would become impossible if the massive port and real estate development proceeded. For the last few years, this has been prevented by the inability of the developer to secure investment funds in this risky venture.

0.2.4.6.11. Extensions to the Ramsar site

The original report which proposed the Ramsar site based its approach on the inclusion of representative samples of a range of wetland habitat types. Since that time, a strong emphasis has developed on protection of functional units, particularly where the wetland is in a natural or near-natural state. It has also been recognised that tropical wetland types, particularly coral systems, mangrove systems and sea-grass beds, are severely under-represented and should have the highest conservation priority.

With this in mind, we recommend extending the boundaries of the Ramsar site. Ideally all of East Caicos would be included (see 0.1.4.6.10 above). Additionally, we recommend adding:

- o The area of East Caicos south of the development area
- o Joe Grant's Cay, Long Bay beach, and the adjacent channels and reef
- The Creeks and flats at Lorimers and Increase
- The reefs off the north shores of East Caicos and Middle Caicos.

Protection of these areas would be of major importance for several reasons, including:

- Nesting beaches for turtles, threatened species, particularly important because most other turtle beaches in TCI are now developed or have proposals for developments.
- Reef areas, which are surprisingly under-represented within the Ramsar site and also under-represented in Ramsar sites across the world.
- Undeveloped beach areas are rapidly disappearing from TCI.
- Creek complexes across the bank through the islands are not well represented.

0.2.4.6.12. Other sites of historic and cultural importance

A survey of other historical sites is required. Some of those noted as of potential importance include: Increase Plantation, Dustry Plantation, School House in Lorimers, Dr John Lorimer's tomb on Middle Caicos, and on East Caicos, the former cotton and sisal plantation, Jacksonville.

The Trust's network of volunteers, combined with TC National Museum personnel and high-school students, could be organised to survey the historical and cultural resource, to identify further sites, buildings, historic trails, fields and artefacts. Initial work has established basic information on a number of sites, and more detailed research is in progress on selected ones.

0.2.4.6.13. Safeguarding the Ramsar site itself

This wetland complex is probably the most natural such area in the Caribbean – an asset of tremendous potential to TCI which is largely unappreciated. As outlined in this plan, there would be great potential benefits in raising awareness of this site, including employment and economic benefits to the local population. However, introducing substantial visiting to the Ramsar site for the first time could also introduce the risks of damaging the fragile ecology of the site as well as the communities of Middle and North Caicos. For this reason, it is strongly recommended that the National Trust continue to take the lead, in conjunction with the local communities, in developing the tourism opportunities relating to the Ramsar site. This would ensure a measure of control, so that the priority remains conservation and that tourism is supportive of that – rather than the reverse.

Much of TCI is Crown land, and there is great cause for concern about the rate is it being allocated to commercial development. Of particular concern is the fact that sites which are meant to be protected are not: in some cases statutory Nature Reserves have been approved for development in breach of existing policies and legislation. One problem is that the Land Register does not indicate which sites are parts of the Protected Areas System established under the National Parks Ordinance and any land shown on the register as Crown Land is assumed to be available for development. This is true of most of the Ramsar site, which is all designated as Nature Reserve, but appears only as "Crown land".

The legislation of the TCI provides two ways for the government to protect historically or environmentally important sites: designating them as parts of the Protected Areas System and transferring them to the National Trust. These may be used together or separately. The National Parks Ordinance provides for the designation of protected areas but does not provide within the Ordinance the means of management to make conservation effective. The National Trust Ordinance provides for the government to transfer publicly owned land to the National Trust; however, the Trust may not treat this as a disposable asset but must instead manage the land in trust for the nation. Both measures have been used in pilot work, and the Trust now has an excellent track record in managing conservation properties.

Given that all of the Ramsar site is designated as a Nature Reserve under the National Parks Ordinance, it is recommended that the TCIG transfer to the Trust those parts of the Ramsar site which are Crown Lands, as was envisaged at the Trust's establishment by statute. Protection must also be afforded to the traditional walking routes, or field roads.

0.2.4.7. Socio-economic aspects, Awareness and Marketing

0.2.4.7.1. Enhancement for local people and their employment

There are considerable possibilities for local employment both in working directly for the Trust implementing and operating conservation and visitor facilities, and in related work providing for visitors. These latter jobs would be largely generated by small businesses of local people, and would be of higher quality than the sort of job generally available to local people if developments are driven by outside organisations. This kind of employment supports local communities and maintains their traditions and quality of life, rather than replacing this with a different (and, in many ways, unwanted) imported social system.

0.2.4.7.2. Small businesses

Increased tourism in Middle Caicos could mean more of a financial base upon which to open tourist-friendly small businesses such as craft shops, shops that sell film, souvenirs, and snack food, and facilities to rent bicycles or kayaks as well as guest houses and restaurants. Plenty of small businesses are already established on Middle Caicos, and they can easily be expanded and made more accessible to visitors without changing their basic nature. As discussed above, small business training has been well received in the local community, and the existing programmes should be expanded to help put local people in a position to take advantage of employment (or, where appropriate self-employment) opportunities provided directly or indirectly by this project's results as these unfold.

0.2.4.7.3. Tourism

One of the main objectives of this plan is the creation of high-quality, low-impact tourism. Aspects of this are already active, and it is important that growth is progressive, at a rate that the local capacity can manage without damaging the communities themselves or the cultural and natural heritage features that provide the interest. There is a need to develop an integrated marketing strategy incorporating input from biodiversity and cultural management plans and socio-economic study.

One key opportunity is the bird-watching tours market. Specialist-led excursions are taken to remote birding sites all over the world. It would be far better for the National Trust to enter this market as a key player than to allow the market to make the discovery on its own and make unsupervised visits to important wildlife sites. The National Trust is also the means through which birders may obtain Bradley's *Official Checklist* and Ground's *Birds of the Turks and Caicos Islands*, both published by the Trust.

0.2.4.7.4. Turks & Caicos National Trust: membership, awareness, imprint

Effective implementation of this plan depends heavily on the TC National Trust to manage the work and facilitate others, and to draw in the support of local civic society, the support as members of both residents and visitors, and the help of expertise from outside the islands. For these reasons, the promotion of the elements in this plan and of the Trust are mutually supportive. Therefore, signs, buildings, publications, trail leaflets etc should carry Trust logos. Trust membership leaflets etc should be widely available, and visitors to trails and centres should be invited to join the Trust.

0.2.4.7.4. Dissemination

The extensive network of the Forum will be used to pull in volunteer expertise and to facilitate the application of the results of this project to comparable situations worldwide. Apart from its practical benefit, this will enhance the reputation of TCI, its government and people. The example of this management exercise will be disseminated to other potential users by presentations led by the Trust at regional meetings and an even wider audience will be addressed by presentations via the Forum's network, including periodic international conferences, UK Government Foreign Office network, *Forum News*, the Forum web-site, Forum member organisations' networks (involving several million individual members), contacts with small island states and the Overseas Territories of other EU Member States. Presentation package, articles, web-pages, Working Group meetings will be developed.

0.2.4.7.6. Wetland awareness

In addition and in combination with the specific information about the Ramsar site and surrounding areas, it is important to use all opportunities to raise awareness about wetlands generally. This is because they are often wrongly thought to be wastelands, when in fact they are crucial, especially in areas such as the TCI. The plan details a number of specific means of conveying this information.

0.2.4.8. Other aspects

0.2.4.8.1. Input to national plan (Sustainable Development Planning Initiative)

The TCI Government has been working for some time on a physical development plan for the country. Previous meetings, especially with the then Director of Planning, staged around the onset of the Darwin Initiative project identified a need for biological and historical material to be incorporated into the planning process. To this end, the biodiversity surveys which form the basis for the management plan were aligned to be compatible with TCI Government information needs. It is anticipated that further information derived from this ongoing work will also be compatible so as to inform further the physical planning process.

As work on this draft of the plan neared completion, TCI's Departments of Planning and of Economic Planning and Statistics (DEPS) had commissioned the pilot stage of the Sustainable Development Planning Initiative (SDPI). Workshops to encourage comment on the draft plan were held within a few days of presentations on the draft ideas of the SDPI. At and around these workshops, staff of the Planning Department, DEPS, the SDPI consultants, staff of the Department of Environmental & Coastal Resources and of Lands& Surveys and others encouraged the development of further analyses to feed into SDPI. With the help of information from the Land Registry, this section is largely the result of that request. It takes this to various levels for different parts of the area, depending largely on the presently available information. It is envisaged that these analyses will be taken further, especially for areas with limited information at present, in future revisions of this management plan.

A striking feature indeed is the lack of dry-land protected areas. These are essentially small parts of the Ramsar site in southern Middle Caicos and northwestern East Caicos, and part of the Conch Bar Caves protected area. This emphasises the need for safeguarding of some of the key dry-land areas, with their important endemic and characteristic species and ecosystems.

The additional important areas identified so far in North Caicos are of two types. One group consists of the group of ponds in the northwest of the island. The other is the extremely important gallery woodland in the vicinity of Wades Green and Kew. This urgently needs survey and safeguarding.Further analysis of the situation and potential of North Caicos is inhibited in that digitised land parcel information is not yet available in the Government's programme. The project has only relatively recently been able to obtain paper copies of the land parcel maps and has not had time or resources to digitise them. It is envisaged that this work will be developed further (as for Middle Caicos below) when digitised land-parcel information is available via one of these routes.

On East Caicos, almost all the dry-land area has been included in the "project area" for the proposed major cruiseliner and related development (see section 4.5.14). This makes open, consultative planning on a zoning basis impracticable, at least while the proposed project remains theoretically current. Some of the important heritage areas have now been identified in East Caicos but this is not exhaustive.

It is striking how much of such an apparently unspoilt island as Middle Caicos is either built, scheduled for building or in private ownership. Most of the land between Conch Bar and Bambarra falls into this category, as does much between Bambarra and Conch Bar and south of the latter. The extent of actual or proposed development along the coast is alarming. This underlines a need to avoid sprawl development and to safeguard the potential for eco-tourism development by careful planning.

0.2.4.8.2. Enhancement for wildlife

The Trust is capable of emerging as a key wildlife advocate especially through the suggesting and drafting of new protective legislation. Along with its conservation education programmes, the Trust must be prepared to lobby for the legislative protection of the habitats and species of special concern. Endemic and critically endangered species are of foremost protection priority. Any animal or plant which exists exclusively in these islands should enjoy full protection against senseless destruction. The Trust is perhaps the most suitable agency to provide the link between the public and government, and is in the position to educate both of these audiences on the importance of conservation legislation.

0.2.4.9. Forward processes

0.2.4.9.1. Biological monitoring

The work of the Darwin Initiative project provided a baseline of information on a range of taxa. The more detailed results continue to be analysed by the volunteer specialists involved. If problems are subsequently revealed, adjustments to the management plan can be developed to address these. Biodiversity surveying and monitoring will use a combination of volunteer outside specialists, working with local people so as to produce the necessary information while also transferring skills. Monitoring techniques are being developed and will be incorporated in the revisions to this plan.

0.2.4.9.1. Evaluation and revision procedures

The basic information allowing monitoring of the biodiversity of the area will become available from the techniques being developed. The monitoring of the management work done and its outcomes will be achieved by means set out in the Logical Framework (Appendix 5). The main features include:

- Regular meetings and reports;
- Scientific survey and monitoring to ensure the safeguarding of biodiversity;
- The development of a long-term financial plan;
- Clear information on utilisation, from visitor centre records, tour fees and other ticket sales, records of school visits;
- o Information on local businesses and demographics from TCI Government;
- Records of presentations, publications and web-visits;
- Formal project reporting.

The monitoring process will involve Trust staff, the Trust Executive Committee and Council and regular community meetings. An annual report for this project will be prepared each year.

0.2.4.9.3. Management

The responsible body leading the implementation of this plan will be the Trust. It is recognised that no governmental or non-governmental agency in TCI yet has the full capacity to manage a plan of this scale and nature. Accordingly, the Forum will continue to support and advise the Trust, drawing on its wide network of experts as appropriate. This collaborative arrangement has worked well in developing this plan, and we anticipate that it will continue to work well in the implementation of it.

The Trust Council has appointed a local committee to bring together the contributions of main interest groups, and inform the work of developing the integrated management planning and implementation. In particular, community meetings will continue to be used as a means of obtaining local wishes, ideas, experience and knowledge. In addition to other involvements by Government personnel, project personnel will hold meetings with relevant departments of TCI Government to maintain inputs, consultation and coordination.

If the full programme of work is resourced, it is envisaged that the following personnel will be required. Day-to-day management of the local work will be by a Conservation Officer, with a business manager later recruited to run the Bambarra centre. The Conservation Officer will be supported by a warden on each of the two main islands, Middle Caicos and North Caicos. It is envisaged that, by the end of the project, increasing income from project operations together with support from the Conservation Fund, and other income raised by the National Trust will take over the funding from external grants.

0.2.4.9.4. Implementing the Plan

Because of this working nature of the plan, at any one time different elements of the plan will be developed to different extents. Taking the section on trails for example, the actions needed to establish some trails are now quite well worked out. For others, more investigation is needed. For yet others, the likelihood of a suitable trail in the area is recognised, but research is needed even on its route. As work develops, these various components will also move to more filled-out plans at varying rates. Similar comments apply to other sections of the plan.

Wherever possible, the details of the Plan are written in terms that will readily identify which actions have actually been achieved at a later date. This should assist monitoring, reporting, selecting priorities for future periods, and in revising the Plan periodically.

It is not envisaged that the facilities outlined in the Plan should all be implemented immediately. This would be impracticable in terms of resourcing and managing. Rather, it is envisaged that annual and other work programmes will select appropriate priorities from the overall plan. Neither do the potential facilities below comprise the full range possible. It is envisaged that this management plan will be a working document, and appropriate additional elements will be added in revisions.

The results of the Darwin Initiative work, both scientific and based on local knowledge, lead to recommendations on particular sites appropriate for conservation/restoration activities, and integration with cultural heritage. Further such recommendations are likely to develop during the course of continuing work. The identification of particular sites does not indicate that other areas of North, Middle and East Caicos are without interest. Indeed, it is the fact that these islands still have throughout an important natural element and that management is still largely environmentally sustainable that makes the approach of sustainable development outlined in this plan feasible. The aim should be to maintain such environmentally sustainable approaches throughout the islands. The reason for addressing some particular sites within this is that these areas need some additional management to maintain their very particular special features. These features are important in their own right, as part of maintaining the quality of life of local people, and to provide the continuing basis for economic activity to sustain local human populations.

Part 1. Introduction

1.1. Background

The Turks & Caicos Islands are rich in environmental and historic treasures on which a thriving tourism business is being built. They contain significant areas of unspoilt marine and terrestrial habitats, and many sites of historic interest from the Lucayan and plantation periods. The great conundrum for countries which use their natural resources to bring income from tourism is how to build the industry without destroying the resources on which it is based. Only careful planning can enable a country to do this, and planning requires information. The natural resources of these Islands have not, until now, been well-documented, and this has hindered the development of appropriate policy planning and activities. This management plan, which covers a large area of unspoilt marine and terrestrial ecosystems centred on the Ramsar site in North, Middle and East Caicos is based on extensive scientific study of the resources in the area. Building on this scientific research and on extensive consultation with the people who live there, this plan lays out the means to develop an appropriate-scale eco-tourism industry which will preserve both the environmental resources and the human communities which have lived there for the last two centuries.

The Ramsar Convention on Wetlands of International Importance, signed by 133 contracting states by July 2002 since its adoption in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Under this convention, a large area centred on Middle Caicos has been declared a Wetland of International Importance, and both the UK and TCI Governments are committed to manage the site in a way that ensures its conservation and wise use. This is one of the largest (58,617 ha) and most natural of UK Ramsar sites, and one of the few which includes the high-priority coral reef, mangrove and sea-grass bed ecosystems. As part of its commitment to conservation, the TCI Government has designated the entire site as a Nature Reserve under the National Parks Ordinance, and has worked cooperatively with the Turks and Caicos National Trust ("the Trust") and the UK Overseas Territories Conservation Forum ("the Forum") in the development of this management plan.

This plan results from a joint project between the local communities, the Trust, the Forum, and another of the Forum's member organisations, CABI Bioscience. The work was carried out under a Memorandum of Understanding with the Turks and Caicos Islands Government, and with financial support from UK Government (including the Darwin Initiative) and others. The intention is that the collaborative venture should continue with the Trust leading the implementation of this plan, the Forum continuing to contribute extensive technical support, both working in close and active collaboration with the local community. The TCI Government is continuing to support this, for example by provision of a building and land for an eco-centre on Middle Caicos and a vehicle, as well as other support. Through a project managed by the Forum, the UK Government (Foreign & Commonwealth Office Environmental Fund for Overseas Territories) continues to contribute towards the cost of this work. The work is complementary to the development of management of marine national parks by the DFID-supported Coastal Resources Management Programme (CRMP), now part of the Department of Environmental & Coastal Resources (DECR).

The purpose of the present plan is to provide means by which the internationally important biodiversity and cultural heritage of the Caicos Islands can be treasured by local people and experienced by visitors without damage. The plan works through wide-ranging co-operative action with the local people, local Government and other institutional stakeholders, and deploys biodiversity and other heritage information for the long-term benefit of the Islands and their inhabitants. This will enable the local people to protect the area by generating sustainable usage involving ecotourism-based activities, as well as education. This will be accomplished through (1) this shared, regularly reviewed management plan; (2) trained local personnel working as wardens, guides and educators; and (3) integrated programmes to develop tourism resources such as trails, hides, an eco- centre, displays, courses, booklets etc.

1.2. Meeting international responsibilities

Implementation of this plan would help in a major way to fulfil the UK & TCI Government commitments under the Ramsar Convention. Implementation would also address all four key elements of the Convention on Biological Diversity by providing skills enabling local people to use environmental resources, share these with visitors and receive incomes, by biodiversity conservation and sustainable development.

The Convention on Biological Diversity underlines the need to integrate conservation of biodiversity into all sectoral plans and policies. The TCI Government recognises this in its tourism slogan "Beautiful by Nature." However, much work needs to be done to implement this. One crucial element is the long awaited National Physical Plan (now within the Sustainable Development Planning Initiative, SDPI). The TCI Department of Physical Planning has made clear to the project partners that it would welcome major input to the new SDPI with regard to the Ramsar site and adjacent areas in North, Middle and East Caicos, which form such a high proportion of the country's area. The TCI Tourism Department has similarly proposed collaboration for work on Middle and North Caicos.

Further, implementation of this management plan will be a critical step in fulfilling the Environmental Charter. On 26th September 2001, in common with other UK Overseas Territories, the TCI Government signed an Environmental Charter with the UK Government. This is reproduced at Appendix 2. The Charter involves wide-ranging undertakings by both the UK and TCI Governments, including a commitment by the TCIG to "ensure the protection and restoration of key habitats, species and landscape features through legislation and appropriate management structures and mechanisms..." The implementation of this management plan is potentially one of the major ways by which the TCIG's commitments in this Charter are implemented.

1.3. The views of the local community

The wishes of the local community have been sought and integrated throughout the development of this plan; this will continue in the implementation phase. Some of these consultations are summarised in Appendix 7. The central theme which came out in every community meeting was sustainable management and the conservation of environmental resources in a way that enhances the lives of the people living there.

This is a special situation in which a small group of people had, until a few years ago, been living at near subsistence levels for two centuries, closely integrated in a sustainable way with their environment. However, a rapidly changing socio-economic environment is causing both a loss of these skills and of the local communities. Local residents regret this loss of the quality of life but are powerless to reverse it without jobs for their young people. The presence of an internationally important biodiversity site (and historical and cultural heritage features) provides both a further need and an opportunity for reversing this trend. Without the continued presence of people, there can be no local culture and little chance of effective biodiversity conservation; the people and the heritage depend on each other.

Timing is critical. Development is at a stage which could either follow a sustainable model or could intensify to lose the local cultural and biodiversity heritage. If left without planned intervention now, two main threats are imminent: (1) externally driven intensive development with irreversible changes; and (2) loss through death of elderly persons of the detailed and extensive knowledge of traditional ways of life and sustainable practice. The pace of externally driven development is likely to accelerate when the European Union-funded dock and ferry link between Providenciales and North Caicos, and the causeway which will link North and Middle Caicos, come on line. It is of vital concern to the local communities that environmental protections be in place before that time.

1.4. Formula for success

The situation in the subject area of this plan gives one of the best opportunities anywhere to provide a conservation model which will have wide applicability, because of the following features which are present in rare combination:

- o a local community which wishes to maintain its way of life;
- the presence of an internationally important site for biodiversity in an area of historic and cultural important which has the potential to attract significant numbers of paying visitors;

- o a local membership-based statutorily established NGO which can provide the focus for management;
- o a sympathetic government set in a stable framework and which is supportive;
- local people who have seen the rapid development on adjacent islands and therefore have a clear idea of the alternative routes, and would prefer a sustainable one if that can be facilitated;
- the presence of senior citizens with first-hand knowledge of sustainable practices and willingness to pass this on;
- a mechanism for ongoing funding for management of protected areas through the recently implemented visitor tax earmarked in the Conservation Fund;
- a small country, which will be prepared to flag up the success of this major project to very wide international audiences, which may wish to use the model;
- a constitutionally linked partner country within the same nation-state (UK) with very limited involvement in government locally but with a supportive approach.

1.5. Objectives

To provide a practicable means to conserve the rich biodiversity and cultural integrity of the Caicos Islands, including the Ramsar wetland of international importance, through enabling the local people to protect the area by generating sustainable usage involving eco-tourism-based activities, as well as educating both visitors and the next generation of citizens.

More specifically:

1. To provide a means by which the rich biodiversity and cultural heritage of the area can be treasured by local people and experienced by visitors without damage to these internationally important ecosystems

2. To facilitate the development of the capacity of local people to establish small businesses based on eco-tourism and traditional crafts, so as to provide both the economic incentive for item 1 above, and employment for local people so that they no longer need to leave the islands to find work, thereby maintaining the communities and cultural integrity.

3. To provide means of coordinating the work, educating local children (and where appropriate adults) and visitors and integrating the work into the National Physical Plan [now the Sustainable Development Planning Initiative] and the implementation of the Environmental Charter.

4. To use this experimental approach to provide an example to the widely spread small island communities which are searching for ways of maintaining biodiversity and local culture while generating an income, so that these can be maintained rather than surrendering to intensive development models imposed and driven by external investment replacing local culture and control by North American/European systems.

1.6. Plan approach

The Plan addresses these objectives by integrating the various elements in an approach which is potentially sustainable in environmental, social and economic terms. This is by linking conservation of biodiversity, historic and cultural heritage with means of gaining income for local people from this, and hence increasing the value of maintaining it. This builds on the wish of local people to maintain their communities by facilitating development on an appropriate scale to provide enough local jobs while not so many that the local social framework is overwhelmed and sustainability lost. Importantly, control is restored largely to local hands. This project is innovative because it will provide an alternative to foreign-driven intensive built development in the country. Instead, it will empower and involve the local people to utilise and extend their undervalued skills and knowledge to create a product unique to their islands. This will involve multisectoral cooperation, and will result in both the maintenance and regeneration of their communities and their natural, historical and cultural heritage.

The methodology does this by making maximum use of local involvement, supplementing this where necessary (e.g. in technical surveys and evaluation) but in a way which facilitates capacity-building so that further tasks can become locally undertaken. The approach is multi-sectoral, integrated and firmly rooted in unique local culture,

rather than focussing on just one element as happens in some development projects (which might, e.g. relate just to craft work or to nature protection or to tourism development).

The operational plan assists the local people of TCI to establish "ownership" of local biodiversity, by facilitating the implementation of a management plan for local habitats. It facilitates the development of sustainable, low-impact eco-tourism, and thereby provides a model for the integration of biodiversity conservation into local planning and action. Key elements will include:

- Provide local people with the means to influence the development of tourism, integrating the conservation of biodiversity, using a sustainable model – consistent with the Ramsar Convention, the Convention on Biological Diversity, the Environmental Charter and the wishes of the local community.
- o Arrange local conservation management control over key areas of biodiversity and historic value.
- o Regular community meetings and with other stakeholders
- o Develop the initial management plan into final plan as shared working tool, with regular revision.
- Design and construct nature trails, hides etc in phased programmes; integrated leaflets, signs & displays matched to the opening of different trails etc.
- o Produce other interpretative and awareness-raising materials.
- Train local tour guides.
- o Develop means of access control, fees and system of enforcement, feedback and revision as necessary.
- o Establish plan for longer term maintenance, including using resources generated by the activities.
- Develop further modules of successful environmental education course, and use resource centres, trails etc as "living classrooms".
- o Facilitate local small businesses based e.g. on local crafts and services.
- o Establish management systems and regular reporting.

1.7. Geographical coverage

This plan is centred on the Ramsar site of North, Middle and East Caicos (see Fig. 1). However, it is not restricted to this area but includes much of the surrounding area of North, Middle and East Caicos. This is for two main reasons.

First, site boundaries are to some extent artificial, and sites need to be managed in conjunction with the surroundings, which are parts of the same ecological, hydrological and geomorphological systems. Attempts to manage parts of such systems in isolation are likely to be both inefficient and ineffective. Moreover, the work of the Darwin Initiative project demonstrates high biodiversity and other interest outside the site boundaries. In a few cases, this interest occurs in other protected sites, but in most cases in areas not so protected.

Second, if the local community is to benefit from the development of eco-tourism as outlined in the plan, it is essential that these surrounding areas are included in the plan.

Information gathered to date is not, of course, uniform across the whole area. During the Darwin Initiative project work, some emphasis was placed initially on Middle Caicos, although other areas were not neglected. It is planned progressively to fill major gaps in coverage. Already, work on North Caicos has been increased considerably.

1.8. Structure of this plan

Following the Introductory material in Part 1 of this Plan, Part 2 describes the important features of the area in the light of the best available information. This results from the scientific surveys in the Darwin Initiative project, together with collation of local knowledge and other sources.

Part 3 briefly evaluates overall objectives in the light of this material, serving as the basis for Part 4, which is the operational part of the Plan.

Several Appendices contain supporting information, to which reference is made in the main parts of the Plan.



Figure 1 (on previous page). North, Middle and part of East Caicos, showing the boundary of the Ramsar site. (Note that this is a reduced version of the map, so that the actual scale is about 1:200,000, as reflected by the scale bars.) The key is amplified in section 2.2.1.

Part 2. Description

This part brings summarises the main results of the Darwin Initiative project studies, together with a collation of relevant material from other sources. This serves to describe the main features of the area, as a basis for later parts, which analyse the work needed. Analysis of much of the Darwin Initiative material continues, and future editions of the Plan will incorporate this and other material as it becomes available.

2.1. Geography

2.1.1. Geology

The Bahamas Platform (also including Florida, Turks and Caicos and nearby areas) was formed about 150 million years ago. Sealey (1994) gives a convenient summary of the geological history of the region, and this is summarised below.

From about 200 million years ago, the North Atlantic Ocean was created when North America drifted away from Africa and Europe. By about 150 million years ago, fault lines in the opening rift created a triangular projection off the south-east coast of North America, the Bahamas Platform. The areas that became southern Florida and the Turks and Caicos Islands were all part of the Platform. The Caribbean Sea and West Indian Islands had not yet been formed. (Dietz *et al.* 1970). At the boundary of North America and the Atlantic Ocean the continental crust was stretched and thinned as Africa pulled away from it. This thinning crust began to be flooded by the new ocean, and sediments were laid down in the shallow seas so formed. As the stretching went on, the crust got thinner and weaker. As the sediments got heavier they weighed down on the weakened crust, forcing it to sink. (The widening of the Atlantic is still going on today, although at a slower rate believed to be about 2.7 cm (1.1 inch) a year. The stretching of the crust has probably now stopped altogether.)

Boreholes have shown that a very unusual origin for the rocks of this platform. Despite drilling as deep as 6 000 metres (20 000 feet), volcanic material has never been encountered. The rocks are all of the same type, shallow water carbonates, and these can only have formed near the surface. Virtually all the rock (possibly except the deepest from one borehole, which may illustrate the basal layer) is no older than the Cretaceous Period, that is 135 million years old. Virtually all these rocks are of marine origin, except some fossil soils and sand-dune rock (aeolian limestone). This suggests that the region has always had a marine environment from the time of its formation until the recent Ice Ages.

The great thicknesses of limestones of consistent type, down to at least 6 000 m (20 000 ft – as deep as the ocean is today), and total absence of any other rocks is both remarkable and unique. To produce this, two processes had to be occurring: the production of sediment at a fairly rapid rate in a shallow marine environment; and subsidence of the crust on which the region stands. The rate of subsidence had to be fairly slow so that the water did not get too deep for the processes to continue, but not so slow that sediments appeared for prolonged periods above sea-level. Furthermore, geographical conditions at the surface must have been fairly similar throughout this period, an area of shallow seas and banks.

The Turks & Caicos are geologically related to their neighbours – the Bahamas and the Blake Plateau to the north, Florida, and Northern Cuba. Throughout this region similar conditions existed. The Blake Plateau which lies to the north can be considered to be a submarine extension of the Bahamas that was drowned about 80 million years ago, but carried on sinking so that it is now under 900 metres (3 000 feet) of water. Cuba is rather different from the other islands because it has been subjected to mountain building at its extremities, but virtually all of northern Cuba has had the same history as the Bahamas and Turks & Caicos – shallow water carbonate deposition for 200 million years. Much of mainland Cuba is a flat limestone plain, and numerous islands fringe the northern shores.

All this time the region was nearly at sea-level, and probably formed a single vast marine plain dotted with islands. This situation changed only when, in some areas, the rate of adding sediment became less than the rate at which the crust below it was sinking.

About 80 million years ago there must have been a major change in the environment. Perhaps it was the creation of the Gulf of Mexico which led to the flooding of the region by the waters of the Gulf Stream. If so, this strong current may have carried the sediments away, or the changing conditions may have stopped the production of sediment. In either case, the absence of a build-up of sediment in some parts of the sinking platform would have led to flooding and submergence. Perhaps there was an excess of sediment which smothered and killed the coral reefs. Whatever happened, the result was:

- the drowning of the Blake Plateau;
- the separation of The Bahamas from Cuba and Florida;
- the disintegration of the south-eastern Bahamas and the Turks and Caicos Islands into a series of small banks (with low islands on them), surrounded by a complex system of troughs and basins over 1800 metres (6 000 feet) deep;
- the creation of troughs and channels within and between the Little and Great Bahama Banks.

The banks have been evolving since Cretaceous times, even if there was a single event that disrupted the original platform. Mullins & Hine (1989) suggests that several processes are at work:

- step-faulting or rifting which creates troughs or channels; this lowers the sea-bed below the depth at which shallow water sedimentation can occur.
- in-filling of these troughs by lateral accretion: sediment is swept into the channels from the adjacent banks to windward.
- scalloping of the bank margins which creates crescentic embayments; as this continues the bank is progressively destroyed. It has been suggested that this is what produced the fragmentation of the southeastern Bahamas and Turks & Caicos, perhaps because scalloping was more active in this area.

Observation of the bank margins from research submarines suggests that this kind of erosion is most active on the windward sides. Erosion takes the form of collapse of portions of the bank edge, in much the same way that a cliff face collapses. The collapsing leaves crescentic embayments in the platform edge. Successive collapses over millions of years create a progressive destruction of the bank, like the headward erosion of river valleys, and this may account for the large semicircular embayments found in the Columbus Basin, and at the head of the Tongue of the Ocean, today.

In the case of the Tongue of the Ocean it, should be noted that its general alignment follows subterranean faults in NNW/SSE direction, but that the southern extension of the 'tongue' is a huge embayment oriented to the east. Even bigger is the Columbus Basin to the south-east of the Tongue of the Ocean, and it can be conjectured that if scalloping and headward erosion continue the Tongue and the Columbus Basin will join, and the Great Bahama Bank will be split in two. In the case of the Turks & Caicos Islands and the south-eastern Bahamas it has been suggested that this has already happened. This area is much closer to the North American Plate margin than the northern Bahamas, and it is therefore more likely to be affected by plate movements. Earthquakes along the plate margin (in the vicinity of Cuba and Hispaniola), would provide just the right kind of shock-waves to trigger the collapse of unstable masses along the edge of the bank. As the Bahamas platform is much narrower in this region anyway, channels could have been cut through it more quickly than in the north, such as the Crooked Island Passage, the

Mayaguana Passage and the Caicos Passage.

However they were formed, the deep-water troughs and channels receive much less sediment than the shallow-water areas. Some sediment undoubtedly enters them from catastrophic collapses along the bank edge, and these avalanches have been identified as turbidity currents as they continue across the sea floor. In addition there is a continuous fine 'rain' of minute particles from the banks. This settles over the deepwater sea-bed as an *ooze*, which is the only sediment found in areas far from land. During the current geological era, known as the Quaternary Era, some 120 metres (400 feet) of sediments have been laid down over Andros, but only a metre-thick layer of ooze has been deposited in the adjacent Tongue of the Ocean and Providence Channel. Consequently, sedimentation in these areas did not keep up with the subsidence of their floors, which now lie well below the level of the banks.

On the banks themselves, sedimentation continued, accumulating at a rate of about 2 cm (0.8 inches) per 1 000 years. Each bank is a self-contained system, usually referred to as an atoll. In it a variety of sediments are produced, but these would simply be washed away and lost were it not for the retaining walls of the atolls the coral reefs. In many ways the atolls, whatever their shape, can be likened to a bucket of sand (the loose sediments) with the sides of the bucket (the coral reefs) holding it in. (The term 'atoll' is not meant to imply the volcanic origin so common in Pacific atolls. Atolls are marine sedimentary structures whatever they are built on.)

The sculpting of these rocks depended largely on actions in the Pleistocene Ice Ages, which began approximately two million years ago, and may not have ended yet. Four main periods of glaciation are known, separated by three interglacials. These interglacials were periods when the climate was probably fairly similar to the present time.

When snow fell in the higher latitudes, it did not melt in summer and return to the oceans. Instead, it accumulated in great ice caps and glaciers on the land, so the level of the oceans dropped. The best evidence suggests that, in the third glacial, sea-level in the region fell by well over 120 metres (400 feet), and, in the last one, by just under 120 metres. Glaciation was not a simple process and the effect on sea-level was quite varied, with a minimum of about -120 metres (-400 feet) and a maximum of about +6 metres (+20 feet).

As sea-level fell, the oolite was blown up from the beach to form dunes. When sea-level fell farther no more oolite was formed, and the land was covered with vegetation. When sea-level rose enough to flood the banks, new sediment was formed and was washed up on new beaches. Eventually, a new line of dunes was formed. In the next glacial period sea-level fell again and the cycle was repeated. As the winds blew across the new land, the oolitic sand was piled into great sand-dunes at right angles to the wind. The ridges are complex, being comprised of many dunes, some of which were eroded and all of which were superimposed on others, and in turn often buried. The dunes harden as rock ridges.

It was not, of course, necessary for the sea to drop hundreds of metres for the sand to be piled into dunes – it only needed to be left a few metres above sea-level. Over the whole period of the Ice Ages, sea-level fell sufficiently to expose the banks at least four times. Periods of drowning in-between created fresh oolite, and so a fresh line of dunes, later to become ridges, could be formed.

Of great importance to the later development of the ridge is the cave and its related features. Caves occur in all the other landscapes as well, but usually these are so low-lying that the caves are flooded. Those associated with the blue holes are good examples of this. It is only when a cave is found on relatively high ground, well above the water table, that it is dry and accessible.

Limestone is a rock which dissolves easily in rainwater, which is why there are no rivers. Instead, the water finds its way underground, eventually to the water table. Caves are the result of this downward movement, and usually a cave consists of two sets of characteristics as a result. It will have vertical sections, where the water is falling downwards, and horizontal sections where the water, now an underground stream, is flowing, probably towards the sea.

The reason for having several levels may be explained, by each one representing a different water table level. Water-table levels are related to sea-level, and as the sea-level changed so did the water-table, with underground streams moving to different depths or levels. The base of the fresh-water lens, where fresh water meets salt water in the mixing zone, has chemical conditions which cause increased rock dissolution. As a result, whilst both the top and the bottom of the fresh water lens are the zones for cave formation, where these layers meet, at the edge of the
lens, is likely to be most favourable for dissolution and cave formation.

Blue holes and underground caves are features which can be formed only above sea-level. In addition, some of the features connected with them, such as stalactites, are further evidence of an atmospheric origin. Consequently any, depth recorded for a blue hole will also be an indication of how low sea-level was at that time. Several blue holes reach 130 metres (400 feet) or more. This is why some blue holes are in the sea. (when they may also be called ocean holes). During the periods of glaciation, both the entire Caicos Bank (as well as the entire Turks and other Bahaman banks) were dry land, and would have been subject to erosion and solution. Blue holes would have formed in many areas, but most of them would have been filled in by marine sediments once the rising sea covered them up. In some areas they have stayed open. This could well be due to the passage of water through them as the tides rise and fall, particularly if there is an outlet into deep water.

2.1.2. Tides and Currents

The following notes are based on direct observations, reports by local people and information in Pavlidis (1998).

The islands of the Turks and Caicos are affected by the west setting North Equatorial Current on both their northern and southern extremities. After entering the Caribbean the North Equatorial Current splits into two branches, the northern branch flowing northeast of the Turks and Caicos and the Bahamas as the Antilles Current, with an average velocity of approximately 0.5 knot. To a lesser extent the Antilles Current also flows through the Old Bahama Channel along the northern coast of Cuba and through the islands of the Turks and Caicos themselves. The more southern branch of the North Equatorial Current makes its way around the Caribbean and the Gulf of Mexico and enters the Straits of Florida as the Gulf Stream, with an average velocity of approximately 2.5 knots in a northward direction. Once north of the Bahamas, the stronger Gulf Stream merges with the weaker Antilles Current and bears off north and northeastward across the North Atlantic.

Where the shallow banks drop off to deeper ocean waters, the tidal currents flow in and out of the passes and cuts, sometimes reaching 2-4 knots in strength, and even more in a few of the more narrow passes. Some cuts may be impassable in adverse wind conditions or in heavy swells that may exist with or without any wind.

Tidal amplitude varies from less than 1 m (about 2 ft) at neap tides to a little more than 1 m (about 4 ft) at spring tides (at new and full moon). In the complex system of channels, tidal delays may occur, and the regular sine-curve of water-levels may become very distorted, often with the flow (rise) occurring in a much shorter time than the ebb (fall). Tides on the Caicos Banks are generally northwest on the flood and southwest on the ebb with an average strength of approximately 1 knot. However, in the more complex channels, the current may often appear in places as a swift flowing river, and currents may flow from 2.5 to over 4 knots.

Tides depend more on wind and pressure than regular tidal cycle proper. In the Lorimers vicinity (and generally in the shallows on the Caicos Bank on the south side of the islands), strong and persistent northerly winds may keep water down. Strong southerly winds will give the southern shore higher tides than normal. (However, this sort of feature normally varies locally depending highly on local topography. Caution needs to be observed, not least because strong winds can markedly affect both tidal range and flow velocity.)

Senior local residents report that one can walk between islands (crossing creeks in correct tidal conditions), and that this was formerly the main means of travel, and of moving livestock. Again, local knowledge would be required to use this method safely, and – even in the most favourable tidal conditions – is likely to require at least very deep wading, if not swimming, across channels. It is not advised.

2.1.3. Climate

(Modified from Pavlidis 1998) The climate is generally warm and dry, with occasional heavy rain. The Turks and Caicos Islands lie in the path of the northeast trade winds. Temperatures usually stay in the neighbourhood of 70°-85°F (21°-29°C). Winter temperatures in the Turks and Caicos rarely fall below 60°F (16°C) and generally are above 75°F (24°C) in the daytime. The average year-round temperature in the Turks and Caicos is 83° F (28°C). During the summer months the lows are around 75°-78°F (24°-26°C) while the highs seldom rise above 90°F (32°C) except in

the hottest months of September and October when they can reach 95°F (35°C). Seawater temperatures normally vary between 74°F (23°C) in February and 84°F (29°C) in August. The trade winds also bring rain to these islands, although there can be prolonged droughts. Grand Turk averages 20" (50 cm) per year while the Caicos group averages around 40" (100 cm) per year. The rainiest month is May; the summer months may see a lot of rain depending on the actions of tropical waves and hurricanes. In the winter, rainfall is dependent upon frontal passages.

Humidity is fairly high all year long, especially during the summer months, but breezes can lessen the effect. In the summer, winds tend to be light, 10 knots or less from the southeast with more calms, especially at night. In the winter, the prevailing winds are east-southeast and stronger. It is not unusual to get a week of strong winds, 20 knots or more, during the winter months as fronts move through. These fronts tend to move through with regularity during the winter months and become more infrequent as spring approaches. The wind will usually be from the southeast or south before a front and will often be very light to calm. As the front approaches with its telltale bank of dark clouds on the western and northwestern horizon, the winds will steadily pick up and move into the southwest, west, and northwest. Strongest winds are usually from the west and northwest. After the front passes the winds will move into the north and northeast for a day or two before finally settling back into an east/southeast pattern until the next front. Winds just after the front tend to be strong and the temperature a little cooler.

In the summer the weather pattern is typically scattered showers with the occasional line squall. Although the main concern during June through November is hurricanes, the Turks and Caicos are more often visited by a tropical wave with its strong winds and drenching rains. Tropical waves, sometimes called easterly waves, are low pressure systems that can strengthen and turn into a tropical depression or hurricane.

2.1.4. Wetlands background

The early report on the potential Ramsar sites in the Turks & Caicos (Clarke & Norton 1987) provides a useful background to the wetlands, and parts of its background are summarised below.

The total exposed flat limestone formations of the Bahama and Turks & Caicos islands (11,406 km²) is comparable to the size of Jamaica, while the submerged banks cover ten times that area. The Turks and Caicos are structurally part of the southern Bahamas group, receiving only about half the rainfall of the northern islands (Grand Turk has a mean annual precipitation of 729.7 mm/28.73"). The Turks and Caicos Islands are therefore examples of small dry islands, and lack large watershed systems such as rivers and estuaries. Instead there are relatively large areas of shallow marine banks and intertidal creeks, lagoons and flats. Inland water bodies are made up of salinas and salt ponds, with relatively few freshwater formations such as marshes and sinkholes.

The shallow submerged banks (delimited by the 100 fathom depth contour) are made up of the Turk Island Bank (254 sq km) and the Caicos Bank (5,334 sq km), of which a substantial proportion is less than 1 fathom deep. There are an additional 38,000 ha of intertidal sand banks and mud flats. Of the 500 sq km (50,000 ha) total dry land area of the Turks and Caicos Islands, 26,669 ha (over half the land area) are wetlands (Directory of Neotropical Wetlands, Scott & Carbonell1986).

Clarke & Norton (1987) note the following main wetland types.

Submerged Sand Bank – this habitat covers vast areas on the southern side of the island group. Of these shallow water banks, approximately 15% is less than 1 fathom in depth. The banks are part of the Bahama oolite formation laid down by the action of abundant bacteria. The substrate is generally silty sand worked by tidal currents which vary with the topography. There are scattered clumps of sponges, algae and sea grasses; callionassid shrimp mounds are common and shallow water corals and reef fish occur. Whilst not great in diversity, the extent of this habitat makes it very significant in terms of the productivity and nutrient cycling of the island ecosystem. It forms important feeding grounds for juvenile green turtles (endangered species), bonefish, tarpon, and mullet (commercial species).

Intertidal Sand and Mud Flats – Intertidal and occasionally flooded flats make up another large habitat type comprising 38,000 ha. Bare sand and mud is interspersed with salt marsh plants such as glasswort *Salicornia* spp., marsh grass *Distichlis* and stunted mangroves. These flats form important feeding areas for birds during low tides and fish during high tides. Lagoon – Protected inlets which are tidal and open to the sea at least at very high tides. Together with Mangrove Swamp, this habitat type forms 25% of all wetlands. Typified by a thick border of red mangroves *Rhizophora mangle* around open water, with other marine elements such as algae, coelenterates, nereid worms, tunicates and ophuroids. The lagoon is a productive system with thick soft mud substrate and abundant invertebrates, forming important feeding areas for birds and commercial fish species during juvenile stages.

Mangrove Swamp – This can intergrade with Lagoon habitat but generally Mangrove Swamp is more or less enclosed and has less marine influence. Salinity is variable but conditions are generally hyposaline. Vegetation is patchy with clumps of red, black and button mangrove interspersed with pools and mud. Drier areas support marsh plants and this can intergrade with marshland. The larger more isolated swamps provide feeding and breeding sites for a variety of waterbirds including the threatened West Indian whistling duck *Dendrocygna arborea*.

Salt Pond – Periodically connected to the sea if only during storms, salt ponds are discrete water bodies bordered by a narrow zone of mangrove species. Underlying the open water, soft mud supports limited submerged vegetation. Marsh plants grow along the edges including *Marsilea nashii* which is endemic to the Southern Bahamas. The shallow water provides ideal feeding areas for resident and migrant waders, herons, terns and gulls. Salt Ponds make up about 20% of wetland types.

Salina – [Note that this is the technical usage. Locally, "salinas" can refer also to the flats.] Salinas are inland ponds which are generally hypersaline. The shallow open water often dries out and salt crystalises along the edges. When recently inundated, brine shrimp *Artemia maritima*, a favoured food of the flamingo, can become abundant. The pond is bordered by buttonwood, usually the silver variety *Conocarpus erectus* var. *griseus* and salt marsh plants. If large and isolated, salinas provide feeding and nesting habitat for flamingos. Salinas make up about 45% of wetland types.

Sinkhole – These are usually circular holes in the limestone rock holding fresh to hyposaline water. Often fairly deep, they provide important permanent freshwater habitat which supports submerged vegetation and a wide variety of invertebrates. Where connected to underground cave systems, some unusual crustacea may occur. This is important feeding and nesting habitat for water birds such as the Least Grebe.

Marshland – This includes the range of freshwater to saline formations with fluctuating water levels and marly type soils which makes up about 10% of wetland types. Vegetation is dominated by grasses, sedges, spikerush and reedmace (*Cladium, Cyperus, Echinodorus, Eleocharis* and *Typha*) and can intergrade with more marine elements (e.g. *Distichlis* and *Batis*). Marshlands provide rich feeding grounds for resident and migrant waders, herons and ducks including the threatened West Indian whistling duck *Dendrocygna arborea*.

2.1.5. Map features and place names

There is good general agreement between the published 1:25,000 maps and the Darwin Initiative maps, based on satellite imagery and ground survey. With the capabilities of the more modern technique, more precision on vegetation types and other habitat features was possible. The new satellite-based maps also take the opportunity to update the information on new roads. Geographical Positioning System information collected on ground surveys was also deployed to add information on trails through tall vegetation, which are otherwise not detectable either by the aerial photography on which the early published maps were based or by the satellite imagery.

It should be noted that (as is not infrequent in maps anywhere), there is some local variation in place names. In some cases, different local people may attribute a place name to different features, in some cases overlapping. Attempts have been made with the recent map to avoid this as much as possible. However, it is desirable to avoid ambiguity by using grid references in support of records as much as possible.

2.1.6. General topography and walking conditions

The general structure of the main Caicos Bank islands is:

- o on the northward side, a reef between the reef-edge to deep water and the shore;
- the shore, in some areas backed by dunes;

- o a dry scrub area, grading in places to taller woodland and forest, with a fairly sharp break to the flats;
- o the flats progressively grade to deeper water over the bank.

Generally speaking, the dry area forms the largest proportion in the west (Providenciales) and least in the east (East Caicos), where the wet flats dominate, with intermediates on islands between.

This basic pattern is complicated by ponds, creeks and lagoons in any of the zones.

The shore is generally easily walkable, albeit sometimes laborious if the sand is soft (or the wind blowing) or slippery on some of the rocky areas.

Some parts of low maritime scrub on the northern edges of Middle and East Caicos are slightly less dense than the standard scrub (see below), and consequently rather more crossable.

The main dry scrub areas provide a major challenge to access. Most of the old tracks (marked as red lines on the 1:25,000 map) as well as some of the old roads are now overgrown with scrub, and are impassable without a cutlass. The scrub generally is solid and impenetrable off the track, unless new tracks are cut. This has implications for surveying in the scrub (a network of paths would be necessary, and sound-based methods desirable where practicable); for reaching the ponds; and for reaching the open flats habitat (beyond the scrub).

The ponds, generally within this scrub zone, are extremely varied in appearance and nature, even adjacent ones (see also Clarke & Norton 1987).

Once reached, the flats ("salinas") generally provide easy walking, although the surface may be slippery mud, and sometimes covered with shallow water. Care needs to be taken to avoid quicksand areas. These seem to be particularly the case in some lagoons with permanent water, such as Big Pond, although the dry beach there is firm.

Much of the flats have open, low mangrove savannah vegetation. In addition, dense mangrove strips occur along channels, giving an amazingly patterned landscape appearance from the air. Quite a number of distinct ponds exist, even within the flats.

There are many complex habitat gradations throughout the area, these essentially natural transition features being one of the major scientific and conservation interests of the area.

Particularly after rains, the area is remarkable for its densities of mosquitoes. These show considerable variations in density and activity in different habitat zones. By some of the ponds and particularly on wet areas of the flats, at such seasons, chemical repellent is largely ineffective. Locally made whisks are slightly more so. Head netting, thick clothing and gloves are strongly recommended in such situations.

2.2. Biodiversity description

2.2.1. Mapping and vegetation classification

An accurate map showing the distribution of different habitats and ecosystems within a site is fundamental to effective management planning. Fred Burton, of the Cayman Islands and formerly Programme Director of the Cayman Islands National Trust, led for the Darwin Initiative project on the production of such a map for the Turks & Caicos Islands Darwin Project. The starting point was a satellite image, which was classified and ground-truthed. Roads, trails and boundaries were added subsequently. The resulting map is shown at Figure 1. Further work is in hand to refine the dry-ground classification.

The final classifications are noted below, and related also to Ramsar Convention classifications, and the occurences of these within the designated Ramsar site.

Ramsar class A: Shallow marine waters

Water

Open seawater over sand banks south of the Caicos Islands, and in channels between them. Bottom vegetation not

described or mapped.

Ramsar class B: Marine beds

Water

Open seawater over sand banks south of the Caicos Islands, and in channels between them. Bottom vegetation not described or mapped

Ramsar class C: Coral reefs

Water

Typical Caribbean barrier reef communities, including a reef crest and a back-reef lagoon off the north shore of East Caicos.

Ramsar class D: Rocky shores

Ramsar class E: Sand / shingle shores (including dune systems)

Ramsar class G: Tidal flats

Water

Low tidal flats which were flooded at the time of satellite image acquisition, showing as shallow water on the map, are unvegetated sand and silt substrates.

Exposed intertidal mud

Unvegetated sand and silt substrates exposed at the time of satellite image acquisition.

Ramsar class H: Salt marshes

Salicornia-Batis-Portulaca saltmarsh

A succulent herbaceous salt marsh community, on a flat calcareous silt substrate. Dominated by *Salicornia virginica*, *Salicornia bigelovii*, *Batis maritima*, and *Portulaca rubricaulis*. *Lycium tweedianum*, *Chamaesyce vaginulatum*, *Sporobolus virginicus*, and scattered *Avicennia germinans* shrubs may be present.

Distichlis / Sporobolus saltmarsh

A grass-dominated salt marsh community, on a flat calcareous silt substrate. Dominated by *Sporobolus virginicus* and *Distichlis spicata* in varying proportions. *Borrichia frutescens, Salicornia virginica, Salicornia bigelovii, Lycium tweedianum, Portulaca rubricaulis*, with *Conocarpus erectus* as isolated shrubs or trees, may be present.

Mixed saltmarsh with sparse silver Conocarpus

Scattered *Conocarpus erectus* var. *seriacea* shrubs and trees forming up to 20% cover on a calcareous silt substrate with emergent limestone bedrock. *Sporobolus virginicus, Salicornia virginica, Rhachicallis americana, Borrichia frutescens, Portulaca rubricaulis, Salicornia bigelovii, Fimbristylis ferruginea, and <i>Batis maritima* form a partial ground cover in varying combinations. *Avicennia germinans* may be present as a rare emergent shrub or tree.

Ramsar class I: Mangrove / tidal forest

Rhizophora & Avicennia mangrove shrublands

Mangrove shrubland communities 1 metre tall, forming 40% - 60% cover on soft calcareous mud covered with a thick algal turf, and a network of tidal creeks. Ranging from monospecific *Avicennia germinans* at the landward extreme of the community, through mixed *Avicennia germinans* – *Rhizophora mangle*, to monospecific *Rhizophora mangle* towards the seaward edge.

Rhizophora, Avicennia and *Laguncularia racemosa* shrublands also occur in more inland sites, associated with *Conocarpus erectus* and succulent halophytes on pond fringes and in seasonal floodwater channels.

Ramsar class Q: Saline / brackish lakes - permanent

Ponds

Shallow brackish to hypersaline ponds, usually narrowly fringed by mangroves and succulent halophytes and otherwise unvegetated. Water levels fluctuate seasonally and many ponds may dry out periodically or seasonally, grading to class R below.

Ramsar class R: Saline / brackish lakes - seasonal / intermittent

Ponds See Q above.

Ramsar class Ss: Saline / brackish marshes - seasonal / intermittent

Unvegetated rock & mud flats

Rock pavements and dark calcareous silt flooded by seasonal/intermittent expansion of natural brine pans. Virtually devoid of higher plants due to extremely high salinity. Slightly raised rock areas may rarely support a few prostrate *Conocarpus erectus*, severely stunted *Avicennia germinans*, *Salicornia virginica* or *Rhachicallis americana*.

Sparsely vegetated saline sand flats

Approximately 75% unvegetated sand with a thin algal crust, supporting local aggregations of *Avicennia germinans* shrubs, and the succulent halophytes *Portulaca rubricaulis*, *Salicornia virginica* and *Suaeda conferta*. Intermittently flooded by rain and/or tide. Old flamingo nests were observed in this habitat.

Ramsar class Sp: Saline / brackish marshes - permanent

Natural brine pans

Depressed rock pavement areas, intermittently filled by high tides, becoming extremely hypersaline due to evaporation, forming crystalline salt at the margins. No vegetation.

Ramsar class W: Shrub-dominated wetlands

Conocarpus shrubland on saltmarsh grasses

Conocarpus erectus, usually var. *seriacea*, forming a 1-3 metre seasonally flooded shrubland over a herbaceous community dominated by *Sporobolus virginicus* or occasionally *Distichlis spicata*. *Conocarpus erectus* var. *erectus* is often present as a prostrate shrub, with *Salicornia virginica, Portulaca rubricaulis, Borrichia frutescens, Rhachicallis americana, Jacquinia keyensis, Rhynchospora colorata, Fimbristylis ferruginea, Agalinis maritima, and occasionally Rhizophora mangle* and/or *Avicennia germinans* as shrubs.

Conocarpus-Rhachicallis dwarf shrubland

A seasonally flooded, shrubland with most woody vegetation dwarfed, on calcareous silt with emergent limestone bedrock. Dominated by prostrate *Conocarpus erectus*, with *Rhachicallis americana*, *Rhizophora mangle*, *Jacquinia keyensis*, *Manilkara bahamensis*, *Thrinax morrisii*, *Borrichia frutescens*, *Coccoloba uvifera*, *Cladium jamaicense*, *Swietenia mahagoni*, *Gundlachia corymbosa*, *Strumpfia maritima*, *Crossopetalum rhacoma*, *Sophora tomentosa*, *Fimbristylis ferruginea*, and *Distichlis spicata*.

Ramsar class X: Tree-dominated wetlands

Seasonally flooded woodlands (various)

1). Conocarpus erectus, including var. seriacea, forms seasonally / intermittently flooded woodland communities on very slightly raised sand banks amid tidal flats. The tree layer may be monospecific, or may variously include *Pithecellobium keyense, Dodonea viscosa, Guapira discolor, Swietenia mahagoni, Maytenus phyllanthoides* and *Metopium toxiferum*. The shrub layer may include the endemic *Eupatorium lucayanum, Crossopetalum rhacoma, Borrichia frutescens, Thrinax morrisii, Coccoloba uvifera*, and *Erithalis fruticosa*, while the herbaceous layer typically includes *Sporobolus virginicus, Chamaesyce vaginulatum and Lycium tweedianum*.

2). *Sabal palmetto* palms form seasonally flooded woodlands in association with *Gundlachia corymbosa* where fresh to brackish floodwater accumulates during the rainy season. The two species are strongly co-dominant, with *Distichlis spicata* often also abundant.

Seasonally flooded Pinus woodland

Pinus caribaea woodland occurs in extensive stands intermingled with other seasonally flooded habitats. The limestone bedrock has very thin soils, and many seasonally flooded sinkholes: the entire habitat floods with fresh water during periods of intense rain. *Sabal palmetto* and *Cladium jamaicense* grow in the sinkholes. The shrub layer is usually sparse, with *Coccoloba uvifera, Thrinax morrisii, Randia aculeata, Tabebuia bahamensis, Cassia inaguensis, Byrsinomia lucida, Lysiloma latisiliquum, Savia erythroxyloides, Conocarpus erectus, Metopium toxiferum, Acacia*

choriophylla, Swietenia mahagoni, Ernodea serratifolia and Erithalis fruticosa. Herbaceous species include Rhynchospora colorata, Jacquemontia havanensis, Cassytha filiformis, and the ground orchid Spiranthes vernalis.

Ramsar class Other

Dry shrublands, woodland and forest

Diverse xerophytic mixed evergreen-deciduous shrublands, merging to higher woodland and forest, on limestone bedrock and thin soils. Species composition varies with elevation above ground water, and exposure to salt spray. Abundant tree species include *Lysiloma latisiliquum, Coccoloba diversifolia, Tabebuia bahamensis, Coccothrinax argentata, Thouinia discolor, Metopium toxiferum, Acacia choriophylla, Cephalocereus millspaughii, Guaicum sanctum and Thrinax morrisii.* Several orchid species in the genus *Encyclia* are also widespread and conspicuous in these habitats. As noted above, further work is in hand to refine the dry-ground classification.

2.2.2. Plants

Plants represent some of the most important species in terrestrial ecosystems, "feeding" on sunlight by photosynthesis, and providing sustenance to the many organisms that feed on their leaves, roots, seeds and flowers. They also provide the structures in which many animals nest, hide from predators, or wait in ambush for their prey. Botanical survey work under the Darwin Initiative project was undertaken by Dr Gerald "Stinger" Guala and Jimi Sadle of the Fairchild Tropical Garden in Miami (*e.g.* see Guala, 2001), with valuable input from Fred Burton (Cayman Islands), Bryan Naqqi Manco and Kathleen Wood (Providenciales). The Turks & Caicos flora has attracted some previous study, principally during the compilation of the standard work on the plants of the Bahamas (Correll & Correll 1982). Indeed, the Turks & Caicos flora is essentially a subset of the Bahamian flora, reflecting the biogeographic, geological and climatic similarity of the Turks & Caicos to adjacent Bahamian islands. However, the Turks & Caicos flora contains a number of interesting and distinctive features, and the fieldwork conducted under the Darwin Initiative has produced a number of new plant records for the Islands, for example, *Malaxis spicata, Oldenlandia callitrichioides, Ponthieva racemosa* and *Psychotria nervosa*. Further new records are anticipated, as the plant specimens are processed. The material processed to date is summarised in the species list that follows:

Abrus precatorius L. Guala 2318 Acacia acuifera Benth. Guala 2311 Acrostichum aureum L. Guala 2358 Agalinis maritima (Raf.) Raf. JS070 Ambrosia sp. Guala 2343 Anthenophora sp. Guala 2291 Argusia gnaphalodes Guala 2337 Aristida ternipes Guala 2295 Asteraceae Guala 2300 Asteraceae Guala 2365 Boerhavia sp. Guala 2327 Boerhavia sp. Guala 2330 Borrichia sp. Guala 2288 Borrichia sp. Guala 2366 Bourreria ovata Micrs. Guala 2306 Bumelia americana (Mill.) Stearn. JS056 Byrsonima lucida (Mill.) DC. JS050 Caesalpinia sp. Guala 2316 Calliandra haematomma (Bert.) Benth. JS034 Canavalia sp. Guala 2342 Capparis sp. Guala 2335 Cassia sp. Guala 2348 Cassytha c.f. bahamense Guala 2302

Cassytha filiformis L. Guala 2305 Casuarina equisetifolia L. Guala 2338 Centrosema virginianum (L.) Benth. Guala 2281 Chaemasyce sp. JS036 Chamaecrista sp. JS033 Chamaesyce articulata (Aubl.) Britt. JS039 Chamaesyce blodegetii (Engelm. ex Hitchc.) Small. JS022 Chloris petraea Sw. Guala 2293 Cissus intermedia A. Rich. JS041 Clusia rosea Jacq. Guala 2321 Coccoloba sp. JS052 Coccoloba sp. JS057 Coccoloba sp. JS058 Coccothrinax sp. Guala 2315 Corchorus hirsutus L. JS024 Croton discolor Willd. JS037 Cuscuta cf. americana L. Guala 2280 Cynachum angustifolium Pers. JS072 Cynachum eggersi (Schlctr.) Alain. JS059 Cyperus fuligineus Chapm. JS027 Dactyloctenium aegypticum (L.) Beauv. JS020 Dodonea sp. Guala 2334 Eleusine indica (L.) Gaertn. Guala 2304 Encyclia hodgeana (Hawkes) Becker. JS060 Encyclia rufa (Lindl.) Britt. & Millsp. JS043 Eragrostis bahamensis Hitchc. Guala 2312 Eragrostis bahamensis Hitchc. JS031 Erithalis sp. Guala 2309 Ernodea sp. Guala 2349 Eugenia sp. Guala 2362 Eupatorium lucayanum Britt. JS038 Eupatorium odoratum L. JS044 Eupatorium sp. Guala 2283 Evolvulus arbuscula Poir. Guala 2282 Evolvulus bracei House, JS068 Fabaceae Guala 2355 Gochnatia paucifloscula (Wr. ex Hitchc.) Jervis ex Cabrera. JS053 Helichtris sp. Guala 2298 Heliotropium nanum Northrop. JS032 Hibiscus brittonianus Kearney. BM sn indet JS035 indet JS047 indet JS051 indet. Guala 2310 indet. Guala 2332 indet. Guala 2339 indet. Guala 2340 indet. Guala 2352 indet. Guala 2364 Ipomoea triloba L. JS021 Jacquemontia cayensis Britt. JS062 Jacquemontia havanensis (Jacq.) Urb. Guala 2284 44 Version 1.00 October 2002

Jacquemontia havanensis (Jacq.) Urb. JS028 Jacquemontia havanensis (Jacq.) Urb. JS054 Launaea intybacea (Jacq.) Beauv. JS069 Leucaena leucocephala (Lam.) DeWit. Guala 2317 Limonium bahamense (Griseb.) Britton. JS073 Lithophila muscoides Sw. JS064 Lobelia lucavana Britt. & Millsp. JS063 Lysiloma sp. Guala 2356 Macroptilium lathyroides (L.) Urb. BM sn Malaxis spicata Sw. BM sn new for TCI Manilkara sp. Guala 2307 Melochia sp. Guala 2354 Melochia tomentosa L. Guala 2319 Melochia tomentosa L. JS023 *Mimosa* sp. Guala 2357 Oldenlandia callitrichioides Griseb. JS026 new for TCI Oleaceae Guala 2285 Panicum sp. Guala 2353 Paspalum c.f. blodgetii Guala 2290 Paspalum millegrana Schrad. Guala 2363 Paspalum sp. Guala 2292 Passiflora sp. Guala 2301 Pavonia bahamensis A.S. Hitchc. JS061 Pectis linifolia L. JS030 Petiveria alliacea L. Guala 2324 Phyllanthus amarus Schum. JS066 Pinus caribea Morelet var. bahamensis (Griseb.) Barrett & Golfari. Guala 2347 Plumeria sp. Guala 2336 Poinsettia sp. Guala 2329 Ponthieva racemosa JS049 new for TCI Psidium sp. Guala 2308 Psychotria nervosa Sw. JS046 new for TCI *Rhynchosia minima* (L.) DC. JS040 Rhynchospora sp. Guala 2351 Rhynchospora sp. Guala 2360 Rivina humilis L. Guala 2322 Sabal palmetto (Walt.) Lodd. ex. Roem & Schult. Guala 2344 Salvia serotina L. JS025 Schizachyrium sp. Guala 2346 Setaria sp. Guala 2296 Sida acuta Burm. f. Guala 2326 *Sida ciliaris* L. JS067 Sideroxylon salicifolia JS045 Sideroxylon sp. Guala 2303 Smilax sp. Guala 2333 Solanum sp. Guala 2325 Spermacoce sp. JS029 Spigelia anthelmia L. JS065 Spigelia sp. Guala 2361 Spiranthes polyantha Reichb. f. JS048 Sporobolus sp. Guala 2289

Sporobolus virginicus (L.) Kunth. JS055 Sporobolus virginicus (L.) Kunth. JS071 Stachytarpheta jamaicensis (L.) Vahl. JS042 Stachytarpheta sp. Guala 2359 Stenandrium carolinae Leonard & Proctor ex. Leonard. BM sn Stenotaphrum secundatum (Walt.) O. Ktze. Guala 2341 Stylosanthes sp. Guala 2320 Sueda conferta (Small) I.M. Johnst. JS074 Swietenia mahogani (L.) Jacq. Guala 2350 Tabebuia bahamense (Northrop) Britt. Guala 2297 Teramnus sp. Guala 2287 Thouinea discolor Griseb. Guala 2286 Tillandsia utriculata L. Guala 2331 Uniola paniculata L. Guala 2345 Verbena sp. Guala 2328 *Xanthoxylum* sp. Guala 2299 Paspalum fimbriatum Kunth. Guala 2294 Sterculiaceae Guala 2313 Conocarpus erectus L. Guala 2314 Cissus sp. Guala 2323

As well as leading the botanical fieldwork under the Darwin Initiative project, the Fairchild Tropical Garden is providing further support and facilities relevant to the on-going study of the plants of the Turks & Caicos. In particular, Fairchild administers an impressive "virtual herbarium", where images of (and information on) individual plant species can be viewed through the internet. As well as the main Fairchild herbarium collection, other specimens (including the herbarium of the Cayman Islands National Trust) can be accessed here. It is anticipated that, as the specimens from Turks & Caicos develop towards a formal collection, these will also be made available electronically, courtesy of Fairchild. An initial set of Turks & Caicos specimen images is already accessible, and can be viewed at www.virtualherbarium.org/lf/tci/tci.html.

