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Saving Our Special Nature of Montserrat

Newsletter 4, July 2017

Foreword

Welcome to the fourth issue of the newsletter about the project entitled *Maximising long-term survival prospects of Montserrat's endemic species and ecosystem-services*. This is a good and reasonably concise title for technical use – but is a bit of a mouth-full for everyday use. So we thought that, for the latter, we might try something shorter – but meaning much the same thing, as well as trying to capture also the wider aspects. You see it above. It has not skipped our notice that it does lend itself to an abbreviation relevant to the urgency and importance of the matter: *SOS Nature of Montserrat*.

We are very grateful for the many kind and encouraging comments from people welcoming the first three newsletters. We hope that you enjoy this one too. In it, we highlight the starting of more local *Adopt a Home for Wildlife* projects, which are gathering increased participation by local people. We provide the first reports on the third intensive period of work in late June and early July, when again visiting experts worked alongside local people. We touch on some of the project work going on all of the time in Montserrat, UK and elsewhere. We focus on the visit of the Montana State University (MSU) team (and UKOTCF) in June-July 2017. The MSU team used the opportunity to show the new Montserrat-centred access to database systems and the



Male Montserrat oriole, Montserrat's national bird on red heliconia, Montserrat's national plant. Photo: Dr Mike Pienkowski

previous insect survey records that they have captured for the database. Their visit both tested its match to Montserrat's needs by consultations on the final formatting aspects, and provided training to people in Montserrat in the use of the online database. The team also continued the insect fieldwork, in which local people participated for training, and provided public lectures. We describe also some of the initial analyses of the satellite imagery to which we have negotiated access, this being of great value both for the consultations on the future of the south and for other aspects of the work. The visit was, of course, part of the ongoing project, and follow-up discussions were held between project partners and the Government of Montserrat centred on how best to incorporate the recommendations on integrating environment and physical planning (see *SOS Nature Newsletter 3*, page 7) into Montserrat's laws and procedures, as well as planning future collaboration within and beyond the present project. This issue is slightly later than we had planned, but this is because of all the progress – hence, this almost double-sized issue to reflect all this activity.

Please feel free to show or forward these newsletters to others. If anyone sees these and would like to be added to the circulation list, please send your email address to cwensink@ukotcf.org.

For more information on the project, the main contacts are:

Dr Mike Pienkowski & Catherine Wensink, UK Overseas Territories Conservation Forum: m@pienkowski.org cwensink@ukotcf.org. See also www.ukotcf.org

Nicolas Tirard & Mrs Sarita Francis, Montserrat National Trust: nicolas.tirard@gmail.com mnatrust@candw.ms

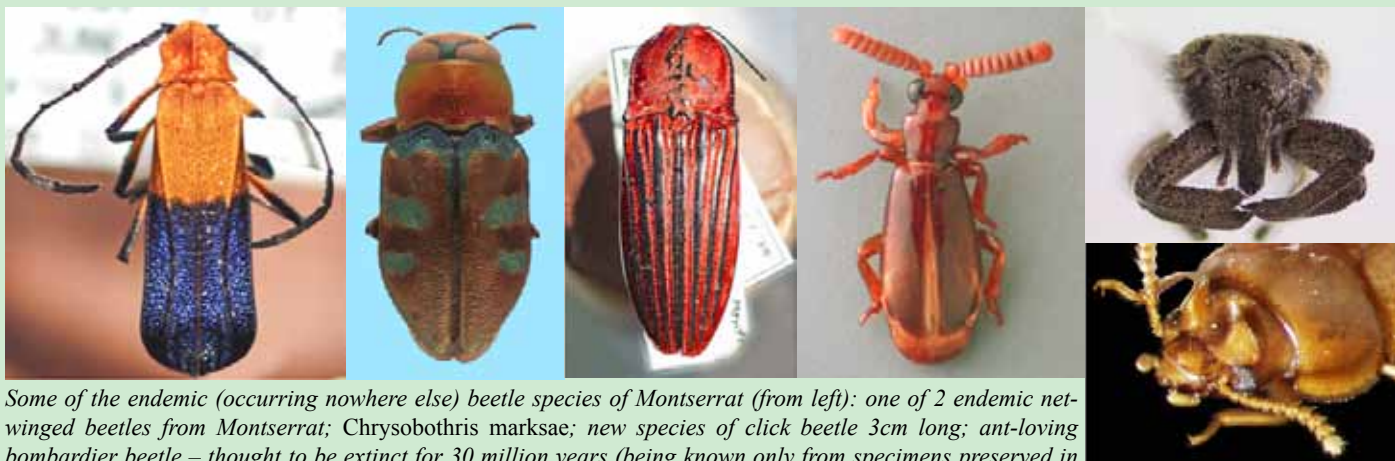
Hidden gems: Montserrat's insect fauna

When the project partners first drafted their application to the Darwin Plus initiative, they were inspired by the words of the Minister for Agriculture, Trade, Land, Housing and Environment, Hon. Claude Hogan, back in 2015 at a workshop on Environment Impact Assessment organised by UKOTCF with the Montserrat National Trust. He said that we must do everything we can to protect every “nook and cranny of our island”. This couldn't be

Part of the audience – who, to their own surprise, became insect enthusiasts – attending the lecture at Montserrat National Trust.

Photo: Catherine Wensink





Some of the endemic (occurring nowhere else) beetle species of Montserrat (from left): one of 2 endemic net-winged beetles from Montserrat; Chrysobothris marksae; new species of click beetle 3cm long; ant-loving bombardier beetle – thought to be extinct for 30 million years (being known only from specimens preserved in amber); (above) ant-loving weevil, which has South American relatives; (below) new Montserrat darkling beetle 3mm long. Photos: Dr Ivie, Montana State University

any more true, especially when we consider the insect world. They are often hidden in every “nook and cranny” where we don’t tend to see them. Yet, they are working hard for us everyday in many different ways. Montserrat is particularly rich in insects compared to many of its neighbouring islands. More study needs to be done and, of course, they need to be protected and conserved.

Dr Mike Ivie is a Professor in Entomology at Montana State University (MSU) in the United States. He is the curator of the West Indian Beetle Fauna collection (WIBF). He has been visiting Montserrat for over 20 years and, during this time, he has amassed an impressive number of specimens. MSU is located in Bozeman, close to Yellowstone National Park in the Rocky Mountains. It has a very dry climate with very low humidity, making it the perfect place to hold and preserve a biological collection of this kind. Some of the specimens originate from scientists who first explored Montserrat over a hundred years ago.

Between 2000-2005, Dr Ivie was part of a team that conducted a biological survey of the Centre Hills. Working closely with many Montserratians, they collected an estimated 1.5 million insect specimens. 13,044 of these were mounted back at the laboratory in Montana.

It takes many years to analyse the specimens, and often there are so few specialists available that some may not be analysed for many years. Dr Justin Runyon, an associate researcher at MSU, has recently published a paper on the long-legged flies of Montserrat, without ever visiting the island! His expertise helped to identify flies (see pages 13, 14 & 17), which were collected

inadvertently during many visits to the island, when other insects were the main target. They were stored in the laboratory until Justin started to study them.

The beetle fauna of Montserrat is now quite well known. 728 species of beetles are found on the island. Of these, 81 are single-island endemics: that is, they are found nowhere else on earth; 53 are exotics (*i.e.* introduced by people); and 273 have an unknown status.

