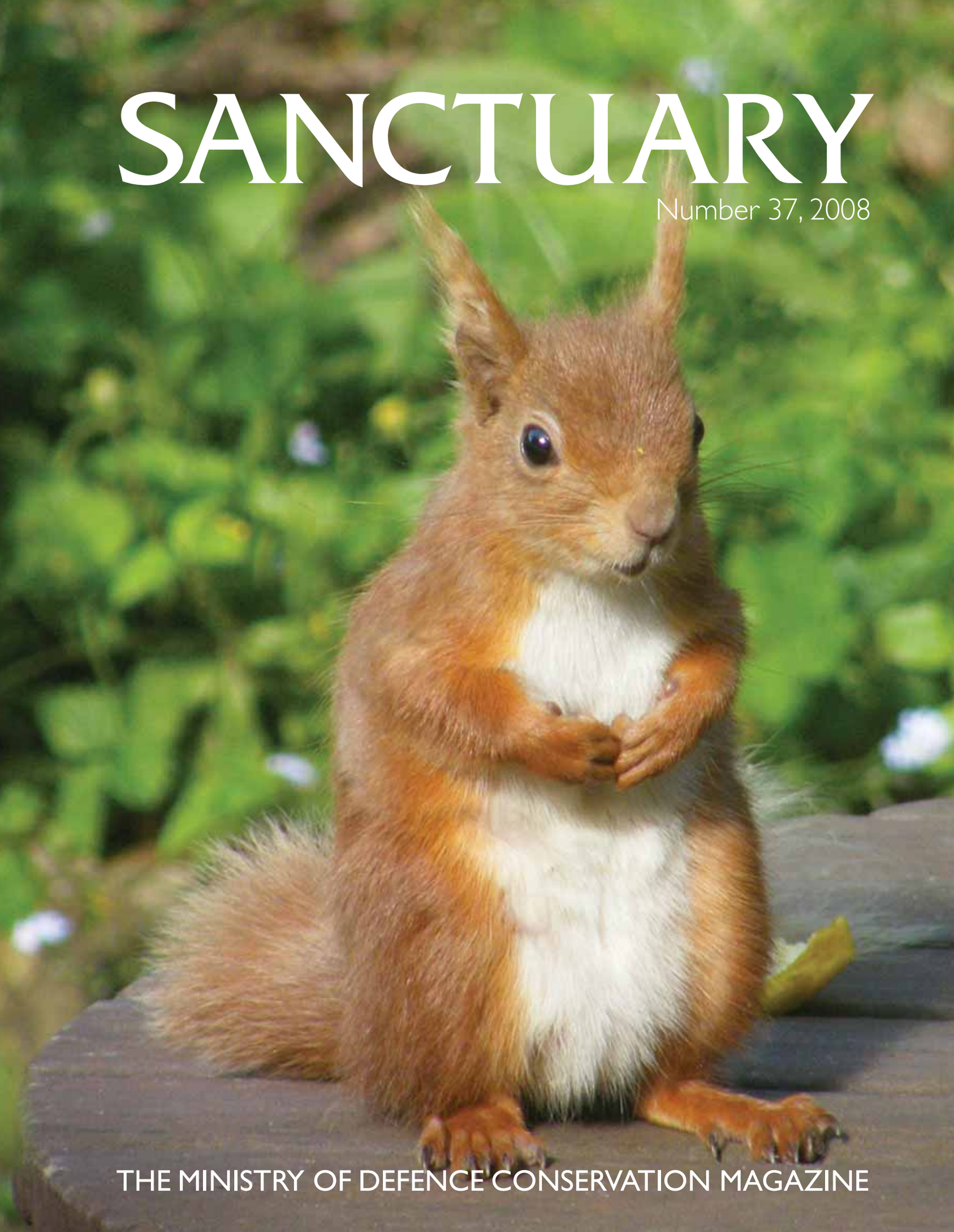

SANCTUARY

Number 37, 2008

THE MINISTRY OF DEFENCE CONSERVATION MAGAZINE

The Ministry of Defence Conservation Magazine

Number 37 - 2008

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Sanctuary is an annual publication about conservation of the natural and historic environment on the defence estate. It illustrates how the Ministry of Defence (MOD) is undertaking its responsibility for stewardship of the estate in the UK and overseas through its policies and their subsequent implementation. It is designed for a wide audience, from the general public to the people who work for us or volunteer as members of the MOD Conservation Groups.

It is produced for the MOD by Defence Estates.

Cover image credit: Red squirrel at Newtown Ranges. Photography: Barry Angell.

AS90 in hide. Photography: Keith Anderson.

Submissions:

Guidelines for contributors can be obtained by e-mailing the editor at: esp.secrm@de.mod.uk

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Foreword

Vice Admiral Tim Laurence *CB MVO ADC*
Chief Executive Defence Estates

The 2008 edition of SANCTUARY, which I am delighted to introduce, demonstrates the ongoing diversity of conservation issues being tackled across the defence estate both in the UK and overseas. With great pressure on us to support the current, very high, level of operational activity, it is not easy to devote time and money to the natural and historic environment, so the remarkable stories of progress told in these pages reflect great credit on all those involved.

The potential effects of climate change on the estate are mentioned more than once. It is vital to collect accurate information in this respect and we have asked for your help here. The facts must then be analysed objectively, to avoid jumping to the wrong conclusions. As with all aspects of estate management, we must prioritise carefully and target our limited resources at areas of greatest need or where we can have the most effect.

Despite our military training requirements, our commitment to ensuring the sustainability of our natural and historic environment is highly regarded and we should be proud of our efforts in preserving our heritage. I am especially pleased to see in this edition three diverse articles about our military heritage, and also to see the work of our overseas volunteers reflected in two articles about Cyprus. I hope the latter will encourage more contributions next year from overseas correspondents.

Finally, I take this opportunity to offer my warmest congratulations to this year's Sanctuary Award winners, whose projects are described on pages 3-5 and to send my thanks to all those who devote so much time and imagination to protecting and enhancing the wonderful national asset that is the defence estate.

Vice Admiral Tim Laurence CB MVO ADC

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For details on public access to the Defence Estate go to
www.access.mod.uk

The Sanctuary Awards

The aim of the Sanctuary Awards is to recognise and encourage group and individual efforts that benefit wildlife, archaeology, environmental improvement (for example waste or energy projects) or community awareness of conservation on or within land and property that the MOD owns or uses in the UK or overseas.

In 2008 the awards were divided into four categories: Individual Achievement; Heritage; Environmental and Sustainability. The winners of each category receive a shield and certificate. An overall winner, selected from the category winners, receives the Silver Otter for one year.

The Sanctuary Award Board

The Sanctuary Award Board for 2008 were: for Defence Estates: Martin Coulson, Land and Property Policy, Property Directorate; Ian Barnes, Head of the Environmental Support Team; Ted Cundall, Parliamentary Business and Stakeholder Management, Property Directorate and Pippa Morrison, Biodiversity Adviser, Property Directorate. Again we would like to pass on our thanks to Marcus Yeo, Director of Resources and External Affairs, Joint Nature Conservation Committee, for acting as external judge.

Silver Otter Winner

Leconfield Carrs Conservation Group are winners of the Environmental Project Award and the Silver Otter. The Group has developed three nature trails at the Defence School of Transport (DST) in Leconfield. The trails, known as the Leaf Trails, range from 1.4 km to 4.5 km and have been designed to show some of the best features on the site. The aim is for staff, dependants and where possible hosted groups from outside DST to learn more about the wildlife on the site.
A particularly innovative aspect to their work has been the creation of virtual walks, timed with a moving dot on a map and accompanied by descriptions of principal features of the walk. These have been transferred onto a website enabling staff to familiarise themselves with the walks and learn more about this large and complex site. Work to prepare the trails has included development of the bird hide overlooking the largest lake to allow scopes to be used, and the clearance of several ponds. An information board has been provided at the start of the Training Area giving the routes for the trails, photographs of species likely to be found and the necessary safety information. The trails are marked out with colour coded arrows on posts. The Board was impressed by the energy and innovation that has gone into the creation of these trails.

Official opening of the Leaf Trails by Dr Robert Stoneman Chief Executive of the Yorkshire Wildlife Trust. Photography: Defence School of Transport.

Dr Robert Stoneman and Colonel Brook at the official opening. Photography: Defence School of Transport.

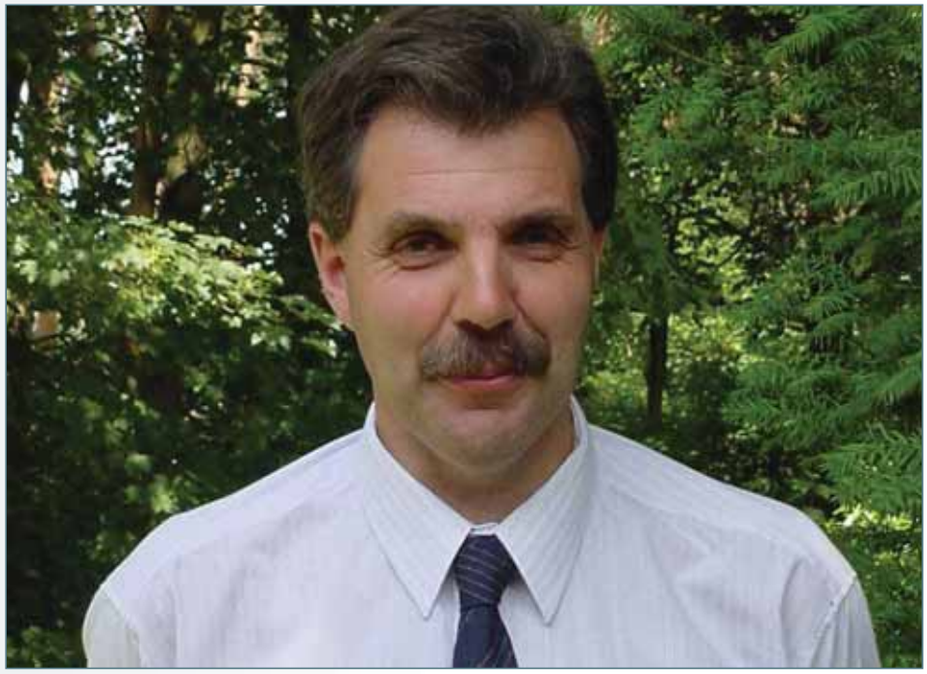
Red route information board. Photography: Defence School of Transport.

The Sanctuary Awards

Individual Achievement Award

This award is presented to an individual who, in the consideration of the judges, has made a significant personal contribution to the stewardship of the estate.

Jonathan Gasson from DE Land Management Services has shown great imagination and passion in his work to meet the government targets set for the Sites of Special Scientific Interest (SSSI) on the Defence Training Estate in the Home Counties. He has worked closely with stakeholder groups including the Surrey and Hampshire Wildlife Trusts to create a grazing animal partnership through which the favourable condition status of the SSSIs can be achieved and maintained. This work brought significant bureaucratic, scientific and practical challenges but Jonathan overcame these with quiet determination and formed a workable scheme that will benefit all parties.



Jonathan Gasson. Photography: Defence Estates.

Environmental Project

Highly Commended

The first certificate was awarded to Regional Prime Contract (RPC) East and Babcock DynCorp for the improvement works carried out on RAF Barnham Training Area Site of Special Scientific Interest (SSSI). The Board was pleased to see that RPC East and Babcock DynCorp had worked closely with the Defence Training Estate, Natural England and the site Conservation Group to carry out the delicate task of tree and scrub removal that will help deliver SSSI improvements and safeguard the features necessary for successful military training.

RAF Barnham Training Area SSSI before the improvement works. Photography: Babcock DynCorp.

RAF Barnham Training Area SSSI after the improvement works. Photography: Babcock DynCorp.

Environmental Project

Highly Commended

The second certificate goes to DTE Pembrokeshire and 14 Signal Regiment for the clean up of Frainslake Beach and Bullslaughter Bay at Castlemartin Range. In 2004, 2007 and 2008, Lynne Ferrand, the coastal ranger for the MOD estate in Pembrokeshire, organised troops from 14 Signal Regiment to assist in cleaning up the many tons of rubbish that are washed up on to these beaches. In 2007, 24 soldiers working over the two beaches filled a total of 9 skips with rubbish. The task at Bullslaughter Bay is made harder as the beach is located at the bottom of the cliffs, meaning that rubbish has to be hauled by hand back up to the top. The latest clean up in May 2008 saw 7 skips filled. This work has improved the amenity value of the beaches as well as bringing environmental benefits.

Clean up of Frainslake Beach. Photography: Crown Copyright.

Clean up of Bullslaughter Bay. Photography: Crown Copyright.

Sustainability Project

Winner

The MOD's Police and Guarding Agency Training College "Green Team" have made outstanding efforts to deliver sustainability improvements in line with MOD's Sustainable Development Action Plan. An Environmental Policy for the site was drawn up and work began on reducing the amount of waste material sent to landfill each year. With support from Aramark, the site multi-activity contractor, waste materials including used paper, plastic bottles and cups are collected, sorted and sent for recycling. Energy saving has been encouraged through the promotion of simple measures such as switching off computers, monitors and lights. Funding was also applied for to fit thermostatic radiator valves throughout the Headquarters buildings. The Board felt that the "Green Team" has done a magnificent job and have created a model that similar groups should aspire to.

Runner up

Project Redstart began at Warminster Garrison where Aspire Defence Services Limited supply timber waste from construction and demolition projects as a raw material for making nest boxes. Mr Geordie Ward and a team of volunteers make the boxes in their spare time, working to British Trust for Ornithology standards. The boxes are then sold on to staff in the Salisbury Plain area with guidance on where they should be placed. Around £3000 has been raised so far through the sale of the boxes, with the proceeds being passed to local Conservation Groups. Following the success of this initiative the team intend to branch out into making hedgehog and bat boxes.

Heritage Award

The Bulford Chalk Kiwi Project is a worthy winner of the Sanctuary Heritage Award. The project undertook to repair, clean and protect the image of a Kiwi created in 1918 by New Zealand soldiers based at Sling Camp. (See Set in Stone - Monumentalising the Military on page 32 for more details on how chalk monuments are created and the work carried out on the Kiwi).

MDPGA Green Team. Photography:Crown Copyright.

Geordie Ward with robin boxes. Photography: Project Allenby/Connaught.

Other Award Winners Were:

Environmental Project Runner-Up

The Sea Mounting Centre Conservation Working Group at Marchwood carried out a renovation project to enhance a small lake on the site. For details of this project see page 72.

Sustainability Project Highly Commended

The St Athan Environmental Programme covers a wide range of sustainability work being undertaken by the Defence Estate's Site Management Team. The Board was very impressed by the breadth of work being undertaken at St Athan. For more details of this project see page 46.

RAF Fylingdales - Improving Public Access

View of RAF Fylingdales over the North York Moors. Photography: Sarah Jupp.

in the North York Moors National Park

During 2007 RAF Fylingdales, through close discussion with the North York Moors National Park Authority, created a new permissive bridleway to improve access between existing public rights of way. The bridleway, which is around 1.5 km long, crosses the moorland to link the Lyke Wake bridleway to bridleways leading through Langdale Forest. It also crosses the area which once housed the classic 'golf balls'. This improved access provision is close to popular tourist sites such as Whitby and Goathland.

In addition to being a National Park, the North York Moors are designated as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) and Special Protection Area (SPA) for its nationally and internationally important moorland habitats and fauna. The moorland around RAF Fylingdales is a mosaic of dry heather moor, wet heath, deep peat mires and scattered broadleaved scrub along streams. There are also internationally important populations of upland breeding birds including merlin and golden plover. Considerable effort was made by staff from RAF Fylingdales, the National Park Authority, Natural England and Defence Estates to ensure that the route chosen for the bridleway was practical, attractive to users but minimised impacts such as erosion or disturbance to birds.

Peat mires, wet heath and the soft banks along Eller Beck are vulnerable to erosion from feet, hooves and mountain bike tyres, which can cause a direct loss of vegetation or damage to the bank side burrows of water vole. Ground nesting birds such as lapwing, skylark, curlew, red grouse and merlin are known to be using the immediate locality and are particularly sensitive to disturbance from free roaming or 'noisy' dogs. The rights of way agreement signed between MOD and the National Park Authority covers the provision of a permissive bridleway for 5 years with a condition that dogs are kept on a short lead, (meaning that walkers, horse riders and mountain bikers who are under close control from their dogs are welcome!). These terms are considered a reasonable compromise to extend and improve public access across a lovely moorland landscape, whilst safeguarding the statutory designation features of the natural environment and to ensure stock welfare for the tenant sheep farmer.

Providing a relatively easy route for horses and people to traverse over this challenging moorland was not an easy task. Once a route had been agreed the RAF carried out an initial hazard assessment to assess its safety, as the area has been used for military activities since World War Two. Additionally, a fair section of the identified route was knee to thigh high in dense heather, which sounds romantically inspiring for a good moorland tramp, but I assure you, one is likely to trip up over thick and hidden heather stems to fall inelegantly in a heap! MOD's commercial partner, Carillion Enterprise Ltd undertook considerable work to create and then maintain a 3m wide open path. This work included cutting vegetation by tractor and flail and removing arisings. The steep banks of small ditches were softened to give a shallower gradient or small timber sleeper bridges were installed. Two new timber bridle bridges have been installed across the larger ditches and particularly wet ground, along with six new bridle gates. Minor adjustments have also been made to the stock fences to give a better route alignment.

RAF Fylingdales Conservation Group members who have a wealth of experience and knowledge about the bird ecology on the moors, are undertaking monitoring surveys during the critical bird breeding months to provide data regarding any interactions between users of the path and birds and possible impacts. This will help the National Park Authority and RAF Fylingdales to assess both the benefits of the new bridleway and impacts on other land use interests.

Sarah Jupp MRICS CEnv
Environmental Support Team
Defence Estates.

Female Merlin. Photography: Geoff Kaczanow.

Golden Plover. Photography: Geoff Kaczanow.

Ratty Returns to Warcop

On one of the rare sunny days last July, a team of excited people gathered around a Land Rover on Warcop Training Range. Inside was a very precious cargo of 184 water voles, who were most likely completely unaware of how important this day would be both for them, and the future of their species.

It is quite ironic that in Cumbria, one of the most watery counties in England, an animal such as the water vole should be in such dire straits. The water vole has become Britain's fastest declining mammal following pressure from intensified agricultural methods, causing loss of habitat, and the arrival of the American mink which is now widespread throughout our countryside.

Reintroducing a species is really a last ditch attempt to save it once it is clear that the animal is unlikely to be able to regain its former range through habitat work and protection alone. These projects are complex and the intended release sites are chosen with great care in order to give the animals their best shot at survival. The Warcop reintroduction took two years of planning, habitat work and breeding water voles in captivity.

MOD staff set to work creating new lengths of waterway to provide more living space for the voles. Water voles ideally like slow flowing waterways with lush bank side vegetation to eat and earthy banks in which to dig their burrows. Though not very well adapted to a watery environment, lacking either waterproof fur or webbed feet to aid swimming, in Britain the water vole is very much associated with this type of environment and uses water as an escape route when danger threatens. In days gone by, when water voles were extremely common, the "plop" of a disappearing vole was a familiar sound when strolling along the water's edge.

Each of the voles was microchipped so that they could be recognised again after release. Using pioneering technology, the Cumbria Water Vole Project Team have been able to detect the voles in the wild using remote sensors which read the microchips as the animals go about their daily business, without disturbing them or having to use bulky radio collars. This then tells us how far the voles have moved around the site and who is sharing riverbank with whom!

In spring 2008, the sensors assisted the project staff in confirming that a good number of the water voles had survived their first winter in the wild. This was very encouraging news and set the scene very nicely for the next stage, which was to release more voles onto a site nearby.

On the 16th May 2008, 111 water voles were introduced to two more sites at Warcop which were connected to the original sites by a series of streams and ditches. The hope is that the voles will freely move between the sites and do not become isolated in little pockets of habitat.

A further release is planned for later this summer at another two locations. Meanwhile, those voles already running free appear to be doing very well and are regularly seen nibbling happily on the banks of streams. Let's hope that these little pioneers go forth and colonise and ensure the future of their species in Cumbria.

Jenny Holden
Water Vole Project Officer
Cumbria Wildlife Trust & Eden Rivers Trust

Water vole release. Photography: Ann and Steve Toon.

Jenny Holden, Water vole project officer. Photography: Ann and Steve Toon.

Rare Woodland Bats on the Isle of Wight

Barbastelle. Photography: Ian Davidson-Watts.

In the last edition, we reported on a project that was looking for rare bats on the Isle of Wight (IOW). The focus of the report was on Newtown Ranges, MOD's main site on the island, where the rare Bechstein's bat was found to breeding along with a range of other bat species. The wider project aimed to survey all of the IOW's significant woodlands for rare woodland bat species.

In total the project surveyed 43 woodlands of various types and sizes, from conifer plantations to ancient semi-natural woodlands. All areas of the IOW were sampled covering a wide variety of landscapes, including coastal landslip and chalk ridges. In total 250 bats of 12 different species were caught, with the Bechstein's bat being caught most frequently. This was probably due to the effectiveness of the ultrasonic lure method employed for this species, and that it is much more widely distributed on the island than previously thought. Male Bechstein's appear to be able to use a range of woodland types, including very recently planted or regenerated woodlands. Radio-tracking showed that they used a variety of trees to roost in (usually on their own) including sycamore, horse chestnut, oak and ash. Breeding female Bechstein's bats, however, were restricted to ancient woodlands.

Nine colonies of breeding Bechstein's bats were discovered. Interestingly 85% of maternity roosts were found in woodpecker holes in ash trees. In addition to this a total of four colonies of the rare barbastelle bat have also been discovered and the grey long-eared bat, Britain's rarest resident mammal, was caught on a couple of occasions too.

The results of this work have exceeded expectations. The number of known breeding colonies of Bechstein's bats in the UK has almost doubled as a result of this project. This highlights the probable under-recording of this species elsewhere in southern England, probably due to its elusive nature and the requirement for specialist kit and experienced surveyors. It is highly likely that the IOW is the UK stronghold for Bechstein's bats, due to the island's milder climate, availability of connected woodlands and possibly the absence of the aggressive tree hole predator and competitor - the grey squirrel.