Amongst the plants recorded so far are tree species such as the Bahama Pine *Pinus caribea* var. *bahamensis* and Strong Back *Bourreria ovata*, and climbing plants including *Jacquemontia havanensis* and *Centrosema virginianum*. Amongst the ground flora are species such as Yellow Flower *Turnera ulmifolia* and Freda Bush *Rivina humilis*, both of which are said to have medicinal properties that make them useful components of a tonic, with particular value in the treatment of stomach ailments.

In parallel with plant survey work, Turks & Caicos National Trust staff are working on the Native Plant Nursery initiative. This centres on the propagation of native plants, and plants of traditional usage, for sale and distribution throughout TCI. Fundraising events were held on Providenciales and Grand Turk on Earth Day weekend, and the Grand Turk plant sale was particularly successful. The construction of a small temporary shade (made of local materials) was completed, and a large supply of used pots has been located. Plants are doing very well and more species are being propagated every week. Native plants of interest amongst those being cultivated are Frangipani *Plumeria*, Gumbo Limbo *Bursera*, Mahogany *Swietenia*, Necklace Pod *Sophora* and Geiger Tree *Cordia*. Plants of important cultural usage which are being grown include Burn Plant *Aloe*, Indian Almond *Termenalia*, Seville Orange *Citrus*, and Guinep *Melicoccus*. The National Trust plans to present trees to all schools throughout the islands for schoolyard plantings, and future sales will help to support the on-going propagation work.

2.2.3. Insects

Insects account for over half of the world's biodiversity; of the approximately 1.75 million living species known to science, 950,000 are insects. The 1.75 million known species probably represent only 10% of the total number of living species, and under-studied groups of organisms like bacteria and fungi (and many marine taxa) are substantially under-represented. However, many insect species also remain to be discovered, and the dominance of insects as a component of global biodiversity is unlikely to be challenged (*e.g.* see Groombridge 1995).

Within terrestrial ecosystems, insects not only represent a massive proportion of the different species present, but often represent some of the most abundant organisms. The diversity and abundance of insects reflects their vital (but often overlooked) contribution to the functioning of healthy terrestrial ecosystems. For example, they provide a source of food for many other animals (and some plants), contribute substantially to the decomposition and "recycling" of organic matter, often help maintain the structure of the environment on which other species depend (including maintenance of soil condition) and provide pollination services to many plants. The ecological relationships between insects and plants within a given biological community are often particularly close.

As well as representing a significant proportion of global biodiversity in numerical and functional terms, insects can provide valuable resources available for direct exploitation by humans. As well as widely recognised products (such as honey and other bee products), services can be derived from insects. For example, their diversity and rapid response to environmental change makes insects an ideal group of organisms ("biological indicators") with which to measure the health of an ecosystem. Well-designed monitoring programmes, based on analysis of changing insect faunas, can provide valuable information on the integrity and stability of entire biological communities.

2.2.3.1. The insect fauna of the Turks & Caicos Islands

The relatively small area of the Turks & Caicos Islands, combined with relatively arid local conditions, will limit the number of insect species expected to occur here (as with other groups of animals and plants). Nonetheless, a fair representation of major insect taxa would be expected (as, for example, would be the case with the neighbouring southern Bahamian islands with which the Turks & Caicos share many biological characteristics). Around 30 taxonomic orders of insects are recognised under modern systems of classification (e.g. see Daly, Doyen & Purcell 1998; Gullan & Cranston 2000). Table 2.2.3a below summarises the likely representation of each of these insect orders in the Turks & Caicos Islands.

Order	Common name	Global species no.*	Likely representation in the Turks & Caicos Islands (estimated species no.)**
Coleoptera	beetles	375000	Present (500)
Diptera	flies	250000	Present (200)
Lepidoptera	butterflies, moths	165000	Present (400)
Hymenoptera	ants, bees, wasps	120000	Present (200)
Hemiptera	bugs	82000	Present (100)
Orthoptera	grasshoppers, crickets, katydids	20000	Present (25)
Collembola	springtails	8000	Expected (15)
Trichoptera	caddisflies	7000	Unknown
Odonata	dragonflies, damselflies	5000	Present (25)
Phthiraptera	parasitic lice	5000	Expected (15)
Thysanoptera	thrips	5000	Expected (10)
Neuroptera	lacewings, antlions, owlflies	5000	Present (15)
Blattodea	cockroaches	4000	Present (10)
Ephemeroptera	mayflies	3000	Present (10)
Psocoptera	booklice, barklice	3000	Expected (10)
Phasmida			
(Phasmatodea)	stick insects	2500	Possible (5)
Siphonaptera	fleas	2400	Expected (10)
Isoptera	termites	2300	Present (10)

Table 2.2.3a. Likely representation of insect orders in the Turks & Caicos Islands.

Plecoptera	stoneflies	2000	Unknown
Mantodea	mantids	2000	Present (5)
Dermaptera	earwigs	1800	Expected (5)
Diplura	diplurans	800	Unknown
Strepsiptera	strepsipterans	550	Unknown
Mecoptera	scorpionflies,	-00	
	hangingflies	500	Unknown
Thysanura	silverfish, firebrats	370	Unknown
Archeognatha	bristletails	350	Unknown
Megaloptera	alderflies, dobsonflies,		
0.1	fishflies	350	Unknown
Embioptera	webspinners	200	Not expected (0)
Raphidioptera	snakeflies	200	Unknown
Protura	proturans	175	Unknown
Zoraptera	angel insects	30	Not expected (0)
Grylloblattodea	rock crawlers	20	Not expected (0)

* approximate numbers of species known worldwide in each order (estimates derived from a number of sources).

** these estimates are gross approximations

The massive diversity and abundance of insects, and the limited taxonomic expertise available for many of the lessstudied groups, makes a comprehensive characterisation of the insect fauna of even a limited area impractical under most circumstances. The resources and underlying objectives of the Darwin Initiative project Developing Biodiversity Management Capacity Around the Ramsar Site in the Turks & Caicos Islands required that a selective approach be adopted to insect biodiversity survey work. Consequently, two insect groups were selected for particular attention, the butterflies (a highly visible and attractive group, with flagship potential and likely appeal to eco-tourists) and the beetles (the single most diverse insect group, numerically and ecologically). Although limited data and observations were collected in relation to other insect groups, the most detailed work was conducted on these two.

The body of published information available on the butterflies and beetles of the Turks & Caicos Islands differs considerably. Although the butterfly fauna has not been studied in detail, some useful literature is available, including data that allow faunistic comparisons to be made with neighbouring southern Bahamian islands. The local beetle fauna, however, has attracted almost no previous attention, and useful comparative data are lacking. Consequently, the level of detail of information generated by the Darwin Initiative project for these two insect groups is quite different.

2.2.3.2. The butterflies of the Turks & Caicos Islands

The insect order Lepidoptera is made up of the butterflies and moths. In general terms, butterflies are day-flying, whilst moths are nocturnal. A small number of conspicuous, day-flying moths are present in the Turks & Caicos Islands, but the bulk of the moth fauna is active only at night. Although this group was not selected for particular attention under the Darwin Initiative project, a number of moth specimens were collected (particularly those attracted to light), and so some data will become available in due course.

Historically, work on the butterflies of the Turks & Caicos Islands has been sparce. Because of the islands' biogeographical association with the Bahamas, some ostensibly Bahamian collecting has extended into the Turks & Caicos Islands. Hence, some Turks & Caicos Islands butterfly records are given by Rindge (1955) on the basis of work conducted under the auspices of the Van Voast-American Museum of Natural History expedition to the Bahama Islands between December 1952 and May 1953.

Available literature hints at earlier collecting in the Turks & Caicos Islands, but details are not clear; Clench & Bjorndal (1980) refer to *Euphyes singularis insolata* being known "from a single old specimen in CM [Carnegie Museum] from Grand Turk", but provide no further information on the source of that material.

The original description of *Anaea* (=*Memphis*) *intermedia* is based on material collected from Grand Turk by N. Golding in the period December 1965 - January 1966 (Witt 1972). The corresponding NHM registration number BM 1966-44 [not BM 1965-44, as given by Witt] refers to 6 Lepidoptera from the Turks & Caicos Islands deposited by Golding. Three of these are listed as *intermedia* type specimens by Witt (1972), whilst the status (and identities) of the other specimens requires further research in the NHM collection. No further information on Golding's collecting in the Turks & Caicos Islands is readily available.

Harry Clench, the godfather of late twentieth century butterfly studies in the Bahamas, certainly collected in the Turks & Caicos Islands. Clench & Bjorndal (1980) record that he visited Grand Turk in 1978, and collected specimens of *Epargyreus zestos inaguarum* on Providenciales and North Caicos in the same year. Harry Clench's formal description of *Strymon acis leucosticha* (Miller et al., 1992) indicates that he collected this btterfly on Middle Caicos on 9 February 1978, and on North Caicos on 3 and 11 February 1978.

One of the most useful sources of observational data on the butterflies of the Turks & Caicos Islands (St Leger 198?) was published in the local magazine the *Turks & Caicos Current*. Robert St Leger was Development Finance Officer within the Turks & Caicos Islands Government in the early 1980s, and by the time of the publication of his article, had collected nearly 200 specimens and recorded 37 species (including 22 from Grand Turk). Although lacking some of the editorial discipline of a formal scientific publication, St Leger (198?) appears to be the first attempt to draw together any kind of checklist of the Turks & Caicos Islands' butterfly fauna.

For many years, Riley (1975) was the standard field guide to the butterflies of the West Indies, and includes a number of references to the Turks & Caicos Islands. Unfortunately, neither this book, nor the excellent regional work that has now surpassed it (Smith, Miller & Miller 1994) include a distributional summary from which the Turks & Caicos Islands list can be easily derived. Although all individual species and subspecies accounts in Smith *et al.* (1994) have been scrutinised (detailed accounts of some 600 butterflies in total), for relevant information, this is not always unambiguous. For example, it is not possible to assess whether "distributed throughout the Bahamian islands" indicates a definite record for the Turks & Caicos Islands.

2.2.3.3. A preliminary checklist of the butterflies of the Turks & Caicos Islands

The preliminary checklist below indicates that the Turks & Caicos Islands have yielded records of 47 butterflies, but not all of these would be expected to be extant at any one time (see below). The main sources of butterfly records from which this preliminary list is derived are St Leger (198?) and Smith *et al.* (1994). A small number of records are derived from other sources (Rindge 1955; Clench & Bjorndal 1980). Other publications (e.g. Miller *et al.* 1992; Simon & Miller 1980) provide very valuable contextual information on the butterflies of the southern Bahamian islands, but where these allude directly to Turks & Caicos records, these have invariably been collated by Smith *et al.* (1994). Observations made under the Darwin Initiative project have been very valuable in confirming (or shedding doubt on) more or less ambiguous records from the literature, and have also added to the list.

It should be noted that a wider range of species is recorded from the Bahamas in general (e.g. see Riley 1975; Smith *et al.* 1994). Furthermore (as noted above) given the historical tendency to include the Turks & Caicos Islands as part of the Bahamas for biological recording purposes, a number of these 'Bahamian' records *may* have been collected in the Turks & Caicos Islands. Other species records may not have been collected from the Turks & Caicos Islands. Other species' distributions within the wider Bahamas. The butter-fly fauna of Hispaniola, which is likely to have a lesser influence than the Bahamas on the Turks & Caicos fauna, is outlined in Schartz (1989).

Codes in square brackets after a name indicate the source of Turks & Caicos Islands records:

R = Rindge (1955)

St = St Leger (198?)

Sm = Smith *et al.* (1994)

Other sources are given in full

Codes/sources in brackets indicate that a source *strongly implies* the occurrence of a butterfly on the Turks & Caicos Islands, e.g. by recording a widespread West Indian distribution for a very common butterfly.

Common names follow Riley (1975)

<u>Family</u>: DANAIDAE (Monarchs and Milkweeds) Danaus plexippus plexippus (Linnaeus, 1758) [St, (Sm)] (the Monarch) Danaus plexippus megalippe (Hübner, 1826) [St, (Sm)] (subspecies of the Monarch) Danaus gilippus berenice (Cramer, 1779) [St] (subspecies of the Queen)

<u>Family</u>: NYMPHALIDAE (Emperors, Fritillaries, etc.) *Memphis intermedia intermedia* (Witt, 1972) [St, Sm] (the Turk Island Leaf Butterfly) *Eunica monima* (Cramer, 1782) [St] (the Dingy Eunica) *Hypolimnas misippus* (Linnaeus, 1764) [Ground, pers. obs.] (the Mimic) *Junonia evarete* (Stoll, 1782) [St] (the Caribbean Buckeye) *Anartia jatrophae guantanamo* Monroe, 1942 [Sm] (subspecies of the White Peacock) *Anthanassa frisia* (Poey, 1832) [R] (the Cuban Crescent Spot) *Vanessa cardui* (Linnaeus, 1758) [St] (the Painted Lady) *Euptoieta claudia* (Cramer, 1779) [St] (the Variegated Fritillary) *Euptoieta hegesia hegesia* (Cramer, 1779 [St, Sm] (the Mexican Fritillary)

Family: HELICONIIDAE (Heliconias)

Agraulis vanillae insularis Maynard, 1889 [R, St] (subspecies of the Gulf Fritillary)

Family: LYCAENIDAE (Blues and Hairstreaks)

Chlorostrymon maesites maesites (Herrich-Schäffer, 1864) [St, Sm] (Clench's Hairstreak)
Strymon martialis (Herrich-Schäffer, 1864) [St, Sm] (the Cuban Grey Hairstreak)
Strymon acis leucosticha Clench, 1992 [R (as subspecies armouri), Sm] (subspecies of Drury's Hairstreak)
Strymon columella cybira (Hewitson, 1874) [St, (Sm)] (subspecies of Hewitson's Hairstreak)
Electrostrymon angelia dowi (Clench, 1941) [Sm] (subspecies of the Fulvous Hairstreak)
Leptotes cassius theonus (Lucas, 1857) [R, St] (subspecies of the Cassius Blue)
Brephidium exilis isophthalma (Herrich-Schäffer, 1862) [R, St, Sm] (subspecies of the Pygmy Blue)
Hemiargus hanno filenus (Poey, 1832) [St, Sm] (the Hanno Blue)
Cyclargus ammon ammon (Lucas, 1857) [St] (Lucas's Blue)
Cyclargus thomasi clenchi (L.Miller, Simon & Harvey, 1992) [R (as subspecies thomasi), Sm] (subspecies of Thomas's Blue)

Family: PIERIDAE (Whites and Sulphurs)

Ascia monuste eubotea (Godart, 1819) [St] (the Great Southern White) Eurema daira palmira (Poey, 1846) [?(Sm)] (subspecies of the Barred Sulphur) Eurema elathea (Cramer, 1775) [St] (the False Barred Sulphur) Eurema nicippe (Cramer, 1782) [St] (the Black-Bordered Orange) Eurema lisa euterpe (Ménétriés, 1832) [St, (Sm)] (subspecies of the Little Sulphur) Eurema dina (?subspecies helios) D.M.Bates, 1934 [St] (subspecies of the Bush Sulphur) Eurema chamberlaini mariguanae D.M.Bates, 1934 [St, Sm] (subspecies of Chamberlain's Sulphur) Kricogonia lyside (Godart, 1819) [St, Sm] (the Guayacan Sulphur) Anteos maerula (Fabricius, 1775) [St] (the Giant Brimstone) Phoebis agarithe antillia F.M.Brown, 1929 [St] (subspecies of the Large Orange Sulphur) Phoebis sennae sennae (Linnaeus, 1758) [St, (Sm)] (the Cloudless Sulphur) Aphrissa neleis (Boisduval, 1836) [St] (the Pink-Spot Sulphur) Family: PAPILIONIDAE (Swallowtails)

Battus polydamas lucayas (Rothschild & Jordan, 1906) [St, Sm specifically records absence from TCI] (subspecies of the Polydamus Swallowtail)

Heraclides andraemon bonhotei (Sharpe, 1900) [St, Sm] (subspecies of the Bahaman Swallowtail) *Heraclides aristodemus bjorndalae* (Clench, 1979) [St, Sm] (subspecies of the Dusky Swallowtail)

Family: HESPERIIDAE (Skippers)

Epargyreus zestos inaguarum Clench & Bjorndal, 1980 [St, Sm] (subspecies of the Zestos Skipper) *Urbanus proteus domingo* (Scudder, 1872) [R, St, (Sm)] (subspecies of the Common Long-Tail Skipper) *Urbanus dorantes cramptoni* W.P.Comstock, 1944 [(Sm)] (subspecies of the Dorantes Skipper) *Ephyriades brunnea brunnea* (Herrich-Schäffer, 1862) [R, St, ?(Sm)] (the Jamaican Dusky Wing) *Hylephila phyleus* (Drury, 1774) [R, St, (Sm)] (the Fiery Skipper) *Wallengrenia* (?species *drury*) (Latreille, 1824) [St, Sm, but Clench & Bjorndal (1980) and Miller et al. (1992)
shed doubt on species determination] *Euphyes singularis insolata* (Butler, 1878) [Clench & Bjorndal (1980)] (subspecies of Butler's Branded Skipper) *Lerodea eufala* (W.H.Edwards, 1869) [St ?questionable] (the Eufala Skipper) *Panoquina panoquinoides panoquinoides* (Skinner, 1892) [St, (Sm)] (the Obscure Skipper)
In summary, then, the butterfly fauna of the Turks & Caicos Islands appears to consist of the following: Family: DANAIDAE (Monarchs and Milkweeds) – 3 (sub)species
Family: NYMPHALIDAE (Emperors, Fritillaries, etc.) – 9 species

Family: HELICONIIDAE (Heliconias) – 1 species

Family: LYCAENIDAE (Blues and Hairstreaks) - 10 species

Family: PIERIDAE (Whites and Sulphurs) - 12 species

Family: PAPILIONIDAE (Swallowtails) - 3 species

Family: HESPERIIDAE (Skippers) – 9 species

This gives a total of 47 butterflies.

This total is broadly consistent with that given by Miller *et al.* (1992) for neighbouring islands in the southern Bahamas: Crooked (33); Acklins (26); Mayaguana (22); Great Inagua (37). In each of these cases (as with the analysis given above for the Turks & Caicos Islands), it is likely that additional collecting effort would accumulate further species records. However, a proportion of the fauna in each case would be expected to consist of vagrants, or highly mobile species that establish only short-term local populations but regularly re-colonise. In weighing under-recording against the occasional presence of such ephemeral species, Simon & Miller (1986) conclude that the "butterfly fauna of [Great Inagua] might be composed of no more than 40 species at any one time, even though the total number of species recorded from there might be significantly higher."

2.2.3.4. Ecological groupings of Turks & Caicos butterflies

Published accounts of the ecology of each butterfly on the preliminary checklist (generally based on observations made outside the Turks & Caicos Islands), and observations made under the Darwin Initiative project, will allow these insects to be grouped into broad ecological categories. Part 3 of this Plan includes a brief consideration of the Turks & Caicos butterflies that show most restricted distributions (ie. highest degrees of endemicity), and therefore have disproportionate conservation value and potential interest to visitors.

2.2.3.5. The beetles (Coleoptera) of the Turks & Caicos Islands

As noted above, background information on the beetles of the Turks & Caicos Islands is almost non-existent. Consequently, the work conducted by Dr Roger Booth under the Darwin Initiative project represents the first assessment of the islands' coleopteran fauna. Under these circumstances, species-level determinations for all speci-

mens collected cannot be expected in the short-term. However, the following represents a summary of the material processed thus far:

Family: CARABIDAE – 12 species Family: DYTISCIDAE - 5 species Family: GYRINIDAE - 1 species Family: HYDROPHILIDAE - 5 species Family: HISTERIDAE – 2 species Family: HYDRAENIDAE - 1 species Family: PTILIIDAE – 4 species Family: STAPHYLINIDAE - 18 species Family: SCARABAEIDAE - 1 species Family: SCIRITIDAE - 5 species Family: PTILODACTYLIDAE – 1 species Family: HETEROCERIDAE - 1 species Family: LIMNICHIDAE – 1 species Family: BUPRESTIDAE - 1 species Family: ELATERIDAE – 2 species Family: ANOBIIDAE - 3 species Family: PTINIDAE - 2 species Family: BOSTRICHIDAE - 4 species Family: TROGOSSITIDAE - 1 species Family: NITIDULIDAE – 2 species Family: LAEMOPHLOEIDAE - 1 species Family: LANGURIIDAE - 1 species Family: PHALACRIDAE - 3 species Family: CORYLOPHIDAE - 1 species Family: COCCINELLIDAE - 5 species Family: MYCETOPHAGIDAE - 1 species Family: TENEBRIONIDAE - 7 species "Family": ALLECULINAE - 3 species Family: MONOMMIDAE - 1 species Family: OEDEMERIDAE - 2 species Family: MELOIDAE – 1 species Family: CERAMBYCIDAE - 11 species "Family": BRUCHINAE - 1 species Family: CHRYSOMELIDAE - 4 species Family: ANTHRIBIDAE - 1 species Family: CURCULIONIDAE - 18 species "Family": SCOLYTINAE - 3 species Family: ?? – 1 species

This gives a total of 137 species across 38 families. These totals will increase as on-going analysis of material progresses.

Amongst the fauna identified to date, species with a range of distributions and ecologies are represented. For example, amongst the coccinelid (ladybird) beetles, are found *Cycloneda sanguinea* (a widespread, New World, aphid predator), *Diomus rosecollis* (a likely scale insect predator with a Caribbean distribution) and *Psyllobora schwarzi* (a likely mould-feeder, known from Cuba, Hispaniola, the Bahamas, Grand Cayman and South Caicos – making it one of the few beetles previously recorded from the Turks & Caicos Islands). Amongst the bostrichid beetles (which typically feed in dry, dead wood) are *Xylomeira tridens* and *Tetrapriocera longicornis*, both of which are relatively widespread in the Caribbean. Widespread species tend, not surprisingly, to be more easily identified to species during an initial sorting of material. Species with more restricted distributions are more challenging, as they

may not be represented in reference collections (or may not have been collected before, requiring a formal description of the new species to be drawn up).

2.2.3.6. Other insects of the Turks & Caicos Islands

Dragonflies and Damselflies (Odonata)

Dunkle (1989, 1990) notes that the Turks & Caicos Islands are faunistically like the Bahamas, and lists the following 6 species of Damselfly and 27 species of Dragonfly under a checklist for the Bahama islands. The Turks & Caicos fauna will, therefore, constitute <u>a subset</u> of this checklist:

Order: ODONATA

Sub-order: ZYGOPTERA (Damselflies)

<u>Family</u>: LESTIDAE (Spreadwings) Lestes scalaris Gundlach, 1888 (Dusty Spreadwing) Lestes spumarius Hagen in Selys, 1862 (Antillean Spreadwing)

<u>Family</u>: COENAGRIONIDAE (Pond Damsels) *Enallagma civile* (Hagen, 1861) (Familiar Bluet) *Ischnura hastata* (Say, 1839) (Citrine Forktail) *Ischnura ramburii* (Selys, 1850) (Rambur's Forktail) *Nehalennia minuta* (Selys, 1857) (Tropical Sprite)

Sub-order: ANISOPTERA (Dragonflies)

<u>Family</u>: AESHNIDAE (Darners) Anax concolor Brauer, 1865 (Blue-waisted Darner) Anax junius (Drury, 1770) (Common Green Darner) Coryphaeschna ingens (Rambur, 1842) (Regal Darner) Epiaescha heros (Fabricius, 1798) (Swamp Darner) Gynacantha ereagris Gundlach, 1888 (Cuban Darner) Gynacantha nervosa (Rambur, 1842) (Twilight Darner) Triacanthagyna trifida (Rambur, 1842) (Phantom Darner)

Family: LIBELLULIDAE (Skimmers)

Brachymesia furcata (Hagen, 1861) (Red Pennant) Celithemis eponina (Drury, 1773) (Halloween Pennant) Dythemis rufinervis (Burmeister, 1839) (Red Setwing) Erythemis simplicollis (Say, 1839) (Eastern Pondhawk) *Erythemis vesiculosa* (Fabricius, 1775) (Great Pondhawk) Erythrodiplax berenice (Drury, 1770) (Seaside Dragonlet) Erythrodiplax justiniana (Selys in Sagra, 1857) (Antillean Dragonlet) Erythrodiplax umbrata (Linnaeus, 1758) (Band-winged Dragonlet) Idiataphe cubensis (Scudder, 1866) (Metallic Pennant) Libellula needhami Westfall, 1943 (Needham's Skimmer) Macrodiplax balteata (Hagen, 1861) (Marl Pennant) Micrathyria didyma (Selys in Sagra, 1856) (Three-striped Skimmer) Orthemis ferruginea (Fabricius, 1775) (Roseate Skimmer) Pachydiplax longipennis (Burmeister, 1839) (Blue Dasher) Pantala flavescens (Fabricius, 1798) (Wandering Glider) Pantala hymenaea (Say, 1839) (Spot-winged Glider) Tramea abdominalis (Rambur, 1842) (Vermilion Glider) Tramea insularis Hagen, 1861 (Antillean Glider)

Tramea lacerata Hagen, 1861 (Black-mantled Glider) *Tramea onusta* Hagen, 1861 (Red-mantled Glider)

Dunkle (1989, 1990) notes that none of these species are endemic to the Bahamas (clearly, therefore, none can constitute Turks & Caicos endemics), and that some of these (and other) dragonflies may simply be vagrants there. Dunkle (1989, 1990) also notes that most species fly all year, and that most habitats for Odonata in the Bahamas occur on the larger islands, in the form of ponds, rock pits and marshes (there are no fresh water streams); many Bahamian surface waters are too brackish for Odonata, with the exception of a few dragonflies.

2.2.4. Reptiles and Amphibians

Under the Darwin Initiative project, surveys of herpetiles (reptiles and amphibians) were undertaken by Glenn Gerber and Tandora Grant (San Diego Zoological Society, Centre for the Reproduction of Endangered Species), and Bryan Naqqi Manco. This survey work was centred on Middle and North Caicos, but results also draw on observations made elsewhere in the Islands. Fortunately, one of the survey periods in November 2000 included several cooler and rainy days, which provided the ideal conditions for many important finds. A number of endemic reptiles were identified, and an endemic gecko (*Aristelliger hetchi*) reported from an earlier survey but thought to be extinct was rediscovered. Marine turtles were not included in the survey, which recorded: two species of frog (both introduced); nine species of lizard (one of which is introduced); and three species of snake. Further information suggests the presence of one (introduced) species of freshwater turtle on Pine Cay, and other introduced amphibians on Providencialis. The species identified by this survey work are summarised below, and further information on the herpetofauna of the wider region is given by Schwartz & Henderson (1991).

2.2.4.1. Amphibians

2.2.4. 1.1. Frogs

Elutherodactylus planirostris (ground frog) Greenhouse Frog

A small, nocturnal, largely terrestrial, insectivorous frog. This species is native to Cuba and the northern and central Bahamas. Three subspecies are recognized, one of which, *E. p. planirostris*, has been introduced to North Caicos and possibly some cays to the west. The species was not known previously from Middle Caicos but has recently spread there. Also introduced to Florida, Mexico, Jamaica, and the Cayman Islands.

Osteopilus septentrionalis (Cuban Treefrog)

A large, nocturnal, arboreal, primarily insectivorous treefrog. This species is native to Cuba, the Cayman Islands, and the northern and central Bahamas. No subspecies are described. Introduced to Pine Cay and North Caicos. Not present on Middle Caicos in 1995 but has spread there since. The species has also been introduced to Florida, Puerto Rico, the Virgin Islands, and Anguilla.

2.2.4. 2. Reptiles

2.2.4. 2.1. Lizards

Anolis scriptus (anole or tree lizard) Turks & Caicos Bark Anole

A moderately-sized, diurnal, arboreal, insectivorous lizard. This species is native to the southern Bahamas and the Turks and Caicos. Four subspecies are recognized, one of which, *A. s. scriptus*, is endemic to the Turks and Caicos Islands, including Middle Caicos.

Aristelliger hechti (gecko, croaker, or woodslave)

A moderately-sized, nocturnal, arboreal, insectivorous lizard. This species is endemic to the Turks and Caicos. No subspecies are recognized. The species is known only from the Caicos Bank. It does not appear to have been

collected from Middle Caicos but has been reported from East and North Caicos and so probably does occur on Middle.

Cyclura carinata (iguana) Turks & Caicos Rock Iguana

A very large, diurnal, mostly terrestrial, herbivorous lizard. This species is native to the Turks and Caicos and to Booby Cay off Mayaguana Island in the southern Bahamas. Two subspecies are recognized, one of which, *C. c. carinata*, is endemic to the Turks and Caicos Islands. This subspecies is abundant on some of the small cays off Middle Caicos, but appears to have been extirpated from Middle proper. The other subspecies, *C. c. bartchi*, is endemic to the small island of Booby Cay off Mayaguana.

Note: Both subspecies are listed: (1) as "Critically Endangered" (IUCN, 1996); (2) in Appendix I of the Convention on International Trade in Endangered Species (CITES, 1992); and (3) as "Threatened" by USFWS (1994).

Hemidactylus mabouia (house gecko or wood slave)

A moderately-sized, nocturnal, arboreal, insectivorous lizard. This species is a native of Africa. It was introduced to the Caribbean centuries ago on wooden sailing vessels associated with the slave trade. It is now found throughout much of the Caribbean, including the Turks and Caicos. In the Turks and Caicos, the species is known to occur on Grand Turk, South Caicos, and Providenciales. It has now been found on Middle and North Caicos and Parrot Cay as well. It is most likely to be found around settlements.

Leiocephalus psammodromus (curly-tailed or lion-headed lizard) Curly Tail

A large, diurnal, terrestrial, omnivorous lizard. This species is endemic to the Turks and Caicos, including Middle Caicos. Six subspecies are recognized, but the animals from Middle Caicos are unassigned subspecifically.

Mabuya mabouya (skink or slippery back or snake doctor) Mabuya Skink

A moderately-sized, diurnal, terrestrial, insectivorous lizard. This species is native to Jamaica, Hispaniola, Puerto Rico, the Virgin Islands, the Lesser Antilles, and the Turks and Caicos. Three subspecies are recognized, one of which, *M. m. sloanei*, is found throughout the Turks and Caicos, including Middle Caicos.

Sphaerodactylus caicosensis (pygmy gecko) Caicos Islands Reef Gecko

A very small, mostly nocturnal, mostly terrestrial, insectivorous lizard. This species is endemic to the islands of the Caicos Bank, including Middle Caicos. No subspecies are recognized.

Sphaerodactylus mariguanae (pygmy gecko)

A very small, mostly nocturnal, mostly terrestrial, insectivorous lizard. This species is known only from Mayaguana Island and Booby Cay in the southern Bahamas and from Grand Turk in the Turks and Caicos. No subspecies are recognized. This species is not known to occur on Middle Caicos.

Sphaerodactylus underwoodi (pygmy gecko)

A very small, mostly nocturnal, mostly terrestrial, insectivorous lizard. This species is endemic to the islands on the Turks Bank. No subspecies are recognized. This species is not likely to occur on North, Middle and East Caicos.

2.2.4. 2.2. Snakes

Epicrates chrysogaster (boa) Bahaman Rainbow Boa

A moderately-sized, mostly nocturnal, semi-arboreal, constricting snake. This species is native to the southern Bahamas and the Turks and Caicos. Three subspecies are recognized, one of which, *E. c. chrysogaster*, is endemic to the Turks and Caicos Islands, including Middle Caicos. Several varieties of this boa exist, including at least two distinct pattern types. One type, the more frequent, is spotted, while the rarer variety is striped; patterns representing a combination of stripes and spots are also seen occasionally. Although this species is not currently listed as threatened or endangered, several other Caribbean species of *Epicrates* are threatened or endangered.

Note: This species is protected under Appendix II of the Convention on International Trade in Endangered Species (CITES, 1992).

Tropidophis greenwayi (pygmy boa) Caicos Islands Trope Boa A small, mostly nocturnal, semi-arboreal, constricting snake. This species is endemic to the islands of the Caicos Bank. Two subspecies are recognized, one of which, *T. g. greenwayi*, occurs on Middle Caicos. The other subspecies, *T. g. lanthanusi*, is endemic to the Ambergris Cays.

Note: This species is protected under Appendix II of the Convention on International Trade in Endagered Species (CITES, 1992).

Typhlops richardi (blind snake)

A very small, secretive, burrowing snake that specializes on termites. This species is native to Puerto Rico, the Virgin Islands, and the Turks and Caicos. No subspecies are recognized. It is not known from Middle Caicos but probably occurs there.

2.2.4.2.3. Turtles

Trachemys terrapen (pond slider)

A moderately-sized, diurnal, aquatic (freshwater), omnivorous turtle. This species is native to Jamaica and the central Bahamas. No subspecies are described. Although unconfirmed, a small introduced population is reported to occupy one or more of the freshwater ponds on Pine Cay. Very unlikely to be on Middle Caicos.

Marine turtles.

Marine turtles were not the subject of the current study, but work by others including the Department of Environmental & Coastal Resources shows the importance of the area for nesting of the important and vulnerable species *Chelonia midas, Eretmochelys imbricata, Caretta caretta*.

2.2.4.3. Habitat usage by herpetiles

Lizards are infrequent on the salt marsh and tidal flat areas, but are common throughout the islands' scrub habitats (although *Mabouya mabuya sloanei* is most frequent in higher scrub forest with a more open understory). All of the lizards may be found in areas of human settlement, and *Anolis scriptus scriptus* is often found inside houses. Vital for lizards are the small pockets of freshwater-influenced, moist habitats such as caves and sinkholes. For example, whilst *Sphaerodactylus caicosensis* may be encountered under leaf-litter in all scrub habitats and around human dwellings, it is most frequent around the mouths of caves and sinkholes: in areas where the ground is relatively moist and leaf litter has had a chance to accumulate deeply. Similarly, this endemic species favours the moist, shady microclimate under large trees (not exclusively native tree species).

Snakes may also be found in all areas of scrub habitat but are most frequent, like lizards, in moister habitats. *Tropidophis greenwayi greenwayi* is commonly encountered under rocks and logs beside freshwater ponds. It is also common wherever *Sphaerodactylus caicosensis*, one of its major prey, is abundant. Similarly, *Epicrates chrysogaster chrysogaster preys* on lizards, but also on mice, and is often found near houses, under building materials and in high grass. The blind snake *Typhlops richardi* (or thread snake as it is locally called), is found only after heavy rains in rich, loose organic soils. They are fast moving, difficult to find, and conditions do not often favour their finding. More work must be done positively to identify this animal. It is assumed, like other similar snakes, to feed underground on termites and other soft-bodied insects. Like the other Turks & Caicos herpetiles, it is most likely encountered in the moist microclimates under large trees.

2.2.4. 4. Threats to herpetiles

As elsewhere, the most significant threat to herpetiles in the Turks & Caicos Islands is probably habitat loss. There is evidence that even small-scale destruction of habitat leads to direct mortality, as well as disrupting the ecology of local species: walks through fields recently burned for small-scale agriculture often revealed several charred snake bodies. Apart from habitat loss, the biggest threat to snakes in the Turks & Caicos Islands is probably persecution. Here, as in many parts of the world, snakes are amongst the least respected of all animals. Powerful religious symbolism and widespread misconceptions (so-called "common knowledge") underpin a fear of snakes in the Islands, and many are killed as soon as they are seen. (Whilst the Biblical association of snakes with evil is common around the world, there is one snake story unique to this region that is worthy of mention. It is said that a cat can kill a snake by allowing the snake to wrap around its body - the cat then inflates its body, and breaks the snake into

pieces! No one has apparently ever seen this happening. . .) It is commonly assumed that the local snakes are venomous, but this is not the case - two of the three species documented are constrictors, and the third is a minuscule termite-eating worm snake. This negative attitude can be changed only by education, and early indications suggest that progress can be made in this area. Younger children responded well to snakes that were used as classroom exhibits in work conducted by the Darwin Initiative project with local schools on Middle Caicos.

2.2.5. Bats

Over 100 bat species occur in the Caribbean, including many endemic to particular islands or groups of islands. Although the Turks & Caicos have some good caves, the small, remote, low lying character of the islands, and their lack of forest vegetation, limits the number of bat species found here. In January and November 2001, Dr Tony Hutson, a leading bat expert from the UK, and Tim McCarthy, from the Carnegie Museum of Natural History in Pittsburgh, conducted surveys of the bats on Middle Caicos. Known caves and other likely roost sites were visited, to record numbers and behaviour of the different species.

2.2.5.1. Introduction and background

As one aspect of the Darwin Initiative Project on Turks & Caicos Islands, the bat work was designed to:

1. assess available knowledge of bats of the Turks & Caicos Islands;

- 2. carry out a bat survey on Middle Caicos;
- 3. provide training to local people from TCI National Trust (TCNT) staff and its members and others;
- 4. provide equipment, literature and other resources to enable local people to continue bat studies on the islands;
- 5. provide local education;

6. offer a population monitoring programme for resident bats

7. provide recommendations for further work to assist in the conservation of the resident bats.

A first visit was made to Middle Caicos, TCI, on 10-24 January 2001. Prior to this visit, the available literature on the bats of Turks & Caicos Islands (TCI) and surrounding areas was accumulated and reviewed, and a draft illustrated key to the (potential) species prepared.

In this brief (2-week) visit to Middle Caicos, cave, building and other roost sites or potential roost sites were investigated, counts were made of the bats in the principal cave (Conch Bar Village Cave), evening bat detector surveys were carried out, some mist-netting away from roosts was attempted, and some local training and education was achieved.

A number of other potential sites for investigation were identified.

Five bat species were identified, most of them Caribbean endemics.

2.2.5.2. Historical review of bats of TCI and findings of 2001 study

Most recent reviews of the bat fauna of the Antilles have not included the Turks & Caicos or have included them within the Bahamas (e.g. Koopman 1989; McFarlane 1991; Breuil & Masson 1991). The fauna has been included in discussions about the Bahamas (e.g. Koopman *et al.* 1957; Buden 1985; Morgan 1989). Morgan (1989) discusses the origins and affinities of the Bahamian (including Turks & Caicos) fauna and its relationship to island size and location. In two reviews of the biodiversity and conservation of UK Overseas Territories, one lists five bat species (Oldfield 1987) for TCI and one does not mention bats (Procter & Fleming 1999). A number of the earlier papers have discussed bats from the Turks & Caicos, but this literature is scattered.

It would appear that ten species of bat have been recorded from TCI (one apparently in error and at least two only from (sub)fossil material). Each species and reference to its occurrence on TCI is discussed below. Population data are included where available.

2.2.5.2.1. Family Phyllostomidae (spear-nosed bats)

1. Macrotus waterhousii Gray 1843. Big-eared bat

The species is found from the extreme south-west of USA through Mexico possibly to Guatemala, and through the Greater Antilles to Hispaniola, and in the Bahamas. The populations in USA and much of Mexico are often regarded as a separate species, *M. californicus*. IUCN Red List status: LRlc.

Shamel (1931) described an adult male from Kingston, Providencialis (sic), collected from a cave on 23 July 1930, as a new subspecies, *Macrotus waterhousii heberfolium*. It was the only occupant of the cave. Buden (1975b) recorded 15 specimens from Providenciales (at least three were from an unnamed cay in Chalk Sound) and one from North Caicos. On North Caicos, Buden (1975a) noted this species in a solution hole near Sandy Point (several miles north west of Kew). He recognized only two subspecies in the West Indies and included the TCI material in *M. w. waterhousii*. Bats of this species collected in 1985 by Operation Raleigh (Moss, 1985) from Conch Bar Cave, Middle Caicos, were identified by Hill (1985) also as subspecies *M. w. waterhousii*. Morgan (1989) recorded fossil material from Conch Bar Cave.

In January 2001, the species was found at Conch Bar Cave (c.20 on 11 January, 15 on 15 January, 10 on 21 January); Indian Cave (5 seen on 11.i, 17 trapped at emergence on 12 January, 2 trapped at emergence on 18 January); Mango Tree Hole, near Lorimers (3 in small cave on 12 January); Miss Angela Hall's house, Lorimers (6 in roof on 12.i and 14.i); Charlotte Hall's house, Lorimers (1 in roof on 14 January, locals surprised and said there used to be up to 50).

[Buden 1975a: The three Chalk Sound bats were in an early stage of pregnancy on 27 February 1972]

2. Brachyphylla cavernarum Gray, 1834.

Oldfield (1987) lists this species as from TCI. No record has been found and the species is unlikely to occur here. This listing probably arises from reference to earlier works where the *Brachyphylla* sp. on TCI was sometimes considered a subspecies of *B. cavernarum* (e.g. Buden, 1977, considered the TCI population to belong to *B. cavernarum pumila*). As currently understood the species occurs from Puerto Rico eastwards through the Antilles.

3. Brachyphylla nana Miller, 1902

The species is recorded from Cuba, Cayman Islands, Hispaniola and Turks & Caicos. Morgan (1989) refers to fossil (or more recently extinct) material from Jamaica and northern Bahamas. IUCN Red List status: LRnt.

Buden (1977) collected 19 specimens from Conch Bar Cave, Middle Caicos, in March 1975. Although the bats occurred in several roost sites during his visits, he only ever found one group of no more than 30-40 individuals on any one visit. Of the 19 bats collected, all 12 females were gravid. He assigned his material to *B. cavernarum pumila*. Bats of this species collected in 1985 by Operation Raleigh (Moss, 1985) from Conch Bar Cave, Middle Caicos, were identified by Hill (1985) as *B. nana*. Morgan (1989) recorded fossil material from Conch Bar Cave, Middle Caicos.

In January 2001, the species was located in one or both of two very adjacent roost sites in Conch Bar Cave on all visits and the colony was estimated to comprise 500-1000 individuals. Five adult males were trapped at the roost on 15 January and three adult males trapped outside the cave on 20 January

4. Erophylla sezekorni (Gundlach, 1860) Buffy flower bat

The species is recorded from through most of the Bahaman Archipelago (including Turks & Caicos), Cuba, Cayman Islands, Jamaica, Hispaniola and Puerto Rico. The populations from the latter two localities are often separated as the subspecies *E. s. bombifrons*. IUCN Red List status: LRlc.

Shamel (1931) recorded 16 specimens (as *E. planifrons*) from Stubbs Guano Cave, East Caicos. Buden (1976) recorded it from Providenciales, North Caicos and Middle Caicos. He observed groups of usually 4-30 individuals, and two groups of about 50. On North Caicos, Buden (1975a) noted this species in a solution hole near Sandy Point (several miles north-west of Kew). Bats of this species collected in 1985 by Operation Raleigh (Moss, 1985) from

Conch Bar Cave, Middle Caicos, were identified by Hill (1985).

In January 2001, the species was found roosting in Conch Bar Cave in groups of between one and c.30 individuals, with one exceptional group of 60-70. A count on 15 January located c.460 individuals and 425 on 21 January Fourteen were trapped near the entrance to Conch Bar Cave on 20 January The species was not found roosting elsewhere but five trapped emerging from Indian Cave on 12.i must have been roosting there or close by.

5. Monophyllus redmani Leach, 1821 Leach's long-tongued bat

The species is recorded from Cuba, Jamaica, Hispaniola, Puerto Rico and the southern Bahaman Archipelago (including Turks & Caicos). IUCN Red List status: LRlc.

Buden (1975a) recorded individuals or small groups of up to 15-20 individuals in the Bahamas (including TCI) but considered it uncommon (but also states that he collected 30 specimens and 'saw few others'). Apart from at roosts, he netted one in semixeric woods near Kew, North Caicos, in February 1972. He also found it on Middle Caicos. Morgan (1989) refers to Buden (1975a) also recording the species from Providenciales, but there appears to be no mention of Providenciales in Buden's discussion on this species. Bats of this species collected in 1985 by Operation Raleigh (Moss, 1985) from Conch Bar Cave, Middle Caicos, were identified by Hill (1985). Morgan (1989) recorded fossil material from Conch Bar Cave; he also recorded fossil material of this species from Andros and New Providence in the more northern Bahamas, where it has not been recorded in recent times.

In January 2001, the species was found roosting in Conch Bar Cave in groups of 1-20. Two counts of the whole cave gave very different counts for this species: 16 on 15 January and 117 on 21 January One was trapped near the entrance at dusk on 20 January No individuals of this species were seen roosting in Indian Cave, but two trapped emerging on 12.i and one on 18 January must have been roosting there or close by. Two were also trapped in a road cutting south east of Bambarra on 21 January

6. Artibeus jamaicensis Leach, 1821

A widespread species of the Caribbean (including Bahamas) and Central and South America, recorded from TCI by Buden, 1974 (and restated in Buden, 1985). Buden collected two individuals (an adult male and a gravid female) on Providenciales 'from an undercut section of a solution hole located near the north coast, between the settlement of Blue Hills and the Third Turtle Inn'. Buden also found one skull in prey remains of barn owl in a cave 'located less than 0.5 miles (0.8 km) north of the airport at Blue Hills [Providenciales] on 25 February 1972'. These locations were not investigated during the present visit, but undercut cliffs with hollows were noted on the north coast by Third Turtle Inn; however, much of this area is now developed. There should be investigation to assess whether the species persists on TCI.

IUCN Red List status: LRlc.

2.2.5.2.2. Family Natalidae (funnel-eared bats)

7. Natalus stramineus Gray, 1838

Morgan (1989) records subfossil remains of *N. major* (currently considered a synonym of *N. stramineus*) from Conch Bar Cave, Middle Caicos. *N. major* was recognised from Jamaica and Hispaniola (with extinct populations on Cuba, Isle of Pines, Cayman and northern Bahamas). *N. stramineus* is widely distributed from Mexico to Brazil. Two other *Natalus* spp. (*tumidifrons* and *lepidus*) are recorded from the Bahamas and it seems reasonable to postulate that the genus may still occur on the Turks and Caicos.

IUCN Red List status: LRlc.

2.2.5.2.3. Family Vespertilionidae (vesper or plain-nosed bats)

8. Lasionycteris noctivagans (Le Conte, 1831)

A widespread species of Canada and USA south to northern Mexico and Bermuda. It is a known migrant. The only record from TCI (and Bahamas?) is reported by Buden (1985). A female was found five miles east of the Third

Turtle Inn, Providenciales in 15 October 1970. The bat was found in a semi-torpid condition behind a window shutter on the outside of a house.

IUCN Red List status: LRlc.

9. Lasiurus borealis (Muller, 1776) Red bat

A widespread species of Canada and USA south through the Caribbean and Central America to Chile and Argentina. IUCN Red List status: LRlc.

Koopman *et al.*(1957) record a single specimen (as *L. minor*) 'from the Caicos' collected in 1891. Buden (1985) reported two incomplete skulls he had found in a cave on Providenciales on 9 January 1975 as *L. b. minor*.

Bats assumed to be this species were heard on a bat detector near Bambarra, Middle Caicos, in January 2001 and one was mist-netted there on 22 January. That individual is now preserved in the British Museum (Natural History). At the time that this bat was in the hand, at least one other individual was still flying in the area. The species is likely to be resident on TCI.

2.2.5.2.4. Molossidae (free-tailed bats)

10. Tadarida brasiliensis (Geoffroy, 1824)

A widespread species of southern USA, through Central America and much of the Caribbean and into South America. The only record for TCI is of fossil material from Conch Bar Cave, Middle Caicos (Morgan, 1989). The species occurs widely in the Bahamas and Greater Antilles and may well occur in TCI. However, the species usually emerges early and is obvious in flight, and the echolocation calls of free-tailed bats heard through a bat detector are characteristic; nothing resembling a free-tailed bat was seen or heard on Middle Caicos in January 2001.

IUCN Red List status: LRnt.

2.2.5.2.5. Summary of known bat fauna

It can, then, be said that the current known bat fauna of TCI comprises big-eared bat *Macrotus waterhousii*, Cuban fruit-eating bat *Brachyphylla nana*, buffy flower bat *Erophylla sezekorni*, Leach's long-tongued bat *Monophyllus redmani* (all family Phyllostomidae) and red bat *Lasiurus borealis* (Vespertilionidae). In addition, *Artibeus jamaicensis* and *Lasionycteris noctivagans* have been recorded in recent times; *Natalus stramineus* and *Tadarida brasiliensis* are recorded from fossil material only; *Brachyphylla cavernarum* has been recorded in error.

Apart from the other species mentioned above, there is the possibility or likelihood of some other species being found on TCI. These include other species of *Natalus* (Natalidae), *Eptesicus fuscus* (Vespertilionidae) and possibly *Molossus molossus* (Molossidae). It is even possible that the fishing bat (*Noctilio leporinus* – Noctilionidae) may occur.

Further information on these bats can be found in Novak (1994) and a key to identification of the bats of the region is available in Baker *et al.* (1984). Many of the species are covered by species accounts in the *Mammalian Species* series published by the American Society of Mammalogists.

2.2.5.3. 2001 survey

Survey and bat studies were carried out mainly in the northern parts of Middle Caicos around the east-west limestone ridge and road, and from there to the north coast.

2.2.5.3.1. Caves

Known caves were surveyed, concentrating on the main caves of Conch Bar Village Cave and Indian Cave. Additional caves were searched for in likely areas or areas identified by other residents.

Conch Bar Village Cave, Conch Bar

Conch Bar Village Cave is an extensive cave system and a map from Moss (1985) is presented at 4.5.2.14 Annex 2. Locality names from the current interpretative board outside the cave have been added. A local cave guide advised that the wet chamber/passage at the east end led through to further cave areas that opened to the surface near Buttonwood Pond; this area was not investigated during the current visit.

On 11 January a general investigation of the main tourist areas was carried out. All four recorded species were seen, including about 20 *Macrotus* and one group of c.10 *Monophyllus*. Most of the *Macrotus* and the *Monophyllus* were in the light or threshold zone, *Erophylla* mostly further into the dark zone. A number of feeding sites of *Macrotus* were noted.

On 15 January a full survey of the system was carried out with the location of all bats marked on a map. Totals are given in Table 2.2.5a. The presence of *Brachyphylla* was confirmed by catching five from the main group.

A repeat survey was carried out on 21 January On the previous count it had been difficult to locate individual (groups of) bats on the map (perhaps due to our unfamiliarity with the site), so on this occasion, the cave was divided into 21 identifiable areas and (groups of) bats allocated to individual areas. This may be a better method for long-term monitoring, but may lose some information of the detailed distribution of species within the cave. Totals are given in Table 2.2.5a. A cave guide who had assisted the Operation Raleigh survey in 1985 thought that the bat numbers were about the same then as now.

On the evening of 20 January a single 6-m net was set on the edge of the clearing about 30m from the cave entrance; 14 *Erophylla*, 1 *Monophyllus* and 3 *Brachyphylla* were examined.

On the morning of 22 January the cave was revisited to catch individuals of each species for portrait photographs.

Table 2.2.5a. Full counts of bats in Conch Bar Village Cave, Middle Caicos.

	Macrotus	Erophylla	Monophyllus	Brachyphylla
15 January 2001	15	c.559	16	500-1000
21 January 2001	10	c.425	117	500-1000

Indian Cave, west of Conch Bar, near Blue Horizon

This 'cave' is really more like an arch stretching for about 30m north to south. At the south end the roof is low (c.2m), at the north end it is high (c.10m) with various hollows and deep crevices (and may possibly connect to a cave system). There are holes in the roof through which grow well-established *Clusia* and *Ficus* trees. On 11 January, the cave was searched during the day and 5 *Macrotus* were recorded on the north wall. On the evening of 12 January, 1x18-m 1x10-m and 1x6-m mist nets were set within the covered area. *Macrotus* (17), *Erophylla* (5) and *Monophyllus* (2) were caught. These species and numbers bear little relation to what was found there during the day and many bats were caught very soon after dusk, so it is assumed that there is access to a more extensive cave system either directly from Indian Cave or in the close vicinity (indeed, at one stage it is thought that bats were entering the cave through a hole in the roof). On 18 January 2x12-m and 1x6-m mist nets inside the 'cave' between 17.30 and 20.00 caught only two *Macrotus* and one *Monophyllus*; there was generally very little activity on this night and certainly much less than on the previous netting night. On 20 January an hour was spent in the morning searching through owl pellet debris for bat remains; probably 95% of remains were rat, 5% bird and no bat remains were found.

Blue Horizon

On 17 January two sea caves were examined. These had potential as bat roosting sites, but none was found. At the time there was a strong north wind blowing into the caves and it is possible that bats use these caves in a different

season. There are many small surface holes in this area, but none suitable for bats was found. The owner of the Blue Horizon Resort, Mr Witt, reported that bats lived in a cave to the east of the main house. On 20 January the hill to the east of the property was searched. Many small surface holes, some quite deep, were found, but nothing that looked particularly suitable for bats was identified. A group of four shallow surface holes associated with a scruffy *Clusia* tree lower down near the road were also searched. Again these did not look particularly suitable, but were under shade and had overhanging rims. Here Bryan Manco reported a small broad-winged sandy-coloured bat fly across one hole, but the bat could not be relocated. The site would be worth rechecking.

Charles Rigby Hole, nr Lorimers

Bats are reputed to use this site, which was visited on 12 January It has a circular horizontal entrance about 6m across, partly overgrown. The floor at the entrance is about 6m down. There is a considerable overhang under all of the rim of the entrance. From the surface a barn owl was seen, but no bats or signs of bats. Since it would be difficult to catch bats emerging vertically from this cave, a return visit was made at about 04.15 on 16 January with a view to catching bats returning to the site in the morning. By 06.00 it was too light for bats still to be out and no bat had been seen or heard on a bat detector. It is, nevertheless, possible that bats had returned before our observations or that the site has seasonal use. It looks extensive enough to justify further exploration.

Mango Tree Hole, nr Lorimers (19 221 656 E, 24 117 51 N)

Visited on 12. i., the site is possibly a collapsed cave passage. It is an oblong pit with rock faces on three sides and soil/debris sloping up to the fourth side. At the end of each of the shorter (transverse) walls away from the main rock face is a short low passage. Standing with ones back to the main central rock face the passage at the end of the left wall had three *Macrotus waterhousii* roosting in a solution hole ('chimney') in the ceiling; the passage at the end of the right wall had no bats and no particular roost features.

Fig Tree Hole, nr Lorimers

Visited on 12 January, the site is similar to Charles Rigby Hole, but with a smaller (5m) surface entrance and shallower (c.3m) drop to floor level. Access was effected via a 'fig' tree growing out of the hole; there was only a shallow rock overhang, no underground extension and no bats.

2.2.5.3.2. Buildings

As a result of requests for information on bats, buildings reported to be used by bats were investigated, as well as some gardens where bats (fruit-eating bats) might feed.

Two or three gardens in Bambarra were investigated for fruiting/flowing trees. Miss Gertie Forbes's house seemed the richest, but see below under mist-netting.

At Lorimers, Miss Angela Hall's old house (behind new house; 19.221993E, 2412570N; 8m) was investigated on 12 January; 6 *Macrotus* were present and were still present on 14 January

Charlotte Hall's House was investigated on 14 January and a single *Macrotus* was identified. This surprised locals because they thought there had been up to 50 there. The house is now surrounded by dense scrub; this might be a disturbing factor or the roost might have seasonal use.

2.2.5.3.3. Bat detector survey

Two Stag Electronic Bat Box III bat detectors were used for evening survey work to find foraging and commuting bats, mainly between Lorimers and the west end of Montpeller Pond, plus one evening in Conch Bar village.

On 11 January, the area around Bambarra village, especially Miss Miss Gertie Forbes's garden and down to the well area and Miss Constance's fruit garden, were checked. Two bats, later identified as *Lasiurus*, were heard at Miss Miss Gertie Forbes's well.

Various sections of the road between Lorimers and Turnup Pond, and down to the accommodation at Simply Heaven were checked on 13 January, 14 January, 15 January, 16 January, 19 January, 21 January, 22 January and 23 January Particular attention was paid to garden/fruit areas (particularly on the south side of Bambarra village), the quarry with fresh-water pools near Lorimers, the deep road cutting south of Bambarra and other pond areas.

Apart from the two at Miss Miss Gertie Forbes's well, *Lasiurus* was heard at the road cutting on 14 January, 19 January and 22 January (and not at this spot on 15 and 21 January); at least two were present on 22 January

Bat detector survey around Conch Bar village on 17 January, paying particular attention to fruiting trees, produced no bats seen or heard.

It is perhaps worth noting that until the *Lasiurus* was caught, AMH had considered that this was probably an *Eptesicus* sp. (*E. fuscus*). Since *Eptesicus* spp. are largely house bats, particular attention was directed to try to identify which settlement these bats were coming from. *Lasiurus* is a tree bat, roosting in vegetation, and hence this focus of the search for a roost site was totally misplaced.

2.2.5.3.4. Mist-netting

Mist-nets were erected in the evening near or in Bambarra on four evenings, in Conch Bar village (one evening) and at Indian Cave (two evenings) and Conch Bar cave (one evening); the results of netting in or by caves is reported above under 2.2.5.3.1 Caves.

On the evening of arrival (10 January), 1x18-m and 1x12-m mist nets were erected in the garden of our accommodation at Simply Heaven (Kehl Villa), near Bambarra. No bats were caught or seen (or expected!).

On 11 January, 1x18-m and 1x12-m nets were set in Miss Miss Gertie Forbes's garden, Bambarra. One bat was seen and none caught.

On 17 January, a 6-m net was set by a *Terminalia* tree with ripe fruit outside Felix's Bar, Conch Bar Village. No bats were seen or trapped.

A 6-m net was hand-held across the road in the cutting south of Bambarra on 21 January Two *Monophyllus* were trapped, both heavily dusted with pollen. The exercise was repeated on 22 January when a single *Lasiurus* was caught.

2.2.5.3.5. Talking to people

People were asked for information about bats and bat sites. These included general public, islanders and cave tour guides. Most people seemed interested in bats, had no concerns about them and, indeed, considered them good things to have around.

2.2.5.3.6. Data from bats found

Details of bats found are given above and summarised here.

All bats examined in the hand were aged, sexed, reproductive state assessed, weighed and the forearm measured. In all, 55 bats were examined.

In addition, attempts were made to investigate the diet of captured bats by collecting pollen from fur and droppings from bags used to hold the bats during processing.

To collect pollen, a small piece of (opaque) Scotch Magic Tape was wiped over the head of pollinivorous bats; the tape was then fixed to a normal 3x1" glass slide. Peter Stafford at the Department of Botany, The Natural History Museum, London, agreed to have a preliminary look at the eight slides so collected. He also had one tube containing fruit seeds in droppings. The BM has no reference material of pollens of the area and Peter was hoping that the material would be under clear tape to allow a superficial examination without removing the tape. In view of these difficulties he has returned the material to AMH. However, he looked at one sample from bat 54 (*Monophyllus*, near

Bambarra, 21 January01) from which pollen of Cactaceae (cf. Cleome) is identified.

Three droppings from the single insectivorous *Lasiurus* were examined by AMH. Almost all of the remains were of small Lepidoptera, plus evidence of about three small beetle species. This agrees with published data on the diet of this species (e.g. Schmidly's *Bats of Texas*, 1991). The sample has been passed to Roger Booth to see if anything further can be said about the beetles.

Ectoparasites (Diptera; Streblidae)were collected from two *Monophyllus redmani*; ectoparasites were not obvious on the other species examined. It is not known that there have been any ectoparasites collected from these islands before.

2.2.5.3.7. Other observations

Additional observations were made on the bats where possible. Two observations of note are recorded here, although it is accepted that a full literature search has not yet been made.

Macrotus. In Indian Cave on 18 January and some time after dusk, several individuals were hanging on the wall making a 'chip' with a frequency from ultrasonic to much less than 10 kHz (quite audible to the human ear). These bats were also shaking half-opened wings and twisting the head around. Other individuals were visiting and hanging nearby. It is likely that this was some territorial/mating display. The same display was observed in Conch Bar Village Cave during the day on 21 January

Erophylla. With many of the groups in Conch Bar Village Cave there was single individual at the top of a 'chimney' in the cave roof repeatedly flapping its wings in short bursts; this could be heard easily before the roost was visible. Whether this was warning of our approach or a (?male) display to other bats is not clear.

There was no evidence of mating, pregnancy or lactation in any bats examined.

2.2.5.3.8. Recordings of bat sounds

It was intended to make recordings of bat sounds as heard through the bat detector for the purpose of developing an identification tape. Recordings of *Macrotus* echolocation calls in flight and social calls while at rest on cave wall, and of *Lasiurus* in flight and foraging were made. These need to be edited and the other species similarly recorded. Nevertheless, it could be said at this point that differentiation of some of the species using the caves may be difficult or impossible with the kind of detector currently available on the island. Further, *Macrotus*, *Erophylla*, *Monophyllus* and *Brachyphylla* all produce relatively quiet echolocation calls, which cannot be detected in the field except at very close range.

Notes were taken in the field re *Macrotus*, *Monophyllus*, *Lasiurus*; other details are available for some species from the literature/personal contacts.

2.2.5.3.9. Training

TCNT staff

Bryan Manco, Project Officer for TCNT, accompanied the specialists most of the time in the field.

The following equipment was provided for use on the islands:

Two Stag Electronics Bat Box III bat detectors with headphones, two pairs of gloves, one folding-frame hand net and handle, one set dial calipers, one 100g P esola balance, guy cord, batteries.

The following literature was supplied for use on the island:

General: Walker's Bats of the World, The Bats in Question;

Field techniques: The Bat Worker's Manual, Field Techniques - Bats, Ecological and Behaviorial Methods for the Study of Bats;

Bat detector guidance: The Bat Detective (booklet & CD);

Relevant regional literature: A range of papers on the bats of Bahamas/Antilles, species accounts where available for recorded or likely species from *Mammalian Species*;

Key to recorded/possible bat species on TCI: a draft key with notes and illustrations of likely bat species was prepared prior to the visit; this will be developed to provide a guide to identification in the hand, in roosts, by bat detector, and to include brief notes on behaviour, distribution, local observations, Red List status;

'A level' students and DECR staff

The Biology A Level class from Providenciales visited Middle Caicos on 18/19 January. In the afternoon of 18th a session was held on bats (biology, diversity, conservation, local fauna, etc). This was followed by a visit to Indian cave in the evening to see and hear bats in the field. Senior students from the High School on North Caicos and junior and DECR staff joined the specialists in November 2001.

Elementary school

On the last morning of the January visit, Bryan Manco gave a very impressive introduction to bats to, first, the older children and then the whole school. They were also able to see a live bat (the red bat, *Lasiurus*) and to hear it through the bat detector. This was part of a wider programme with the school.

Cave tour guides

A discussion meeting was arranged for cave tour guides. It was agreed that the TCNT would rearrange such a meeting to consider the Code of Conduct for Tour Guides and related matters.