As part of this project, Dr Ivie and his team are re-visiting the island. The team includes Dr Justin Runyon (see profile on pages 13-14), PhD candidate Frank Etzner (see also pages 15-16) and Donna Ivie. The purpose of this visit is to see if what they think they know about the beetle fauna is correct, and to extend the survey. They estimate that, for beetle species, the inventory is 90% complete. There were several habitats where the 2000-5 surveys did not collect. These were coastal areas and land associated with agriculture. There were also several species from historic records that were not found. One of these was a weevil closely associated with bromeliads. This species is sensitive to ash and so it could be that it has become extinct on the island. Dr Runyon is looking for long-legged flies, as they are largely undescribed for Montserrat but provide important functions including predating on other pest species (see *Did you Know* on page 17).

Beetles and other invertebrates are crucial for livelihoods and the economy. They provide many services to Montserrat, which go largely unnoticed. These include: pollination, pest-control, food sources to other, larger animals, and a role in nutrient-cycling. Oxygen produced by healthy vegetation and clean water



Dr Mike Ivie, MSU (in front of screen), supported by Frank Etzner, MSU (at flipchart), Mike Pienkowski, UKOTCF (next left) and Nicolas Tirard, MNT (far right) discuss and refine the database with a group of enthusiastic young professionals and degree students at Montserrat National Trust. Photo: Catherine Wensink

production depend largely on soil quality. Insects stimulate and accelerate the breakdown of organic materials by other organisms, such as soil-mites, bacteria and fungi. This enhances soil fertility. Some insects mix organic and inorganic material, which increases the soil's ability to capture and store water. For example, this can be seen clearly on Montserrat. When insects are doing their work, there will be no negative effect on the marine environment as, usually, fresh clean water runs from the Centre Hills along the ghauts into the sea. However, when insects on land are not able to provide these functions, e.g. after extreme rainfall, silt-water runs on to the reefs and damages them.

Dr Ivie gave a word of caution about human activities that modify the natural environment and its complex workings. "The fact that nature works is a mystery. It's a puzzle with many pieces. We risk ecological collapse if we lose one piece of that puzzle. We are talking about complex processes and we don't really know the impacts that the loss of each part of the process would have. We fool around with them at our own risk." But he also talks about what the island has to offer the outside world in terms of its biodiversity and its welcoming community. Montserrat is a special place for him, despite being very well travelled, having visited over 63 countries.

In order to transfer his enthusiasm for insects to the people of Montserrat, on 27th June, Dr Ivie together with Dr Justin Runyon, gave a lecture on the island's unique invertebrate fauna at the Montserrat National Trust. It was attended by 54 people

including: HE Governor Elizabeth Carriere, school children, students, farmers, government departments, non-government organisations, private sector, and the news media.

The full lecture was also recorded to broadcast a few days later on Montserrat's radio station ZJB. Several attendees requested that the lecture be made widely available on the Trust's website as it was so interesting but a lot to take in.

Dr Ivie believes that access to information on the invertebrate fauna of the island is the next step in the process. Currently, a secure and stable database houses the data at Ohio State University, on behalf of a consortium of universities. It meets all international standards and is funded by an endowment, which means that funding for it is unlikely to end. It also means there are data-managers to fix bugs (computer bugs that is) and to ensure that it is constantly updated. James Beck at MSU has developed a portal that will sit in front of the database so that the data can be accessed readily on Montserrat (see *SOS Nature Newsletter 3*, pages 5-67). It will be possible to extract data from this for research, analysis, mapping, student projects etc. Training workshops for this took place on 30th June. These included participants from Montserrat National Trust, Department of Environment, Statistics Department, GIS Specialist from Physical Planning Unit, Montserrat Community College as well as several interested students, and project organisers from Montana State University and UKOTCF.

Did you know...?

Australian pine *Casuarina equisetifolia*

Casuarina is native to Australia and the Pacific region. It has been introduced to the Caribbean by human activity. The Centre for Agriculture and Bioscience International (CABI) notes that *Casuarina* has become widespread throughout the region, but including also parts of the US, South Africa and Brazil, probably due to seed being dispersed further on trade winds, after initial spread by humans. CABI describes *Casuarina* as a "fast growing species with prolific seeding ability which is able to take advantage of disturbed sites for colonization. Where it establishes it may form dense, low biodiversity stands with negative impacts on native flora, fauna, soil character and dynamics." These negative effects result from both over-shading and the toxic chemicals that it emits to kill other (often native) plants.



Using satellite images to locate invasive species in the exclusion zone

Invasive species have a detrimental impact on natural ecosystems, as seen with *Casuarina* above. Invasive plants can outcompete native plant species in a number of ways. They are able to grow rapidly, covering large areas and taking space, light and nutrients in the soil. Some are able to release poisons in to the soil, which inhibit other plants from growing.

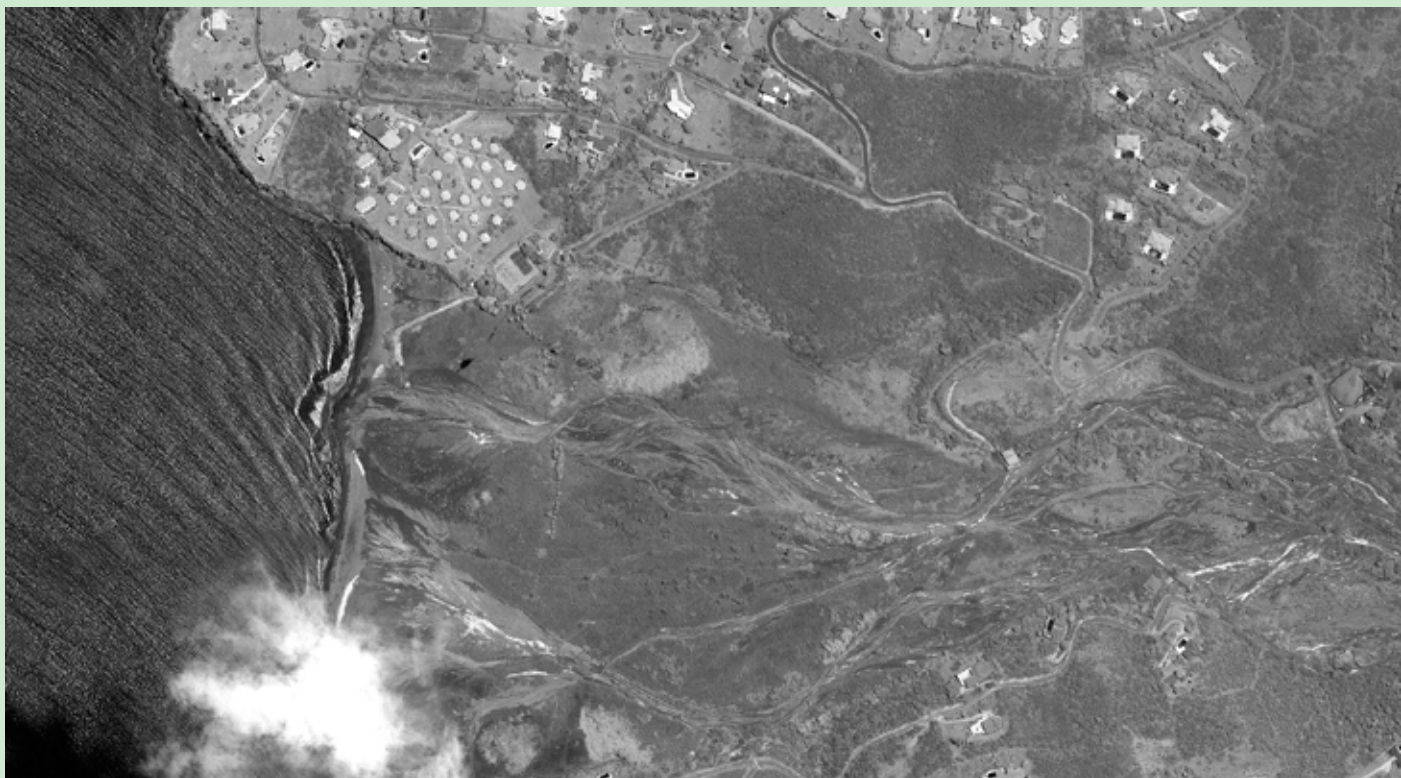
The island's endemic fauna and flora are at risk from several invasive species. So, part of the project is looking at maximizing the space available to native wildlife and reducing the threats to them. We are looking at the extent of invasive plant species on the island.