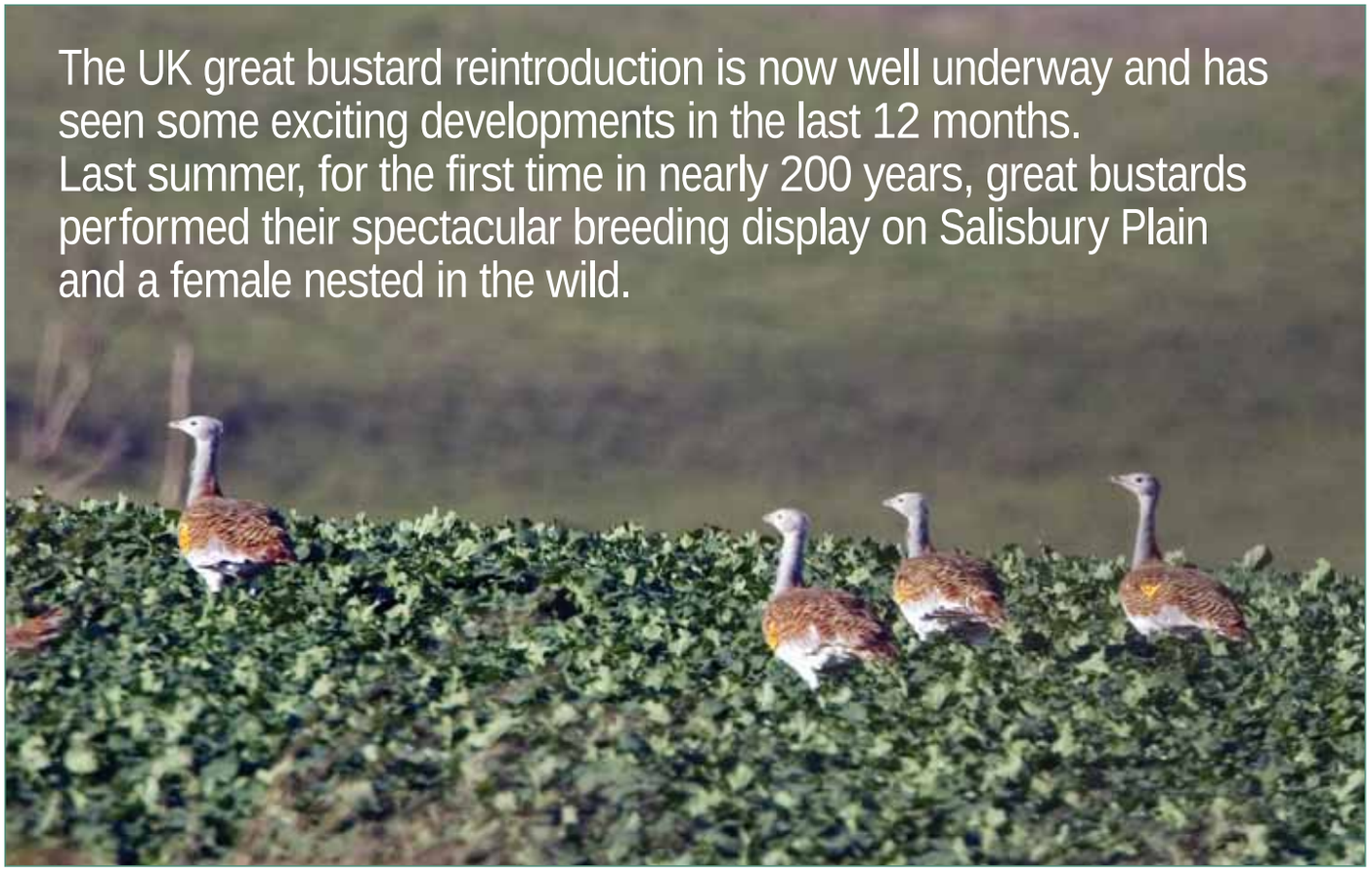
In collaboration with Bristol University the data collected will now be used to develop a predictive model for Bechstein's bats to identify what woodland types could support breeding populations. This model will be used by organisations such as the Isle of Wight Council, Environment Agency, Forestry Commission and landowners to ensure these elusive species can be taken into account.

Bat emergence count. Photography: Ian Davidson-Watts.

Ian Davidson-Watts
Research Team Leader

Great Bustard Reintroduction

The UK great bustard reintroduction is now well underway and has seen some exciting developments in the last 12 months. Last summer, for the first time in nearly 200 years, great bustards performed their spectacular breeding display on Salisbury Plain and a female nested in the wild.



Flock of great bustards on Salisbury Plain. Photography: David Kjaer.

The reintroduction is being carried out by the Great Bustard Group (GBG), an independent charity, which aims to establish a self-sustaining population across the southwest of England. The project is based on the Salisbury Plain Training Area (SPTA), where annual releases have taken place since 2004. A total of ten releases are scheduled with up to 40 birds being released each autumn. So far, a total of 69 birds have been released and, despite the naturally high level of mortality they suffer in the wild, there are great bustards alive from all four releases. Summer 2007 saw the formation of the first flocks of different aged birds marking the start of an age structure forming in the new population. Males are thought to be four or five years old before they start to breed so to have had the first nesting attempt so early in the reintroduction programme was tremendously encouraging.

Despite their size, great bustards are capable of flying considerable distances and, when on the ground, are actually incredibly shy and difficult birds to see. Their movements and character have made monitoring the birds a real challenge for the GBG. They are all released with identification wingtags and the majority also have remote tracking devices. Great bustard expert Professor Juan Carlos Alonso from Madrid's Natural History Museum is working closely with the GBG, helping to fit the birds with GPS enabled tracking units. Although very costly, these units allow the birds' movements to be tracked without GBG staff leaving the office! By logging onto the internet to retrieve the GPS data, the locations of birds can be plotted over aerial photographs and maps. This drastically reduces field costs and the access issues which arise when trying to track birds across private land and the SPTA ranges. Not all the birds have GPS trackers so if you are lucky enough to catch a glimpse of a great bustard please do report your sighting to the GBG.

This information helps GBG study the movements and habits of individual birds and monitor the progress of the project.

Although most of the great bustards released on SPTA disperse across southwest England each winter, the survivors have all come back in subsequent springs. Dispersal tends to be up to 60 km, normally in a south/west direction within Wiltshire, to Dorset and Somerset. There have of course been several exceptions with some birds flying further and in slightly different directions. Their movements have even made national news, such as the female which stopped off at Berkeley and Oldbury Power Stations on the Severn Estuary, in January 2008, on its way to the Wildfowl and Wetlands Trust's headquarters at Slimbridge. In March it returned to the release site for the first time since its release in 2004.

Great bustard flying. Photography: Martin Cade.

Each year several birds stay local to the site after their release and along with the influx of birds returning each spring, the pen has become an important place for great bustards to feed and roost year round. But it is not just bustards that are using the pen, as five farmland species on the UK Red List of Conservation Concern have bred inside it, including the nationally rare stone-curlew, grey partridge and corn bunting. Because of the importance of the pen to all these birds, a decision was made in spring 2008 to double its size. Work had to be completed quickly, before the nesting season began, leaving little time for fund raising and completing the task. Thankfully, a local business, Solstice Park, came to the rescue and helped purchase the necessary equipment and a local Battery of XIX Regiment of the Royal Artillery, recently returned from Afghanistan, was only too willing to help with constructing the new pen extension.

Great bustards for the UK reintroduction come from the world's second largest population, found in the Russian Federation. The chicks are hatched in Russia, from eggs collected from nests threatened with destruction as a result of routine agricultural operations. Egg collection takes place in accordance to a protocol drawn up with independent observers, including representatives of BirdLife International and the Russian Bird Conservation Union.

The GBG is working closely with organisations in Russia, to help conserve the donor population and has formed practical links with other international organisations working to tackle conservation issues throughout the great bustard's range. In November 2007, the GBG hosted the first ever conference on great bustard rearing and release methods, which was attended by delegates from conservation projects across Europe and Russia.

Despite its long history as a feature of the British countryside and its strong association with Wessex, the great bustard is currently considered a non-native species by the UK Government. This legal quirk means that the GBG cannot receive funding support through conventional conservation grants. It does not receive financial assistance from any government departments or organisations such as the RSPB. Consequently, the GBG is always seeking organisations and individuals keen to support its work and bring back this magnificent bird.

For information on membership, volunteering with the GBG, background about the reintroduction and latest news, click on **www.greatbustard.com.**

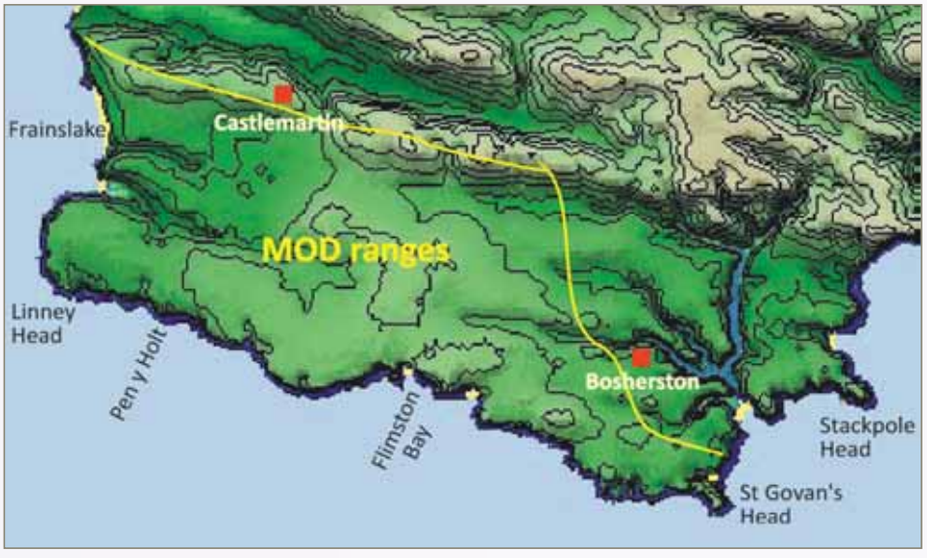
To arrange a visit to see the great bustards at the reintroduction site telephone **07817 971 327.**

Al Dawes
Project Officer
Great Bustard Group
www.greatbustard.com

Castlemartin Ranges - Rocks and Landforms

View NW across the limestone plateau (St Govan's Chapel bottom right). Photography: Sid Howells.

The MOD ranges at Castlemartin occupy one of the most distinctive landscapes in the Pembrokeshire Coast National Park. The range control tower at Warren and western radar station at Great Furzenip headland are situated on a 12km long ridge of Old Red Sandstone overlooking a broad plateau of carboniferous limestone covering around 32km^2.



Topographic map showing the dissected limestone plateau and Old Red Sandstone ridge at its northern limit.

The military base is situated at the foot of the southern slope of the ridge near its central point. Only the eastern extremity of the limestone plateau lies outside the range.

The coastline of the range extends from Freshwater West to Broad Haven. Most of it has been identified by the Geological Conservation Review as being of UK or international importance to geological science, as well as part of our heritage to be enjoyed by anyone with an appreciation of geology and scenery. The coast path between Broad Haven and Stack Rocks is open whenever military training activities are not in progress. Due to the presence of unexploded shells and other ordnance, the section between Stack Rocks and Freshwater West is only accessible to visitors during supervised walks.

On the western coast of the range, vegetated sand dunes extend inland for up to 1.5km and rise on to the plateau surface. At the northern end of Frainslake beach, these dunes have been eroded revealing how wind-blown sand can become naturally cemented by calcium carbonate derived from rainwater leaching of sea shell fragments incorporated within the wind-blown sand. These 'sand rocks' are resting on a relict wave-cut platform with beach sediments which are around 125,000 years old. Archaeological excavations have revealed partial burial of developing Iron Age settlements, less than 3,000 years ago, and it is likely that significant changes to the dunes occurred in response to unusual climatic phases throughout the period from 125,000 years ago right up to the present time.

The limestone plateau surface is a modified remnant of a marine erosion surface which is similar to, but much more extensive than, the wave-cut rock platforms seen around the present coastline. This surface was formed around 70 million years ago, during the latter part of the Cretaceous period. It was subsequently raised to 60m above sea level by a combination of tectonic forces and climate-related fall in sea level.

A new coastline began to form, with the sea exploiting any weakness along this extremely exposed coastline. Waves around 5-10m high, and occasionally greater, are encountered in this area, resulting from the full force of Atlantic weather systems. The complexity of the coastal landforms has been increased by retreat of the coastline into an area of relict karst scenery, a landscape shaped by the dissolution of limestone which displays distinctive surface features, such as circular depressions or dolines and underground drainage through caves. The result is one of the finest areas of coastal limestone scenery in the world, including landforms such as the iconic Green Bridge of Wales, Stack Rocks, the 'Devil's Cauldron', Bosherston Mere and many steep-sided, narrow inlets or geos such as Stennis Ford and Huntsman's Leap.

The 'Green Bridge of Wales', a text book example of a natural arch in an area where the sea has eroded ancient karst features. Note the different inclinations of rock layers in the background. Folded strata have been displaced to left of foreground by 500m due to a fault at Flimston Bay. Photography: Sid Howells.

Great Furzenip headland and dunes backing Frainslake Sands
The wave-cut platform and cliffs provide excellent exposures of the Old Red Sandstone. Photography: Sid Howells.

Castlemartin Ranges - Rocks and Landforms

Other processes that have affected this area are less obvious. Although most rainfall now percolates down into the limestone bedrock, the plateau surface has evidently, at various times, been dissected by rivers and streams, particularly in the Bosherston area.

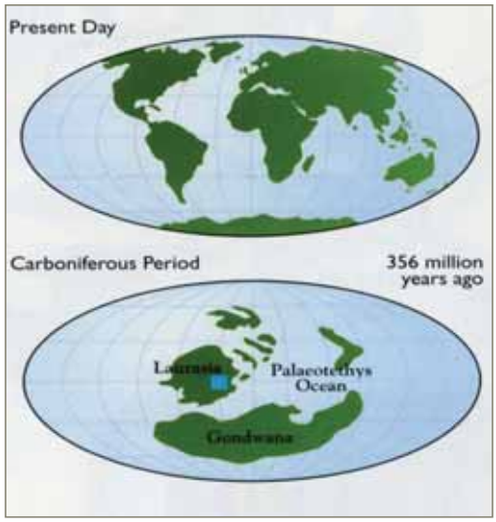
Valleys at Bosherston Lakes (left) and New Quay (right). Photography: Sid Howells.

These valleys are likely to have been initiated as the limestone plateau was uplifted and probably had a thin cover of impermeable marine clay. Patches of clay still present today appear to have been developed by in-situ weathering of muddy limestones in a warm humid climate.
The overgrown Flimston Clay Pits were excavated in deposits that originally accumulated in a shallow lake, around 30 million years ago.
The pipe clays, used in the manufacture of clay pipe and other ceramics, were shipped from a nearby headland where remnants of a loading platform can still be seen.

Clay loading platform at the Devil's Cauldron (a collapsed cavern). Photography: Sid Howells.

Considerable modification and deepening of the original river valleys would have occurred during the Ice Age, when groundwater was frozen but vast flows of meltwater from ice and snow occurred as a result of seasonal and long term improvements in climate.
During severe climatic deterioration, ice sheets also moved over this area, fed by glaciers emerging from the mountainous areas along the eastern margins of the Irish Sea.
The passage of ice bevelled the western margins of the old red sandstone ridge and left a skimming of red clay and sandstone fragments, together with many more exotic rock types, referred to as erratics, over the limestone plateau. Some of the most common erratics are of harder igneous rocks from the St David's Peninsula and Ramsey Island, although stones from as far north as the Firth of Clyde and Midland Valley of Scotland are sometimes found amongst the glacial debris. Along the coast, this material has been reworked into modern beach pebbles and much of the beach sand was originally deposited by rivers emerging from melting ice sheets.

Although the development of the scenery is a fascinating subject, absolute astonishment is frequently encountered when the history of the limestone rocks is explained. The carboniferous limestone is composed of layers of shelly sand and mud that accumulated between 360-325 million years ago in warm seas near the equator. The total thickness of the limestone layers is approximately 1500m, equivalent to the height of Ben Nevis. For comparison, the modern cliffs at Stack Rocks are only 40m high.



Configuration of continents early in the Carboniferous period (the carboniferous limestone sequence was deposited in warm seas near the equator (blue square).

These sediments were gradually transformed into rock and fossils by natural processes and have been transported to their present position by movements of the plates that make up the Earth's crust (so-called 'continental drift'). A 'collision' of continents around 290 million years ago caused folding and fracturing of the rock layers.

Sediments of deep water beyond offshore shoals were transformed into rocks. Photography: Sid Howells.

The limestones become progressively younger from Frainslake to Flimston Bay. Thereafter, towards St Govan's Head, the beds are repeated on the southern limb of a synclinal fold (downfold). A small outcrop of the lowest rock of the 'millstone grit' series lies to the east of Bullslaughter Bay along the axis of this fold (the Bullslaughter Bay Syncline).

Looking east from the Green Bridge of Wales the effects of the folding can be seen but it is also clear that the rocks near the viewpoint are only gently inclined to the north. The explanation of this mismatch lies at the back of Flimston Bay where the pulverised limestone marks the line of a massive fault. The sideways displacement along the fault is around 500m, which would have occurred in occasional increments of a few metres or less, associated with minor earthquakes. The fault cuts obliquely across the plateau, where it is concealed by soil and vegetation, before re-emerging on the foreshore at Frainslake. It then cuts through Great Furzenip before ending in a splayed network of smaller faults at Little Furzenip. The Flimston Fault is just the northern tip of a fracture which cuts through the rocks of Devon and the Bristol Channel. There are spectacular examples of folding at Pen-y-holt Bay.

Folds in limestone beds at The Cabin Door (a collapsed archway – see inset). Photography: Sid Howells.

Fossils are abundant in the carboniferous limestone, the most common being corals (both individual and colonial types), brachiopod shells and fragments of crinoid stem. Brachiopod shells are superficially similar to those of bivalves such as cockles but on closer examination their shape is different. The creature that lived inside was significantly different, using long feathery arms to filter organic material from seawater. Crinoids consisted of a long stalk attached to the sea bed with a feathery-armed globular top. Although referred to as 'sea-lillies' they are sea creatures related to starfish and sea urchins.

Many other types of fossil and occasionally some mineralisation can be seen on the ranges. As owners of land designated as a Site of Special Scientific Interest (SSSI) the MOD has a duty to ensure that those granted access do not remove fossils or damage any other aspect of the geological interest. Cave formations and bones buried within cave sediment are also vulnerable. The mode of preservation of the fossils in the limestone is such that they are only seen clearly on lightly-weathered rock surfaces. If removed, the scientific resource is, effectively, lost, as it can take a very long time for weathering to reveal new examples, and greater insights may be gained by observing the fossils in-situ. Anyone proposing to collect rock, mineral or fossil samples within the SSSI must obtain consent from both MOD as land-owner and the Countryside Council for Wales (CCW). Strict adherence to guidance and codes of conduct is required, where necessary under supervision from CCW or the Castlemartin Ranger for both geological and biological conservation reasons. There is, however, no restriction on taking photographs of rocks and fossils!

Sid Howells

Sid Howells is a former employee of the Field Studies Council and has worked since 1991 as Regional Earth Scientist (West Wales) for the Countryside Council for Wales.

Left: An artist's impression shows a community of sea creatures on a shallow sea bed in the Carboniferous period. Colonial corals (centre) and fragments of crinoids stem (right) are fairly common finds. Photography: Sid Howells.

Castlemartin Ranges - Limestone Mosses

Castlemartin Ranges. Photography: Sam Bosanquet.

The Castlemartin Ranges in south-westernmost Wales hold some of the most spectacular coastal limestone scenery in the country. The cliffs are famed for their population of choughs, as well as rare lime-loving plants like Goldilocks aster *Aster linosyris*, and the terricolous scrambled egg lichen *Fulgensia fulgens*. Inland, the largest expanse of unimproved neutral grassland in Wales is home to shrill carder-bees *Bombus sylvarum* and the biggest colony of marsh fritillaries *Euphydryas aurinia* in west Wales. A survey in 2002 revealed a larger population of the Biodiversity Action Plan priority liverwort petalwort *Petalophyllum ralfsii* in the disused sand quarry at Brownslade Burrows than on all its other UK sites put together. David Holyoak estimated over 400,000 thalli were present.

Despite these riches, the mosses and liverworts of the rest of Castlemartin were almost totally unknown. Only two moss records exist from the 1950s on the main range. Some casual recording carried out during a vegetation survey I was part of in 2004 revealed Wales' second colony of the diminutive entire threadwort *Cephalozia calyculata* (Red Data Book (RDB) Vulnerable) in coastal heathland at St Govan's Head, followed by a third colony slightly further west during a walk on the coast path. Another visit in 2006, this time looking for grassland fungi, produced the even tinier sessile earth-moss *Ephemerum sessile* which was new for Pembrokeshire. The presence of such minute plants in this vast area suggested that much more awaited discovery if a more systematic search could take place.
The need for such a search was strengthened by the results of a survey of the adjacent Stackpole National Nature Reserve, which also had few historic records and yet turned out to be superbly rich.

Winter visits were needed to coincide with the fruiting of ephemeral mosses and liverworts. Consequently, the first of a series of searches of the range took place in December 2007.
Things got off to the best possible start with the discovery that thin clay soil on the edge of a drag-target gully supported a patch of strap-leaved earth-moss *Ephemerum recurvifolium*. At just 1 mm tall, this winter-fruiting moss is just about as small as British bryophytes get, but the long-beaked spore capsules nestled between characteristically recurved leaves have a real charm through a hand-lens. As the only previous Welsh record came from Bangor, on the north Wales coast, I was whooping with joy at this find.