2.2.5.3.10 Additional information

Cave tours

More visits were made to Conch Bar Village Cave than would have been approved at such a site in UK. It was clear that tourist visits are also frequent and not controlled. It is difficult to say that such a level of disturbance is affecting the bats because the bats are still there and it seems reasonable to assume that there are other suitable (but perhaps not as ideal) sites. Until now there has been no approval or licensing of tour guides and no record of frequency, areas visited, length of visits, periodicity, number of visitors. This and the showing of bats to the public and lack of 'sanctuary' areas may be a long-term problem and needs to be considered. The proposed Code of Conduct for Tour Guides, as well as Health and Safety requirements for the guides and their customers and the involvement of nature conservation interests in the management of this (and similar) sites may assist in assuring a sustainable use of the cave to demonstrate its geomorphology, history and natural history. It is of, course, essential that the guides are committed to the conservation of the cave and its fauna (including for their own interests), but it is also highly desirable from the point of view of them being in the best position to monitor the site and identify problems. Tour companies should also be provided with the code (principal companies identified by a cave guide included J&B and Silver Deep).

Archaeological data on cave bats from Indian Cave

Archaeological work is going on in Indian Cave under the leadership of David Steadman, University of Florida, USA. It would seem that long-term field work at this site is probably no problem for the bats, but it certainly would be if carried out in, say, Conch Bar Village Cave. Much of the history of the mammal fauna of Turks & Caicos and the Bahamas has been acquired from cave deposits. The present work seems to have been going on for some time (in

phases), but the present researchers are not aware of any data having been published, although in a very brief conversation, David Steadman said that he had a lot of bat remains.

Visit to Providenciales

On the return journey on 24 January, Tony Hutson and Roger Booth had a few hours in Providenciales. After a brief visit to the TCNT office, they were given a quick tour around part of the island by Fleur Stanbrook (a resident). This included a look at the hills and cliffs around Turtle Cove, Grace Bay and across to Chalk Sound. Most of the central and eastern parts of the island looked very developed and with a lot of current development, such that its importance to bats may be more from foraging habitat than roosting sites. Fleur Stanbrook reported that she had seen bats in the evenings around Grace Bay. The area is undoubtedly very different from when Buden visited in the early 1970s.

2.2.6 Birds

Within the Darwin Initiative project and other work since 1998 at most seasons of the year, a great deal of bird observations have been made in the plan area and other parts of TCI, co-ordinated by Dr Mike Pienkowski, UK Overseas Territories Conservation Forum, with the help of several observers including local residents and visiting specialists. These add substantially to earlier information. At the time of preparing this version, an analysis is in progress on Important Bird Areas (IBAs) in the Turks & Caicos Islands. This is part of a world-wide analysis applying a common framework of assessment. In future versions of this Plan, the final results of the IBA analysis will be incorporated. Further analyses will also be undertaken. In the interim, the summary of information below and its use have taken into account the developing IBA results.

The following list of birds is based on Patricia Bradley's (1995) *Official Checklist* published by TCNT, and has been updated as part of the present study.

The listing is interrupted to provide summaries, based on current work, of the status of key species relevant to management planning in this context. Not all species are annotated. In several cases, notes on several species are grouped together.

The abbreviations used are the system from Bradley (1995):

RELATIVEABUNDANCE

- a = abundant in habitat
- c = common
- u = uncommon
- r = rare

STATUS

- BR = breeding resident
- BSV = breeding summer visitor
- (SV) = summer visitor, breeding not proved
- (BR) = breeding suspected, not proved
- R = present throughout year, not breeding
- WV = winter visitor, not breeding
- (WV) = suspected winter visitor
- P = in passage, mainly fall (autumn) and spring
- V = vagrant or irregular casual visitor
- I = introduced by man, feral
- ? = unconfirmed sightings

OCCURRENCE ON EACH ISLAND GROUP

- PR Providenciales
- WC West Caicos

- NC North Caicos
- MC Middle Caicos
- EC East Caicos
- SC South Caicos
- PC Pine Cay
- CI* Caicos small cays
- CI Caicos Islands (including all the above group)
- GT Grand Turk
- S Salt Cay
- TI* Turks small cays
- TI Turks Islands (including all the above group)

TCI Turks & Caicos Islands (i.e. the whole country)

 EXAMPLE OF HOW TO USE THIS KEY:

 Species
 Status

 Blue-winged Teal Anas discors
 cWV.Cl:uWV.TI

 (common winter visitor on Caicos Islands; uncommon winter visitor on Turks Islands)

Several species newly reported in TCI since Bradley's book have been added. These species are marked by underlining.

FAMILY/COMMON NAME	SPECIES	STATUS
	GREBES – PODICIPEDIDAE	
Least Grebe	Tachybaptus dominicus	uBR.Cl:WVTI
Pied-billed Grebe	Podilymbus podiceps	uBR.Cl:WV.TC1

Least Grebe resident on many ponds but favours particularly small, deep sink-holes such as Nanny Pond and Cottage Pond. Pied-billed Grebe may use these too, but favours larger ponds and the shallow water inshore over the reef.

	SHEARWATERS - PROCELLARIIDAE	
Audubon's Shearwater	Puffinius lherminieri	uBSV.TCI
	TROPICBIRDS - PHAETHONTIDAE	
White-tailed Tropicbird	Phaethon lepturus	uBSVTCI
	BOOBIES - SULIDAE	
Masked Booby	Sula dactylatra	V
Brown Booby	Sula leucogaster	(BR).TI
Northern Gannet	Sula bassanus	?V.PR

This group of seabirds are essentially marine and visit land mainly for nesting. The cliffs of northwestern Middle Caicos, below that part of Crossing Place Trail, is an important nesting area for the white-tailed tropicbird, and is one of the few places in the islands with suitable cliffs. The adjacent Highas Cay is similarly used. Local residents familiar with birds describe Audubon's shearwater breeding in this area and the islets off the cliffs. This burrownesting species visits land only at night, so records are few, and these reports important.

PELICANS – PELECANIDAE

Brown Pelican Pelecanus occidentalis

uBR.EC:R.TCI Commonly seen gliding on the wind along the reefward shore, while searching for fish, and also on the ponds. Breeding sites include Flamingo Pond, East Caicos.

CORMORANTS - PHALACROCORACIDAE

Double-crested Cormorant	Phalacrocorax auritus	?V.PR>
Olivaceous Cormorant	Phalacrocorax olivaceus	uWV/P.GT

FRIGATEBIRDS – FREGATIDAE

Fregata magnificens

Magnificent Frigatebird uBR.TCI An important and long-established breeding colony of these, also known as man o'war birds, occurs on the mangrove bush off the south coast of Middle Caicos, suitably named Man o'War bush. Although marine feeders, snatching food from the surface or from other birds, the frigate-birds never land on water. The birds are seen in small numbers ranging widely over its feeding areas around the islands and beyond.

	HERONS – ARDEIDAE	
American Bittern	Botaurus lentiginosus	?V.GT
Least Bittern	Ixobrychus exilis	rWV.GT&PC
Great Blue Heron	Ardea herodias	uWV.TCI
Great Egret	Casmerodius albus	uWV.TC1I
Snowy Egret	Egretta thula	uR/WV.TCI
Little Blue Heron	Egretta caerulea	uR/WV.TCI
Tricolored Heron	Egretta tricolor	cBR.TCI
Reddish Egret	Egretta rufescens	uBR.TCI
Cattle Egret	Bubulcus ibis	uBR.TCI
Green Heron	Butorides virescens	cBR/WV.TCI
Black-crowned Night Heron	Nycticorax nycticorax	uWV.TCI
Yellow-crowned Night Heron	Nyctanassa violacea	cBR.TCI

The herons and egrets are some of the most typical birds of the area, making use of the ponds and marshes. Although seen most frequently at the accessible ponds, surveys on foot, by boat and from the air demonstrate usage throughout the extensive flats, mangroves and waterways, suggesting substantially important populations of the main species in these areas, including great blue heron, great egret, snowy egret, tricolored heron, reddish egret and green heron.

Cattle egrets are more terrestrial birds, typically of farmed lands. A sizeable flock frequents the areas along the main road on Middle Caicos.

The yellow-crowned night-heron also uses both terrestrial and wetland areas, often eating crabs and lizards. The low scrub vegetation along Crossing Place Trail west of Conch Bar and the associated Fish Ponds seem to be particularly favoured, although the species occurs widely.

	IBIS AND SPOONBILLS - THR	ESKIORNITHIDAE
Glossy Ibis	Plegadis falcinellus	V.CI
Roseate Spoonbill	Ajaia ajaja	V.GT
These two vagrant species are occasionally	y seen, the spoonbill more frequently.	Flamingo Pond and, when flooded,

the flats on Middle Caicos seem to be favoured sites but various temporary wetlands have also been used.

FLAMINGOS - PHOENICOPTERIDAE

Phoenicopterus ruber cBR.Cl:uP.TI

Some hundreds to thousands of flamingos use the ponds of the Caicos Islands. It is quite likely that the number is variable because these birds often act as a population ranging over a wide area, partly because suitable breeding

Greater Flamingo

conditions tend to occur irregularly and infrequently. The main ponds used are the three Flamingo Ponds (on each main island), Big Pond, the unnamed waterway between the main part of East Caicos and Hog Cay, Fish Ponds and the pond complex in northwestern North Caicos; other ponds may be used to a lesser degree. Signs of nesting activity have been reported from Flamingo Ponds on North and Middle Caicos, Big Pond and some smaller ponds in Middle Caicos and some of the NW North Caicos ponds.

GEESE AND DUCKS - ANATIDAE

Fulvous Whistling Duck	Dendropygna bicolor	V.TCI
West Indian Whistling Duck	Dendrocygna arborea	u(BR).Cl
Black-bellied Whistling-Duck	Dendrocygna autumnalis	?V
Canada Goose	Branta canadensis	I.PR
Green-winged Teal	Anas crecca	rP.WC
Mallard	Anas platyrhynchos	I.PR
White-cheeked Pintail	Anas bahamensis	cBR.TCI
Northern Pintail	Anas acuta	rWV.GT
Blue-winged Teal	Anas discors	cWV.Cl:uWV.TI
Northern Shoveler	Anas clypeata	RWV/1P.TCI
American Widgeon	Anas americans	RWV/P.TCI
Redhead	Aythya americana	RWV.PR&PC
Ring-necked Duck	Aythya collaris	rP.CI
Lesser Scaup	Aythya affinis	uWV.TCI
Hooded Merganser	Lophodytes cucullatus	rWV.TCI
Ruddy Duck	Oxyura jamaicensis	uBR.CI
Masked Duck	Oxvura dominica	rWV.pc

The important and vulnerable West Indian whistling duck breeds in, and or otherwise depends on, several wetlands. These include Village Pond, Lorimers Quarry, Nanny Pond, Duck Pond, parts of the North Caicos Flamingo Pond complex, and some of the East Caicos ponds. Despite being such a large and conspicuous bird in some situations, it can be surprisingly secretive and inconspicuous. Some of its other sites in wetlands in the woodland and scrub almost certainly remain undiscovered. The bird is known locally as the "brown bomber", apparently because of being viewed as an aerial attacker of grain fields.

Other commonly seen ducks include white-cheeked pintail, blue-winged teal, American widgeon and lesser scaup, with some of the other species seen less commonly. The main habitats are the ponds, with usage varying according to the water levels. Flamingo Pond on North Caicos is particularly important, and may hold large flightless moulting flocks, e.g. of white-cheeked pintail. Other ponds which are particularly important in some situations include Fish Ponds, Village Pond, Middle Caicos Flamingo Pond, Turnup and Montpeller Ponds, Washing Pond, Duck Pond, Topham Pond, Daddy Long Pond, the East Caicos ponds and many of the marshes.

	HAWKS – ACCIPITRIDAE	
Osprey	Pandion haliaetus cBR.TCI	
Northern Harrier	Circus cyaneusrP.TCI	
Sharp-shinned Hawk	Accipiter striatus	V.TCI
Red-tailed Hawk	Buteo jamaicensis	V.GT
	FALCONS – FALCONIDAE	
American Kestrel	Falco sparverius	cBR/(WV).TCI
Merlin	Falco columbarius	uWV11P.TCI
Peregrine Falcon	Falco peregrinus	uWV1P.TCI

Ospreys occur throughout the area, both as visiting wintering birds and particularly as the breeding residents, which are part of a distinctive race of TCI and southern Bahamas (*Pandion haliaetus ridgwayi*). They tend to nest on islets off the north coast or on trees/telegraph poles, and range widely hunting fish.

The most abundant bird of prey is the American kestrel, seen throughout the islands, including on the flats, but most readily seen spread regularly along the telegraph wires watching for prey. The related merlin and peregrine are less commonly seen, but regular.

	QUAIL & GUINEAFOWL	– PHASIANIDAE
Gambel's Quail	Callipepla gambelli	I.PR
Helmeted Guinea-fowl	Numida meleagris	I.Cl

	RAILS AND COOTS – RAI	LIDAE
Clapper Rail	Rallus longirostris	uBR.TC1
Sora	Porzana carolina	uWV.TCI
Purple Gallinule	Porphyrula martinica	rWV/P.CI
Common Moorhen	Gallinula chloropus	uBR.TC
American Coot	Fulica americana	cWV/R.Cl:uWV.GT

Coots are commonly seen on the same waterbodies as the ducks described above. Moorhens tend to use some of the smaller ponds and marshes. The "walking" rails, clapper and sora are particularly difficult to see, as they tend to stay in tall vegetation in marshes. Clapper rails breed in the area, and have been observed in small pools such as Village Pond and some of the ponds and marshes in the woodland/scrub areas.

	LIMPKINS - ARAMIDAE	
Limpkin	Aramus guarauna	V.TI
	PLOVERS - CHARADRIIDAE	
Black-bellied Plover	Pluvialis squatarola	cWV/P.TCI
Lesser Golden-Plover	Pluvialis dominica	rWV/P.TCI
Snowy Plover	Charadrius alexandrinus	cBSV.CI
Snowy Plover	Charadrius alexandrinus	cBSV.TCI
Wilson's Plover	Charadrius wilsonia	cBSV.TCI
Semipalmated Plover	Charadrius semipalmatus	cWV/P.TCI
Piping Plover	Charadrius melodus	rP.TCI
Killdeer	Charadrius vociferus	cBR.TCI
	OYSTERCATCHERS - HAEMATOPODIDAE	
American Oystercatcher	Haematopus palliatus	uBR.TCI
	STILTS - RECURVIROSTRIDAE	
Black-necked Stilt	Himantopus mexicanus	cBR.TCI
American Avocet	Recurvirostra americana	V.GT
	SANDPIPERS - SCOLOPACIDAE	
Greater Yellowlegs	Tringa melanoleuca	uWV/cP.TCI
Lesser Yellowlegs	Tringa flavipes	cWV/P.TCI
Solitary Sandpiper	Tringa solitaria	uP.TCI
Willet	Catoptrophorus semipaimatus	cBSV/.uWV.TCI
Spotted Sandpiper	Actitis macularia	uWV/cP.TCI
Upland Sandpiper	Bartramia longicauda	rP.MC
Whimbrel	Numenius phaeopus	uWV/P.TCI
Hudsonian Godwit	Limosa haemastica	rP.PR&PC
Ruddy Turnstone	Arenaria interpres	cP/R.TCI
Red Knot	Calidris canutus	rP.TCI

Sanderling	Calidris alba	cWV/P.TCI
Semipalmated Sandpiper	Calidris pusilla	cWV/P.TCI
Western Sandpiper	Calidris mauri	uWV/P.TCI
Least Sandpiper	Calidris minutilla	cWV/P.TCI
White-rumped Sandpiper	Calidris fuscicollis	uP.TCI
Pectoral Sandpiper	Calidris melanotos	uP.TCI
Dunlin	Calidris alpina	rWV/P.TCI
Stilt Sandpiper	Calidris himantopus	cWV/P.TCI
Short-billed Dowitcher	Limnodromus griseus	cWV/P.TCI
Common Snipe	Gallinago gallinago	uWV.TCI

Some arctic-breeding shorebirds occur in large numbers in the spring and autumn (fall) migration periods. Some remain in smaller numbers in the winter, and small numbers of immature birds may also occur in the summer. These species occur in shallow pools, exposed mud, the flats and the shallow waters. Although individual flocks are rarely huge, there is such an extent of suitable habitat that total numbers using the area must be quite large, especially when migratory turnover is taken into account. There are slight habitat differences between species, but large overlap. The commonest are: black-bellied plover, semi-palmated plover, lesser and greater yellowlegs, willet (which is also a breeding species in summer), spotted sandpiper, whimbrel, ruddy turnstone, sanderling, semipalmated sandpiper, western sandpiper, least sandpiper, stilt sandpiper, short-billed dowitcher.

On the sandy coasts, there are increasing non-breeding records (which sadly probably reflect better coverage, rather than an increase) of the vulnerable piping plover.

On these coasts and sandy shores of ponds and salinas, Wilson's and snowy plovers breed, as do the resident killdeers. Resident oystercatchers nest on sea shore sites.

Black-necked stilts are common breeding residents, occurring in very many of the ponds. Stilts and willets may breed in substantial numbers on the flats when wet conditions occur.

GULLS AND TERNS - LARIDAE

Laughing Gull	Larus atricilla	cBSV.TCI
Bonaparte's Gull	Larus philadelphia	V.PC
Ring-billed Gull	Larus delawarensis	rWV.TCI
Herring Gull	Larus argentatus	uWV.TCI
Gull-billed Tern	Sterna nilotica	cBSV.TCI
Caspian Tern	Sterna caspia	rWV1P.GT&PR
Royal Tern	Sterna maximus	cBR.TC1
Sandwich Tern	Sterna sandvicensis	uWV/cBSV.TCI
Roseate Tern	Sterna dougallii	uBSVTCI
Common Tern	Sterna hirundo	rP.TCI
Least Tern	Sterna antillarum	cBSV.TCI
Bridled Tern	Sterna anaethetus	cBSV.TCI *
Sooty Tern	Sterna fuscata	aBSV.TCI *
Black Tern	Chlidonias niger	rP.TCI
Brown Noddy	Anous stolidus	aBSVTCI*
Black Skimmer	Rhynchops niger	V.P>

Laughing gulls are the common breeding gull of the area, nesting particularly on islets in various situations. These are replaced in winter by mainly juvenile herring and ring-billed gulls. The shallow waters and ponds are important feeding areas for both, Fish Ponds and the Flamingo Ponds being particularly favoured feeding and roosting areas.

Royal terns are breeding residents, although individuals probably range widely at sea outside the breeding season. In summer, they are is joined by breeding least terns, Sandwich terns, roseate terns, bridled terns, sooty terns and brown noddies. Many of these use small cays, and work is in hand to detail the distributions. In suitably wet

seasons, gull-billed terns may breed on the flats.

LANDBIRDS

PIGEONS AND DOVES - COLUMBIDAE	
Columba leucocephala	uBR.TCI
Zenaida asiatica	uBR.TCI
Zenaida aurita	cBR.TCI
Zenaida macroura	cBR.TCI
Columbina passerina	cBR.TCI
Geotrygon chrysia	r(BR).NC&PC
<u>Starnoenas cyanocephala</u>	<u>V.NC</u>
	PIGEONS AND DOVES - COLUN Columba leucocephala Zenaida asiatica Zenaida aurita Zenaida macroura Columbina passerina Geotrygon chrysia <u>Starnoenas cyanocephala</u>

White-winged, zenaida and mourning doves and common ground-dove occur commonly, especially in the woodland and scrub areas. White-crowned pigeon also occurs widely in this habitat, but is less common. Locations are variable, probably depending on the fruit crop, but the woodlands of north-western North Caicos seem favoured.

Key West Quail-dove is reported from the woodland areas of the Caicos Islands, but there are few recent sightings. There have, however, been several sightings in 2001-2 in the woodlands of the Wades Green area of blue-headed quail-dove, a Cuban endemic.

	CUCKOOS – CULCULIDAE	
Yellow-billed Cuckoo	Coccyzus americanus	cP.TCI
Mangrove Cuckoo	Coccyzus minor	uBR.TCI
Smooth-billed Ani	Crotophaga ani	cBR.TCI
Occurring mainly in scrub and woodland,	the latter two species are residents,	the first a passage migrant albeit in
very large numbers.		

	BARN OWLS – TYTONIDAE	
Barn Owl	Tyto alba	uBR.Cl.
A nocturnal hunter which uses many of	the caves as day-time roosts (and pro	bably nesting sites).

Short-eared Owl	OWLS-STRIGIDAE Asio flammeus	V.GT
	NIGHTHAWKS – CAPRIMULG	IDAE
Common Nighthawk	Chordeiles minor	uP.TCI
Antillean Nighthawk	Chordeiles gundlachii	cBR.TCI
Chuck-will's-widow	Caprimulgus carolinensis	rWV.TCI
The Antillean nightjar is nocturnal hunter islands	of insects, which generally roosts on o	pen ground. Widespread through the

	SWIFTS - APODIDAE	
Black Swift	Cypseloides niger	?V.GT
Chimney Swift	Chaetura pelagica	rP.TCI
	HUMMINGBIRDS - TROCHILIDAE	
Bahama Woodstar	Calliphlox evelynae	aBR.TCI
Bee Hummingbird	Mellisuga helenae	V.PR
Cuban Emerald	<u>Chlorostilbon ricordii</u>	<u>V.EC</u>
The Bahama woodstar is common throughout the islands. The Cuban Emerald, endemic to Cuba, has been recorded in East Caicos in the 1930s and in 1998, these actually representing quite a high proportion of the visits by ornithologists to this uninhabited island.

KINGFISHERS – ALCEDINIDAE

Belted KingfisherCeryle alpyonuWV.TCIWinter visitor, using a wide range of water bodies, including ponds, shallows and creeks.

WOODPECKERS - PICIDAE

Yellow-bellied Sapsucker	Sphyrapicus varius	uWV.TCI
Hairy Woodpecker	Picoides villosus	V.PR
	TYRANTS – TYRANNIDAE	
Eastern Wood Pewee	Contopus virens	rP.GT&PR
Greater Antillean Pewee	Contopus caribaeus	V.PR
Eastern Kingbird	Tyrannus tyrannus	rP.PR

Gray Kingbird is a common breeding summer visitor, most easily seen spaced along the telephone wires. Giant Kingbird *Tyrannus cubensis*, now restricted to Cuba, used to occur in the Caicos Islands, and there have been some possible recent sightings.

Tyrannus dominicensis

SWALLOWS - HIRUNDINIDAE

aBSV.TCI

cBR.Cl

Progne subis	uP.TCl
Progne dominicensis	V.GT
Tachycineta bicolor	rP.TCI
Stelgidopteryx serripennis	rP.TCI
Riparia riparia	uP.TCl
Hirundo pyrrhonota	rP.TCI
Hirundo rustica	uP.TCl
	Progne subis Progne dominicensis Tachycineta bicolor Stelgidopteryx serripennis Riparia riparia Hirundo pyrrhonota Hirundo rustica

CROWS - CORVIDAE

Corvus nasicus

Cuban Crow

Gray Kingbird

Cuban crow occurs only in Cuba and in the Caicos Islands. The population in the latter seems particularly important. The bird uses the scrub, woodland and mangrove habitats and the village surrounds, particularly foraging for fruit.

	GNATCATCHERS & THRUSHE	ES – MUSCICAPIDAE
Blue-gray Gnatcatcher	Polioptila caerulea	cBR.TCI
Grey-cheeked Thrush	Catharus minimus	rP.PR>
American Robin	Turdus migratorius	V.PR&PC
Blue-gray gnatcatcher is a common bird	of dense scrub and woodland, wi	th particularly high densities in the

woodland between Lorimers and Bambarra.

	MOCKINGBIRDS – MIMIDAE	
Gray Catbird	Dumetella carolinensis	cWV.TCI
Northern Mockingbird	Mimus polyglottos	aBR.TCI
Bahama Mockingbird	Mimus gundlachii	aBR.TCI
Pearly-eyed Thrasher	Margarops fuscatus	uBR.CI:(BR).TI
Both the three breeding residents and the	wintering visiting catbird occur thro	ughout the islands.

WAGTAILS & PIPITS - MOTACILLIDAE

V.MC

American Pipit

<u>Anthus spinoletta</u>

First recorded (a single bird) at Conch Bar, Middle Caicos in November 2001, following prolonged gales.

	WAXWINGS – BOMBYCILLIDAE	
Cedar Waxwing	Bombycilla cedrorum	rWV.PR>
European Starling	STARLINGS – STURNIDAE Stumus vulgaris	V.GT
	VIREOS – VIREONIDAE	
White-eyed Vireo	Vireo griseus	uWV/P.TCI
Thick-billed Vireo	Vireo crassirostris	cBR.Cl
Yellow-throated Vireo	Vireo flavifrons	uWV.TCI
Philadephia Vireo	Vireo philadelphicus	rP.PR>
Red-eyed Vireo	Vireo olivaceus	rP.TCI
Black-whiskered Vireo	Vireo altiloquus	c(SV).TCI

Thick-billed Vireo is restricted to Bahamas, TCI, Cayman and a few small cays. In TCI, it is restricted to the Caicos Islands, where an endemic subspecies *Vireo crassirostris stalagmium* is recognised. It is an abundant bird in dense scrub and woodland, with particularly high densities in the woodland between Lorimers and Bambarra.

Black-whiskered vireo is a common summer visitor from its South American breeding grounds and the white-eyed vireo a less common winter visitor from the north.

Blue-winged Warbler	Vermivora pinus	rP.PR>
Tennessee Warbler	Vermivora peregrina	uP.PR
Nashville Warbler	Vermivora ruficapilla	rP.TCI
Northern Parula	Parula americana	cWV.TCI
Yellow Warbler	Dendroica petechia	aBR.TCI
Chestnut-sided Warbler	Dendroica pensylvanica	rP.PR
Magnolia Warbler	Dendroica magnolia	uWV.TCI
Cape May Warbler	Dendroica tigrina	aWV.TCI
Black-throated Blue Warbler	Dendroica caerulescens	uWV.TCI
Yellow-rurnped Warbler	Dendroka coronata	cWVTCI
Black-throated Green Warbler	Dendroka virens	uWV/P.TCI
Blackburnian Warbler	Dendroica fusca	rP. PR
Yellow-throated Warbler	Dendrolca dominica,	uWV/P.TCI
Kirtland's Warbler	Dendroica kirtlandii	rWV.GT,NC,SC
Prairie Warbler	Dendroica discolor	UWV/P.TCI
Palm Warbler	Dendroica palmarum	aWV.TCI
Bay-breasted Warbler	Dendroica castanea	rP.PR>
Blackpoll Warbler	Dendroica striata	uP.TCI
Cerulean Warbler	Dendroica cerulea	?V.GT
Black-and-white Warbler	Mniotilta varia	cWV.TCI
American Redstart	Setophaga ruticilla	cWV.TCI
Prothonotary Warbler	Protonotana citrea	rP.TCI
Worm-eating Warbler	Helmitheros vermivorus	uWV/P.TCI
Ovenbird	Seiurus aurocapillus	cWV.TCI
Northern Waterthrush	Seiurus noveboracensis	cWV.TCI

WOOD-WARBLERS - PARULIDAE

Louisiana Waterthrush	Seiurus motacilla	rWV.NC.GT
Kentucky Warbler	Oporomis formosus	RP.TCI
Connecticut Warbler	Oporomis agilis	?rP.Cl
Mourning Warbler	Oporomis philadelphia	RP.NC
Common Yellowthroat	Geothlypis trichas	cWV.TCI
Hooded Warbler	Wilsonia citrina	uWV/P.TCI

The wood warblers are a large and complex group, mainly migrant visitors at various seasons. The yellow warbler is a breeding resident. All the warblers tend to use a range of scrub and woodland habitat, including mangroves as well as other woodlands. The area from the savannah mangrove flats north of Big Pond northwards through the woodlands between Lorimers and Bambarra, to the Haulover shore area seems to be particularly important. This is also the area in which sightings have been made of Kirtland's warbler, one of the rarest and most vulnerable species in North America. (This species breeds only in certain areas of Michigan state, USA.)

	BANANAQUITS - COEREBIDAE			
Bananaquit	Coereba flaveola	cBR.TC1		
	TANAGERS - THRAUPIDAE			
Stripe-headed Tanager	Spindalis zena	u(BR).PR&NC		
Summer Tanager	Piranga rubra	uP.GT		
Scarlet Tanager	Piranga olivacea	rP.TCI		
	GROSBEAKS - CARDINALIDAE			
Rose-breasted Grosbeak	Pheucticus ludovicianus	uP.TCI		
Blue Grosbeak	Guiraca caerulea	cP.TCI		
Indigo-bunting	Passerina cyanea	uWV/aP.TCI		
Painted Bunting	Passerina ciris	?V.PR		
Dickcissel	Spiza americana	?V.GT		
	EMBERIZIDAE			
Black-faced Grassquit	Tiaris bicolor	cBR.Cl		
Greater Antillean Bullfinch	Loxigilla violacea	cBR.MC&EC		
White-crowned Sparrow	Zonotrichia leucophrys	rWV.MC		
Bobolink	Dolichonyx oryzivorus	cP.TCI		
Brown-headed Cowbird	Molothrus ater	?V.PR		
Northern Oriole	Icterus galbula	uP.TCI		
Demonscritte and common in demos h	ush through out			

Bananaquits are common in dense bush throughout.

The Greater Antillean Bullfinch is also a bird of dense scrub, but is restricted in TCI to Middle and East Caicos, where it is an endemic subspecies *Loxigilla violacea ofella*. It is replaced on North Caicos (and Providenciales) by the ecologically similar (but not closely related) stripe-headed tanager. It is remarkable to witness such marked distributional differences over such a small area as between such close islands.

The black-faced grassquit is a common but inconspicuous bird of open areas.

Some of the other species, such as blue grosbeak and indigo bunting are common passage migrants.

In addition to the observational work, a good deal of training and awareness raising has been undertaken. A supply of reconditioned binoculars, a telescope, GPS and other equipment as well as field guides has been available for use by local personnel.

Part 3. Assessment of Opportunities and Threats

As set out in Part 1, the objective of this Plan is to maintain the biodiversity and cultural integrity of the Caicos Islands including the Ramsar wetland of international importance through enabling the local people to protect the area by generating sustainable usage involving eco-tourism-based activities. More specifically:

1. To provide a means by which the rich biodiversity and cultural heritage of the area can be treasured by local people and experienced by visitors without damage to these internationally important ecosystems

2. To facilitate the development of the capacity of local people to establish small businesses based on eco-tourism and traditional crafts, so as both to provide the economic incentive for (1) and employment for young people so that they no longer need to leave the islands to find work, thereby maintaining the communities and cultural integrity.

3. To provide means of coordinating the work, educating local children (and where appropriate adults) and visitors and integrating the work into the National Physical Plan [now the Sustainable Development Planning Initiative].

4. To use this experimental approach to provide an example to the widely spread small island communities which are searching for ways of maintaining biodiversity and local culture while generating an income so that these can be maintained rather than surrendering to intensive development models imposed and driven by external investment replacing local culture and control by North American/European systems.

This Part starts to place the features that make that location important, in some sort of evaluated context. In order to do this, this Part summarises the features of priority biodiversity importance outlined in Part 2. The second main section in this Part then considers the other features of the area which provide opportunities or threats to the implementation of the Plan objectives. This then leads to the operational plan in Part 4.

3.1. Confirmation of important features of biodiversity

In this section, the initial information on the various taxa surveyed are summarised in terms of local, regional and/or international importance, taking account as practicable and appropriate aspects such as rarity, characteristic of the region or ecosystem, naturalness, and fragility.

3.1.1. Plants

Processing of the plant material collected under the Darwin Initiative project continues, and the botanical data compiled to date cannot be regarded as comprehensive. Indeed, given the number of different species involved, and the difficulty of collecting in denser habitats, further fieldwork is required (and planned) to accumulate additional specimens. The relationship between the Turks & Caicos National Trust and the Fairchild Tropical Garden is developing positively, and will provide a basis for further work in this area.

However, even on the basis of the specimens and observations collected thus far, a number of priorities for sensitive conservation management are becoming apparent. A number of individual species recorded by the Darwin Initiative study (or reported elsewhere as occurring in the Turks & Caicos) are worthy of particular attention. For example, the status of the palm *Pseudophoenix sargentii* should be evaluated and studied; this has been recorded in cultivation, but if an indigenous population could be located, this would be an important biodiversity resource in conservation terms. The orchid *Encyclia caicensis* is also notable, as an apparent Turks & Caicos endemic; biosystematic work is required to clarify the taxonomic status of this species.

As well as species-level interest, the habitats of the Turks & Caicos are also of conservation relevance in botanical terms. The presence of disjunct pineland of *Pinus caribea* var. *bahamensis* (Griseb.) is notable; the gallery forest adjacent to Wade's Green Plantation (North Caicos) is also a botanically interesting area, worthy of conservation and further investigation; and the limited fresh water habitats support locally rare botanical communities, the value of which should be recognised in conservation planning.

3.1.2. Insects

As noted in part 2 of this Plan, knowledge of differing aspects of the insect fauna of the Turks & Caicos Islands is very variable in its extent. In assessing the 'range size rarity' of individual species, the limited knowledge of the faunas of neighbouring islands (or even continental mainlands) creates a further difficulty. Some Turks & Caicos Islands' species of restricted distribution (endemics) are likely in most of the major insect orders, and may also occur in those orders with few local representatives. Such species of particular conservation value and local interest certainly occur in the one insect group for which relatively comprehensive data are available – the butterflies.

3.1.2.1. Endemicity amongt Turks & Caicos Islands butterflies

Biogeographically, the Turks & Caicos Islands are part of a set of southern Bahamian islands, and it is in this context that butterfly species of restricted distribution (endemics) are considered here. A useful analysis of endemicity of butterfly faunas in the southern Bahamian islands has been conducted by Miller *et al.* (1992). Observations of Turks & Caicos butterflies conducted under the Darwin Initiative project do not significantly conflict with these authors' conclusions.

Miller *et al.* (1992) conclude that 42.5% of the species recorded from Crooked, Acklins, Mayaguana and the Inaguas are "widely distributed, monomorphic, apparently vagile species that are of limited use in a biogeographic analysis". They consider this to be consistent with the approximately 50% of the overall West Indian butterfly fauna which is expected to fall into the category of "dispersalist". In relation to individual islands, Miller *et al.* (1992) conclude that the following numbers and proportions of species are widespread and vagile:

- Crooked, 16 out of 33 (48.5%);
- Acklins, 14 out of 26 (53.9%);
- Mayaguana, 12 out of 22 [including a sight record for *Ascia monuste*, but excluding a sight record of *Hamadryas feronia diasia*] (54.5%)
- Great Inagua, 17 out of 37 [excluding "the one *very* questionable *Ephyriades zephodes* record cited by Clench & Bjorndal (1980)"] (46%).

It is likely that widespread species make up a similar proportion of Turks & Caicos Islands butterflies, leaving approximately 50% of the fauna showing some degree of endemicity. Based on faunal lists with such widespread species removed, Miller *et al.* (1992) note that, in general, Crooked and Acklins support similar faunas ("as expected, because they share the same bank"); that the Inaguas usually share faunal elements with the Turks & Caicos; that Mayaguana supports a fauna similar to that found in the Inaguas, but more similar to that of the Turks & Caicos; and that the Crooked / Acklins fauna is rather different from that found across the Inaguas / Mayaguana / Turks & Caicos.

Miller *et al.* (1992) go on to consider the southern Bahamian butterflies not included on their list of "widespread" species; these "endemic taxa" have more or less restricted distributions within the southern Bahamian islands (summarised in Miller *et al.*'s Table 1). As such, these authors consider the following to be closest to having TCI endemic status:

- Strymon acis leucosticha (TCI only)
- Memphis intermedia intermedia (TCI, Inaguas)
- · Eurema chamberlaini mariguanae (TCI, Mayaguana)
- · Cyclargus thomasi clenchi (TCI, Inaguas, Mayaguana)
- · Heraclides aristodemus bjorndalae (TCI, Inaguas, Mayaguana)
- · Wallengrenia sp. (TCI, Inaguas, Mayaguana)

Note: Smith *et al.* (1994) refer to Jacqueline Miller's intention to describe a new <u>subspecies</u> of *Wallengrenia drury* (cf. the new <u>species</u> promised to be forthcoming from this author by Clench & Bjorndal (1980) and Miller *et al.* (1992)). Those earlier papers had suggested that the Turks & Caicos form of *Wallengrenia* would be included in the new entity (with the restricted distribution shown above), but Smith *et al.* (1994) suggest that the TCI form is the "typical *W. drury*", which is much more widely distributed.

On this basis, *Strymon acis leucosticha* appears to be the one butterfly that is entirely confined in its distribution to the Turks & Caicos Islands.

Miller *et al.* (1992) include the formal description of *leucosticha* by Harry Clench (based on 55 specimens collected in 1978, mostly from Conch Bar, Middle Caicos, with some also from Whitby, North Caicos). In his description, Clench notes that "we flew over to Middle Caicos for the day, and, as we walked westward from the airstrip at Conch Bar, we encountered several *Croton* plants, where we found and took a few more *acis*. We proceeded further, and both *Croton* and *acis* became more numerous. Soon we reached a side road that headed north toward the nearby coast, and we followed it. It quickly began to cross an area of rolling hills, in sight of the sea. This area was covered solidly with low, heath-like vegetation, rarely more than 0.4-0.6m high, at least half of which was *Croton* (the remainder included *Coccothrinax* palms and *Cocoloba uvifera*, among other things). In this *Croton* heath *acis leucosticha* was extremely common, and hundreds could have been taken in a few hours. They were flying, perching on the *Croton* leaves and feeding at its flowers." This passage suggests that the area where Clench found *leucosticha* most abundant is precisely the same area where Oliver Cheesman found it to be most common during surveys under the Darwin Initiative project in 2001/02. Given the significance of this butterfly in biodiversity terms, this area (immediately between Conch Bar village and the northern shore, and to the west in the Crossing Place Trail / Fish Ponds area) is probably of much greater conservation value than is immediately apparent.

3.1.3. Reptiles and Amphibians

There is no evidence of an indigenous amphibian fauna in the Turks & Caicos Islands; both amphibian species found during herpetile surveys are recent introductions (the frogs *Osteopilus septentrionalis* and *Eleuthrodactylus planirostrus planirostrus*). However, the reptile fauna not only contains a high proportion of indigenous species, it also exhibits a high level of endemicity. Herpetile surveys indicate that the Turks & Caicos Islands support four endemic species of lizard (the gecko *Aristelliger hechti*, Curly Tail *Leiocephalus psammodromus*, Caicos Islands Reef Gecko *Sphaerodactylus caicosensis* and pygmy gecko *Sphaerodactylus underwoodi*) and one endemic species of snake (the Caicos Islands Trope Boa *Tropidophis greenwayi*). In addition there are three further lizards (Turks & Caicos Bark Anole *Anolis scriptus*, Turks & Caicos Rock Iguana *Cyclura carinata carinata* and Mabuya Skink *Mabuya mabouya sloanei*) and one snake (Bahaman Rainbow Boa *Epicrates chrysogaster chrysogaster*) that are endemic at the subspecific level. Certain reptiles, whilst not confined to the Turks & Caicos Islands is confined to the small island of Booby Cay off nearby Mayaguana, and *Sphaerodactylus mariguanae* is also restricted to Mayaguana and the Turks & Caicos.

The vulnerability of the Turks & Caicos herpetofauna is recognised to a limited extent by the international conservation status of certain local species. The snakes *Tropidophis greenwayi* and *Epicrates chrysogaster* are protected under Appendix II of the Convention on International Trade in Endagered Species (CITES, 1992), and the iguana *Cyclura carinata* is protected under Appendix I of the same Convention, as well as being listed as "Threatened" by USFWS (1994) and "Critically Endangered" by IUCN (1996).

The lizard fauna is common throughout the island habitats, although *Mabouya mabuya sloanei* is more common in higher scrub forest with a more open understory. More vital for the reptiles are the small pockets of freshwater influenced moist habitats such as caves and sinkholes. While *Sphaerodactylus caicensis* may be encountered under leaf-litter of all of the scrub habitats and around human dwellings, it is more frequent around the mouths of caves and sinkholes: in areas where the ground is more moist and leaf litter has had a chance to accumulate deeply. A similar habitat frequented by this endemic species are the moist, shady microclimates under large trees (not exclusively native tree species). Snakes may be found in all areas of scrub habitat but are most frequent, like *Sphaerodactylus caicensis* (one of their prey items), in moister habitats. *Tropidophis greenwayi greenwayi* is commonly encountered under rocks and logs beside freshwater ponds. This snake is also common where *Sphaerodactylus caicosensis* are abundant, this being their major prey item.

Apart from habitat loss, the biggest threat to snakes is persecution, partly under the mistaken assumption that they are venomous. This attitude can be changed only by education. Occasionally, the Darwin Project Officer was called out to collect "nuisance" snakes and, sometimes, braver people brought them to the Project headquarters in a bucket. The Project kept one Rainbow Boa for educational purposes, using it in classroom presentations throughout the islands. Children who had not yet had the chance to develop a fear and disdain for snakes were given the opportunity to learn about these animals and other reptiles while meeting this special classroom visitor. The snake is

a very well-liked guest in the classroom; when Bryan meets children in the villages, their first question is often "...when will you bring the snake back to school?!" With the help of this special animal, the students get a chance to learn about the creatures that share their island home, and how to live happily alongside them.

3.1.4. Bats

Four species were found in caves (one of them also occurs in small rock shelters and houses). Of these, the Bigeared Bat *Macrotus waterhousii* feeds on large insects, such as cockroaches and katydids and even the giant Erebus moth; the bat lives singly or in small groups near the entrance to the caves or in disused houses. The Buffy Flower Bat *Erophylla sezekorni* and Leach's Long-tongued Bat *Monophyllus redmani* form larger groups deeper into the cave, and both have long noses and tongues to feed on nectar from flowers; both species will also eat pollen and some insects. The fourth cave species, the Cuban Fruit-eating Bat *Brachyphylla nana* feeds mainly on fruit. The latter three species are all endemic to the Caribbean and are probably very important for the pollination and seed dispersal of many plants. The fruit-eating bat has quite a restricted range and the large colony on Middle Caicos marks the northern limit of its distribution. These bats have been recorded in TCI before, but a fifth species (initially heard on a bat detector, and finally trapped with a mist-net) proved to be a new record for the islands: the Red Bat *Lasiurus borealis*. This species feeds on small insects. Four further species have been recorded from TCI, two from fossil material, and two from Providenciales (a widespread species seen there in the 1970s, and a single record of a well-known North American migrant).

A quarter of the world's bat species are listed as threatened and a further quarter are close to slipping into one of the threatened categories. One of the Middle Caicos species fits into the latter category. Tony Hutson found it very refreshing to be on an island where there did not seem to be any serious conservation threats at present. But it may not always be so; the high level of development on Providenciales has probably already had a significant impact on the bats there. We hope that the islanders will remain aware of the value and conservation needs of bats, and that future development and other human activities will allow a healthy and varied bat population to thrive on the islands. The people of Middle Caicos are interested in their bats, and rather like having them around (perhaps because some species feed on the local mosquitoes and biting midges!). Many tourists also visit the Conch Bar Caves and see the bats. Here is a possible source of conservation concern. It is important that the tourists and their guides have the opportunity to appreciate the bats, but also recognise the bats' sensitivity to disturbance. A policy on cave tours to maintain the biological and other interests of Conch Bar Village Cave (and any other tour caves used by bats) should be established. There should be greater involvement of nature conservation interests in the management of the site. Monitoring the bat populations on the island will help to identify changes that arise from human activity or natural causes, and a conservation code for cave visits has been drafted (see 4.5.2).

3.1.5. Birds

Birds move around more freely than most animals. It is often thought that they can go somewhere else if something goes wrong with their habitat in a particular place. However, recent ecological studies indicate that bird populations survive only because the birds have a network of habitats available to them – nowhere is surplus to their requirements. Fieldwork on wetland birds before and during the Darwin Project has shown that the TCI study area is very important to waterbirds and that usage is very variable. This variability is seasonal and year-to-year, and probably relates largely to weather conditions. It is important that human intervention does not make things yet more complicated. Consider the vulnerable West Indian Whistling Duck. The project has raised local interest in this important and secretive bird, and several valuable breeding observations have been made by local residents and project staff. However, one breeding site was made unavailable in 2001 because someone hunting crabs burnt the vegetation where the bird nests, even though this is a Nature Resrve.

The interesting and unusual flora and fauna of Turks and Caicos Islands wetlands, particularly the bird life such as flamingos, provides valuable opportunities for education, scientific study, tourism and recreation. Few areas in the West Indies offer large areas of undisturbed wetland habitat for native and migratory waterfowl. The geographical location of these wetlands serves as a "stepping stone" in the eastern flyway that bridges two continents, North and South America. Waterfowl find crucial respite and refuelling from the rigours of migration when moving south in the

late summer and early autumn and north again in spring. The wetlands of the Turks and Caicos are extremely important for the continued survival of several migrant and native species. This is particularly true for migrant shorebirds whose populations are at their lowest as they return to breeding areas in North America. West Indian species of waterfowl (ducks, flamingos, herons, and shorebirds) are also losing habitat as tourism related development expands in the region. Among species of particular concern that are found in the Turks and Caicos are the Reddish Egret (scarce and considered vulnerable – Directory of Neotropical Wetlands, Scott & Carbonell 1986), West Indian Whistling Duck (vulnerable, being threatened by hunting and habitat loss – IUCN Red List, 1986) and American Flamingo. The area regularly supports internationally important populations of:

West Indian whistling duck *Dendrocyhna arborea* (VU), the Caribbean population of brown pelicans *Pelecanus occidentalis*, the nominate subspecies of the reddish egret *Egretta rufescens*, the "Cuban/Bahaman" population of the West Indian flamingo *Phoenicopterus ruber*, white-cheeked (or Bahama) pintail *Anas bahamensis*, possibly non-breeding black-bellied plover *Pluvialis squatarola cynosurae*, possibly non-breeding lesser yellowlegs *Tringa flavipes*, Caribbean subspecies of gull-billed tern *Sterna nilotica aranea*.

Whilst the importance of the wetlands is increasingly well known, the dry woodlands had not been noted for their wildlife. It is now clear that birds here make themselves obvious only in the one or two hours just after dawn and at certain times of year. The study has found that these woodlands support important breeding populations of characteristic local birds, some widespread but others found in no or few other places (such as the Bahamas, Cuba or Hispaniola); these include Thick-billed Vireo, Bahama Woodstar Hummingbird, Greater Antillean Bullfinch and Cuban Crow. In addition to these, the woodlands are vital wintering areas for some North American breeding populations. These birds may also be more obvious in April-May than at other times, because they spend a lot of time feeding to fuel their migrations to their breeding grounds. Among the most important finds during the recent fieldwork were several Kirtland's Warblers. This is one of the most threatened bird species of the region, the world population consisting of only about 3000 individuals. They breed only in a restricted habitat in one part of Michigan, USA and spend the non-breeding season in largely unknown locations in the Bahamas and TCI. It is now clear that the woodland on Middle Caicos is important to the survival of this species and for the continued well-being of many others. Indeed, it is likely that the scrublands and woodlands throughout TCI are of much more importance to wildlife than generally realised. All too often they are regarded as wastelands, but we should be very careful how these areas are treated during the Islands' development.

TCI is usually grouped with the Bahamas as an "endemic bird area" (holding species which occur nowhere else). However, TCI also shares the Cuban Crow only with Cuba. The Darwin project has sighted yet more species otherwise restricted to Cuba (see Part 2).

Internationally important dry-land species occurring on the Ramsar site (and in some cases more importantly on the adjacent woodland area which is ecologically linked):

Cuban Crow Corvus nasicus - occurs only in Cuba and in the Caicos Islands;

Thickbilled Vireo *Vireo crassirostris stalagmium* - endemic subspecies restricted to the Caicos Islands; Greater Antillean Bullfinch *Loxigilla violacea ofella* - endemic subspecies restricted to Middle and East Caicos;

Kirtland's Warbler Dendroica kirtlandii(VU) - see above.

3.1.6. Ecosystems

The preliminary results of the preceding Darwin Initiative project – combined with local knowledge – underline the importance of the wetlands and the terrestrial ecosystems for fisheries and farmers.

3.1.6.1. Wetlands

Ray and Sprunt (1971) pointed out the great value of the habitats in the Turks and Caicos Islands because in many cases they are as close to the natural state as any to be found on similar island systems in the American tropics. These considerations make the Turks and Caicos Islands likely candidates for the possession of wetlands of international importance.

In tropical systems such as the Turks and Caicos Islands coastal mangroves are now recognised as one of the most productive systems in the world providing rich nursery grounds for many commercial species. Thus the important local fisheries for conch, lobster and bonefish depend on organic food material produced in mangrove areas and distributed by the numerous creeks and channels to the bank and reefs. Enclosed Lagoons and Mangrove Swamps make up 25% of the wetlands in the Turks and Caicos Islands and the large shallow sea channels separating North, Middle and East Caicos are fringed by dense growths of Red Mangrove.

Mangrove swamps and salt ponds also serve to reduce flooding and trap sediments which would otherwise enter the coastal waters during heavy rainfall and smother corals and seagrass beds that depend on clear water.

Mangroves serve to protect coastlines against erosion especially during heavy storms. This natural barrier may be damaged in storms but will grow back again without cost to man. Island building and maintenance is a living process and the dynamics of island formation and erosion are complex.

The salinas and salt ponds of the Turks and Caicos make up 65% of the wetlands on the islands providing valuable wildlife habitat. They have also been valuable sources of salt and retain cultural and historical value.

Freshwater formations make up 10% of the wetlands on the islands and represent the watershed system of the Turks and Caicos Islands and thus form a vital resource which if degraded affects every sphere of land use, especially in a dry climate. Pollution or depletion of the watershed can affect agriculture and water supplies linked through the porous limestone rock, and can eventually affect offshore marine habitats such as coral reefs.

For the above reasons international conservation bodies have been particularly concerned over the decline of wetland habitats in the Caribbean region and every effort should be made to conserve this resource while it is still in relatively good condition in the Turks and Caicos.

The importance of some of the wetlands of the area, including the area later designated as a Ramsar site, was established by Clarke & Norton (1987), who also noted the importance of the following areas outside that site:

Dick Hill Creek (now a Nature Reserve) Bellfield Landing (now a Nature Reserve) Mangrove Pond Mud Hole Pond Moore Hall Pond Pumpkin Bluff Pond (now a Nature Reserve) Cottage Pond (now a Nature Reserve) Bottle Creek Fish Pond Montpeller [including Turnup] Pond Windward Going Through The Lagoon, East Caicos Ponds, East Caicos

Since that report, the Parties [i.e. nations] to the Convention have identified major gaps in coverage of ecosystems amongst the designated sites across the world, and have identified these gaps as priorities. These include coral reefs, seagrass beds and mangrove swamps. In addition, there is a developing approach to include within boundaries complete functional systems, rather than example habitat-types.

On these bases and more recent information outlined earlier, the following areas should be considered as candidates for safeguarding as part of the heritage and as an investment for local community economic development, based on heritage:

Nanny Pond & Trail Long Bay, Middle Caicos The creeks and flats at Lorimers and Increase, Middle Caicos Duck Pond, Middle Caicos Turnup & Montpeller Ponds, Middle Caicos Joe Grant's Cay and the adjacent channels English Pond, Middle Caicos Jack Pond, Middle Caicos East Caicos flats and marshes Fish Ponds, Middle Caicos Blowing Hole, Middle Caicos Juniper Hole, Middle Caicos East Caicos ponds Small cays for iguanas etc The reef off the north & east shore of East Caicos The reef off the north shore of Middle Caicos

The Darwin Initiative project results have confirmed the importance of the Ramsar site, and identified additional aspects of importance. North, Middle & East Caicos comprise one of the largest and probably the most pristine wetland systems in the Caribbean (and coral/mangrove systems generally). The Ramsar site is the fourth largest Wetland of International Importance designated by the UK and its Overseas Territories. This is important because there is increasing evidence that the long-term survival of many populations of animals and plants is dependent on the continued existence of large, continuous blocks of suitable habitats.

3.1.6.2. Terrestrial areas

The systematic survey of important areas for nature conservation of the late 1980s addressed wetlands but not terrestrial habitats. The importance of these has therefore been overlooked. The work of the Darwin Initiative project and other recent studies are now able to start correcting this. Some particularly important areas are:

Woodland and scrub areas between Lorimers and Bambarra, Middle Caicos Crossing Place Trail west of Conch Bar, Middle Caicos Gallery forest adjacent to Wade's Green, NW North Caicos.

3.1.6.3. Marine areas

The Darwin Initiative work has not centred on marine areas, because this is the focus of work by DECR and CRMP. However, in the context of inter-relatedness of systems and proximity to the existing Ramsar site, it is worth noting the summary map supplied to UK Foreign & Commonwealth Office by IUCN World Conservation Monitoring Centre (reproduced on the following page). The importance of the coral reef off North, Middle and East Caicos is evident, as is the particularly extensive area off the eastern shore of East Caicos.

Key to map:

Red = coral

Green = main mangrove areas [Note that this is summary information; the more precise information from the current project summarised in Fig 1 should be used in preference.]

Water depths indicated by shades of blue, with changes at depths of 200m and 2000m

Source: IUCN World Conservation Monitoring Centre/ UK Foreign & Commonwealth Office



3.2. Related opportunities and threats

3.2.1. Historical and archaeological sites

Long-term archaeological work has been carried out on the Arawak sites within the area. A site (MC6, or *Ia góra*), within the Ramsar site on the south side of Middle Caicos, is considered to have been a major regional centre of pre-Columbian society (e.g. Keegan 1997, although this is questioned by Jones O'Day 2002), as were the caves on both Middle and East Caicos. Several other Lucayan settlement sites on the north shore of Middle Caicos have also been excavated, with important finds.

TCNT and the National Museum have both worked on the historic plantations, and this material will also be incorporated in trails and displays. Some of the more important plantation features include:

Wades Green, North Caicos Haulover Plantation Ruins and Field, Middle Caicos Dustry Plantation Ruins, Middle Caicos Dr John Lorimers tomb & surrounds, Middle Caicos Jacksonville ruins, East Caicos

3.2.2. Visitor sites and interest

There is already a low level of visiting to some parts of the area. Cottage Pond and the viewing position at the north end of Flamingo Pond on North Caicos are both popular places, but interpretation is lacking. TCNT's recent opening of Wade's Green on North Caicos is already attracting visitors.

On Middle Caicos, the shore on parts of Crossing Place Trail, Conch Bar Caves, Indian Cave and Man o'War Bush are popular visitor sites. Indeed, concern at how to manage increasing visitors to the caves is one of the priority concerns of local residents who welcomed the development of this Plan partly for this reason.

This embryonic visitor interest is both an opportunity and a potential threat, if it were to develop unmanaged. Now is the time to implement such management, before serious problems arise.

3.2.3. Protected and other important sites

Several sites in North, Middle and East Caicos have already been listed under the National Parks Ordinance as protected areas, although management for these areas awaits the implementation of the present plan. In addition, several sites, although not listed as protected areas, are also protected by Ordinance by virtue of ownership by Turks & Caicos National Trust. Several other sites have been recognised in previous reports as being of importance, but are not as yet protected.

Site	Status	Ownership	Comment
Wades Green - North Caicos	-	TCNT	ExCo agreed 99-year lease to TCNT for Wades Green on 17 Nov 1999. Management part of Darwin study
Gallery forest near Wade's Green, NW North Caicos		Mainly private, with some Crown	Management part of Darwin study
East Bay Islands National Park - North Caicos	NP	?Crown	
Cottage Pond Nature Reserve - North Caicos	NR	?Crown	
Dick Hill Creek and Bellefield Landing Pond Nature Reserve - North Caicos	NR	?Crown	
Mangrove Pond, N Caicos			Identified by Clarke & Norton 1987
Mud Hole Pond			
St Thomas Hill Pond			
Moore Hall Pond			
Pumpkin Bluff Pond Nature Reserve - North Caicos	NR	?Crown	
Three Mary Cays Sanctuary - North Caicos	Sanct	?Crown	

Site	Status	Ownership	Comment
North, Middle and East Caicos (International Ramsar Site)	NR	Crown	Wholly includes also NR22: Vine Point (Man O'War Bush) and Ocean Hole Nature Reserve - Middle Caicos. Management part of Darwin study
Crossing Place Trail, Middle Caicos (including Blowing & Juniper Holes)	-	Various, but much Crown	Management part of Darwin study
Fish Ponds, Middle Caicos	-	Crown	Management part of Darwin study
Indian Cave, Middle Caicos	-	Crown	Management part of Darwin study
Conch Bar Caves National Park - Middle Caicos	NP; should be NR	Crown	Includes Village Pond & Buttonwood Pond. Management part of Darwin study
English Pond, Middle Caicos	-	?Crown	
Jack Pond, Middle Caicos	-	?Crown	
Old School and grounds, Bambarra	-	TCNT	Transfer from TCIG agreed 2001 for eco-centre. Management part of Darwin study
Woodland and scrub areas between Loriners & Bambarra, including:	-	Various owners including some Crown	Management part of Darwin study
- Haulover Plantation Ruins and Field, including trail	-	Crown	Management part of Darwin study
- Nanny Pond & Trail	-	Crown	Management part of Darwin study
- Trail to Armstrong Pond	-	Mainly Crown	Armstrong Pond is within the Ramsar site NR17. Management part of Darwin study
- Trail to flats & Big Pond	-	Mainly private where not on flats	Management part of Darwin study
Turnup & Montpeller Ponds, Middle Caicos	-	Crown	Management part of Darwin study
Corry & Washing Ponds	-	Crown/ private	Management part of Darwin study
Duck Pond, Middle Caicos	-	Crown	Management part of Darwin study
Long Bay, Middle Caicos	-	Crown	Management part of Darwin study
Dustry Plantation Ruins, Middle Caicos	-	?private	
Dr John Lorimers tomb & surrounds, Middle Caicos	-	?privaye	
School House in Lorimers, Middle Caicos	-	?Crown	
The creeks and flats at Lorimers and Increase, Middle Caicos	-	Crown	Management part of Darwin study
Joe Grant's Cay and the adjacent channels incl Windward Going Through	-	?Crown	Identified by Clarke & Norton 1987
East Caicos Caves		Crown	Identified by Clarke & Norton 1987
Jacksonville ruins, East Caicos	-	?Crown	
East Caicos ponds	-	?Crown	
East Caicos flats and marshes	-	Crown	Identified by Clarke & Norton 1987
Small cays for iguanas etc	-	?Crown	
The reef off the north shore of East & Middle Caicos	-	Crown	Spakling et al; FCO
The reef off the east shore of East Caicos	-	Crown	Spalding et al; FCO
Areas of importance for plants with traditional uses			To be identified in further work
Other historical/archaeological sites			To be identified in further work

3.2.4. Built development activities

The continual tendency for multinational companies to develop resorts and speculative developments on previously unspoilt islands has been one of the major problems in many areas. The history of these demonstrates all too frequently damage to the environment and to the quality of life of local people, usually not accompanied by any financial benefits to them, as opposed to the overseas investors. A common pattern is for development to become increasingly intensive, with the result that most of the originally attractive nature is lost. Subsequently, custom and investment declines, and the economy becomes depressed, without the possibility of attractive areas on which to base more sustainable development. Such a pattern has happened in turn to many areas around the Mediterranean and more recently elsewhere. In the last few years, there are several reports of regular visitors to, e.g., the Cayman Islands abandoning them because they considered them spoilt, and moving to TCI.

Within TCI, the most intensive development has been in Providenciales. However, there are plans (with implementation not funded) for a huge resort and mega-cruise-liner port at East Caicos, smaller developments (on which sporadic work has begun) on Middle Caicos, and substantial areas of individual building development on both North and Middle Caicos.

3.2.5. Visitor centre

In 2001, TCI Government decided to transfer to the Turks & Caicos National Trust the former Vera Hamilton Primary School in Bambarra, Middle Caicos. The property consists of a large, open area near the heart of Bambarra Settlement, and several buildings. The largest of these is the school house, which consists of two large adjacent rooms, each of about 80m². Architectural plans are currently being drawn up, and funds for the renovation of the buildings are being sought. The District Commissioner's Office recently renovated the basketball court within the grounds of the former school, a first step in returning the property to being a centre for community activities.

It is intended that much of the property will be used as an interpretive visitors' centre and a research base. Included in the grounds will be a botanical garden of native plants and plants of cultural importance. A working "field" or garden, is also planned for the site. One of the school building's rooms will be renovated as a visitors' centre and research station. Exhibit areas will hold cultural, historical, and natural history displays. This area will also include an office and space for herbarium and collections, as well as a research room available for visiting scientists and students. The other half of the school will be used as lodgings for visiting scientists, students, and National Trust staff and affiliates.

3.2.6. Local communities

The local community took a major role in initiating this Plan and the work which underlies it, making it clear that they wished to find ways to maintain their communities and quality of life with many traditional elements. Local people noted that they have seen the rapid built development on adjacent islands and therefore have a clear idea of the alternative routes, and would prefer a sustainable one if that can be facilitated. The presence of senior citizens with first-hand knowledge of sustainable practices and willingness to pass this on is a major asset, and is the basis of the information in many of the immediately following sections.

The population of Middle & North Caicos is about 3000, including about 350 school children, teachers, 500 farmers, 120 fishermen, 200 small business persons, including crafts-people preserving traditional skills, and those interested in developing these and other skills.

Comparable small communities around the world are seeking solutions for sustainable development and environmental conservation, and will be interested in learning from the experiences here.

In the light of the intensive development pressures, many external, in TCI at present and the resultant plethora of pressures and initiatives, this project aims to provide a strategic framework which will enable local people to harness these initiatives for the benefit of wildlife resource and their own sustainable development.

3.2.7. Field-roads

Amongst the local knowledge which TCNT has started to deploy under this Plan is that of Field-roads. These are the traditional paths across the islands, most of which have fallen into disuse in the last few years, subsequently becoming overgrown and impassable. These field-roads are potentially valuable bases for interpreted and guided trails. This is because they link interesting places, through valuable habitat, which allows demonstration of wildlife, culturally important plants, and historic features. Work on finding, assessing, opening and developing these field-roads has already commenced, and is noted in Part 4. Part of the assessment addresses whether opening would have negative impacts on the environment or socially important features.

3.2.8. Traditional crafts

One of the most positive aspects of the traditional crafts of the Turks and Caicos Islands is that the undertaking of the majority of them are sustainable practices. One of the few products that is not very sustainable (at the levels practiced) is charcoal production; but this has nearly ceased with the drop in Middle Caicos population (although it is increasing in Providenciales, where many Haitian immigrants use charcoal production as a way to make extra money).

Two main types of "straw" crafts are made: Fanner Grass baskets, and Top Straw products. Fanner Grass is a coastal grass found on the dune habitats. The grass is cut (not uprooted) and it can recover from this harvesting so long as it is not done too frequently. The grass is dried and then used as the base for coil baskets, which are sewn with dried, waxed Silver Top Palm fronts (see following section, Top Palms). The baskets are made in three basic styles. A broad, shallow pan shaped basket, which is the true Fanner basket, is used to separate the shell from the meal of ground corn. "Fanning" the corn is done by shaking it in this type of basket and removing the corn shell by wind action and by hand. Shallow oblong baskets are made for holding bread and small objects. Taller baskets, often with tight-fitting lids, are made for sale to tourists. The coil style is identical to the baskets produced in West Africa today. It is believed that the Gambian people marrooned on the Caicos Bank in the 1840's from the wreck of the Spanish Slave Ship *Truvador / Esperanza* first introduced this style of basketry to the Caicos Islands. Similar baskets in Gambia are woven so tightly, that they are used for carrying water.

Indeed, many cultures employ this style, and nearly identical baskets can be found in North, South and Central America, India and Southeast Asia. This global production suggests that the artists here could adapt other worldwide styles into their work here, to increase variety. One recent idea is the inclusion of Bahama Pine needles in the baskets to add a pleasant scent – this is common in the coil baskets of the Southeast United States.

The only imported items needed for production are wax (which is often found washed ashore on the beaches) and large sewing needles. Some artisans use the coil style with White Top leaves to produce an open-weave basket or unique wall hangings. Although uncommon, some artisans in the past have made thong slippers using this method.

The Top Palm Straw crafts fall into two categories: woven, and plaited. White Top Palm *Sabal palmetto*, Silver Top Palm *Cocothrinax* and Buffalo Top Palm *Thrinax*, are the plants used for this straw work. All are palmetto trees with palmate or costa-palmate leaves. The leaves are cut in such a way that the tree is not killed for its product.

White Top is a wetland tree that prefers open areas and tolerates periodical flooding. The large leaves are stripped and dried for weaving and plaiting. Silver Top is a small scrub forest tree. The leaves are stripped and dried, or dried in bundles for other products besides straw products. Buffalo Top is a small tree found in moister areas. Its broad leaves are harvested primarily for covering thatch roofs.

Weaving: The White Top leaves can be cut into broad strips and woven into bags, baskets, and mats. The production of hats by hand weaving results in a "Mexican Hat."