Through a grant from the DigitalGlobe Foundation, the project was able to acquire several high-resolution satellite images of the island. By using these images, it has been possible to look at some of the areas of the exclusion zone, which are inaccessible

or partly accessible, to determine the status of some of the most invasive plants found on the island e.g. *Casuarina* and blackberry.

Casuarina, or Australian pines, were planted in many parts of the world to provide shaded areas. However, they also inhibit growth of other plants, by releasing chemicals in to the soil. They grow rapidly and soon take over large areas producing a dense blanket of leaf litter, which covers the ground. Some research from outside of Montserrat, has found that it has reduced endemic insect diversity, as well as its well established effect on suppressing native plants, both by shading and releasing toxins into the soil.

Blackberry is also an invasive. Although it is edible and enjoyed by many, very little grows underneath it when it takes over an area, and so it reduces native species diversity.



Above: QB panchromatic satellite image of Belham River mouth in May 2006, with the ground still relatively clear with no *Casuarina* stands following ash re-deposition by water flowing in the valley. Below: WV2 panchromatic image of the same area in March 2015, after *Casuarina* colonised huge areas. In many other Caribbean islands, *Casuarina* colonisation comes about when ground is disturbed for development, but here it has taken hold under the influence of volcanic activity (although human intervention to bring *Casuarina* into the region is still the ultimate cause). The *Casuarina* is shown more clearly in the false-colour image (WV2 MUL image March 2015) on the next page, where the *Casuarina* shows as bright red. All satellite images courtesy of DigitalGlobe Foundation. (For those who would like a bit more explanation of the abbreviations in this caption and some other aspects of these images, please see the final section of this article, on page 6.)



In the second workshop on the south (see *SOS Nature Newsletter* 3, pages 8-9), James ‘Scriber’ Daley, from the Forestry Department provided an account of some of the invasive species which are spreading in several localities including *Casuarina* and blackberry but also acacia and neem. It has been possible to provide visual evidence of these observations by using the high-resolution satellite images to zoom-in on certain areas (see images above and on next page, top).

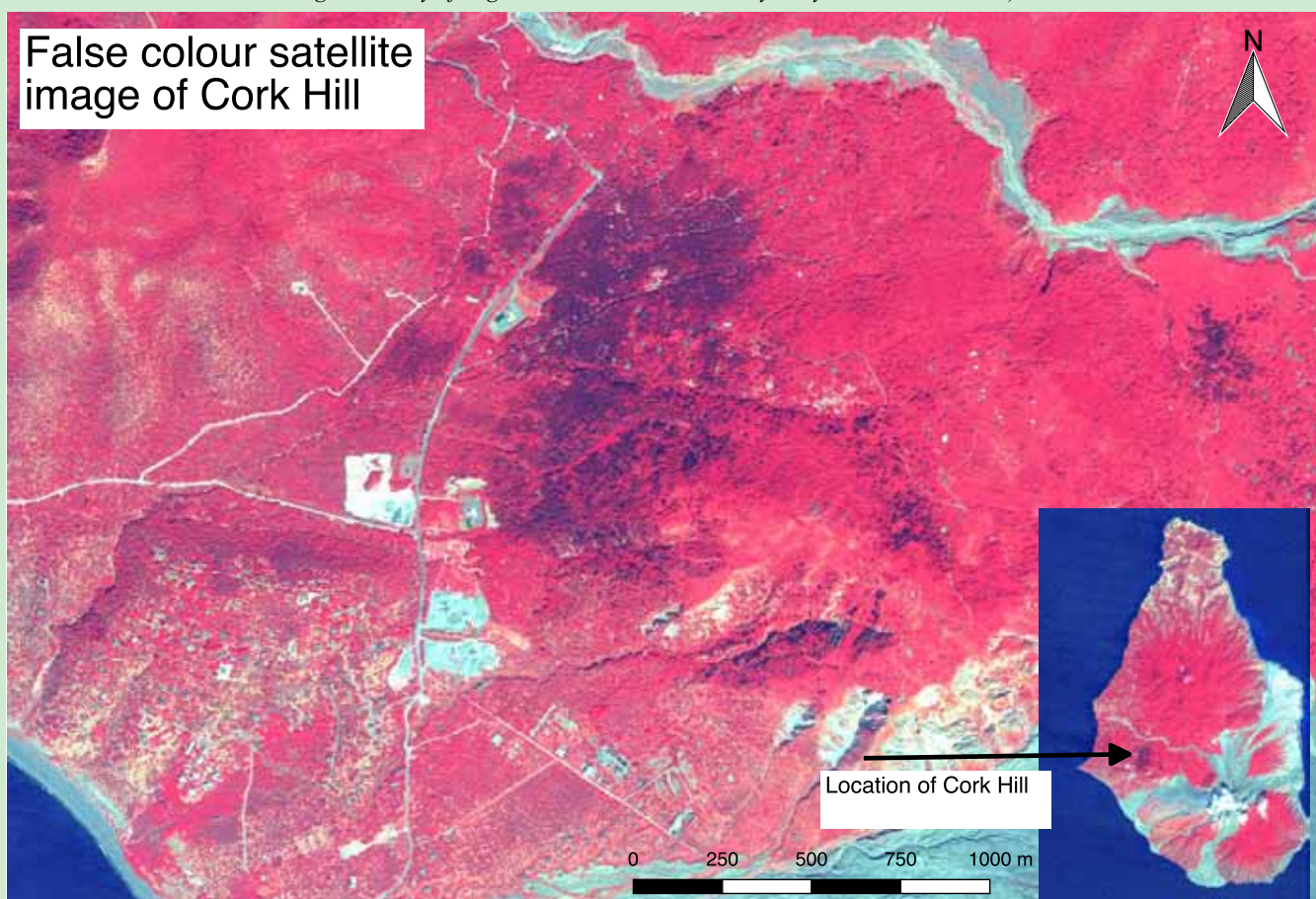
Participants in the third workshop on the future of the south were shown some images indicating where the spread of blackberry and *Casuarina* can be seen. The false colour image (next page, lower) shows very clearly the spread of blackberry on Cork Hill. With the imagery we can estimate the size of the area and the exact location.

It may be possible to conduct targeted removal of the invasive species, before they spread beyond what is feasible to control.



Above: see caption on previous page.