Excitement continued in the form of over 100 rosettes of the spectacularly large (by bryophyte standards) rose-moss *Rhodobryum roseum*, last seen in the county in 1958. This was sharing sheltered limestone ledges above Blucks Pool bay with the aptly named pretty cord-moss *Entosthodon pulchella* (RDB Vulnerable), streaky feather-moss *Brachythecium glareosum* and hemisphaeric liverwort *Reboulia hemisphaerica*. Exposed outcrops further west were home to tall pottia *Protobryum bryoides*, which is much rarer in Wales than in England, and the salt-tolerant Starke's pottia *Pottia starckeana*.

Blucks Pool. Photography: Sam Bosanquet.

Pretty Cord-Moss. Photography: Sam Bosanquet.

Tiny mosses were evidently the typical start to a Castlemartin day, as Pembrokeshire's first beric beard-moss *Leptobarbula berica* greeted me from the bottom of a disused limestone quarry on my second morning. There are just three other Welsh records of this 2mm tall Mediterranean moss, but its liking for worked rock suggests that it may be more widespread and somewhat overlooked. This is backed up by two other Welsh records coming from a bridge near St Clear's and a park in the middle of Newport. The Mediterranean flavour is enhanced by the scarce 'commutata' form of smallest pottia *Pottia davalliana* and 'howei' form of variable forklet-moss *Dicranella varia*, which grow together in abundance on the range's coastal track and are considered much more typical of southern Europe.

The third day of the survey, in early January 2008, concentrated on the eastern end of the range. The steep lime-rich slopes on the north-eastern side of St Govan's Head turned out to be particularly rich, with a much larger colony of entire threadwort *Cephaloziella calyculata* than any other known in Wales, mixed with abundant Husnot's frillwort *Fossombronia husnotii*. Heathy ground also held the threadwort, as well as heath earwort *Scapania irrigua* and blunt cord-moss *Entosthodon obtusus*, two species that are much more at home on the hills of north Pembrokeshire and are otherwise unknown in the south of the county. The mix of heathland and acid habitats with limestone is one of the star features of Castlemartin.

Natural limestone outcrops are astonishingly rare in inland Pembrokeshire, thanks to extensive quarrying and the lack of large rivers in the limestone districts. The same is true at Castlemartin, but fortunately one outcrop in Mount Sion Covert has escaped the quarrymen and is home to species like rambling tail-moss *Anomodon viticulosus*, lesser striated feather-moss *Eurhynchium striatulum* and wall scalewort *Porella platyphylla*, which are absent from the rest of the range. The *Eurhynchium* is classified as Nationally Scarce in Britain and very rarely produces fruit, however it is abundant on the Mount Sion Covert outcrop and had copious spore capsules.

The survey revealed 176 species of moss and liverwort on the Castlemartin Ranges, of which six are currently unknown elsewhere in the county. Whilst this is not a particularly long list it includes 13 Nationally Scarce species and two which are on the Red Data List, making this one of the key sites for bryophyte conservation in Pembrokeshire. The notable mosses and liverworts are concentrated in a few patches of suitable habitat set within vast expanses of tall grassland. Protecting them will require targeted efforts rather than large-scale changes in practice.

Comparison between Castlemartin and the other major coastal limestone area in south Wales, the Gower Peninsula, shows that whilst they are very similar there are subtle differences. One of the RDB species, entire threadwort *Cephaloziella calyculata*, is more widespread at Castlemartin than on Gower, whereas pretty cord-moss *Entosthodon pulchella*, is less plentiful.
The Gower's limestone heathland has mostly gone, which explains the absence of heath earwort *Scapania irrigua* and sessile earth-moss *Ephemerum sessile*. The extreme exposure around Linney Head favours tall pottia *Protobryum bryoides*, whereas the more sheltered ground on Gower holds mosses such as round-fruited grimmia *Grimmia orbicularis* and common extinguisher-moss *Encalypta vulgaris*.
The exceptionally rare Levier's beardless-moss *Weissia levieri*, which grows on Gower and just one other site in Britain, really should be on Castlemartin, but so far it eludes detection.
Overall, the two sites, one managed for military training and the other managed by the National Trust for tourism, complement each other very well and are among the jewels in Wales' moss-rich crown.

Sam Bosanquet

Lesser Striated Feather Moss. Photography: Sam Bosanquet.

Rose Moss. Photography: Sam Bosanquet.

Tall Pottia. Photography: Sam Bosanquet.

Sam Bosanquet is the British Bryological Society's bryophyte recorder for Pembrokeshire and author of the forthcoming 'Mosses and Liverworts of Pembrokeshire'. He works for the Countryside Council for Wales (CCW) as a vegetation surveyor.

Adapting to Climate Change

Rape crop used for biofuel manufacture. Photography: Iain Perkins.

Regular readers will recall that in 2005 Sanctuary considered the potential impacts that climate change could have on MOD and the defence estate. These covered all aspects of our work from changes in the type of training and equipment we may have to provide for our Service personnel, the type of office accommodation that may be required through to how we may need to manage our coastal estate and the support that our tenant farmers may need in the face of changing agricultural and economic demands. It is only when written down like this that we really appreciate just how widely changes in climate will impact on our business.

Over the intervening years MOD has continued to work towards incorporating climate change considerations into our planning and decision making. A number of in-house studies have been carried out, working alongside key stakeholders, to identify the impacts of climate change and increased flood risk on our estate. The results of these studies will be used to inform future planning and development. The article on the following pages regarding the need for new flood defences at Royal Marine Base Chivenor is just one example of the work currently being undertaken.

However, there is still more to be done and we would value any assistance that Sanctuary readers can give us in identifying areas of concern and developing the right policies to address changes. We would like to know particularly about the effects of climate change that you have noticed in your area.

For example:

1. Have you noticed any changes in the range, location or composition of species of flora and fauna in your area?
2. Have incidences of flooding or storms increased in your area? Have these become more damaging than in the past?
3. Have you noticed that your office, home or conservatory now becomes too hot for comfortable use? Has air conditioning in your vehicle become a need rather than a luxury?

We would like to you to provide as much detail as possible, such as: dates; locations; the extent of the problem; has there been any lasting impact from a flood or storm event; and has there been a cost whether economic, social or personal?

Car trapped in flood on Salisbury Plain. Photography: Chris Moore.

Please send your responses to espsustainability@de.mod.uk or by post to the Sustainable Development address on the inside back cover to reach us by the end of 2008. We will report back in future editions where our work is heading, and what you were able to tell us. Thanks in advance for your help.

Begonia Pedriera-Requiera
Defence Estates

Flood Defences at Royal Marine Base Chivenor

Flooding is fast becoming an important issue that must be tackled in order to develop the defence estate. Consideration will have to be given to protecting low-lying developed land near coasts and rivers, and areas with flood defences in place may have to consider improvements to adapt to the effects of climate change.

Panoramic view of RMB Chivenor. Photography: Black & Veatch Ltd.

Flood Defences at Royal Marine Base Chivenor

In recent years, government legislation has incorporated Planning Policy Statement 25: Development and Flood Risk (PPS25) and Flood Risk Assessments (FRAs) as a major part of the planning process. Development of land is restricted if it is at risk of flooding, unless measures are taken to prevent or lessen the potential effects of flooding. Having lost Crown Immunity to planning legislation in June 2006, all MOD sites are subject to FRAs. The result of one such assessment can be seen at Fleet establishment Royal Marine Base (RMB) Chivenor and the subsequent flood defence core works project.

RMB Chivenor

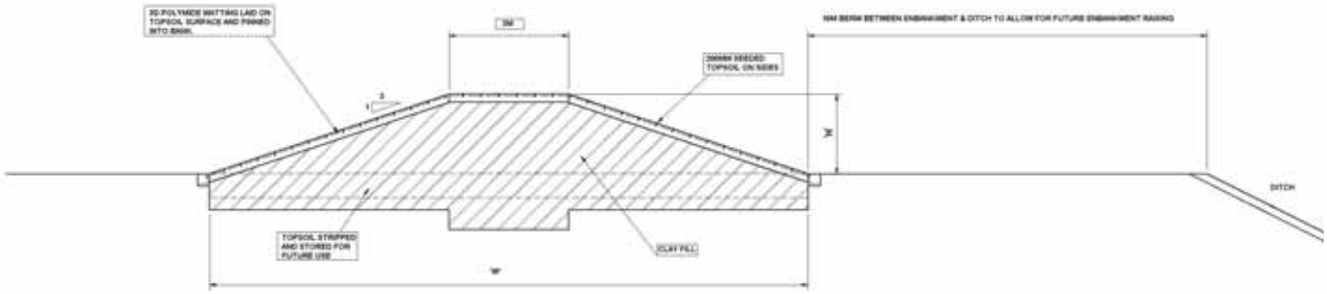
Located near Barnstaple in North Devon, RMB Chivenor is a low-lying former RAF airfield on the northern banks of the picturesque Taw Estuary. The site was handed over to the Royal Marines in 1995 and is home to the Commando Logistic Regiment who deploy across the world in support of 3 Commando Brigade. It also hosts a flight of RAF Search and Rescue Sea King helicopters.

RMB Chivenor is of strategic importance to MOD and the Royal Naval Estate Organisation (RNEO) has embarked on significant development of the site to support its new role. Important projects planned for the future include major motor transport facilities and new accommodation.

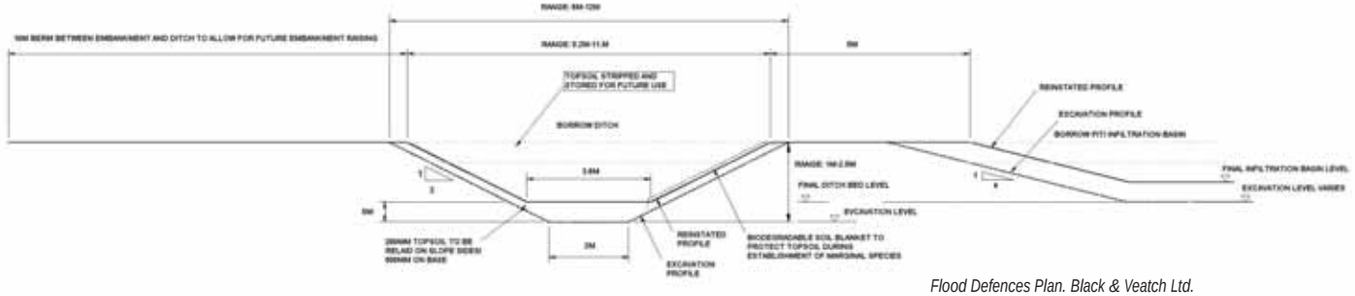
As part of the core works procurement process, Defence Estates (DE) commissioned Debut to carry out an Assessment Study, which included a Tidal Flood Risk Assessment (undertaken by Black and Veatch, Ltd). It was found that RMB Chivenor was at risk from an extreme tidal flood event (a 1 in 200 year event) and improved flood defences are required to protect the site.

The Department of Environment, Food and Rural Affairs (DEFRA) recommends that a 'managed adaptive' approach is taken towards flood protection schemes, where multiple interventions are carried out over time, following constant assessments of the flood risk. The current objective for RMB Chivenor is to construct defences capable of protecting their facilities for at least the next 25 years and which can be adapted thereafter.

The new motor transport facility. The embankment is to be constructed in the foreground of the picture. Photography: Helen Sosnowski.



TYPICAL FLOOD EMBANKMENT
SCALE 1:50



Flood Defences Plan. Black & Veatch Ltd.

TYPICAL BORROW DITCH AND INFILTRATION BASIN
SCALE: 1:50

Decisions on how to defend a flood risk area can be difficult as the complexities of the area and its surrounding environment must be considered in any scheme. RMB Chivenor is surrounded by land subject to significant conservation designations and environmentally sensitive areas. To the west of the site, the Braunton Burrows is a Special Area of Conservation (SAC) for its coastal sand dunes system and mud/sandflats, and is a UNESCO World Biosphere Reserve (BR) for its terrestrial and coastal/marine ecosystems. The base falls into the BR buffer zone.

The sewage treatment works located at the boundary of the site. This will fall outside the new defences and will have its own mini embankment constructed around it. Photography: Helen Sosnowski.

The Taw-Torridge Estuary is designated a Site of Special Scientific Interest (SSSI) for its estuarine habitats and littoral sediments and is an Important Bird Area for migratory wading birds and wildfowl. Isley March, south of the site, is an RSPB Reserve for the same type of birds. The South West Coastal Path (or Tarka Trail) runs to the north of the base and is popular with visiting tourists and important to the local economy. The site also lies in the Braunton Bat Sustenance Zone, an area that the greater horseshoe bat *Rhinolophus ferrumequinum* uses for foraging.

Although RMB Chivenor itself is not particularly rich in habitat value, it is home to species such as the ground nesting skylark, golden plover, the common toad *Bufo bufo*, palmate newts *Triturus helveticus*, the common lizard *Lacerta vivipara* and grass snake *Natrix natrix*. The potential biodiversity impact of the flood project has been carefully considered by the project team and mitigation works carried out where appropriate.

Defence Mechanisms

Current flood defences at RMB Chivenor consist of a combination of a raised earth bank, flood walls and natural ground. The 2-3m high earth bank along the site boundary, however, is considered to be insufficient protection against a tidal flood event. Whilst the bank is protected by concrete faced stone revetments, it is too narrow in some places (1m wide) and does not meet current design standards.

Various improvement options were considered and in December 2007 it was decided that a new 2600 metre long earth embankment would be constructed around the base's main buildings and development area.

Although the airfield would be immersed if an extreme tidal flood event occurred, only 1000m of runway is required for helicopter takeoffs. A stretch of the runway between the two strips of proposed embankment lies on naturally higher land and provides the required 1000m meaning that additional defences are not required. Other structures located around the airfield will either be moved or individually protected with more raised earth banks.

The bulk of the embankment is made up of clay (alluvium), covered with a layer of polymide matting. This will be laid over with topsoil which will allow seeding, eventually making it less visually intrusive. Whilst the height will remain constant the depth of the bank will vary to reflect the topography of the land. To allow vehicular access the crest of the embankment will be 3 metres wide with a hardened surface. Borrow pits that are dug out will be reinstated as infiltration basins to manage any excess surface runoff. These will be around 10 metres away from the embankment to allow for development to deal with future flood predictions.

Extensive land quality testing has been carried out to check for unexploded Second World War ordnance. Great care will be taken during excavation to ensure that the clay layer is not penetrated entirely, as the embankment may be rendered useless if water could infiltrate under it and into the protected area.

The development is exceptionally sustainable as very little imported material will be used to construct the embankment. The borrow pits and infiltration basin will provide the clay, and the topsoil for the top of the embankment will be stripped and stored from the land where it is to be built. Any concrete that is disturbed will be crushed and re-used as foundation material or infill for new developments at RMB Chivenor.

The flood defences will be built by Debut South West, with construction beginning in September 2008. The works should be completed by November 2009. However, completion is very much dependant upon the weather. Too much rain during the excavation and earth moving period may lead to delays whilst the natural clay dries out! Preparations began at the end of February to mitigate the environmental impact of the project. Scrub clearing and grass cutting works were completed in mid-March to deter ground nesting birds from inhabiting their usual nesting areas during the construction works.

The Future

This project is an example of the benefits of partnering. RNEO, DE and Debut have worked in collaboration to achieve a successful outcome, which assures the future development of RMB Chivenor. The team has worked hard to minimise the environmental impact of the project and accomplish a design solution that is compatible with the military use of the establishment. They have also readily accepted innovative ideas and promoted sustainability throughout.

Helen Sosnowski, Policy Support, RNEO, with input and support from Emily Simmons, Defence Estates.

Butterflies at Locks Copse

Male silver washed fritillary. Photography: Barry Angell.

Locks Copse is a 6.8 hectare oak and hazel woodland situated on the western edge of the live firing range at Newtown Ranges and Jersey Camp in the north west of the Isle of Wight. As an entomologist, July on Newtown Ranges is a time of exceptional interest.

The white admiral and silver washed fritillary are true woodland butterflies that fly up and down the rides of the copse at this time of the year. The white admiral has striking black and white wing markings, while the fritillary is a flash of orange as it darts around the copse in search of nectar from blackberry blossoms. Managed rides and clearings throughout the copse encourage the growth of blackberry shrubs, which in turn provide the flowers that form the main source of food for a myriad of insects. Meadow brown, marbled whites, large skippers and ringlets all mingle with the white admirals from early July, when the first of the silver washed fritillaries also appear.

The silver washed fritillary is one of the largest butterflies using the copse. The male butterflies flit from flower to flower in search of pollen and patrol the rides constantly looking for females. After mating the female fritillary will seek out suitable trees to lay its eggs in the bark crevices. After about fourteen days the eggs hatch into tiny caterpillars which then spin a web to hibernate in for the winter. The following spring the caterpillars climb down the tree to search for violets to feed on. Clearings and rides in Locks Copse are enlarged and cleared annually to promote the growth of violets. This has clearly been a successful strategy as silver washed fritillary numbers have improved in recent years.

Valezina. Photography: Barry Angell.

Female silver washed fritillary. Photography: Barry Angell.

Female silver washed fritillaries are normally very similar in colour to males. The upper wings are orange but do not have the scent gland markings. However, there is a variant form of the female known as the valezina. This lacks the orange upper wings of the normal form and instead has a silvery greenish tinge on its upper wings with the silver streaks on the underside which give the butterfly its name. The valezina is capable of flying in much shadier conditions than a normal female. This variant is only found in the south of England between Dorset and the West Weald, the New Forest and the woods of the Isle of Wight and it was with great excitement that I spotted one of these unusual insects flitting through Locks Copse one day in the middle of July last year.

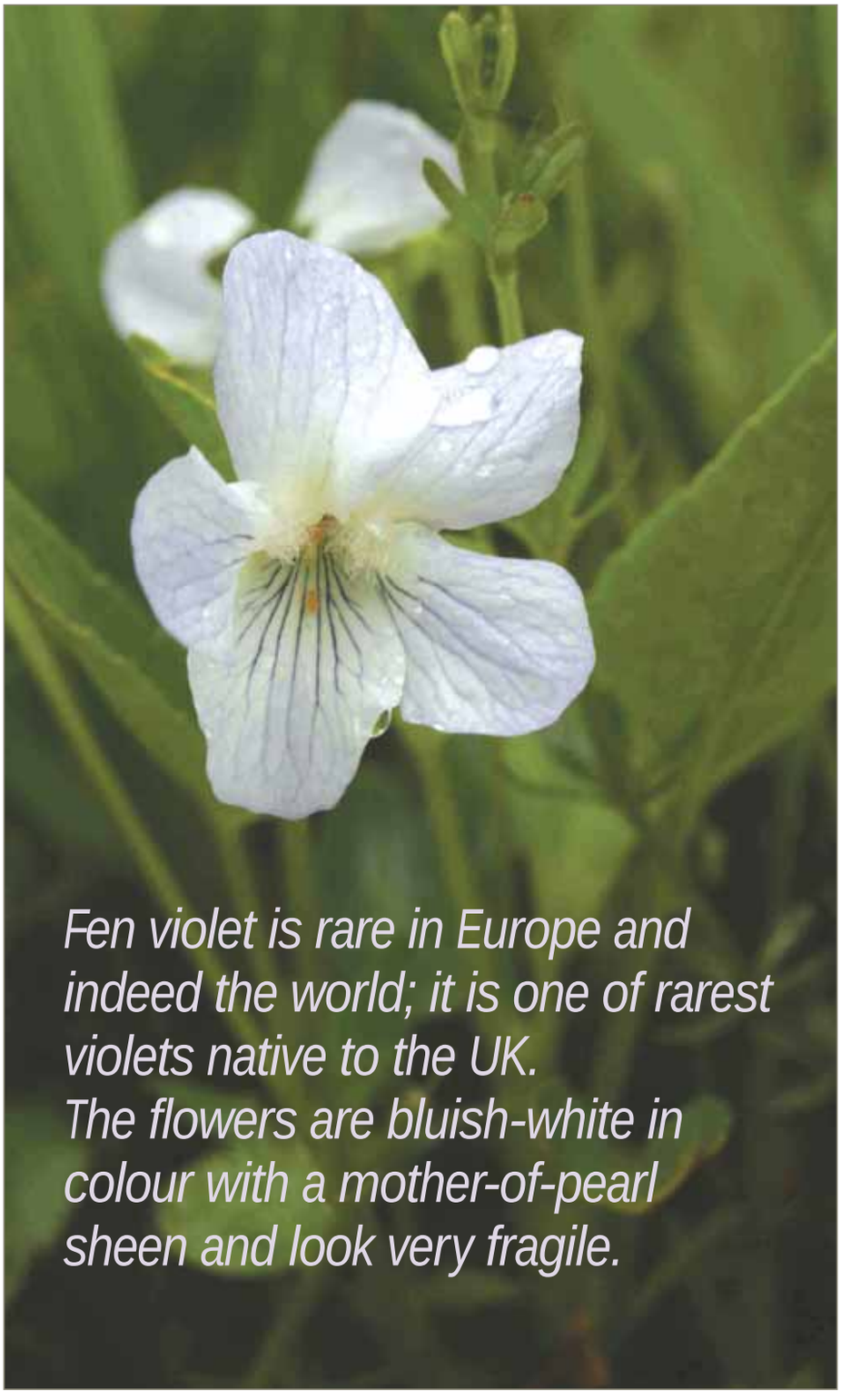
For enthusiastic Victorian collectors the New Forest was considered the epicentre for the silver washed fritillary and the much prized aberation valezina. The great butterfly author and artist F. W. Frowhawk had his first sighting of a valezina in the New Forest. In 1888 he wrote that silver washed fritillaries were in profusion and the beautiful variant valezina was met with at every few yards. F. W. was so enraptured by this butterfly that he named his daughter Valezina. In 1998 his daughter Valezina, Vicountess Bolingbroke, was asked to open the Frowhawk Walk in the New Forest named in honour of her father.

The four woods on Newtown Ranges provide good breeding sites for local butterfly populations. As a conservation group we are determined to maintain and enhance the habitats of these vulnerable insects.

I look back to the summer with fond memories of white admirals and silver washed fritillaries but above all of that silver jewel of Locks Copse, the valezina.