Plaiting: The White Top leaves can be sliced thinly and "plaited" into "fathoms," which are long, flat strips of woven leaves, several inches in width. These "fathoms" are then sewn by hand or machine to produce bags, purses, hats, dolls, mats, and baskets. Recently, artisans have been experimenting with other ideas such as portfolios and compact disk or video racks. Most artisans choose to dress their products with print fabrics or lace, and often they will use plastic raffia (as do Bahaman crafters) to add wording, patterns, or designs. Coconut leaves, which dry

much darker than the White Top leaves, are used for colour variety and patterning known as "peas 'n rice." Workshops held by the National Trust continue to present development and marketing ideas to the crafters to diversity their wares.

Bundles: Other crafts made from Silver Top clusters are the famous Middle Caicos Mosquito Whisks, small handbrooms, and large house brooms.

Fibre: Other traditional uses of Silver Top are for a cheap, quick fibre. Conch is nearly always strung on Silver Top fibre for drying. Chickens are "tied" when transporting (to prevent escape) with Silver Top leaves. Young Silver Top leaves are sometimes pulled from the tree so that the tender parts can be eaten as a vegetable or field snack, but care must be taken not to break the terminal bud as this will kill the plant.

Cattails: "Dawn" (*Typha*) is used in the weaving of mats and baskets as well. It is usually braided then hand sewn in a coil form to make mats or rugs. The same is done with rope gathered from old nets that drift on to the beaches.

Gum Elemi Boats: Small model boats are carved from Gum Elemi tree wood *Bursera simaruba*. This soft wood grows quickly with adequate rain.

Caicos Sloops: The Caicos sloops are built largely from traditional materials. Mahogany wood is used for the keel, and Locust wood is used for the ribs. Trees are not felled for the locust ribs; only branches are taken. For many years, Middle and North Caicos residents benefited from trade with Haiti by using locally produced sloops. The sloops carried dried conch and fish out through the reef cuts, over the Caicos Bank, and then to Cap Haitien. They returned loaded with produce, seeds, household goods, and livestock. While no trade sloops are currently in use on Middle and North Caicos, smaller versions of these boats are still built today, using traditional methods and many traditional materials. Mr. Headly Forbes of Bambarra (pictured in the Summary 0.1.3.5), building a sloop's skeleton from West Indian mahogany Swietenia mahogani and locust Lysiloma latisiliquum. Because of the extreme hardness of the wood, mahogany is used for the outer keel, and the natural zig-zags in the branch form of locust can be used to create strong, curved ribs. Lysiloma trees need not be felled to harvest the contorted branches, as the trees do not grow much higher than twenty feet (about 6 m). An experienced boat builder can produce a perfectly formed rib from a raw, crooked branch of Lysiloma in a matter of minutes, first using a hatchet, then a hand plane. While the lightest of the local woods were once used to cover the ribs, imported, untreated white pine planks are the preferred material for the boats' hulls now. Once the single mast is fixed in place, the few remaining boat builders enjoy using bright colours to paint their boats. Every August, a festival is held in Middle Caicos (the "M.C. Expo") which features a sloop race. A regatta in South Caicos also attracts the boat builders and sailors. Some people also practice this craft on a much smaller scale, building model boats for decoration or sale. Sloop building is one example of the many crafts that are being lost in the Turks & Caicos Islands. The Turks & Caicos National Trust are working on ways to encourage recruitment of new craftspeople for the boats so that this skill will not be lost forever.

The artisans of Middle Caicos recognize that more developed areas do not have the plant diversity to support their crafts any longer. They would like to see the areas where traditional craft materials grow protected. The sustainable harvest of materials must continue so that should the demand for crafts increase in the future, the areas will be protected from over-harvest as well.

3.2.9. Bush-medecine (or Ethnobotany)

Many of the above elements depend on local knowledge of the uses and distribution of a wide range of naturally occurring materials, especially many species of plants. A number of the plant species that occur in the Turks & Caicos Islands have particular cultural significance, particularly in relation to their traditional medicinal uses.

A wide range of bush medicines is available in the Turks and Caicos Islands. Bush Doctors were once quite common but now are few and far between. Younger people seem to respect the knowledge, and often use the products themselves – but as far as the National Trust can tell, there are no bush doctors in the making. Because 80% of the world's medicines are plant-derived, it is important to catalogue the knowledge since it may benefit the entire world someday. The Rosy Periwinkle, a common introduced yard flower (known as a dangerous invasive in more suitable climates) is used here for the treatment of diabetes. It is known to have medicinal compounds that fight childhood leukaemia as well. Several plants are soaked in water to make cooling drinks. Local key limes are

used for the treatment of sore throats. Several plants are used for the reduction of fever (including baths of Indian Neem and several teas). At least one homeopathic medicinal plant, a *Croton*, is said to be under study by a pharmaceutical corporation.

One medicine of special concern is the tree known as Maubey. Maubey trees are found in low, moist areas and are now uncommon. The mature wood of this slow-growing tree is boiled to make a bitter "heal-all" still commonly used. The tree has yet to be matched to a botanical name – its identification is important so that we may better protect it from over-harvest.

The use of plants in traditional medicine on Middle Caicos has been summarised by Halberstein (1997), and the use of many of these species in the wider region is described by Honychurch (1980).

3.2.10. Local food production

Many structural features from the Plantation period remained in use in the post-plantation subsistence-agricultural period. Old cattle enclosure walls are still present in some areas, and some are marked on the published maps. Local sources indicated that cattle-keeping on Middle Caicos stopped in the 1940s. They reported also that horses and cattle suffered considerably from mosquitoes.

Large areas of Middle Caicos were under cultivation before the majority of the population left to find work in the Bahamas and Providenciales in the 1970s. The farming supported the population, and produced a surplus that could be traded to other islands. Senior citizens recall days when the sloops could not carry all of the sweet potatoes produced to Grand Turk, and had to leave many lying on the beaches for later transport. Piles of corn were roasted. Sloops full of crates of fowls were sent to Grand Turk for the traditional Sunday dinner of "scrub chicken." The surplus of the conch-fishing industry was sent to Haiti for trade.

Today farming has largely halted. Older people with medium to high incomes sometimes farm as a tradition, but there are few true subsistence farmers left. When treated appropriately, the land can yield a great deal. With the recent restriction of agricultural professions to Belongers only, there is great opportunity to develop farming practices, preferably those that are sustainable and ecologically friendly. Her Majesty's Prison in Grand Turk has a fruit and vegetable farm, and raises goats and pigs for market slaughter in Grand Turk. They have a sizeable poultry farm that supplies Grand Turk with fresh eggs and meat. These agricultural practices not only relieve dependency on imported food, but they also provide a much fresher food source, as opposed to the foods that arrive from other countries. Fresh, local foods are also less likely to have the contamination risks of the internationally shipped perishable food, which may not always be kept under the optimal conditions.

There are several traditional poultry breeds, some of which now constitute endangered heritage.

Dominique Fowl. Locally called "dominicks," the Dominique is the first New World pure-bred chicken. The breed is over 250 years old and was developed in the American colonies. Pioneers preferred Dominiques because they produce eggs and meat, and they are capable of foraging for themselves. They were common in the American Colonies as early as 1750 and this is the breed the Loyalists would have brought with them in the 1780s. They are considered a critically endangered poultry breed and efforts are underway to preserve this historical chicken.

Scrub Fowl. "Scrub Chicken" was the traditional Sunday meal in the Turks and Caicos Islands. The colorful Scrub Chickens are mixed breeds able to survive free-ranging. Roosters often show the "red" color of the red junglefowl, the wild Asian jungle bird from which all domestic chickens are descended.

Guinea Fowl. Known as "guinea chicks" locally, helmeted guinea fowl originate on the savannas of Africa. They were introduced to Europe through Turkey, and so were originally called Turkey Fowl. They are still popular on farms in southern Europe. Their fame in France made Guinea Fowl popular in Haiti. Most of the Turks and Caicos Guinea fowl came from Haiti as part of the trade goods which replaced the dried conch sent to Haiti by the Caicos Islands fishermen.

Turkeys. Turkeys were brought to the Caicos Islands from Haiti by the fishermen who sold their dry conch in Cap Haitien. Turkeys are originally from North America, and when they were first brought to Europe, people mistook them for Guinea Fowl, which were called Turkey Fowl at the time. Thus, Turkeys became known

for the country from which Guinea Fowl first reached Europe.

Fishing has long been an important activity. In the waterways, it is important to note the existence of a cut, made some years ago by a visiting RAF team at the request of Lorimers villagers. This is through the isthmus between Lorimers Creek and Increase Creek (at grid reference 192239 24101). It avoids a long detour and dragging the boat through shallow water (where the map marks Ingram Channel). However, note that these shallow channels need local knowledge for safe navigation.

3.2.11. Education and school relations

TCNT has a strong record in environmental education, including summer schools and the development and implementation in local schools of the curriculum programme *Our Land, Our Sea, Our People*.

The Darwin Initiative project also involved training elements at various levels. During the volunteer specialists' visits, a wide range of those interested in developing skills have been invited to join in on Middle Caicos. Those to take advantage of this ranged from the local elementary school on Middle Caicos and the British West Indies Collegiate from Providenciales. From the latter, the biology teacher and her students got a chance to explore Middle Caicos and work hands-on with plant collections, insect trapping and catching methods, and mist-netting, weighing, measuring, and parasite collection of bats. Four high school biology students and their teacher, from Raymond Gardiner High School in North Caicos, attended the November 2001 Field Research Training Session. Two staff members of the DECR also attended the training at different times. Their learning focused on plants, bats and birds. The students participated in a plant and bird watching walk early in the morning, and attended a hands-on plant identification workshop. They were also able to visit Indian Cave one evening, where bat specialists Tim McCarthy and Tony Hutson were mist-netting bats for a DNA study. One student, Simone Johnson, and one DECR staff member, Jasmine Parker, were asked to assist in the "wing punching" of the bats for the DNA study, and braved considerable opposition from mosquitoes during this delicate process! The group has expressed interest in returning to Middle Caicos and working with the National Trust in the future. Completion certificates for students who have participated in this programme (and survived the mosquitoes) are being developed.

Another extra area of training developed was capacity-building in the Middle Caicos community as a whole to take an increased part in decision-making of the future of their island, based partly on the preliminary results of this project discussed in community meetings.

3.2.12. Small business workshops

A recent TCI Government-commissioned study of poverty (Kairi 2000) highlights the urgent needs of these islands. Work by two groups, TCNT and TCI Government, are already trying to address these. TCNT, with part funding from CANARI Caribbean Natural Resources Institute, has been conducting a series of well-received small business workshops in Middle Caicos (see below). TCI Government's agency TCInvest has established, with UNDP assistance, projects on the Development of Small-scale Enterprises for Income and employment Creation, and The Small Enterprise Development Centre. There is close contact between TCNT and TCInvest, and this integrated approach will be developed further in this project.

An example of this work is provided by the small business workshops on Middle Caicos conducted by TCNT in January and February 2000. These aimed to:

- 1. Engage local entrepreneurs in exercises to help organize their ideas.
- 2. Assist business people with respect to starting and managing a small business.
- 3. Obtain information from individuals to make sessions relevant to their needs.
- 4. Provide information to enable participants to complete a simple business plan.
- 5. Expose participants to samples of relevant documents required for establishing and managing a business.
- 6. Provide Tour Guides with additional valuable information on historic sites and other places of significance to

incorporate into their presentations.

7. Provide basic First Aid Training.

Role-play was one activity used to emphasise statements and reinforce points raised in the discussions and presentations. Participants were placed in various situations to see how they would deal with visitors to the islands with varying interests. The workshop setting also allowed for small working groups. Group exercises involved: identifying a business; designing a flyer for publicity; and making a presentation on the business. Participants had a chance to use their creativity and presentation skills. Other activities included packing and wrapping; some items were products made by the participants. All participants were given receipt books and business cards to help them with their record keeping and promotion of their business.

Participants from all three settlements on Middle Caicos were actively involved in the sessions, which covered topics including: product, packaging, promotion, customer service, pricing, business plan, distribution, professionalism and effectiveness as a customer service person. At the end of the last session, much appreciation was extended to the Trust for conducting these training exercises. The Trust will maintain contact with this interest group.

3.2.13. Native plants

A recent (April 2002) workshop, held by the Planning Department, Ministry of Natural Resources, and Architects and Designers Organization on Providenciales, addressed the issue of disappearing scrub forest. The Planning Department wishes to work with the National Trust and other botanical authorities to draw up guidelines for the replacement of native vegetation on sites cleared for development. A critical need for the *enforcement* of the guidelines already existing was addressed.

Currently, native plants are used by some of the landscapers: they are favourable because they are largely adaptable to the climate, they need little or no irrigation, they do not interrupt the low profile of the scrub forest, and they have countless benefits to the native fauna. Unfortunately, the majority of the "native" species sold and used here are imported from South Florida, where the native plant industry is thriving. This, of course, creates the problem of the inadvertent introduction of non-native animals and possibly harmful weed species. Foreign snails, lizards, amphibians, and insects have been introduced to the islands in this manner. With the Miami area being a key import site for the exotic pet trade, a number of exotic reptile species have become established there and could easily make their way to the Turks and Caicos Islands through the plant trade.

The National Trust could use an established native plant nursery to train interested people in native plant propagation tactics, which would create opportunities for the aforementioned agricultural professions. The National Trust is also working towards labelling plant specimens at its sites so that visiting residents can make selections of native plants for their own properties based on what they see in these settings.

3.2.14. Turks & Caicos National Trust (TCNT)

TCNT a local membership-based statutorily established NGO which can provide the focus for management.

Under its Ordinance, the Turks & Caicos National Trust has a unique and statutory role to represent civil society. The Ordinance includes a range of roles, including:

o Identify, investigate, classify, protect and preserve any area, site, building, structure, or object of cultural, historic or natural significance;

o Receive land from the Crown

o Hold this and other property in trust for the future, including the powers (and requirement in the case of land transferred from the Crown) to declare such property inalienable and to provide public access;

o Create a Heritage Register.

The Trust has an excellent record of achievement over its short period of active operations and a good working

relationship with Government, which is represented on its Council.

TCNT has built up a widely acknowledged expertise in environmental education. This started with awareness raising on endemic and threatened species (Turks & Caicos Rock Iguana Conservation Programme, and later work on the West Indian Whistling Duck). Later work developed self-supporting public access to small nature reserves, such as Little Water Cay, and the major curriculum development programme *Our Land Our Sea Our People*.

TCNT has taken the lead amongst local organisations in respect of conservation of heritage and sustainable development on Middle and North Caicos.

Some examples of these and other activities are included at Appendix 4. TCNT's outline note of its Middle Caicos Eco-tourism Project is copied below.

Middle Caicos: A Mecca for Eco-tour Opportunities

Middle Caicos, known as the Cameo of the Caicos Cays. A silhouette of beauty and strength symbolically carved in the passage of time. This rugged, yet regal landscape personifies a place where the past has left a legacy for a future full of promise and prosperity.

Fast becoming a mecca for eco-tour opportunities in the Turks and Caicos Islands, Middle Caicos is using its past to create a future in this environmentally conscious industry. Not yet spoiled by the trappings of large-scale development, the island has managed to maintain its own strength of culture and character. The people of Middle are a reflection of their surroundings, having thrived for several centuries by living in harmony with the land and sea; a precedent they actively strive to maintain.

The Middle Caicos Eco-tourism Project is an effort to help them continue to do just that. This local community based program, prompted through the National Trust, seeks to give the financial and physical support needed to promote eco-tour activities on the island. As the infrastructure is already in place, carved through the island's illustrious history and nature's own perfection, these attributes are easily embellished upon for the opening of an eco-tourism trade.

The first major endeavor of the project, The Crossing Place Trail (CPT), combines the aspiration for preserving the past while conserving nature for the future. This magnificent coastal trail has shared its treasures with many through the years by providing a means of livelihood and communication to the islands in between. The old coastal path has now been reopened from Conch Bar to a site along the western shores of Middle, known as Crossing Place, where settlers used to cross-over to North Caicos. A haven for those that love to hike, the 5 mile trail leads along coastal headlands, down beaches and through inland bush. Now open once again, it has become an avenue for commerce and contact with the worlds beyond Middle Caicos.

The CPT continues from Conch Bar to Bambarra, where one can take a leisurely bike ride along the beach. The 7 mile biking trail follows what is known as the old Bay Road. Along the route, there are numerous spots to stop for a snorkel or swim. The trail ends at Bambarra Beach and Landing, where one can find native sloops and tikki huts, or take a walk through shallow waters towards Pelican Cay. Sailing enthusiasts can even enjoy an outing on one of the locally made sloops. Other watersports services are also available for those who wish to free dive and fish or just explore the watery realms.

Coolin'out in the caves is another eco-tour option. Conch Bar Caves are the most renowned with numerous underground caverns that wind and dip extensively. A haunt for bats and Indian bones, the local lore given during your guided tour certainly adds spice to the adventure. Indian Cave has a dramatic dome shaped ceiling with an aerial arbor of roots and trees and can be easily accessed from the CPT.

Remnants from the prosperous Loyalist Era can be found in the form of plantation walls and foundations. Trails have been reopened to the once prosperous Haulover and Dustry estates near the settlement of Lorimers. Numerous other sites are easily accessed or viewed from today's roads and paths. Digressing even further in time, evidence of Lucayan sites on Middle date back to the early 1400's. Several archeological expeditions have unearthed fossils and facts that lead to the belief that this island was once an epicenter for these ancient Indian tribes. The most renowned site, labeled MC-6, can be accessed by a 2 hr hike to an interior lake region.

In searching for the past, one mustn't forget to enjoy the pleasures of present day Middle Caicos. The natural splendor of the settings are unsurpassed; the native flora and fauna revel in this yet unrivaled land. But the key to truly experiencing the aura of this incredible place lies in its human inhabitants. Steeped in old world wisdom and idioms, the natives are filled with local legends and lore.

Aside from opening their hearts and minds, the residents of Middle will open their homes to visitors for a sampling of the delectable local fare. Peas and rice, lobster, conch, chicken and their famous Middle Caicos grits are just a few of the appetizing selections. Several

hand-made products are produced on island, such as woven baskets and hats, mosquito whips, whisk brooms and cloth dolls. Sample bags of the locally grown and ground grits complete with favorite recipes are also available. These items can now also be purchased at the National Trust office.

Getting to Middle Caicos is an experience in itself. Whether by boat or local charter flight, one gets an eye-opening view of the Caicos island chain. Arrangements can be made via your local tour desk, water-sports operator or airline services. Taxi and rental car services, trail and cave guides, water sports operators and local food establishments are available on island, but need to be booked in advance. Ask to see a Middle Caicos booklet at your resort or rental residence for further details on arranging an eco-tour excursion.

The options are endless for those who prefer the environmentally and historically orientated adventure. Hiking, snorkeling, and biking while exploring historical sites and caves are just the beginning of what the Eco-tourism Project has in store for its future. Middle Caicos welcomes all to experience an adventure back in time with their motto "Our Past is Our Future.....Explore it With Us

3.2.15. Specialist expertise

TCNT's membership of, and involvement in, the UK Overseas Territories Conservation Forum gives it access to the Forum's wide network of expertise, often available to help colleagues in TCI at little or no cost. This has being deployed, for example, in facilitating capacity development of the Trust, in assisting TCI and UK Governments fulfil their commitments in providing maps and details of the Ramsar site, the technical input into the Darwin Initiative project, historic building restoration expertise and others. Various other possibilities are also being explored, including the facilities of the international Millennium seed-bank of Royal Botanic Gardens Kew.

3.2.16. Department of Environmental & Coastal Resources and the Coastal Resources Management Project

The Department of Environmental & Coastal Resources (DECR), within the Ministry of Natural Resources, is the TCI Government Department responsible for nature conservation, fisheries and related matters. Limited resources had prevented much progress on the management of protected areas by official bodies. Because of this, UK's Department for International Development (DFID) have funded for several years a project (CRMP) with TCI Government to develop and implement management plans for three of TCI's marine National Parks, in the seas adjacent to Providenciales and West Caicos, as well as building an environment centre on Providenciales and funding some interpretative work. (In TCI usage, National Parks implies a strong element of recreational activity in the protected area.) With the ending of the project, CRMP is developing into a protected areas department within DECR. It is to be hoped that this official protected areas service will be able successfully to implement these three plans and extend to other TCI marine national parks and some other protected areas.

This work is complementary to TCNT's expertise in terrestrial and wetland conservation, and the management of nature reserves and historic sites. There is considerable potential for collaboration and sharing of the major needs for conservation work in TCI.

3.2.17. Conservation Fund

TCI benefits from having a newly established Conservation Fund. This is funded by a 1 percentage point addition to the previously existing 8% tax on visitors, charged mainly on accommodation and meals. This Fund provides a mechanism for ongoing funding for management of protected areas. The ways of implementing these intentions are still being developed.

This general area was the subject of much discussion at the UKOT environmental conferences organised by UK Government in London in 1999 and by UKOTCF and Gibraltar Government and NGO in Gibraltar in 2000. Relevant parts of the conclusions of these conferences were:

London conference:

'There was considerable formal and informal discussion at the conference of ways to fund environmental projects. Several territories have already established environmental protection funds, typically through a levy on incoming and

departing tourists, or through an accommodation or similar tax. This method of fundraising was seen as a useful mechanism to link environmental sustainability with economic activity, e.g. eco-tourism. The natural environment provides a major source of economic livelihood for many people in the OTs. However, environmental taxes were not seen as a solution for all environmental problems. There was recognition that the carrying capacity of valuable habitats (e.g. coral reefs and intensity of diving activity) set limits to the growth of taxable exploitation of the environment. Further, an environmental fund should not replace existing expenditure on environmental conservation; nor should it be used to fund environmental impact assessments (which should fall to the proposer of developments) or to mitigate environmental damage by any operation (which should fall to the operator). Typical uses for an environmental protection fund could include: the purchase of land to be used as a nature reserve; provision of management services for protected areas; public environmental education.

"... There was widespread recognition of the need for transparency in the planning and administration of environmental levies. Several participants suggested that Boards of Stakeholders be set up to include those with key roles in environmental protection in the territory (e.g. government, non-governmental organisations, corporate sponsors, educational bodies).

'In addition, this kind of good governance relies on transparency, freedom of information, consultative decision making and wide participation. And good governance criteria should also apply to procedures for levying, allocating and using environmental funds. ...Overall, features essential to success are: openness in the management and operation of the fund; clear criteria for projects to be funded; the involvement of both governmental and non-governmental environmental bodies in the decision making; and feedback to visitors and others who contribute to the fund on how the resources are spent. These should specify outcomes achieved or intended (e.g. "This will enable us to expand the area of protected coral/mangrove/tussac grass/forest at X"; "As a result of the fund we have established a visitor information centre at Y"; "The fund will support work to expand the area covered with indigenous plant species").'

Gibraltar conference:

'A frequently repeated message in several sessions has been the importance of owning land in order to ensure longterm conservation. ... Those territories with National Trust type legislation have a particularly helpful mechanism available for governments to enlist the resources of NGOs. Lands given by governments to National Trusts can be declared inalienable, so that the NT cannot treat this land as an ordinary disposable asset, but must safeguard it in trust for the people. Such transfers of land by government tend to attract further contributions by private individuals and organisations, making this a very cost-effective investment by government. It is also important to ensure an income stream for site-management. Sunday morning's discussion presented one strong route. Conservation Funds can be one of the few popular taxes. At least part of these can be ear-marked for the organisations managing protected areas. Again, there are extra benefits in that NGOs managing such protected areas can often draw in matching funding from both domestic and international sources, as well as major volunteer effort.

'Something of a consensus evolved in discussion of the management of dedicated environmental funds in several OTs. The most successful examples involve an environmental tax being placed in a statutory fund separate from general government funds, managed by a Board with representation from government, NGO and private sector interests. Openness and accountability, strong and unambiguous legislation, and a constructive relationship between environmental NGOs and local governments are seen as key elements. Relative access between government and NGO agencies to grants from such funds is an ongoing concern needing resolution in several OTs.'

3.2.17.1. Some specific experiences

The Cayman Islands Government has suffered all sorts of criticism, domestically and internationally, for mishandling a conservation tax. It made official announcements that this tax would be used to set up a conservation fund but then did not get round to formalising this in law. Later, when funds became tight, it simply used the money to assist in balancing general expenditure – which, because of the omission, may have been legal but certainly resulted in serious criticism of the Government. It has now indicated that will put in place the legislation that it had originally indicated, to address future income from the tax. In the Falkland Islands, a similar thing happened when the Government introduced an "environmental" tax on visitors although it was actually a general tax. They quickly saw the light and removed the claim that it was environmental.

3.2.17.2. Applying this to TCI

It is important that the criteria for the use of these public funds be transparent, appropriate and accountable. It is also important that the handling of the fund is efficient and does not itself consume excessive resources (including personnel time). There should also be effective requirements for agreeing objectives for projects, monitoring whether these are met through a defined reporting programme, and feeding lessons learnt back into consideration of future rounds of projects.

The fund should be additional to existing Government funding. It is important that Government, special funds and non-governmental organisations share responsibility for conservation. This is reflected in point 6 of Annex 5 (*Management policies for the Conservation Fund*) of the *Coastal Resources Management Project Memorandum* (TCI Government & Department for International Development, August 1998, and contained in all updated versions): "The Conservation Fund is not intended to replace TCIG allocations for DECR." It is also important that the fund is not used to finance remedial or protective measures which should be met by the developer whose development causes this need (the "polluter pays" principle adopted by many countries).

In recent discusions, four main possibilities have been identified for the use of the Conservation Fund, and consideration is being given to what usage is appropriate. This is set against a background of fluctuating revenues given that the Fund is generated through a levy on hotel bills. These four possibilities are:

1. The need to fund the national parks service in TCI Government, emerging from the Coastal Resources Management Project.

2. The need to secure the funds the National Trust, especially in respect of its management of some protected areas.

3. The need to direct resources from the conservation fund to a small grants scheme which supports small scale environmental initiatives in TCI.

4. If sufficient funds are available to contribute towards the funding of the existing TCI Government Department of Environmental & Coastal Resources (DECR).

Because "the Conservation Fund is not intended to replace TCIG allocations for DECR" (see above), there is some difficulty with point 4 above. The Cayman debacle and the other experiences touched on above make it all the more vital for good governance purposes that TCI be transparent and true to initial undertakings in how this is set up.

In terms of how to deploy the funds as between, 1, 2 & 3 above, it seems desirable to avoid fossilising interim practices as if they were the objective. There seems some danger also of assuming from interim practice as to which are "core" and which not. Experience shows that a more successful model would be look at the underlying objectives, and attempt to design the mechanism to address these. The Memorandum between UK and TCI Governments, with sometime involvement of TCNT makes it clear that the overall objective is protection of the country's natural and historical resources.

One of the potential strengths of the situation in TCI is that more than one agency, including at least one governmental and one non-governmental, are involved in managing protected areas. Amongst all the countries on which information is available, multi-agency models result in better conservation than monopoly suppliers. However, problems arise when one agency is dependent on another, so some degree of symmetry is desirable. For example, it would be a recipe for problems if one body had to apply to another for funds or approval when both are in similar businesses. Ideally, both should be looking to a third body for funding support (and there is the potential for this in the committee system in TCI). Experience in many places tends to support this. One striking example which came up at the conferences was the Seychelles. Here, there has been much toing-and-froing and rewriting of rules in order to achieve a successful model for a fund. The key proved to be a high degree of openness and a decision committee drawn widely from both government and NGO bodies. Earlier attempts to work just through government appointees were not sustainable.

It seems important not to confuse core support for conservation bodies with funding their work to manage parts of

the protected area system. It is understood that some parts of the protected area system (e.g. all historic sites, and certain Parks and Reserves) will be looked after by other agencies, and not the emerging national parks service. Provision must be made in the guidelines for funding for those part of the protected area system. To the extent the Trust is involved in such management, support for these specific Protected Areas should not be conflated with thecore support for the Trust.

The concept of small project grants, if well managed, is potentially very productive. It should be provided for in the budgeting, as for the other elements.

The next issue is how to decide on the division of funding. It is not quite the same issue, but a comparable problem is how to deploy the costs of organisations which are funded from several others. Such organisations occur in both governmental and non-governmental situations. For both the sharing-out-of-funds situation and the sharing-out-of-costs one, there seem to have been two basic models tried.

In one, some sort of rationale is used to work out an appropriate percentage division of the income as between those bodies managing the various protected areas (with an element too for the small projects fund). The advantages of this method are that it avoids an annual scrum, and gives the bodies concerned a reasonable indication of what to expect in the following years, aiding sensible forward planning. The difficulties are related to setting the percentages, and in the lack of accountability of previous performance feeding into future allocations.

The main alternative is a bidding model. This is the route favoured by UK (and most other governments) in dealing with its departments, agencies and other bodies it expects work from. In this scheme of things, each body produces its report on work done in the preceding period, its plan for work in the next period, and its budget. The last includes its expenditure, income from other sources, and requested income from the conservation fund. The advantages are that it is open and encourages accountability and effective performance. The disadvantages are that it involves work in making a transparent decision each year, and that there is more uncertainty in the future (but that could also be considered as an advantage, in that those delivering well will be encouraged to do more).

It is possible that one could use a hybrid system. There could be an amount or percentage fixed for several (say 3 to 5) years, relating to some of the core work which is not volume-related. (This seems conceptually linked to the idea of part of the government's protected area service as well as the annual subvention to the National Trust.) A second amount could be related more to an annual bid along the lines indicated above, related to the management needs of the protected areas managed by each body.

It is strongly recommended that the same system is used in respect of all the bodies managing protected areas for TCI, whether these bodies are NGO or governmental. All the experience elsewhere points to continuing problems and friction if there is an asymmetric situation.

Point 4 of Annex 5 of the *Project Memorandum* sets out: "The general function of the National Parks Advisory Committee (NPAC) will be to encourage and promote for the benefit and enjoyment of present and future generations of the people of the Turks and Caicos Islands the provision, protection, conservation and enhancement of the natural and historical resources of the Turks and Caicos Islands." Point 5 of Annex 5 of the *Project Memorandum* requires that the NPAC will establish specific criteria for grant applications for financing from the Conservation Fund. These criteria will be for:

 \cdot encouragement, promotion, and assistance in the development, management and conservation of national and marine parks

• efforts by qualified individuals and organizations on research, studies, or management activities to establish, operate, maintain and manage parks and protected areas

• activities that directly support the management of national and marine parks..."

An early task for NPEAC is to establish specific criteria on appropriate and priority uses for the Conservation Fund. A basis for these criteria is readily available by inspection of the requirements of international agreements on conservation to which TCI is a party (by agreement with and through UK Government, which handles international treaties). Some of these ideas which might be developed into appropriate criteria include:

1. Core support for the TCI National Trust (a membership NGO established by statute), to undertake works including consultation by government, to aid good government by providing an independent voice on conservation matters. For efficiency, it may be sensible to provide an annual figure for core activities of such an organisation, rather than waste large quantities of time attempting to convert such core activities into artificial "projects". Specific project proposals by this organisation would be handled as for other projects.

2. Support for *further development of the National Parks system*, with clearly set out plans and objectives

3. Development of plans for – and mechanisms for delivery of – the conservation of biodiversity and heritage throughout the land- and sea-areas of TCI, and the incorporation of biodiversity conservation in the plans for all sectors of the economy (This is an activity which should be government funded, but complementary activities by NGOs would be appropriate for funding.)

4. Implementation of *site-safeguard* for the most important areas for biodiversity and heritage, with clear management plans developed and implemented (Again, this is an activity which should be partly Government-funded, but the elements handled by conservation NGOs would be appropriate for Conservation Fund support.)

Some would argue that items 5 to 9 below should be government-funded, as they fall within the basic remit of the Government's Department of Environmental and Coastal Resources, although it could be argued that non-governmental contributions could be eligible for support from the Conservation Fund.

5. The *development of biodiversity and heritage targets*, including restoration and recovery of damaged ecosystems and threatened wildlife populations, *and action plans* to achieve these.

6. The *compilation of existing data on biodiversity and heritage, new surveys where required*, and cross-sectoral reviews of policies that relate to the use and conservation of biodiversity and heritage.

7. *Ecological studies necessary to inform plans for conservation.* (This should <u>not</u> include the costs of Environmental Impact Assessments – whose costs should be included in the relevant development and met fully by the developer.)

8. A system for *monitoring and reporting* publicly (including in fulfilment of international commitments) on the state of biodiversity and heritage and any impacts upon it

9. Training programmes for key personnel and the integration of biodiversity and heritage conservation into *education* curricula *and public awareness* programmes.

It is now recognised that the conservation of biodiversity is important in its own right, but also as a fundamental basis of human economies, as well as important for the quality of human life. Globally, the services supplied to the human economy by ecosystems has recently been costed as at least US\$ 33 trillion (10¹²) per year, compared with global gross national product total of US\$ 18 trillion per year (Costanza *et al.* 1997). In TCI, the economy relies even more directly on the natural environment than it does in many other places. This is not surprising as TCI is particularly rich in biodiversity, containing some of the most natural wetland systems in the Caribbean. This is particularly important for the fisheries and the tourism industry. TCI's tourism slogan of "Beautiful by nature" is particularly appropriate. However, the natural environment is easily damaged. The international tourism market is likely to be particularly sensitive to see that the funds raised from the levy are well used to maintain this nature. Development and transparent application of appropriate criteria for use of the Conservation Fund will therefore be crucial both to the industry and to the maintenance of the outstanding natural environment and historic heritage of TCI.

The way in which the Conservation Fund guidelines and implementation are settled will have a major bearing on matters in this Plan, as well as TCI's implementation of the Environmental Charter more generally.

3.3. Conclusions

The sections above outline some of the importance of the area in international and local terms, as well as the features which provide opportunities and threats to the objectives of the plan. The purpose is to provide means by which the

internationally important biodiversity and cultural heritage of the Caicos Islands, including the Ramsar wetland of international importance, can be treasured by local people and experienced by visitors without damage; this will be through enabling the local people to protect the area by generating sustainable usage involving eco-tourism-based activities, as well as education. The core of this will be a shared, regularly reviewed management plan, trained local personnel, and integrated programmes of development of trails, hides, a centre, displays, courses, booklets etc.

The approach is multi-sectoral, integrated and firmly rooted in unique local culture, rather than focussing on just one element as happens in some development projects (which might, e.g. relate just to craft work or to nature protection or to tourism development).

The following, operational Part integrates the foregoing to list the actions required. It is envisaged that the implementation work-plans will be drawn from this overall Plan in the light of resources available at each period.

Part 4. Prescription: Management Plan proper

4.1. Introduction

This management plan is part of a management process, not a document to be placed on the shelf and forgotten about. The process is intended to involve periodic reviews and revisions. These reviews will allow assessment of progress so far against the plan, as well as consideration of what aspects of the plan itself need revision in the light of increased knowledge and experience by all concerned.

Because of this working nature of the plan, at any one time different elements of the plan will be developed to different extents. Taking the following section on trails for example, the actions needed to establish some trails are now quite well worked out. For others, more investigation is needed. For yet others, the likelihood of a suitable trail in the area is recognised, but research is needed even on its route. As work develops, these various components will also move to more filled-out plans at varying rates. Similar comments apply to other sections of the plan.

Wherever possible, the details of the Plan are written in terms that will readily identify which actions have actually been achieved. This should assist monitoring, reporting, selecting priorities for future periods, and in revising the Plan periodically.

4.2. Field-roads (Trails) and Hides/Blinds

4.2.1. Background

A key to the approach of conserving the internationally important biodiversity of the Caicos Islands is to make more of it available to be experienced. This is both so that local people can know and cherish it, and to provide facilities for visitors, these in turn providing opportunities for local employment. The development of visitor centres, trails, viewing platforms and supporting information will be central to the project. These will provide the basis for awareness-raising, the education work noted above, material for visitors and their local guides, sales points for local crafts and for tickets for trails etc.

The general idea was well spelt out in the early report on potential Ramsar sites in TCI (Clarke & Norton 1987):

"Wetland sites can be exploited as tourist attractions as long as adequate access and guidance is provided. Educational and natural history tours are becoming increasingly popular and bird-watching groups travel far and wide. The designation of a Ramsar site will create great interest in the Turks and Caicos Islands as a natural history destination and this could be tied in with the existing interest in diving on the coral reefs.

"Access may be provided by boat ... On land trails are required with board walks in mangrove areas and hides erected at strategic places. ... Nature trails could be established by continuing or improving existing trails ...

"Guidance can take the form of self-guided trails with signs, labelled trees, display boards, and leaflets. Guided tours to explain the ecology, etc., would attract visitors (e.g. people at Club Med would go on such tours), and provide part-time employment for knowledgeable individuals. Training for local guides should be possible through regional organisations."

4.2.2. Overview (including integration, funding, guides, stakeholders)

Several factors need to be taken into account in developing a system of facilities for experiencing the heritage of the Caicos Islands. These include:

o The development of the system should be modular, so that some elements can become fully operational at an early stage, and help generate interest and support from the early stages.

o Even though modular, the scheme should fit a wider plan, so that the various elements will be integrated at later stages when more are in place.

- o Trails and hides should cover a range of ecosystems and other interests.
- o Wherever possible, historical and cultural features should be included as well as biological ones.
- o Trails should incorporate a range of distances and challenges.

o Throughout, damage to the biological, historic and cultural heritage should be avoided. Indeed, the object is to conserve this.

o Usage should be monitored.

o Schemes to generate income should be implemented as early as possible, so as to support maintenance of existing facilities and the addition of more modules (following the example of the Trust's successful Little Water Cay trails).

o Wherever possible, facilities should be related to Information Centres or other Trust facilities, so as to enhance interpretation, aid supervision and provide a range of opportunities for visitors.

It is not envisaged that the facilities outlined below should all be implemented immediately. This would be impracticable in terms of resourcing and managing. Rather, it is envisaged that annual and other work programmes will select appropriate priorities from the overall plan. Neither do the potential facilities below comprise the full range possible. Indeed, when a late draft of this plan was discussed at a community meeting on Middle Caicos in early 2002, local residents (who had been involved throughout in finding and re-opening the field-roads) were keen to point out the possibilities for additional trails etc, based on further traditional field-roads. It is envisaged that this management plan will be a working document, and appropriate additional elements will be added in revisions.

The main activities involve designing and managing integrated nature and historic trails, based where practicable on traditional paths (field-roads), and including vegetation management, board-walks over wet areas, viewing hides & platforms and signage. Project personnel will use results of the Darwin Initiative surveys, information on cultural and historical sites, land and access information and other information to identify appropriate areas for public access; construct trail infrastructure (by locally recruited trades-persons); and convert relevant biodiversity, historical and cultural information into user friendly interpretative materials. Systems will be established for guided access with limitations as necessary to conserve resources. Existing collaboration with local tour guides will be developed to agree capacity limitations, means of access control, fees where appropriate, and system of enforcement, feedback and revision as necessary.

In the following sections, the various components of the work are considered in turn.

4.2.3. Field Roads

4.2.3.1. Introduction

The following are the field-roads which have been identified as an appropriate sub-set of the total. Together, they would provide a range of experienced, generally grouped on the main settlements. However, even individually, they would provide a range of steadily increasing interest. Some of the trails, and the centres, are superimposed in mauve ("fuchsia") on the maps on the following pages.

4.2.3.2. Crossing Place Trail

This trail was primarily of historic and scenic importance. However, as a result of work reported here (see Sections 2 & 3), it is now known to be of conservation importance also to butterflies, birds and other features. The trail is already in place following work by the Trust, and marked to some extent, and is valued highly by the local community and visitors.

Some particular points were noted on a review of the Trail west of Conch Bar in February 2002:

o Between Conch Bar and Blue Horizon, the path is sign-posted adequately, and passes through some low vegetation, including cacti of interest, and passing some ruins. These could both be features of interest within a trail guide.

o A short way along, as the trail rises up King Hill (just before Mudjin Harbour Point), it is possible to get a good view down on to the first of the Fish Ponds. At this point, some waterbirds (e.g. herons and reddish egrets) would be another feature of interest which could be mentioned in a trail guide, with bird identification information to hand.

o The trail through the Blue Horizon complex becomes more difficult to traverse, as the path is made up primarily of bare karst rock, which is sharp underfoot, and somewhat unstable in places. This surface either needs improving, or some sort of warning should be posted indicating the problem. It is also not clear where the trail is in places around here – which does not help when one is focusing intently on the ground to prevent a fall. Clearer signage is needed here to direct persons on the correct route.

Once one is well past Mudjin Harbour, the terrain underfoot improves, and again the walker can concentrate on the views – either the coastal scenery or the Fish Pond complex, which is now adjacent to the trail, and would be featured in a trail guide.

o There is a substantial amount of rubbish on the beach and coastal vegetation all along this trail. One of the Crossing Place Trail signs explains that these items, mainly washed into shore from the Atlantic, were a treasure trove for locals..., but frankly, most of it today is just an eyesore! It should be feasible to remove some of it on a periodic basis, particularly the plastic items. Some other items are heavy, and may be a long way from the road, but a regular, selective clean-up schedule could do a lot to improve the state of the beach, whilst still allowing the "treasure trove" aspect to be appreciated.

o There is a sign in the vicinity of Sandy Hill Cay which portrays the northern end of the trail as a loop, giving the walker a chance to walk around the coast to the tip at Juniper Hole, then walking along the coast to meet the trail again, and joining the coast below the Boiling Hole. In reality, one can walk up to Juniper Hill (but climbing this should not be encouraged – see below), then down to one of the ponds, but here the trail ends. This also means that the suggested loop below the Boiling Hole runs to a dead end. It would be an improvement if this loop could be reinstated, so that the trail has a circular route, rather than the whole experience being from end to end and back again. Once past the Blowing Hole, it again becomes difficult to find where the trail is, and more markers are needed here.

o The painted Crossing Place trail signs were each used as a perching place by American kestrels, also between Norbellis Coves and Conch Bar settlement there was an osprey on numerous occasions. Much more information could be provided also on the butterflies, botanical and herpetological interest along the trail.

Further work is needed:

• to secure the land against future damage (see section 4.5.8 below)

 \cdot to improve the signage at the western part of the trail, and to provide a clear route to the road near Pine Barrel Landing (see above)

 \cdot to provide clear warning signs to avoid the dangerous ground in the area of Juniper Hole unless accompanied by a qualified guide

 \cdot to provide an information leaflet/map of the trail, perhaps at a small charge, preferably with suggestions for which parts of this long trail are suitable for walking or cycling

• to provide rest spots along the trail with information and interpretative materials to boost public awareness (e.g. family surnames done in ceramic tiles on stone benches)

• once nearby hides/viewing places are available, to link these into the trail information







4.2.3.3. Haulover Plantation Field-road

This proposed trail follows the track opened by the Trust to the foundations of the major plantation buildings at Haulover. This would provide a short, easy trail (a little over 1 km, a little less than 1 mile, for the whole walk out and back). It would provide opportunities to view wildlife of dry bush habitats and view the impressive plantation remains. Work needed includes:

- to confirm permission for the Trust to implement and operate the trail
- to complete identification of features of interest on the trail, to be identified by numbered pegs (this has now been done)
- to write the trail leaflet to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc) (this has now been done)
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to complete ground-clearance of trail (especially de-stumping) to minimise risk of tripping
- to install the numbered pegs and a sign featuring TCNT at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and management (see section 4.5.7)
- to investigate the longer term potential of making this trail suitable for use by people with physical disabilities

4.2.3.4. Nanny Pond Field-road

This proposed trail follows the track opened by the Trust to the small, permanent, deep freshwater Nanny Pond. The trail passes through farmed patches and tall bush, and alongside 3 shallow, temporary ponds. This would provide a 1 km (about 0.7 mile) each way, moderate trail. It would provide opportunities to view wildlife of dry bush habitats and several types of wetland, varying with season. Work needed includes:

- to confirm permission for the Trust to implement and operate the trail
- to complete identification of features of interest on the trail, to be identified by numbered pegs
- to devise a way of viewing Nanny Pond without causing disturbance to wildlife; this probably means construction (at a non-sensitive season) of a hide without damaging the screening vegetation
- to write the trail leaflet to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc)
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to complete ground- and some vegetation-clearance of trail to minimise risk of tripping
- to install the numbered pegs and a sign featuring the Trust at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and management (see sections 4.5.7 & 4.5.10).

4.2.3.5. Field-road from Lorimers to Big Pond, Middle Caicos

This could provide a half-day adventure experience, for those who wish to see some of the wild places. If it is made clear that it is at least a 2-hour walk each way (with, at the most productive seasons, mosquitoes - see below), but a chance to see uniquely special wild places, the dedicated wildlife tourist (an increasing market) will be interested. The trail route itself passes through dry scrub and woodland, with several historic features, such as a well and walls, together with a great deal of wildlife: vegetation, especially attractive insects (notably butterflies) and spiders, as well as birds. Crossing the ridge, there are good views in all directions across the various habitats. The route across the flats passes further old walled fields and a range of wetland habitats, rich in wildlife with noticeable birds at suitable seasons.

This is a more ambitious project, but one that could generate significant work in the local community (see also below). Guides would be needed, both to explain the history and wildlife, as well as to show the route and ensure that visitors did not (wittingly or unwittingly) disturb the wildlife.

Work needed includes:

- to confirm permission for the Trust to implement and operate the trail
- to complete identification of features of interest on the trail, and decide whether to use numbered pegs or depend solely on guides; some marker posts will still be needed on the flats
- to write the trail leaflet to relate to these features, working in reference to mobile features (birds, butterflies, etc) and seasonal differences
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to install the numbered pegs (if used) and a sign featuring TCNT at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail (see sections 4.5.7 & 4.5.16)
- The bush route (already opened by the Trust) would need to be cut back at regular intervals (of perhaps about 6 months, depending on weather), especially after rain and plant growth.
- The surface of the ground through the bush is good walking, and would not need much attention, apart from removal of stumps likely to cause tripping. Indeed, the emphasis would be to keep the conditions as natural as possible.
- It may become desirable to lay a board-path across the marsh N of Big Pond, and possibly through the marsh at the end of the pond marked as "Topham Pond" on the map (although some local usage has this as "Daddy Long Pond", a name used on the map for the next pond to the south); this would have the side benefit to visitors that they would not have to wade through shallow water over mud (which, actually, can be quite refreshing!) but to protect the mud flats from damage which could become severe and lasting if not protected. As usage of this trail is likely to develop slowly, it may not be necessary to introduce board-walks in the early stages, and only progressively later.

These maintenance activities would create some local employment, as would the guiding. Here, it would be valuable to collect the historic knowledge of older local people – and particularly valuable to enlist some of these as guides. This would help capture this information, both for archiving and for passing on to younger guides. Some training would be necessary in guiding practice, in good codes of conduct, in wildlife aspects of guiding.

The high concentration of particularly active mosquitoes at certain times of year (especially October-November, and continuing through February) provides both a challenge and an opportunity. This is, indeed, one manifestation (if a slightly uncomfortable one) of the biological richness of the area. Many animals we value more highly depend on the mosquitoes for food. The dry bush and Big Pond itself tend to be (relatively) free of mosquitoes. However, Lorimers village and the wet parts of the flats are mosquito-rich at some seasons. There is the potential here for significant local craft work, to provide traditional woven hats with the addition of head protection netting. Similarly,
the traditional attractive and practical insect whisks could be produced. Such items (and suitable gloves) could be available – for purchase or hire – at the information centre (see section 4.3.1). This could also provide a point of sale for other traditional woven material, alongside the message of traditional use of natural materials.

4.2.3.6. Increase Road

The old road from Lorimers to Increase Plantation, formerly a main thoroughfare, is now overgrown and most of it is no longer even a passable track. A long-term possibility would be to open this up as a trail. This could provide the option of converting the Lorimers-Big Pond walk into a circular tour – and possibly even a cycling extension to the Crossing Place Trail.

4.2.3.7. Armstrong Pond Field-road

This track is only for the reasonably fit. Taken at a pace to view things *en route*, it takes at least 3 hours in each direction. It is a little shorter than the distance from Lorimers to Big Pond, but the terrain is quite taxing. It runs from near Bambarra via East Armstrong Pond to the flats at the major Arawak archaeological site. It crosses a very wide range of dry scrub, wetland and transitional habitats.

There is a possibility of linking to the Big Pond-Lorimers route to make a circular tour, with road transportation between Lorimers and Bambarra. Although this would be longer than retracing steps, it would probably be less taxing. The total walk would be about 6 hours, plus any prolonged stopping time. It would probably be popular with reasonably fit eco-tourists used to trails in, for example, US National Parks.

Work needed includes:

- to confirm permission for the Trust to implement and operate the trail
- to complete identification of features of interest on the trail, and decide whether to use numbered pegs or depend solely on guides; some marker posts will still be needed in parts, and, if extended to Big Pond, on the flats
- to write the trail leaflet to relate to these features, working in reference to mobile features (birds, butterflies, etc) and seasonal differences
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to install the numbered pegs (if used) and a sign featuring the Trust at the start of the trail
- \cdot to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and management (see sections 4.5.7 & 4.5.16)
- The bush route (already opened) would need to be cut back at regular intervals (of perhaps 6 months), especially after rain and plant growth.
- The surface of the ground through the bush would need some work, particularly the removal of stumps likely to cause tripping. However, the emphasis would be to keep the conditions as natural as possible, and not to make the trail so wide as to lose the nature of being within the woodland.
- to train guides in the use of the trail; some training would be necessary in guiding practice, in good codes of conduct, in wildlife aspects of guiding
- These maintenance activities would create some local employment, as would the guiding.
- The comments about mosquitoes made for the Lorimers-Big Pond Trail would relate also to some extent to this trail.

4.2.3.8. Duck Pond Field-road

This proposed trail follows the track from near Bambarra to Duck Pond, about 1 km to the south. The trail passes through farmed patches and bush, to the ponds. This would provide an easy trail about 1 km (0.7 mile) in each direction, with opportunities to view wildlife of a range of habitats in proximity to Bambarra. A hide at Duck Pond would be a useful addition (see below).

Work needed includes:

- to confirm permission for TCNT to implement and operate the trail
- to identify features of interest on the trail, to be marked by numbered pegs
- to devise a way of viewing Duck Pond without causing disturbance to wildlife; this probably means construction of a hide (see below)
- to write the trail leaflet to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc)
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to complete ground- and some vegetation-clearance of trail to minimise risk of tripping
- to install the numbered pegs and a sign featuring TCNT at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and management (see sections 4.5.7 & 4.5.10).

4.2.3.9. Washing Pond and Corry Pond Field-road

<u>Washing Pond:</u> Washing Pond (marked on the older aerial photo maps as Corry Pond) is a "swash" between two ridges: the ridge upon which runs the King Road, and the ridge which flanks the north-east side of Flamingo Pond. A field-road to the area runs from the King Road, through scrub forest and some formerly farmed patches (recovering). The end of the trail opens on to a seasonally flooded marsh. This marsh is covered in low grasses and has several large patches of *Typha*, along with an abundance of *Sabal palmetto*. Washing Pond itself is a shallow pool of brackish water surrounded by buttonwood and *Typha* thickets. Several open areas provide excellent views of the pond.

The marsh area is home to many insects, most notably butterflies and dragonflies. Observations by Darwin team scientists revealed that butterflies of several species breed in this area. A variety of spiders is also to be found here, and land crabs are abundant. This pond is an excellent birding area. Some species seen here are rails, coots, moorhens, white-cheeked pintails, teals, great blue herons, little blue herons, great egrets, cattle egrets, snowy egrets, plovers, flamingos, hummingbirds, catbirds, anis, and blue-gray gnatcatchers. Approach to some of the open areas is covered and would make for an excellent hide location. Numbers of birds can be quite high and it is not unusual to see many or all of the described species at the pond simultaneously. The distance from the road would make blind and boardwalk construction difficult, but this would greatly improve the access and usage of the site. Once on the grassy marsh, walking is easy (when the marsh is dry) through the adjacent palmetto woodland and *Typha* patches. Washing Pond is viewable distantly from the King Road.

<u>Corry Pond</u>: Corry Pond is accessible from the field road to Washing Pond. Care must be taken to route a new trail around the crowns of the large manchineel trees between Washing and Corry Ponds. The approach to Corry Pond runs through a habitat that is sparse in plant cover. Corry Pond itself seems to be a blue hole. Sisal soaking pens remain from times when rope-making was still done. A group that the TCI Government has permitted to explore all of the Blue Holes has shown some interest in this hole, but believes that it is not deep enough to warrant immediate study. The bank of Corry Pond opposite the Washing Pond access trail actually lies within several meters of the King Road, but the thicket of "cats paw," a spiny, tough scrub, discourages easy passage. Legends about Corry

Pond abound, including the story of a resident mermaid.

Work needed includes:

- to confirm permission for TCNT to implement and operate the trail
- to identify features of interest on the trail, to be marked by numbered pegs
- to devise a way of viewing the ponds without causing disturbance to wildlife; this probably means construc tion of one or two hides (see below)
- to write the trail leaflet to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc)
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to complete ground- and some vegetation-clearance of trail to minimise risk of tripping
- to install the numbered pegs and a sign featuring TCNT at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and management (see sections 4.5.7 & 4.5.16).

4.2.3.10. Old (sometimes "King") Road, Middle Caicos

The old main road from Bambarra to Conch Bar is passable in a vehicle with high ground clearance (except when flooding in the low parts is particularly severe – which is fairly rare). It is not passable in a car with little ground clearance – due to both rocks in part and flooding in wet seasons in others. The road probably needs to be kept open because of access to the radio transmitter and beyond to the power line which follows the road. However, the vegetation is in need of trimming. The road is accessed by the power company's truck, which is an extremely high all-terrain vehicle. The road is not kept clear regularly (even when requested). This may need to be addressed through the District Commissioner's Office and the Ministry of Public Works.

The road passes through a range of habitats including dry scrub/woodland and several wetland types, as well as skirting the pine woodland and Conch Bar Caves. It also provides a view over Flamingo Pond, which at times supports a range of interesting birds (flamingoes, spoonbills, ducks, herons, shorebirds etc). A viewing platform (see below) would be useful at this location. The road further to the west in the low-lying area also runs along the Ramsar site boundary.

The old road could be used in conjunction with the Crossing Place Trail to make a circular route, probably appropriate for cycling, although the Bambarra - Conch Bar route would be a feasible day walk.

Work needed includes:

- to confirm permission for TCNT to implement and operate the trail
- to identify features of interest on the trail, to be identified by numbered pegs
- to write the trail booklet to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc)
- to devise a means of charging for visitors because this is a public road, this would probably be feasible only for the leaflet and perhaps for use of hide/viewing platform
- to install the numbered pegs and a sign featuring TCNT at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and

management (see section 4.5.16).

4.2.3.11. Short field-roads in Bambarra – Flamingo Pond area

Especially with the development of the environmental centre at the old school in Bambarra, it would be beneficial to develop a short-moderate walking trail from there, preferably circular. This would include the interesting ecosystems and historical features near the village, but would also provide for a relatively short walking rote to the proposed hide/viewing platform overlooking Flamingo Pond. It could possibly provide options also to link to the two other short trails proposed near Bambarra (Duck Pond and Corry Pond Field-roads).

Work needed includes:

- to survey the routes of the trail(s), using traditional field roads as far as possible
- to confirm permission for TCNT to implement and operate the trail
- to identify features of interest on the trail, to be identified by numbered pegs
- to write the trail leaflet to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc)
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to cut/clear trails as necessary
- to install the numbered pegs and a sign featuring TCNT at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and management.

4.2.3.12. Buttonwood Pond Field-road

A well-established but somewhat overgrown trail runs from Conch Bar, along the south side of Village Pond to Buttonwood Pond. It runs through dry scrub and alongside several wetland habitats including the open water and sawgrass beds at Village Pond and mangrove swamp at Buttonwood Pond. There are also patches of transient vegetation. This provides a short walk (about 1 km each way) conveniently in the vicinity of Conch Bar. It lies within the Conch Bar Caves Protected Area. (This material is considered further in Section 4.5.2 on Conch Bar Caves Protected Area). It may be necessary to discourage heavy use of this trail or incorporate appropriate features in the route and design if it is discovered that it brings visitors too close to bird nesting and feeding habitats in the back of the pond.

There is the possibility of turning it into a circular walk, using the well established (but similarly overgrown) fork to Conch Bar Caves, returning via a section of the old road and the path from the airport to the village. This would also have the advantage of passing (or starting from) TCNT's kiosk at the airport. However, it might be disadvantageous to provide alternative access to the caves area (see section 4.5.2). It would, however, probably be possible to divert the return route to miss the caves entrance.

Another possibility for making this route circular has yet to be explored. This would be to open up the other route to Buttonwood Pond, from the coast road (and Crossing Place Trail) from the north, via the ruins of Stubbs Plantation.

Work needed includes:

- to confirm permission for TCNT to implement and operate the trail
- to identify features of interest on the trail, to be identified by numbered pegs
- to ensure that viewing points at the two ponds do not cause undue disturbance
- 112 Version 1.00 October 2002

- to write the trail leaflet to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc)
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to complete ground- and some vegetation-clearance of trail to minimise risk of tripping
- to install the numbered pegs and a sign featuring TCNT at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and management (see section 4.5.2)
- to explore the options for extending the trail to a circular route

4.2.3.13. Boat trip to East Caicos

The boat trip from Lorimers to East Caicos would make a very attractive wilderness and heritage experience. Whilst it is possible to travel from the north coast of Middle Coast to East Caicos over the open sea, a far more interesting experience (and less weather dependent) is through the creeks to Windward Going Through, and across the open sea for only the final stage to near Jacksonville (or through very shallow water – kakak or punting south of Joe Grant's Cay). This gives a far more complete impression of the habitats, better views of wildlife (flamingoes, herons, pelicans, shorebirds, kingfishers, small birds, ospreys, etc.) and a valued experience. It also relies on the knowledge of local boatmen, providing another contribution to the local economy. These people can also give information on local history, such as the fish trap at Blow Hole, the sisal farm at Jacksonville.

It would be worth exploring the possibility of restricting usage of these narrow waterways to kayaks and small boats with local boatpersons/guides.

4.2.3.14. Boat trip to Man o'War Bush and Ocean Hole

Several local boatmen run trips to Man o'War Bush (the nesting colony of magnificent frigatebirds (see 4.5.11) and Ocean Hole (a very deep solution hole, now in the sea).

Because this is in the Ramsar site and is also listed separately as a protected area, some means of monitoring usage is required.

It would also be worthwhile investigate the possibility of enhancing the visit by other stop-offs of biodiversity interest *en route* through Bottle Creek Mouth from the starting/ending point of Pine Barrel Creek.

4.2.3.15. Cottage Pond, North Caicos

The very short walk from the highway to Cottage Pond could be developed into a trail with interpretative material. Because this Pond is frequently visited by visitors without a particular interest in wildlife, such signage could be used as an introduction to other trails and facilities.

4.2.3.16. Wade's Green, North Caicos

Wade's Green is TCNT's important historic and natural reserve on North Caicos. Potentially, there will also be an interpretative centre there (see section 4.3.2).

The site already has attractive signage relating to the historic structures (although this may need revision in the light of more recent archaeological study).

The site would benefit from additional information and guidance on the biological and historic features, and this work is currently iin progress.

4.2.3.17. North Caicos Dump Field-road

This trail leads south from the highway near the entrance to Wade's Green, through dry woodland and scrub, through a range of wetland habitats to the open flats. A range of wetland types not easily reached elsewhere can be viewed from this trail of easy, level walking of moderate length (about 2 km or 1.3 miles in each direction). These include open flats, saltmarshes, buttonwood savannah flats, palmetto woodland and others. Most of the trail lies in the Ramsar Site.

Work needed includes:

- to confirm permission for TCNT to implement and operate the trail
- to identify features of interest on the trail, to be identified by numbered pegs
- to write the trail leaflet to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc)
- to devise a means of charging for trail use by visitors perhaps using the leaflet as ticket, and to agree with tour companies and guides
- to install the numbered pegs and a sign featuring TCNT at the start of the trail
- to train guides in the use of the trail
- to secure the conservation of ecosystems in the vicinity of the trail including appropriate land ownership and management (see section 4.5.16)
- It would probably be desirable to lay a board-path across the parts of the trail that become flooded at times; this would have the side benefit to visitors that they would not have to wade through shallow water over mud, but would mainly be to protect the mud flats from damage which could become severe and lasting if not protected. As usage of this trail is likely to develop slowly, it may not be necessary to introduce board-walks in the early stages, and only progressively later.

4.2.3.18. Flamingo Pond, North Caicos

The early report on possible Ramsar sites (Clarke & Norton 1987) noted "a nature trail could be established along the north end of Flamingo Pond leading to Malley Pond. Sensitive breeding areas should be off limits during the breeding season. For example Sawgrass Pond on North Caicos should be managed as a Nature Reserve with restricted access."

This and other possibilities in this area should be investigated further and proposals developed in due course.

4.2.3.19. Pineyards Field-road, North Caicos

This track from the main road south of Bottle Creek settlement provides the potential for a trail through a crosssection of dry scrub, several wetland ecosystems and pineyards. Further investigation and assessment are needed.

4.2.4. Hides (blinds), platforms and shelters

4.2.4.1. Introduction

This section addresses the need for built structures to complement the field-roads and other viewing opportunities. These would fulfil several functions, each structure probably combining several of these uses. The different uses are:

• Hide (UK usage) or blind (US usage): a structure in which observers can remain concealed, allowing close viewing of wildlife (often birds) without disturbing them. Avoidance of disturbance is important in some

situations, both for the benefit of observers (so that they can obtain good views) and the wildlife (for which disturbance may prevent essential activities such as feeding or breeding). Hides normally have narrow view ing windows but are otherwise enclosed, especially on sides facing the wildlife. Depending on the local geography, they may also have screens to shield the approach of observers from the sight of wildlife at a fixed location, such as a small pond.

- Viewing platforms: structures to provide a vantage point from which to overlook scenic features.
- Shelters: Structures with a roof to provide shelter from strong sunlight or heavy rain, particularly useful for breaks in walks and often combined with viewing platforms.

Each of these structures may also have subsidiary purpose, for example:

- Venue for interpretative and public awareness materials, such as display boards and leaflets.
- Locations for tour guides to use as a focus to speak to groups, or for a warden to meet visiting groups.

In most cases, the structure will be appropriate for several purposes, and the design should be adjusted to the local situation and to cater for these different purposes. Some combinations of uses will be inappropriate. For example, a hide intended for the viewing of particularly sensitive species would not be appropriate as a meeting place for discussions or for a social gathering at mealtimes. Again, such incompatible usages can be borne in mind at the design stage, and supplemented by appropriate signage.

The building of elevated, thatched viewing platforms or hides (blinds) will facilitate visitors' viewing of birds and other wildlife. Worldwide research and observation tactics have shown that wild birds will come to accept a hide as part of their habitat, and will often come to ignore the presence of people when they remain quietly inside the hide.

The size of hides will need to be adjusted to suit individual locations. Generally, they have a long side with a narrow horizontal viewing window facing the main area of interest. However, in some situations, there may be interest on more than one side. The wall opposite the main window is normally solid, with a screened door, so that observers are not silhouetted to the wildlife. Some screening, preferably using natural materials may be necessary to allow observers to approach the hides without causing disturbance. The thatching of roofs will be done in the style traditional to the Caicos Islands. Benches inside the hides will allow for seating area, at suitable heights for using the viewing windows. In areas which can be serviced by trash collection, covered trash bins will assist in the limiting of litter. Each hide will be outfitted with a name sign including the National Trust logo. Simple cards available from the National Trust Offices or other suitable venues will show pictures or paintings of birds or other wildlife common the each respective pond, with the common English, local, and Latin names printed. A symbol will depict endangered or threatened species. These cards will act as a "ticket" to the hides, and a small fee will be collected by the National Trust from the sale of each. Proceeds will benefit the maintenance of the hides, future literature production, and other projects. For ponds in close proximity to a road, a small area for parking would be prepared as well.