Below: False colour image shows the spread of blackberry (the very dark areas) on Cork Hill. James ‘Scriber’ Daley noted that there was a large area of blackberry on Cork Hill. We know that blackberry is good at storing carbon and has very dense leaves. Plants reflect near infrared and green light, while absorbing red. The leaves of blackberry are so dense they absorb more red light, therefore making them appear darker in this image compared to the vegetation which surrounds them. With the imagery, we can estimate the size of the area and the exact location. (All satellite images courtesy of DigitalGlobe Foundation. Analysis by Catherine Wensink)



This is something the *Adopt a Home for Wildlife* initiative may take forward, in due course.

Meanwhile, Mr Dwayne Hixon, an “Adopter” (see *SOS Nature Newsletter* 3, pages 3-4, and pages 6-9 in this issue) has been working with the Montserrat National Trust to control some of the *Casuarina* seen in the satellite images of Belham River mouth at Old Road Bay (see images at top and on previous

page). Good progress is being made, which we will report on again later in the year.

Other analyses of the images (pages 10-12) illustrate the damaging impacts of introduced feral goats on the globally threatened tropical dry forest ecosystem, and the great value of remaining patches of this in the north of the island and more extensive areas in the south.

A bit more on satellite images

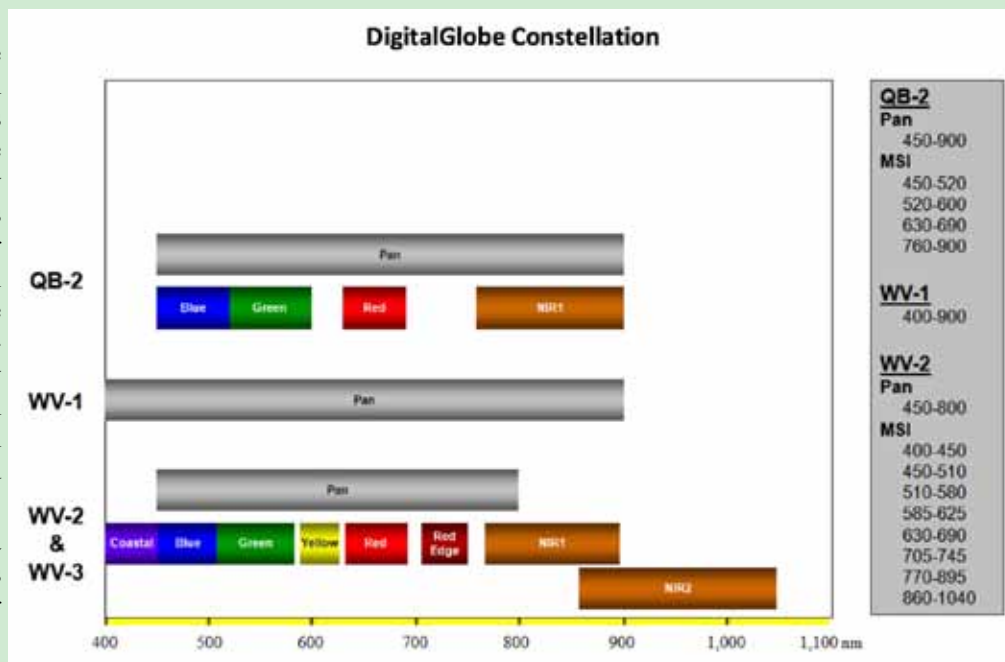
A little more explanation is given below on the abbreviations used in the earlier captions and text in this article.

QB = *QuickBird*. This is the name of DigitalGlobe's satellite launched in 2001. The satellite collected panchromatic (black and white or PAN) imagery at 61 centimeter resolution and multispectral imagery (MUL) at 2.44m

WV2 = *WorldView 2*, DigitalGlobe's satellite launched in 2009. The satellite collected panchromatic (black and white or PAN) imagery at 46 centimeter resolution and multispectral imagery (MUL) at 1.84m

As explained well by *Wikipedia*: "A multispectral image is one that captures image data within specific wavelength ranges across the electromagnetic spectrum. The wavelengths may be separated by filters or by the use of instruments that are sensitive to particular wavelengths, including light from frequencies beyond the visible light range, i.e. infra-red and ultra-violet. Spectral imaging can allow extraction of additional information the human eye fails to capture with its receptors only for red, green and blue."

Courtesy of DigitalGlobe, here is a diagram of the bands (wavelengths of light) used by some of their satellites.



Adopt a Home for Wildlife gains more partners

In *SOS Nature of Montserrat Issue 2*, we gave the background to the setting up, as part of the current project, of *Adopt a Home for Wildlife*. Through this, the Montserrat National Trust (MNT) aims: to conserve and enhance the beauty of Montserrat; preserve the fauna and flora of Montserrat; make the public aware of the value and beauty of the island's heritage; pursue a policy of conservation; and act in an advisory capacity.

MNT is looking for partners in the community to lend a hand in keeping the island beautiful, clean and full of unique wildlife and habitats.

MNT is grateful for the support of UK Overseas Territories Conservation Forum, the Darwin Plus fund and the other partners in the present project, in setting up this programme.

The *Adopt a Home for Wildlife* in Montserrat programme allows individuals, organisations, community groups and businesses to agree to maintain and protect a public space for a year at a time, with renewals annually. The programme runs all year round, and gives everyone the opportunity to make a difference in their local area.

New site: Ventana, Garibaldi Hill

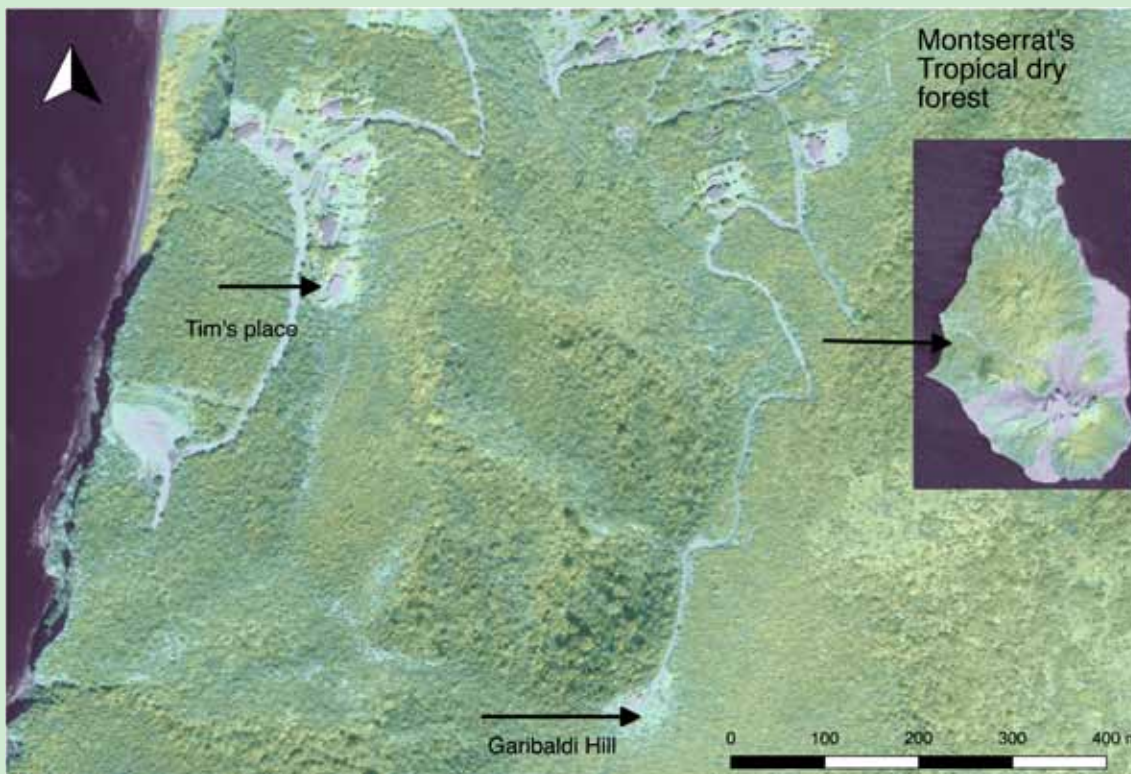
Tropical dry forest is one of the most threatened ecosystems in the world. In Montserrat, this occurs at lower levels of the hill than the rain- and cloud-forest, but many areas have been lost because this is the main area for townships. We were delighted when Mr Tim Orton told Mike and Ann Pienkowski of UKOTCF when they met him by chance that he would love to manage the area of dry