Barry Angell

Conserving a Rare & Delicate Treasure at the Otmoor Rifle Range



Fen violet is rare in Europe and indeed the world; it is one of rarest violets native to the UK. The flowers are bluish-white in colour with a mother-of-pearl sheen and look very fragile.

Fen Violet at Otmoor.
Photography: Phil Cutt.

This species is classified as endangered in the UK, and is fully protected under Schedule 8 of the Wildlife and Countryside Act, 1981 (as amended). It is also a UK Biodiversity Action Plan Key Species.
These little plants live in wet places like bogs, marshes or flat, swampy grassland, provided the vegetation is not too tall. Fen violet seeds can lie dormant in the ground for many years and they will only begin to grow when the ground has been disturbed and the weather conditions are right.
It is probably the most elusive of our violet species, and consequently has been seen by very few.

Fen violet was never widespread and is now restricted to Otmoor, Oxfordshire and two fens in East Anglia. It was recorded in Oxfordshire in the 1820s but not seen there again until 1964.
This site was destroyed shortly afterwards when the land was drained and converted to arable use. However, a hybrid between fen violet and heath dog violet *V. canina* continued to grow in nearby fields which were not drained. This was considered to be a suitable site for reintroduction.
In May 1997 the area was surveyed as part of English Nature's (now Natural England) Species Recovery Programme, around 30 true fen violet plants were found growing in ground which had been heavily disturbed by the removal of willow. Such disturbance of the ground seems to be essential for turning over the seed bank to bring new seeds to within reach of the surface, enabling new plants to grow.

Otmoor Rifle Range seen through Ragged Robin on the adjacent hay meadow, May 2008. Photography: Phil Cutt.

Volunteers marking the position of newly emerged plants in mid-May 2008. Photography: Camilla Lambrick.

Habitat loss along with effects of drainage, ploughing and lack of management on many of its former sites have all had a major part to play in the dramatic decline of this species. In some years thriving populations can be seen at its three remaining sites, but its occurrence remains sporadic and unpredictable with Otmoor being the only UK site to have reliable flowering in recent years. Visits at many times reveal a disappointing show; the plant being largely absent and surviving mainly by seed. It is the resilient nature of this seed that has been the key to the fen violet's survival. This explains, for example, why the plant was able to make a dramatic show at Wicken Fen, Cambridgeshire, after an absence of many years.

The Otmoor Conservation Committee has to balance the needs of a huge variety of wildlife including brown hairstreak butterflies and grasshopper warblers. The MOD warden works with the tenant farmer and the Environment Agency to maintain suitable water levels, hay cutting, harrowing and cattle grazing. It is also hoped that, by removing willows along the hedgeline at intervals of perhaps 10-15 years, more seed will be brought to the surface to germinate. In this way a viable population of fen violet can be maintained here.

Detailed ecological work aims to unravel some of the mysteries of the fen violet. This is being done on the Otmoor range where the Rare Plants Group of the Ashmolean Natural History Society of Oxfordshire has been monitoring the population since it appeared. Recently the population in the hay meadow has been declining and now one group of plants is being studied in detail to identify new and recurring plants and the ratio in which they occur. One of the main questions is whether plants are produced mostly by seed or vegetatively (where roots travel along and send up a shoot several inches away). This may allow us to explain the unpredictable nature of the plant, and help us understand how best to manage it. We hope that the results will enable us to ensure that the fen violet becomes a lasting part of the wetland scene, both in the short and the long term.

Reference: Palmer M. 2006. Fen violet Viola perscicifolia Schreber: A review of conservation work carried out under English Nature's Species Recovery Programme: 1993-2005. English Nature Research Report 676.

By Rebecca Tibbetts, Camilla Lambrick and Phil Cutt

Militarised Landscapes in Twentieth

Project team at Tyneham. Photography: Tim Cole.

Few people are aware that the Ministry of Defence (MOD) is one of the UK's largest landowners, overseeing approximately one percent of national territory. Over half of this is classified as 'rural.' These landholdings are also relatively under-studied in our universities, especially in history departments. In June 2007, a team of historians from the University of Bristol began a three-year project on 'Militarised Landscapes in Twentieth-Century Britain, France and the United States'. Research is being funded by the Landscape and Environment Programme of the Arts and Humanities Research Council. The aim of the project is to undertake a comparative analysis of the emergence, meaning and management of militarised landscapes in Britain, France and the United States. One of our particular interests is how military land functions as reservoirs of biodiversity, often superior in 'green' value to surrounding non-militarised landscapes. The lack of human residents and civilian activity is another central ingredient of our research. British, French and American history demonstrates common ground and national divergences to provide a vital historical perspective on highly topical questions of military power (defending nation) and environmental responsibility (defending nature).

Particular areas of study are the conversion of former military sites into wildlife refuges in Colorado (Coates); the relationship between the social history of human displacement from British militarised lands and the environmental history of these sites (Cole); the impact of the World Wars on the French defence estate and protests against the expansion of military land and the evolution of environmental awareness within the military since 1945 (Pearson).

School memorial, Mynydd Epynt, SENTA. Photography: Tim Cole.

At the Sennybridge Training Area (SENTA) in Powys, a memorial plaque commemorates the spot where the local school once stood. The school was closed in June 1940, when the War Department removed families from this valley. An unattributed quote at the bottom of the plaque asserts, 'No more fun and healthy play, without the small school the valley is empty.' However, in ecological terms, the valley is full. The training estate on the Epynt is home to a wide variety of animals and is particularly rich in birdlife. But it is the flora that makes the site of particular ecological interest. Hundreds of species of mosses, liverworts, lichens and fungi can be found here, including the slender green feather moss which occurs in at least five areas on the range, which has earnt the site 'Special Area of Conservation' (SAC) status.

Century Britain, France & the USA

There are two very different ways of looking at SENTA, either as a place emptied of its human residents to make way for military training or a place teeming with biodiversity. What is more difficult to assess is the connection between the removal of human inhabitants and contemporary SAC status. While military training is potentially environmentally damaging, a case can be made that the impact of intensive agriculture is just as, if not more, destructive. The Joint Nature Conservation Committee saw 'sporadic damage from trampling and the use of small explosive charges' to be less of a threat to the slender green feather moss than permitting 'farmers to drain or fertilise more of the range.'

It is not simply the absence of intensive agriculture in the present that is significant in writing environmental histories of military landscapes. We also aim to consider the ways in which these landscapes may have developed if they had not been seized for military use. However military use has to be balanced with issues of public access and heritage responsibilities that are particularly marked at sites like the Epynt, and the English villages of Imber and Tyneham.

Echoes of the histories of Imber and Tyneham can be found in France, particularly in the Provencal village of Brovès which was requisitioned by the French army during the creation of Canjuers base and training ground in the 1960s and 1970s. The case of Larzac, where sheep graze and produce the milk for Roquefort cheese, is a significant example of the history of protests against the expansion of military land. The French army abandoned the Larzac camp extension in 1981 after a decade of protests.

As in the UK, military ownership of land in France has created landscapes that are markedly different to surrounding fields, forests, and inhabited spaces. For example, a section of Camp de Bitche in North Eastern France forms part of a UNESCO biosphere reserve and a number of camps are now part of the European Union's 'Natura 2000' network. The French Ministry of Defence has introduced environmental policies and agreements, including protocols for cooperation with the Ministry for the Environment and has recently established a centralised office to oversee environmental issues. But there is not, as yet, a French equivalent of Sanctuary.

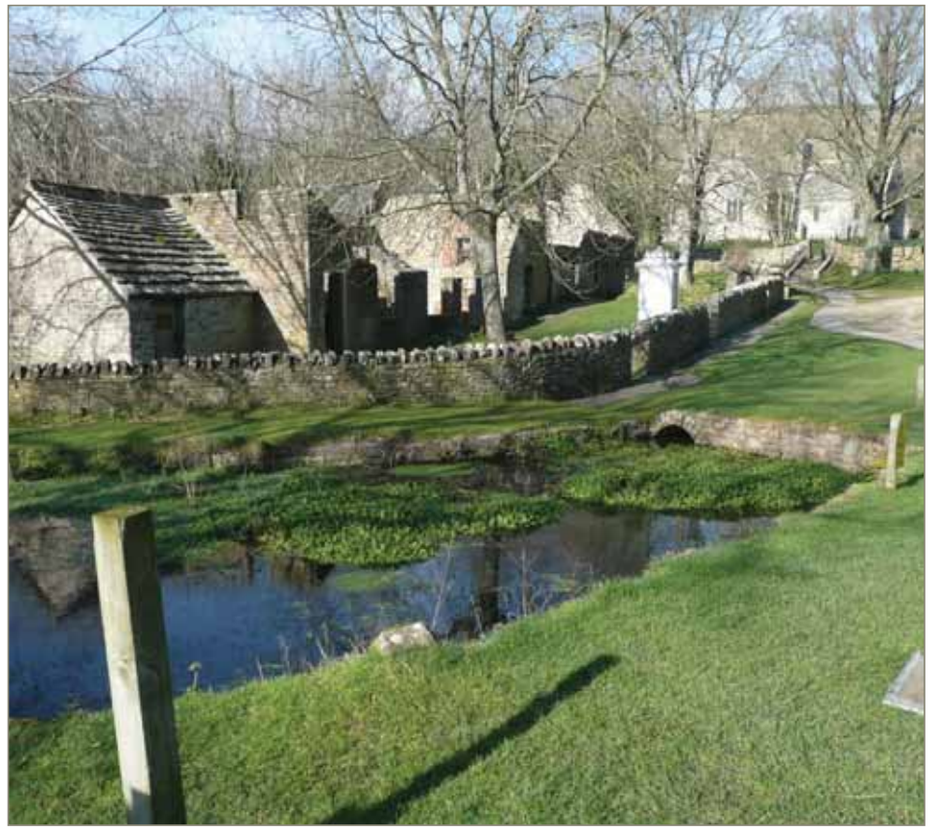
A quick flick through the pages of Sanctuary demonstrates that British military lands are rich in wildlife. Whether by happy accident, such as the suitability of water-filled ruts left by military vehicles as habitat for the protected fairy shrimp on Salisbury Plain, or through concerted efforts to protect and even assist in projects involving the re-introduction of species such as the great bustard, MOD is increasingly aware of the ecological value of its estate, and its responsibilities as conservator.

Project student, Marianna Dudley is producing a doctoral thesis that will represent the first environmental history of the UK defence estate. Although she will be investigating the 'greening' process at an institutional level, the most fruitful research to date has been conducted 'from the ground up.' Visits to Salisbury Plain and Lulworth Range have revealed visually stunning and varied landscapes, free from intensive farming and other customary forms of human pressure. The fact that lands which are habitually shelled and traversed by troops and heavy vehicles offer a 'sanctuary' for often endangered flora and fauna does not conform to the conventional perception of military practices as invariably destructive.

The time span covered by Dudley's work encompasses the establishment of national parks, a growing sense of ecological crisis, and the emergence of the environmental movement. The pages of this very magazine will be well-thumbed, both as an example of MOD's growing awareness of its environmental role, and of how it presents its custodial duties to the wider public. We hope that local wildlife and Conservation Groups will also prove to be important sources of research material, and if anyone feels they have any experiences or information to contribute, please contact her at md5616@bristol.ac.uk.

Her thesis will be grounded in case studies covering five sites in southwestern England and Wales: Salisbury Plain Training Area; Sennybridge; Lulworth Range on the Dorset coast, where the renowned 'ghost' village of Tyneham was requisitioned in 1943; Castlemartin gunnery range within the Pembrokeshire Coast National Park and Dartmoor.

Tyneham Village. Photograpy: Tim Cole.



Militarised Landscapes in Twentieth

Team Walking Salisbury Plain. Photography: Tim Cole.

Two external partners are assisting our project. The Defence Estates Environmental Support Team (EST), based at Westdown Camp on Salisbury Plain, is helping with the practicalities of site visits which are indispensible; furnishing valuable advice and making research materials available. One of the highlights of our project conference, to be held in Bristol in September 2008, will be a field trip to Salisbury Plain facilitated by our EST project partner. Without this co-operation our research would be limited.

Our other partner is Icon Films, a small, award-winning, Bristol-based film making company. Since the Arts and Humanities Research Council likes to see the findings of the projects it funds communicated beyond academia, one of our outputs will be a short documentary about the great bustard of the Salisbury Plain training estate, made together with Icon Films.

The bustard (featured in Sanctuary 34 (2005): 14-17 and on pages 10-11 is one of the species included in a second series of four-minute films that Icon is producing for BBC 1's 'The One Show – Back from the Brink.' The theme of the series is how some UK species have been brought back from the brink by the dedicated efforts of conservation workers. There is an important element of surprise in each feature. These remarkable wildlife success stories are often situated in unlikely places or, as the bustard illustrates, in environments where public access is restricted. Salisbury Plain's defence estate was selected for the reintroduction project because it represents the closest surviving approximation to the former habitat of a bird extinct in the UK since the 1830s.

By the time this article appears, the project team will have completed its round of British site visits, thereby advancing our understanding of the often enigmatic nature of militarised landscapes and discovering again that ecological health and environmental wealth can be found in surprising places.

Century Britain, France & the USA

Worbarrow Bay, Lulworth Range. Photography: Tim Cole.

Peter Coates, Tim Cole, Chris Pearson and Marianna Dudley.
The team is based in the Department of Historical Studies (School of Humanities) at the University of Bristol. For further information about the project, visit www.bristol.ac.uk/history/militarylandscapes or contact us by e-mail p.a.coates@bristol.ac.uk; tim.cole@bristol.ac.uk; chris.pearson@bristol.ac.uk: md5616@bristol.ac.uk

View from FIBUA village, SENTA Range. Photography: Tim Cole.

From Ruins to Regeneration Buildings at risk on the defence estate

Introduction

MOD is responsible for over half the government's historic estate including 793 listed buildings, which vary enormously in age and character from purpose-built military structures in barracks, dockyards and airfields to farmhouses, cottages and country houses. In addition there are 720 scheduled monuments including standing structures such as fortifications, as well as earthworks, ruins and buried remains. Although the majority of MOD's historic buildings are well maintained and continue to perform an operational function, some have fallen into disrepair. Where historic buildings are considered vulnerable to decay, they are classified by English Heritage as being 'at risk'.

What is a 'Building at Risk'?

Details of all the listed buildings and structures known to be at risk on the government estate are published in the Biennial Conservation Report on the Government Historic Estate, published by English Heritage and available on the web (www.helm.org.uk/gheu). They are graded from A (the most severe cases where there is immediate risk of rapid decay) to F (where a solution has been identified and is being implemented). MOD has the largest and most diverse stock of historic buildings on the government estate, and has more Buildings at Risk (BARs) than any other government department. In total, there are 28 MOD entries within the 2008 Biennial Conservation Report representing structures on 19 sites. Entries range from groups of buildings, such as the technical buildings at RAF Bicester, to isolated structures such as Ridgemarsh Farmhouse on Foulness Island. Some of the largest and most challenging cases are the nineteenth-century fortifications built to defend the naval bases at Plymouth, Portsmouth and Chatham.

Ridgemarsh Farmhouse. Photography: Alan Johnson.

The majority of MOD's BARs are roofed structures which are vulnerable to decay because they lack an operational use. Resources are not always available for the repair of empty buildings, especially those in course of disposal, as estate funding is limited and needs to be prioritised to support defence capability. In some cases, historic buildings cannot be used or be sold easily due to their proximity to danger template areas (such as Sutton's Manor House at Shoebury), or for counter-terrorism or security reasons.

A strategy for MOD's BARs

MOD, like all government departments, is committed to finding a solution to its BARs either through repair, re-use or disposal. MOD began a two-phase initiative for its BAR cases in 2004. The first phase, completed in 2006, provided an audit of existing cases and examined the reasons and issues why buildings become 'at risk'. MOD is responding to these issues through measures such as raising awareness and strengthening the condition assessment process. The second phase involves providing greater detail on each BAR case, including information on its significance, current maintenance regime, future proposals for the building or site, and costed solutions for repair and re-use. This information is used to inform an action plan for the resolution of each case. In 2007 MOD appointed a BAR officer to work with Defence Estates (DE), the Services and English Heritage to put these plans in place.

Measures to address individual BAR cases

Each BAR case is different and needs a plan of action to suit its specific circumstances. However, a condition survey is essential to help clarify the current level of repair and maintenance. MOD is working with its contractual partners to ensure that every listed building on its estate has an inspection report produced every four years. Decisions about the future of historic buildings should be based on a thorough understanding of their heritage values, which can be summarised in a statement of significance. More unusual or complex buildings and monuments may merit recording and architectural investigation. English Heritage supports MOD's work and has produced specialist reports on buildings of national significance.

Recently English Heritage has produced detailed reports on the Rotunda at Woolwich and the Block Mills at Portsmouth Naval Base. This research is invaluable as it is being used to form the basis for conservation management plans, setting out policies to guide future sustainable use and development.

The Rotunda, Woolwich Common, London. Photography: English Heritage.

Branshaw Bastle. Photography: Defence Estates.

Due to the complexity of issues surrounding them, BAR cases can take many years to resolve and temporary works are often necessary to keep buildings wind and weathertight. For Branshaw Bastle, a scheduled monument on Otterburn Training Area in Northumberland, consolidation works to prevent further deterioration were sufficient to remove it from the BAR Register. For roofed structures, full repair may be necessary in some circumstances, such as at the Block Mills at Portsmouth, currently undergoing a major repair project.

Some buildings and structures, such as earthworks and fortifications, cannot be re-used due to their form or location. The high cost of full repair from the public purse is not always justifiable and often the most appropriate course of action is to allow long-term natural decay. At Fort Elson MOD is working with English Heritage to agree a protective management regime, including periodic inspections and measures such as vegetation control and maintenance of site security.

A number of MOD cases are on sites which are surplus to defence needs, including the military airfields at Bicester and Dunkeswell. Disposal can offer a new lease of life for these historic places. MOD endeavours to secure a sustainable future for heritage sites in the disposal process, which can be an important factor in regeneration. The recent developments at Royal Clarence Yard in Gosport, Shoebury Barracks in Essex and Royal William Yard in Plymouth demonstrate how redundant military sites can be transformed into attractive and distinctive new communities.

Partnership working with English Heritage

Staff within English Heritage's Government Historic Estates Unit (GHEU) work closely with DE heritage staff to help resolve MOD's BARs. Regular meetings are held to review the overarching approach to BAR strategy and to monitor changes to the condition of each case. These are followed up by joint site visits to discuss detailed action plans for individual buildings and monuments. The MOD initiative on BARs is delivering results and shows that solutions can be found to even the most intractable cases. 2008 will see the launch of English Heritage's Heritage at Risk initiative. This will incorporate the existing Buildings at Risk register and set out an approach to other types of heritage assets including scheduled monuments, conservation areas, marine assets and historic parks and gardens.

Will Holborow
Head of the Government Historic Estates Unit
English Heritage

RAF Scampton Hangar. Photography: Copyright English Heritage NMR.

Examples

RAF Scampton, Lincolnshire

This bomber station is famous as the home of 617 Squadron (the 'Dambusters'). The group of four C-type hangars, dating from the 1930s, were listed grade II in 2005. Two of them have recently been added to the list of buildings at risk, as they are in poor condition and underused. DE and the Regional Prime Contractor have prepared a plan of action, in liaison with English Heritage and the local planning authority. This consists of a schedule of repairs, for which funding is being sought over the next two years, linked to a maintenance plan.

Ridgemarsh Farmhouse, Foulness, Essex

This isolated farmhouse dates back to c1700 and is listed grade II. Located on a Ministry of Defence firing range, the building is in poor condition and is currently unsuitable for permanent occupation because of its location within the range danger template. DE will be working with English Heritage and the site contractor QinetiQ in establishing a way forward to resolve this BAR.

The Rotunda, Woolwich Common, London

Built in 1814 as a temporary pavilion at Carlton House, Westminster, it was re-erected at Woolwich in 1818. It housed the Royal Artillery Museum for many years until the museum moved to Firepower at Woolwich Arsenal at the end of the 1990s. The Rotunda, which is listed grade II*, now houses the reserve collection of Firepower. The lead roof is failing and expert advice has confirmed that this defect can only be corrected by complete replacement of the roof covering. English Heritage has made a detailed survey and carried out historical research. DE has undertaken an options study and is now working with the Army, English Heritage and the local planning authority to establish a way forward.

Branshaw Bastle, Northumberland

This scheduled monument is the central building of a small extended farmstead situated within the Otterburn Ranges. Over many years, the building had become a ruined, roofless shell and was in danger of further collapse. Following archaeological recording and consolidation work, the bastle was removed from the Buildings at Risk register in April 2007. It is subject to continued monitoring and maintenance.

Set in Stone - Monumentalising the Military

A series of badges of the Great War carved into the hill at Fovant. From left to right: The 6th Battalion, City of London Regiment (City of London Rifles), Australian Imperial Force badge, the Royal Corps of Signals, the Wiltshire Regiment. Photography: Richard Osgood.

The British Isles is composed of landscapes that have been sculpted and influenced by human hands. People have always wanted to leave reference points and memorials in their environs. These can be as small as carvings or as large as cathedrals but they often serve the same purpose - to make sense of one's existence and to leave a legacy for future generations.

Perhaps because they, at times, live closer to the experience of death than many others, those that serve in the armed forces are major exponents of memorial features. This is a phenomenon that has existed as long as there has been conflict. For example, there are Bronze Age depictions of warriors in Scandinavia and much graffiti has been left to us by soldiers from the Roman Legions through to those that served with Cromwell or Napoleon. From more recent conflicts there is American graffiti on trees and walls at Tidworth on Salisbury Plain, placed there by men prior to their moving for the D-Day landings and in pubs such as the Swan at Lavenham graffiti from pilots who might otherwise be on bombing raids over Germany. Indeed many other buildings in the UK still bear testament to these acts but within a cultural heritage environment this graffiti is often of great interest; more worthy of preservation and recording than an ASBO.

The chalklands of England provide the canvas for an altogether larger form of memorial. From the Bronze Age, societies have carved figures into the hillsides around which they lived. The Uffington White horse between Oxford and Swindon is the oldest example and is reminiscent of images on later Celtic coins. We also have the white horses of the 18th and 19th centuries found throughout Wiltshire and the carving of the giant at Cerne Abbas in Dorset.