The building of the hides will take up minimal space and create disturbance only where the support posts are cemented into the ground. The parking areas will be small and alongside the road's shoulder. Locally harvested thatch, from the white top palm and buffalo top palm, will be cropped sustainably by thatchers (as is their normal practice). Where practicable, waste bins will keep litter to a minimum. Construction of the hides may result in the short-term disturbance of wildlife, and the timing of their construction should be planned to minimise that; the hides will steer people away from disturbing the ponds and other sensitive areas, and allow for minimal disturbance in the future. The presence of the hides is likely to create a sense of pride in the ponds and other venues as unique and special features, suitable for marketing to tourists. This pride will help instil a desire to help protect the ponds and other features from further disturbance. The literature will educate the visitors (local and tourists) to the hides about the birds of the Turks and Caicos Islands, and about the importance of these wetlands. The hides and other structures will serve as locations for the education of groups from schools and as shelters from the weather for passers-by, as local residents will have free access to them. Thus, potential benefits include:

- Establishment of a set of observation hides at important wetlands and other venues
- Education of all visitors to the hides, including tourists, local visitors, and school students

- A decrease in the disturbance to the birds which use the ponds and other sensitive areas
- · Increased sense of stewardship to the ponds and other features as valuable habitats
- · Additional destinations for tourists to choose from during their visits
- Attraction of bird-watchers to the area, encouraging the islands as a bird-friendly tourism destination

There is approximate information on the costs of works available from an estimate made for the production of six small hides near roads:

Item	Cost (US\$)
Materials for construction	3,500.00
Labour for construction	4,500.00
Thatching	1,000.00
Signage	2,000.00
Design and production of wildlife identification materials	2,000.00
Occasional repairs through year	2,000.00
Total Costs	15,000.00

This equates to an average of \$2500 per hide, although the cost would probably be larger if hides were produced individually. Management and supervisory costs are not included.

Recurrent costs would be the maintenance of the sites including structural repairs, clearing of parking areas and maintenance of supplies of identification materials.

Work needed includes:

- The assessment of the best locations for a hide at each site, as well as any dealing with any land ownership issues at the sites
- Tailoring the basic design options to the site and purposes
- The recruitment of local carpenters and thatchers
- The construction of the hides (including thatching), and clearing of parking areas where appropriate
- Close management and supervision of this work by someone understanding the conservation objectives and the need to avoid damage and disturbance
- The design and production of the wildlife identification literature and the hide name signs
- The publishing of the necessary literature and explanation of the policy of the literature as a ticket
- Work with local tour guides
- The Public Health Department will be informed of the presence of the trash bins, which may be emptied during their normal collection times.
- The marketing and encouragement of use of the hides
- The checking and maintenance of the hides
- · Observations will be made as to the effects of building on presence of wildlife in the ponds
- Community meetings will be held to describe the goal of the project
- Supervision and management of the work

In selecting the sites for structures as resources become available, it is important to take into account the need for a spread both geographically and in relation to the range of ecosystems and wildlife. It is also necessary to relate the placement of the hides and other structures to the development of trails described above. Middle Caicos is the largest

of the Turks and Caicos Islands in land area and is quite diverse in habitat type. Research by the Darwin Initiative Project shows several important wetland habitats exist throughout Middle Caicos. The Ramsar Wetland of International Importance site on the south side of this island and much of North Caicos provides great expanses of wetland communities for plants and wildlife. The dry-lands of the northern side of Middle Caicos also contain several important wetlands. The wetlands of Middle Caicos provide excellent habitats for many waterfowl and wading bird species as well as other wildlife. Some of the wetlands frequented by birds are in close enough proximity to roads to be easily viewed from the road area. Many similar features relate also to North Caicos. Some of the possible venues are indicated below. Although priorities are not indicated at this stage, the current stage of knowledge, and of related interpretative developments, suggest that the following might be the most appropriate priorities in the short-term:

Hides at Village Pond, Nanny Pond, Turnup Pond and, if trails are developed, at Duck Pond and Washing Pond;

Platform at Haulover Trail, Flamingo Pond, Middle Caicos;

Repairs and interpretation at shelters at Flamingo Pond, North Caicos.

4.2.4.2. Flamingo Pond, Middle Caicos

Flamingo Pond near Bambarra is included in the Ramsar Wetland site and is frequented by flamingos throughout the year, but most especially in the winter. Evidence of flamingo breeding activity has recently been found in Flamingo Pond. It is also important for other wildlife.

The old main road is passable by vehicles with high ground clearance (see section 4.2.3.10). A hide/viewing platform just off this road (at about 192161 224157) would have several benefits:

- The road probably needs to be kept open because of access to the radio transmitter and beyond to the power line which follows the road.
- · Interesting birds (flamingoes, spoonbills, ducks, herons, shorebirds etc) may be seen here, but this should not be the main feature, as occurrences of mobile animals are unpredictable and numbers are relatively low.
- There is a wide view from here of the distant low flats, through the bush hills, to the coral reef and open sea: this provides the opportunity for a display explaining the structure of the islands and the habitats, together with a panoramic view key naming the features.
- This also provides a rare accessible view-point of the Ramsar site, as Flamingo Pond is included in a northern loop of its boundary.
- These features would also give the opportunity of explaining the Ramsar Convention, the international value of this area, and the work of the Trust.
- There should be low maintenance costs and, with the proximity of communications and power facilities, good prospects of sponsorship.
- At later stages, there is the possibility of expansion to develop a nature trail, perhaps to another hide down the hill to overlook the marsh to the west, perhaps returning along the old road.

If the viewing area is to have vehicle (as opposed to walking-only) access, this would require a commitment from the appropriate government department to keep the King Road cleared for the unhindered passage of tour vehicles. Most tour guides are reluctant to go there now because of the scratching their vehicles will endure, as well as possible flat tyres from the bad road quality.

4.2.4.3. Kitty Pond, Middle Caicos

Kitty Pond, between Bambarra and Conch Bar, is used by several species of birds in the winter, including brown pelicans and flamingos. It is close to the main road, but a viewing position might be needed either through the bushes or over them.

4.2.4.4. Village Pond in Conch Bar, Middle Caicos

Several ponds have been affected by the construction of roads. These include Village Pond in Conch Bar, part of Conch Bar Caves National Park. This brackish tidal pond is frequented by black-necked stilts, Bahama pintails, greater flamingos, and several species of herons, and is a confirmed breeding site for the endangered West Indian whistling duck. The main road for Middle Caicos was pushed through Village Pond (despite the obvious intention of avoiding this unnecessary damage, which is to be seen in the original plans for the road), and part of the pond is now a grassy marsh also used by birds and other wildlife. With the road now there, there is a good opportunity to show this very important site to a wide public.

4.2.4.5. Fish Ponds, Middle Caicos

The Fish Ponds near Pine Barrel Landing, which are tidal sea-water ponds, are often used by flamingos and several species of herons, and terns are common at this site at some seasons. The Fish Ponds are traversed by a causeway for the Ferry Dock road. Shallow culverts under the road do not replace the natural flow from before the construction of the causeway, but marine life still manages to survive in these ponds (see section 4.5.9).

4.2.4.6. Montpeller Pond, Middle Caicos

Montpeller Pond, near Bambarra, is a seasonal salt pond flanked by buttonwood groves and frequented by flamingos in the winter.

4.2.4.7. Turnup Pond

Turnup Pond is a small pond forming part of the Montpeller Pond complex, but separated by marshes from the main Montpeller Pond. It is frequently rich in water birds and is situated beside the bend in the main road where it turns up from near the shore, towards Bambarra. Although very close to the road, the pond is not easily viewed from there because of bushes and the difficult location on the bend of the road. A hide here could be very useful, although careful attention will need to be given to road safety aspects in relation to car-parking and access.

4.2.4.8. Washing Pond, Middle Caicos

See section 4.2.3.9 for a description.

4.2.4.9. Duck Pond, Middle Caicos

Duck Pond is a rich pond (probably named for its hunting potential when this was practiced) in the scrublands. If the fairly short trail to this pond is developed (see section 4.2.3.8), it would be important to construct a hide by the pond in order to avoid disturbance while providing viewing opportunities.

4.2.4.10. Nanny Pond, Middle Caicos

Nanny Pond is a small but very deep pond in a hollow surrounded by thick woodland. It is very important for wildlife but, because of its small size, it is probably potentially very sensitive to disturbance. The National Trust has opened a very interesting trail to this pond (see section 4.2.3.4). However, if usage is to include the end of the trail near (and possibly eventually past) Nanny Pond, a carefully designed hide will be needed.

4.2.4.11. Big Pond, Middle Caicos

There are some possibilities for structures in the Big Pond complex to provide both viewing hides and shelters. However, there are counter arguments that, at the low level of usage expected in the near future, it might be more satisfactory to leave the area in a more wilderness state. It would be necessary to keep this status under review in the light of changed usage, so that any increased usage does not have an adverse impact – in which case, some more

active management measures, possibly involving viewing structures, might be required.

4.2.4.12. Cottage Pond, North Caicos

Cottage Pond is a small but very deep pool, with some similarities to Nanny Pond (see above). A main difference is that Cottage Pond is near the road, with a wide track reaching it. As a consequence, it is much visited, even though it is a statutory nature reserve. A hide overlooking the pond would be likely to be productive in terms of viewing opportunities for birds, but this would be ineffective if other visitors arrived at the pond while people were birdwatching. Any such development here would therefore require considerable further study and public consultation with the local community as to the agreed usage of the site.

4.2.4.13. Wade's Green, North Caicos

The National Trust has already provided an elevated viewing platform at Wade's Green Plantation. This affords both a view of the ruins of the main building and also a view over the western part of North Caicos to the nearby cays, and on to Providenciales in the distance. This platform needs completion, interpretation materials and a programme of maintenance.

4.2.4.14. Flamingo Pond, North Caicos

Shelters have long existed at the north end of Flamingo Pond on North Caicos, where the Ramsar site boundary crosses the main road. These shelters need considerable renovation and the addition of interpretative material, as well as a programme of maintenance. A new viewing building is being constructed at the Flamingo Pond Outlook in Whitby. Some building of new structures is in progress.

4.2.4.15. Other locations, North Caicos

Further investigation is needed of the potential for viewing structures at sites in North Caicos. There is almost certainly considerable potential for these around Flamingo Pond and in the related complex of marshes, integrated with trails also needing research (see section 4.2.3.18).

4.2.5. Publications

4.2.5.1. Interpretation for field roads etc

It is planned to develop and implement a programme of integrated leaflets, signs and displays matched to the opening of each trails etc, this programme itself related to the availability of financial and human resources.

It is envisaged that signage for field-roads will normally consist of a prominent entrance sign with logo(s), together with numbered feature posts. This will minimise costs and intrusion, while allowing changes to be made relatively easily and cost-effectively to the information content. It is anticipated that the guide leaflet to each field-road will serve as the ticket. The basic concept for format would be a single sheet printed on both sides, and incorporating sketch map, notes on numbered locations, illustrations and notes on the natural, historical and cultural features. Notes on mobile species likely to be seen will need to be worked into the text. It is planned that the sheet be laminated or be produced of a comparable standard. This would have several advantages:

- It becomes a souvenir, with extra awareness-raising potential.
- Any discarded or lost copies will not produce unrecoverable litter and may be recyclable.
- The leaflets will become collectable (and saleable) in their own rights, for example as sets for placemats.

4.2.5.2. Identification and awareness-raising

It is intended that material be prepared to aid the recognition and identification of various aspects of TCI wildlife. This is for several purposes, including increasing the awareness of the richness of this, as well as increasing the ability of local people and visitors to contribute to survey and monitoring. The Darwin Initiative project has made considerable progress on this, usually in collaboration with others.

4.2.5.2.1. Birds

The Darwin Initiative project was pleased to collaborate in the production of a major new book *The Birds of the Turks and Caicos Islands*, which was launched at the AGM of the Turks & Caicos National Trust in November 2001. The book is hard cover, 96 pages with 236 full colour pictures. While it concerns mainly birds, there is a section on habitats which also covers butterflies, moths and reptiles. The purpose of the book is two-fold: to serve as an educational tool for local people, especially children, to learn about their natural heritage, and to introduce visitors to the fauna of the TCI. In furtherance of the first objective, the Trust is giving a copy of the book to every school in the country. In tourism terms, we believe the book will help to attract tourists as some 51 million people in the United States alone call themselves bird watchers. In line with the objectives of the project, it is hoped that it will also encourage visitors to visit other Islands in addition to the main tourist resort of Providenciales, as it describes locations on other Islands which are particularly good for birdwatching.

The book was written and the photography done by Richard Ground, the Chief Justice of the TCI. Mr Ground's wildlife photographs have been published in many magazines over the last dozen years, and he produced a book on the wildlife of the Cayman Islands while he was Attorney General there. The lay-out and management of the publication process was done by his wife, Dace. They have donated the book to the Trust. The publication of the book was made possible by a generous donation from Robin and Sheila Laing, long-time residents of Grand Turk, and by an interest-free loan from the Conservation Fund, a new fund based on a visitor tax. Books can be purchased from the Trust office directly, as well as from local shops, at US\$20.00 each. They will be available at other Trust outlets.

4.2.5.2.2. Butterflies, Mammals, Reptiles & Amphibians

The extensive research on butterflies carried out for this plan is in process of being turned into a small book. Dr Oliver Cheesman is writing the book, and it will be illustrated by Richard Ground, who did the book on birds. One or more booklets on bats, reptiles and amphibians will probably follow.

4.2.5.2.3. Plants

We understand that Kathleen Wood has nearly completed a book to be published by Macmillan Press on the plants of these islands, including those with medicinal uses. It is expected to be comprehensive and authoritative, and will be of great use to visitors.

4.3. Information centres

4.3.1. Bambarra environmental centre

4.3.1.1. Renovation

TCI Government has donated the old school building at Bambarra, Middle Caicos, and its land to TCNT. Actual transfer of the land is in progress including necessary mutation of land parcels. Restoration, renovation and modification are required. Architectural drawings have been prepared during the period of the Darwin Initiative project. Some funding has been secured from local business and the balance is being sought through grants from and via TCI Government. As this version of the plan is drafted, TCNT has invited bids for roof repair.

Further work is necessary to secure funding and complete these works.

4.3.1.2. Exhibits

A variety of exhibits can be installed in the Centre. Outdoor exhibits can include traditional farming, medicinal plants, heirloom crops, ornamental displays of native plants (to encourage native gardens), heirloom livestock exhibits, traditional building techniques, and traditional outdoor cooking demonstrations.

Indoor exhibits can be of two types: flat display boards with photos and text, and display case exhibits. The flat boards could have information about traditional crafts, showing the materials "from Bush to Basket" and the entire process of producing the fanner-grass and palmetto baskets and hats. This area would include room for local artisans to produce their wares on-site, and would be adjacent to a sales floor of locally produced crafts. Other flat-board displays could be about animals and plans in ecosystems. For example, an overview of cave ecology and habitats, and a close-up look at bats physically and behaviourally.

A comprehensive trail map would make for a useful display as this will be the operations centre for the field-roads system. Indeed, as many displays as possible (including crafts and ecology) should relate to features visible from trails, hides etc.

Display cases could hold items of cultural, natural, and historical interest. Pottery shards and round-holed conch shells, as well as items on loan from the National Museum, would make for an impressive display on the Taino people. Such exhibits could also be backed by flat-boards with photos and text. Plant and insect displays from the herbarium and insectarium would allow visitors to understand some of the biodiversity of the islands.

A mangrove aquarium is an efficient way to display a "slice" of a mangrove habitat indoors. Such an exhibit is easy to maintain with the proper equipment and can display fauna such as fish, crabs, shrimp, anemones, urchins, and other mangrove inhabitants. A reptile exhibit is also easy to maintain and can give the visitors a close-up view of snakes and lizards. The animals of these exhibits can be rotated with animals in educational use to give the education animals a rest.

4.3.1.3. Native plant nursery

Recent land development in the Turks and Caicos Islands, especially Providenciales, has resulted in the destruction of large amounts of coastal, scrubland, and wetland habitats. The continuing development of the islands for tourism, residence and industry threatens these habitats which, while of great biological importance, are not widely valued in their natural state. With the removal of these habitats, native plants will decline in population as exotic ornamental plants are used for landscaping purposes. The importation of exotic ornamental plants carries with it the risks of the inadvertent introduction of other species of plants and animals, including plant pests. Already several islands have established populations of non-native animals and plants, which endanger the remaining natural habitat and some species. Introduced plant pests and diseases threaten the small-scale subsistence agriculture still practiced in some areas. Many introduced ornamentals have no benefit to the native animals as the native plants would.

The Turks and Caicos National Trust's Darwin Initiative Project created a small facility for the propagation of native plants for fund raising sales in January of 2001. The original materials were purchased at a discount rate and the potential for several species were investigated by cuttings and seed planting. As successful species were identified and propagated, the inventory of the nursery increased. The current native plant nursery is supplied with pots and containers from several horticultural ventures. Seeds and cuttings are gathered from many sites around the Turks and Caicos Islands, but especially in Middle Caicos.

Under encouragement from the National Trust and others, demands for locally grown native plants are increasing throughout the Turks and Caicos Islands. Residents, resorts, and businesses are showing interest in using native plants in their landscaping. The use of native plants should be encouraged in landscaping, as the natural botanical communities of the Turks and Caicos Islands are under the constant and growing threat of destruction for development. Such plantings would lessen the impact which the clearing of scrubland, wetlands, and coastal plant communities has on the populations of native plants and animals. Furthermore, native plants are well adapted to local conditions, often requiring less watering, and are more economical.

The Turks and Caicos National Trust aims to encourage the use of native plants for landscaping ventures, while creating a locally produced stock of such plants for sale and distribution around the islands. The proposed native plant nursery is to be situated on the former Bambarra School grounds, which have been transferred to the National Trust for the creation of a Project Headquarters and Research and Visitors' Centre. The intended site for the nursery will be to the north of the school's water cistern where access to a fresh water supply is available.

The initiative would result in:

1. Propagation of a large and varied stock of native plants for sale to nurseries, resorts, and the general public; this would reclaim some destroyed habitat, furnish native animals and plants with extended range, and increase pride in local flora and fauna through the beautification of public and private areas.

2. Creation of an arboretum with some of the unsold plants which would serve as an example site of native landscaping on the Bambarra School property around the developing Research and Visitors' Centre.

3. Employment and training of one Middle Caicos resident in a community where jobs are scarce.

Subject to funding, the project entails the hiring and training of one Middle Caicos resident who would be selected by the project supervisors.

A local team of contractors will be hired to create a level white earth base; erect a shade lath, hot house, and a storage shed; and to install the necessary infastructure for water and electrical supply.

Lumber, cement, shade cloth, hardware, hot house plastic, infastructural materials, and gravel or beaten rock must be purchased for the construction of the facility.

Consumable supplies including fertilizer, rooting hormone, horticultural chemicals, coconut peat moss, plant labels, pots, seed trays, and protective equipment must be purchased initially, but the nursery will use profits from plants sold to purchase these supplies in the future.

The transport of the building materials to Middle Caicos by Middle Caicos Transport Ltd. Ferry and the transport of the plants to Grand Turk and Providenciales for sale will be considerable expenses which must be funded.

The propagation of native plant species will make available a stock of landscape quality trees and shrubs for gardening and beautification. Plantings with native plants will assist wild populations of plants in keeping a hold in their native habitats, while providing benefits to the wildlife which are dependent on these plants. Green waste from the plant nursery will be composted. Minimal non-recyclable waste will be created. Pesticides for plants, whenever possible, will be nontoxic and low-impact to the environment, and "green" products will be used as much as they are available.

Initiation of this element (like most others) is dependent on funds becoming available. Establishment costs were estimated in September 2001 as:

Item	Cost (US\$)
Materials for Construction	4,000.00
Labour for Construction	4,000.00
Consumable products	5,000.00
Transport and Shipping	2,000.00
Employment/ Training	5,000.00
Total Costs	20,000.00

Supervisory and management costs are not included. Recurrent costs would include the purchase of the consumable products, transport and pay of a hired trainee and caretaker for the nursery.

4.3.2. Wade's Green

4.3.2.1 Assets

<u>Geographic Features</u>: Assets of the site Wade's Green Plantation include an area of tropical dry forest west of Kew Settlement, North Caicos. The site includes a varied topography and the central ruins of a Loyalist Plantation founded by Wade Stubbs in 1789. The area surrounding Kew is the only place in the Turks and Caicos Islands where the all tropical dry forest habitat exists. Consequently, the site has great natural value as well as historic value.

<u>Geological Features</u>: The tropical dry forest of Wade's Green Plantation is nourished by relatively deep fertile soils. These soils make the area popular for farming. Rock outcroppings are common on the site but many are not attached to the bedrock.

<u>Historic Structures</u>: Approximately ten large building ruins exist on the site, which is surrounded by rock walls. These walls extend out from the main ruins site in all directions. Three walled roads leave the site to the east, west, and north. Two wells have been found on the site. A great deal of broken glass and pottery can be found on the site. Metal artifacts are also occasionally found. Foundations and remains of other outbuildings exist around the site. Two large boiling pots sit close to the Great House. Several of the buildings include the unique Bahamian ship etchings in the walls, which are currently under study.

<u>Historic Information</u>: Records of Wade's Green Plantation are relatively complete. All records dealing with Wade Stubbs, Wade's Green Plantation, and subsequent use of the Wade's Green Plantation Site are to be included as attachments to a development of this outline plan for easy reference.

<u>Contemporary Structures:</u> An unfinished thatch pavilion has been built near the Great House. A viewing tower is adjacent. The Great House has a refurbished bridge in it so visitors may see the inside of the building more easily. A wooden gate has been erected at the entrance of the site.

<u>Botanical Features:</u> The dry tropical forest habitat type includes many plants that are unique to this area of the Turks and Caicos Islands. Many of the plants on the site grow in abundance in this habitat while they are rather infrequently encountered in the scrub forests, which are the major woody plant habitat in the islands. The size of the trees here is more varied than in the scrub forest: there is a proper forest structure with an emergent layer, a closed canopy, open under story, and herb layer. This structure provides a shaded forest floor covered in rich leaf litter, and serves to contain moisture.

<u>Botanical Exhibits</u>: Several botanical exhibits featuring ornamental or regionally-native tropical dry forest trees have been installed. In some cases these beds are holding areas for specimen plants which are to be later installed in the as yet un-established National Botanic Gardens. A complete plant list exists for the site. The plant list exists in two forms – one is a list of names (English, Latin, and Local, if available) and the other has a complete annotation including native range, invasive status, points of interest, and specimen origin. The annotated list also includes notation if the plant is being held for removal to the National Botanic Gardens.

<u>Field</u>: A local style field has been cut to demonstrate the traditional post-plantation style of farming. The field is used to grow corn, beans, potatoes, melons, sugarcane, and cassava.

Zoological Features: Several animals appear to be confined to this forest type. Most notably is the Caicos Islands Gecko *Aristelliger hetchi*, which inhabits crevices in the walls and ruins. This large endemic gecko is abundant on the site, but very difficult to find elsewhere. The Key West quail dove is common on the site, while nearly absent in other areas of the island. The Cuban endemic blue-headed quail dove has been seen on the site. Because of the rich habitat, animals native to other areas of the islands are more abundant and obvious here. Curly-tail lizards, anoles, snakes, Cuban crows, white-crowned pigeons, greenhouse frogs, and other animals are common on the site. Erebus moths are frequently found in rock wall crevices. A species of large, fierce ants with enormous mandibles are common.

<u>Accessibility</u>: Wade's Green Plantation is easily accessible from the road to Bellefield Landing, which is to be developed further in the near future. A parking lot at the site entrance allows vehicles to approach the site but keeps them out of the site itself. The site is not currently suitable for visitation by persons who have difficulty walking.

4.3.2.2 Problems

<u>Geographic Problems</u>: Wade's Green Plantation currently sits off of the utility grid of North Caicos. Electricity is not available to the site. Water is not currently available aside from what is caught in the sugar bowls and what is in the Original Well. A plan to install a catchment for water is underway.

<u>Geological Problems</u>: The richness of the soil of the tropical dry forests puts them in danger of clearing for farmland. The National Trust maintains a good relationship with farmers; this is not always the case in other countries. Sometimes forest preservation interests and farming interests collide on the matter of land. This could be a problem in the future that the National Trust should examine as soon as possible. The National Trust maintains a traditional field on the site. This field should not be expanded under any circumstances, nor should any other parts of the dry tropical forest be cleared in this manner. The National Trust maintain a commitment to protecting this rare and fragile habitat type on North Caicos. The possibility of moving the field to another location, and enabling restoration of the forest at the field's present location should be investigated.

Problems of Historical Structures: Three main threats to the historic structures exist:

1. Structural integrity decreasing with time. As the ground and buildings settle, it is possible that they will collapse. As wooden window and door beams rot or are eaten by termites, it is likely that these openings will collapse.

2. Structural integrity decreasing due to natural damage. Trees, especially Short-leaved Fig *Ficus citrifolia* grow in the building walls. Over time, it may be that the tree is the only thing holding the building up. The trees' natural sway in the wind is a threat to the buildings, as is the weight of the trees as they are rooted in thin soil. Killing the trees is not a solution because when they rot away or are eaten by termites, there will be gaps left that could cause the buildings to collapse. Experts on ruins should be consulted to find out what are the best solutions for the long term survival of the ruins.

3. Structural integrity decreasing due to human activity. People climbing on the ruins and scratching graffiti into the walls are threats to the buildings. Climbing knocks loose the weathered cap-stones which protect the softer inner limestone blocks. Etching the limestone and plaster walls also opens the soft limestone to the elements and destroys historic drawings on the walls. There are currently no preventative measures installed to keep visitors from etching the walls. Tour guide education and full-time wardening would prevent this.

<u>Historical Information Problems:</u> While the information about Wade's Green Plantation is available, it will take considerable time and money, and probably travel, to acquire copies of important documents. The National Trust should pursue the obtaining copies of all documents pertaining to Wade's Green Plantation, and have at least two copies in two separate locations. The National Museum should also have a copy of all information. Funds generated from the site could in part fund research on the history of the site. Time period specialists should be invited to the site and asked to give a general report of their findings. Eventually, a low-impact archaeological study of the areas of the site which are already cleared would be advisable.

<u>Contemporary Structures' Problems:</u> The recruitment of a reasonable, skilled carpenter on North Caicos has proven very difficult. The structures on the site have been built without precision and care, and the pavilion was left unfinished. The National Trust must be sure that the contractor's cost is negotiated to a reasonable level and that no hidden costs are included. The National Trust should prepare construction contracts and should seek legal advisory with the Legal Advisor to the Committee should a contractor break their contract. The pavilion must be finished when funds become available and regular checks of the structural integrity of the structures must be made. Termites pose a threat to all wooden structures. Wasps nesting in the structures pose a threat to visitors and should be eradicated from the structures. Weathering, especially on the thatch roof of the pavilion, must be considered, as this part of the structure will need periodical replacement.

<u>Botanical Problems:</u> The site must be carefully protected against the escape of invasive species from cultivation. This will require weekly inspections of the areas surrounding plant beds with potentially invasive species. Nonnative ground-covers and specimen plants must be kept in check at all times. Cow Bush stumps must be removed completely from the ground where they re not desired. In other areas, they should continually be cut back until they die. Seed head should not be allowed to form on the Cow Bushes. When day labourers are weeding, native and ornamental species must be protected. Large trees must not be struck with machetes (a practice sometimes done out of boredom) and damaged likewise. All pruning should be done with pruning loppers or shears, not machetes.

Gathering of botanical materials from the site is to be prohibited. This includes collection by National Trust Staff and affiliates.

<u>Botanical Exhibit Problems</u>: The botanical exhibits must be carefully watched so that the trees in them do not overgrow their space. Continual pruning is important to consider. Again, invasive plants must be kept in check and not allowed to escape from the flower beds.

<u>Field Problems:</u> the field must not be expanded or moved. Under no circumstances should any more patches of tropical dry forest be cleared. The field must be kept planted (or restored to forest) so that erosion does not occur.

<u>Zoological Features Problems:</u> Hunting is to be strictly prohibited on the site. Visitors are not to bring dogs on the site under any circumstances, except properly trained guide-dogs for the blind.

4.4.2.3 The Future

The analysis started above will be developed further.

TCNT has arranged researching of this site, which was probably the most important plantation in the country. TCI Government has decided to transfer ownership to TCNT for the country, and surveys to demarcate boundaries and subsequent transfer are in progress. The transfer of land needs completion.

The site is of importance as the plantation site and for surrounding vegetated areas. It is also close to the western part of the Ramsar site, and one access trail into it, as well as to other natural features. It would therefore be appropriate to develop into the Trust's environmental centre in North Caicos, complementing that at Bambarra on Middle Caicos.

UKOTCF arranged via one of its UK member organisations (The National Trust of England, Wales and Northern Ireland) to provide the voluntary services of a professional restoration expert to develop a restoration plan in 2001. This will inform the placement of a visitor centre. Within this project, the Trust (with its partner organisations) will then embark on fundraising from local and international sources, including TCI Government and its agencies, local commerce, its local membership, international companies, governments and NGOs, as well as tourists, to provide for planning and construction of the centre.

TCNT would like to see Wade's Green used the same way Little Water Cay is used, as a travel destination for tourists. TCNT would also like to encourage bird watching groups to use the area. Picnics will be welcome on the parking lot area to keep food off of the main site. TCNT would like to explore more thoroughly the tropical dry forests surrounding the site, especially in light of some interesting sites recently found adjacent to the Wade's Green property.

Wade's Green Plantation Historic Site, much like Little Water Cay, is now receiving a steady flow of visitors from North Caicos and Providenciales. To improve the experience for the visitors, the Trust will, as funding allows, install more interpretive signs and produce additional literature. A variety of historic, botanical, and zoological exhibits are also being installed on the site. Included in the plans are a Tropical Dry Forest garden, a plantation-era pottery exhibit, and a bird garden. To reach these goals, a visitor fee as been implemented on a similar model to the Little Water Cay button ticket system. Visitors will receive a Wade's Green Btton with the new Wade's Green Logo as a souvenir, and this will act as their ticket to the site. The buttons are available from the National Trust Offices in Providenciales and North Caicos for the cost of \$5.00 each. Funds collected from this system will be incorporated directly into the maintenance budget of Wade's Green Plantation. Close liaison is being maintained with tour operators.

The site is also going to have a working farm, currently being implemented. This farm will show visitors the traditional style of small-scale swidden agriculture used in the Turks and Caicos. Other smaller farm areas will display the crops grown at Wade's Green in the past. Exhibit plantings of culturally important, native, and ornamen-

tal trees will provide learning opportunities to the visitor. Plantings of heirloom crops such as "guinea corn," a grain grass which has fallen out of agricultural favour, will help to preserve these plants from extinction in the TCI. More accurate site interpretation will be implemented. Souvenirs based on artefacts will be created; one such idea is a metal key ring made from a cast of one of the old skeleton keys found on the site.

An exhibit to display an heirloom breed of fowl, introduced by the loyalists, is underway. TCNT hope to add other traditionally raised breeds once the site is in regular use. Dominique and "scrub" chickens, Guinea-fowl, and royal palm turkeys could be displayed. Other livestock around the site could be added when facilities and finance exist for their care.

4.3.3. Cheshire Hall

Whilst its development is not directly within the programme of work for North, Middle an East Caicos, the historic site of Cheshire Hall Plantation, Providenciales, relates closely to the Middle, North & East Caicos conservation project because it will provide an important first point of contact in the major population and visitor island in TCI. This former plantation site is in an unrivalled location on the major tourist island and centre of population in the country. It lies on the main road between TCI's international airport and all the resorts, and adjacent to the business centre and government offices. On this island undergoing rapid built development, it has the potential to become a key land-mark and educational centre, for both local people and tourists. The views from its situation provide also for a gateway to the environment, geography, history and ecology of the islands. It will be developed as a focal point also to make visitors aware of the other heritage sites throughout the country and to facilitate visits to them. In 2000 TCI Government decided to transfer the site to the Trust. The Trust has undertaken preliminary work to stabilise the ruins and provided basic interpretative signs and leaflets. Some of this pilot work was supported by a grant from the British Government, which was announced by HRH Prince Andrew The Duke of York during his address to the islands' parliament and prior to a visit to Cheshire Hall, in March 2000. UKOTCF arranged via one of its UK member organisations (The National Trust of England, Wales and Northern Ireland) to provide the voluntary services of a professional restoration expert to develop a restoration plan in 2001. This will inform the placement of a visitor centre. Planning, fund-raising and construction of the centre will be required. The Trust (with its partner organisations) will then embark on fundraising from local and international sources, including TCI Government and its agencies, local commerce, its local membership, international companies, governments and NGOs, as well as tourists.

4.3.4. Equipping and manning centres

This will be phased, partly in accordance with the rate of fund-raising. The first phase will be the Eco-centre Centre at Bambarra, for which partial funding has already been secured. The timing of the other two phases will be adjusted during the project. For each centre, an analysis will be made of user needs. The Bambarra Centre will probably house an office, basic accommodation for researchers, the national herbarium, the information database on biological resources in the islands, a visitor centre including displays, locally produced refreshments, giftshop promoting local craft products and native plants, and a base for trails and outdoor educational and visitor activities. Wades Green will provide a comparable centre for North Caicos with additional complementary specialisms. For the role of Cheshire Hall, see above.

4.3.5. Craft sales

TCNT has already developed a cooperative arrangement with residents of Middle Caicos and other islands, to promote and sell their traditional crafts, via the Trust's office in Providenciales, general events, special craft fairs, and potentially the internet. This will be developed further at the centres on Middle and North Caicos, with the additional benefit that the sales at these locations will link closely with the natural and cultural information disseminated there.

4.3.6. Reference collections

For serious scientific work on many taxa, it is important to have reference collections to aid identification of complex groups of species. Where such collections have been made in the course of the Darwin Initiative project 1999-2002, the collections have been made in duplicate. This is so that one of the sets can be repatriated to TCI, while the other is retained at a second location as an insurance. The set for TCI cannot be repatriated until suitable storage conditions are available and reliable; otherwise the material would rapidly decompose. It is envisaged that one of the Trust's environmental centres would provide the home for the reference collection. It would be best for this to be at the location where it would be most used, probably the Eco-centre.

4.3.7. Educational facility

It is planned that the centres, field-roads etc will be developed as an educational resource, using these as living classrooms. The interpretative centres, trails and other facilities will be designed and staffed to incorporate this usage, as well as ensuring access by people with disabilities wherever practicable. (See also following section)

4.4. Training and Environmental Education

4.4.1. Staff

Training will be organised for personnel recruited in a phased manner relating to resources available to implement those elements of the plan requiring staffing. This will involve identifying the nature and level of skills required, evaluating existing competencies of recruits, assessing training needed to reach required levels, and organising this. A key role is that of local counterpart to the Conservation Officer, so that the many skills can be transferred over several months. So far, funding for this has not been achieved, but it remains a priority (see Appendix 7).

4.4.2. Guides

There is a need to identify training needs of existing local tour guides and develop in consultation with them integration of these into the system. As new elements for visitor usage are developed in a modular way, there is a need, in consultation with the guides and external expertise, to identify the nature and level of skills required, to evaluate existing competencies, to assess training required to reach required level, and to organise this. There is a need to maintain a register of guides currently trained and approved for operating in each Trust facility and to ensure the annual review and, as appropriate, renewing of such approvals.

4.4.3. Environmental education

Education work will centre on expanding the highly successful modular curriculum course in environmental education *Our Land, Our Sea, Our People*, developed by TC National Trust in consultation with the TCI Education Department. Subject to resourcing, this will be developed further using the nature reserves as living class-rooms. Project personnel and TC National Trust Education Officer will use biodiversity information from the Darwin Initiative project with historical, cultural information from further studies, and work with local teachers and the Education Dept to incorporate into revisions of existing modules, develop further modules and introduce to schools, including teacher training. TCNT-managed sites will be made available as living class-rooms for school-children throughout Turks & Caicos. Junior conservation programmes will be developed for school-children to participate in conservation work in their communities. The potential for post-school education will be explored with the developing Community College curriculum.

4.4.4. Local communities

Training will be provided for local people in skills needed to support this work, including trail-management, guide work, and the establishment and operation of small businesses compatible with, and supportive of, maintenance of the heritage and way of life. This will build on previous programmes run by TCNT and TCInvest, and collaboration will be explored further.

4.5. Management Considerations for important sites

4.5.1. Introduction

The results of the Darwin Initiative work, both scientific and based on local knowledge, lead to recommendations on particular sites appropriate for conservation/restoration activities, and integration with cultural heritage. Further such recommendations are likely to develop during the course of continuing work. In such cases, project personnel will develop recommendations for incorporation in the integrated management plan, contracting (or securing as volunteers where possible) specialists for detailed plans for selected sites.

In a few cases, recommendations will need to address the conservation of some areas where introduction of public access would itself be damaging. In far more cases, the need will be to assemble viewing site and trail packages which combine a range of interests for the visitors. Much of this is outlined in the preceding sections. This will involve the development of trails of different lengths and difficulties to meet a range of visitor requirements (see section 4.2.3). In all cases, the sustainable capacity of the trails will need assessment. In the case of biological aspects, the expertise and knowledge of the project team and steering group will be supplemented by (largely voluntary) advice from the wide network of international specialists linked UKOTCF's network. In the case of historic structures, the same network will make available appropriate specialists. Furthermore, the TCNT has strong links with the TC National Museum, which will assist in the participation of the key archaeologists.

Recommendations for individual sites follow. The amount of material on different sites varies greatly. This may relate to the amount of work needed, but more often is a result of some issues having been given priority in the first stages of the work. As noted earlier, this management plan is intended as a working document, so that the recommendations and plans for other sites will be developed progressively.

The identification of particular sites does not indicate that other areas of North, Middle and East Caicos are without interest. Indeed, it is the fact that these islands still have throughout an important natural element and that management is still largely environmentally sustainable that makes the approach of sustainable development outlined in this plan feasible. The aim should be to maintain such environmentally sustainable approaches throughout the islands. The reason for addressing some particular sites within this is that these areas need some additional management to maintain their very particular special features. These features are important in their own right, as part of maintaining the quality of life of local people, and to provide the continuing basis for economic activity to sustain local human populations.

4.5.2. Conch Bar Caves Protected Area

[The development of the following section was expedited during the preparation of this plan to meet urgent management needs. For consistency, the extracted material is left here in the same general form as has been used separately, so as to avoid confusion. A consequence is that there is some repetition between this section and some other parts of the plan.]

Management Plan for Conch Bar Caves Protected Area (CBCPA), Middle Caicos, Turks & Caicos Islands

4.5.2.1. The CBCPA Management Plan: summary

This Management Plan addresses access arrangements, health and safety for people using or visiting the site, conservation of the caves themselves and the other parts of the Protected Area, approved uses of the site, management of habitat, visitor resources and mechanisms for revision of the plan as appropriate. As for the wider plan, sustainable use to the benefit of local people is a core aim. The plan has been developed in close consultation with the local community.

The management plan aims to preserve the natural, archaeological and cultural interests of the caves and of the rest of the protected area, while allowing for public appreciation of those features as part of the local and international heritage, and for approved and appropriate research.

It is the intention that management will be integrated with other parts of the area, and this will be addressed in the wider management plan currently in development.

As for the wider management plan, of which this forms a part, it is intended as a working document. Therefore aspects which require further investigation are highlighted as well as those for which information is already adequate to allow operational management decisions. As for the plan as a whole, it is intended that short-term work plans will be developed from its framework.

4.5.2.2. Background

The area is formally designated as a National Park (see Appendix 8). However, it is the view of the National Trust, and others, that it should be reclassified as a Nature Reserve, for the reasons evident in this plan. So as not to preempt this decision, we here use the neutral term "protected area".

CBCPA comprises Conch Bar Caves and the overlying and surrounding areas identified in the Map at Annex 1. Conch Bar Caves are claimed in some literature to be the largest natural cave in the West Indies. (This is unlikely to be true – but further literature research would be necessary to check this.) As currently mapped (Robinson 1984 – see Annex 2), Conch Bar Caves comprises a deep Y-shape with the arms of the Y being about 300m (southern arm) and about 170m (northern arm). The stem of the Y is about 110m long, when it becomes flooded but clearly extends to the East. (Indeed, it is reported to continue until its appearance at an entrance by Button Wood Pond – but this has not been verified in current surveys). There are five entrances, only one readily accessible, and roof vents/collapses.

Geomorphological features: Many formations are stable relicts of geomorphological interest and beauty. However, the cave is still a "living cave", that is, formations are still growing and constantly in a fragile state (principally in the southern arm). Further information on this aspect is understood to be available but has not yet been accessible to this project.

Bats: Four species are known to inhabit the caves. Their sensitivity, especially during the breeding season, must be considered – as must their integral part in the tourism interests of the caves. The bat species are Waterhouse's bigeared bat *Macrotus waterhousii*, Jamaican long-tongued bat *Monophyllus redmani*, buffy flower bat *Erophylla sezekorni* and Cuban fruit-eating bat *Brachyphylla nana*. This is the only known colony of *B. nana*, a Caribbean endemic, in the archipelago of the Bahamas and Turks & Caicos. *M. redmani* and *E. sezekorni* are also Caribbean endemics and uncommon and not widespread, and the cave may provide critical habitat for populations of the Bahaman Archipelago. *B. nana* occurs as one group in a few close chimneys in 'Bat City', which also houses a large proportion of the population of E.sezekorni.

Other cave fauna: A number of cave crustaceans are described from TCI – mainly from Conch Bar Cave. Many of the more interesting cave endemics in the region are from deep water within caves (or related underground habitats – blue holes, etc). There needs to be a review of the known crustacean fauna and its status. The British Museum (Natural History) (contact Geoff Boxall) may be in a position to help here. (A number of references are already available to the Darwin Initiative Project team, but most of these have yet to be followed up. One obvious shrimp species was collected in November 2001). Many insects and other arthropods inhabit the caves (including cave crickets, cockroaches, Diptera, Coleoptera, spiders, woodlice, crabs and amblipygids (whip-scorpions). These, too, should be studied to assess levels of endemicity. (Some specimens of a white woodlouse on bat guano were collected in November 2001.) The occurrence of fish should also be investigated. Barn Owls sometimes use the cave as a roost site.

Historical/Archaeological features: The cave presents a number of features of historical interest, including visitors' names and dates (most repainted and no longer authentic), and holds value for archaeological studies (which must be carried out with methods that do not compromise the other features of conservation interest). Principal interest is in early occupation by Arawak Indians (Lucayan Tainos), and later for exploitation of (bat) guano, etc. Authentic evidence should be identified and preserved and decisions made about other features/ materials. (The results of recent studies by David Steadman should be obtained and assessed, as should some palaeontology done by G. Morgan.) Accurate interpretative material will need to be developed in the light of these investigations. There are other probably uses as hurricane shelter and water source. It is desirable to secure access to unpublished reports in files in TCI but not accessible at present by the National Trust, in order to amplify the information incorporated in this plan.

Outside the cave, the protected area comprises the area between the coast and the old road (see Annex 1). This includes an area of scrubland and the ridge over the cave area, as well as two important ponds. It is possible that these ponds are hydrologically linked to the water systems in the caves. (This would benefit from further investigation.) Village Pond is important in its own right for wildlife including many notable birds. These include Blacknecked Stilts and other shorebirds, Bahama Pintails, and several herons, and the Pond is a confirmed breeding site for the endangered West Indian Whistling Duck. The main road for Middle Caicos was damagingly pushed through Village Pond (despite the obvious intention of avoiding this unnecessary damage, as seen in the original plans for the road) and part of the northernmost part of the pond is now separated as a grassy marsh also used by birds and other wildlife. The second important pond is Buttonwood Pond, which has been less well studied. The ruins of Stubb's Plantation lie at least partly in the eastern part of the site, and would warrant investigation. Part of Crossing Place Trail crosses the site along its coastal edge.

The caves are currently one of the main tourism attractions at Middle Caicos. However, there is concern from the local community (including local guides) as to how much pressure on the sensitive elements, such as geological structures, archaeological material and bats, is compatible with sustainnable usage. This was one reason for both DECR and the local community asking the Trust and the Forum giving priority to investigation of the caves in the work which became the Darwin project to develop this plan.

4.5.2.3. Oversight of Management Plan for CBCPA

The responsibility for the implementation or modification of the Management Plan for CBCPA will rest with the Council of TCNT, which may delegate authority to a committee (for example its Executive Committee or the local committee - see Section 4.8.4), or to staff as appropriate. Trust Council and committees include wide representation but, in modifying the plan, the Trust will take additional steps to consult the local community including guides, government bodies and other interested parties. The Trust will be responsible for the conservation of the site and its intrinsic importance, for the way it is used for education (including any involvement in schools' curriculum if appropriate), research and recreation (and local employment), and for ensuring that such activities are carried out in a manner appropriate to the health and safety of staff, guides and visitors, and similarly that any such activities do not damage other interests of the site. The Trust would incorporate reporting on its stewardship of this site in its statutory reporting to the TCI Government and Legislature.

Any infringements or other matters of concern or interest should be reported to the Turks and Caicos National Trust, or the District Commissioner. The Trust would liaise with DECR in any matters requiring policing under the responsibilities laid on DECR.

A policy for dealing with the infringements or other matters of concern should be developed (e.g. rescinding of licences/permissions, changes of practice).

4.5.2.4. Cave access arrangements

The priority attached by all to ensuring the conservation of the cave's sensitive heritage, both for its own value and as a basis for sustainable tourism to benefit the local community means that the gate on the track to the caves will be kept locked with authorised keyholders. [This may encourage vandalism, but may be worth trying – if vandalism is persistent (it often stops after a year or so in UK experience), change the plan.]. It is recognised that there are various other possibilities for access, although far less easy and unlikely to be used by visitors to the area.

Ideally, authorised keyholders will be a dedicated TCNT warden, with at least one back-up TCNT person, plus an emergency key with a suitable and available island authority (e.g. District Commissioner or police officer). However, until resources are available for a dedicated warden to accompany all visits, it may be necessary to issue approved guides with a key. In this case and until long-term arrangements can be put in place, this key should be kept either with a TCNT officer based on the island or with the District Commissioner, and should be issued to authorised guides for specific visits against their signature in a log-book. All keys remain the property of TCNT.

TCNT may declare the site temporarily closed to access in the event of abuse of access arrangements, or for reasons of any notified temporary hazards or health and safety provisions (e.g. cave collapse, flood), or for reasons of recognition of problems affecting the interest of the cave (e.g. decline in bats, degradation of geomorphology, artefacts), or an accident, or for any other good reason.

TCNT may apply, as appropriate, seasonal restrictions or declare some areas permanently off-limits ('out of bounds' sanctuary areas, e.g. 'Bat City') in the interests of the conservation of bats or other features of concern.

All persons entering the cave must abide by the Health and Safety regulations (see Annex 3).

All persons entering the cave must abide by the Code of Practice with respect to conservation (see Annex 4).

Records of tourist visits and tourist numbers per visit, and ideally names and contact details of tourists, should be kept. As far as possible tour groups should be limited to six and should never exceed ten.

Records of other visits (e.g. for education or research) should be kept.

TCNT will consider limiting the number of tour groups in any one day if this becomes necessary in order to protect the site for continued conservation and use for tourism.

Until a dedicated warden is appointed, an appropriate TCNT staff member or volunteer should visit the site regularly to ensure that recommended practices are being followed and report on where the recommended practices create difficulties for visitors or may pose threats to the conservation concerns. Following the appointment of a dedicated warden, all visits should be monitored by him/her, and a report supplied regularly to TCNT on these points.

4.5.2.5. Tour Guides for the caves

Tour cave guides have been amongst those encouraging the development of the plan and have participated in community meetings and other consultations throughout the process. In common with experience elsewhere, it is much easier for any individual guide to meet the desirable practices if there is a management body to oversee such standards are applied by all other guides. Cave tour guides should be approved and certified by TCNT following training in health and safety, understanding cave geology and formation, ecology (especially bats) and history. They should also be briefed about the TCNT and its role in the management of the site. Approval will be annual, and renewal will require a positive decision by TCNT.

Tour guides should be encouraged to recognise that they have an important (key) role and interest in the conserva-

tion management and monitoring of the CBCPA.

Tour guides must at all times follow and make their tourists aware of the Health and Safety Regulations (see Annex 3).

Cave tour guides should at all times follow and make all visitors aware of the conservation value of the cave and potentially damaging activities identified in the Code of Practice for Conservation (see Annex 4), including identifying highlights before entering the cave.

Tour guides should be encouraged to participate in the running of the cave (see 3.1 above) and in the bat monitoring (see 10.2 below). They should also be encouraged to report biological (or other) observations (e.g. for bats' breeding season).

As far as possible tour groups should be limited to six and should never exceed ten (larger parties should be split into two or more groups).

Tour guides should agree with TCNT set routes for all tours, which should avoid 'Bat City'.

Tour guides should keep all tourists close to them and not allow them to wander from established routes.

Tour guides infringing these rules may have their approval revoked.

4.5.2.6. Research in the caves

Research will be permitted only if it does not threaten the conservation interests of the cave and its fauna.

Research within the caves should be carried out only with the approval of TCNT following submission of a standard application to be reviewed by management authority with external advice as appropriate.

Researchers must submit a full report on their work and its results to TCNT (within 6 months or such other time that has been mutually agreed).

TCNT may wish to maintain a list of research topics it would like carried out in or in relation to the cave and its environs.

4.5.2.7. Management for bats of habitat surrounding the caves

There is a need for further investigation of the habitat and its appropriateness for bats within the CBBPA and any other areas within 2 km of the cave entrances.

The main entrance area should continue to provide some tree cover under which bats can circulate in early evening or at dawn before departure to, or after return from, foraging areas.

The current availability of scrub edge extending from each end of the main cave mouth should be maintained to provide a protective flyway for bats commuting from the cave and then dispersing to feeding sites.

Vegetation around the other entrances should not be allowed to develop to the point where it prohibits free access for bats.

Vegetation around the other entrances should not be cleared to isolate the entrance from adjacent scrub and trees.

4.5.2.8. Management, viewing and access arrangements for surface parts of the protected area

Several very important habitats on the surface are also within the protected area. This includes breeding sites for the vulnerable West Indian whistling duch and other birds, butterflies and plants. It is important to organise management and viewing while impinging as little as possible on traditional uses. If successful, this will result in a vey attractive visitor site in the immediate vicinity of the village.

Village Pond is an important wetland habitat and one which is very accessible to viewing from the road. However, it is also a small area, so that disturbance to wildlife could become both a conservation problem and one restricting the viewing opportunities. There would be advantages in building a viewing structure on the road at Village Pond. This could have more than one function:

• Hide (UK usage) or blind (US usage): a structure in which observers can remain concealed, allowing close viewing of wildlife (often birds) without disturbing them. Avoidance of disturbance is important in some situations, both for the benefit of observers (so that they can obtain good views) and the wildlife (for which disturbance may prevent essential activities such as feeding or breeding). Hides normally have narrow viewing windows but are otherwise enclosed, especially on sides facing the wildlife. Depending on the local geography, they may also have screens to shield the approach of observers from the sight of wildlife at a fixed location, such as a small pond.

• Shelters: Structures with a roof to provide shelter from strong sunlight or heavy rain, particularly useful for breaks in walks and often combined with viewing platforms.

• Venue for interpretative and public awareness materials, such as display boards and leaflets.

The building of a hide will facilitate visitors' viewing of birds and other wildlife. A car-parking area (easily accommodated within the existing road width) beside the hide would be required, and it may be desirable to use a screen of local materials so that visitors can move from vehicle to hide without disturbing birds. (Worldwide research and observation have shown that wild birds will come to accept a hide and even passing cars as part of their habitat, but may be wary to people getting out of cars. They often come to ignore the presence of people when they remain quietly inside the hide.)

The thatching will be done in the style traditional to the Caicos Islands. Locally harvested thatch from the White Top Palm and Buffalo Top Palm will be harvested sustainably by thatchers (as is their normal practice). Benches inside the hides will allow for seating area, at suitable heights for using the viewing windows. Trash bins will assist in the limiting of litter. Simple cards available from the National Trust Offices or other suitable venues will show pictures or paintings of birds or other wildlife common the each respective pond. These cards will act as a "ticket" to the hides, and a small fee will be collected by the National Trust from the sale of each. Proceeds will benefit the maintenance of the hides, future literature production, and other projects.

Buttonwood Pond Field-road. A well-established but somewhat overgrown trail runs from Conch Bar, along the south side of Village Pond to Buttonwood Pond. It runs through dry scrub and alongside several wetland habitats including the open water and sawgrass beds at Village Pond and mangrove swamp at Buttonwood Pond. There are also patches of transient vegetation. This provides a short walk (1 km each way) conveniently in the vicinity of Conch Bar. It lies within the Conch Bar Caves Protected Area. It may be necessary to discourage heavy use of this trail or incorporate appropriate features in the route and design if it is discovered that it brings visitors too close to bird nesting, feeding and resting habitats in the back of the pond. Some work may be necessary to adjust the line of this trail so that it is set back from the Village Pond shore and screened from the pond by natural vegetation. This would prevent too much disturbance of wildlife of the pond, from the road on one side and a trail on the other.

There is the possibility of turning the field-road into a circular walk, using the well established (but similarly overgrown) fork to Conch Bar Caves, returning via a section of the old road and the path (East Road) from the airport to the village. This would also have the advantage of passing (or starting from) TCNT's kiosk at the airport or Conch Bar itself. However, it might be disadvantageous to provide alternative access to the caves area (see 4.1). It would, however, probably be possible to divert the return route to miss the caves entrance.

Another possibility for making the route from Village to Buttonwood Pond circular has yet to be explored. This would be to open up the other route to Buttonwood Pond, from the coast road (and Crossing Place Trail) from the north, via the ruins of Stubbs Plantation. If the ruins of the plantation prove worthy of visit, this could provide also an interesting option spur-walk off the Crossing Place Trail.

Work needed to implement these field-roads or trails includes:

- · identify features of interest on the trail, to be labelled by numbered pegs
- ensure that viewing points at the two ponds do not cause undue disturbance

write the trail booklet/card to relate to these markers for fixed items, and working in reference to mobile features (birds, butterflies, etc)

 \cdot devise a means of charging for trail use by visitors – perhaps using the leaflet/card as ticket, and agree with tour companies and guides

• complete ground- and some vegetation-clearance of trail to minimise risk of tripping; vegetation clearance to pay regard to important features and, where possible, keeping trail sufficiently narrow for vegetation to close overhead

- install the numbered pegs and a sign featuring TCNT at the start of the trail
- train guides in the use of the trail
- secure the conservation of ecosystems in the vicinity of the trail
- explore the options for extending the trail to (a) circular route(s)

Other aspects of development of Crossing Place Trail itself are not addressed here, because these are better considered in the context of the whole of the Crossing Place Trail, rather than in the context of this Protected Area in which a short section of that Trail falls.

4.5.2.9. Interpretative material

It is envisaged that signage for field-roads will normally consist of a prominent entrance sign with logo(s), together with numbered feature posts. This will minimise costs and intrusion, while allowing changes to be made relatively easily and cost-effectively to the information content. It is anticipated that the guide leaflet to each field-road will serve as the ticket. The basic concept for format would be a single sheet printed on both sides, and incorporating sketch map, notes on numbered locations, illustrations and notes on the natural, historical and cultural features. Notes on mobile species likely to be seen will need to be worked into the text. It is planned that the sheet be laminated or be produced of a comparable standard. This would have several advantages:

- It becomes a souvenir, with extra awareness-raising potential.
- Any discarded or lost copies will not produce unrecoverable litter and may be recyclable.
- The leaflets will become collectable (and saleable) in their own rights, for example as sets for placemats.

It is possible that a variant of this model might be appropriate too for the Caves. Further information should be on boards at the cave entrance, including on bats.

A leaflet (which could constitute the ticket – see 9.1 above) should be available from tour companies, the TCNT and on site. It should incorporate an explanation of the conservation interests of the cave and the principal components of the Code of Practice for Conservation (from Annex 4).

It is proposed that a booklet guide to TCI bats (and possibly other mammals etc) be prepared and this would highlight the importance of Conch Bar Village Cave.

Tour companies (and others) may be approached for sponsorship of such interpretative materials.

Information boards and other tourist resources should be kept in the open, away from the cave entrance and positioned so as not to impede bat flight-lines to and from the cave entrance.

4.5.2.10. Monitoring

Visitors to the cave should be monitored as at 4.7 and 4.8. In the light of such monitoring in relation to the changes identified in 8.2 (or to other aspects of interest) TCNT may further limit visitor numbers on a seasonal/ daily basis or with respect to fully protected areas within the cave.

An organized count of the bats should be carried out at six monthly intervals (say July and January). Such counts

may not give full population counts but should be regarded as representative. If bat numbers (of any species) appear to be in decline, the reasons for that decline should be assessed and appropriate measures taken to halt and reverse the decline. As far as possible tour guides should be encouraged to participate in the bat monitoring.

Monitoring of waterbirds using the ponds and of other wildlife are addressed in Section 4.8.2, and will be developed further in later revisions of this plan.

Consideration should be given to the practicability of developing a system of monitoring water quality and movement.

4.5.2.11. Charges

The work in preparing visitor facilities, including trails, interpreting them, maintaining and managing them, has costs, as do the preparation of signs, printing of information, training of guides and general management. Many of these costs have been met, and will be met, by grants from within TCI and overseas. However, providers of such grants are encouraged to give further support if ecotourism facilities themselves generate a contributory income. TCNT has an excellent performance record on this, notably with the Little Water Cay trail. TCNT has used the income from this both to maintain the trails and to help initiate other conservation and environmental work, including that on Middle Caicos.

It is the policy of TCNT to exempt school visits from charges for the use of these facilities. It is the intention also to exempt local residents from charges to their local sites. However, it is important that such usage is monitored, both to demonstrate and allow reporting on the uses made of the resource, and to allow monitoring in relation to conservation management. In this context, it is particularly important that all visits to the caves, whether by paying tourists or by local residents or by school parties or by researchers or by site-managers, are recorded.

In the case of the caves, the ideal position in relation to long-term conservation of the caves (and hence the visitorattracting resource) would be to have a dedicated warden at this facility. The costs of this ought to be defrayed by access charges. Furthermore, it is likely that, with increased visitors, the daily safe capacity of the caves will be reached on at least some days within the reasonably near future. It would be wise to plan ahead for this so that it can be managed positively and without deterring visitor support. In addition to the option of offering access to the caves on other days, it should be TCNT's aim to offer alternative venues of interest on days when the caves are not available. There are many potential venues which are identified within this wider management plan. The rate at which they can be developed is dependent in large part upon funding. Therefore, income from existing resources will help these developments. In this context, it would be sensible to plan for an initial charge for cave visits to be \$10 per person. Bearing in mind that most people paying this are foreign tourists, this is a very small charge in relation to the total costs of their visits to Middle Caicos (about \$150 for a day-trip from Providenciales), and indeed to TCI. This is especially so when it is considered that a souvenir guide-card or button will be included in this charge. Collection would normally be as part of a much larger charge (including transportation etc) collected by the tour-operator.

4.5.2.12. Conservation work

Apart from the work outlined in the above sections on the provision and management of visitor facilities, monitoring etc, proper stewardship of the resource includes various other necessary conservation activities. Some concern monitoring, also noted earlier, and others awareness raising. For example, there are indications that work on the roads does not necessarily treat adjacent habitat (such as Village Pond) with the care that would be appropriate. It would be valuable to make road-workers and their managers aware of the importance of these areas, so that casual damage is avoided. In the case of Village Pond, there would be advantages in reinforcing this importance by building, for example, low walls between the road and the pond on either side.

Awareness raising is also important in terms of other usages of the area. The important sawgrass habitat in Village Pond was burnt in 2001, thereby removing breeding habitat for ducks and other wildlife, apparently for the purpose of unauthorised crab-hunting. Some areas of the protected area are in use for low-level agriculture. The latter may not necessarily be damaging to the natural interest, but some investigation and guidance may be necessary.

In order to achieve effective management, a single organisation needs to take responsibility for the protected area and be accountable for it, even though that body will need to work closely with other conservation bodies, the local community and the government. This plan assumes that this lead body is TCNT, since it has a good working relationship with the local community, who favour this role for TCNT (as evidenced in many community meetings including one co-ordinated and chaired by the Ministry of Natural Resources), as it has brought together the specialist skills to enable a soundly based plan to develop, and because it has experience in operating this kind of ecotourism resource successfully.

There have been some problems with the boundaries of this protected area being subject to erosion. To ensure the long-term safeguard of the resource, in its own right and as an important basis for the local economy, it is important to place the land concerned in conservation ownership in trust for the people of TCI. The protected area comprises the following parcels of land:

 $\cdot \qquad \text{All of parcels 40105/5, 40104/63, and 40104/62. These should be transferred to conservation ownership as soon as possible.}$

 \cdot Part of parcels 40104/135, and an area at the junctions of blocks 40104, 40105 and 40200, whose parcel number is unclear but is probably part of 40200/00. These should be transferred to conservation ownership as soon as new parcel boundaries can be clarified.

Studies are desirable on the range and distribution of the habitats on which the bats are dependent for food, so that conservation measures can be designed for these.

TCNT will use its network of international contacts through UK Overseas Territories Conservation Forum to make researchers aware of studies that it would welcome to help further conservation measures.

4.5.2.13. Revision of CBCPA Management Plan

A system of review of the Management Plan should be established, initially on a yearly basis and later, say, every five years. Any agreed modification to the management plan should not compromise the natural and cultural interests of the site.

This plan and its revisions will provide the wider and longer-term plan from which individual and shout-term work programmes are developed each year or more frequently.

4.5.2.14. Annex 1. Map of Conch Bar Caves Protected Area; and Annex 2. Map of Caves

(These are on the following two pages. Annex 2 is from Robinson 1984.)

4.5.2.15. Annex 3 Health and Safety Regulations

Regulations will be developed to include the following aspects:

• Tour guides and tourists must observe the Health and Safety Code.

• Note should be taken of any notified temporary hazards or health and safety provisions. [This is just to cover for any eventuality, such as a collapse, occurrence of histoplasmosis, flood, an accident, etc – all very unlikely, but care recommended!]

- Any infringements should be reported to the Turks and Caicos National Trust.
- Matters arising from a Health and Safety risk assessment. Risks might include:
- o contact with rock (head injury),
- o falls from collapse of floor or through openings in floor,
- o trips, slips and falls on same level,
- o fear of fauna (crickets, cockroaches, bats, etc)
- o entry into confined spaces,
- o being struck by falling rock,
- o drowning,
- o sudden illness of guide during tour
- 136 Version 1.00 October 2002





· Visitors should be advised of H&S issues

o availability of lights (all tourists should be provided with adequate lighting - but not so bright as to disturb bats!)

o tourists should be advised to wear appropriate shoes

o consideration should be given to whether people should be provided with hard hats, advice on other suitable clothing, etc.

o information should be provided to visitors in resorts before they arrive on Middle Caicos to ensure that they come prepared and suitably dressed

- Tourist parties should include no more than six tourists per party.
- · Records of tourist visits and numbers should be kept.
- A set agreed route for all tours should be established.
- All tourists must remain close to guide and not wander from established routes.

4.5.2.16. Annex 4. Conservation Code of Practice

All visitors should be made aware of the conservation value of the cave and of potentially damaging activities.

1. No smoking in cave.

2. Only electric lights to be used (no combustion type lights, such as kerosene or alcohol lanterns or flame torches).

3. No food or drink should be brought into the caves (as it provides an easy entry route for litter and verminattracting food). Remove all litter and debris.

4. Visitors must not enter or pollute water.

5. No natural feature of the caves (including animals, plants, formations and rocks), or human artefacts of historical interest, may be removed from the cave.

- 6. No animals or plants may be introduced to the cave.
- 7. Avoid disturbance to bats as far as possible, especially in 'Bat City'.
- 8. Do not linger in areas occupied by bats try to keep moving.
- 9. Lights should not be shone directly at bats.
- 10. Noise levels should be kept down.
- 11. Bats should not be disturbed, handled or photographed with flash.

12. Any infringements or other matters of concern should be reported to the Turks and Caicos National Trust.

13. The TCNT may waive some of these rules to enable specialists to carry out approved research or other activities.

4.5.3. Indian Cave

Indian Cave is much less extensive than Conch Bar Caves, consisting principally of a fairly open arch structure, with some very narrow systems connecting into it. It is important for bats. Indian Cave also provides a unique habitat for plants that prefer moister, shadier areas. It is interesting to note that species common on the island have dramatically different growth forms inside the cave and around its entrance. Barn owls are known to use the cave, as are land crabs. It is known as an area where the endemic boas are found (and killed by workers hired [not by an approved management body] to clear the area). Greenhouse Frogs use Indian Cave as a breeding site. While these amphibians are not native, they may have been introduced by human agency or they may have colonized the islands on their own (they are known to do this with great ease).

At present, it has no formal protection, but is frequently visited, being on one arm of the Crossing Place Trail and the

main road. It has been subjected to well-meaning but inappropriate management. It has also been proposed for residential development spreading from Conch Bar. One plan for land division ignored the existence of the cave: a proposed commercial subdivision for Conch Bar has been made for the land upon which the cave sits.

This cave and its surroundings are important for both conservation and as an attraction to visitors if managed suitably. It is recommended that it be protected by being transferred from Crown ownership to safeguarded conservation status, using the powers in the National Trust Ordinance, and that the National Trust incorporate its management in the integrated plan outlined in this document.

4.5.4. Other Middle Caicos Caves

There are reports of small cave systems in other parts of Middle Caicos, particularly near Lorimers, being of importance to bats and other wildlife.