Above: Tim Orton (centre) discusses with Catherine Wensink (UKOTCF) and Nicolas Tirard (MNT) the view (below) of the tropical dry forest behind his house. (Photos: Dr Mike Pienkowski & Catherine Wensink). More images on next page.



forest around his house with guidance from Montserrat Natural Trust as part of the *Adopt a Home for Wildlife* programme.



The colours for this image use the viridis colour scale. Areas of no or little vegetation, such as the ash flows (in the inset) appear purplish. More productive vegetation ranges through blue, greens then yellow. So, the most productive wet forest is yellow (such as Centre Hills on the inset). Tropical dry forest looks green, such as the excellent patch which is this Adopt site, spreading south of Tim's house and east of the road. (Satellite image courtesy of DigitalGlobe Foundation.)



Above: (left) Tim Orton leads Frank Etzler (Montana State University) and Nicolas Tirard (MNT), up a path inside his forest; and (right) view from the track, with the forest on the right. (Photos: Dr Mike Pienkowski, UKOTCF)

Below: views in this tropical dry forest (clockwise from left): cactus vine climbs forest tree; Tim shows Nicolas and Catherine seedling Montserrat orchid growing on sisal Agave (close up below); pair of gray kingbirds. On next page: Jack Spaniard stinging wasps nest; endemic anole lizard (photos: Dr Mike Pienkowski).



Tim had been looking for some time for the right place to retire. He fell in love with his present home, *Ventana*, a few years ago - despite it being grey and covered in ash at the time! It is now very rich tropical dry forest. Like most area of Montserrat, it does suffer from the presence of several alien invasive plants. However, under the



guidance of the project, Tim will be removing the invasive plants which harm native vegetation, and replacing them with native species reared in Montserrat National Trust's new native plant nursery.

New sites: Underwater and shores at Carr's Bay and Little Bay

Montserrat Island Dive Centre, led by Jay Steed and Charley Bartlett, have added two new sites to the *Adopt a Home for Wildlife* initiative. These are Carr's Bay and Little Bay. For both sites, the work includes both underwater conservation and beach clean-up operations, all tackled on a voluntary basis. The underwater, SCUBA-based elements form part also of the network *Adopt a Dive Site*, part of *Dive Against Debris*, co-ordinated by Project Aware, the environmental sister company of the diving standard-setting PADI (Professional Association of Diving Instructors). Charley is a *PADI AWARE Dive Against Debris* Instructor and regularly trains other willing divers on the importance of removing marine litter, so that they may spread their impact even further from the shores of Montserrat.



Left: Charley Bartlett (left) and Jay Steed, of Montserrat Island Dive Centre. Photo: Dr Mike Pienkowski
Right: some of the volunteers in action, below

and above water. Photos: Montserrat Island Dive Centre

On a monthly basis, a team of divers takes to the waters to collect marine debris from the reef while a second team collects along the shoreline. The work undertaken includes delicate removal of fishing line and clothing entangled around and smothering corals, as well as the careful retrieval of beverage cans, bottles and other trash items that lay strewn across the reef. On average, the dive team remove 30 kg of debris from underwater while, at the same time, a further 30 kg are collected from the beach in an attempt to stop the rubbish even making it to the waterline. The majority of trash collected is of plastic origin; along the shoreline, polystyrene and plastic cutlery are the biggest burden, whereas



underwater plastic bags, cutlery and cups usually come out on top.

A varied response from the island has ensued; volunteers have stepped forward from government offices and school groups as well as local conservation organisations and concerned members of the community. Montserrat Island Dive Centre has been requested to present their findings and speak publicly at different events in the hope that trends can change and a greener future can endure.



The Carr's Bay site is adjacent to the Collins Ghaut and Carr's Bay

terrestrial site, which sees a great accumulation of debris washed down from the hillside residential development. Little Bay is the site most commonly referred to for tourism and port activity development. Future hopes are that general education and proper waste disposal become a stronger focus, to minimise the overall effect a small island community like Montserrat can have on the ocean.



New site: Belham River mouth at Old Road Bay

Mr Dwayne Hixon, already an "Adopter" for the Runaway Ghaut (see *SOS Nature Newsletter* 3, pages 3-4), has *Adopted* an additional *Home for Wildlife*. This is part of the area of new ground at Belham River Mouth over-run by introduced alien invasive *Casuarina* (see images and text on pages 3-6 and photo at top of next page by Catherine Wensink).

As part of his development on land leased from the Government, he is working with the Montserrat National Trust to remove most of the *Casuarina* trees – so that the extent of these on the satellite



image is already out of date - as can be seen in the photo below taken from the slopes of Garibaldi Hill (photos below: Dr Mike Pienkowski).



As can be seen from the ground-level photo below, some *Casuarina* trees have been left temporarily to provide shade pending the planting and growth of suitable shade-providing native species.



List of current and planned sites in *Adopt a Home for Wildlife* initiative

Runaway Ghaut - Dwayne Hixon, real estate agent and contractor

This is a historical site adjacent to the Centre Hills forest reserve. It is important because it carries away surface run-off, a natural process, which limits localised flooding and erosion. If it is filled with rubbish, then it will not be able to do this. At present, there are several plant species, not normally found here, which are growing out of control. They threaten our native plants and make it difficult to use pathways. Rats have been found in this area feeding on fruit-trees and rubbish, but there is also evidence of some of native wildlife using this area. In order to encourage more people to visit this site, some actions such as some natural landscaping are needed to create a cleaner, more beautiful, natural area for all to enjoy. The old MNT nature trail, disrupted by earlier road-works, can be reinstated as part of this.

Belham River Mouth, Old Road Bay - Dwayne Hixon, real estate agent and contractor

See above.

Ventana, Garibaldi Hills - Tim Orton

An extremely important area of globally rare and threatened tropical dry forest (see above).

Little Bay (underwater and beach) - Montserrat Island Dive Centre

Carr's Bay (underwater and beach) - Montserrat Island Dive Centre

See above on both of these marine sites.

Colin's Ghaut & Carr's Bay (land) - Julian Romeo, hardware store owner

In the north of the island, this area is one of the most built-up. It is important to protect this site from rubbish and litter, because these attract mosquitoes and other pests, and because these materials end up in the ocean where most cannot break down.