The method of removing lush green turf down to white chalk also proved a popular one for monuments of an altogether more military origin. In the Great War, units stationed in Wiltshire passed time in creating hill figures, often of their Regimental badge. This was perhaps less a labour of love for the soldiers than a duty, with the area on which the Australian badge at Codford is carved being known as 'Misery Hill'.

Carving Regimental badges into hillsides was not new. Many such examples are hewn into rock along the Khyber Pass on the North West Frontier between Pakistan and Afghanistan. What was new was the application of ancient chalk hillside carving techniques to a much more modern theme.

Perhaps the most famous collection of these military monuments is at Fovant in Wiltshire. Here the hillside bears Great War representations of the badges of the London Rifle Brigade, the Post Office Rifles, the Devonshire Regiment and the Australian Commonwealth Forces alongside later depictions of the Royal Corps of Signals, and the Wiltshire Regiment amongst others. Unit ethos and regimental pride has left an important material trace, sufficient for the badges to have been given statutory protection as Scheduled Monuments by English Heritage in 2001.

These gleaming badges on a green background are reminiscent of dress uniforms and in similar vein require a huge amount of upkeep. Hill figures need frequent re-scouring to clean away weeds and refresh chalk which also ensures that the overall shape of the more intricate features can alter over time. If this effort is not undertaken, the figures will slowly cover with vegetation and disappear along with the memories of those regiments that trained in the area in the past. To this end, the Fovant Badges Society looks after their collection of figures with great care.

The badge of the Wiltshire Regiment is clear on the hillside at Fovant. Photography: Richard Osgood.

The endeavours of the project team start to become clear as the head of the chalk kiwi is re-scoured. Photography: Cpl Russ Nolan RLC.

On the MOD estate there is one hill figure; the dramatic chalk kiwi at Bulford. Not surprisingly, this was dug to commemorate the presence of New Zealand forces at nearby Sling Camp in the Great War. The kiwi carving was completed in 1919 at the end of the war. It was designed by Sergeant-Major Percy Cecil Blenkarne of the Education Staff who used a stuffed example in the British Museum as his model. Designed to be best seen at a distance of 1.6km, the proportions of the bird are vast. It stands 127m high, its bill is 45m long and the initials NZ beneath the feet are 20m long.

The Kiwi formalised an archaeological layer within the landscape of Salisbury Plain. The footings of the New Zealanders' barracks are still present, in places protruding from the soil. New Zealand General Service buttons are found periodically and elements of their practice trenches are still visible on Beacon Hill to the north of the Kiwi and are also traceable in old postcards of the carving.

The figure presents an on-going conservation challenge, which requires the combined efforts and partnership of many stakeholders including Cubs and Scouts, Army Cadets, the Royal Corps of Signals, Bulford Conservation Group, Defence Estates and Landmarc Support Services. In the summer of 2007 this team ensured that the Kiwi was re-scoured and surrounded with a rabbit-proof fence. Refreshing the chalk has now become an annual event, held, appropriately enough on April 25th; ANZAC day. In terms of a military ethos, the Kiwi is of huge importance to New Zealand and their High Commission. Several New Zealand citizens have been involved throughout the works.

Although referring to now distant historic events, these military chalk figures vary from other forms of war memorial in that they are about the living as much as the dead and are important to many elements of contemporary society. Chalk carvings are still being formed as a form of art or commemoration. A new white horse was dug at Devizes in 1999 and on a military theme a representation of a propeller was formed at Folkestone in commemoration of those that fought in the Battle of Britain.

The Fovant badges, Codford badge, the Folkestone propeller and the Bulford Kiwi are evocative monuments. The archaeologist Mike Pitts stated that "For nearly a century these remarkable chalk emblems, created, one imagines, in a heady atmosphere of bravado, laughter and foreboding, have been kept alive, just, by local effort".[1]

The MOD's historic estate comprises prehistoric and more modern features each of which are worthy of preservation. The team's restorative work on the Kiwi resulted in a nomination for a Tidworth Community Award – highlighting the value that local people put on their historic environment and the importance of partnership work. If these preservation efforts can engage wide facets of society and inform them about landscape use both past and present, so much the better.

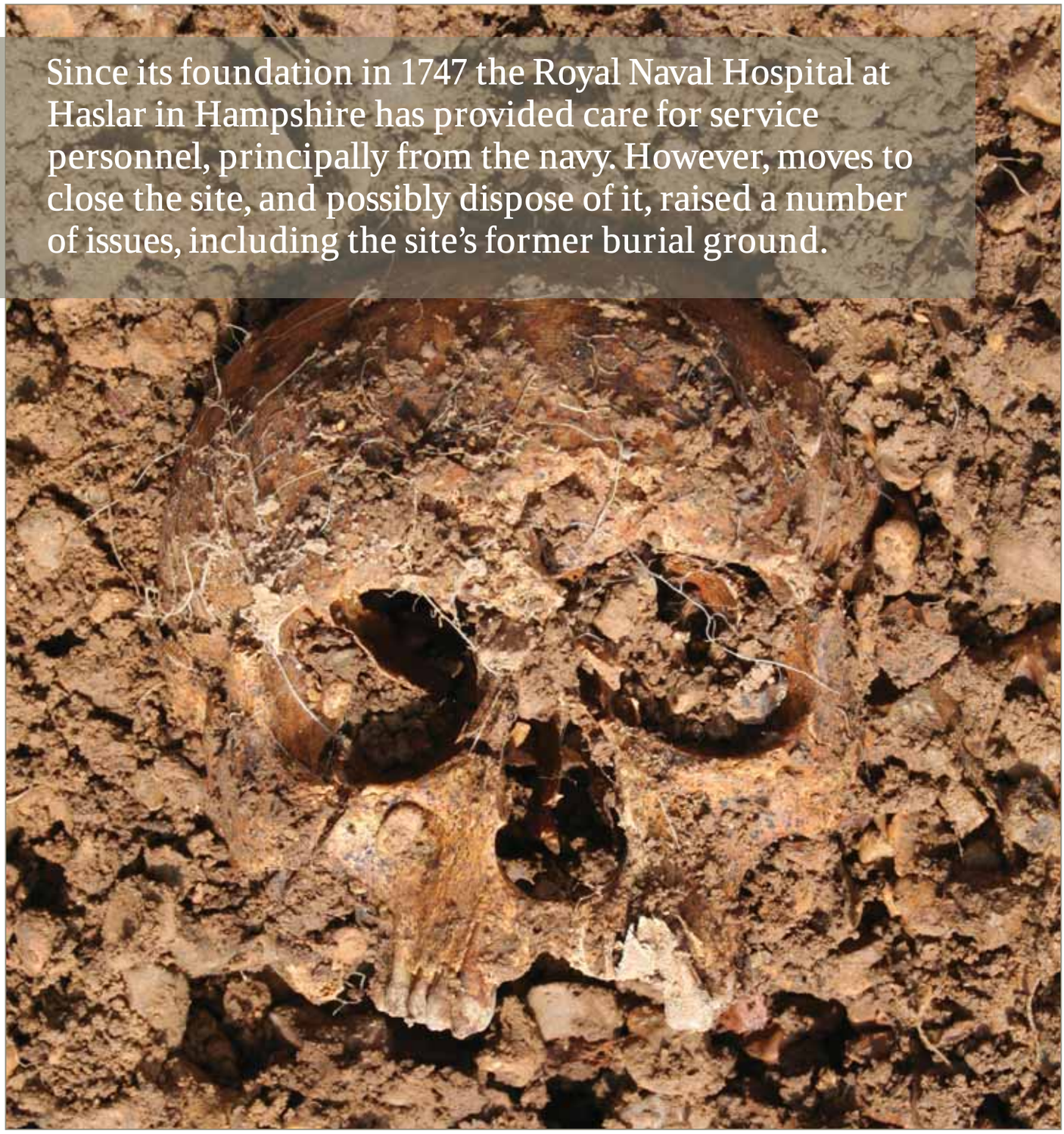
Richard Osgood
Defence Estates

Found just below the feet of the chalk kiwi, this New Zealand general service button from the Great War is one of several found in the region. Photography: Richard Osgood.

[1] Pitts, M.2005 (November-December). In marches upon the heavenly plain. British Archaeology, 85, 36-39.

Body of Evidence - Archaeological Work at Royal Naval Hospital Haslar

Since its foundation in 1747 the Royal Naval Hospital at Haslar in Hampshire has provided care for service personnel, principally from the navy. However, moves to close the site, and possibly dispose of it, raised a number of issues, including the site's former burial ground.



The face of an 18th century sailor emerges from the soil. Photography: Cranfield University.

Royal Naval Hospital Haslar sits on the Haslar peninsula at Gosport, overlooking the Solent. During its long service the Hospital treated the sick and wounded from wars against France, America, Russia and both World Wars. Its patients were Nelson's and Victoria's sailors, the men that built and safeguarded a global empire. Their lives exposed them to injury, wounds and diseases, some quite exotic, from all corners of the globe.

Looking back towards Haslar Hospital from the paddock. Photography: Cranfield University.

The site includes the original 18th century ranges and a chapel, as well as early 20th century isolation units and modern NHS buildings. The western end includes a terrace of smart houses, originally built for the senior officers and surgeons and a walled cemetery, which became the final resting place of officers, ladies and clergy associated with the site and which is now a Garden of Remembrance. Behind these lies a large paddock.

The rationalisation of Defence Medicine raised doubts about the future of the site and numerous options were proposed, including development of the paddock. This proposal prompted a spate of disturbing stories concerning its former use as the hospital's original burial ground. Although the paddock had served as a cemetery between 1757 and 1826 no records survived to give accurate information on the location and number of burials. However folklore had developed to fill the gap left by more conventional history and suggested that an alarming number of bodies might still lie on the site. The cemetery was in use for 73 years, which is 26645 days, minus leap years. If only one person per day died in the hospital, then there would still have been a lot of casualties to bury! Considering the quality of medicine and the number of major conflicts during this period, an average one death per day may be a conservative estimate. The legend was elaborated with tales of ships docking on Haslar Creek and off-loading casualties who were immediately buried in the grave pits. These stories evoked a scene of, appropriately for the 18th century, Gothic horror, with mass burials in pits and of a paddock largely composed of human bone. Aside from the frisson caused by the rumours it was clear that good quality data about the bodies in the paddock would be required for Land Quality Assessment and to test the historical accuracy of the stories. The presence of large numbers of skeletons could have an impact on plans for future development. The advice from Defence Estates (DE) Environmental Support Team was that the earlier this information could be obtained the better as the data could be used to inform discussions and decisions, and guide the management of any risk.

Oxford Archaeology was commissioned to undertake an historical desk-based assessment and an archaeological evaluation. Their initial findings seemed to confirm the stories as contemporary reports of a site "thick with bodies and scattered tombstones" came to light. Further information, including the exhumation and reburial of skeletons found during the building of the terrace of houses in 1798, suggested that burials were not confined to the paddock and walled cemetery. Land used for burials included much of the western end of the site, which now lies beneath gardens, tennis courts, sheds and garages.

The field evaluation included the excavation of a number of trenches across the paddock. These revealed that up to a metre of modern soil had been spread across much of the site during the NHS building programme in the 1970s and confirmed that a large part of the paddock was unsuitable for either burial or building, as it was crossed by the in-filled creek. Burials were uncovered toward the eastern end of the paddock, but not in the quantities suggested by either legend or historical sources. Contrary to the worst fears the burials were neatly laid in either individual graves or graves containing several individuals, rather than the pits full of bone that had been anticipated. Bone preservation was good, which was surprising given the sandy, acidic nature of the soil. Burials were recorded but not lifted as it had been decided that there was no need for exhumation at this stage.

The presence of the bodies raised a number of issues. The first is specifically archaeological as the presence of such a large population of known background could be viewed as an invaluable scientific resource for the study of life in the Royal Navy, including both existence and death aboard ship in the great age of sail. The skeletons of the Mary Rose have already shown how much data may be gathered from such a group. However the excavation and study of the bodies would be expensive. The second issue concerns ethics. Although the law does not prohibit the clearance of old cemeteries such an operation is surrounded by ethical concerns. Whilst the wholesale removal of the burials might be viewed as improper in some quarters, possibly among naval personnel, in an area that retains a strong Royal Navy presence and heritage, the archaeological and medical information that the skeletons retain should not be discarded without study. Whilst more information was required respect should remain a driving principle.

Body of Evidence - Archaeological Work at Royal Naval Hospital Haslar

Physical anthropologists reassembling the skeleton for study following excavation. They will examine the body to determine age, sex and any physical trauma or traces of disease. Photography: Martin Brown, Defence Estates.

Students at work excavating and recording the skeletons in the paddock. Photography: Cranfield University.

Drawings of each burial are made as part of the record. The grid laid over the grave helps to create rapid, accurate scale drawings by guiding the recording archaeologist - it is one metre square and corresponds to gridded drawing film. Photography: Cranfield University.

Following receipt of the evaluation report the decision was taken that there should be no further disturbance of the paddock at this point. The condition of the burials, including bone preservation, suggested that the information that could be gathered from the bodies would make further excavation worthwhile, but only if funding was available for proper post-excavation study, publication and, most importantly reburial. Shortly after this decision was taken the DE Historic Environment Team were approached by the Forensic Institute at Cranfield University, who were seeking a training excavation for their Forensic Archaeology students. This proposal would ensure the further excavation, data gathering and proper study of the excavated remains and would benefit DE, the students and the historic record.

The Hospital agreed to the excavation of seven skeletons in June 2007. Some of the trenches excavated by Oxford Archaeology were reopened, partly because this ensured that remains would be found and partly to enable Cranfield to develop the work undertaken by Oxford Archaeology. The students were trained in all aspects of the work, from excavation and recording of remains to their handling and study in the site laboratory. In this phase of the work the skeletons were examined to determine age and sex, which although expected to be solidly male might have thrown up some surprises as one of the skeletons was either a slight gracile man or a woman, both of which are at odds with the popular image of sailors and Marines. The bones were checked for any obvious signs of pathology or trauma, such as broken bones that had signs of healed injuries, or diseases, such as tuberculosis and syphilis, which leave clear signatures on bone in their advanced stages. These results would feed into various studies, including one concerned with the 18th century Navy that is using material excavated from both Haslar and Greenwich.

The seven skeletons proved an interesting group. Not only was it possible that one was female, another had a curved shin and fused foot bones that indicated a club foot. Another had symptoms of iron deficiency anaemia and had suffered a broken collar bone in the past, which had healed. Another showed symptoms of *osteochondritis dissecans*, which today is associated with baseball players! One body showed signs of a

Scientific recording ensures the maximum information is retrieved and is essential for both scientific study and in criminal cases where forensic archaeology is employed. The two metre pole gives scale. Photography: Cranfield University.

violent death as the head of his right upper arm exhibited evidence of sharp force trauma – he had been cut with sufficient force to mark the bone. The wound showed no sign of healing, meaning that he was injured shortly before his death. The injury suggests that this man had been involved in hand-to-hand combat and that this may well have been the cause of death! These were young men, living in conditions where disease and infection were widespread. They suffered from malnutrition and vitamin deficiencies, which can only have assisted the spread of disease.

The excavation addressed another folktale of the site: the dead were said to have been buried in their hammocks, as would have been the tradition at sea. However, the way in which the skeletons were arranged suggests that they were buried in coffins. This may be because social tradition on land took precedence or, more likely because the patients had beds rather than hammocks and, in contrast to the situation at sea, wood for coffins was readily available.

In addition to the physical anthropological studies checks were carried out to assess the preservation of the bones and to compare it to observations made during the evaluation. Data on the survival and condition of the bones is also being used to inform discussions on the in-situ preservation of archaeological remains, following their disturbance by the evaluation. This research involves English Heritage and staff from Cranfield and is making a significant contribution to the debate about the management of the archaeological heritage. The condition of the bones was reckoned to be worse than at the time of their original disturbance around a year earlier, showing that the decay cycle had been hastened by the evaluation. This suggests that preservation in situ may be a gamble but also supports the excavation and study of the remains which would otherwise have decayed completely without yielding their secrets.

Currently the seven individuals are guests of the Forensic Institute but they will be reburied, either in the paddock where they were originally laid or in the nearby military cemetery. They may well be joined by others as excavations are intended to continue, shedding more light on the Royal Navy that Nelson knew and on the work of one of its principal hospitals.

The research at Haslar has shown how partnerships can work together to achieve important and interesting results. The archaeological research coordinated by DE has improved understanding of the site. This is not just a matter of academic interest because the information will prove invaluable whatever plans are brought forward for the future of the hospital.

Martin Brown
Defence Estates

Acknowledgements

Dr Anna Williams, The Forensic Institute, Cranfield University, for technical data.

Relocation, Relocation, Relocation

> “The Mole had long wanted to make the acquaintance of the Badger. He seemed, by all accounts, to be such an important personage and, though rarely visible, to make his unseen influence felt by everybody about the place.”
>
> Kenneth Grahame, ‘The Wind in the Willows’.

Badger. Photography: Chris Wallace.

In 1992 the Government passed the Protection of Badgers Act to prevent persecution of one of Britain’s best-loved wild mammals.
There followed a close examination of the effect that badgers were having on archaeological monuments on Defence Training Estate Salisbury Plain (DTE SP). In 1999 Defence Estates asked the badger sub-groups of the Conservation Groups if they could provide them with details of how many badger setts were located in Scheduled Monuments (SMs). The badger groups provided a map showing that they were aware of 18 such setts (out of a total then of 305 SMs on the Plain). Subsequently English Heritage carried out a further survey and found 33 SMs affected. By 2000 this had risen to 40 and in 2003 to 52. The latest condition survey undertaken by Wessex Archaeology, looked at all monuments, not just at the scheduled sites, records that 44% of located monuments (740) were impacted by rabbits and 11% by badgers.

In the summer of 2003 and 2004, English Heritage excavated a site called ‘Barrow Clump’ on the east of the Plain to establish the exact nature of damage to archaeological deposits. This site, a round barrow dating to the Early Bronze Age (c.2200 BC), revealed that not only could badger damage be extensive and on-going, but that even some of the most damaged archaeological monuments contained elements that could be protected through the relocation of the badgers. In this case an early Anglo-Saxon cemetery and a Beaker burial were revealed by archaeologists.

This presented a problem – clearly monuments were being affected but how best to protect them? After all there were specific conditions in the 1992 act relating to badger setts and work that would require licensing, including:

(a) damaging a badger sett or any part of it;

(b) destroying a badger sett;

(c) obstructing access to, or any entrance of, a badger sett;

(d) causing a dog to enter a badger sett; or

(e) disturbing a badger when it is occupying a badger sett,

Any aspirations to protect monuments would certainly ‘disturb’ the sett and would thus require specific licensing from the Natural England

Badger gate at Boles Barrow. Photography: Defence Estates.

The profile of the Boles Barrow, a Neolithic monument, under repair following the relocation of the rabbits and badgers that lived within it. Photography: Mike Dando.

Wildlife Licensing Unit. This licence requires stringent conditions to be met. Badgers must be excluded from the sett over a period of time utilising non-harming badger gates. These gates must be closely monitored. Badger gates are a form of metal 'cat-flap' which the badger gets used to using before it is made one-way, precluding re-entrance into the monument. Once the sett is demonstrably free from badger habitation the holes can be sealed. Gates are set into a surrounding wire or electric fence to ensure that these are the only areas of access/egress. All work must be undertaken outside the period of the badger breeding season. In all this work, the badgers' welfare is considered to be essential.

So far badgers have been excluded from several monuments on DTE SP and our, limited, experience has already shown that there is no "one size fits all" solution to the problem. A preferred method for smaller, discrete sites, such as barrows, was pioneered by the National Trust (NT) on a small island of NT property within DTE SP. White Barrow is a Neolithic long barrow dating from c3700 BC. The method used is to pin galvanised chain link mesh directly to the surface of the monument. The grass grows through the mesh which, within a year or so, becomes incorporated within the sward and is no longer visible. This has proved very effective, has no aesthetic implications and does not interfere with existing management regimes.

This method is not practical for huge sites such as hillforts. It is also difficult to apply effectively on uneven ground or where there are trees. For these situations the most effective solution is a perimeter fence, around 1.2m high and with the bottom of the fence draped out 0.6m and pinned to the ground to prevent tunnelling. On smaller sites, this does have the disadvantage of creating islands that require separate management but where this island situation already exists, such as a tree-covered barrow within an arable field, it can be an effective method.

At 38,000 hectares, there are plenty of alternative habitats available to the badgers on Salisbury Plain and it has been agreed with Natural England that it is neither necessary nor useful to provide alternative setts. Thanks to night-vision equipment, we were able to watch badgers currently living in a long barrow on the west of the Plain utilising woodland nearby and thus other probable elements of their territory. The NT were advised to construct an alternative sett as part of their works at White Barrow but the badgers soon abandoned it in preference for a nearby section of Bronze Age ditch.

Whilst there have been some successes in excluding badgers from some monuments, for example several round barrows on the east of the Plain - success has been more elusive on other sites. The guile and strength of badgers has meant that they are still living within Tinhead long barrow. At Sling Camp relocation attempts were faced with people deliberately propping open gates to allow badgers to re-enter the monument and at Boles Barrow a vehicle knocked over the exclusion fence!

Boles Barrow is especially important as it is an iconic monument for many reasons. Excavations in 1801 revealed the presence of a bluestone within this Neolithic barrow; when one considers the journey of these monoliths from Wales to Stonehenge (some 18km away from Boles Barrow) the presence of this stone on the Plain and its incorporation in the barrow must be of significance. The bluestone was presented to Salisbury Museum by the famed war poet, Siegfried Sassoon in 1934. Furthermore, a recent study seems to indicate that there were a large number of burials at Boles that exhibited evidence of violence some 5500 years ago.