Several biologically and culturally important cave systems exist south of Lorimers in Middle Caicos. Three have been visited by the NT staff for exploration. Mango Tree Hole is a large collapsed cave, about 12 feet (4 m) deep with two small passages extending several metres back into the hillside. These passages are home to at least one species of bat. In the bottom of this hole are three large mango trees. The grand-daughter of the woman who planted these trees, Gertie Forbes of Bambarra, knows the history of the trees and their planter. Several other fruit trees are planted around and in the hole. A wall surrounds it. The deep leaf-litter houses many invertebrates and a healthy population of the African Monk Orchid *Oeceoclades maculata*, which introduced itself on hurricane winds during the last few decades.

Charles Rigby Hole is a small opening which widens out quite a lot. The hole is approximately 15 feet (5 m) deep. No bats have been observed there yet. A Barn Owl roosts there in the day-time, and ample ledges in the wall suggest that this may be an appropriate breeding site. Descent into the hole may prove difficult because the owl repeatedly attacked a measurement rope dropped into the hole. The hole was formerly used by a man named Charles Rigby, to grow bananas. No banana trees are left there, but a carpet of ferns covers the floor of the cave. A wall surrounds the cave entrance. This is a dangerous area because of the risk of falling and the seclusion from human settlement.

Fig Tree Hole is 8-10 feet (3 m) deep and has no passages. A large short-leaved fig tree grows out of the hole. The hole itself simply supports the fig tree, but the fig tree may be an important food tree for birds and bats.

Further investigations should be pursued as opportunities arise.

4.5.5. East Caicos Caves

The cave complex in the Flamingo Hill area of East Caicos is reported to be on the same scale as Conch Bar Caves. However, inaccessibility means that it is rarely visited, especially by those who could survey its biological aspects. Attempts to get bat and other specialists to the caves during the Darwin Initiative project 1999-2002 were foiled by adverse weather conditions.

These are probably important caves and their protection is likely to be a priority. Attempts to survey the site should continue. The probable importance of the area should be borne in mind in relation to any proposed developments.

4.5.6. North Caicos Caves

Investigations and enquiries on North Caicos during the Darwin Initiative project 1999-2002 revealed only very small cave features. This matches existing reports and the generally low relief. It is possible that cave systems may occur in the higher elevations of the Bottle Creek area and smaller hills in the northwest of the island. Opportunities should be taken to gather further information, but it is unlikely that caves in this area will prove as important as those of Middle, and probably East, Caicos.

4.5.7. Middle Caicos woodland

A major result of the 1999-2002 Darwin Initiative project has been the identification of the importance of some of the woodland and scrubland areas, especially between Lorimers and Bambarra. The importance of this has been somewhat undervalued as conservation and other interest in the wildlife centred first on the coral reef areas and more recently also on the more terrestrial wetlands. Although the woodlands include many wetland habitats, little of it was included in the Ramsar site, nor indeed the system of protected areas, many of which resulted from a survey of wetlands only.

This group of habitats therefore remains under-represented in areas of statutory or other protection. Some aspects of the importance include:

• Vital wintering habitat for some North American breeding populations. These birds are more obvious in April-May than at other times, because they spend a lot of time feeding to fuel their migrations to the breeding grounds. Among the most important finds during the recent fieldwork were several Kirtland's warblers. This is one of the most threatened bird species of the region, the world population consisting of only about 3000 individuals. They breed only in a restricted habitat in one part of Michigan, USA, and spend the non-breeding season in largely unknown locations in the Bahamas and TCI.

• Small pools with breeding records of the West Indian whistling duck, another vulnerable species, for which major conservation efforts are being undertaken internationally.

Extremely high densities of characteristic local birds, some widespread but others found in no or few other places (such as the Bahamas, Cuba or Hispaniola); these include thick-billed vireo (subspecies restricted to the Caicos Islands), Bahama woodstar hummingbird, Greater Antillean bullfinch (subspecies restricted to Middle & East Caicos) and Cuban crow. It is now clear that the woodland on Middle Caicos is important to the survival of this species and for the continued well-being of many others.

· Important habitat for certain bats

• One of the most important habitats for reptiles. The majority of the reptiles of the Turks and Caicos use the scrub forests and woodlands as their primary habitat. (One exception is the rock Iguana, which prefers coastal areas and coastal coppice habitats; this preference may be by necessity, as the remaining populations are found on small cays and isolated strands where these are the dominant habitats.) The endemic curly-tail lizards and the endemic races of the *Mabuya* skink and bark anole frequent the scrub forests. The endemic boa constrictors also favour this habitat, probably because the aforementioned lizards are their major food source.

• One of the areas in which re-establishment of woodland towards forest has moved furthest in places, so that there is a good range of scrub, woodland and forest types represented.

- · Correspondingly wide range of invertebrate and plant species.
- Additionally there are some important plantation ruins in this area.

• It is also an important area for plants still used for traditional purposes; this is important both for local people using these resources and for the potential interest to visitors.

This great importance and interest is reflected in the fact that several of the field-roads re-opened by the Trust for development of interpretative trails run through these areas. These include the trails to:

- o Haulover Plantation
- o Nanny Pond
- o Big Pond and the flats (salinas)
- o Armstrong Pond
- o Duck Pond
- o Corry and Washing Ponds

Many parts of this area are in private ownership, and it is recommended that the Trust enter negotiations with appropriate owners to ensure awareness of the value of these areas, their conservation, and appropriate access for visitors.

Some parts of this area are in Crown ownership. It is recommended that suitable parts of this important area are transferred to conservation ownership and management as soon as possible. This is for several reasons:

- · Conservation of the important ecosystems at a time before any conflicting proposals occur
- · To allow effective conservation management in a coordinated manner

• To enable the conservation body managing the site to make appropriate charges for access in order to defray the costs of management

- To enable enforcement of agreed conservation management measures
- To ensure public access to appropriate features of interest.

The trail to Haulover Plantation crosses the following land parcels: 40301/17, 18, 20, 21

The trail to Nanny Pond crosses the following land parcels: 40301/3, 24.

A proposed linking of these two trails would cross land parcels: 40301/22, 23.

Adjoining parcels 40300/00 and 40206/7 provide the only remaining Crown-owned access from the main road to the Ramsar site at Armstrong Pond, and embrace the route of the exceptionally biologically rich trail to Armstrong Pond.

Consequently, an important initial major step to securing the conservation of this area, and its future use as a basis of the economic development via eco-tourism could be achieved simply by transferring ownership to the National Trust under its Ordinance, so that it could hold it in trust for the people. Accordingly, it is recommended that these parcels be transferred to Trust ownership to achieve these important objectives. Later consideration might be given to transferring several adjoining parcels in addition: some or all of 40301/1, 2, 4, 5, 6, 7, 8, 11, 13, 14, 15, 16, 19.

4.5.8. Crossing Place Trail

Crossing Place Trail is the traditional route along the Caicos Islands, in particular the Middle Caicos section of this. As such, it is of great cultural importance. The trail is also of great scenic value, and along its route are important sites for wildlife, such as breeding tropic-birds, Audubon's shearwater and a range of herons and egrets in the western part, as well as an endemic and other butterflies.

The Trust, in conjunction with the local community, have re-established the trail, with a programme of signage, interpretation and publicity. Not surprisingly, this is rapidly becoming a major tourism feature for the islands. However, the site lacks effective protection. This needs to be put in place in order to ensure the conservation of this important natural and cultural heritage, and its availability as an essential resource in support of the developing ecotourism economy.

For areas towards Bambarra Beach, the integrity of the Trail has been compromised by the division of the coastal plot into many small units for development inappropriately close to the shore.

Further west towards Conch Bar, the Trail exists as a road reserve along the shore. It would be worth investigating conversion of this reserve into protected area.

Further west still, the Trail crosses parcel 40105/5, which is part of the Conch Bar Caves protected area, and ought therefore be safe if that parcel is transferred to conservation ownership (see section 4.5.2 above).

The Trail then crosses Conch Bar village as a road or road reserve near the shore.

In the western part of Conch Bar village, ownership is unclear, with most being a road reserve, but care should be taken that, if any plots own part of the Trail, development across it should be prevented. Ideally, the Trail here too should be transferred to conservation ownership.

West of Conch Bar, the Trail passes through parcel 40103/94. This is in Crown ownership and is the same plot which includes Indian Cave, so there are several reasons to consider transfer to conservation ownership.

West of this, ownership is within the Blue Horizon development. Here, the owners have apparently undertaken both

to leave the Trail open and to avoid development in the coastal strip. This admirable commitment should be formalised.

West of this, a further development is proposed, but the development boundary wisely excludes the coastal strip holding the Trail. From here westward is some of the most spectacular scenery of the Trail and also some of the most important wildlife aspects, on the coast and on the strip between this and the important wetlands of Fish Ponds (see below). Fortunately, this is also the area of simplest Crown ownership. Consequently, an important initial major step to securing the future of the Trail and the Fish Ponds could be achieved simply by transferring ownership to the National Trust under its Ordinance, so that it could hold it in trust for the people. The parcels concerned in this westernmost section are: 40101/00, 40102/00, 40102/4, 40103/96.

4.5.9. Fish Ponds

Fish Ponds comprise some of the most important wetlands in the area not included within the Ramsar site. The area is rich in fish and invertebrate life (but see below). It provides habitat for a range of conservation-sensitive birds including herons, egrets (including reddish), terns, gulls, flamingos and shorebirds – in some cases and seasons in large numbers.

Local information indicates that the Fish Ponds connect through underground channels to the sea to the north, leading to some tidal movement and water exchange. The construction of the causeway to Pine Barrel Landing has interrupted this water-flow, and local residents in community meetings within this project have drawn attention to large mortality events of fish, crabs etc, which they attribute to deoxygenation as a result of the reduced mixing. The essential problem is that pipes were put in the causeway in order to minimise flooding of the road, rather than to maintain water flow. There is a need to insert in the causeway more pipes, of larger diameter and at greater depth to ameliorate the effect of the causeway.

Notwithstanding this problem, the Ponds retain high value, and would benefit from transfer to conservation ownership. This could be achieved readily in conjunction with the Crossing Place Trail (see above). The land parcels indicated there include much of the Pools area. The Fish Ponds appear to function as an ecological unit with the land and sea towards the western end of the Crossing Place Trail, further supporting the case for conservation ownership and management of this area.

4.5.10. Other Ponds

The northern parts of Middle and East Caicos are characterised by a string of ponds of varying characters (Clarke & Norton 1987). Further important ponds have been identified with the help of local residents, in community meetings and individual discussions. Only a few of these ponds are protected:

- · Village Pond and Button Wood Pond within the Conch Bar Caves site
- · Flamingo Ponds of both Middle and East Caicos in the Ramsar site
- · Black Rock Salina, East Caicos, in the Ramsar site.

However, most are not protected, including:

- Fish Ponds (see above)
- · Jack Pond
- English Pond
- · Kitty Pond
- · Washing Pond
- · Corry Pond
- · Duck Pond
- · Turnup Pond
- · Montpeller Pond
- · Farm Creek Pond
- · Farm Creek Salina
- Nanny Pond (see above)

- the ponds in the quarry west of Lorimers (identified by local residents as important for the freshwater lens, and for wildlife including the vulnerable West Indian whistling duck)
- several ponds on East Caicos SE of Black Rock Salina
- · East Caicos caves

Many of these ponds would warrant protection. Options for Fish Ponds, Nanny Pond (as part of the Woodlands area) and possibly Farm Creek Pond are noted earlier. Amongst all the ponds another obvious priority is the Turnup Pond – Montpeller Pond complex.

Montpeller Pond is a narrow, long pond beside the main road west of Bambarra. Turnup Pond is at the northwestern end of the system. The ponds are very shallow and exceptionally rich in wildlife, most obvious in the wide range of birds commonly seen. These included: West Indian whistling ducks (a threatened species), white-cheeked pintails, least grebes, American coots, great white egrets and other herons, black-necked stilts, greater yellowlegs, banded kingfishers and a range of other species. The site also rated quite highly in the early Ramsar assessment by Clarke & Norton (1987). Montpeller and Turnup Ponds are in two separated pieces of Crown ownership (parcels 40203/ 18 & /16, respectively) and a transfer to conservation ownership is recommended.

4.5.11. Man o'War Bush

Man o'War Bush is a mangrove bush on Caicos Bank a few metres off the southern peninsula of mangroves on Middle Caicos. It is within the Ramsar site. It is an important and well-known breeding colony for magnificent frigatebirds.

Visits are made by boats owned by local boatman/guides. It is normal practice to approach to the immediate vicinity of the bush, so that many adult birds leave. However, some individual birds do not seem to be deterred from landing while the boat is nearby. There is no long-term quantitative data on trends in numbers of birds but the colony appears to be long established. It would be sensible to monitor bird numbers, especially if human visits increase. On the precautionary principle, it might be sensible to explore with boat-operators the practicability of agreeing a minimum limit on approach distance – probably of a few metres in the first instance. This would continue to provide superb views of the birds.

4.5.12. Flamingo Pond, North Caicos

Flamingo Pond of North Caicos is a very large pond complex forming part of the Ramsar site. It is well known for its flamingo flock and is important also for other waterfowl, probably including large moulting flocks of some species.

Local residents have drawn attention to their concerns about certain problems. These included low overflights, outwith those officially permitted in relation to the airport approaches. They were concerned also at some shooting activity. They considered that the presence of a warden would improve the situation considerably, and this is planned in the current proposals from the Trust when funds allow. It is in accordance with this plan.

4.5.13. Western woodlands, North Caicos

There is increasing evidence that the gallery woodland in the general vicinity of Wades Green and other parts of north-western North Caicos may be of particular importance to rare and vulnerable species of a wide range of taxa. The investigations need extending., and this is in progress now. It is already clear that this area has the best area of tall tropical dry forest in TCI, with a rich wildlife needing urgent conservation measures.

4.5.14. Extensions to the Ramsar site

The original report (Clarke & Norton 1987) which proposed the Ramsar site based its approach on the inclusion of representative samples of a range of wetland habitat types. This was a valuable study and we fully support it. However, since that time, the parties to the Ramsar Convention and others have developed further the approaches to
site identification. There is now a strong emphasis on protection of functional units, particularly where the wetland is in a natural or near natural state. Secondly, the Conference of the Parties has recognised that tropical wetland types, particularly coral systems, mangrove systems and sea-grass beds, are severely under-represented.

The East Caicos/Middle Caicos/North Caicos wetland forms probably the best example of its type in the Caribbean (and probably wider). It is also perhaps the most natural wetland amongst the more than 160 wetlands of international importance listed under the Ramsar Convention by the UK Government. The natural wetland formerly extended to Providenciales and South Caicos, but both these areas have suffered severe environmental degradation, although fragments of value remain.

The core unspoilt area is East Caicos. This is a superb complex of natural coral reefs, tidal flats, mangroves and marshlands which provide a haven for wildlife, as well as the natural basis of the fisheries and tourism industries. It is clear to us that the whole of this uninhabited island should be included in the Ramsar site.

However, there is currently a proposal for one of the largest cruise-liner ports in the world, able to take 660 cruise liners and 1.6 million tourists a year. This would take most of the uninhabited island of East Caicos, including its many natural lakes and marshes, as well as potentially having major effects on the Ramsar site, the coral reefs and the fisheries. The scheme, backed by a Canadian property developer, would lead to nearly half of the island of East Caicos's 17,500 acres being turned into docks, roads, leisure centres, shops, golf courses, hotels and luxury flats for wealthy North American and European visitors. An eight-mile main road and bridge would link East Caicos with the smaller island of South Caicos. This would bring in low-paid staff and workers to the port and complex. Most of them are expected to be hired in nearby Haiti and the Dominican Republic, as the number of workers required would equate to about half of TCI's existing population. Visitors at any one time would probably outnumber the local population of TCI.

The importance of East Caicos as the most unspoilt wetland complex in the region seems to be completely undervalued. This has huge potential for the future development of TCI by local people but would become impossible if the massive port and real estate development proceeded. For the last few years, this has been prevented by the inability of the developer to secure investment funds in this high-risk venture.

In this climate, it may not be practicable at present to extend the Ramsar site to include the area which is the subject of the proposed development, but should the cruise ship port project lose Government approval, much of East Caicos should become part of the Ramsar site and be designated as Nature Reserve. There are surrounding areas which are not subject to the same constraint. Indeed, even the developer has indicated that conservation use of such areas would be appropriate. These areas which could appropriately be added, formally and/or by transfer to conservation ownership, to the Ramsar site include:

- The area of East Caicos south of the development area
- · Joe Grant's Cay, Long Bay beach, and the adjacent channels and reef
- The Creeks and flats at Lorimers and Increase
- The reefs off the north shores of East Caicos and Middle Caicos.

Protection of these areas would be of major importance for several reasons, including:

• Nesting beaches for turtles, threatened species, particularly important because most other turtle beaches in TCI are now developed or have proposals for developments.

 \cdot Reef areas, which are surprisingly under-represented within the Ramsar site – and also under-represented in Ramsar sites across the world.

- Undeveloped beach areas are rapidly disappearing from TCI.
- Creek complexes across the bank through the islands are not well represented.

4.5.15. Other historical sites and locations of traditional cultural uses of natural resources

A survey of other historical sites is required. Some of those noted as of potential importance include: Increase Plantation, Dustry Plantation, School House in Lorimers, Dr John Lorimer's tomb on Middle Caicos. Jacksonville, at the NW corner of East Caicos, was a cotton and sisal plantation. Most of workers came from Middle Caicos and other islands. Few lived on East Caicos (and then generally only while working). This was abandoned in the 1920s, although the buildings at Jacksonville were restored in the latter part of the century as a dwelling house, which was occupied for several years. The walls remain in good condition and some of the metal roof on the main building has not yet completely rusted through. This building could provide the basis for use by field workers, interpretation, shelter etc.

Subject to resourcing, the Trust's island network of volunteers, combined with TC National Museum personnel and high-school students, could be organised to survey the historical and cultural resource, to identify further sites, buildings, historic trails, fields and artefacts for cataloguing. Initial work has established basic information on a number of sites, and more detailed research is in progress on selected ones. Prior to further physical ground survey, information would be collated from maps based on aerial surveys combined with interviews with local senior citizens who have first-hand knowledge of many historical field-roads previously used to access these sites – at a time when local communities still practiced sustainable agriculture to a much greater extent than at present. (Since the onset of high-intensity development in Providenciales, large-scale supermarkets on this island with imported, often preserved, foods have reduced the market for locally grown food, although some personal agriculture has been maintained. This provides a knowledge base which can be built upon.) Partly as a result of pilot aspects of this project, there is now a revival of interest in utilising natural vegetation and growing traditional fibre crops as raw materials for a revival of traditional crafts. The potential project would uniquely combine a wealth of untapped, information from the Darwin Initiative's vegetation map (based on satellite-imagery with ground-truthing), local knowledge of senior citizens and the regenerating body of craftspersons to consider actual and potential areas for harvest of plants for traditional crafts and other cultural uses, without depleting the resource. Prior to historical and cultural developments since the plantation period, the Caicos Islands were a major centre of Arawak (Lucayan) culture. This has been the subject of several decades of archaeological research by external universities, and the results would be integrated into the project's work. Apart from inclusion in trails, educational material etc, another aim would be to repatriate information and artefacts to the Turks & Caicos Islands.

4.5.16. Safeguarding of the Ramsar site itself

This wetland complex is probably the most natural such area in the Caribbean – and probably in a much wider area. It is also probably the most complete and natural wetland area amongst the more than 160 designated by UK under the Ramsar Convention. This is an asset of tremendous potential to TCI. However, the site is not widely known, and its value largely unappreciated. As outlined in this plan, there would be great potential benefits in raising awareness of this site. These benefits could involve enhanced conservation as well as employment and economic benefits to the local population. However, introducing substantial visiting to the Ramsar site for the first time could also introduce the risks of damaging the fragile ecology of the site as well as the communities of Middle and North Caicos. For this reason, it is strongly recommended that the National Trust continue to take the lead, in conjunction with the local communities, in developing the tourism opportunities relating to the Ramsar site. This would ensure a measure of control, so that the priority remains conservation and that tourism is supportive of that – rather than the reverse.

It is timely to start such developments soon, because there is increasing development on Middle and North Caicos. Whilst the National Trust and the local community will wish to limit such developments, some will happen – and are happening already. This will create an increased market for such facilities, but it is essential that the National Trust establish these in advance, so that the potential to manage these in a way which allows their long-term conservation is not lost. Such losses – and consequent subsequent economic problems too – have been all too frequent in many other parts of the world.

Much of TCI is Crown land. There appears to be a presumption in some quarters that anyone who comes along with a proposal for built development should be given the piece of Crown land requested. Until the current Sustainable

Development Planning Initiative (SDPI), there was little in the way of effective strategic planning. There was clearly a presumption that all built development is 'good' and should receive government support.

On paper, there are some apparently good planning procedures. However, it is clear that the professional civil servants in planning and other departments are often unable to make use of these. In some cases, statutory Nature Reserves have been approved for development in breach of existing policies and legislation. This has resulted in some of the gems which were meant to be held in trust for the people of the TCI instead being allocated for development. In some cases, important areas such as main remaining turtle breeding areas have been lost to holiday resort development.

On the main islands, the rate of allocation of land to development is amazing. The concept of maintaining the different natures of different islands – itself a potential tourism attraction – is only beginning to be considered, and is now welcomed and promoted by the Tourism Board.

Middle Caicos is currently little developed, but it appears that much of the north coast has now been allocated for development. This includes a major development at Haulover/Farm Creek Lagoon, north of Lorimers, from where a development road was bulldozed in autumn 1998. Further west, areas between the current small resort at Blue Horizon, near Conch Bar and Juniper Hole have been allocated for development. There are thought to be several others (see Section 4.7.1).

Much of the Ramsar site (and other theoretically protected areas) appears on the Land Register simply as Crown Land. It appears that any land on the register as Crown Land is assumed to be available for development. The possibility that such land may be a protected area is not well understood.

The legislation of the TCI provides in two ways for the government to secure or enhance special protection where the biodiversity or cultural heritage interest of the land resource is of particular sensitivity or value. These two ways may be used together or separately. The National Parks Ordinance provides for the designation of National Parks, Nature Reserves, Sanctuaries and Historical Sites but does not provide within the Ordinance for means of management to make conservation effective. The National Trust Ordinance provides for the government to transfer publicly owned land to the National Trust; however, the Trust may not treat this as a disposable asset but must instead manage the land in trust for the nation to maintain its heritage interest and integrity. Both measures have been used in pilot work. In the situations where these mechanisms have been used to transfer a protected area from government, the Trust has a track record of enabling a large number of visitors to experience an endangered endemic species at close range, while maintaining effective protection and generating sufficient income to sustain and enhance the resource as well as contributing to the livelihoods of many local tour businesses.

Given that all of the Ramsar site is designated as a Nature Reserve under the National Parks Ordinance, Government would be well advised to transfer to the Trust those parts of the Ramsar site which are Crown Lands (as was envisaged at the Trust's establishment by statute). This will benefit the private landowners, because in an area which is valued for it natural beauty, the presence of large tracts which will never be developed increases the value of that land which can be developed. For the relatively small privately owned parts of the Ramsar site and important surrounding areas, the Trust and Government will wish to explore possibilities for negotiation with land-owners with a view to purchase, joint management agreements or a wide range of mutually advantageous outcomes.

Because of earlier practical necessity for agriculture, trading, moving to areas of employment on plantations, etc, there has been a strong traditional of the use of historic walking routes, field roads. Many local people have concerns about the loss of these traditional routes often because of the inappropriate placement of new buildings, usually constructed by foreigners. The National Trust is working with local people and the Planning Dept within the Ministry of Home Affairs to establish these rights of way. An interim measure within the planning regulations has been taken experimentally for one of these major routes, the Crossing Place Trail, that runs along the north coast of Middle Caicos. However, as noted earlier, it is likely that further measures in such cases will be needed, and this is being explored further with government.

In order to facilitate the above measures, it will be important to relate land ownership to conservation interest. Conservation personnel will work closely with Land Registry and the Departments of Planning, Economic Planning & Statistics, and Environmental & Coastal Resources extend and update existing information, collated during the Darwin Initiative project (see Section 4.7.1).

4.6. Socio-economic aspects, Awareness and Marketing

4.6.1. Enhancement for local people and their employment

As will be evident from the above, there are considerable possibilities for local employment in the direct work for the TC National Trust of implementing and operating the visitor facilities outlined above. However, the provision of these facilities opens the possibilities of many more jobs providing for visitors coming to see the features of trails etc. These latter jobs would be largely generated by small businesses of local people, and would be of higher quality than the sort of job generally available to local people if developments are driven by outside organisations.

Whilst the total number of jobs would not be large in absolute numbers, it would represent a significant proportion of jobs in relation to the size of the local community. Indeed, it is this type of small-scale employment which can support local communities and maintain their traditions and quality of life, rather than replacing this with a different (and, in many ways, unwanted) imported social system.

The types of work include guides, trail and hide maintenance, boatmen, and local craft work (including further development of that to meet current needs) – see below. Some training would be required, and possibilities for this are already being explored (see below).

For reasons outlined earlier, it would be desirable for all guides on Middle Caicos to work within a system of standards and training of the National Trust. It would be sensible to include in this the existing features of interest which are the subject of tours, notably the caves and the breeding colony of magnificent frigate-birds.

4.6.2. Small businesses

It would be desirable, in consultation with TCI Government's Economic Advisor of the Department of Economic Planning & Statistics (DEPS), to commission a suitable economist to undertake socio-economic analysis on local small business enterprises linked to heritage and prepare a report. In consultation with TCI Government Ministry of Finance and Investment Agency (TCInvest), it would be useful to identify the extent of available relevant information and the parameters of further study needed, in the light of developing heritage management plans. Potential consultants would need experience of socio-economic work with small communities and in heritage-linked aspects.

The successful earlier National Trust pilot programme of small business workshops should be further developed, in collaboration with the complementary UNDP-funded Small Enterprise Development Center programme, acting as resource to this latter programme and to identify gaps. Initial consultations reveal these gaps to be primarily in the areas of small businesses linked to showing visitors the heritage features, and linking to the craft-work; the UNDP project is centred on craft work. In conjunction with this, there is a need to arrange for suitable training to enhance technical skills of local people to meet the business needs, as well as those required to undertake work for the Trust in managing the heritage areas. Such training would help put local people in a position to take advantage of employment (or, where appropriate self-employment) opportunities provided directly or indirectly by this project's results as these unfold.

There is a revival of interest in utilising natural vegetation and growing traditional fibre crops as raw materials for a revival of traditional crafts. There is potential in combining the wealth of untapped information from the Darwin Initiative's vegetation map (based on satellite-imagery with ground-truthing), with local knowledge of senior citizens and the regenerating body of craftspersons to consider actual and potential areas for harvest of plants for traditional crafts and other cultural uses, without depleting the resource.

The loss of many important cultural traditions has been occurring with the swift development of the Turks and Caicos Islands. One tradition that has nearly disappeared in the small-scale subsistence poultry farming which was formerly the basis of life for many Turks and Caicos Islanders. Many residents of the islands have expressed interest in raising poultry for eggs and hobby, but the livestock suitable to the backyard farming methods are simply not available. Some work has already taken place to assist local residents with such developments.

Increased tourism in Middle Caicos could mean more of a financial base upon which to open ecologically-geared or tourist-friendly small businesses. Some potential businesses that could serve the tourists as well as the local Version 1.00 October 2002

community are craft shops, shops that sell film, souvenirs, and snack food, and facilities to rent bicycles or kayaks as well as restaurants and guest-houses. Plenty of small businesses are already established on Middle Caicos, but being a small and tightly-knit community, there is no need to market or advertise businesses by any means but word-of-mouth. Tourists, especially those arriving from North America, often have no idea how to find what they need on the island due to the absence of signs, or a guidebook. The National Trust could easily produce a guidebook for visitors that would serve as a network to the "hidden" businesses. For example, the guide would explain which house to go to for gasoline (because you don't go first to the gas station for gasoline here), where the owner of the shop is likely to be found, and from whom you can buy fresh eggs, sugarcane, or crafts.

4.6.3. Tourism

All the above features will provide increasingly attractive features to high-quality, low-impact tourism. Aspects of this are already active, and it is important that growth is progressive, at a rate that the local capacity can manage without damaging the communities themselves or the cultural and natural heritage features that provide the interest.

There is a need to develop an integrated marketing strategy incorporating input from biodiversity and cultural management plans and socio-economic study. This is a complex activity which needs to evolve. Therefore it will develop progressively, as further information and experience from various activities become available.

One market the National Trust could easily tap into would be the bird-watching tours market. Specialist-led excursions are taken to remote birding sites all over the world. It would be far better for the National Trust to enter this market as a key player in its Turks and Caicos Islands supervision than to allow the market to make the discovery on its own and make unsupervised visits to important wildlife sites. The National Trust is also the appropriate agency through which birders may obtain Bradley's (1995) *Official Checklist* and Ground's (2001) *Birds of the Turks and Caicos Islands*.

4.6.4. Turks & Caicos National Trust: membership, awareness, imprint

Effective implementation of this plan depends heavily on the TC National Trust. This is not just to manage the work and facilitate others, but also to draw in the support of local civic society, the support as members of both residents and visitors, and the help of expertise from outside the islands.

For these reasons, the promotion of the elements in this plan and of the Trust are mutually supportive. Therefore, signs, buildings, publications, trail leaflets etc should carry Trust logos. Trust membership leaflets etc should be widely available, and visitors to trails and centres should be invited to join the Trust.

4.6.5. Dissemination

The extensive network of the UK Overseas Territories Conservation Forum will be used to pull in volunteer expertise (as noted above) and to facilitate the application of the results of this project to comparable situations worldwide.

The example of this management exercise will be disseminated to other potential users by presentations led by the National Trust at regional meetings, including e.g. National Trusts, Caribbean Conservation Association, Society of Caribbean Ornithology, West Indian Iguana Specialist Group etc, with follow-up on bilateral or small-group basis as required. Trust representatives will be coordinated to address relevant meetings and conferences, write articles, and give local TV presentations. It is planned to develop standard presentations and briefing packs for any suitable representative to present. An even wider audience will be addressed by presentations via the UK Overseas Territories Conservation Forum network, including periodic international conferences, UK Government Foreign & Commonwealth Office network, *Forum News*, the Forum's web-site, Forum member organisations' networks (involving several million individual members), contacts with small island states and the Overseas Territories of other EU Member States. Presentation package, articles, web-pages, Working Group meetings will be developed.

4.6.6. Wetland awareness

In addition and in combination with the specific information about the Ramsar site and surrounding areas, it is important to use all opportunities to raise awareness about wetlands generally. This is because they are often wrongly thought to be wastelands, whereas they are crucial, especially in areas such as Turks & Caicos. Several means can be used to raise wetland awareness. Many have been noted above, but some additional ones are noted here.

Display boards, using colour photos, large text, and a few paintings. Some themes used elsewhere are:

A. Title board, with a map of the main wetland area, a summary of what is and is not protected, and recommendations for what needs to be done.

B. A board showing (in pictures) how evapotranspiration from the mangroves helps boost rainfall.

C. A board explaining how nutrients carried out from deep within the wetlands, by outflow of rain-induced floodwater, fertilise the marine environment and so support economically significant resources.

D. "Supporting groundwater resources" explains how major mangrove wetlands help retain "lenses" of fresh water in the rock strata of adjacent dry land areas, which is important to local water supply, and farming.

E. "A shelter and a home" gives examples of animals (especially culturally popular ones like edible crabs) live and/or breed in the mangroves.

F. "Protection from storms" explains about mangroves laying down peat to keep pace with rising sea levels, and the ability of mangrove coastlines to absorb wave energy during storms.

Such posters can be done with very little text, written at a non-technical level suitable for older school children and adults.

Local news stories, whenever there is a grant, acquiring a piece of land, or anything like that. Other possibilities are a regular spot on the local TV.

Partnership with local business.

Primary school resources, such as a colouring book, telling the story, in pictures with very few words, of the connections between the mangroves and the marine environment. Kids like it, colour it in, take it home, and show their parents, and so the parents learn as well. The Trust already has experience and a series of this nature

Information sheets on wetlands, and other aspects are useful resources for teachers, and of interest to the general (adult) public. They can be circulated free to all Trust members, schools, and anyone who asks.

4.7. Other aspects

4.7.1. Input to national plan (Sustainable Development Planning Initiative)

The TCI Government has been working for some time on a physical development plan for the country. Previous meetings, especially with the then Director of Planning, staged around the onset of the Darwin Initiative project identified a need for biological and historical material to be incorporated into the planning process. To this end, the biodiversity surveys which form the basis for the management plan were aligned to be compatible with TCI Government information needs. It is anticipated that further information derived from this ongoing work will also be compatible so as to inform further the physical planning process.

As work on this draft of the plan neared completion, TCI's Departments of Planning and of Economic Planning and Statistics (DEPS) had commissioned the pilot stage of the Sustainable Development Planning Initiative (SDPI). Workshops to encourage comment on the draft plan were held within a few days of presentations on the draft ideas of the SDPI. At and around these workshops, staff of the Planning Department, DEPS, the SDPI consultants, staff of the Department of Environmental & Coastal Resources and of Lands& Surveys and others encouraged the

development of further analyses to feed into SDPI. With the help of information from the Land Registry, this section is largely the result of that request. It takes this to various levels for different parts of the area, depending largely on the presently available information. It is envisaged that these analyses will be taken further, especially for areas with limited information at present, in future revisions of this management plan.

4.7.1.1 Unprotected important heritage areas

Most of the planning processes are concerned in practice with dry-ground areas, because these are the areas which are (initially in this situation) under most pressure for development and because planning processes relate less directly to intertidal and sub-tidal areas. In order to match this usage, Map A (and later maps in this section) distinguish between mainly dry and mainly wet areas.

This simplification for mapping clarity is also helpful in allowing some emphasis to be placed on important heritage areas on dry-land habitat. As noted earlier in this plan, such areas have not received much previous attention, but have been found to be important. Note also that many of the areas noted as currently protected, even within the mainly dry-land areas, are actually wetlands.

Shown in light stippled green shading on Map A are the currently formally protected areas in East, Middle and North Caicos. These include:

The Ramsar Wetland of International Importance (mainly wetland, of course)

Conch Bar Caves (including both wetland and dry-land areas)

East Bay Islands National Park (mainly wetland and beaches)

Cottage Pond Nature Reserve (wetland)

Dick Hill Creek and Bellefield Landing Pond Nature Reserve (wetland)

Pumpkin Bluff Pond Nature Reserve (wetland).

A striking feature indeed is the lack of dry-land protected areas. These are essentially small parts of the Ramsar site in southern Middle Caicos and northwestern East Caicos, and part of the Conch Bar Caves protected area. This emphasises the need for safeguarding of some of the key dry-land areas, with their important endemic and characteristic species and ecosystems.

4.7.1.2 North Caicos

The additional important areas identified so far in North Caicos are of two types. One group consists of the group of ponds in the northwest of the island (Mangrove, Mud Hole, Moore Hall and St Thomas Hill Ponds). The other is the extremely important gallery woodland in the vicinity of Wades Green and Kew. This urgently needs survey and safeguarding.

Further analysis of the situation and potential of North Caicos is inhibited in that digitised land parcel information is not yet available in the Government's programme. The project has only relatively recently been able to obtain paper copies of the land parcel maps and has not had time or resources to digitise them. It is envisaged that this work will be developed further (as for Middle Caicos below) when digitised land-parcel information is available via one of these routes.

4.7.1.3 East Caicos

Land-parcel information is not available for East Caicos. However, as shown on Map B, almost all the dry-land area has been included in the "project area" for the proposed major cruise-liner and related development (see section 4.5.14). This makes open, consultative planning on a zoning basis impracticable, at least while the proposed project remains theoretically current. This is the more so in that the project studies (which are claimed to include an environmental impact assessment) are not available for scrutiny despite several requests at senior level.



5410000

S400000



5410000

S400000



Although not technically within the development "project area", the development also includes access roads over parts of the flats and the length of the dry land at Hog Cay. It should be noted also that there are some problems as between the development "project area" and currently protected areas, in that detailed comparison of boundaries reveals that the "project area" overlaps the Ramsar site in important parts of northwestern East Caicos.

Maps A and B show some of the important heritage areas now identified in East Caicos. This is not exhaustive, for several reasons. For example, the importance of the flats has already been noted (see section 4.5.14). It is likely that much of the dry-land area of both East Caicos proper and Hog Cay (and smaller cays) are likely to be important. However, the impracticability of progressing this with the proposed development still theoretically current, as well as the high costs of study in East Caicos and the unavailability of the developer's contracted results, have meant that, so far, limited resources have had to be deployed mainly elsewhere.

Those important areas so far identified and marked on the maps include:

Jacksonville historic site

East Caicos Caves

The shoreline of importance to nesting turtles

The ponds and marshes on the dry-land area and the large permanent pond in the flats.

Also marked is the shoreward part of the large coral reef area to the east of East Caicos. This could be extended as a thin and important line of edging coral off the NE coast of the islands. This area is highlighted because of its prominence in the UNEP-WCMC study (ref – see section 3.1.6.3).

The importance of these and other areas should not be overlooked, especially as the long-proposed and controversial development is reconsidered.

To the northwest of East Caicos lies Joe Grant Cay, identified as important for land, shore and surrounding creek features. It is understood that a new resort development has just been approved for this cay, but no details are available. The way in which any such development is planned, built and managed would have marked effects on this sensitive heritage area.

4.7.1.4 Middle Caicos

The TCI Government programme of land-parcel digitisation has not yet covered Middle Caicos. However, the project has digitised this information, allowing a more full analysis.

Map C shows as red the dry-land areas which are currently built up or being built. This underestimates the extent of this type of development because isolated buildings are not shown. The red areas shown include:

Lorimers settlement

Bambarra settlement

The many plots sold for building (many now built or under construction) west from Bambarra Beach

Conch Bar settlement

Blue Horizon resort.

Shown as mauve-tinted red are Crown-owned areas which have been approved for development (which has already occurred in some cases). These include:

The extensive resort development at Haulover Point (where much bulldozing of large areas has already taken place intermittently over several years;

Small Crown-owned areas reserved for development on the coast near Bambarra;

The airport area at Conch Bar (slightly overlapping with the Conch Bar Cave designated protected area);

The area of the proposed computer development west of Blue Horizon.

Shown in orange are other areas of private ownership. Other Crown-owned areas are shown in blue-grey. Areas where ownership is still being clarified are shown in yellow.

It is striking how much of such an apparently unspoilt island as Middle Caicos is either built, scheduled for building or in private ownership. Most of the land between Conch Bar and Bambarra falls into this category, as does much between Bambarra and Conch Bar and south of the latter. The extent of actual or proposed development along the coast is alarming. This underlines a need to avoid sprawl development and to safeguard the potential for eco-tourism development by careful planning.

The two small areas of partly dry-land protected areas are shown in green. Overlaid over other areas in green crosshatch are the other important heritage areas identified in this study. These include:

The Crossing-Place Trail and Fish Ponds area;

The Indian Cave and Crossing Place Trail area;

Crossing PlaceTrail east of Conch Bar;

Several ponds

An area of important wetlands around Corry, Washing and Duck Ponds;

The very important woodland and scrub areas between Bambarra and Lorimers;

The probable turtle beaches of Long Bay and elsewhere;

The creek and marsh system between Lorimers and Joe Grant Cay.

Because of private ownerships or approved developments, some of these important heritage areas cannot be addressed directly or immediately, for example parts of the woodland areas and some of the turtle beaches and marshes (the latter being emphasised by the recent approval of resort development on adjacent Joe Grant Cay). However, some actions could be taken readily to safeguard areas in Crown ownership, thereby protecting the potential for economic development through eco-tourism and preventing urban sprawl. These include:

The western part of Crossing Place Trail and Fish Ponds area;

Indian Cave to the Crossing Place Trail;

Those parts of the woodland/scrub area between Lorimers and Bambarra in Crown-ownership;

The remaining shores (for turtle nesting) and creeks and marshes in the Long Bay, and Lorimers to Joe Grant Cay area.

There remains substantial area for built development in the immediate vicinities of Lorimers and Bambarra. There are problems in Conch Bar spreading immediately eastwards or westwards without causing substantial damage. However, there appears to be considerable potential for development southwards. In addition, beyond the protected area to the east of Conch Bar, there is considerable scope for built development. Indeed, the challenge here must be to find some constructive way of avoiding sprawling development filling the area between Conch Bar and Bambarra, especially as almost all of this extensive area is already in private ownership.

4.7.2. Enhancement for wildlife

The National Trust is capable of emerging as a key wildlife advocate especially through the suggesting and drafting of new protective legislation, in partnership with governmental bodies. Along with its conservation education programmes, the Trust must be prepared to lobby for the legislative protection of the habitats and species of special

concern. Endemic and critically endangered species are of foremost protection priority. Any animal (or plant) which exists exclusively in these islands should enjoy full protection against senseless or groundless destruction. The National Trust is perhaps the most suitable agency to work in partnership with Government to provide the link between the public and government, and is in the position to educate both of these audiences on the importance of conservation legislation.

4.7.3. Biodiversity databases

Specialists involved in the Darwin Initiative work are developing appropriate databases in parallel to analyses of the results of the Darwin work and earlier material collated. These will be transferred to the Trust to serve as a basis for adding future records, and systems to handle all.

4.8. Forward processes

4.8.1. Further studies

The current work has identified some priorities for further studies. Those relating to various taxa are being analysed and will be added to later revisions of this plan. At present, a first analysis for bats and other mammals is available, and this is given below.

4.8.1.1. Bats and other mammals

Survey

Survey should continue for other roost sites in caves and buildings or other structures. Bat detectors can be used for survey to establish the distribution and status of *Lasiurus* (and other insectivorous species possibly present on the islands). It is possible that, in the long term, UK volunteer bat workers might be willing to carry out further survey and monitoring if accommodation and local transport costs can be met).

There should be effort to extend survey to other islands in the group. This should include resurvey of sites previously recorded as having bats on Providenciales, North and East Caicos (including survey to assess the status of *Artibeus jamaicensis* on Providenciales), and to assess whether any bats are present on islands where none is recorded (e.g. Turks, South and West Caicos).

The known distribution of bats should be related to broad habitats identified in the current habitat survey.

The use of aerial survey or aerial photographs to assist in identifying other caves and key roost and foraging areas should be explored.

Education and involvement of other people

It is likely that further initiatives towards public education will benefit the conservation of bats and may assist in identifying further important sites. It may be of benefit to seek assistance from Lois Blumenthal, Cayman Islands, who has had considerable success in bat education projects in Cayman. Much of her work has been directed to resolving the problems of bats (mainly free-tailed or 'rat bats', *Molossus molossus*) in buildings, which does not seem to be a problem in TCI (indeed, most people spoken to on TCI seemed to think that bats were a good thing to have around). Nevertheless, many of the educational resources and publicity initiatives developed for the Cayman Islands would probably apply to TCI or could be modified to do so. There should be renewed effort to encourage TCNT members or other suitable (and suitably trained) volunteers to assist with survey and monitoring and local public awareness.

Further diet assessment

It would be valuable to have further information on the food of the islands' bats. Basic information on food and seasonal changes in diet would be valuable in assessing the conservation needs of the bats and would contribute to

public awareness and understanding. However, analysis of pollen (and possibly other plant material) and insects may require the input of appropriate specialists; the input of such specialists should be agreed before considerable effort is put into such a project.

Nectar feeders: from further pollen swabbing of bats (using clear tape) and from collecting of droppings below roost sites. Specialist assistance would be needed for identification. This system would apply to *Erophylla*, *Monophyllus* and *Brachyphylla*. The breadth of diet of these species (which probably includes some fruit and insects in all species) is poorly known. It would be greatly assisted if pollen samples could be collected from likely plants (i.e. larger pale-coloured flowers, well above ground level, open at night, probably strongly scented and with copious nectar or anthers).

Fruit eaters: monthly samples could be easily collected by placing a sheet for a night or two under the *Brachyphylla* roost and sifting through the debris. It is likely that a reasonable knowledge of the local plants would allow the identification of many food items, but some specialist assistance may be needed. While *Brachyphylla* probably feeds mainly on fruits, flower-feeding and insects are also recorded in the diet. A tour guide quoted palm berry as a major food item.

Insect eaters: Macrotus has regular feeding 'perches' where debris of large insect prey accumulates; periodic (e.g. monthly) samples would give a reasonable idea of the diet without the need for any great input from specialists. The species undoubtedly also takes smaller insects, which could only be identified through analysis of droppings. Examination of droppings of this and other insectivorous bats (such as *Lasiurus* or any free-tailed or funnel-eared bats) would probably need the involvement of a specialist.

Species protection

There is no legislation to protect bats on TCI. If conservation legislation is being developed in the Turks and Caicos Islands the conservation of bats should be incorporated. Key sites (such as Conch Bar Cave) should be protected and managed for their bats. Apart from the potential effect of cave tourism on the bat populations, there appear to be no significant threats to bats on Middle Caicos at present.

Archaeological/fossil material

Ensure recently collected archaeological/fossil bat (and other) remains are identified and data incorporated into island database. David Steadman (University of Florida) stated (22 January 2001, pers.comm.) that his material from Indian Cave, etc 'includes a lot of bat material'; we have been unable to ascertain what will happen to this material.

The Bahamian hutia (Capromys [or Geocapromys] ingrahami)

The Bahamian hutia (*C. ingrahami*) was widespread in the Bahamas, but survives only on the tiny island of East Plana Cay (Morgan 1989). Morgan (1989) discusses fossil remains likely to be of this species from Providenciales and Middle Caicos. There is some suggestion from local residents that it may still exist on an area at the S of Middle Caicos. The area should be investigated for evidence of this animal.

Involvement in wider Caribbean bat conservation

For some time it has been the intention of the IUCN/SSC Chiroptera Specialist Group (CSG) to establish a Caribbean Regional Group. This is likely to be established within 2002. A global bat action plan currently in press with IUCN identifies general concerns for the bat fauna of the Caribbean with its many endemics and an overview of bat conservation issues and action; this can be used as a basis for wider or local discussion and the development of collaborative or single island state initiatives. An e-mail interest group on Caribbean bats has already been set up by Lois Blumenthal in Cayman Islands. [France is currently reviewing the bats and their conservation needs in its overseas territories. Apart from Gibraltar, the only UK overseas territories with a bat fauna are those of the Caribbean. The UK Overseas Territories Conservation Forum and its relevant constituent bodies (such as TCNT) should liaise with the CSG regional group when the latter is established.]

4.8.2. Biological monitoring

The work of the Darwin Initiative project provided a baseline of information on a range of taxa. The results of this are summarised earlier in this plan. The more detailed results continue to be analysed by the volunteer specialists involved. Part of this analysis will involve the development of techniques where appropriate and feasible, so that the quality of the biodiversity can be monitored. If problems are subsequently revealed, adjustments to the management plan can be developed to address these. Biodiversity survey and monitoring will use a combination of volunteer outside specialists, working with local people so as to produce the necessary information while also transferring skills. This will build on the use of such techniques during the preceding Darwin Initiative project.

The monitoring procedures will be incorporated in the revisions of this plan, which are envisaged on a regular basis, together with supplements if major developments become available between regular revisions. Initial ideas are indicated below for some taxa.

4.8.2.1. Bats

A provisional system for monitoring the population of all bat species using Conch Bar Village Cave was established from two systematic counts made during the visit in January (see section 2.2.5.3.1 Caves). Such a count should be carried out every 2 months for the first year to establish any significant seasonal variation in populations; thereafter, it should be done twice a year, once shortly before the parturition period (?May/June) and once 6 months later. The pre-parturition count should, if possible, be timed to assess the populations of adult bats present before the young have started flying; this may not be possible if there is broad variation in birth period between species. If there is broad variation the proposal should be reviewed in the light of a knowledge of birth periods. If possible, local people (e.g. cave tour guides) should be encouraged to assist in the counts to ensure continuity of personnel and techniques.

A bat detector transect can be established using a vehicle to drive at no more than 25 km per hour for approximately 40-60 minutes, starting 15 minutes after sunset. The start point for the transect should be varied. The bat detector should be set at 30 kHz to optimise the chance of locating *Lasiurus* and any free-tailed bats present. Such a transect could be carried out once a month for the first year and the situation reviewed.

Other known roosts should be checked annually to confirm presence/absence or species and numbers of bats where possible, and any changes (threats) to roost sites.

4.8.2.2. Birds

Biodiversity monitoring procedures are being developed which will place emphasis on methods which can use relatively inexperienced personnel but nevertheless generate sound data for the purposes; modern ecological research has made major progress in identifying such techniques, which are particularly designed for tropical situations, in which traditional techniques are difficult to apply, both because of the nature of the vegetation and the shortage of specialist personnel. Computing procedures and databases for information handling will be developed, again with an emphasis on minimising manpower needs to handle these. Identification aids (see section 4.2.5.2) and record collection have been initiated in previous work, and will be maintained.

There is also a need for further work on the vulnerable West Indian whistling duck, Kirtland's warbler and endemic subspecies of dry-land birds, and on the breeding biology of species depending on irregular wet conditions.

4.8.3. Evaluation and revision procedures

The basic information allowing monitoring of the biodiversity of the area will become available from the techniques being developed, as noted above. The monitoring of the management work done and its outcomes will be achieved by means set out in the Logical Framework (Appendix 5). The main features (which will deployed as the various relevant elements of the plan are resourced and initiated) include:

o Regular meetings and reports;

- o Scientific survey and monitoring to ensure the safeguarding of biodiversity;
- o The development of a long-term financial plan;
- o Clear information on utilisation, from visitor centre records, tour fees and other ticket sales, records of school visits;
- o Information on local businesses and demographics from TCI Government;
- o Records of presentations, publications and web-visits;
- o Formal project reporting.

At approximately quarterly intervals, detailed aspects drawn from this overall plan will be agreed as priorities to produce short-term work programmes. Relevant monitoring materials drawn from the above will be deployed to review the work achieved against the priorities for the preceding quarter, and that information used to inform the plan for the following quarter. The format of these quarterly meetings will be between the project and site management staff and the supervising team, who will also advise the National Trust Executive Committee and Council.

In parallel, the regular community meetings, involving also the local consultative committee other stakeholders will be continued. This will build on the successful system established under the Darwin Initiative. Strong local participation has been achieved by open community meetings, with a planned but flexible agenda, which has proven an effective mechanism to capture the knowledge and wishes of local persons rather than impose outside ideas upon them.

Staff involved in project work will participate in regular Trust staff meetings. This is already part of regular Trust activities, and will continue to be important as new staff are recruited to the organisation. This will be increasingly vital with the decentralisation of Trust bases for staff from mainly Providenciales, initially to include the project bases of Middle Caicos and North Caicos.

Annually, the project activities and outcomes under this plan will be reviewed by staff and the supervisory team, and an annual report prepared. This will be available to stand alone and for incorporation in the Trust's Annual Report as well as reports to any project sponsors.

The outputs from meetings will be integrated into periodic revisions of working management plans, with full consultation. Working management plans will be annotated with relevant points arising at both community and staff meetings, as well as other inputs, including further research, monitoring, and land-management arrangements. In some cases, this will need early interim amendments to plans. However, in any event, the plans will be reviewed in addition at annual intervals to consolidate appropriate changes. Supplements and revisions of the plan will be issued as appropriate.

4.8.4. Management

The responsible body leading the implementation of this plan will be the Turks & Caicos National Trust, working in consultation with DECR, other TCIG Departments and the local community. It is recognised that no governmental or non-governmental agency in TCI yet has the full capacity to manage a plan of this scale and nature. Accordingly, the Forum will continue to support and advise the Trust, drawing on its wide network of experts as appropriate. This collaborative arrangement, including the extensive network of partners listed in the following section, has worked well in developing this plan, and it is anticipated that it will continue to work well in the implementation of it.

The Trust Council appointed a local committee to bring together the contributions of main interest groups, and inform the work of developing the integrated management planning. This committee proved valuable both in helping the development of the plan and in encouraging local people to make their views known to those in authority. The Trust Council has decided that this positive result should be built upon, by strengthening the local committee for Middle and North Caicos centred on the implementation and further development of the plan.

The earlier committee is listed at the start of this plan. It is recommended that, with its changing role, the committee now be constituted as follows:

TCNT Executive Director (Mrs Ethlyn Gibbs Williams) (Co-Chair)

UK Overseas Territories Conservation Forum Chairman (Dr Mike Pienkowski) (Co-Chair)

TCNT Conservation Officer (Mr Bryan Naqqi Manco) (Secretary)

TCNT local counterpart conservation officer (once resourced and appointed)

District Commissioner, Middle Caicos (Mrs Dottis Arthur)

District Commissioner, North Caicos

TCNT Council North Caicos representative (Mr Fuller Gardiner)

TCNT Council Middle Caicos representative (Mr Hormel Harvey)

Resident of Middle Caicos (currently Mr Alton Higgs)

Resident of North Caicos

Representative of TCIG Dept of Environmental & Coastal Resources (currently Mrs Michelle Gardiner)

Representative of TCIG Dept of Planning (currently Mr Clyde Robinson)

Representative of TCIG Dept of Environmental Health

Representative of TCIG Dept of Economic Planning & Statistics

Representative of TCIG Tourist Board

Representative of TC National Museum

As before, other persons would participate for particular purposes.

Community meetings, will continue to be used as a means of obtaining local wishes, ideas, experience and knowledge. These will be supplemented by extended interviews with elderly (but often still active) local residents. In addition to other involvements by Government personnel, project personnel will hold meetings with relevant departments of TCI Government to maintain inputs, consultation and coordination.

If the full programme of work is resourced, it is envisaged that the following personnel will be required. Fewer staff will be involved if only parts of the full plan are resourced. Day-to-day management of the local work will be by a Conservation Officer, with a business manager later recruited to run the Middle Caicos Eco-centre at Bambarra. The Conservation Officer will be supported by a warden on each of the two main islands, Middle Caicos and North Caicos. Project personnel will analyse tasks and develop job-descriptions in consultation with appropriate partners, matching this to the sequence of developments as modified by any external constraints. It is envisaged that, as the plan is implemented, increasing income from project operations together with support from the Conservation Fund (designed for support of management of Protected Areas), and other income raised by the National Trust will take over the funding from external grants.

Overall supervision of the project will initially be handled by the Executive Director of the Turks & Caicos National Trust, working with the Chairman of the UK Overseas Territories Conservation Forum and accounting to the Trust's Executive Committee. The Trust, in turn, has a statutory duty to report both to its members and to TCI Legislative Council. This provides clear accountability, important both within TCI and to account to external agencies for the use of their funds. It is important for successful co-management to have a lead body clearly set out to provide for accountability, as well as having mechanisms to consult widely with collaborating organisations to provide input of ideas and experience. Apart from scientific, technical, financial and general management, a major role will be to continue the successful capacity-development of the Trust. This will include facilitation of links between TCNT and TCIG personnel to UK Government (which handles external relations including international conventions) and international bodies and agencies.

4.8.5. Partnerships

The work leading to this plan and that envisaged within the plan itself has been highly collaborative. Some of the partners already involved or expressing interest in doing so include:

Turks & Caicos National Trust: full partner in project planning and implementation; membership non-governmental organisation with statutory role; local infrastructure; statutory role in holding and managing land in trust for the country; links into TCI Government and organisations; expertise in protected area management and environmental education as well as facilitating local people.

UK Overseas Territories Conservation Forum: full partner in project planning and implementation; facilitation of capacity-development; scientific guidance; use of its wide network of member organisations and other collaborators both to provide specialists for the work and to disseminate the results; links to UK Government and other international collaborators.

Forum member organisations in UK: expertise and support across a wide range of specialisms and skills; information networking to spread information on results and sponsors (including, e.g., CABI Bioscience, RSPB, the National Trust)

Forum network in other Overseas Territories and other countries: exchange of experience and in particular information networking to spread information on results and sponsors

Government of Turks & Caicos: General support from Governor and Government, including:

Ministry of Finance (especially Department of Economic Planning & Statistics): input into project development; reports & statistics; identification of complementary funding

TCInvest (Government investment agency): input into project development; collaboration on development of small businesses

Ministry of Natural Resources: taking proposals for transfer of protected areas to the safeguard of the Trust through government; facilitation of access to land ownership information; general support

Department of Environment & Coastal Resources (including its department of protected areas): collaboration on a wide range of issues

Department of Planning: incorporation of results into National Physical Plan and other joint working

Departments of Lands & Surveys, and Land Registry

Department of Education: cooperation on educational products and their introduction into schools

Department of Tourism: exploration of promotion of sustainable tourism product in contrast to traditional beach, diving, fishing holidays

Turks and Caicos Hotel & Tourism Association

Local businesses & hotels: development of partnerships in sustainable tourism

Tour guides: provision of training and approval scheme by the Trust

Turks and Caicos National Museum: collaboration on historical and archaeological information

UK Government conservation agencies: exploring possible short-term assistance

Regional associations: networking to spread information on results and sponsors, and to exchange information

Volunteer scientific and technical specialists: various short-term contributions in biodiversity, historical survey, monitoring, research and management.

Appendix 1. References

- Baker, R.J., Groen, J.A. &Owen, R.D. 1984. Field key to Antillean bats. Occasional Papers Museum Texas Tech University, 94: 1-18.
- Bond, J. 1985. Birds of the West Indies. Houghton-Mifflin, Boston.
- Bradley, P.E. 1995. *The birds of the Turks and Caicos Islands: the official checklist*. Turks and Caicos National Trust, Providenciales, Turks and Caicos Islands.
- Breuil, M. & Masson, D. 1991. Quelques remarques sur la biogeographie des chauves-souris des Petites Antilles. *Compte Rendu Societe Biogeographie*, 67(1): 25-39.
- Buden, D.W. 1974. Prey remains of barn owls in the southern Bahama Islands. Wilson Bulletin, 86: 336-343.
- Buden, D.W. 1975a. *Monophyllus redmani* Leach (Chiroptera) from the Bahamas, with notes on variation in the species. *Journal of Mammalogy*, 56: 369-377.
- Buden, D.W. 1975b. A taxonomic and zoogeographic appraisal of the big-eared bat (*Macrotus waterhousii* Gray) in the West Indies. *Journal of Mammalogy*, 56: 758-769.
- Buden, D.W. 1976. A review of the bats of the endemic West Indian genus *Erophylla*. *Proceedings of the Biological Society of Washington*, 89: 1-16.
- Buden, D.W. 1977. First records of bats of the genus *Brachyphylla* from the Caicos Islands, with notes on geographic variation. *Journal of Mammalogy*, 58: 221-225.
- Buden, D.W. 1985. Additional records of bats from the Bahama Islands. *Caribbean Journal of Science*, 21: 19-25.
- Buden, D.W. 1987. *The birds of the Southern Bahamas: an annotated check-list.* (B.O.U. Check-list No. 8) British Ornithologists' Union, London.
- CITES. 1992. Appendices I, II and II to the Convention on International Trade in Endangered Species of Wild Fauna and Flora.
- Clarke, N.V. & Norton, R.L. 1987. *A Ramsar site proposal, the Turks and Caicos Islands*. Report to WWF-UK, Department of the Environment & Overseas Development Administration.
- Clench, H.K. & Bjorndal, K.A. 1980. Butterflies of Great and Little Inagua, Bahamas. Annals of Carnegie Museum, 49: 1-30.
- Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P. & van den Belt, M. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387: 253–260.
- Correll, D. S. & Correll, H.B. 1982. Flora of the Bahama Archipelago. J. Cramer, Hirschberg, Germany.
- Daly, H.V., Doyen, J.T. & Purcell III, A.H. 1998. *Introduction to Insect Biology and Diversity*. Oxford University Press, Oxford.
- Dietz, R.S. et al. 1970. Geotectonic evolution and subsistence of the Bahama Platform. *Geological Society* of America Bulletin 81: 1915-1928.
- Dunkle, S.W. 1989. Dragonflies of the Florida Peninsula, Bemuda and the Bahamas. Scientific Publishers, Gainesville.
- Dunkle, S.W. 1990. Damselflies of the Florida Peninsula, Bemuda and the Bahamas. Scientific Publishers, Gainesville.
- Guala, G. 2001. Collecting in the Turks and Caicos Islands (TCI). *Garden Views* [Fairchild Tropical Garden], July 2001: 14.
- Gullan, P.J. & Cranston, P.S. 2000. *The Insects An Outline of Entomology* (2nd edn). Blackwell Science, Oxford.
- Halberstein, R.A. 1997. Traditional Botanical Remedies on a small Caribbean Island: Middle (Grand) Caicos, West Indies. *Journal of Alternative and Complementary Medicine* 3: 227-239.
- Heywood, V.H. (ed.) 1995. *Global Biodiversity Assessment*. Cambridge University Press (for the United Nations Environment Programme), Cambridge.
- Hill, J. E. 1985. Bats from the Bahamas. Scientific Exploration Society, Newsletter, 16: 11-13.
- Honychurch, P.N. 1980. Caribbean Wild Plants and their Uses. Macmillan Education, Oxford.

- IUCN. 1996. Red List of Threatened Animals. International Union for the Conservation of Nature and Natural Resources Species, Gland, Switzerland.
- Jones O'Day, S. 2002. Late prehistoric Lucayan occupation and subsistence on Middle Caicos, northern West Indies. *Caribbean Journal of Science* 38: 1-10.
- Kairi 2000. Poverty Assessment Report Turks and Caicos Islands Final Draft Report by Kairi Consultants Limited and the National Assessment Team of the Turks and Caicos Islands.
- Keegan, W.F. 1997. Bahamian archaeology: life in the Bahamas and Turks and Caicos before Columbus. Media Publishing, Nassau.
- Koopman, K.F. 1989. A review and analysis of the bats of the West Indies. Pp 635-643 *in:* C. A. Wood (ed.), *Biogeography of the West Indies; past, present, and future*. Sandhill Crane Press Inc., Gainesville. 878pp.
- Koopman, K.F., Hecht, M.K. & Ledecky-Janecek, E. 1957. Notes of the mammals of the Bahamas with special reference to the bats. *Journal of Mammalogy*, 38: 164-174.
- McFarlane, D. 1991. The species-genus relationship in Antillean bat communities. *Mammalia* 55(3): 363-370.
- Miller, L.D., Simon, M.J. & Harvey, D.J. 1992. The butterflies (Insecta: Lepidoptera) of Crooked, Acklins and Mayaguana Islands, Bahamas, with a discussion of the biogeographical affinities of the southern Bahamas and description of a new subspecies by H.K. Clench. *Annals of Carnegie Museum*, 61(1): 1-31.
- Morgan, G.S. 1989. Fossil Chiroptera and Rodentia from the Bahamas, and the historical biogeography of the Bahamian mammal fauna. Pp. 685-740, *in* : C. A. Wood (ed.), *Biogeography of the West Indies; past, present, and future*. Sandhill Crane Press Inc., Gainesville. 878pp.
- Moss, B. [1985]. The Turks & Caicos Islands. Pp101-125 in: Operation Raleigh, Expeditions in the Caribbean, 1984-1985. The Scientific Exploration Society, London.
- Mullins, H.T. & Hines, A.C. 1989. Scalloped bank margins: Beginning of the end for Carbonate Platforms? *Geology* 17: 30-33.
- Novak, R.M. 1994. *Walker's Bats of the World*. The John Hopkins University Press, Baltimore and London. 287pp.
- Oldfield, S. 1987. Fragments of Paradise; a guide for conservation action in the U.K.Dependent Territories. Pisces Publications, Oxford. 192pp.
- Pavlidis, S.J. 1999. *The Turks and Caicos guide: a cruising guide to the Turks and Caicos Islands.* Seaworthy Publications, Port Wahington, Wisconsin.
- Procter, D. & Fleming, L.V. (eds) 1999. *Biodiversity: the UK Overseas Territories*. Joint Nature Conservation Committee, Peterborough.
- Raffaele, H., Wiley, J., Garrido, O., Keith, A. & Raffaele, J. 1998. *Birds of the West Indies*. Christopher Helm, London.
- Ray, C. & Sprunt, A. 1971. Parks and conservation in the Turks and Caicos Islands. Report to TCI Government, 45pp.
- Riley, N.D. 1975. A Field Guide to the Butterflies of the West Indies. Collins, London.
- Rindge F.H. 1955. The butterflies of the Van Voast-American Museum of Natural History expedition to the Bahama Islands, British West Indies. *American Museum Noviates No. 1715*.
- St Leger, R. 198?. Butterflies of T&C. Turks & Caicos Current ??: 48-56.
- Schartz, A. 1989. The Butterflies of Hispaniola. University of Florida Press, Gainsville.
- Schwartz, A.& Henderson, R.W. 1991. Amphibians and Reptiles of the West Indies: Descriptions, Distributions, and Natural History. University of Florida Press, Gainesville.
- Scott, D.A. & Carbonell, M. (Compilers) 1986. A directory of Neotropical wetlands. IUCN, Cambridge.
- Sealey, N.E. 1994. *Bahamian landscapes: an introduction to the geography of the Bahamas*, 2nd ed. Media Publishing, Nassau.
- Shamel, H.H. 1931. Bats of the Bahamas. Journal of the Washington Academy of Sciences, 21: 251-253.
- Simon, M.J. & Miller, L.D. 1986. Observations on the butterflies of Great Inagua island, Bahamas, with records of three species new to the island. *Bulletin of the Allyn Museum* No. 105: 1-14.
- Smith, D.S., Miller, L.D. & Miller, J.Y. 1994. *The Butterflies of the West Indies and South Florida*. Oxford University Press, Oxford.