Nantes River ghaut - Julian Romeo, hardware store owner

This ghaut is one of the major water streams located just north of Salem. This site is important because again it helps to prevent erosion and flooding in times of heavy rain. Some dumping of rubbish has occurred which not only blocks this channel but also creates a dangerous environment for us and for our wildlife. We need to cherish every part of the island by improving areas that perhaps we have forgotten about by deposing of rubbish in the correct way. By conducting regular clean-ups, we can restore and protect our island's natural areas for everyone.

Marguerita Bay and Brimm's Ghaut -

Marguerita Bay is one of the last wetlands on island. The area includes some dry forest habitat. Seabirds can often be seen here including frigate birds, terns etc.

Soldier Ghaut - possible new site (see *SOS Nature of Montserrat* issue 2)

Why Adopt a Home for Wildlife?

As is clear above, the initiative is moving ahead steadily, both with new *Adopters* coming forward and with work on each of their sites. However, there are many other places on this special island which need *Adopting*.

Montserrat is a special island with much to celebrate. Montserratians are renowned for their welcome and hospitality – and are connected with their island's environment as all depend on it for so much, e.g. the water from the Centre Hills, and the natural remedies from plants. Some areas, which are so important to the way of life, are under threat because of the actions of a few: for example, dumping of rubbish, which stops the flow of the streams after heavy rains and attracts flies and mosquitoes. This programme gives all a chance to put these things right by caring for this treasured island and showing others that Montserratians appreciate what makes it so special.

In addition:

- Adopting an area promotes a cleaner, more liveable neighbourhood and gives YOU an active role.
- You can give your group/business/family positive attention for the valuable service you provide.
- You help Montserrat, your island, by volunteering to clean up and maintain its uniqueness.

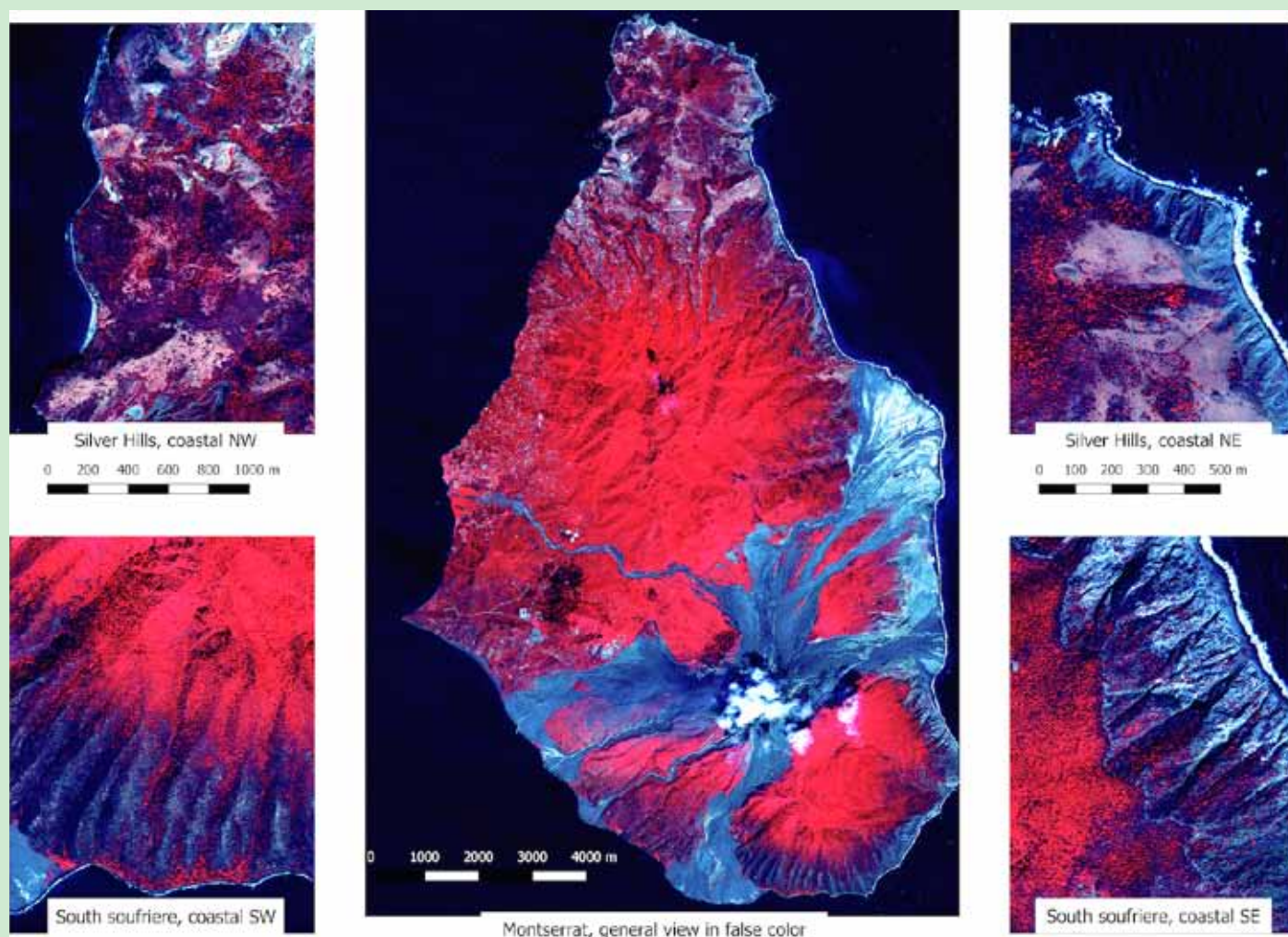
Contact Nicolas Tirard at Montserrat National Trust.

Third workshop for all stakeholders to explore options for the future of the south of Montserrat

The third workshop, in a series of four, that bring together stakeholders involved in different aspects of life on Montserrat to explore options for the future use of the south, was held at the Montserrat National Trust (MNT) on the 23rd June 2017. Project Officer, Nicolas Tirard (based at the MNT) was joined on-island by Dr Mike Pienkowski (UKOTCF Chairman), Mrs Catherine Wensink (UKOTCF Executive Director) and Dr Nicola Weber (UKOTCF Conservation Officer), who all jointly facilitated the workshop. The aim of this meeting was to build on ideas proposed in the previous two, by gathering existing knowledge and data on all aspects of the south of Montserrat and, where possible, geo-referencing these (to their relevant places on the island), using recently acquired, high-resolution, satellite imagery of the island from the DigitalGlobe Foundation. The collection of such information will help in the development of a shared vision for how the restricted access areas can be used in the future, and the development of a management plan/strategy

to move this forward. The team would like to thank UKOTCF's experienced volunteer, Duncan Hutt, for his help in satellite image analysis.