The authors of a recent report on the pathology exhibited by the skeletons found in Boles Barrow concluded that "Boles has indeed suffered, not least from badgers, but a visit to the training area a few days before Christmas 2005 did a great deal to alter our preconceptions about the army's stewardship….Far from threatening the archaeology, the acquisition of the area by the military has had the overall effect of protecting it from the much more destructive impact of modern farming and development".[1] It is essential that the programme of protecting monuments from the diggings of both soldiers and badgers continues, to ensure that the success of this stewardship continues and that, perhaps, the influence of badgers is certainly 'unseen' on archaeological sites.

Richard Osgood (Defence Estates) and Peter Addison (English Heritage)

[1] Smith, M. & Brickley, M. 2007 (March/April). Boles Barrow: Witness to Ancient Violence. British Archaeology, 93, 22-27.

The Battle of Britain Memorial Flight "Lest we Forget"

Lancaster PA474, Spitfire MK356, Spitfire P7350 & Hurricane PZ865. Photography: Cpl George (Crown copyright).

The Flight's Aircraft

Spitfires
P7350, AB910, MK356, PM631, PS915 and TE311

Hurricanes
LF363 and PZ865

Lancaster
PA474

Dakota
ZA947

Chipmunk
WK518 and WG486

The Battle of Britain Memorial Flight based at RAF Coningsby in Lincolnshire is a unique piece of living history. The Flight, which celebrated its 50th Anniversary last year, has Britain's only flying Lancaster bomber. In addition Spitfire P7350 (MK IIa), is the last flying Spitfire to have participated in the Battle of Britain. In this, the 90th year of the Royal Air Force, the Sanctuary Editor visited the Flight at RAF Coningsby to see the aircraft, meet the personnel and to discover more about the Flight's partnership with Lincolnshire County Council.

Brief History of Battle of Britain Memorial Flight

The Historic Aircraft Flight was formed in 1957 to remember and honour "The Few" - those who fought in and those who lost their lives in the Battle of Britain. Based at Biggin Hill the Flight had one Hurricane and 3 Spitfires. In 1973 the Flight acquired its Lancaster, which had been undergoing restoration work at RAF Waddington, and its scope was broadened to become a memorial to the RAF's involvement in all Second World War campaigns. This change was accompanied by the change in title to the Battle of Britain Memorial Flight.

The Flight moved to its current home at RAF Coningsby in 1976 and is now formed of 11 airworthy aircraft including two Chipmunks.

Over the past half century the Flight has gradually built up its display programme from 50-60 appearances a year to 707 appearances at displays and flypasts across the country in 2007. Estimates suggest that as the Flight transits the country appearing at events it will reach an audience of around 6 million people.

The Battle of Britain Memorial Flight

The Battle of Britain Memorial Flight is the commemorative centrepiece for the RAF and as such receives around £2.3 million of public funding per year. It has a permanent staff of five – the Officer Commanding, an Operations Officer, Operations Assistant, Administrative Support and, since 2006, a dedicated Public Relations Officer. A ground crew of 25 full-time engineers, the majority of whom have volunteered for posts on the Flight, support the 12 aircraft, of five different types.

With the exception of the Officer Commanding all the pilots on the Flight are volunteers from operational squadrons. The bomber crew will tend to fly on two out of four weekends in the display season, the fighter crews three or four out of five.

The Flight has three main operational roles:

1. Commemorative and ceremonial: to appear at a range of events from the Queen's Birthday flypast to small veterans' events across the country.
2. Promotional: appearances at around 100 air displays each year. The Flight staff will try to engage with the public at these events to promote the RAF within the community.
3. Inspirational: the flypast events. These are free and seen by many thousands of people across the country as the aircraft travel from event to event.

Conservation

Squadron Leader Al Pinner MBE has been the Officer Commanding of the Flight since 2006 and sees part of his role as being the curator of a living, breathing museum. Whilst the aircraft are on the ground they can seem lifeless but in the air they come to life. Preserving the aircraft in an airworthy condition means that they can travel the length and breadth of Britain keeping the memory of the Second World War crews alive.

As far as it is possible to do so aircraft are maintained in their original condition, retaining the link to their history. For example Spitfire P7350 (MK IIa) still has visible bullet damage sustained in the Battle of Britain. However the need to balance authenticity with current safety standards and best practice means that maintaining the aircraft is no easy task. Wherever possible original parts are used for servicing and repairs and the Flight has a large of stock of spares. However, should these begin to run low then specialist firms can be called on who are willing and able to renovate or manufacture replacement components.
Some standards, particularly those relating to safety, can only be met by installing modern equipment. The challenge is then to find a way of carrying out adaptations that is sympathetic with the aircraft's structure and preserves historic

Sqn Ldr Al Pinner MBE. Photography: Crown Copyright.

For example, in the Dakota you will find newly fitted passenger safety restraints meeting current safety requirements but above these there are the marks made on the cabin wall over the years by parachutists before making their jumps.
A number of the aircraft this year have been fitted with updated radar systems to allow them to continue to fly.

Partnership

Since 1986 the RAF and Lincolnshire County Council have operated a unique partnership to open up access to the Flight's aircraft. The Battle of Britain Memorial Flight Visitors' Centre is operated by the County Council but is based on MOD land next to the hangar housing the Flight's aircraft. The Visitors' Centre provides the Flight with a public interface that the RAF is not resourced or equipped to provide. It houses exhibitions, a shop, a small café and education facilities and is the base for the 40 volunteer guides who have been recruited and trained to give guided tours of hangar and explain the history of the aircraft and the airmen they represent. The guides include a number of World War II veterans who can speak from first hand experience of operating and maintaining the aircraft. This gives a rare insight and a human aspect to this important part of British history.

The Visitors' Centre is unique as it is a public facility on an operational military establishment. The Flight is a working part of the RAF – not a visitor attraction or a museum. Tours take place around the work going on in the hangar; in fact part of the attraction is seeing the precise, painstaking work that goes into maintaining these aircraft. The historic aircraft sit alongside the RAF's newest aircraft, the Typhoon, which is currently preparing for active duty.

Visitor profile

At present the Centre's visitor profile tends towards the more mature visitor and includes a number who visit for nostalgic reasons.
The Centre also attracts families, educational visits and those interested in the technology behind the aircraft. The Council are constantly looking for opportunities that enable them to offer visitor experiences that appeal to all sections of the community. In winter 2008, a series of tours are planned for those interested in the technological and mechanical aspects of the aircraft. The tours will coincide with the maintenance programme and will give an opportunity to watch the technicians working on the aircraft.

Challenges

Whilst hosting around 20,000 visitors a year on an operational base brings unique opportunities to see the RAF in action it also brings challenges, not least the issue of security.

RAF personnel are required to be present at all times in the Flight hangar when the public are present. In common with most operational bases flying does not take place at RAF Coningsby at weekends or Bank Holidays and personnel are off duty. This means that at the times when most museums and tourist attractions are at their peak, the Visitors' Centre cannot open. To try to mitigate this, the RAF arrange for personnel to be present on 4 or 5 weekends a year so that the Centre can open. These weekends attract huge visitor numbers.

The display season creates an issue too: the absence of aircraft on display duties can lead to disappointment for visitors, who often come to the Centre to see a specific aircraft. Centre staff work closely with the RAF to ensure that they know which aircraft will be out on display duty and when and deal with many telephone queries from visitors checking dates when 'their' aircraft will be in the hangar.

Conclusion

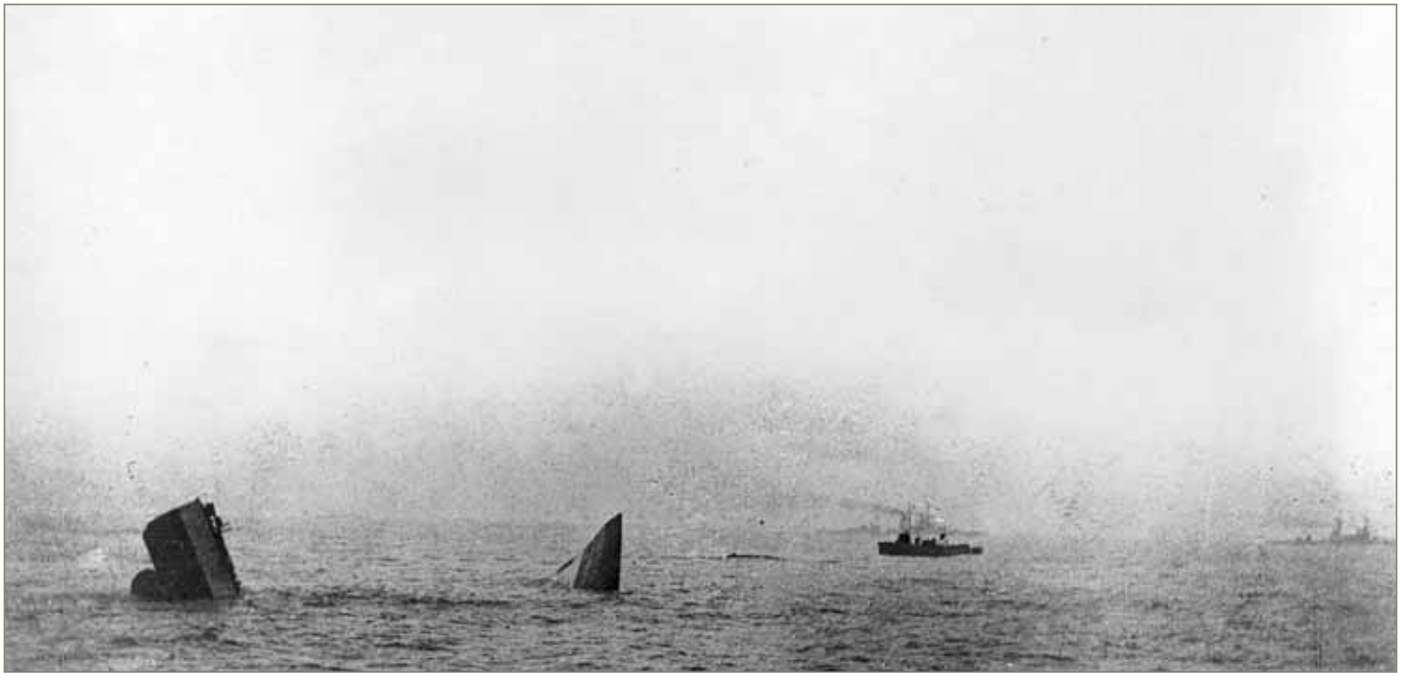
The new and old is a theme that runs through the Flight and its operations. The Typhoons that can be seen from the Flight's offices; today's RAF personnel carefully and meticulously working to maintain these historic assets; the interaction between current personnel and the veteran guides to provide a visitor experience that caters for all ages and interests. Lincolnshire County Council has used its heritage, tourism and educational knowledge and links to create a facility which both promotes the RAF and its history and reflects Lincolnshire's pride in its aviation heritage. But the final word rightly sits with Squadron Leader Pinner and emphasises this link between past and present: "The Flight means different things to different people but it is right and appropriate that the aircraft continue to fly to honour the fallen and as a reminder that in this age of constant operations more will fall."

With thanks to Gill Fraser and Councillor Graham Wheat from Lincolnshire County Council. Squadron Leader Al Pinner, MBE and Jeanette O'Connell, Battle of Britain Memorial Flight. For more information about the Flight and the Visitors Centre visit www.bbmf.co.uk

Battle of Britain Memorial Flight Visitors' Centre. Photography: Lincolnshire County Council

The Wrecks of Jutland

2nd Battle Squadron in action at Jutland. Photography: Copyright Royal Naval Museum, Portsmouth.



Sinking of HMS Invicible. Photography: Copyright Royal Naval Museum, Portsmouth.

The Battle of Jutland took place on 31 May / 1st June 1916 when the British Grand Fleet under Jellicoe clashed with the Imperial German Navy's High Seas Fleet under Scheer in the North Sea off the coast of Jutland. It was without question the most significant naval battle of the First World War. Opinions remain divided on which side actually won the engagement and both sides have claimed victory.

From the start of the war, the German Naval High Command knew that they could not hope to defeat the entire British Fleet at one time; they simply did not have sufficient ships or gun power. Rather, the Germans pursued a risky strategy based on attrition; their intent was to lure out and destroy elements of the Grand Fleet with the aim of fighting a future decisive engagement on more even terms. The Royal Navy's strategic aim on the other hand was either to engage and destroy the German Fleet - "to Trafalgar them" - or, failing that, to keep the High Seas Fleet bottled up thus protecting British shipping movements.

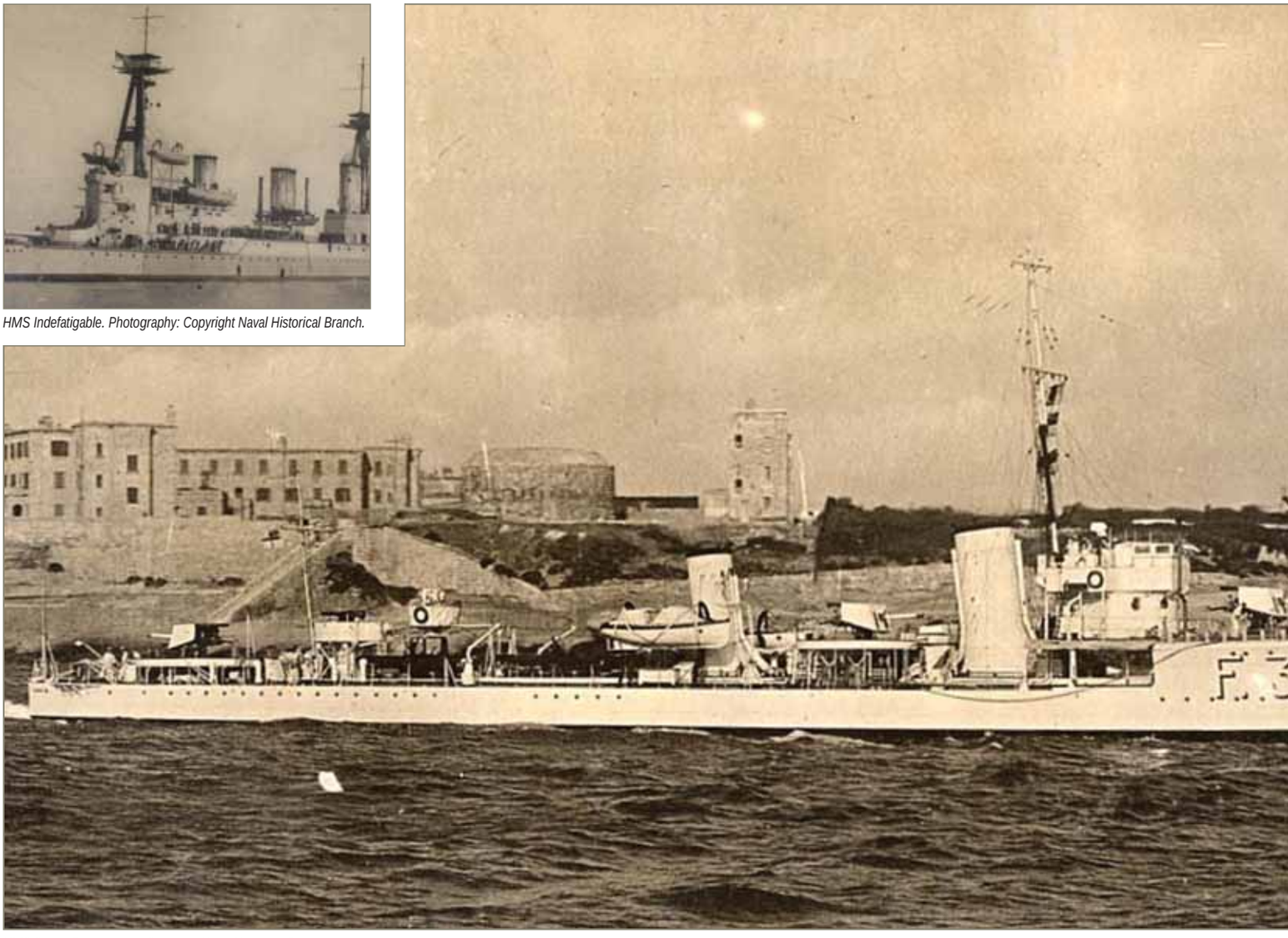
At the end of May 1916 the German Fleet launched an operation in the North Sea aimed at drawing in and destroying Vice Admiral Beatty's battle cruiser squadrons. However the British had learned of the German plan and Jellicoe brought the rest of the Grand Fleet to rendezvous with Beatty, springing the German trap in the process. The two Fleets - totalling 250 ships between them - met on the afternoon of 31 May and a running battle ensued. Poor ammunition handling practices led to the British battle cruisers INDEFATIGABLE and QUEEN MARY blowing up, causing Beatty to make his famous remark: 'There seems to be something wrong with our bloody ships today'.

The main action was over by 2100 and during the night the Germans made for home. The British lost more ships than the Germans (fourteen as against eleven), and twice as many men, but the Germans suffered more damage.

Certainly the losses on both sides of men and materiel were frightful, even by the harsh standards of the Great War.

The British handling of the Grand Fleet action was heavily criticised in the Press but if Jutland was a tactical victory for the Germans the strategic victory could be said to have gone to Britain. Although the High Seas Fleet did venture out again after Jutland, British naval supremacy in the North Sea remained unchallenged and as a result the naval blockade of Germany remained intact. The German Navy turned its attention to unrestricted submarine warfare, with what were ultimately to be disastrous consequences.

HMS Indefatigable. Photography: Copyright Naval Historical Branch.



HMS Shark. Photography: Copyright Naval Historical Branch.

The Wrecks and their protection

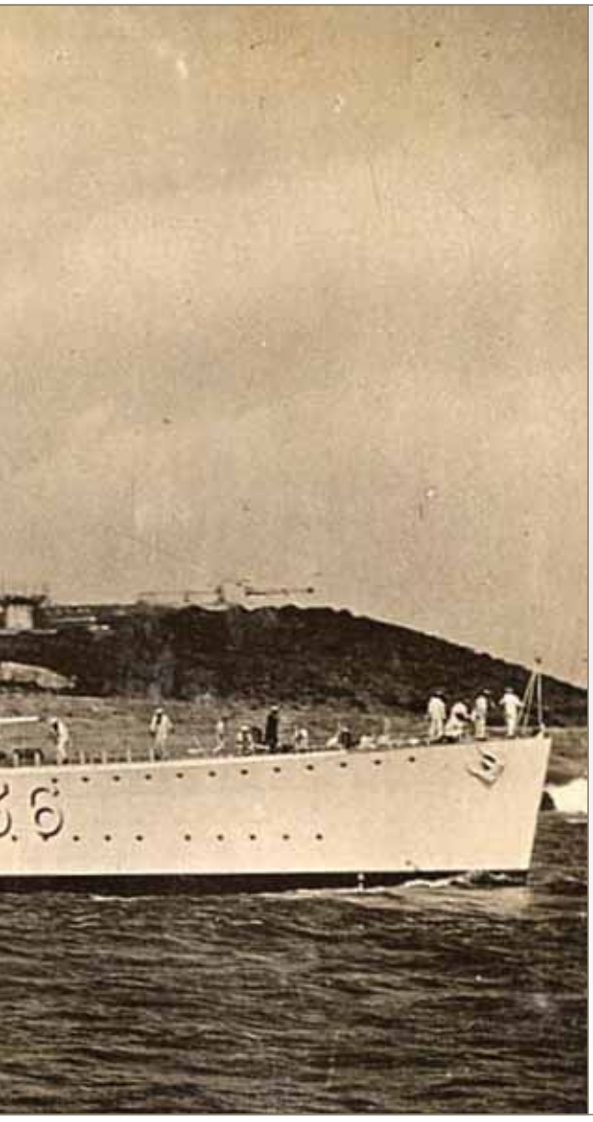
The Jutland wrecks lie in international waters and today are popular destinations for recreational divers operating from the Continent.
The increased availability of sophisticated diving equipment and techniques, referred to as "technical diving", has meant that even deep-lying wrecks can be visited by divers and regrettably there have been reports of souvenir hunters interfering with the wrecks and removing artefacts.

In 2006, to coincide with the 90th anniversary of the Battle, the United Kingdom announced new protections for the British wrecks sunk at Jutland, which we consider to be military maritime graves under the provisions of the Protection of Military Remains Act (PMRA) 1986. The fourteen wrecks were made protected places, equating to a "look but don't touch or enter" regime for sea users. Whilst divers are free to dive on the wrecks any intrusive activity would require prior licensing by the Ministry of Defence. By taking this action we aim to send a clear signal to divers and other groups that the United Kingdom wishes the Jutland wrecks to be accorded proper respect, which seems only reasonable given the sacrifice of human life that the wrecks represent together with their considerable historic importance.

The Jutland wreck designations are part of a rolling programme of identification and assessment against criteria aimed at extending protection under PMRA to all eligible British vessels. Since 2002 forty-eight vessels in UK and international waters (including the British Jutland ships) have been designated under the Act and a further ten will be added this year.

While the PMRA designations of the British Jutland wrecks were generally widely welcomed, the measure undoubtedly has certain inherent limitations. Not least of these is a problem common to all such maritime protection measures, namely that of the sheer physical difficulty of detecting any offences that might be committed and identifying and prosecuting those thought to have committed them.

There is also the fact that the Act's provisions can be applied only to British citizens or subjects, or to British-registered vessels. The Act itself does not provide for any active management of designated



Losses at Jutland[1]

BRITISH	GERMAN
Battle Cruisers	**Pre-dreadnought**
HMS INVINCIBLE	POMMERN
HMS INDEFATIGABLE	**Battle Cruiser**
HMS QUEEN MARY	LUTZOW
Cruisers	**Light Cruisers**
HMS WARRIOR	FRAUENLOB
HMS DEFENCE	ELBLING
HMS BLACK PRINCE	ROSTOCK
	WIESBADEN
Destroyers	**Destroyers**
HMS TIPPERARY	V48
HMS ARDENT	S35
HMS FORTUNE	V27
HMS SPARROWHAWK	V4
HMS SHARK	V29
HMS TURBULENT	
HMS NESTOR	
HMS NOMAD	
Fatalities	**Fatalities**
5,672 men	2,115 men

wreck sites beyond preventing unauthorised interference with them; the Ministry of Defence does not attempt to prevent the wrecks deteriorating naturally over time. Although PMRA can be used (and has been used) to designate the wrecks of other countries' military vessels if they lie in UK waters, in international waters only British military vessels can be protected. Germany has no equivalent legislation to allow her to protect her own Jutland wrecks. The United Kingdom's Protection of Wrecks Act 1973, which deals with historic and hazardous wrecks, applies to UK waters only. No European legislation, whether focused on the protection of maritime graves or on the preservation of historic artefacts and sites, appears to exist that would allow the Jutland wrecks as a group to be identified and legally safeguarded.