- Spalding, M.D., Ravilious, C. & Green, E.P. 2001. *World Atlas of Coral Reefs*. Prepared at the UNEP World Conservation Monitoring Centre. University of California Press, Berkeley, USA.
- USFWS 1994. Endangered and Threatened Wildlife and Plants. United States Fish and Wildlife Service, Division of Endangered Species, Washington, D.C.
- White, A.W. 1998. A birder's guide to the Bahama Islands (including Turks and Caicos). American Birding Association, Colorado Springs.
- Witt, T. 1972. Beitrage zur Kenntnis der Gattung Anaea Hubner (1819) (Lep., Nymphalidae). Mitteilungen der Munchner Entomologischen Gesellschaft 62: 163-183.

Appendix 2: Environmental Charter agreed between Turks & Caicos Islands and the United Kingdom

Environment Charter

TURKS AND CAICOS ISLANDS



Guiding Principles

For the UK government, for the government of the Turks and Caicos Islands and for the people of the Turks and Caicos Islands.

- 1 To recognise that all people need a healthy environment for their well-being and livelihoods and that all can help to conserve and sustain it.
- 2 To use our natural resources wisely, being fair to present and future generations.
- 3 To identify environmental opportunities, costs and risks in all policies and strategies.
- 4 To seek expert advice and consult openly with interested parties on decisions affecting the environment.
- 5 To aim for solutions which benefit both the environment and development.
- 6 To contribute towards the protection and improvement of the global environment.
- 7 To safeguard and restore native species, habitats and landscape features, and control or eradicate invasive species.
- 8 To encourage activities and technologies that benefit the environment.
- 9 To control pollution, with the polluter paying for prevention or remedies.
- 10 To study and celebrate our environmental heritage as a treasure to share with our children.

toy lo Derek H. Taylor TRES AND CALCOS ISLANDS 26 September 2001

Valerie Amos

Valerie Amos UNITED KINGDOM 26 September 2001

Commitments

The government of the UK will:

- Help build capacity to support and implement integrated environmental management which is consistent with the Turks and Clarcos (slands' own plans for sustainable development.
- 2 Assist the Turks and Caicos Islands in initiating, reviewing and updating environmental legislation.
- 3 facilitate the extension of the UK's ratification of Multilateral Environmental Agreements of benefit to the Jurks and Caices Islands and which the Turks and Caices Islands has the capacity to implement (and a desire to adopt).
- 4 Keep the Turks and Caicos Islands informed regarding new developments in relevant Multilateral Environmental Agreements and invite the Turks and Caicos Islands to participate where appropriate in the UK's delegation to international environmental negotiations and conferences.
- 5 Help the Turks and Caicos Islands to ensure it has the legislation, institutional capacity (technology, equipment, procedures) and mechanisms it needs to meet international obligations.
- 6 Promote better cooperation and the sharing of experience and expertise between the Turks and Caicos Islands, other Overseas Territories and other states and communities which face similar environmental problems.
- 7 Use UK, regional and local expertise to give advice and improve knowledge of technical and scientific issues. This includes regular consultation with interested nongovernmental organisations and networks.
- 8 Use the existing Environment Fund for the Overseas Territories, and promote access to other sources of public funding, for projects of lasting benefit to the Turks and Calcos Islands' environment.
- 9 Help the Tinks and Caicos islands identify further funding partners for environmental projects, such as donors, the private sector or non-governmental organisations.
- 10 Recognise the diversity of the challenges facing Overseas Territories in very different socio-economic and geographical situations.
- 11 Abide by the principles set out in the R in Declaration on Environment and Development (See Annex 2) and work towards meeting International Development Targets on the environment (See Annex 3).

The government of the Turks and Caicos Islands will:

- Bring together government departments, representatives of local industry and continence, environment and heritage organisations, the Governor's office, individual environmental shampions and other community representatives in a forum to formulate a detailed strategy for action. (See Annex 1).
- 2 Ensure the protection and restoration of key habitats, species and landscape features through legislation and appropriate management structures and mechanisms, including a protected areas policy, and attempt the control and eradication of invasive species.
- 3 Ensure that environmental considerations are integrated within social and economic planning processes; promote sustainable patterns of production and consumption within the territory.
- 4 Ensure that environmental and environmental health impact assessments are undertaken before approving major projects and while developing our growth management strategy.
- 5 Commit to open and consultative decisionmaking on developments and plans which may affect the environment; ensure that environmental impact assessments include consultation with stakeholders.
- 6 Implement effectively obligations under the Multilateral Environmental Agreements already extended to the Turks and Caicos Islands and work towards the extension of other relevant agreements.
- Review the range, quality and availability of baseline data for natural resources and biodiversity.
- 8 Ensure that legislation and policies reflect the principle that the polluter should pay for prevention or remedies; establish effective monitoring and enforcement mechanisms.
- 9 Encourage teaching within schools to promote the value of our local environment (natural and build) and to explain its role within the regional and global environment.
- 10 Promote publications that spread awareness of the special features of the environment in the Turks and Caicos Islands; promote within the Turks and Caicos Islands the guiding principles set out above.
- 11 Abide by the principles set out in the Bao Declaration on Environment and Development (See Annex 2) and work towards meeting International Development Targets on the environment (See Annex 3).

Annex 1 - Illustrative Paper

Topics for consideration by environment committees as components of environmental action strategies.

Note: The circumstances of each OT vary considerably from those with no resident population (eg. SGSSI), very small populations (eg. Pitcairn) to those with bigger populations and a wider range of local resources and skills. Some already have groupings that bring together a variety of stakeholders in the main local environmental issues. It is for each territory to establish/develop the most suitable framework to develop action plans that link the shared principles of the OTs Environment Charter to the needs of each territory. The headings just suggest some areas which each territory may wish to consider - some may be clearly applicable or more important in some territories than in others.

ISSUE SPECIFIC EXAMPLES

1.) Environment/Development Interface

- Sustainable development strategies
- Participatory approaches to environmental and conservation management
- Ensuring environmental planning and management do not disadvantage the poor
- Promotion of sustainable livelihoods
- Rio Declaration and International Development Targets
- Agenda 21 groups
- Consideration of the built environment

2.) Habitat & Species Conservation/Restoration; Invasive Species

- Establishment of baseline information
- Documentation of local ecosystems, fauna & flora
- Priorities -working from baseline information
- Significance for local livelihoods, including tourism
- Key institutions, people and external linkages
- Action planning implementation of plans, setting targets
- Priorities for monitoring, reporting, disseminating and applying knowledge

3.) Pollution

- A mechanism for monitoring pollution
- Awareness of international (and regional) pollution agreements and standards

4.) Energy and Technology Issues

- Sustainable energy policies eg. transport, renewable energy sources, energy conservation
- Appropriate new green technologies UK help with technology transfer

5.) Natural Disasters

- Inclusion of hazard management within development planning
- Vulnerability assessments for habitats and species
- Precautionary measures
- Slow onset disasters (degradation of habitats, climate change)

EXAMPLES OF RESPONSE MECHANISMS

1.) Local Legislation

- Local implementation of Multilateral Environmental Agreements (MEAs)
- Regional agreements/co-operation

• Identification & examination of key items of legislation (eg. Planning permission, Designation of protected areas or species, Environmental Impact Assessments (EIAs), Control of pollution, Regulation of natural resources based industries: fisheries, forestry, agriculture, tourism)

• Effectiveness of implementation - support of local community

• Scope for adopting ideas from other OTs, other countries/territories in the region and the UK.

2.) Environmental Impact Assessments

- Capacity building for EIA production
- Early identification of stakeholders

• Environmental Assessment in planning procedures: Strategic Environmental Assessment and National Physical Plans

3.) Multilateral Environmental Agreements (MEAs)

- Effectiveness of implementation of those MEAs already extended
- Costs and benefits of extending other MEAs
- Reporting and requirements
- Dissemination of information about MEAs & their relevance
- Support needed from UK Departments, Government Agencies and NGOs on international MEA conferences of parties, regional meetings & new negotiations
- Use of international secretariat, UK government and agency, & NGO websites

• Possible contribution to global/regional benefits of MEAs - eg. sharing best practice, being host for workshops and research projects of more than purely local significance

4.) Funding for Environmental Work

- Budgetary and staffing provisions
- Environmental taxes
- Identification of potential sources of funding for environmental projects
- Identification of projects and prioritisation
- Preparation of applications to funding sources
- Monitoring of progress towards outcomes of funded projects
- Reviewing programme and priorities
- Publicising results locally and wider (in concert with funding agencies)
- 5.) Education and Youth Activities; Media and Public Attitudes
- Disseminating the guiding principles contained within the charter.
- Environmental education programmes in schools
- Information on websites in the territory and links to regional, UK and international websites
- Media strategies
- Conservation volunteer schemes
- Procedures for public inquiries on major developments

6.) Regional and International Links

- Networking with other OTs
- Environmental links to other small island states, territories and communities

• Links to residents and friends of the territory in the UK and elsewhere (also as source of funds, tourists, expertise)

Annex 2 - International Development Targets on the Environment

Preamble

The United Nations Conference on Environment and Development,

Having met at Rio de Janeiro from 3 to 14 June 1992,

Reaffirming the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972, and seeking to build upon it,

With the goal of establishing a new and equitable global partnership through the creation of new levels of co-operation among States, key sectors of societies and people,

Working towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system,

Recognizing the integral and interdependent nature of the Earth, our home,

Proclaims that:

Principle 1

Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

Principle 2

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 3

The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Principle 4

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 5

All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

Principle 6

The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.

Principle 7

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustaina ble development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

Principle 8

To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

Principle 9

States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

Principle 10

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Principle 11

States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.

Principle 12

States should cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.

Principle 13

States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and

compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

Principle 14

States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.

Principle 15

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific cer tainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Principle 16

National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

Principle 17

Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

Principle 18

States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.

Principle 19

States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.

Principle 20

Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

Principle 21

The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.

Principle 22

Indigenous people and their communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.

Principle 23

The environment and natural resources of people under oppression, domination and occupation shall be protected.

Principle 24

Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.

Principle 25

Peace, development and environmental protection are interdependent and indivisible.

Principle 26

States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.

Principle 27

States and people shall cooperate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.

Annex 3 - International Development Targets on the Environment

The International Development Targets have been agreed by the entire United Nations membership, following a series of summit meetings held by the UN and its specialised agencies over the last ten years or so. The meetings discussed progress in poverty reduction and sustainable development and set targets for measuring that progress.

The target for the environment is as follows:

There should be a current national strategy for sustainable devel opment in the process of implementation, in every country by 2005, so as to ensure that current trends in the loss of environmental resources are effectively reversed at both global and national levels by 2015.

Appendix 3: Ramsar Convention

Wetlands

Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life. They occur where the water table is at or near the surface of the land, or where the land is covered by shallow water.

The Ramsar Convention takes a broad approach in determining the wetlands which come under its aegis. Under the text of the Convention (Article 1.1), wetlands are defined as:

"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres".

In addition, the Convention (Article 2.1) provides that wetlands:

"may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands".

As a result of these provisions, the coverage of the Convention extends to a wide variety of habitat types, including rivers and lakes, coastal lagoons, mangroves, peatlands, and even coral reefs.

In addition there are **human-made wetlands** such as fish and shrimp ponds, farm ponds, irrigated agricultural land, salt pans, reservoirs, gravel pits, sewage farms, and canals.

Wetlands occur in every country, from the tundra to the tropics. How much of the earth's surface is presently composed of wetlands is not known exactly. The World Conservation Monitoring Centre has suggested an estimate of about 570 million hectares (5.7 million km²) – roughly 6% of the Earth's land surface – of which 2% are lakes, 30% bogs, 26% fens, 20% swamps, and 15% floodplains. Mangroves cover some 240,000 km² of coastal area, and an estimated 600,000km² of coral reefs remain worldwide. Nevertheless, a global review of wetland resources submitted to the Conference of the Parties to the Convention on Wetlands in 1999, while affirming that "it is not possible to provide an acceptable figure of the areal extent of wetlands at a global scale", indicated a 'best' minimum global estimate at between 748 and 778 million hectares. The same report indicated that this "minimum" could be increased to a total of between 999 and 4,462 million hectares when other sources of information were taken into account.

Why conserve wetlands?

Wetlands are among the world's most productive environments. They are cradles of biological diversity, providing the water and primary productivity upon which countless species of plants and animals depend for survival. They support high concentrations of birds, mammals, reptiles, amphibians, fish and invertebrate species. Of the 20,000 species of fish in the world, more than 40% live in fresh water. Wetlands are also important storehouses of plant genetic material. Rice, for example, which is a common wetland plant, is the staple diet of more than half of humanity.

More and more economists and other scientists are working in the field of the valuation of ecosystem services. This is a difficult task, still full of uncertainties, but there is no other choice than to progress in this direction. Some recent studies have indicated that ecosystems provide at least US\$ 33 trillion worth of services annually, of which US\$ 4.9 trillion are attributed to wetlands.

The interactions of physical, biological and chemical components of a wetland, such as soils, water, plants and animals, enable the wetland to perform many vital functions, for example: water storage; storm protection and flood mitigation; shoreline stabilization and erosion control; groundwater recharge (the movement of water from the wetland down into the underground aquifer); groundwater discharge (the movement of water upward to become surface water in a wetland); water purification through retention of nutrients, sediments, and pollutants; and stabilization of local climate conditions, particularly rainfall and temperature.

Wetland values

Wetlands provide tremendous economic benefits, for example: water supply (quantity and quality); fisheries (over two thirds of the world's fish harvest is linked to the health of coastal and inland wetland areas); agriculture, through the maintenance of water tables and nutrient retention in floodplains; timber production; energy resources, such as peat and plant matter; wildlife resources; transport; and recreation and tourism opportunities.

In addition, wetlands have special attributes as part of the cultural heritage of humanity: they are related to religious and cosmological beliefs, constitute a source of aesthetic inspiration, provide wildlife sanctuaries, and form the basis of important local traditions.

These functions, values and attributes can only be maintained if the ecological processes of wetlands are allowed to continue functioning. Unfortunately, and in spite of important progress made in recent decades, wetlands continue to be among the world's most threatened ecosystems, owing mainly to ongoing drainage, conversion, pollution, and over-exploitation of their resources.

The Convention

The **Convention on Wetlands** is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar, on the southern shore of the Caspian Sea. Thus, though nowadays the name of the Convention is usually written "Convention on Wetlands (Ramsar, Iran, 1971)", it has come to be known popularly as the "Ramsar Convention". Ramsar is the first of the modern global intergovernmental treaties on conservation and wise use of natural resources, but, compared with more recent ones, its provisions are relatively straightforward and general. Over the years, the Conference of the Contracting Parties (the main decision-making body of the Convention, composed of delegates from all the Member States) has further developed and interpreted the basic tenets of the treaty text and succeeded in keeping the work of the Convention abreast of changing world perceptions, priorities, and trends in environmental thinking.

The official name of the treaty – *The Convention on Wetlands of International Importance especially as Waterfowl Habitat* – reflects its original emphasis on the conservation and wise use of wetlands primarily to provide habitat for waterbirds. Over the years, however, the Convention has broadened its scope to cover **all aspects** of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. For this reason, the increasingly common use of the short form of the treaty's title, the "Convention on Wetlands", is entirely appropriate.

The Convention entered into force in 1975 and as of 1 June 2001 has 124 Contracting Parties. More than 1070 wetlands have been designated for inclusion in the List of Wetlands of International Importance, covering some 81 million hectares.

UNESCO serves as Depositary for the Convention, but its administration has been entrusted to a secretariat known as the "Ramsar Bureau", which is housed in the headquarters of IUCN–The World Conservation Union in Gland, Switzerland, under the authority of the Conference of the Parties and the Standing Committee of the Convention.

Why do countries join the Ramsar Convention?

Membership in the Ramsar Convention:

- entails an endorsement of the principles that the Convention represents, facilitating the development at national level of policies and actions, including legislation that helps nations to make the best possible use of their wetland resources in their quest for sustainable development;
- presents an opportunity for a country to make its voice heard in the principal intergovernmental forum on the conservation and wise use of wetlands;
- brings increased publicity and prestige for the wetlands designated for the List of Wetlands of International Importance, and hence increased possibility of support for conservation and wise use measures;
- brings access to the latest information and advice on application of the Convention's internationally-accepted standards, such as criteria for identifying wetlands of international importance, guidelines on application of the wise use concept, and guidelines on management planning in wetlands;
- brings access to expert advice on national and site-related problems of wetland conservation and management through contacts with Ramsar Bureau personnel and consultants and through application of the Ramsar Advisory Mission mechanism when appropriate; and
- encourages international cooperation on wetland issues and brings the possibility of support for wetland projects, either through the Convention's own Small Grants Fund or through the Convention's contacts with multilateral and bilateral external support agencies.

What are the commitments of Parties joining the Ramsar Convention?

When countries join the Convention, they are enlisting in an international effort to ensure the conservation and wise use of wetlands. The treaty includes four main commitments that the Contracting Parties have agreed to by joining.

1. Listed sites

The first obligation under the Convention is to designate at least one wetland for inclusion in the **List of Wetlands of International Importance** (the "Ramsar List") and to promote its conservation, including, where appropriate, its wise use. Selection for the Ramsar List should be based on the wetland's significance in terms of ecology, botany, zoology, limnology, or hydrology. The Contracting Parties have adopted specific criteria and guidelines for identifying sites that qualify for inclusion in the List of Wetlands of International Importance. (See Ramsar Information Paper no. 4.)

2. Wise use

Under the Convention there is a general obligation for the Contracting Parties to include wetland conservation considerations in their national land-use planning. They have undertaken to formulate and implement this planning so as to promote, as far as possible, "**the wise use of wetlands in their territory**" (Article 3.1 of the treaty).

The Conference of the Contracting Parties has approved guidelines and additional guidance on how to achieve "wise use", which has been interpreted as being synonymous with "sustainable use". (See Ramsar Information Paper no. 7.)

3. Reserves and training

Contracting Parties have also undertaken to establish nature reserves in wetlands, whether or not they are included in the Ramsar List, and they are also expected to promote training in the fields of wetland research, management and wardening.

4. International cooperation

Contracting Parties have also agreed to consult with other Contracting Parties about implementation of the Convention, especially in regard to transfrontier wetlands, shared water systems, and shared species. (See Ramsar Information Paper no. 13.)

Over the years, the Conference of the Contracting Parties has interpreted and elaborated upon these four major obligations included within the text of the treaty, and it has developed guidelines for assisting the Parties in their implementation. These guidelines are published in the Ramsar Handbook series. (See Ramsar Information Paper no. 16.)

Reporting

Contracting Parties report on progress in implementing their commitments under the Convention by submission of triennial National Reports to the Conference of the Contracting Parties. The National Reports become part of the public record.

The Conference of the Contracting Parties

The implementation of the Ramsar Convention is a continuing partnership between the Contracting Parties, the Standing Committee, and the Convention Secretariat (the Ramsar Bureau), with the advice of the Scientific and Technical Review Panel (STRP) and the support of the International Organization Partners. Every three years, government representatives of the Contracting Parties meet as the Conference of the Contracting Parties (COP), the policy-making organ of the Convention which reviews the general trends in the implementation of the Convention as reflected in the National Reports and adopts decisions to improve the way in which the Convention works. The programme of each meeting of the Conference also includes a series of technical sessions which analyze issues of importance in the field of wetland conservation and wise use, including further interpretation and development of the key Convention concepts. Ramsar COPs have gained the reputation of being highly effective events, allowing an active involvement and participation of the non-governmental and academic community.

Ordinary meetings of the Conference of the Contracting Parties have been held at: 1. Cagliari, Italy, 1980; 2. Groningen, Netherlands, 1984; 3. Regina, Canada, 1987; 4. Montreux, Switzerland, 1990; 5. Kushiro, Japan, 1993; 6. Brisbane, Australia, 1996; 7. San José, Costa Rica, 1999; 8. Valencia, Spain, 2002 (scheduled).

The Standing Committee

The Standing Committee meets annually to carry out interim activity between each COP on matters previously approved by the Conference; prepare documentation for consideration at the next COP; supervise implementation of policy by the Ramsar Bureau and execution of the Bureau's budget; and decide upon applications for project support from the Ramsar Small Grants Fund.

The Standing Committee consists of 13 Contracting Parties elected on a proportional basis from the six Ramsar regions – Africa, Asia, Europe, Neotropics, North America, and Oceania – as well as the host countries of the most recent meeting and the next meeting of the COP. The Contracting Parties which host the Ramsar Bureau and Wetlands International are invited to participate as Permanent Observers, and the "International Organization Partners" (see below) are invited to participate in an advisory capacity.

The secretariat

The **Ramsar Convention Bureau** is the permanent secretariat for the Convention and carries out the day-today coordination of the Convention's activities. The Bureau is headed by a Secretary General, who supervises the work of a small number (currently 14) of technical, communications and administrative staff, and four interns. Ramsar staff members work in several languages (notably the Convention's three official languages, English, French, and Spanish) and provide expertise in a range of disciplines. Consultants are recruited from time to time as needed.

The Scientific and Technical Review Panel

The Scientific and Technical Review Panel (STRP) provides scientific and technical advice to the Conference of the Contracting Parties. The STRP is composed of 13 individual members with appropriate scientific and Plan for Biodiversity Management and Sustainable Development around the Turks and Caicos Ramsar Site 177 technical knowledge, selected from the six Ramsar regions, and representatives of the four International Organization Partners. Other relevant organizations also contribute to the work of the STRP as observers.

The International Organization Partners

The Conference of the Parties may confer the status of International Organization Partner to international organizations, both intergovernmental and non-governmental, that "contribute on a regular basis and to the best of their abilities to the further development of the policies and technical and scientific tools of the Convention and to their application". So far, four international non-government organizations that have been associated with the Convention since its inception have been recognized as IOPs. They are BirdLife International, IUCN–The World Conservation Union, Wetlands International, and the World Wide Fund for Nature (WWF).

Guidelines for Ramsar site selection

The text of the Convention (Article 2.2) states that:

"Wetlands should be selected for the List [of Wetlands of International Importance] on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology" and indicates that "in the first instance, wetlands of international importance to waterfowl at any season should be included".

To facilitate the implementation of this provision, the Conference of the Parties has developed criteria to assist in the identification of wetlands of international importance. The latest version of the Criteria was adopted by the 7th meeting of the Conference of the Contracting Parties in 1999.

Group A of the Criteria. Sites containing representative, rare or unique wetland types

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Group B of the Criteria. Sites of international importance for conserving biological diversity

Criteria based on species and ecological communities

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

Criterion 3: A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Criterion 4: A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

Specific criteria based on waterbirds

Criterion 5: A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.

Criterion 6: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Specific criteria based on fish

Criterion 7: A wetland should be considered internationally important if it supports a significant proportion of

indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

The Ramsar concept of "wise use"

Under Article 3.1 of the Convention, Contracting Parties agree to "formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory".

As this term "wise use" gained currency within the Ramsar community and was used elsewhere for different purposes, the Conference of the Parties recognized the need for greater precision and adopted the following definition at its 3rd meeting in Regina, Canada, in 1987:

"The wise use of wetlands is their sustainable utilization for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem."

At the same time, "sustainable utilization" of a wetland was defined as: "Human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations."

"Natural properties of the ecosystem" were defined as: "Those physical, chemical and biological components, such as soil, water, plants, animals and nutrients, and the interactions between them."

To assist the Parties in implementing the wise use concept, the Wise Use Working Group, established at Regina, developed *Guidelines for the implementation of the wise use concept*, which were adopted by the 4th COP in Montreux, Switzerland, in 1990. Also at the 4th meeting, the Wise Use Project, funded by the Government of the Netherlands, was instituted, and an international panel of experts began work which culminated in the *Additional guidance for the implementation of the wise use concept*, adopted by the 5th Meeting of the Parties in 1993, as well as the book of principles and case studies entitled *Towards the Wise Use of Wetlands*, edited by T.J. Davis (Ramsar, 1993). The Ramsar Strategic Plan 1997-2002, which was adopted by the Conference of the Parties in Brisbane in 1996, states that the Contracting Parties consider the term "wise use" to be synonymous with "sustainable use" and goes on to observe that "*through this concept of 'wise use', the Convention has always emphasized that human usage on a sustainable basis is entirely compatible with Ramsar listing and wetland conservation in general.*"

The 'Wise Use Guidelines' call upon Contracting Parties to:

- **adopt national wetland policies**, involving a review of their existing legislation and institutional arrangements to deal with wetland matters (either as separate policy instruments or as part of national environmental action plans, national biodiversity strategies, or other national strategic planning);
- **develop programmes** of wetland inventory, monitoring, research, training, education and public awareness; and
- take action at wetland sites, involving the development of integrated management plans covering every aspect of the wetlands.

The Guidelines emphasize the benefits and values of wetlands for sediment and erosion control; flood control; maintenance of water quality and abatement of pollution; maintenance of surface and underground water supply; support for fisheries, grazing and agriculture; outdoor recreation and education for human society; and

climatic stability.

The Ramsar Bureau assists the Contracting Parties in implementing the Guidelines and Additional Guidance on the wise use of wetlands by:

- providing expertise, either through Ramsar technical personnel and its network or through external consultants;
- funding projects through the Ramsar Small Grants Fund; and

seeking third-party funding for wise use projects.

Application in TCI

The Convention encompasses all types of wetland from temporary to permanent bodies of fresh or salt water. Wetland types found in the Turks and Caicos Islands include the extensive tidal and submerged banks to the south of the islands, mangrove swamps, salt ponds and salinas, sinkholes, marshes and intertidal beaches. Contracting Parties are also obliged to promote the wise use of all wetlands whether they are in the List or not. It is important to emphasise that Ramsar is not a "hands off" Convention and that a Ramsar site may be used and exploited for the benefit of people provided this does not harm the ecological character of the site.

The original reasons set out for selecting the present Ramsar site were as follows (Clarke & Norton 1987):

The boundaries were chosen to include prime examples of each type of wetland habitat within a single contiguous area, the major link between types is the intertidal and submerged banks on the South side of the Caicos Islands. On the west side of the proposed Ramsar area Malley Pond, Whitby Cove Slough, and Sawgrass Pond drain into Flamingo Pond on North Caicos providing excellent examples of marshland, mangrove swamp and salt Pond. On the east side of the proposed area Flamingo Pond and Black Rock on East Caicos provide prime examples of lagoon and salina habitat. While each of the locations described as part of the proposed Ramsar site may not qualify individually as a site of international importance, together they provide a remarkable range of unspoilt wetland habitats which is rare in such island systems in the region.

The criteria that qualify the total area as a Ramsar site are as follows [note that these refered to an earlier revision of the criteria]:

1. Importance to waterfowl - regularly supports 1% of the individuals in a population of one species. The West Indian whistling-Duck, *Dendrocygna arborea*, (e.g. found at Sawgrass Pond on North Caicos) is given vulnerable status in the 1986 IUCN Red List of Threatened Animals. It is scarce and believed to be declining because of hunting and habitat (Freshwater and brackish swamps) loss (Endangered Birds of the World, ICBP, 1981). The total population is unknown but probably numbers less than 1,000 pairs in the Caribbean. Two flocks were sighted (11 and 15 birds per flock) during the survey suggesting family groups and implied breeding. Sightings occurred at Sawgrass Pond and Bellfield Landing, North Caicos. The former pond is included in the Ramsar site boundary while the latter is not and should be protected by other means.

2. Importance to plants and animals - is of special value as the habitat of animals at a critical stage of their biological cycles. The submerged banks, creeks and lagoons are used by endangered green turtles and commercial fish, conch and lobster for feeding. The coastal mangroves form nursery grounds for reef fish and commercial species. Flamingos and other waterbirds depend on the Salt Ponds and Salinas for feeding and breeding areas. The northern beaches of North, Middle and East Caicos arerecorded as turtle nesting areas (Fleetmyer 1983) and the section on East Caicos within the boundaries appears to be suitable nesting habitat.

3. Importance as representative habitat - is a particularly good example of small island wetland habitat in the Caribbean region. Because of the light use by man in recent years the proposed area is as close to the natural state as any similar island system in the American tropics.

The major wetland sites included within the proposed Ramsar boundaries are summarised below:

Submerged Sand Bank and Intertidal Sand and Mud Flats - The southern marine boundary encloses prime
examples of these habitats on the south side of North, Middle and East Caicos. The unique Ocean Hole is also included.

Lagoons - Big Pond on Middle Caicos and Flamingo Pond on East Caicos are both good examples of lagoon habitat, the former opening to the sea on the south and the latter opening on the north side of the islands.

Mangrove Swamp - Sawgrass Pond on North Caicos, West Armstrong Pond on Middle Caicos, and Flamingo Pond on East Caicos provide representative areas of swamp.

Salt Pond - Flamingo Pond on North Caicos, and Topham Pond on Middle Caicos are good examples of salt Pond habitat.

Salina - Flamingo Pond and East Armstrong Pond on Middle Caicos, and Black Rock Salina on East Caicos provide good examples of salinas.

Sinkhole - several small sinkholes are found within the proposed boundaries on Middle Caicos.

Marshland - Malley Pond and Whitby Cove Slough on North Caicos and scattered areas on Middle Caicos provide good examples of this habitat.

Small Island - Iguana Cay is included in the boundaries providing a refuge for iguanas (*Cyclura cornuta*) which have been exterminated on the larger islands and only exist on a few cays in the Turks and Caicos.

Coastal Rock, Beach and Dune communities - These habitat types are found on the north coast of East Caicos.

Coppice/Pineland - these vegetation zones provide buffer areas around wetland habitat on North and Middle Caicos.

As noted in the main body of the report, the new information now available extends this considerably, and raises the importance of the Ramsar site and adjacent areas even further. The project provided material at the request of UK and TCI Governments to allow an updating of the official Ramsar Information Sheet. This is copied below.

RAMSAR INFORMATION SHEET

FOR WETLANDS OF INTERNATIONAL IMPORTANCE

Site	reference number		6UK001				
1	Compilation date		10 July 20	02			
2	Country		UK (Turk	s & Caicos)			
3	Name of wetland		North, Mi	ddle and Eas	t Caicos I	Islands	
4	Site centre location	n:	Latitude: 2	21 45 00 N	Longi	tude: 71 45 0	0 W
5	Altitude (m)	Min:	0	Max:	30	Mean	
6	Area (ha)		58617				

7 Overview

A wetland site of international importance containing a variety of marine and coastal habitat types, and complex natural transitions. Noteworthy are mangrove swamps, diverse bird life, numerous Arawak sites and several inlet cays. The whole area is a particularly good example of coastal wetland habitat in the Caribbean, providing shelter and nursery locations for various species of waterfowl, turtles and commercial fish species.

8 Wetland type Marine/coastal wetland

Code	Name	% Area
С	Coral reefs	0.9
D	Rocky shores	0.1
E	Sand / shingle shores (including dune systems)	0.1
Q	Saline / brackish lakes: permanent	0.8
R	Saline / brackish lakes: seasonal / intermittent	0.2
Sp	Saline / brackish marshes: permanent	2.6
Ss	Saline / brackish marshes: seasonal / intermittent	7.5
Ts	Freshwater marshes / pools: seasonal / intermittent	0.1
W	Shrub-dominated wetlands	4.6
Xf	Freshwater, tree-dominated wetlands	9.9
Other	Other	2.8
В	Marine beds (e.g. sea grass beds)	50.3
G	Tidal flats	4.6
Н	Salt marshes	7.3
Ι	Mangrove / tidal forest	8.2

9	Ramsar	Criteria	1, 2, 3, 4, 6
-			-, -, -, -, -, -, -

10 Map of the site

11 Compiler

Inint	Nature	Consei	rvation

Monkstone House City Road Peterborough Cambridgeshire PE1 1JY UK

Telephone/Fax : +44(0) 1733 562626 / +44(0) 1733 555948

12 Justification of criteria

Ramsar criteria 1

The North, Middle and East Caicos wetlands comprise interrelated ecosystems complete with submerged mangroves, algal flats and seagrass beds. It is a wetland site of international importance containing a variety of marine and coastal habitat types, and complex natural transitions. Noteworthy are mangrove swamps, diverse bird life, numerous Arawak sites and several inlet cays. The whole area is a particularly good example of coastal wetland habitat in the Caribbean, providing shelter and nursery locations for various species of waterfowl, turtles and commercial fish species.

Committee

Ramsar criterion 2

Internationally important species occurring on the site (and in some cases more importantly on the adjacent woodland area which is ecologically linked and for which measures of conservation are being explored): The following Turks & Caicos Islands endemic species of lizard:

the gecko Aristelliger hechti (CR), Curly Tail Leiocephalus psammodromus, Caicos Islands Reef Gecko Sphaerodactylus caicosensis;

and the one endemic species of snake: the Caicos Islands Trope Boa Tropidophis greenwayi.

In addition there are three further lizards that are endemic at the subspecific level:

Turks & Caicos Bark Anole *Anolis scriptus scriptus*, Turks & Caicos Rock Iguana *Cyclura carinata carinata* (CR; the only subspecies of *Cyclura carinata* found outside the Turks & Caicos Islands is confined to the small island of Booby Cay off nearby Mayaguana); Mabuya Skink (or slippery back or snake-doctor) *Mabuya mabouya sloanei*);

and one snake: Bahaman Rainbow Boa Epicrates chrysogaster chrysogaster.

The waters of the Ramsar site are important for turtles *Chelonia midas, Eretmochelys imbricata, Caretta caretta*, but most nesting beaches have not been included.

Cuban Crow Corvus nasicus - occurs only in Cuba and in the Caicos Islands;

Thick-billed Vireo *Vireo crassirostris stalagmium* - endemic subspecies restricted to the Caicos Islands; Greater Antillean Bullfinch *Loxigilla violacea ofella* - endemic subspecies restricted to Middle and East Caicos;

Kirtland's Warbler *Dendroica kirtlandii* (VU) - non-breeding grounds for one of the most threatened bird species of the region, the world population consisting of only about 3000 individuals, which breed only in a restricted habitat in one part of Michigan, USA and spend the non-breeding season in largely unknown locations in the Bahamas and TCI.

Ramsar criterion 3

Additionally, submerged mangroves and algal flats are important in contributing suspended material to nearby sand banks and by virtue of circulation to and from the cuts and creeks, the mangroves also contribute materials to the coral reefs.

Ramsar criterion 4

The wetlands are thought to play a major role in providing a nursery and feeding grounds for numerous fauna. They act also as land-protection against hurricane damage. The shallow flats where the seagrasses grow serve as major nursery areas of the inshore marine environment. They are the immediate recipients of nutrients produced from the mangrove areas themselves. The areas often do not contain many species, but some exist in high numbers. Thus the economic value of these areas, particularly with regard to edible species such as mullets and shrimp and sport species such as bonefish, is high.

Ramsar criterion 6

The site (in some cases in combination with adjacent ecologically linked areas) regularly supports internationally important populations of

West Indian whistling duck *Dendrocyhna arborea* (VU), the Caribbean population of brown pelicans *Pelecanus occidentalis*, the nominate subspecies of the reddish egret *Egretta rufescens*, the "Cuban/Bahaman" population of the West Indian flamingo *Phoenicopterus ruber*, white-cheeked (or Bahama) pintail *Anas bahamensis*, possibly non-breeding black-bellied plover *Pluvialis squatarola cynosurae*, possibly non-breeding lesser yellowlegs *Tringa flavipes*, Caribbean subspecies of gull-billed tern *Sterna nilotica aranea*.

13 General location

Nearest town/city: Kew, North Caicos Island. The settlements of Whitby, Bottle Creek (North Caicos), Conch Bar, Bambarra and Lorimers (Middle Caicos) are all situated close to the site. Administrative Region: Turks & Caicos

14 Physical Features

Soil & Geology Geomorphology and Landscape	basic, biogenic reef, limestone, mud, nutrient-poor, sand caves, coastal, enclosed coast (including embayment),
intertidal sediments (including sandflat/mudflat), isl subtidal rock (including rocky reefs), subtidal sedim	ands, lagoon, lowland, open coast (including bay), pools, ents (including sandbank/mudbank)
Nutrient status	mesotrophic, oligotrophic
pH	alkaline
Salinity	brackish / mixosaline, fresh, hypersaline / hyperhaline,
saline / euhaline	
Soil	mainly mineral
Water permanence	usually permanent, usually seasonal / intermittent
Summary of main climatic features	Rainfall averages 700 mm per year but is very variable.

Potential evapotranspiration exceeds rainfall. Temperatures vary between 20°C and 35°C. Highest temperatures and rainfall occur in the summer.

15 Hydrological values

Shoreline stabilisation and dissipation of erosive forces, Sediment trapping

16 Ecological features

At February 2002, the Ramsar site and adjoining areas which form part of the same system are the subject of a detailed study leading towards a management plan for the area. The study is being conducted by the UK Overseas Territories Conservation Forum, CAB International and the Turks & Caicos National Trust, in conjunction with the local residents and the TCI Government. The study was funded largely by the UK Department of the Environment, Agriculture and Rural Affairs Darwin Initiative. Work to implement the plan is planned by the Turks & Caicos National Trust and the UK Overseas Territories Conservation Forum, with support initially from UK Foreign & Commonwealth Office as well as sources in Turks & Caicos. (Contact point: UK Overseas Territories Conservation Forum (Attn: Dr Mike Pienkowski), 102 Broadway, Peterborough PE1 4DG, UK; E-mail : pienkowski@cix.co.uk; web: www.ukotcf.org).

Some of the first products of this study were the maps which accompany this data form (see also section 8). These are amplified below by notes on the main vegetation and habitat classes compiled by Frederic J. Burton. Each Ramsar category is followed by a paragraph on the map categories (where appropriate) which fall within it.

Ramsar class A: Shallow marine waters

Water

Open seawater over sand banks south of the Caicos Islands, and in channels between them. Bottom vegetation not described or mapped. (Nothing is attributed to this category in section 8 because category B describes better.)

Ramsar class B: Marine beds Water

Open seawater over sand banks south of the Caicos Islands, and in channels between them. Bottom vegetation not described or mapped but aerial and boat checks indicate extensive areas of sea grass.

Ramsar class C: Coral reefs

Water

Typical Caribbean barrier reef communities, including a reef crest and a back-reef lagoon off the north shore of east Caicos.

Ramsar class D: Rocky shores

Occurring along parts of the north-eastern shores of the Caicos Islands and small islets off these. Within the site, this is primarily on East Caicos and Iguana Cay.

Ramsar class E: Sand / shingle shores (including dune systems)

Occurring along parts of the north-eastern shores of the Caicos Islands and small islets off these. Within the site, this is primarily on East Caicos.

Ramsar class G: Tidal flats

Water

Low tidal flats which were flooded at the time of satellite image acquisition, showing as shallow water on the map, are unvegetated sand and silt substrates.

Exposed intertidal mud

Unvegetated sand and silt substrates exposed at the time of satellite image acquisition.

Ramsar class H: Salt marshes

Salicornia-Batis-Portulaca saltmarsh

A succulent herbaceous salt marsh community, on a flat calcareous silt substrate. Dominated by *Salicornia virginica, Salicornia bigelovii, Batis maritima*, and *Portulaca rubricaulis. Lycium tweedianum, Chamaesyce vaginulatum, Sporobolus virginicus*, and scattered *Avicennia germinans* shrubs may be present.

Distichlis / Sporobolus saltmarsh

A grass-dominated salt marsh community, on a flat calcareous silt substrate. Dominated by *Sporobolus virginicus* and *Distichlis spicat*a in varying proportions. *Borrichia frutescens, Salicornia virginica, Salicornia bigelovii, Lycium tweedianum, Portulaca rubricaulis*, with *Conocarpus erectus* as isolated shrubs or trees, may be present.

Mixed saltmarsh with sparse silver Conocarpus

Scattered *Conocarpus erectus* var. *seriacea* shrubs and trees forming up to 20% cover on a calcareous silt substrate with emergent limestone bedrock. *Sporobolus virginicus, Salicornia virginica, Rhachicallis americana, Borrichia frutescens, Portulaca rubricaulis, Salicornia bigelovii, Fimbristylis ferruginea, and <i>Batis maritima* form a partial ground cover in varying combinations. *Avicennia germinans* may be present as a rare emergent shrub or tree.

Ramsar class I: Mangrove / tidal forest

Rhizophora & Avicennia mangrove shrublands

Mangrove shrubland communities 1 metre tall, forming 40% - 60% cover on soft calcareous mud covered with a thick algal turf, and a network of tidal creeks. Ranging from monospecific *Avicennia germinans* at the landward extreme of the community, through mixed *Avicennia germinans* - *Rhizophora mangle*, to monospecific *Rhizophora mangle* towards the seaward edge.

Rhizophora, Avicennia and *Laguncularia racemosa* shrublands also occur in more inland sites, associated with *Conocarpus erectus* and succulent halophytes on pond fringes and in seasonal floodwater channels.

Ramsar class J: Coastal brackish / saline lagoons

The waterways between the islands (i.e. not in the open sea N or S) might fall into this category, but they fall also into other categories (e.g. B) and have been included there.

Ramsar class Q: Saline / brackish lakes - permanent

Ponds

Shallow brackish to hypersaline ponds, usually narrowly fringed by mangroves and succulent halophytes and otherwise unvegetated. Water levels fluctuate seasonally and many ponds may dry out periodically or seasonally, grading to class R below.

Ramsar class R: Saline / brackish lakes - seasonal / intermittent Ponds See Q above.

Ramsar class Ss: Saline / brackish marshes - seasonal / intermittent

Unvegetated rock & mud flats

Rock pavements and dark calcareous silt flooded by seasonal/intermittent expansion of natural brine pans. Virtually devoid of higher plants due to extremely high salinity. Slightly raised rock areas may rarely support a few prostrate *Conocarpus erectus*, severely stunted *Avicennia germinans*, *Salicornia virginica* or *Rhachicallis americana*.

Sparsely vegetated saline sand flats

Approximately 75% unvegetated sand with a thin algal crust, supporting local aggregations of *Avicennia germinans* shrubs, and the succulent halophytes *Portulaca rubricaulis, Salicornia virginica* and *Suaeda conferta*. Intermittently flooded by rain and/or tide. Old flamingo nests were observed in this habitat, as well as in some ponds.

Ramsar class Sp: Saline / brackish marshes - permanent Natural brine pans

Depressed rock pavement areas, intermittently filled by high tides, becoming extremely hypersaline due to evaporation, forming crystalline salt at the margins. No vegetation.

Ramsar class Ts: Freshwater marshes / ponds: seasonal / intermittent Pine woodland sinkholes

Ramsar class W: Shrub-dominated wetlands

Conocarpus shrubland on saltmarsh grasses

Conocarpus erectus, usually var. *seriacea*, forming a 1-3 metre seasonally flooded shrubland over a herbaceous community dominated by *Sporobolus virginicus* or occasionally *Distichlis spicata*. *Conocarpus erectus* var. *erectus* is often present as a prostrate shrub, with *Salicornia virginica, Portulaca rubricaulis*, *Borrichia frutescens, Rhachicallis americana, Jacquinia keyensis, Rhynchospora colorata, Fimbristylis ferruginea, Agalinis maritima*, and occasionally *Rhizophora mangle* and/or *Avicennia germinans* as shrubs.

Conocarpus-Rhachicallis dwarf shrubland

A seasonally flooded, shrubland with most woody vegetation dwarfed, on calcareous silt with emergent limestone bedrock. Dominated by prostrate *Conocarpus erectus*, with *Rhachicallis americana*, *Rhizophora mangle*, *Jacquinia keyensis*, *Manilkara bahamensis*, *Thrinax morrisii*, *Borrichia frutescens*, *Coccoloba uvifera*, *Cladium jamaicense*, *Swietenia mahagoni*, *Gundlachia corymbosa*, *Strumpfia maritima*, *Crossopetalum rhacoma*, *Sophora tomentosa*, *Fimbristylis ferruginea*, and *Distichlis spicata*.

Ramsar class Xf: Freshwater tree-dominated wetlands

Seasonally flooded woodlands (various)

1). Conocarpus erectus, including var. seriacea, forms seasonally / intermittently flooded woodland communities on very slightly raised sand banks amid tidal flats. The tree layer may be monospecific, or may variously include Pithecellobium keyense, Dodonea viscosa, Guapira discolor, Swietenia mahagoni, Maytenus phyllanthoides and Metopium toxiferum. The shrub layer may include the endemic Eupatorium lucayanum, Crossopetalum rhacoma, Borrichia frutescens, Thrinax morrisii, Coccoloba uvifera, and Erithalis fruticosa, while the herbaceous layer typically includes Sporobolus virginicus, Chamaesyce vaginulatum and Lycium tweedianum.

2). *Sabal palmetto* palms form seasonally flooded woodlands in association with *Gundlachia corymbosa* where fresh to brackish floodwater accumulates during the rainy season. The two species are strongly co-dominant, with *Distichlis spicata* often also abundant.

Seasonally flooded Pinus woodland

Pinus caribaea woodland occurs in extensive stands intermingled with other seasonally flooded habitats. The limestone bedrock has very thin soils, and many seasonally flooded sinkholes: the entire habitat floods with fresh water during periods of intense rain. *Sabal palmetto* and *Cladium jamaicense* grow in the sinkholes. The shrub layer is usually sparse, with *Coccoloba uvifera, Thrinax morrisii, Randia aculeata, Tabebuia bahamensis, Cassia inaguensis, Byrsinomia lucida, Lysiloma latisiliquum, Savia erythroxyloides, Conocarpus erectus, Metopium toxiferum, Acacia choriophylla, Swietenia mahagoni, Ernodea 186 Version 1.00 October 2002*

serratifolia and Erithalis fruticosa. Herbaceous species include Rhynchospora colorata, Jacquemontia havanensis, Cassytha filiformis, and the ground orchid Spiranthes vernalis.

Ramsar class Other

Dry shrublands

Diverse xerophytic mixed evergreen-deciduous shrublands and woodlands, on limestone bedrock and thin soils. Species composition varies with elevation above ground water, and exposure to salt spray. Abundant tree species include *Lysiloma latisiliquum, Coccoloba diversifolia, Tabebuia bahamensis, Coccothrinax argentata, Thouinia discolor, Metopium toxiferum, Acacia choriophylla, Cephalocereus millspaughii, Guaicum sanctum* and *Thrinax morrisii*. Several orchid species in the genus Encyclia are also widespread and conspicuous in these habitats.

The notes in this section and, more particularly in sections 17 and 18, will be amplified when the results of current studies coordinated by UK Overseas Territories Conservation Forum, CAB International and the Turks & Caicos National Trust become fully available.

17 Noteworthy flora

Internationally important species occurring on the site Habitat:

The mangroves of the TCI are typical of the region. Three species of mangrove, *Rhizophora mangle*, *Laguncularia racemosa* and *Avicennia germinans* grow with *Conocarpus erectus* (Combretaceae) in mixed stands along the inland margin of the islands fringing the Caicos Bank.

Nationally important species occurring on the site

Habitats:

Pine forests are particularly noteworthy on North Caicos which has the highest rainfall of all the islands, as well as on Middle Caicos.

The dry shrubwoods of coastal areas and rocky plaints, with species such as the prickly pears, *Opuntia millspaughii*, *O. bahamana* and *O. lucayana*, have been identified as regional priorities for the conservation of cacti and succulents.

Matured forest stands are rare in many places, probably because of clearance for plantations, hurricane action, and possibly the high demands for fuelwood and for charcoal production (CDB 1983).

Higher plants:

Batophora sp, Penicillus sp, Halimeda sp, Acetabularia sp, Caulerpa sp, Thalassia testudinum, Cymodocea filiforme, Rhizophora mangle, Avicennia germinans, Salicornia perrins, S.bigloveii, Borrichia arborescens, Sporolobus virginicus.

Predominant tree species of the forest/scrub biome of the Turks and Caicos include *Pithecellobium quadalupense* (Leguminoseae), *Conocarpus erectus* (Combretaceae), *Bursera simaruba* (Burseraceae), a species of lignum-vitae *Guaiacum santum* (Zygophyllaceae) (EN), Caribbean mahogany *Swietenia mahagoni* (Meliaceae) (EN), *Manilkara zapota* (Sapotaceae) and Caribbean pine *Pinus caribaea* (Pinaceae).

The following tree and shrub species, all scarce and local in Turks and Caicos and restricted regionally in this distribution, were evaluated against IUCN red list criteria but are not considered to be globally threatened. *Caesalpinia reticulata, Euphorbia gymnonata, Hibiscus brittonianus, Mimosa bahamensis, Pavonia bahamensis, Pinus caribaea var. bahamensis, Tabebuia bahamensis, Thouinia discolor, Ziziphus taylori, Encyclia caitensic, Argythamnia argentea, Opuntia x lucayana, Limonium bahamense, Cynanchum stiptatum, Borreria brittonii, B. capillaris.*

18 Noteworthy fauna

Internationally important species occurring on the site: Reptiles and amphibians:

the following Turks & Caicos Islands endemic species of lizard:

the gecko Aristelliger hechti (CR),

Curly Tail Leiocephalus psammodromus,

Caicos Islands Reef Gecko Sphaerodactylus caicosensis;

and the one endemic species of snake: the Caicos Islands Trope Boa Tropidophis greenwayi.

In addition there are three further lizards that are endemic at the subspecific level:

Turks & Caicos Bark Anole Anolis scriptus scriptus,

Turks & Caicos Rock Iguana *Cyclura carinata carinata* (CR; the only subspecies of *Cyclura carinata* found outside the Turks & Caicos Islands is confined to the small island of Booby Cay off nearby Mayaguana);

Mabuya Skink (or slippery back or snake-doctor) Mabuya mabouya sloanei);

and one snake: Bahaman Rainbow Boa Epicrates chrysogaster chrysogaster.

Marine turtles are common, nesting on many of the cays, *Chelonia midas, Eretmochelys imbricata, Caretta caretta*.

Birds:

Dendroica kirtlandi, Dendrocygna arborea, Phaethon lepturus catesbyi, Pelecanus occidentalis occidentalis, Fregata magnificens, Ardea herodias, Casmerodius albus egretta, Egretta thula thula, Egretta caerulea, Egretta tricolor ruficollis, Egretta rufescens colorata, Bubulcus ibis ibis, Butorides striatus bahamensis, Nycticorax nycticorax, Nycticorax violaceus violaceus, Phoenicopterus ruber ruber, Dendrocygna arborea, Anas crecca, Anas bahamensis bahamensis, Anas discors, Oxyura jamaicensis, Pandion halioetus ridgwayi, Rallus longirostris, Pluvialis squatarola, Charadrius alexandrinus nivosus, Charadrius wilsonia, Charadrius seimpalmatus, Charadrius melodus, Charadrius vociferus, Haematopus palliatus prattii, Himantopus mexicanus, Tringa melanoleuca, Tringa flavipes, Tringa solitaria, Catoptrophorus semipalmatus, Actitis macularia, Bartramia longicauda, Numenius phaeopus, Arenaria interpres, Calidris alba, Calidris pusilla, Calidris mauri, Calidris minutilla, Calidris melanotos, Calidris himantopus, Limnodromus griseus, Gallinago gallinago, Larus atricilla, Sterna nilotica aranea, Sterna maxima maxima, Sterna sandvicensis acuflavida, Sterna dougallii dougallii, Sterna hirundo, Sterna antillarum antillarun, Sterna anaethetus recognita, Sterna fuscata fuscata, Anous stolidus stolidus, Ceryle alcyon.

19 Social and Cultural Values

Aesthetic Aquatic vegetation (e.g. reeds, willows, seaweed) Archaeological/historical site Conservation education Current scientific research Fisheries production Non-consumptive recreation Sport fishing Subsistence fishing Tourism Traditional cultural

20 Land tenure/ownership

Ownership category	On-Site	Off-Site
National/Crown estate	+	+
Private	+	+

21 Current land use

Activity	On-Site	Off-Site	Scale
Nature conservation	+	+	Small-Scale
Tourism	+	+	Small-Scale
188 Version 1.00 October 2002			

Recreation	+	+	Small-Scale	
Research	+	+	Small-Scale	
Collection of non-timber natural pro	oducts: subsis	tence	+	+ Small-Scale
Cutting of vegetation (small scale/s	ubsistence)	+	+	Small-Scale
Fishing: (unspecified)	+	+	Small-Scale	
Fishing: recreational/sport	+	+	Small-Scale	
Arable agriculture (unspecified)		+	Small-Scale	
Grazing (unspecified)		+	Small-Scale	
Urban development		+	Small-Scale	
Other		+	Small-Scale	

22 Adverse factors affecting the ecological character of the site

On-Site	Off-Site	Scale	
al species	+	+	Small-Scale
species	+	+	Small-Scale
nt +	+	Small-Scale	
e	+	Large-Scale	
	On-Site al species t species nt + e	On-SiteOff-Siteal species+t species+nt ++e+	On-SiteOff-SiteScaleal species++t species++nt ++Small-Scalee+Large-Scale

23 Conservation measures taken

Conservation measure	On-site	Off-site
NNR	+	+

24 Conservation measures proposed but not yet implemented

see below

Site vulnerability and management statement

The Ramsar site was protected under domestic legislation as a nature reserve around the time of its listing under Ramsar. At the same time, several other nearly sites were protected. Recent and current studies have identified other parts of the adjacent and ecologically linked areas which need protection.

There is no current management plan. However, the purpose of the Darwin Initiative project 1999-2002 is to produce a draft management plan, and this is on schedule for production in 2002. The work is coordinated by the Turks & Caicos National Trust and the UK Overseas Territories Conservation Forum, and has involved local people at all stages. The general approach of the draft management plan was enthusiastically supported at a community meeting in Middle Caicos in February 2002.

As noted above, the Darwin Initiative project Developing Biodiversity Management Capacity Around the Ramsar Site in Turks & Caicos Islands is being completed in 2002. Led by UK Overseas Territories Conservation Forum, CAB International and the Turks & Caicos National Trust, this is resulting in a draft management plan for the Ramsar site and surrounding area, which has already achieved a high degree of local support during its development. TCNT and UKOTCF are setting up follow-up work to bring this plan into operation, including its further development. This has received initial financial support from the UK Foreign & Commonwealth Office and local sources, with the further necessary support being pursued. Some aspects of the plan are indicated in sections 26 & 27 below.

25 Current scientific research/survey/monitoring and facilities

The Darwin Initiative project has brought together a group of scientific specialists from a range of institutions, many of whom have not previously worked together. The biodiversity surveys conducted have drawn on: conservation management, organisational capacity building and ornithological expertise from the UK Overseas Territories Conservation Forum; entomological expertise from CABI Bioscience and the Natural History Museum in London; botanical expertise from The Fairchild Tropical Gardens (Florida) and the National Trust for the Cayman Islands, with satellite-imagery skills of the latter; knowledge of bats from the joint chairman of the IUCN/SSC Chiroptera Specialist Group and conservation advisor to The Bat Conservation Trust, and the Carnegie Museum of Natural History (Pennsylvania); expertise in herpetiles from the Zoological Society of

San Diego. In each case, the work of these recognised international specialists has been complemented by the knowledge of local people. The results of this work are being incorporated in the draft management plan as well as being prepared for scientific publication. Needs for further study and for monitoring are being addressed within the context of the working plan.

26 Current conservation education

The training and education elements of the Darwin Initiative project have been varied considerably to fit in with changing local requirements. During the specialists' visits, a wide range of those interested in developing skills have been invited to join in on Middle Caicos. Those to take advantage of this ranged from the local elementary school on Middle Caicos to the British West Indies Collegiate from Providenciales, the High School on North Caicos and staff of the TCI Government. Another extra area of training developed was capacity-building in the Middle Caicos community as a whole to take an increased part in decision-making on the future of their island, based partly on the preliminary results of this project discussed in community meetings. In terms of formal education, the Turks & Caicos National Trust, in consultation with local schools, has developed and implemented an internationally acclaimed environmental education programme for elementary schools Our Land, Our Sea, Our People. This fills a gap in either the absence of suitable environmental material or the use of locally inappropriate materials from UK or distant parts of the Caribbean, so as to restore in young people a value in local knowledge of relations with their environment, while it is still possible to benefit from the first-hand knowledge of their grandparents, who had to live off the land. This will be extended using results from the study of the Ramsar site and adjacent area.

The ecotourism-related developments noted below will be used also for educational purposes.

27 Current recreation and tourism

A key element of the draft management is the provision and management of trails, other viewing situations, literature and guide training at a range of situations within the Ramsar site and surrounding area. Other initiatives of the Turks & Caicos National Trust and of the TCI Government are providing support to local residents on the development of small businesses compatible with, and complementary to, the conservation and education initiatives.

The Government of the Turks & Caicos has transferred to the Turks & Caicos National Trust a former school building, in Bambarra, Middle Caicos, to provide an environmental centre. The building requires considerable renovation before it can be used effectively, but it is already a major asset. TCNT, with the support of TCI Government, UKOTCF and others, is seeking funding for this from various sources, mainly in-country. This will integrate with the other initiatives noted above.

28 Functional jurisdiction

Ministry of Natural Resources, Government of the Turks & Caicos Islands, Grand Turk, Turks & Caicos Islands, British West Indies

29 Management authority

Proposal for Turks & Caicos National Trust (PO Box 540, Providenciales, Turks & Caicos Islands, British West Indies; tel +1 649 941 5710; fax +1 649 941 4258; e-mail: tc.nattrust@tciway.tc) to lead in mgmt of site in conjunction with TCI Gov Departments.

30 Bibliography

Specific References

Aldridge, B.A. 1987. Sampling migratory birds and other observations on Providenciales Island, BWI. in Journal of Field Ornithology 58.

Anon. 1985. Operation Raleigh Magnificent Frigatebird Survey. London, Operation Raleigh. Unpublished report.

Anon. 1990. Turks and Caicos Islands strategic review. Final Report. Mokoro.

- Anon. 1999. The Darwin Initiative. Turks & Caicos National Trust Review for the Years 1997-99, 9. Providenciales, Turks & Caicos National Trust.
- Anon. 2000. Conserving biodiversity in the Turks and Caicos Islands. Forum News 18: 5 (UK Overseas Territories Conservation Forum).
- Anon. 2000. DArWiN in TCI, newsletter 1 of the Darwin Initiative Project Developing biodiversity management capacity around the Ramsar site in the Turks & Caicos Islands (available at www.ukotcf.org).
- Anon. 2000. The Darwin Initiative Project on Middle Caicos. Turks & Caicos National Trust Review for the Year 2000, 6. Providenciales, Turks & Caicos National Trust.
- Anon 2001. Developing biodiversity management capacity around the Ramsar site in the Turks & Caicos Islands. Forum News 19: 4 (UK Overseas Territories Conservation Forum).
- Anon. 2001. The Darwin Initiative Project on Middle Caicos. Turks & Caicos National Trust Review for the Year 2000, 12. Providenciales, Turks & Caicos National Trust.
- Anon. 2001. DArWiN in TCI, newsletter 2-3 of the Darwin Initiative Project Developing biodiversity management capacity around the Ramsar site in the Turks & Caicos Islands (available at www.ukotcf.org).
- Areces-Mallea, A.E. 1997. The Caribbean islands. In: The IUCN/SSC action plan for cacti and succulents, ed. by S F Oldfield, 14 + 211. Gland & Cambridge, IUCN.
- Auffenberg, W. 1983. Feeding strategy of the Caicos ground iguana. In. Iguanas of the world: their behaviour, ecology and conservation, ed. by G M Burghardt & A Rand, 84-116. Park Ridge, New Jersey, Noyes Publishers.
- Auth, D. 1980. The thermal biology of the Turks and Caicos rock iguana. Florida, University of Florida.
- Bond, J. 1985. Birds of the West Indies. Houngton-Mifflin Co. Boston, 256pp.
- Bradley, P.B. [Undated]. Bird conservation in United Kingdom Dependent Territories in the West Indies. Unpublished manuscript.
- Bradley, P.B. 1995. Birds of the Turks and Caicos Islands the official checklist. Turks and Caicos Islands, National Trust of the Turks and Caicos Islands.
- Brown, J. 1983. The activities of PRIDE Turks and Caicos Islands. Caribbean Conservation News, 7: 20-22.
- Brownell, W N & Stevely, J M. 1981. The biology, fisheries and management of the queen conch. Strombus gigas. Marine Fisheries Review, 43(7): 1-12.
- Brudenell-Bruce, P.G.C. 1978. The Birds of New Providence, Bahamas.
- Buden, D.W. 1981. Endemism and patterns of distribution among terrestrial vertebrates in the Bahamas. The Journal of the Bahamas National Trust, 5: 1-18.
- Buden, D.W. 1987. The Birds of the Southern Bahamas, an annotated checklist. British Ornithological Union. Checklist No 8, 119pp.
- Butler, P. 1997. An iguana's tale. Promoting conservation education and sustainable resource development in the Turks and Caicos Islands. Philadelphia, Rare Center for Tropical Conservation.
- Carr, A, Meylan, A, Mortimer, J, Bjorndal, K & Carr, T. 1982. Surveys of sea turtle populations and habitats in the western Atlantic, USA, National Oceanic and Atmospheric Administration. (NOAA Technical Memorandum NMFS-SEFC-91).
- CDB. 1983. Regional forestry sector, country study report, Turks and Caicos Islands. Barbadoc, Caribbean Development Bank.
- Clark, C D, Ripley, H T, Green, E P, Edwards, A J & Mumby, P J. 1997. Mapping and measurement of tropical coastal environments with hyperspectral and high spatial resolution data. International Journal of Remote Sensing, 20: 237-242.
- Clark, N V & Norton, R L. 1987. The Turks and Caicos Islands, a Ramsar site proposal. Final report to the Turks and Caicos Islands Government, WWF-UK, DoE and ODA. 33pp.
- Clarke, N. and Norton, R. 1987. Turks and Caicos Wetland Survey: Final Report. Report to the Turks and Caicos Islands Government. Overseas Department Administration, London.
- Collar, N J, Crosby, M J & Statterfield, A J. 1994. Birds to watch 2: the world list of threatened birds. Cambridge, BirdLife International.
- Correll, D S & Correll, H B. 1996. Flora of the Bahama Archipelago. New York, Lubrecht & Cramer.
- Correll, D.S & Correll, H.B 1982. Flora of the Bahama Archipelago. J Cramer. 1692 pp, 715 illus.
- Doran, E B. 1958. The Caicos conch trade. Geographical Review 48: 388-401.