Catherine and Nicolas engaged the participants by outlining insights gained from the satellite maps, for example visualising areas of vegetation. It was clear that there were areas in the south, around Roche's in the south Soufrière Hills range that appeared to be as productive as the Centre Hills, as we would expect from James 'Sciber' Daley's reports in previous workshops. In addition to these rain- and cloud-forests, there are important areas of tropical dry forest, an extremely important, but relatively rare and declining, ecosystem throughout the world (*see images below*). The team explained that, while the satellite imagery can show the areas of high productivity, there is a need for 'ground-truthing' the natures of the forest in the south for more detailed analysis. These will help assess whether these are still largely intact native habitat or the extents that these species



The 4 insets allow one to visualise the impact of goats on the coastal dry forest. In places of the Silver Hills (top right and top left), one can see the presence of large patches light pink, that are absent from the South Soufrière Hills (low right and low left). On the ground, those patches correspond to savanna, with very limited biodiversity. It will be important to prevent over-grazing in the south following in the steps of the north. Healthy tropical dry forest (a rare and threatened ecosystem globally) appears as dark blue, and one can see that the largest patches of this colour lie around the South Soufrière Hill area. One can note that:

- Dry forest in the North is being threatened by goats.
- Dry forest on the west foothills of the Centre Hill is largely gone as a consequence of built development.
- Dry forest on the east foothills of the Centre Hills is threatened by further built development.

Protecting the South Soufrière Hill, mainly from feral animals, as human cannot access, might be the best way to preserve this ecosystem in Montserrat (as well as particular areas further north – see pages 6-9).

(Satellite image courtesy of DigitalGlobe Foundation; analysis by Nicolas Tirard, MNT.)



Above: Catherine Wensink, UKOTCF Executive Director (standing), reminds the workshop of the outcomes of its previous meetings, shortly after Dulcie James, Montserrat National Trust President (far right) opened the meeting. Below: James 'Scriber' Daley describes some of the special features of the south of Montserrat, relating these to the analyses satellite image. Photos: Dr Mike Pienkowski



are spreading (as reported in the workshop by Department of Environment representatives who have been in that area most recently).

In previous workshops there was agreement that special areas of the south should be preserved for Montserrat's special biodiversity, and discussion of invasive species promoted participants to consider the effects that unregulated feral animals were currently having in that area. James 'Scriber' Daley of the Department of Environment described damage to the native vegetation that he had observed from feral goats, and also the spread of invasive vegetation that can outcompete native species. Dr Mike Ivie, an entomologist from Montana State University, talked about the biological importance of this area in the south, commenting on its intactness and remarking that endemic invertebrates common in Roche's are now rare in the Centre Hills. He described how beetles are good indicators of biodiversity, and so the numbers found here are indicative of its health. Dr Ivie described this area as an ark of biodiversity for Montserrat, with the potential to repopulate other

areas of the island should anything else happen.

The workshop participants discussed in more detail activities that had previously been suggested for areas in the south that include environment protection, job creation and growth of tourism. Information and ideas were gathered to help assess their feasibility taking into account practicalities such as safety, local resources and capacity, demand and funding. Over the coming months, the team will be compiling all the information that they have collected through the workshops from those knowing the ground situation, meetings during visits to the island, and also consultations with overseas experts.

This will be put into a first draft of a Strategy for the South of Montserrat which will be the focus of discussions at the fourth and final workshop to be held in November 2017 at the Montserrat National Trust.

Minister Hogan Hogan ended the session by thanking everybody for their attendance and participation. He emphasised his support



The workshop in session



The workshop discussions draw to a close, before Minister of Agriculture, Trade, Lands, Housing and Environment, Hon. Claude Hogan (near right), addresses the gathering.

for the project and the need for a working plan for if/ when the south of the island becomes more useable and the need for more immediate interim measures. He hoped that the plan resulting

from these workshops will be good tool to guide the work itself and also for seeking funding and further collaboration to bring additional capacity, skills and training to the island.

SOS Nature of Montserrat team on Montserrat Radio ZJB

Now a regular feature during UKOTCF's visits to Montserrat, members of the project team again joined Rose Willock for about an hour of discussion on her Saturday morning show on ZJB Radio on Saturday 24 June 2017.

The team present included Dr Mike Ivie (Montana State University), Nicolas Tirard (Montserrat National Trust) and Dr Mike Pienkowski, Catherine Wensink and Dr Nicola Weber (UK Overseas Territories Conservation Forum).

Rose suggested that we share the satellite images on social media so that all could be the wonderful images. UKOTCF posted some of the analysed images, based on those made available courtesy of DigitalGlobe Foundation, as a first effort to engage with young people on island. Over 4000 people saw the post, which shows how powerful social media can be! Comments were "#home".



Photos: Dr Nicola Weber, Catherine Wensink & Dr Mike Pienkowski, UKOTCF

SOS Nature of Montserrat team

In this regular section of our newsletter, we introduce some of the team working on the project. In this issue, we introduce Dr Nicola Weber, UKOTCF's new Conservation Officer, taking over the role pioneered by those friends of Montserrat, Sarah Barnsley and Emma Cary. Both Sarah and Emma initially joined UKOTCF for 6 months, and ended up staying 3 years. As we write, Nicola is part of the current project visit to Montserrat. For Nicola, it is a move from one volcanic island to another; she was previously Head of Conservation in the mid-Atlantic Island of Ascension.

Also present, as part of the team led by a very long established friend of Montserrat, Dr Mike Ivie of Montserrat State University are entomologists Dr Justin Runyon and Mr Frank Etzer, with LaDonna (sometimes "Donna") Ivie helping all to thrive.

Dr Nicola Weber (Conservation Officer, UK Overseas Territories Conservation Forum)

Nicola holds a BSc in Marine and Environmental Biology from the University of St Andrews and an MSc in Biodiversity and Conservation from the University of Exeter. She completed her PhD in 2011 which examined social interactions of the European badger and their implications for the transmission of bovine tuberculosis. Immediately following this, she moved to Ascension Island with her husband to study the green sea turtle population there, with Ascension being the second largest green turtle nesting rookery in the South Atlantic. They stayed there for 5 years; taking over the running of the Ascension Island Conservation Department in 2013. During this time, they implemented a number of changes, including the creation and implementation of the first Biodiversity Action Plan for the Island, Protected Areas and Wildlife Protection legislation, and



Dr Nicola Weber on Boatswainbird Island, off Ascension.

a vibrant marine conservation and research programme. They left at the start of 2017 to raise their young family in the UK for a while, but are still actively involved in work on Ascension Island through Darwin Plus and BEST grants.

Nicola is very happy to have the role of Conservation Officer for the UKOTCF and to remain involved with the Southern Oceans UKOTs, and is also excited to expand her involvement with and knowledge of the other UKOTs, in particular those in the Caribbean where she has previously worked on sea turtle conservation programmes. You can view more about her research here: www.researchgate.net/profile/Nicola_Weber

Dr Justin Runyon (Associate Researcher at the Montana State University, USA)

Justin's research focuses on plant-insect chemical ecology. His current research includes: (1) exploring chemically-mediated ecological interactions between invasive plants and herbivores to improve biocontrol as a management tool; (2) examining how bark beetle attack alters tree chemistry and how this affects flammability to better predict and manage wildfires; (3) investigating the roles plant volatiles play in plant-pollinator interactions and how climate change alters these interactions at the community level; and (4) exploiting sagebrush chemistry to improve restoration. Justin also researches the taxonomy and biodiversity of long-legged flies (Diptera: Dolichopodidae) – see page 17.

In 2013, Justin was a recipient of President Obama's Early Career Awards for Scientists and Engineers, the highest honour bestowed by the United States Government on science and engineering professionals in the early stages of their independent research careers. He received his award at the White House. The project field-work in June 2017 is his first visit to Montserrat. Here are his first impressions, part-way through his visit, of the biodiversity, particularly long-legged flies, and the island itself.