The Ministry of Defence would certainly argue that in designating the British Jutland wrecks under PMRA we are acknowledging the sacrifice of those who lost their lives in the battle, and are doing our utmost to prevent them being unlawfully disturbed. However for historians and archaeologists this level of protection, while welcome, does not go far enough. They point out that the Battle of Jutland was the last occasion in which opposing fleets fought using the naval gun as the principal weapons system. The Jutland wrecks represent the largest legacy in European waters of a former era of naval and European history and are a historical and cultural resource that in principle could remain for years to come.[2]

The British maritime archaeology lobby is keen to encourage the United Kingdom and other European nations, including Germany, to cooperate in developing a framework for the management of the Jutland site as a cultural resource for the benefit of future generations. This initiative is in its early days and the legal obstacles and resource implications are likely to be significant. There is no guarantee that it will be possible or practicable to meet aspirations in this area.

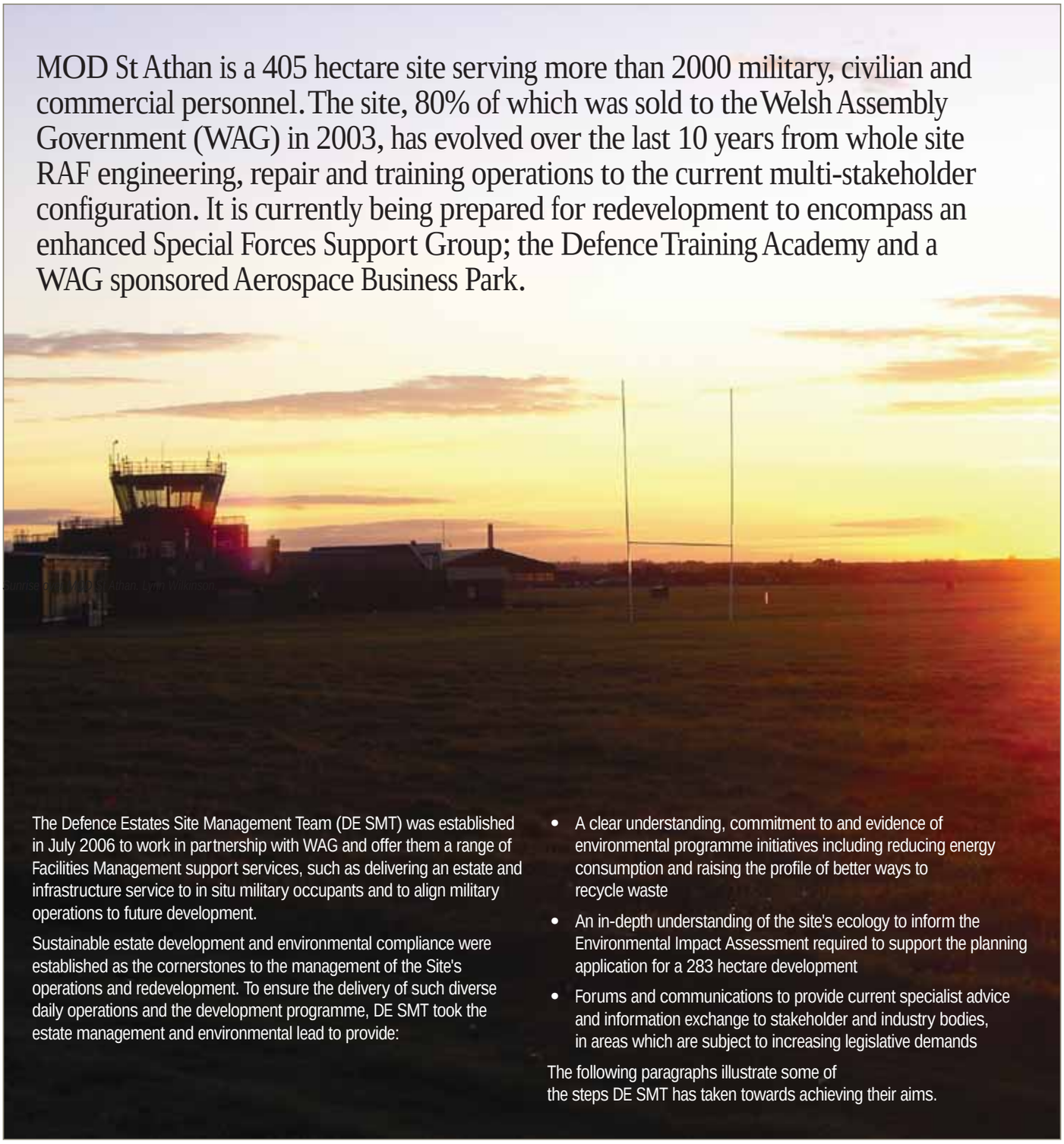
Peter MacDonald
CNS-Heritage

[1] Adapted from "The Royal Navy Day by Day" Sainsbury & Philips.

[2] Taken from unpublished material produced for "Battle of Jutland Conference - Managing the Cultural Resource": an international seminar held at the University of Wolverhampton 25 May 2006

Environmental and Sustainable Estate Management at MOD St Athan

MOD St Athan is a 405 hectare site serving more than 2000 military, civilian and commercial personnel. The site, 80% of which was sold to the Welsh Assembly Government (WAG) in 2003, has evolved over the last 10 years from whole site RAF engineering, repair and training operations to the current multi-stakeholder configuration. It is currently being prepared for redevelopment to encompass an enhanced Special Forces Support Group; the Defence Training Academy and a WAG sponsored Aerospace Business Park.



The Defence Estates Site Management Team (DE SMT) was established in July 2006 to work in partnership with WAG and offer them a range of Facilities Management support services, such as delivering an estate and infrastructure service to in situ military occupants and to align military operations to future development.

Sustainable estate development and environmental compliance were established as the cornerstones to the management of the Site's operations and redevelopment. To ensure the delivery of such diverse daily operations and the development programme, DE SMT took the estate management and environmental lead to provide:

- A clear understanding, commitment to and evidence of environmental programme initiatives including reducing energy consumption and raising the profile of better ways to recycle waste
- An in-depth understanding of the site's ecology to inform the Environmental Impact Assessment required to support the planning application for a 283 hectare development
- Forums and communications to provide current specialist advice and information exchange to stakeholder and industry bodies, in areas which are subject to increasing legislative demands

The following paragraphs illustrate some of the steps DE SMT has taken towards achieving their aims.

Sunrise over MOD St Athan. Photography: Lynn Wilkinson.

Energy Management

A dedicated Energy Office monitors and measures the use of energy across the site. DE SMT uses this information to highlight any areas of high usage and can amend or control the way energy is used. The future redevelopment of the site means that we are exploring new greener methods of generating electricity such as combined heat and power units, or biomass burning units which would utilise reusable materials from site.

Water Resources and Management

St Athan is bounded to the north and south by watercourses that are classed 'A' in respect of water quality. There are 14 discharge points from the site to these watercourses. DE SMT are responsible for the management of the discharge conditions and maintenance of the outfalls. An Integrated Pollution Prevention Plan has been formulated and tested to deal with any potential incident that may cause pollution and has attracted highly favourable comments from the Environment Agency.

Sustainable Estate Management

Within six months of its establishment the DE SMT achieved ISO 14001 accreditation benchmarking site practice and underpinning the Team's delivery, credibility and achievements. The Team has fostered an ethos of make a difference; change old habits and make sustainability best practice across the Site.

Ecology

St Athan is situated between two diverse habitats (maritime/coastal and managed grassland) meaning that flora and fauna is varied and diverse. The team faces the challenge, familiar to all those working on the defence estate, of balancing operations with obligations to protect species and habitat. Parcels of land that are rich in plants, invertebrates and mammals have been allocated for conservation work. For example, provisions are in place to manage the north of the site for birds and small mammals. On the south of the site great crested newt translocation is being developed in partnership with the Countryside Council for Wales. Surveys of bats and other species are also being carried out to inform the site redevelopment plans.

Regular engagement with local schools and community organisations that are interested in the ecology of the Vale of Glamorgan, particularly the St Athan area, has been a key element of the team's strategy. Open-air classrooms that allow local primary schools to observe the site through the changing cycles of the year under the stewardship of site environmental specialists have been a particularly successful initiative.

Great Crested Newt. Photography: Andy McIntyre.

Site Watercourse. Photography: Brian Acott.

Newly constructed newt ponds. Photography: Andy McIntyre.

Environmental and Sustainable Estate Management at MOD St Athan

UK National Recycling Award. Photography: Crown Copyright.

Waste Management

The correct management and disposal of waste is at the forefront of Government and DE management plans. The cost of sending waste to landfill or for other methods of disposal is increasing substantially year on year. The principle of Reduce, Reuse, Recycle and Recover before disposal, is the key to meeting the legislative obligation to segregate waste and source recipients for waste streams prior to disposal by landfill. St Athan now centrally manages all of its waste at a main handling centre where it is segregated into the various waste streams, including cardboard and paper, waste oils, hard and soft plastic, metals, WEEE, cars and green waste. This ensures that a higher proportion of the usable waste is recovered and the potential for cross contamination is lessened. Skip collection, transport costs and gate fees have all been reduced due to the introduction of waste compactors at the St Athan Recycling Centre.

The Site now recycles more than 70% of recoverable material, which in real terms means that around 450 tonnes of waste was diverted in the first six months of operation. In this time the site has changed from one of salvage and skips to one of recycling and reusing where costs are reduced and income is generated.

DE SMT achievements have been acknowledged by the waste industry at the Annual Recycling Awards sponsored by Severnside where the Team won three awards including the prestigious "National Recycling Champions" award sponsored by Letsrecycle.com.

Chief Executive Defence Estates officially opening the St. Athan Recycling Centre. Photography: Crown Copyright.

Sustainability poster campaign. Photography: Crown Copyright.

Heritage Survey of World War II Installations. Photography: Lynn Wilkinson.

Communication

Considerable efforts have been made to fully engage all personnel on site and attract them to buy-in to the wide programme of activities. A significant communication campaign incorporating publications, media articles, posters, for example on recycling, and totalisers at the main entrance has drawn considerable interest. Groups have been encouraged to visit the Recycling Centre to see the scale of the operation. In addition to staff, visitors have included CE DE, who opened the Centre, Welsh Assembly Ministers, councillors, representatives of local industry and school parties.

Cadw

During the Second World War St Athan was considered vulnerable to attack and as a consequence was heavily defended. Within the site boundary there is a Battle Headquarters, built to defend the airfield from attack. The observation cupola and entrance have survived in excellent condition. The condition of the interior is yet unknown, however, evidence suggests that if it is in the same condition as the exterior, then it would be one of, if not the best surviving Battle Headquarters in Wales.

Although very overgrown, 14 pillboxes were also discovered, many of which have survived in good condition. Three have been identified as Picket-Hamilton forts. These forts were designed to pop up, engaging enemy troop-carrying aircraft attempting to land at St Athan. Two complete examples have been located.

Cadw has recommended that these and many other examples of the defences built around the airfield during 1940-1 are scheduled as monuments of national importance. These significant historic finds will be protected during the redevelopment of the site and incorporated into future plans.

And finally...

DE SMT will continue to make a difference and pursue a proactive approach to best practice and will address all site environmental and sustainability issues, as they arise and develop initiatives to deal with each.

Wing Commander Richard Read OBE
DE Site Director, MOD St Athan

Wittering Heath, RAF Wittering

Brown Argus Butterfly. Photography: Jeff Davies, Cannon Horticulture.

Biodiversity

The "Heath" is remnant semi-natural grassland covering approximately six hectares situated on the western end of the base. It is of a calcareous character but slowly becoming colonised by hawthorn scrub. It is noted as a potentially important site for brown argus and the occasional grizzled skipper. Chalkhill blue, marbled white, green hairstreak and dingy skipper butterflies are all found in similar habitat within a five mile radius and potentially could occur with the correct management. The respective larval food plants for these butterflies, including birds foot trefoil, horse shoe vetch, agrimony, creeping cinquefoil and wild strawberry, can be found in patches amongst the rank grassland.

The area is prime habitat for willow warblers, lesser whitethroat, whitethroat and garden warbler, with tree pipits attempting to breed in 2007. The heath is also a wintering ground for short eared owl, barn owl, stonechat and woodcock. Common lizard, hare, stoat and weasel exist in variable numbers and noctule and pipistrelle bats hunt locally. Curlew breed on the camp and have been seen utilising the cover by bringing their young onto the heath.

Interesting flora such as twayblade, common spotted, early purple and bee orchid can all found within Wittering camp, but only common spotted is found on the heath. We would hope to encourage the other orchids with selective management. Other flora such as blackstonia and pink centaury, both indicators of calcareous grasslands, are also both present. The site adjoins two significant stands of small leaved lime woodland which form an important feature in this part of Northamptonshire.

The Plan

We determined that there were four options to encourage regeneration. Do nothing and allow natural succession to take place ultimately resulting in monotypic woodland, accelerate this process by planting native broadleaves, attempt to restore semi-natural grassland with part scrub habitat and finally attempt full restoration of semi-natural grassland

The conservation value of this site is currently represented by the semi-natural grassland element and its importance for invertebrates and the potential for restoration. It is an unused, non amenity island within an active airfield giving interested parties an option to create some beneficial habitat. It was therefore considered that attempting to restore the mixed grassland and scrub cover was the best option. Proper restoration and subsequent management would be best achieved by grazing the site with livestock in autumn and winter, particularly sheep, cattle or a conservation breed of pony e.g. Exmoor. As grazing is not an option, Cannon and the RAF Rough Shoot Club have agreed a mutually beneficial plan that will lead to some initial management regimes.

Firstly, we created four phased zones to assist project management, impacts and monitoring. Once these are in place, we will clear defined areas of encroaching hawthorn, creating glades and ride networks and regenerating poor condition gorse and broom at the same time. Grass will be cut and raked off annually in late summer and autumn. In conjunction with this we intend to scrape, disturb or turn in small selected areas of sward to investigate seed base.

Wittering Heath before the clearance work. Photography: Richard Coy, Cannon Horticulture.

Wittering Heath after the clearance work. Photography: Jeff Davies, Cannon Horticulture.

As the area was originally fenced off to contain rabbits, these will be monitored to see their effects on emergent and existing vegetation. Winter and summer bird recording surveys will continue as will logging other flora and fauna and, if feasible, we can introduce other features such as bird ringing and moth trapping. An ongoing report will be undertaken and made available.

Along with the recovering favourable Site of Special Scientific Interest (SSSI) on the base, interest has been recognised by various conservation agencies and it is hoped to encourage visits that include local employees, residents and schools, to appreciate the development work undertaken on Station and where possible consider some volunteer schemes in the future.

Cannon Horticulture work with their supply chain partners Babcock Dyncorp, in conjunction with Defence Estates and the RAF. We would also like to thank our colleagues in South West Prime for welcome advice.

Jeff Davies
Regional operations director
Cannon Horticulture

Common Spotted Orchid. Photography: Jeff Davies, Cannon Horticulture.

Germany

Senne Training Area

Red deer stag & hinds. Photography: Ludwig Teichmann.

Defence Training Estate Germany (DTE G) was formed on 1 April 2007 and became fully operational on 1 July 2007, with a new Commander and headquarters based in Sennelager. It is responsible for all UK administered ranges and training areas in Germany and its mission is to provide a safe and sustainable training estate to meet the needs of defence.

The Senne training area is the UK's largest range and training area complex in Germany. Situated in the German State of Northrhine-Westphalia, it forms part of the much larger Senne area which amounts to approximately 25,000 hectares, and backs onto the hills of the Teutoburger Wald running south west from Bielefeld-Brackwede to Schlangen. The training area is situated in the southern tip and covers an area of 12,000 hectares, including 600 hectares leased from the Prince of Lippe. The land is made available to British Forces for their exclusive use by the Federal Government under the Supplementary Agreement to the NATO Status of Forces Agreement.

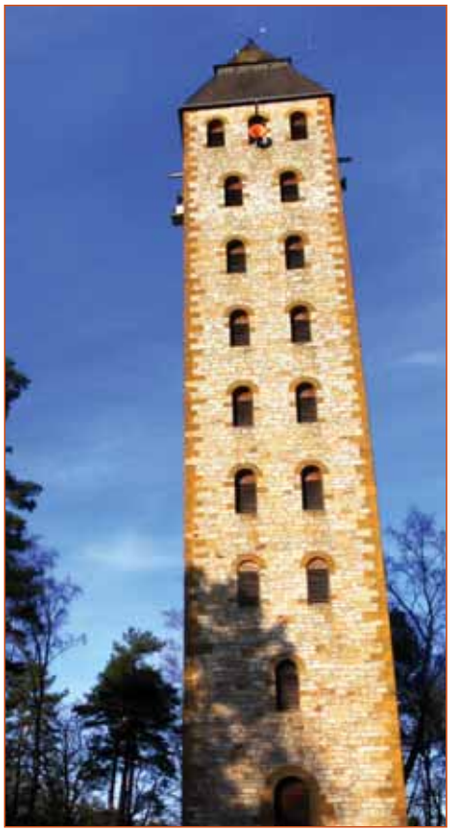
The Senne training area consists of a variety of facilities including: 14 tactical training areas, 10 live firing marksmanship ranges, 6,000 hectares of dry training areas, amphibious and engineer areas, eight campsites as well as many other minor training facilities. On average it is used for 345 days a year. In addition to the British Forces the Bundeswehr have a co-use agreement meaning other NATO countries can purchase spare capacity when available. To manage the environmental and conservation aspects of the training area DTE G works very closely with the Bundesforstamt Senne who manage the forestry, game and advise on ecological and conservation issues. In addition the British Forces fund the Bundesanstalt fur Immobilienaufgaben Bielefeld (BImA), (Lands Maintenance Team) who maintain the open areas. In-house professional guidance is provided by the Defence Estates Europe, Environmental Advisor.

It is acknowledged that the Senne is one of the most important ecological sites in the region and, as tenant, DTE G are committed to maintaining the balance between military training and the environment. Civil and military cooperation is essential in harmonising military training and environmental issues. This is discussed at annual joint meetings between DTE G, the German authorities and their representatives involved with the Senne.

The annual Anglo German Environmental meeting is jointly chaired by Commander DTE G and a Senior District Government Director. It has members and representatives from military and civilian organisations involved in the environmental and conservation management of the Senne.

The recognition of military primacy, separation of the training area, restrictions on leisure pursuits and access has protected the varied landscape and wildlife. Species of animals and plants that are rare elsewhere are still found in abundance in their specific habitats on the Senne. The military use of the area has resulted in the preservation of much of the original condition and provides an excellent example of cooperation between the British military (user), Federal authorities (owner) and BImA (landlords).

Major John Gregson
DTE Germany



Haustenbecker Tower. Photography: Ludwig Teichmann.

Cyprus - Conservation Group Update

There have been major changes to conservation activities in Cyprus over the last year. The main change has been the establishment of a new Conservation Group for British Forces Cyprus (BFC) in early 2008. This followed restructuring of the Command which resulted in the Western and Eastern Sovereign Base Area Commands being replaced by a single Command.

The inaugural Conservation Group meeting, chaired by the BFC Command Advisor for Environment, took place in February and was attended by over 30 stakeholders from the military, police, Republic of Cyprus (RoC) authorities and non-governmental organisations. The role of the group is to facilitate effective liaison between relevant stakeholders and to ensure coordination of conservation activities. Environmental issues in Cyprus are very political, so the work of the Conservation Group has never been more important in ensuring that stakeholders remain involved.

A number of key conservation programmes continue alongside a few new ones. The various Turtle Watch groups have undertaken a range of beach patrols over the nesting season (June-October). Beach cleaning and rescuing turtles caught up in fishing lines and nets unfortunately still takes up a disproportionate amount of time and highlights some of the conservation issues for these species. Episkopi Turtle Watch collected 120 bags of rubbish from one beach in a single morning! As a result of the new Nature Ordinance passed in September 2007, the Sovereign Base Area Administration (SBAA) are tightening up on procedures for managing and monitoring turtle nests and the turtle watch data will be used to designate certain beaches in the bases as Special Areas of Conservation (SAC).

The griffon vulture colony at Episkopi (the last in Cyprus) appears to be in decline. Despite the protection afforded by the station to the nesting sites, the population is as low as 12 birds with only two breeding pairs. This is due to impacts from changes in farm practices and the odd poisoned carcass. As the vultures have long lives natural recruitment from such a small pool is unlikely to bring about a return to favourable conservation status in Cyprus. Other measures are in the pipeline and have been highlighted recently on the BBC's Inside Out programme. The Conservation Group is working with the RoC Game Fund, Forestry Dept and Birdlife Cyprus on a plan to establish safe food sources in secure feeding areas, and a reintroduction programme. This now appears to be the only chance for this species in Cyprus.

On a more positive note three Special Protection Areas for birds are being designated in the Western Sovereign Base Area, in and around the Akrotiri peninsular (see pages 54-57). Members of the Conservation Group played a key role in supplying the data necessary to make these designations possible. A bat project has also been started and monitoring programmes established for the Egyptian fruit bat, free tailed, greater horseshoe, Kuhl's pipistrelles and Schreiber's bats.
In addition funding has been allocated to investigate the roosting and feeding behaviour of the Egyptian fruit bat to inform the designation of SAC for Europe's only fruit bat.

The archaeological sub group have been very active. Major investigations are underway at Dreamer's Bay, Akrotiri, which now appears to be of major significance as a naval station during the Ptolemaic period. In addition, the RoC Department of Antiquities has been protecting key pebble mosaics at Akrotiri.