- Edwards Hill, J. 1985. Operation Raleigh bats from the Bahamas, January-February 1985. London, Operation Raleigh. (Unpublished report).
- Ehrhart, M. 1989. Status report of the loggerhead turtle. In: Proceedings of the Second Western Atlantic Turtle Symposium, ed. by L. Ogren, 122-144. USA, National Oceanic and Atmospheric Administration. (NOAA Technical Memorandum NMFS-SEFC-226).
- Fleetmyer 1983. Turks and Caicos National Report. In Proceedings of the Western Atlantic Turtle Symposium July 1983, 3: 409-422.
- Garland, J L. 1994. Final report on Project 90727, Turks and Caicos National Parks. (Unpublished report).
- Gaudian, G. 1997. Wetland Survey of the Turks and Caicos Islands. A Proposal for Funding. Department of Environment and Coastal Resources.
- Gerber, G P. 1995. Population status of the Turks and Caicos Rock Iguana. Report to the National Trust of the Turks and Caicos Islands. Tennessee, University of Tennessee.
- Gibbs-Williams, E. 2001. Little Water Cay Nature Trails and Middle Caicos Darwin Initiative Project. Calpe 2000: Linking the Fragments of Paradise, an international conference on environmental conservation in small territories (Proceedings of a conference held at Gibraltar, Sept-Oct 2000), ed. By M. Pienkowski, 72-73. UK Overseas Territories Conservation Forum (available at www.ukotcf.org).
- Green, E P, Mumby, P J, Edwards, A J & Clark, C D. 1996. A review of remote sensing for tropical coastal management. Coastal Management, 24: 1-40.
- Green, E P, Mumby, P J, Ellis, A C, Edwards, A J & Clark, C D. 1997a. Estimating lead area index of mangroves from satellite data. Aquatic Botany, 58: 11-19.
- Green, E P, Mumby, P J, Ellis, A C, Edwards, A J & Clark, C D. In press. The assessment of mangrove areas using high resolution multispectral airborne imagery (CASI). Journal of Coastal Research.
- Gricks, N. 1994. Whale-watching in the West Indies: a guide to cetaceans and sites of the region. Washington DC, Island Resources Foundation.
- Groombridge, B & Luxmoore, R. 1989. The green turtle and hawksbill (Reptile Cheloniidae) world status, exploitation and trade. Lausanne, CITES.
- Ground, R.W. 2001. The Birds of the Turks and Caicos Islands. Providenciales (TCI), Turks & Caicos National Trust. 96pp.
- Hepburn, I, Oldfield, S & Thompson, K. 1992. UK Dependent Territories Ramsar study: Stage 1. Unpublished report.
- Institute of Development Studies. 1981. Turks and Caicos development plan. Sussex and London, Sussex University and the Overseas Development Agency.
- IUCN. 1992. Protected areas of the world: review of National systems. Volume 4, Nearctic and Neotropical. Cambridge and Gland, IUCN.
- Iverson, J B. 1978. The impact of feral cats and dogs on the populations of the West Indian Rock Iguana Cyclura carinata. Biological Conservation, 14: 63-73.
- Iverson, J B. 1987. Notes of the natural history of the Caicos Islands dwarf boa, Tropidophis greenwayi. Caribbean Journal Science, 22: 191-198.
- Kucharski, K.M. 1980. The spiny lobster fishery in the Turks and Caicos Islands: a status report and recent landings. Fort Lauderdale, South Florida Institute of Marine Sciences.
- Lightbourne, E S. 1991. Development of a marine park in a developing country to implement pre-impact maintenance for coral reef
- management. In: Proceedings of the Regional Symposium Public and Private Cooperation in National Park Development, ed by G Cambers. Tortola, British Virgin Islands National Parks Trust.
- Mitchell, A J B, Dawson Shepher, A R & Wakeling, H L. 1985. Environmental appraisal of a proposed aragonite mining operation and other proposed activities at West Caicos Island. Unpublished report to the Government of the Turks and Caicos Islands, British West Indies.
- Mitchell, B A & Barborak, J R. 1991. Developing coastal park systems in the tropics: planning in the Turks and Caicos Islands. Coastal Management, 19: 113n134.
- Mulliken, T.A. 1996. The status of the queen conch fishery in the Caribbean. Traffic Bulletin, 16: 17-28.
- Mumby, P J, Edwards, A J, Green, E P, Anderson, C W, Ellis, A C & Clark, C D. In press a. A visual assessment technique for estimating seagrass standing crop on a calibrated ordinal scale. Aquatic Conservation.

- Mumby, P J, Green, P, Clark, C D & Edwards, A J. In press d. Measurement of seagrass standing crop using satellite and digital airborne remote sensing. Marine Ecology Progress Series.
- Mumby, P J, Green, E P, Clark, C D & Edwards, A J. 1997. Coral reef habitat mapping: how much detail can remote sensing provide? Marine Biology, 130: 193-202.
- Mumby, P J, Green, E P, Clark, C D & Edwards, A J. In Press b. Digital analysis of multispectral airborne imagery of coral reefs. Coral Reefs.
- Mumby, P J, Green, E P, Clark, C D & Edwards, A J. In press c. Benefits of water column correction and contextual editing for mapping coral reefs. International Journal of Remote Sensing.
- Nardi, G C. 1982. An analysis of the queen conch fishery of the Turks and Caicos Islands, with a review of a new, multi-purpose dock receipt. MSc Thesis. Stony Brook, New York, State University of New York.
- Nicholls, J T. 1921. A list of Turks Islands fishes, with a description of a new flatfish. Bulletin American Museum Natural History, 44: 21-24.
- Norton, R & Clark, N. 1992. Notes of the rock iguana of the Caicos Islands. Florida Field Naturalist, 20: 45-46.
- Operation Raleigh. 1986a. Report on the Turks and Caicos expedition. Report on the distribution of habitats and species of the north coast of Providenciales and Leeward Cays (Part 1). York, University of York.
- Operation Raleigh. 1987a. Report on the Turks and Caicos expedition. Management of the marine and coastal resources of the island of Grand Turk, and recommendations for protected areas (Part 4). York, University of York.
- Orr, K & Halaby, J. 1984. The natural world of the Turks and Caicos Islands. Rockville, McCollum Press.
- Pienkowski, M. 2001. Some of North America's rarest birds in Turks & Caicos Islands. Forum News 20: 6 (UK Overseas Territories Conservation Forum).
- Pienkowski, M. 2002. Final field season of the Forum's Darwin Initiative in Turks & Caicos. Forum News 21: 6 (UK Overseas Territories Conservation Forum).
- Ray, C & Sprunt, A 1971. Parks and Conservation in the Turks and Caicos Islands. Report to TCI Government, 45pp.
- Ray, C & Sprunt, T. 1971. Parks and conservation in the Turks and Caicos Islands. A report on the ecology of the Turks and Caicos with particular emphasis upon the impact of development upon the natural environment. TCI, Turks and Caicos Islands Government.
- Ray, C. & Sprunt, A. 1971. Parks and Conservation in the Turks and Caicos Islands. Report to the Turks and Caicos Islands Government.
- Sanderson, J. 1982. Birds of the Turks and Caicos Islands. Turks and Caicos Current, November/December 1982.
- Scott, D.A. & Carbonell, M. (Compilers) 1986. A Directory of Neotropical Wetlands. IUCN Cambridge and DWRB Slimbridge.
- Sealey, N.E. 1994. Bahamian landscapes: an introduction to the physical geography of the Bahamas. 2nd edition. Nassau, Media Enterprises.
- Smith, G. 1992. Return of Cyclura carinata to Pine Cay, Turks and Caicos Islands. Herpetological Review, 23: 21-23.
- Spotte, S, Bubucis, P M & Adams, G. 1992. Diurnal occupancy of crevices and overhangs by fishes on the Caicos Bank, Turks and Caicos Islands, British West Indies. Bulletin Marine Science, 5: 66-82.
- Sprunt, A. 1984. The status and conservation of seabirds of the Bahama Islands. In: Status and conservation of the world's seabirds, ed. by J P Croxall, P G H Evans & R W Schreiber. Cambridge, International Council for Bird Preservation. (ICBP Technical Publication No 2).
- Sullivan, K M, Ciappone, M & Lort, C. 1994. Abundance patterns of stony corals on platform margin reefs of the Caicos Bank. Bahamas Journal of Science, 1: 2-12.
- TCIG. 1975. National Parks Ordinance (Ordinance No.11 of 1975).
- TCIG. 1992. The National Parks Order, 1992. List of National Parks, Nature Reserves, Sanctuaries and Areas of Historical Interest.
- Turks and Caicos Islands Government. 1992a. Maps of the national parks, nature reserves, sanctuaries and areas of historical interest as listed in the National Parks Order 1992. Grand Turk, Department of Environment, Heritage and Parks, Ministry of Natural Resources.
- Turks and Caicos Islands Government. 1992b. The National Parks (Protection and use of National Parks, Nature Reserves, Sanctuaries and Areas of Historical Interest) Regulations 1992. Grand Turk, Turks and Caicos Islands Government.

- UNEP/IUCN. 1988. Coral reefs of the world. Volume 1: Atlantic and Eastern Pacific. UNEP regional seas directories and bibliographies. Gland and Cambridge, IUCN and Nairobi, UK/UNEP.
- Wanless, H R & Dravis, J J. 1989. Carbonate environments and sequences of the Caicos platform: field trip guidebook T374. Washington DC, American Geophysical Union.
- Wood, K M. 1996. Ecology of the Turks and Caicos Islands. A guide for teachers at the primary school level. Florida, Florida International University.

Appendix 4: Turks & Caicos National Trust

Information on some of the work of TCNT is given below.

MISSION STATEMENT:

To safeguard the natural, historical and cultural heritage of the Turks & Caicos Islands for present and future generations and for the enjoyment of all.

The Turks & Caicos National Trust is a membership, non-profit, non-governmental organisation dedicated to the preservation of the cultural, historic and natural heritage of the Turks & Caicos Islands. It was founded in 1992, after the passage of enabling legislation by the TCI Government. The Turks & Caicos National Trust is governed by an elected Council which includes representatives from all the inhabited islands in the TCI.

The enabling legislation gives the Trust a wide variety of powers, among which are the powers to: • Identify, investigate, classify, protect and pres erve any area, site, building, structure, or object of cultural, historic or natural significance;

• Hold property in trust for the future, including the powers to declare such property inalienable and to provide public access;

• Create a Heritage Register;

TURKS & CAICOS NATIONAL TRUST STAFF

The National Trust daily routine of managing the office of the Trust lies with the Executive Director, Ethlyn Gibbs-Williams and support staff comprising, an Executive Officer Colette Robinson, Administrative Assistant Jovett Harvey, and Public Relations/Education Officer Gigi Williams.

The National Trust also has field staff, who oversee the management of the Darwin Project, Little Water Cay and other heritage sites. Allen Ray Smith the Heritage Sites Supervisor oversees all the National Trust sites and supervises the field staff, Bryan Manco the Darwin Project (now Conservation) Officer currently based in Middle and North Caicos and Bruce Garland the Little Water Cay Warden.

PROJECTS

Enrich your knowledge of the Turks & Caicos by visiting these historic and natural sites, all of which are projects of the Turks & Caicos National Trust



CHESHIRE HALL

The Trust has been granted a 99 year lease on this important Loyalist site in Providenciales. It is slated to become a major cultural tourism facility. So far, some signage has been installed, and some of the buildings stabilised, and the preliminary studies and archaeological work will soon be underway. Plans include nature trails and a garden featuring native plant species.

WADES GREEN

The Trust is working with two community-based groups to conserve and make accessible these well-preserved ruins from the Loyalist Period. Access is along an

ancient

carriage trail, leading to the ruins of the Great House and its support buildings which give a powerful sense of life in North Caicos over 200 years ago. The Trust has been granted a 99 year lease on the property.



Plan for Biodiversity Management and Sustainable Development around the Turks and Caicos Ramsar Site 195



SNORKEL TRAILS SMITH REEF & THE BIGHT REEF

The Trust has developed snorkel trails on two of Providenciales best snorkel reefs. These feature "reef balls" which give the visitor information on the marine life and on reef etiquette, in order to ensure that while snorkellers are learning about our vibrant marine environment they avoid damaging this delicate ecosystem.

LITTLE WATER CAY ROCK IGUANA NATURE TRAIL

This tiny island just northwest of Providenciales is home to some 2000 rare and endangered rock iguanas. The Trust has developed two boardwalk trails which give the visitor the chance to see these endemic lizards, as well as ospreys and other birds, while protecting both the animals and their delicate habitat.





MIDDLE CAICOS CROSSING PLACE TRAIL

Hiking & Biking trails along the coastal headlands of Middle Caicos which follow the old path from Lorimers to the place where in times long past the people crossed the sandbars to North Caicos. This endeavor is a part of the Middle Caicos Eco-Tourism Project, a local community based program prompted through the National Trust to give the financial and physical support needed to promote eco-tour activities on Middle Caicos.

THE BOILING HOLE

The Trust is engaged in a joint project with the Sc hool for Field Studies to study and enhance the Boiling Hole on South Caicos. The site was designated as an area of Historic Interest in the National Parks Ordinance, 1992, because the Boiling Hole was a vital part of the South Caicos salt works. The natural flow of oceanic water through the Boiling Hole was once directed to control the water levels in the salinas to facilitate salt production. In addition to its historic value, the area contains abundant wildlife, from flamingoes which feed in the salinas to herons that roost in the mangroves.



This project consists of three elements:

1. Development and installation of interpretive and directional signs covering general information about the salt works, aquatic birds, mangroves, the endemic heather, sheepshead minnows and other marine species of significance.

2. Establishment of a Naturalist Training Programme for tour guides, so that they will be conversant in the cultural and natural history of the Boiling Hole and the surrounding areas, and can give visitors a high-quality experience.

3. Completion of a scientific investigation of the birds and fish that inhabit the Boiling Hole and adjacent salinas.

It is critically important that we enhance our cultural and historic tourism resources on every Island, and the Trust is delighted to have formed a partnership with the School for Field Studies and Marine Resources Faculty, Andy Danylchuck, to work together in this endeavour.

PROGRAMMES

Stewardship of Trust Lands

One of the major purposes of the Trust is to hold land in trust for the future of the TCI. The Trust owns three areas of important habitat, located in Providenciales, North Caicos and Grand Turk, and has recently been granted long-term leases on several other sites of environmental and historic importance. We also work with Government to protect nature reserves and sanctuaries.

Public Awareness and Education

Public education has always been a top priority. We conducted an extensive campaign on the Rock Iguana, under a grant from the RARE Centre for Tropical Conservation, and are currently engaged in a country-wide programme on the West Indian Whistling Duck. We are also working with the CRMP Office to raise public awareness about the importance of the country's parks, reserves and sanctuaries.

Partnership

The Trust works with many partner organisations, including the TCI Government, the TC Hotel & Tourism Association, the Tourism Board, the TCI National Trust, the RARE Centre for Tropical Conservation, the Royal Society for the Protectio n of Birds, the Caribbean Ornithology Society, UK Overseas Territories Conservation Forum, Mangrove Action Project and many more. Our international partners recognise the unique importance of our wetlands, woodlands and marine environment.

Mangrove Action Project (MAP) sponsored a contest which involved kids from all over the world to produce artwork and poems with the theme " Why Are Mangroves Important To Me And My Community" and the **Turks & Caicos secured the month of August**, you can view and purchase the calendar for 2002 at the following address www.earthisland.org/map/calendar.htm

Pages from International Children's Art & Poetry 2002 Calendar



S. A. Morley Turks & Caicos - Age 11 August 2002



Liyama Atikah Binti Malaysia - Age 10 January 2002

Education Publications *ECO-ECHOES*

Eco-Echoes is the Turks & Caicos National Trust's children's environmental booklet. It is used as supplementary material in the public awareness programme, and is designed to appeal to school children ages 4 - 12. The booklet is produced quarterly and is distributed to all prima ry schools in the country, including private schools. All Junior members receive a personal copy of the booklet, each quarter.



Plan for Biodiversity Management and Sustainable Development around the Turks and Caicos Ramsar Site 197

Echo Echoes is widely used by teachers as resource material in planning lessons covering topics such as mangroves, coral reefs, national parks, birds, etc.





The Birds of the Turks & Caicos Islands

The Turks & Caicos National Trust launched the publication of the first comprehensive book about the Birds of the Turks and Caicos Islands on Thursday November 15th, 2001 at its Annual General Meeting. The book has a hardcover, with 96 pages of 236 coloured pictures, of birds found in the islands. The birds were photographed and information written by Richard Ground.

One copy of the book is available for \$20.00

10 copies or more are available for \$16.00 per copy.

Appendix 5: Logical framework for next stages of work

This logical framework addresses a wide sweep of needs for the management of the area centred on the North, Middle and East Caicos Ramsar Wetland of International Importance. It also pays attention to the use of the example in the wider context of the rest of TCI and other countries. It is important to recognise that this framework considers needs and is not a statement of what will happen. In order to implement the framework, resources are required. These will need to come from a variety of sources. Various parts of the work outlined in the framework can be broken into projects, which can be progressed on different schedules. At the time of preparation of this version of the plan, several elements of funding have been secured allowing commencement of some elements of the work.

Intervention logic	Objectively verifiable indicators of achievement	Sources and means of verification	Assumptions
Overall objectives			
What is the overall broader objective, to which the project will contribute ?	What are the key indicators related to the overall objective?	What are the sources of information for these indicators?	
To maintain the biodiversity and cultural integrity of the Caicos Islands including the Ramsar wetland of international importance through enabling the local people to protect the area by generating sustainable usage involving eco-tourism-based activities	Maintained presence and distribution of key species and ecosystems, and maintained & enhanced economic activity of local people, as well as maintaining numbers in local communities and increasing the numbers of the working population remaining locally	Continued survey results compared with those from Darwin Initiative project. Local business summary; population demographic figures from TCI Government	No large-scale externally generated built development approved for Middle, North or East Caicos. Natural disasters do not impose huge damage.
Project purpose			
What are the specific objectives, which the project shall achieve?	What are the quantitative or qualitative indicators showing whether and to what extent the project's specific objectives are achieved?	What are the sources of information that exist or can be collected? What are the methods required to get this information?	What are the factors and conditions not under the direct control of the project which are necessary to achieve these objectives? What risks have to be considered?
1. To provide a means by which the rich biodiversity and cultural heritage of the area can be treasured by local people and experienced by visitors without damage to these internationally important ecosystems	Maintained or increased participation in the project by local people. Extra protection for treasured sites in place. Increased visitor numbers. Maintained presence and distribution of key species and ecosystems	Records of community meetings. Reports of TC National Trust. Logs at visitor centres; ticket sales for charged sites; numbers of (uncharged) school visits. Wardens' reports.	
2. To facilitate the development of the capacity of local people to establish small businesses based on eco-tourism and traditional crafts, so as both to provide the economic incentive for (1) and employment for young people so that they no longer need to leave the islands to find work, thereby maintaining the communities and cultural integrity.	No. of small businesses increases. Skilled work force increases. More young adults remain on North & Middle Caicos.	Project reports and TCInvest information. Ditto plus Ministry of Finance statistics. TC Government statistics.	Supply of people of appropriate working ages with readiness to participate in training. (This is partly influenced by the project's awareness raising - and pilot work is encouraging.)
3. To provide means of coordinating the work, educating local children (and where appropriate adults) and visitors and integrating the work into the National Physical Plan.	Trails, literature, training etc in place and modules of Our Land, Our Sea, Our People extended. Results of work incorporated in National Physical Plan.	Project reports. Environmental education course module documents. National Physical Plan document.	TCI Government National Physical Plan progresses.
4. To use this experimental approach to provide an example to the widely spread small island communities which are searching for ways of maintaining biodiversity and local culture while generating an income so that these can be maintained rather than surrendering to intensive development models imposed and driven by external investment replacing local culture and control by North American/European systems.	Widespread availability and promotion of project- based material: presentations, documents, web- sites, publications.	Project reports; publications and their circulation lists; web-sites and statistics on web- visits	Organisations elsewhere are interested. (Pilot work indicates a high demand.)

Expected results			
What are the concrete outputs envisaged to achieve the specific objectives?	What are the indicators to measure whether and to what extent the project achieves the envisaged results and effects?	What are the sources of information for these indicators?	What external factors and conditions must be realised to obtain the expected outputs and results on schedule?
1.1 Working biodiversity management plan	Plan in place and being used	Plan document & reports of project meetings	
1.2 Working cultural heritage management plan	Heritage survey done; plan in place and being used	Plan document & reports of project meetings	
1.3 Appropriate infrastructure (e.g. trails, hides, signage) to maintain and enhance above, and manage access to it	Tracks and signs in place and visited	Project reports, including visitor statistics	External economic activity remains adequate to provide the share of income expected from this.
1.4 Trained personnel (e.g. guides, wardens, educators, managers, conservation officers, technicians)	Personnel in place, training needs assessed, regularly updated and met	Project reports	
1.5 Interpretative materials (e.g. leaflets, displays, information for signs, curriculum and other education materials)	Scientific and historical information translated to accessible form.	The documents and other materials themselves, and project reports	
2.1 Socio-economic analysis and report on existing and potential small business enterprises established and operated by local people and directly linked to the natural, historical and cultural heritages of the Caicos Islands	Report produced	Contract report	Cooperation of TCI Government maintained (as expected)
2.2 Based on this report and prior small business training and consultation workshops and local community meetings, facilitation and training for local people to establish further small businesses and to provide craft, educational technical and other vocational skills required.	Training provided	Project reports	Local people take up training opportunity (as expected on the basis of pilot work)

2.3 Enhanced capacity of the TC National Trust to manage human resources and technical and scientific management of conserved areas as well as its own enterprise elements.	Executive Director completes personnel management course. Human resources policy adopted and in place. Business management system in place.	Project reports. TCNT Council minutes & Annual Reports. Executive Director's reports to Council. Project reports.	TCI Government/ Conservation Fund continue to give core support (in recognition of TCNT's role in site-management, education etc) allowing TCNT to support expansion.
2.4 Optimised tourism income to the project and community while remaining within the sustainable capacity of the resource	Recommendations of socio- economic study and of biodiversity and cultural heritage plans taken up and utilised. Fee collection system in place.	Project reports including financial and scientific monitoring information.	
3.1 A maintained programme of community meetings and management of an integrated and dynamic strategic plan to link the diverse activities to mutual benefit	Meetings occur regularly and are well attended. Action Points from meetings incorporated in strategic plan.	Meeting minutes. Strategy review documents and project reports.	
3.2 Establishment and successful operation of information and resources centres	Centres in place and used by visitors and local people, including for the sale of crafts.	Project reports, especially visitor numbers, sales figures.	External funding raised for construction and equipping centres.
3.3 A wide ranging education programme for local people, teachers and students within the schools system, and visitors	Modules of Our Land, Our Sea, Our People enlarged and updated and teachers trained in their use. Field studies modules developed. Regular programme of presentations available at Centres. Special modules developed for people with disabilities. Programmes on local television.	Education programme documents. Project reports.	TCNT Education Officer continues to be funded by Conservation Fund (i.e. visitor tax).
3.4 Incorporation of plans from this project (which addresses a high proportion of the country's land area) into the National Physical Plan	Recommendations from integrated management plan evident in National Physical Plan	National Physical Plan document	TCI Government continues work to produce National Physical Plan.
3.5 Effective management of the overall project	Project indicators match plan. Financial & technical produced on schedule	Reports to funding bodies.	

4.1 Management plans for other nature reserves and historic sites in Turks & Caicos.	Management plans produced	Plan documents and project reports	Resources available from the Conservation Fund or elsewhere to contribute to the costs of sites transferred to TCNT management
4.2 Establishment of a Heritage Register (as envisaged in statute) to identify all sites within the country warranting special protection and management	Heritage Register produced	Heritage Register document	Availability of volunteer effort
4.3 Dissemination of experience from this pilot project throughout the Caribbean Region	Widespread conferences, workshops & publications. Information supplied to follow-up enquiries.	Project reports; publications and their circulation lists	
4.4 Dissemination of experience of this pilot project as an example of a small island ecosystem to appropriate countries worldwide	Information on web-site. Widespread conferences, workshops & publications. Information supplied to follow-up enquiries.	Project reports; publications and their circulation lists; web-sites and statistics on web- visits	
What are the envisaged effects and benefits of the project?			
Development of the capacity of the Turks & Caicos National Trust wisely to manage protected areas and business enterprises, and to contribute to national strategies both itself and by facilitating other elements of civil society			
Enabling the resident population of the Caicos Islands to maintain their communities and way of life but with sufficient skills training, jobs and income to reverse the current loss of viability through emigration to avoid poverty			
Conservation and sustainable management of the internationally important ecosystems			

Benefit to existing and future generations of Turks & Caicos Islanders through enhanced awareness of the importance of their natural and cultural inheritance underpinned by a sound curriculum and teacher training in this subject		
Benefit to the wider international community as an example of what can be achieved by small communities to protect their way of life and internationally important natural resources by taking control of their own livelihoods		
What improvements and changes will be produced by the project?		
Reversal of the loss of the economically active work-force from the resident population of the Caicos Islands and consequent decline of community viability		
Halting further loss of fragile ecosystems to externally powered intensive development (which then also generates positive-feedback to further intensification)		
Timely mitigation of the potentially negative aspects of the EU- funded road causeway link between Middle and North Caicos, which would otherwise exacerbate the negative developments of the previous item		
Implementation of the international convention commitment of effective conservation management for the internationally important Ramsar wetland and associated ecosystems		

Activities			
What are the key activities to be carried out and in what sequence in order to produce the expected results?	<i>Means:</i> What are the means required to implement these activities, e. g. personnel, equipment, training, studies, supplies, operational facilities, etc.	What are the sources of information about project	What pre- conditions are required before the project(s) start(s)? What conditions outside the project's direct control have to be present for the implementation of the planned activities?
			Pilot work on several elements has addressed many of the pre- conditions required so that relatively few items outside of the project's control are likely to place major constraints. Only items additional to those noted above within this logical framework are noted below.
1.1.1 Communicate results of biodiversity surveys carried out under the Darwin Initiative as baseline for project work	Hold initial meeting of project personnel, supported by familiarisation with reports, to ensure that the results from the preceding Darwin Initiative project are fully available to, and utilized by, the project.	Survey results; feedback from community meetings	
1.1.2 Analyse human actual and potential impacts on biodiversity	As 1.1.1, combined with analyses of increased human activity on study sites, by project personnel	Local knowledge; reports of incidents; monitoring by wardens; reports by visitors	
1.1.3 Develop action plan to implement biodiversity conservation	Project personnel to discuss draft management plan produced by Darwin Initiative with wider pool of TCI stakeholders to produce final working version		
1.1.4 Develop monitoring and revision procedures	Based on recommendations of specialist researchers, project personnel develop and implement procedures to secure information on biodiversity changes to allow input to revisions of plan (see 3.1.3). Develop computing procedures for information handling.		

1.2.1 Survey historical and cultural resource	TC National Trust island network volunteers identify further sites, buildings and artifacts for cataloging. Collate information on actual and potential areas for harvest of plants for traditional crafts and other cultural uses. Develop assessment criteria, recording formats & database.	Local knowledge of senior citizens; national archive sources; UK records; Museum	Adequate volunteers; access to archives; project activation before many elderly knowledgeable local persons (mainly aged about 80) die.
1.2.2 Develop recommendations and action plan on sites appropriate for conservation/restoration activities, and integration with cultural heritage	Project personnel to develop recommendations for incorporation in integrated management plan, contracting (or securing as volunteers where possible) specialists for restoration plans for selected sites.		
1.3.1 Establish full picture of land ownership and rights of way	Project personnel to work closely with Land Registry and Planning Departments to extend and update existing information, collated during Darwin Initiative.		
1.3.2 Develop agreements, land transfers, leases etc as appropriate to establish Turks & Caicos National Trust management control over key areas of biodiversity and historic value	Project personnel to develop applications to Government in relation to land in public ownership, and to enter negotiations with relevant private land-owners.	Land ownership records plus project information	Land parcel ownership is accessible. Owners can be contacted. TCI Govt approve land transfers of government land.
1.3.3 Design and manage integrated nature and historic trails, based where practicable on traditional paths, and including vegetation management, board- walks over wet areas, viewing hides & platforms and signage	Project personnel to take results of Darwin Initiative survey and of sustainable capacity (see 1.1.1&2), studies of cultural & historical sites (see 1.2.1&2), land & access information (see 1.3.1&2) and other information to decide on appropriate areas for public access; construct trail infrastructure (by locally recruited trades-persons); convert relevant biodiversity, historical and cultural information into user-friendly interpretative materials.		
1.3.4 Establish system for guided access with limitations as necessary to conserve resources	Further develop existing collaboration with local tour guides to agree capacity limitations, means of access control, fees where appropriate, and system of enforcement, feedback and revision as necessary.		

1.4.1 Develop job-descriptions for the necessary tasks and the timing from when these roles will be needed	Project personnel to develop job- descriptions in consultation with appropriate partners, matching this to the sequence of developments as modified by any external constraints.	
1.4.2 Establish financial plan for maintenance of these tasks within and beyond the project period, using resources generated by the activities initiated and other local funding sources	On the basis of experience to date combined with that during the first part of the project, revise preliminary projections of on-going aspects of the work, review potential for income from within these activities, examine potential income from other sources, such as governmental support for the statutory heritage protection function, and prepare forward plan beyond the project period.	
1.4.3 Identify training needs of existing local tour guides and develop in consultation with them integration of these into the system	In consultation with the guides and external expertise, identify nature and level of skills required, evaluate existing competencies, assess training required to reach required level, and organise this.	
1.4.4 Phase recruitment of required personnel	Integrate the results of 1.4.1 and 1.4.2, and implement recruitment strategy aligned to this.	
1.4.5 Organise appropriate training for successful candidates	Identify nature and level of skills required (see 1.4.1), evaluate existing competencies of recruits, assess training required to reach required level, and organise this.	
1.5.1 Develop and implement programme of integrated leaflets, signs and displays matched to the opening of different trails etc	Implement 1.3.3 in the light of the financial and human resources (see 1.4.2 to 1.4.5).	
1.5.2 Work with local teachers to develop further modules of teaching materials, based on the successful pilot programme of TC National Trust and Education Dept environmental education course "Our Land, Our Sea, Our People"	Project Personnel and TC National Trust Education Officer to use information from the Darwin Initiative project to incorporate into revisions of existing modules on the environmental education programme "Our Land, Our Sea, Our People". Make TCNT- managed sites available as living class-rooms for school-children from throughout Turks & Caicos. Develop junior conservation programme for school-children to participate in conservation work in their communities. Explore with the developing Community College curriculum potential for post- school education.	

2.1.1 In consultation with TCI Government's Economic Advisor, commission suitable economist to undertake socio-economic analysis on local small business enterprises linked to heritage and prepare report	In consultation with TCI Government Ministry of Finance and Investment Agency (TCInvest), identify extent of available relevant information and the parameters of further study needed, in the light of developing heritage management plans. Identify potential consultants with experience of socio-economic work with small communities and in heritage-linked aspects, and commission study.	
2.2.1 Further develop successful existing TC National Trust pilot programme of small business workshops	TCNT to work in collaboration with TCI Government's agency TCInvest in UNDP-funded projects on the Development of Small-scale Enterprises for Income and employment Creation, and The Small Enterprise Development Centre, acting as resource to these projects and to identify and address gaps.	
2.2.2 Arrange for suitable training to enhance technical skills of local people to meet the business needs	Identify the technical skills needed both in small businesses and in support of TCNT work, so that local people are in a position to take advantage of employment (or, where appropriate self-employment) opportunities provided directly or indirectly by this project's results as these unfold.	
2.3.1 Management training for Executive Director of the TC National Trust	Identify suitable human resource management course and arrange for enrolment and related logistics.	
2.3.2 Strategic development training for TC NT Council and Executive Committee	Extend previous successful facilitation of organisational development of the Trust so that it is well able to cope with the steadily increasing management of its resources and programmes. The capacity of the Trust will need to be sustainable beyond the project, and the work will be designed to provide for such sustainability.	
2.4.1 Develop integrated marketing strategy incorporating input from biodiversity and cultural management plans and socio-economic study	This is a complex activity which needs to be in place in its initial form as early as possible. Therefore it will develop progressively, as information from other activities becomes available. This will start with the heritage management plans and will later incorporate the results of the socio-economic and financial plan. Some overlap with work on these latter elements will be beneficial to allow some iteration in their development.	

3.1.1 Continue to hold regular community meetings and meetings of other stakeholders	This will build on the successful system established under the Darwin Initiative. Strong local participation has been achieved by open community meetings, with a planned but flexible agenda, which has proven an effective mechanism to capture the knowledge and wishes of local persons rather than impose outside ideas upon them.	
3.1.2 Hold regular staff meetings	This is already part of regular TCNT activities, and will continue to be important as new staff are recruited to the organisation. This will be increasingly vital with the decentralisation of Trust bases for staff from mainly the developed island of Providenciales, initially to include the project bases of Middle Caicos and later North Caicos.	
3.1.3 Integrate outputs from meetings into periodic revisions of working management plans, with full consultation	Working management plans will be annotated with relevant points arising at both community and staff meetings, as well as other inputs, including further research, monitoring, and land-management arrangements. In some cases, this will need early interim amendments to plans. In any event, the plans will be reviewed in addition at annual intervals to consolidate appropriate changes.	
3.2.1 Restoration, renovation and modification of old school building at Bambarra, Middle Caicos	TCI Government has greed to donate this old building and its land to TCNT. Architectural drawings have been prepared in the pilot period, and funding is being secured. Actual transfer of the land is in progress including necessary mutation of land parcels.	
3.2.2 Planning, fund-raising and construction of centre at Wades Green Historic Site, North Caicos	The Forum arranged via one of its UK member organisations to provide the voluntary services of a professional restoration expert to develop a restoration plan. This will inform the placement of a visitor centre. Within this project, the Trust (with its partner organisations) will then embark on fundraising from local and international sources, including TCI Government and its agencies, local commerce, its local membership, international companies, governments and NGOs, as well as tourists.	

3.2.3 Planning, fund-raising and construction of centre at Cheshire Hall Historic Site, Providenciales, to provide first point of contact in the major population and visitor island in TCI	On this island undergoing rapid built development, Cheshire Hall has the potential to become a key land mark and educational centre, for both local people and tourists. The views from its situation provide also for a gateway to the environment, geography, history and ecology of the islands. It will be developed as a focal point also to make visitors aware of the other heritage sites throughout the country and to facilitate visits to them. As for activity 3.2.3, the Forumarranged via one of its UK member organisations to provide the voluntary services of a professional restoration plan. This will inform the placement of a visitor centre. Within this project, the Trust (with its partner organisations) will then embark on fundraising from local and international sources, including TCI Government and its agencies, local commerce, its local membership, international companies, governments and NGOs, as well as tourists.	
3.2.4 Equipping and manning centres	This will be phased, partly in accordance with the rate of fund- raising (3.2.2 & 3). The first phase is Bambarra Centre (3.2.1). It should therefore be possible to start within the first year of the project. The timing of the other two phases will be adjusted during the project. For each centre, an analysis will be made of user needs. The Bambarra Centre will house an office, basic accommodation for researchers, the national herbarium and seed-store, the information database on biological resources in the islands, a visitor centre including displays, locally produced refreshments, giftshop promoting local craft products and native plants, and a base for trails, and outdoor educational and visitor activities. Wades Green will provide a comparable centre for North Caicos with additional complementary specialisms. For the role of Cheshire Hall, see 3.2.3	

3.3.1 Develop further modules to build on successful pilot environmental education programme "Our Land, Our Seas, Our People"	Project Personnel and TC National Trust Education Officer to use biodiversity information from the Darwin Initiative project with historical, cultural information from this project and work with the Education Dept to incorporate into revisions of existing modules, develop further modules and introduce to schools including teacher training, based on the highly successful earlier TCNT environmental education programme "Our Land, Our Sea, Our People". Make TCNT-managed sites available as living class-rooms for school-children from throughout Turks & Caicos. Special modules developed for people with disabilities. Develop junior conservation programme for school-children to participate in conservation work in their communities. Explore with the developing Community College curriculum potential for post-school education.	
3.3.2 Develop educational activities and material using resource centres with trails and other facilities as living classrooms	These new modules (3.3.1) will include work in living classrooms in the field as well as more traditional elements. The interpretative centres, trails and other facilities will be designed and staffed to incorporate this usage, and to ensure access for people with disabilities.	
3.4.1 Interact with TC Government Dept of Physical Planning to meet their request that this work inform the National Physical Plan	It is expected that, by the start of this project, TC Government will commence work on a physical development plan for the country. Previous meetings staged around the onset of the Darwin Initiative project, identified a need for biological and historical material to be incorporated into the planning process. To this end, the biodiversity surveys which form the basis for the management plan were aligned to be compatible with TCI Government systems. It is anticipated that further information derived from this project will also be compatible so as to inform the physical planning process. Confirmation of this will be obtained at the outset through meetings with the relevant senior personnel in the planning dept.	

3.5.1 Provide project management	The Forum, as proven effective project managers in work by itself and in partnership with UK Overseas Territories, will provide overall project management, working as necessary with the Executive Director, Treasurer and other officers of the TCNT.	
3.5.2 Establish representative project group	Local committee will include representatives from North and Middle Caicos, representatives of appropriate government departments, the Forum, the Trust's own development steering group, the Conservation Officer, with others co- opted as necessary for each stage of the process.	
3.5.3 Ensure that project activities and outcomes are regularly reported and evaluated by the project group and management team, with regular reports as required to project sponsors	Each project group meeting will be minuted, and include an evaluation three times per year of the activities since the last evaluation. Annual reports will be prepared on the work, with these feeding also into both the Trust's and the Forum's annual reports widely circulated to members and others.	
4.1.1 Secure the services of appropriate local personnel and international specialists (on a volunteer basis wherever possible) to produce management plans for all existing sites in the management of TC National Trust, extending this as necessary	Identify persons and organisations prepared to make available appropriate specialist experts, and coordinate working visits with local counterparts from TCNT and TCI Government officials to produce plans	
4.2.1 Commission review of existing information with additional survey and analysis as necessary to revise the list of natural, historical and cultural sites warranting statutory protection and/or ownership by TC Natural Trust	Collate existing information, identify gaps in coverage (geographical, in conservation value, in perceived threats) produce initial updated list and arrange additional surveys to allow revisions within regular work of the project.	
4.3.1 Presentations led by TC National Trust at regional meetings, including e.g. National Trusts, Caribbean Conservation Association, Society of Caribbean Ornithologists, West Indian Iguana Group etc, with follow-up on bilateral or small-group basis as required	Coordinate TCNT representatives to address relevant meetings & conferences, write articles, develop presentations and briefing packs for any suitable representative to present; give local TV presentations.	
4.4.1 Presentations via UK Overseas Territories Conservation Forum network, including periodic international conferences, UK Government Foreign Office network, Forum News, UKOTCF web-site, UKOTCF member organisations' networks (involving several million individual members), contacts with small island states and the Overseas Territories of other EU Member States	Develop presentation package, articles, web-pages, working group meetings.	

Appendix 6: Statutory protected areas in Turks & Caicos

NATIONALPARKS

- 1. Admiral Cockburn Land and Sea National Park South Caicos
- 2. Chalk Sound National Park Providenciales
- 3. Columbus Landfall Marine National Park Grand Turk
- 4. Conch Bar Caves National Park Middle Caicos
- 5. East Bay Islands National Park North Caicos
- 6. Fort George Land and Sea National Park North of Pine Cay
- 7. Grand Turk Cays Land and Sea National Park Grand Turk
- 8. North West Point Marine National Park Providenciales
- 9. Princess Alexandra Land and Sea National Park Providenciales
- 10. South Creek National Park Grand Turk
- 11. West Caicos Marine National Park West Caicos

NATURE RESERVES

- 12. Admiral Cockburn Nature Reserve Long Cay, Middleton Cay, Six Hill Cay
- 13. Bell Sound Nature Reserve South Caicos
- 14. Cottage Pond Nature Reserve North Caicos
- 15. Dick Hill Creek and Bellefield Landing Pond Nature Reserve North Caicos
- 16. Lake Catherine Nature Reserve West Caicos
- 17. North, Middle and East Caicos (International Ramsar Site)
- 18. North West Point Pond Nature Reserve Providenciales
- 19. Pigeon Pond and Frenchman's Creek Nature Reserve Providenciales
- 20. Princess Alexandra Nature Reserve Little Water, Donna, and Mangrove Cays
- 21. Pumpkin Bluff Pond Nature Reserve North Caicos
- 22. Vine Point (Man O'War Bush and Ocean Hole Nature Reserve Middle Caicos

SANCTUARIES

- 23. Big Sand Cay Sanctuary Big Sand Cay
- 24. French, Bush and Seal Cays Sanctuary South Caicos Bank
- 25. Long Cay Sanctuary South East of Grand Turk
- 26. Three Mary Cays Sanctuary North Caicos

HISTORICAL SITES

- 27. Boiling Hole South Caicos
- 28. Cheshire Hall Providenciales
- 29. Fort George Fort George Cay
- 30. H.M.S. Endymion Wreck South of Big Sand Cay
- 31. Molasses Reef Wreck South East of West Caicos
- 32. Salt Works and Village Salt Cay
- 33. Sapodilla Hill Rock Carving Providenciales

Appendix 7: Consultations and Recruitment for the project on Biodiversity management and sustainable development around Turks & Caicos Ramsar site [centred on Middle Caicos]

These consultations were held by TC National Trust staff and, when in the TCI, Forum personnel. As the project went forward, CABI personnel were also involved in the meetings, as noted. This is not a complete list of consultations, because many informal meetings were held both in person and by telecommunications. The contacts between Trust personnel and others, in particular, are greatly under-recorded. Also not included are the many meetings of Trust Council and Executive Committee at which the work was discussed and future elements and applications planned, nor the widely circulated project newsletters and numerous other forms of interim reporting.

July 1997

• Consultation with DECR (Christie Hall and Judith Lynn Garland) on whether they would welcome work by Forum and National Trust. Conch Bar Caves and the Ramsar site were top of the list that DECR indicated they would like Forum/Trust to take a lead on.

Autumn 1997

• Following many discussions over preceding months, final consultation with DECR and others to agree on application for Darwin Initiative funding

Spring to Autumn 1998

• Darwin Initiative funding application unsuccessful. Consultations undertaken with local community, TCI Government Departments and international partners in Forum network to develop and submit new Darwin proposal. Applications prepared to UK Government sources and UK NGO members of the Forum, resulting in modest funding to continue preparatory and development work.

Oct/Nov 1998

• Consultations with members of Middle Caicos community about the scope and direction of the proposed project

• Further consultations with Governor, Ministers, DECR and others on application for Darwin Initiative funding.

April/May 1999

• Consultations with Middle Caicos community, DECR, CRMP, Ministers, Governor and others about the forthcoming Darwin Initiative project, for which funding had just been approved.

August 1999

- · Discussions with local Middle Caicos community on forthcoming project.
- Meetings with Governor, DECR and CRMP.

November 1999

The Forum (Dr Mike Pienkowski, Sara Cross), the Trust (Ethlyn Gibbs-Williams) and CABI Bioscience (Dr Oliver Cheesman) spent a few days in Grand Turk meeting with Ministers, Permanent Secretaries, Governor John Kelly, National Museum, Director of Planning, DECR (Christie Hall and Michelle Fulford) to discuss the Darwin Project. Invitations extended to all for their personnel to benefit from training by the volunteer visiting specialists

throughout the project. This was followed by a letter from the Forum to DECR, noting areas in which the DECR could be involved in the project. (At this time, CRMP were rather preoccupied with visiting DFID consultants who were considering the future of CRMP, and did not feel able to become very involved in discussions.)

• A community meeting in the form of a 'Planning for Real' Workshop was held in Conch Bar, as part of the formal initiation of the Darwin Initiative project, to gather from the local residents places of interest etc., that needed protection and that were of ecological importance.

· Project highlighted at Trust AGM, with many stakeholders present, and in Annual Report.

Feb 2000 (and for some weeks before)

Many contacts with DECR and CRMP as Darwin Project tried to find suitable local candidate for post of project officer. The preferred option of the project partners was to recruit a Turks Islander as project officer, and several potentially suitable candidates were encouraged to apply in the openly advertised recruitment. However, despite much encouragement by the Trust, none of these maintained their applications. The project was fortunate to secure instead as project officer a well qualified candidate who is a relation of a local resident and who happened to be visiting TCI at the time of the recruitment advertisement. The project then began to explore ways of finding and funding the appointment of a counterpart, to work alongside the project officer from a later date (see below).

April 2000

· Field work and consultations with local residents, Middle Caicos.

• Start of work of project officer, based in Middle and North Caicos, with further frequent consultations and interactions with local community.

May 2000

· Community meeting in Middle Caicos.

July 2000

· Meetings with Governor and Minister Natural Resources

August 2000

· Courtesy briefing to CRMP

• Meeting with Darwin Committee and wider community in Middle Caicos (Mark Day, DECR Director, in attendance and also briefed separately outside the meeting).

November 2000

· Project highlighted at Trust AGM and Annual Report

Launch of Darwin Project Middle Caicos — Permanent Secretaries Nat Res, Public Works & Providenciales present. Mark Day and Michelle Fulford (DECR) attended. CRMP also invited: the Chief Park Warden and the Admin Officer attended.

• Various scientific specialists starting study, and general invitation to participate issued, including searching for suitable potential local counterparts.

Jan/Feb 2001

• Other scientific specialists starting study, and general invitation to participate issued.

• School involvement in the field work with training from specialists.

March 2001

• Meetings with the Governor, the Ministry of Finance, TCInvest, DECR Director (Mark Day), CRMP (Judith (Garland) Campbell)

• Planning session with Trust Executive Committee for next phase of work, plus inclusion of this in Trust Council full-day workshop on future priorities. Development of project funding proposals, including provision of local counterpart, for submission to European Commission, Darwin Initiative, FCO and others.

April 2001

· Bird field work and meetings with Middle Caicos residents

June 2001

 \cdot Two community meetings were held in Middle Caicos – one at the beginning and the other at the end of the month

August 2001

• Meetings with Governor, Ministers, senior officials in several departments, including DECR (Michelle Fulford Gardiner), CRMP (Judith (Garland) Campbell) [who indicated that CRMP did not really have the time or skills to be able to contribute in consultations], Dept of Tourism and other bodies, such as National Museum.

· Community meeting on Middle Caicos.

November 2001

· More fieldwork, with involvement of schools and DECR staff.

• Appointment made to meet Project Manager CRMP Judith (Garland) Campbell, but she was not at her office, apparently being detained elsewhere.

15 Nov 2001

· Project featured at Trust AGM and Annual Report

February 2002

- · Community meeting Middle Caicos, to discuss early draft of parts of management plan
- More fieldwork, with involvement of schools and DECR staff.
- Met Governor. Updated Minister Natural Resources, who invited presentation on the plan to ExCo.

• Appointments made to meet with DECR Director Mark Day but he cancelled; met with Deputy Director Michelle Fulford Gardiner.

• CRMP staff involved in other meetings, so could not be available for meeting on project, but project staff joined their meeting on other issues.

Spring 2002

Applications for funding for implementation work to European Commission and Darwin Initiative unsuccessful, due to severe over-subscription (about 40-fold) of applications. Limited funding secured from FCO. Volunteer specialist assistance secured which, combined with the FCO funds, allowed the work to continue, but at a low level, and with insufficient funds to allow recruitment of local counterpart. Trust Executive Committee decide to apply to Conservation Fund for funding for local counterpart; to avoid confusion the application would be made once the Conservation Fund had completed consideration of the application for a contribution to the costs of the Middle Caicos Eco-centre, handling of which proposal had been postponed several times over preceding months.

May-June 2002

• Conservation Fund again deferred consideration of Middle Caicos Eco-centre application, so that proposal to fund local counterpart also delayed.

• Appointments made to meet with Mark Day (DECR Director) but he cancelled; met Deputy Director Michelle Fulford Gardiner (and subsequently in touch with her on various aspects).

• Spoke with Project Manager CRMP, Judith (Garland) Campbell and arranged meeting, but she cancelled; met with Rob Wild, Co-Management Advisor, CRMP.

- Meetings with Governor, Minister Natural Resources, officials in Planning, Tourism and others.
- Briefing meetings for Trust Council members on the draft plan.
- Advised all of plan to hold workshop on draft plan in August.

August 2002

· Informal discussions with Acting Director DECR, Dept of Financial Planning & Statistics, Director of Planning, Sustainable Development Planning Initiative consultants, and various others.

- · Considered at Trust Council
- Workshop for all interested parties to be held 22 August 2002.

In Workshop and follow-up meetings, possible funding sources identified for local counterpart and other elements of proposals delayed by lack of funding. Applications being developed.
Appendix 8: Extract from the National Parks Ordinance and subsidiary legislation, noting protected areas only within the plan area



TURKS AND CAICOS ISLANDS

CHAPTER 80

NATIONAL PARKS ORDINANCE and Subsidiary Legislation

Revised Edition

showing the law as at 15 May 1998

This is a revised edition of the law, prepared by the Law Revision Commissioner under the authority of the Revised Edition of the Laws Ordinance 1997.

This edition contains a consolidation of the following laws-

	Page
NATIONAL PARKS ORDINANCE	3
Ordinance 11 of 1975 in force 30 October 1975	
Amended by Ordinance 10 of 1989 in force 12 January 1990	
Amended by Ordinance 12 of 1992 in force 7 August 1992	
NATIONAL PARKS ORDER – Section 3	9
Legal Notice 40/1992 in force 7 August 1992	
Amended by Legal Notice 35/1995 in force 14 July 1995	
NATIONAL PARKS REGULATIONS – Section 8	21
Legal Notice 41/1992 in force 7 August 1992	
Amended by Legal Notice 4/1994 in force 18 February 1994	
Amended by Legal Notice 18/1994 in force 29 April 1994	
INDEX	40

Also included in this chapter is a designation by the Executive Council of areas for use by the public as parks—

PUBLIC PARKS GRAND TURK DESIGNATION

39

Gazette Notice 198 of 1993 .. in force 17 March 1993

CHAPTER 89

NATIONAL PARKS ORDINANCE

ARRANGEMENT OF SECTIONS

SECTION

- 1. Short title
- 2. Interpretation
- 3. Declaration of national parks etc
- 4. Usage of national parks, etc
- 5. Provisions with respect to land in areas declared to be national parks, etc
- 6. Restriction on certain activities harmful to the ecology
- 7. Enforcement
- 8. Regulations

CHAPTER 89

NATIONAL PARKS ORDINANCE

(Ordinances 11 of 1975, 10 of 1989 and 12 of 1992)

Commencement

[30 October 1975]

AN ORDINANCE TO PROVIDE POWERS TO PERMIT THE ESTAB-LISHMENT OF PARKS, NATURE RESERVES, SANCTUARIES AND AREAS OF HISTORICAL INTEREST, AND GENERALLY FOR THE CONSERVATION OF THE NATURAL ENVIRONMENT AND ECOLOGY OF THE ISLANDS AND FOR PURPOSES CONNECTED THEREWITH.

Short title

1. This Ordinance may be cited as the National Parks Ordinance.

Interpretation

2. In this Ordinance, unless the context otherwise requires—

"area of historical interest" means an area declared to be of historical interest under section 3;

"court" means the Magistrate's Court;

"development" includes any change in use, the erection of any structure and the carrying out of any drainage, dredging or sewerage scheme, and such other activities as may be pre-scribed by the Governor by order;

"national park" means a national park established under section 3;

"nature reserve" means a nature reserve established under section 3;

"private land" means any land the title to which is vested in any person other than the Crown or the Government; "sanctuary" means a sanctuary established under section 3.

Declaration of national parks etc

3. The Governor may by order declare any area in the Islands, including any part of the territorial waters of the Islands, to be—

- (*a*) a national park; or
- (b) a nature reserve; or
- (c) a sanctuary; or
- (d) an area of historical interest.

Usage of national parks, etc

- 4. (1) Subject to any regulations relating to any particular national park or nature reserve—
 - (*a*) an area which is designated as a national park shall be open to members of the public for recreational use, including camping, fishing and sailing, and the Governor may make a grant of development per-mission for the erection in the area of buildings, the construction of roads, marinas and such other development as may be considered to be desirable to facilitate enjoyment by the public of the natural setting of the area and any features of historical interest therein:

Provided that in considering whether or not any such development as is mentioned in this para-graph as being permissible shall be authorised in any particular case, the paramount consideration shall be to limit such development to the minimum consistent with the reasonable access to and enjoyment of the area by members of the public;

(b) an area which is designated as a nature reserve may be used for agricultural, arboricultural, piscicultural, sporting and recreational purposes, subject to such restrictions as may be prescribed and which may be considered desirable to ensure a proper balance in the natural ecology of the area; but no building or other development shall be permitted except in accordance with the conditions of a grant of development permission made by the Governor and such grant shall only be made for a building or other development which is required for one of the aforesaid uses which are permissible in a nature reserve.

(Amended by Ord. 10 of 1989)

(2) The declaration of an area as a sanctuary shall be made primarily for the purpose of the protection of the natural ecology, or of any particular form of living organism (including any marine life), in the area, and the avoidance of disturbance of the area by human beings, either at any time or at particular times according to the circumstances and the form of life which it is desired to protect. Entry into a sanctuary shall not be permitted except in accordance with any regulations made in respect of that sanctuary and no person shall carry out any development in a sanctuary.

(3) The declaration of an area of historical interest shall be primarily for the purpose of protecting an object of historical interest therein. Such an area may form part of a national park, nature reserve or sanctuary, and in such case shall be subject to those provisions of this section and any regulations which are applicable to that park, reserve or sanctuary. In the case of any other area of historical interest, the public shall have access to the area, or to any object of interest therein, during such times and subject to such conditions as may be prescribed by regulations which are applicable to that area; and no person shall carry out any development in that area except under a grant of development permission made by the Governor.

(Amended by Ord. 10 of 1989)

Cap.73

(4)Sections 63, 64 and 65 of the Physical Planning Ordi-nance shall apply *mutatis mutandis* to applications for develop-ment permission in a national park, a nature reserve, a sanctuary or an area of historical interest as

they apply to applications for development permission in a conservation area made under the Physical Planning Ordinance:

Provided that the Director of Planning appointed under the Physical Planning Ordinance shall make available to the Minister responsible for this Ordinance a copy of the environ-mental impact statement referred to in those sections before any application for development permission is approved. (*Inserted by Ords. 10 of 1989 and 12 of 1992*)

Provisions with respect to land in areas declared to be national parks, etc

Cap. 78

Cap. 47

5. In any case in which private land is included in any area which has been declared to be a national park, a nature reserve, a sanctuary or an area of historical interest and the Governor does not consider that it is necessary for the purpose to which the declaration relates to acquire such land under the Land Acquisi-tion Ordinance, any person entitled to any interest therein shall be entitled to receive compensation from the Government for the diminution, if any, in the value of his interest consequen-tial upon any restrictions imposed on his use of the land by reason of such declaration. If agreement cannot be reached between the Government and the party concerned as to whether or not any compensation is payable, or as to the amount thereof, the matter shall be referred to arbitration under the provisions of the Arbi-tration Ordinance.

Restriction on certain activities harmful to the ecology

- 6. (1) If the Governor is satisfied that—
 - (a) it is, or is likely to become, necessary for the pre-vention of the pollution of, or any other harmful or disturbing effect or influence on, the natural ecol-ogy of any national park, nature reserve or sanctu-ary; or
 - (b) the preservation of any particular form of living organism (including vegetable or marine life) in any part of the Islands so requires,

he may by order impose restrictions on any development or the depositing or discharge of any waste or harmful matter in any area which he considers would have direct or indirect harmful effect on such natural ecology or living organism.

(2) The provisions of section 5, with respect to the assessment and payment of any compensation, shall apply *mutatis mutandis* in the case of any diminution in the value of any interest in land by reason of any restrictions imposed by order made under this section.

Enforcement

- 7. (1) Any person who—
 - (*a*) carries out any development in a national park, nature reserve, sanctuary or area of historical interest, except in accordance with the terms of a grant of development permission made under sec-tion 4; or
 - (b) fails to comply with any restriction imposed by an order made under section 6; or
 - (c) enters any sanctuary without authority,

shall be guilty of an offence and shall be liable on sum-mary conviction to a fine of \$50,000 dollars or to twelve months imprisonment or to both such fine and imprisonment.

(Amended by Ords. 10 of 1989 and 12 of 1992)

(2) The court before which any person is convicted under the provisions of this section may order the demolition of any structure erected or the reinstatement of anything altered or removed in contravention of the provisions referred to in sub-section (1), and in default of compliance with any such order of the court, the

Governor may cause the necessary work to be carried out and may recover as a civil debt the cost of so doing from the person in default.

(3) An appeal shall lie to the Supreme Court from any decision or order of the Magistrate's Court made under this section.

Regulations

8. (1) The Governor may make regulations for carrying into effect the purposes and provisions of this Ordinance, and without derogation from the generality of the power hereby conferred, such regulations may provide—

- (*a*) for the control and management of national parks, nature reserves, sanctuaries and areas of historical interest;
- (b) the conditions subject to which members of the public shall be permitted to enter and use any national park, nature reserve or area of historical interest, and for the issue of licences to permit per-sons to enter any national park, nature reserve, sanctuary or area of historical interest for any par-ticular purpose;
- (c) for the regulation and control of prohibition of any hunting or fishing in or the removal of any living organism or any substance from any national park, nature reserve, sanctuary or area of historical interest;
- (d) for the appointment of persons as wardens and for the conferring on such wardens of powers to enforce the regulations;
- (e) that a contravention of a provision of the regula-tions constitutes an offence and for a penalty on summary conviction in respect of such contraven-tion not exceeding—
 - (i) a fine of \$50,000 or a term of imprisonment for 12 months or both; and
 - (ii) in the case of a continuing offence, a fine of \$100 for every day or part of a day on which the offence continues;
- (f) power for a court to order a person convicted of an offence referred to in paragraph (e) to pay the cost of repairing any damage to a national park, nature reserve, sanctuary or area of historical interest caused by the commission of such offence;
- (g) power for a warden, a police officer or a fishery officer to arrest without warrant any person whom such warden or officer, as the case may be, rea-sonably suspects to be committing, to have com-mitted or to be about to commit an offence against the regulations or this Ordinance, and for the sei-zure or forfeiture to the Crown of any article used in the commission of any such offence or alleged offence;
- (*h*) power for a police officer or fishery officer to ini-tiate proceedings for offences against the regula-tions; and
- (*i*) for the imposition of fees and charges in respect of any matter with regard to which provision is made in the regulations or in this Ordinance.

(Amended by Ord. 12 of 1992)

Cap. 104

(2) In subsection (1)(f), "fishery officer" has the meaning assigned thereto by regulation 3(1) of the Fisheries Protection Regulations. (*Substituted by Ord. 12 of 1992*)

NATIONAL PARKS ORDER – SECTION 3

(Legal Notices 40 of 1992 and 35 of 1995)

Made by the Governor under section 3 of the National Parks Ordinance.

Commencement

[7 August 1992]

Short title

1. This Order may be cited as the National Parks Order.

Formation of national parks

2. The areas named and described in the first column of Part I of the Schedule are declared to be national parks for the protection or promotion of the corresponding features of interest specified in the second column.

Formation of nature reserves

3. The areas named and described in the first column of Part II of the Schedule are declared to be nature reserves for the protection or promotion of the corresponding features of interest specified in the second column.

Formation of sanctuaries

4. The areas named and described in the first column of Part III of the Schedule are declared to be sanctuaries for the protection or promotion of the corresponding features of interest specified in the second column.

Formation of areas of historical interest

5. The areas named and described in the first column of Part IV of the Schedule are declared to be areas of historical interest for the protection or promotion of the corresponding features of historical interest specified in the second column.

Site plans

6. (1) The areas described in the Schedule are delimited on site plans designated NP 1–11, NR 12–22, S 23–26 and HA 27–33, that may be inspected at the offices of the Department of Environment, Heritage and Parks during normal working hours.

(2) In a case of inconsistency between the description of an area in the Schedule and its delimitation on a site plan, the former shall prevail for all purposes of interpretation.

SCHEDULE

PART I

National Parks

Ref	Name and Area	Features of Interest
4.	Conch Bar Caves National Park: An area of 235 acres in Middle Caicos bounded in the north by the high water mark and in the east by a line connecting grid reference BQ 120 167, BQ 120 162, BQ 119 161, BQ 119 158, to the south by the main road and to the west by east road, a line connecting grid reference BQ 107 162, BQ 108 162, BQ 108 164 and the south and east side of a 40 feet wide road reserve and back to the starting point (Grid references are to sheet 7 Series E8112 (DOS 309P) Edition 2-OSD 1984.Site Plan NP4.	Extensive under-ground cave system containing large sub-terranean lagoons and bat colonies; once mined by slaves for guano
5.	<i>East Bay Islands National Park</i> : An area of 8746 acres in North Caicos comprising Bay, Conch, High and Major Hill Cays and bounded by a line from grid reference AQ 992 289 at North Mouth to AQ 994 292, AQ 999 292, BQ 019 277, BQ 033 261, BQ 039 204, BQ 031 188, BQ 020 193, AQ 999 222, AQ 995 231, AQ 994 241, AQ 997 261, AQ 983 265, the middle of the channel between Major Hill Cay and the mainland, AQ 986 289, AQ 987 291 and to the starting point. Grid references are to sheet 5 Series E8112 (DOS 309P) Edition 2-OSD 1985.Site Plan NP5.	Scenic islands and favourite picnic area

PART II

Nature Reserves

Ref	Name and Area	Features of Interest
14.	Cottage Pond Nature Reserve : An area of 20 acres in North Caicos bounded by straight lines connecting ZV 099 285, ZV 099 281 and AQ 901 281, along the 25 ft. contour to the road to Sandy Point at AQ 903 284 and back along the road to the starting point. Grid references are to sheet 4 Series E8112 (DOS 309P) Edition 2-OSD 1984 and sheet 5 Series E8112 (DOS 309P) Edition 2-OSD 1985.Site Plan NR14.	Bird nesting
15.	<i>Dick Hill Creek and Bellefield Landing Pond Nature</i> <i>Reserve:</i> An area of 975 acres in North Caicos bounded by a straight line from ZV 067 266 on the eastern edge of Dick Hill Creek to ZV 068 266, a straight line to ZV 068 253 on the north side of the Bellefield Landing road, along the north side of this road to ZV 065 252, the north side of a track to ZV 057 256, a straight line to ZV 056 258, a straight line to ZV 053 272, following the edge of the hard ground around Dick Hill Creek back to the starting point. Grid references are to sheet 4 Series E8112 (DOS 309P) Edition 2-OSD 1984.Site Plan NR15.	Bird nesting

Ref	Name and Area	Features of Interest
17.	North, Middle and East Caicos Nature Reserve (International Ramsar Site): An area of 210 square miles bounded by straight lines connecting grid references ZV 050 230, ZV 090 250 and AQ 936 260; the edge of the hard ground; a straight line connecting AQ 936 260 and AQ 934 262; the 25 foot contour, the Kew/Whitby road; a straight line connecting AQ 911 279 and AQ 935 276; the edge of the hard ground (including Mally Pond Slough and Whitby Bight); straight line connecting AQ 942 298, AQ 945 306 and AQ 947 305; the edge of the hard ground; a straight line connecting AQ 951 296 and AQ 958 296; the edge of the hard ground; a straight line connecting BQ 028 162 and BQ 080 150; the edge of the hard ground (including Flamingo Pond); straight lines connecting BQ 160 140, BQ 165 132, BQ 167 137; BQ 175 138; BQ 176 137, BQ 182 127, BQ 188 128; the shoreline of Armstrong Pond; a straight line between BQ 186 115 and BQ 187 111; the edge of the hard ground; a straight line between BQ 268 060 and BQ 286 071 the centre line of the channel between Joe Grants Cay and East Caicos; a straight line connecting BQ 305 090 and BQ 330 085; the reef wall, a straight line sconnecting BQ 371 056 and BQ 364 045; the north-east side of a track; a straight line connecting BQ 323 075 and BQ 322 078; the edge of the hard ground; and straight lines connecting BQ 330 040, BP 260 960, BQ 050 020, ZV 050 180 and ZV 050 230.Grid references are to sheets 4, 5, 6, 8, 9, 10, 11 Series E8112 (DOS 309P) Edition 2-OSD 1984.Site Plan NR17.	A wetland site of international importance containing a variety of habitat ty-pes representative of the region. Noteworthy individual si-tes within the park include the Mally Pond Slough, Sawgrass Pond and Flamingo Pond wet-land area which contains excellent natural mangrove swamp, rich and varied fauna and diverse bird life, the unique Ocean Hole off Middle Caicos, believed to contain diverse and unusual fauna; the Arm-strong and Big Ponds areas of Middle Caicos, the former area including numerous Ara-wak village sites, and the Iguana Cay and Flamingo Pond area on and close to East Caicos. The whole area is a particularly good example of coastal wetland habitat in the Caribbean region. It regularly supports 10% of the individuals in a population of one species of waterfowl (on Sawgrass Pond, the threatened West Indian Whistling Duck) it has special value as the habitat of animals at a critical stage of their biological cycles (submerged banks, creeks and lagoons used by endangered turtles and commercial fish species for feeding).
21.	Pumpkin Bluff Pond Nature Reserve : An area of 427 acres in North Caicos comprising the entire area of Pumpkin Bluff Pond to the edge of hard ground, lying within the area bounded by grid references ZV 086 306, ZV 096 294 and AQ 913 312. Grid references are to sheet 4 Series E8112 (DOS 309P) Edition 2-OSD 1984 and sheet 5 Series E8112 (DOS 309P) Edition 2-OSD 1985.Site Plan NR21.	Bird nesting
22.	Vine Point (Man O' War Bush) and Ocean Hole Nature Reserve: An area of 1870 acres in Middle Caicos bounded by a line connecting the following grid references BQ 054 046, BQ 043 034, BQ 060 018, BQ 099 044, BQ 092 051, BQ 066 035 and to the starting point. Grid references are to sheets 6 and 8 Series E8112 (DOS 309P) Edition 2-OSD 1984.Site Plan NR22.	Frigate bird nesting area, and 220 feet deep by 1200 feet wide hole in 3 feet shallow sand bottom

PART III

Sanctuaries

Ref	Name and Area	Features of Interest
26	<i>Three Mary Cays Sanctuary</i> : An area of 33 acres in North Caicos comprising the total area of Three Mary Cays and the surrounding 400 ft of sea up to 50 ft seaward of the low water mark of the north coast of North Caicos.Site Plan S26.	Osprey nest site