"For me, I guess the highlight of the trip was catching that little fly on Woodlands Beach. It has only been collected once before – ever – from Dominica and that specimen was damaged. I got quite a few and this will allow me, or someone else [back at the laboratory], to actually describe it and give it a name so that is one of the most exciting finds.



Dr Justin Runyon and his specimen collecting box (see text and pictures of box on next page). Photos: Catherine Wensink (and Dr Justin Runyon for large photo at top of next page)



"I have been here only a week. It has surpassed my expectations in terms of diversity of things out there and also the abundance of species.

"I really like Montserrat. I like how laid back it is and how green it is, especially at the lower elevations. A lot of these islands at the lower levels were ruined for cane fields over centuries, but here the habitat at lower elevation is in better shape than a lot of the other islands."

Justin has a beautiful Japanese crafted collection box where he is keeping his specimens (*see pictures*) which he hopes to fill by the end of the trip with some of Montserrat's smallest treasures in order to build up a more complete biological collection. This collection of specimens, which the team has been authorised by permit to collect, will enable the team and others to continue identifying Montserrat's invertebrate fauna for many years to come. Often collections, which are carefully maintained, can last hundreds of years and can form the basis for scientific research and discovery for many generations.

with the 2017 Montserrat oriole and other forest bird survey (*see photo to left, courtesy of James 'Sciber' Daley*).

During the project team visit in June-July 2017, Stephon joined the entomologists in the field and laboratory for much of the time (*photo below, with Frank Etzler, Montana State University; Photo: Dr Justin Renyon*).



Stephon Hixon (Montserrat field-worker and guide)

Stephon Hixon is under training with James 'Sciber' Daley, and is rapidly picking up a wide range of valuable skills. Sciber is very excited to be working with Stephon as part of Honorable Gregory Willock's youth programme. He believes that Stephon will make an outstanding conservationist in future. Stephon recently helped



SOS Nature of Montserrat project partner organisations

In this regular section of our newsletter, we will profile, in turn, the organisations which are partners in the project.



Montana State University Entomology Collection Team (continued)

In *SOS Nature of Montserrat Newsletter 3*, we introduced Dr Michael A. Ivie and those of his team based in the Department of Entomology at Montana State University (MSU) who are dealing

with the database and the inputting of existing data. In this issue, we introduce the aspects of their work concerned with field collection and subsequent analysis. This includes a summary (pages 1-3) of the lectures by Mike and his colleague, Dr Justin Runyon (who is profiled on pages 13-14).

Here we describe some of their ways of working, with a series of photographs featuring Mike's post-graduate student, Frank Etzler, about trapping insects and how they will analyse them



when they get back to the laboratory (the temporary one in Montserrat accommodation, before returning to full facilities in Montana).

On this page is a series of photos (*by Dr Mike Pienkowski*) of Frank setting up a Malaise trap (in this case, in Tim Orton's tropical dry forest – see pages 6-8). The key here is to juggle tensions on this very uneven ground, to generate smooth planes of the vertical and near vertical netting that constitute the trap. The trap is based on the tendency of walking and flying insects to move upwards when they encounter surfaces. The trap concentrates them in the apex, where a bottle of preservative is positioned. This means that the trap can be left for several days between checkings – particularly useful in remote locations.

At the top of the next page, Frank demonstrates one of the more active catching techniques: hitting vegetation with a stick (or, in this case, the handle end of another active collecting item, a butterfly net), while holding a stretched cloth collecting tray below.



Areas under bark are also very important habitats for beetles and other insects. *Below left*, Frank levers bark off dead trees, to inspect the rich insect-hunting area under it, to catch *(below right)* a beetle *(bottom left)*.



Leaf litter is also important, with large quantities collected from target locations, preliminarily sorted while in

Montserrat, and then (in common with other trapped insects – *like those at top right from the light-traps*) taken in preservative to Montana, where many person-years of work will be spent on them, largely by volunteers and students.

Some of the other traps used include light traps for



night-active insects *(below right for the catching bag in position at the bottom of the trap; two of the traps at bottom right)*. These take advantage of the tendency of the insects to move towards light. *(Photos left & centre by Dr Mike Pienkowski and, in right column, by Catherine Wensink.)*



Did you know...?

Long-legged flies

In Dr Mike Ivie's lecture (see pages 1-3), he told us that flies are some of the most understudied organisms in the world. Very few specialists exist. Yet, they are a diverse group and have many important functions.

Dr Justin Runyon is particularly interested in Dolichopodidae (long-legged flies). Flies in this group are small, usually metallic green with long, slender legs. They are the 3rd largest family of flies, with over 8,000 species worldwide. They are very common in and around streams/water and on vegetation. Males often have ornaments to attract females. Adult flies are predators. They feed on smaller invertebrates. Some species prey on larvae of mosquitoes, a common and disease-carrying pest.

The Centre Hills survey focused on beetles, but many long-legged flies were caught in nets and were taken back to the laboratory at Montana State University. No dolichopodid species were known from Montserrat prior to the survey, simply because no-one had studied them. 62 species (26 genera) of Dolichopodidae were found. 15 new species were new to science. This was more species than predicted based on the size of Montserrat. So far, specimens have been studied only from the non-exclusion zone – so the true figure is likely to be much higher.

Some examples of new species found only on Montserrat are pictured on this page.



Above: under the microscope - (left) Chrysotus: 14 species found, including 3 new to science; (right) two new species of Systemus were found on Montserrat, this genus being a new record for the West Indies (note the 1-mm bar, for scale). All photos on this page: Dr Justin Runyon

Below: Chimerothalassius: (left) actual size on pin, alongside Eastern Caribbean 10-cent coin; (right) its coastal habitat.



Above and right: Thrypticus: 5 species found, including 2 new to science

Did you know...?

Bottle bee *Melipona variegatipes* (or *lautipes*), producer of Amerindian honey



Above: *Melipona* bees at the entrance to a natural hive. Below: closer view of *Melipona* bees collected. Photos: Dr Justin Runyon (above) and Catherine Wensink (below).



Montserrat is home to a very special bee. The species, endemic to Montserrat, Guadeloupe and Dominica, was used by the Amerindians to harvest honey and wax before the introduction of the European honey-bee. The quality of their honey was recognized as early as 1654 as “better than the European one”, and another interesting fact is that this local species cannot sting. Similar species have been domesticated in South and Central America, and some people in Montserrat were still harvesting “wild honey” until recently.

It seems that the species present in Montserrat differs from the one found on other islands, and it has been given a specific name: *Melipona lautipes*. It is therefore possible that the local wild bees are indeed very special! A colony recently visited the garden of the Montserrat National Trust, looking for a place to build a new nest and such visitors are surely welcome!

Broom palm *Coccothrinax barbadensis*, local ornament



Broom Palm. Photo: M. Olivier

This species was first found by Philemon ‘Mapie’ Murraine, above the old airport in 2011. It is one of the only 3 species of palm that are native to Montserrat, and it is still present in the wild. It was widely used to make brooms in the past, and the species was probably over-harvested – but it definitely deserves to be protected, as it is a truly beautiful part of our landscape!

This is a small, but apparently healthy, population with a lot of seedlings and ripening fruits when visited in July 2017 (probably needing about another two weeks to ripen).



Mapie told us “the guys in the village [Trants and Farm] would climb this mountain to harvest them to make brooms.” This is probably the reason why they are now found only at the top of this little hill of uneasy access, but they are spreading back downhill, as we have seen a lot of seedlings as we went down.

Drawing from the Biodiversity Heritage Library