Finally, the importance of data was raised at the last Conservation Group meeting. With the high turnover of British forces personnel and civilians, there is a tendency for personnel to leave Cyprus with very useful data obtained during their time here. The SBAA Environment Department is setting up a data centre where members of the Conservation Group and others can deposit their records. If you have served here and have data that would support the conservation management of the SBAs we'd be very interested to here from you. Please email sbaaenviro@cytanet.com.cy

Ian Davidson-Watts
Command Advisor (Environment)
British Forces Cyprus

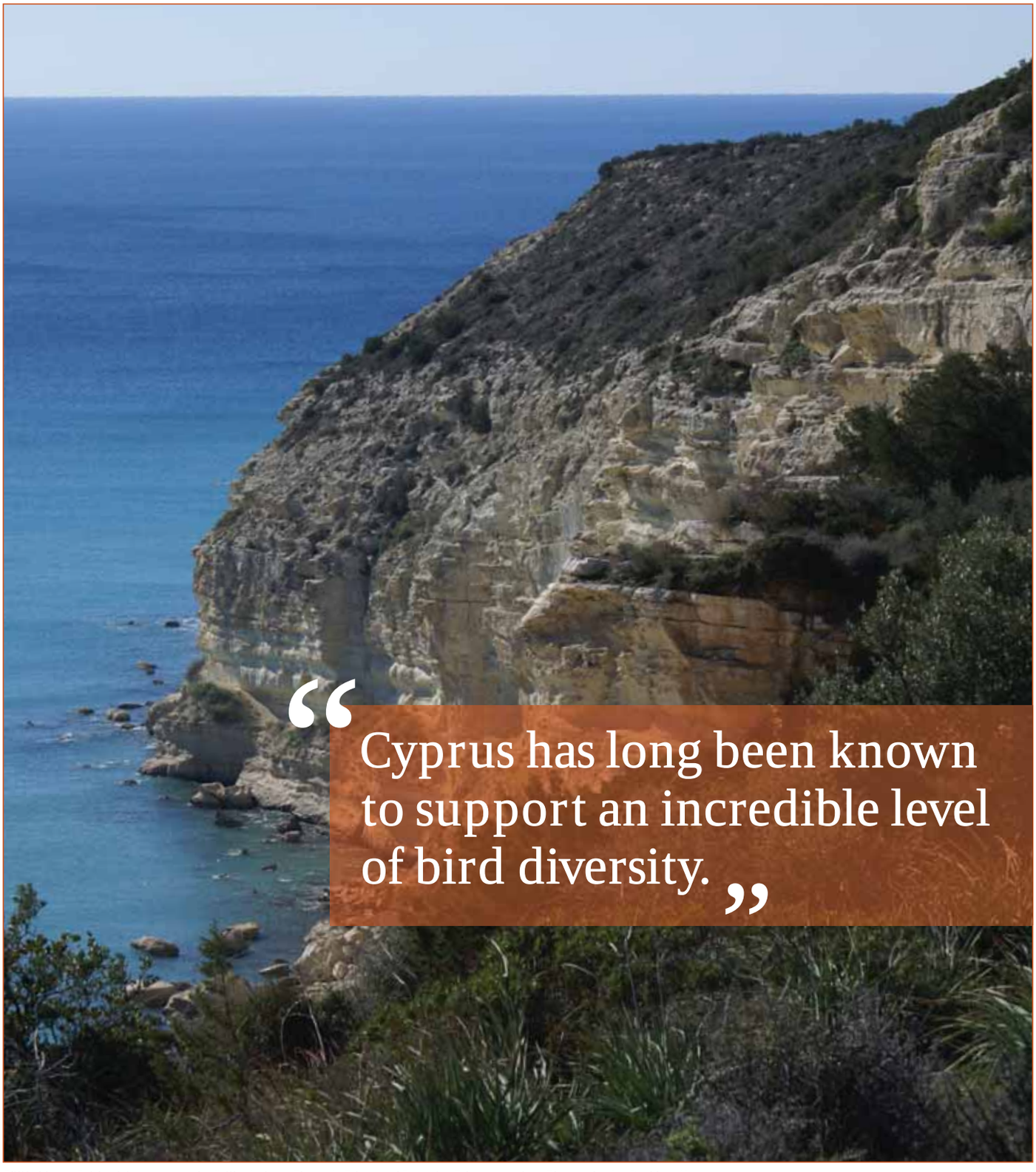
Members at the inaugural meeting of the Conservation Group. Photography SBAA.

Episkopi Turtle Watch Group cleaning Kourium Beach. Photography: David Stokes.

Egyptian Fruit Bats. Photography: Dr Ian Davidson-Watts.

Cyprus

Special Protection Areas for Birds in the Sovereign Base Areas of Cyprus



Cliff habitat at Episkopi that supports the Griffon Vulture, Elenora's Falcon and Peregrine Falcon nest sites. Photgraphy: Ian Davidson-Watts.

Introducing the Sovereign Base Areas of Cyprus

The Sovereign Base Areas of Cyprus (SBAs) of Akrotiri and Dhekelia, usually referred to as Western Sovereign Base Area (WSBA) and Eastern Sovereign Base Area (ESBA), are those parts of Cyprus which have remained under British jurisdiction since the creation of an independent Republic of Cyprus (RoC) in 1960. Their purpose is to support the military use of the area. However as 60% of land is in private ownership and is home to many Cypriot nationals, a civilian 'administration' known as the Sovereign Base Areas Administration (SBAA) was formed to govern the area. This Administration is in effect the civil government of the SBAs. Its range of interest is that of any civil government but, many of its functions, particularly in respect of the Cypriot inhabitants, are carried out by Republican officials on behalf of the Administration under delegated powers.

The SBAA, due to its predominant military purpose, reports to the MOD in London. It carries out those minimum functions directly related to the exercise of sovereignty such as the enactment of legislation, maintenance of law and order and the control of immigration and development. The SBAA Environment Department is responsible for meeting the SBA's obligations to sustainability and the environment, especially those that relate to nature conservation.

Why designate Special Protection Areas in the SBAs?

The accession of the RoC to the European Union in 2004 brought with it a number of legal obligations to protect and conserve the birds of Cyprus. In line with the requirements of the EC Birds Directive, the RoC was required to introduce legislation to protect birds, manage the hunting of game in a sustainable manner and designate Special Protection Areas (SPAs). The result was the enactment of the Protection and Management of Game and Wild Birds Law 2004 and the designation of nine SPAs. Although the SBAs are not part of the European Union, the Treaty of Establishment requires them to mirror the laws of the RoC. In line with these obligations the SBAA enacted the Protection and Management of Game and Wild Birds Ordinance 2004 to ensure important bird species and populations have the level of protection required by the EU Birds Directive.

Cyprus has long been known to support an incredible level of bird diversity. Its position between three continents, Europe, Asia and Africa makes it particularly important to migratory birds that pass through during the autumn and spring. In addition to this, unique habitats within Cyprus support some of Europe's most important breeding and over wintering bird species that often congregate in their thousands. Cyprus has a bird list of 378 species. This includes two endemic species, the Cyprus pied wheatear and the Cyprus warbler. In addition there are four endemic subspecies: Cyprus scops owl, coal tit, short-toed treecreeper and jay.

The presence of the SBAs and their predominant use as military bases means that pressures such as tourist development have been severely curtailed and, as a result, they retain some of the best undeveloped, semi-natural (as well as historic) landscapes in Cyprus. The military presence in large parts of the SBAs also prevents unregulated disturbance such as illegal netting and poaching as well as other potentially damaging activities. This has ultimately resulted in the SBAs containing some of the best bird areas in Cyprus, especially around the Akrotiri peninsular in the WSBA. This is already recognised as an important bird area (Birdlife International) supporting a range of species, from the last Cypriot colony of griffon vultures to the largest congregations of water birds on the island. With such a diversity of birds the obligation to protect areas which are critical to their life-cycle has never been greater and in March 2008 the SBAA Environment Department consulted on three Special Protection Areas to contribute to the conservation of Cyprus' internationally important bird populations.

What's been designated?

Three SPAs have been designated. The Episkopi Cliffs SPA, the Akrotiri Cliffs SPA and the Akrotiri Wetlands SPA.

The Episkopi Cliffs SPA consists of the limestone cliffs and associated natural habitats such as juniper maquis, phrygana, olea and ceratonia forests to the south, east and west of Episkopi Garrison. These areas form some of the most important nesting sites for bird species in Cyprus. Many of the nesting areas fall inside Episkopi Garrison which provides a degree of isolation and restrictions on disturbing activities. The cliffs are

Eleonora's Falcon at Akroitiri Cliffs. Photography: SBAA.

Griffon Vulture at Episkopi Cliffs. Photography: SBAA.

Cyprus

Special Protection Areas for Birds in the Sovereign Base Areas of Cyprus.

Greater Flamingos at Akrotiri Salt Lake. Photography: SBAA.

the most important breeding site for the resident griffon vulture whose overall numbers are in decline in Cyprus. The peregrine falcon, an uncommon breeding resident in Cyprus, also breeds at the cliffs. Surveys undertaken over the last five years indicate that an average of 37 breeding pairs of Eleonora's falcons use the cliffs.

Similarly the Akrotiri Cliffs SPA situated at the southern end of the Akrotiri Peninsula predominantly consists of cliffs formed in the pleistocene geological period. The cliffs provide a combination of habitats including submerged and partially submerged sea caves and vegetated sea cliffs, adjacent to garigue and maquis habitats. The combination of these habitats and the relatively undisturbed location within a military base provides important breeding sites for Eleonora's Falcon (average nesting pairs over the last five years: 32), and the resident breeder European (Mediterranean) shag.

However the jewel in the crown is the Akrotiri wetlands SPA. The largest wetland in Cyprus, part of which is already a Ramsar site, comprises the salt lake and other coastal lagoons and pools, halophytic wetlands, the Phassouri Marsh (reedbeds and sedgebeds), surrounding marshes and halophilus scrubs, eucalyptus plantations and adjacent farmland.

The salt lake, the Phassouri Marsh and the surrounding wetlands support the largest number of water birds in Cyprus. Eighty-nine species of migratory water birds use the area for wintering, roosting and foraging. Thousands of flamingos use the salt lake every year for wintering (peak number over the last five years: 10,000). Hundreds of demoiselle cranes use the salt lake and the surrounding marshes in August and September for roosting (365 birds recorded in 2007). Large numbers of white storks and common cranes also concentrate at the wetlands (between late September and late October more than 10,000 cranes have been recorded over-flying the Akrotiri Peninsula). The wetlands are used by 20 species of sandpipers (especially ruff and little stint) numbering in their thousands during spring migration. Akrotiri Salt Lake is also one of the two most important nesting sites for the black-winged stilt (up to 54 pairs nested there during spring 2005).

The general area, and especially the eucalyptus forest and the fruit plantations, is an important site for migratory raptors. Large numbers of red-footed falcons (up to 830), honey buzzards (up to 5,000), marsh harriers (up to 600), lesser kestrels (up to 137), and many other species of raptors pass through the area (autumn migration raptor count from 2004 - 2007 identified 25 species of raptors with a total annual population of up to 7000 birds).

The spur-winged plover also uses the Phassouri marsh area regularly for breeding. This marsh is also the only nesting site for the globally endangered ferruginous duck that colonised the site from 2005, and also one of the two nesting sites for the black-headed yellow wagtail on the island. Significant numbers of shelducks over winter at the salt lake, while large numbers of slender-billed gulls and bee-eaters are passage migrants. It is one of the two nesting sites for the Kentish plover on the island.

Conservation challenges

The designation of these SPAs is only the first step to the conservation of these bird populations. The Ordinances allow for legal orders to be made for the regulation of damaging activities, both within and outside MOD establishments. This is particularly relevant for habitat management issues. However, the greatest current threats include the continued bird poaching and other illegal hunting activities which are currently rife in Cyprus and the drought which Cyprus has been experiencing over the last few years. The latter in particular is likely to have serious consequences for the wetlands at Akrotiri.

Its not all doom and gloom however. Bird hunting and poaching issues are considered a top priority for the SBA Police. In the first two months of 2008 the Police have spent 540 hours on anti-poaching patrols in 40 anti-poaching operations. Two hundred and ninety seven limesticks and twenty-eight mistnets have been seized. In the same period sixty-two offenders were arrested and forty-five have received fines. British Forces Cyprus, supported by Defence Estates are currently developing Environmental Management Systems which will include procedures to ensure that military activities are properly managed to avoid negative impacts, and that sustainable development targets to conserve water are properly implemented at these and other designated sites.

An appreciation of the importance of these SPAs will be vital to their continued effectiveness, and it is the continued development of the SBAA Environment Department's Environmental Information and Education Centre at Akrotiri that has a key role to play in the long term future of these SPAs.

Ian Davidson-Watts
Dr Ian Davidson-Watts is the Head of SBAA Environment Department, based at Episkopi, Cyprus.

British Indian Ocean Territories

The Royal Navy Birdwatching Society Ornithological Survey of Diego Garcia.

Red-Footed Booby: a common breeding species on Diego Garcia. Photography: Chris Patrick, RNBWS.

Readers of Sanctuary may be aware of the unique military base sited on Diego Garcia in the British Indian Ocean Territories (BIOT). This strategic asset situated 1800 km east of the Seychelles and some 3000 km west of Indonesia, in the middle regions of the Indian Ocean is also home to a thriving seabird colony. However, the fate of this colony has not always been so healthy. In the late 19th century vast numbers of breeding seabirds were reported on mainland Diego Garcia but they did not survive the interference of man and his commensals (primarily rats and cats). Certainly by the early 20th century there were few breeding seabirds on the mainland of Diego Garcia, although the three islands at the entrance to the lagoon have long been a protected area free of rats and full of breeding seabirds.

The 1976 Exchange of Notes between the UK and USA allowed the USA to build facilities in the western part of Diego Garcia leaving the eastern arm outside the specific area. Access to this Conservation Area was controlled and limited. In 1985 there were less than 10 pairs of red-footed booby, *Sula sula* on mainland Diego Garcia but the numbers were steadily increasing. Further measures were taken to protect the Conservation Area and the population increased to 2600 pairs in 1996 and 4320 pairs in 2007. The area north of Minni Minni to Barton Point and the three lagoon islands, part of the original Conservation Area, was designated an Important Bird Area (IBA) on the strength of the breeding red-footed booby.

Sponsored by the Overseas Territories Environmental Programme (OTEP), the RSPB (the BirdLife International Partner in the UK), the Chagos Conservation Trust (CCT) and the Royal Navy Birdwatching Society (RNBWS), two expeditions were mounted to Diego Garcia in May 2005 and November 2007. The aim was to carry out a census of the seabirds of Barton Point IBA using robust, repeatable, scientific methods. Critically, the expeditions spanned the calendar year in order to investigate the breeding strategies of the seabirds present. Incidental to the primary expedition aim, a number of other records were collected that will assist in building up the biological knowledge of this under researched area.

The November 2007 expedition members. L-R CPO Chris Patrick, Lt Col Roger Dickey, Major Andrew Bray, Major Peter Carr, CPO Mark Cutts and CPO Tony Tindale. Photography: Chris Patrick, RNBWS.

Throughout the duration of the two expeditions 221, 30m x 10m quadrats from within the 28 km of lagoon and ocean side coastline where the boobies breed were counted. Extrapolating from this data, it was calculated that in May 2005 there were 4370 breeding pairs of red-footed booby, and in November 2007, 203 breeding pairs.

The counting of the quadrats was a truly expeditionary affair. Access problems caused by fallen trees meant that vehicles could not reach the Barton Point area and up to 29kms had to be covered daily on foot in searing temperatures. In other areas of the colony, counts had to be undertaken from the water and kayaks and a motor launch had to be hired to achieve this. It was the consensus among expedition members that bird watching on a Service expedition is not as easy as it sounds and not for the faint-hearted!

The breeding seabird data gathered by the RNBWS expeditions is important for conservation throughout BIOT. The limited seabird censuses conducted to date in BIOT have mainly taken place in March for access, permission and time reasons. The RNBWS data demonstrates that for red-footed booby, the most numerous large breeding seabird in the Territories, counts for one month will not reveal the true breeding population size, meaning the breeding population may have been under estimated. Specifically for Diego Garcia, the knowledge that the peak breeding period for seabirds is between January and July should influence the timing of any major management work that needs to be conducted for military reasons in the IBA.

The two expeditions also identified 14 new bird species for BIOT including gull-billed tern, *Sterna*

Moorhen: a new species for BIOT that may have established a breeding population. Chris Patrick, RNBWS.

nilotica; Saunders's tern, *Sterna saundersi*; white-cheeked tern, *Sterna repressa*; yellow wagtail, *Motacilla flava* (all first recorded May 2005). Black-crowned night-heron, *Nycticorax nycticorax*; Indian pond-heron, *Ardeola grayii*; common moorhen, *Gallinula chloropus*; common snipe, *Gallinago gallinago*; pectoral sandpiper, *Calidris melanotos*; ruff, *Philomachus pugmax*; parasitic jaeger, *Stercorarius parasiticus*; white-throated needletail, *Hirundapus caudacutus*; common swift, *Apus apus* and fork-tailed swift, *Apus pacificus*. Whilst of little direct immediate conservation value, these findings assist in building up global knowledge of these species as well as a better understanding of the avian populations that use Diego Garcia. Longer term, particularly for species such as common moorhen and black-crowned night-heron, these findings may herald colonisation.

Several other species that had been recorded fewer than five times previously in the Chagos were also found, some of which had not been seen since the early 1970s. The recording, and in most cases photographing, of garganey, *Anas querquedula*; glossy ibis, *Plegadis falcinellus*; great egret, *Casmerodius albus*; little egret, *Egretta garzetta*; common ringed plover, *Charadrius hiaticula*; Kentish plover, *Charadrius alexandrinus*; Eurasian curlew, *Numenius arquata*; redshank, *Tringa tetanus*; marsh sandpiper, *Tringa stagnatilis*; Terek sandpiper, *Xenus cinereus*; grey-tailed tattler, *Heteroscelus brevipes* and oriental pratincole, *Glareolum maldivarum*, greatly assists in building up the ornithological picture of this under watched area.

Oriental Pratincole: a seemingly rare species on Diego Garcia. Photography: Chris Patrick, RNBWS.

Rhyothemis Variegata Linn. (Picturewing): a new species of dragonfly for BIOT. Chris Patrick, RNBWS.

The November 2007 expedition also found a new species of dragonfly, *Rhyothemis variegata* and tracked the territorial expansion of two new recently arrived herptile species, the cane toad, *Bufo marinus* and the oriental garden lizard, *Calotes versicolor*. Both of the herptiles appear to have colonised Diego Garcia in the 21st century and are of possible future conservation concern.

In summary, the two RNBWS expeditions have contributed a wealth of useful data that can be used for conservation purposes within the Chagos. The findings are in accord with Action Two of the Chagos Conservation Management Plan as they have instigated a long-term scientific programme of monitoring the seabirds of one of the IBAs within the Chagos. This accessible IBA could be used as an indicator of the health of the less-accessible IBAs in the outer atolls. For a very small financial investment and with limited impact upon the serving troops on Diego Garcia, RNBWS has contributed a great deal towards the long-term ecological understanding of this unique area.

A full expedition report from the May 2005 expedition is available in Sea Swallow 54, the journal of RNBWS (www.rnbws.org.uk). A full report of the November 2007 expedition will appear in Sea Swallow 57. A paper covering the breeding population of red footed booby of Barton Point will be published in an internationally recognised ornithological journal in the future. Further information on this unique area and the Chagos Conservation Trust can be found at www.chagosconservationtrust.org/

Major Peter Carr BSc Hons AIEEM RM

Falkland Islands

Six Months Down South

Silver Teal with chicks, Champina Pond, 9th Dec 2006. Photography: Steve Copsey.

I stepped out of the jumbo jet and onto the tarmac. It was the end of July 2006 and I was immediately lashed by a near horizontal sleet storm. The temperature hovered around the zero mark. Welcome to Mount Pleasant, I was here for the next six months.

Many servicemen and women have now served in the Falklands; I had previously visited the islands twice, both times by ship, so to have six months on terra firma would be a new experience. The timing of the visit was just about perfect. I was joining towards the end of austral winter and my time would terminate towards the end of summer. That ensured as a keen birdwatcher I would be here for the full breeding season.

Much has been written about the wealth of wildlife that the Falkland Islands have to offer, and I had many chances during my tour to sample the various delights. What I was not aware of was the wildlife literally on your doorstep. The Mount Pleasant Airfield (MPA) complex contained some excellent wildlife sights of its own.

Two months into my tour I was joined by a fellow Royal Naval Birdwatching Society (RNBWS) member, CPO Mark Cutts. His arrival heralded the start of spring and together we intended to be out in the field as much as work commitments would allow. Before our visit we had liaised with Robin Woods a renowned expert on the flora and fauna of the islands, and a member of Falklands Conservation. He informed us that an ongoing breeding bird survey was taking place over the next five years, and our help was enlisted to cover much of the area around MPA and Mare Harbour.

Within the MPA complex there were two main areas of interest, both of which were shallow fresh water ponds. The first was Sand Pond situated just south of the Medical Centre. The second was Champina Pond. This pond, which also has some marshes adjacent to it, is located to the north of the main runway near to the control tower.

Bodies of water on the Falklands fall into two simple categories, either they have plenty of birdlife on or around them or not. This appeared to be down to the presence of the native water milfoil *Myriophyllum elatinoides*, which is a good oxygenating plant and beneficial to all manner of water borne life forms. The two ponds at MPA had this plant in abundance and as a consequence were home to many birds.
The main species on these ponds were, as you'd expect wildfowl and grebes. The grebes were represented by two species white tufted and silvery. The former occupied the ponds in ones and twos, whereas the silvery was present in the twenty to thirty bracket. Over the Christmas period, which was at the height of the breeding season, we counted 17 silvery grebe nests on Sand Pond. Sadly, a few days after Christmas, a violent storm washed a number of these nests away. However, the silvery grebe is a resilient little bird and a count early in January 2007 produced a minimum of 11 chicks on the pond. These are very difficult to see among the mass of water weed so it is more than likely that most birds survived the storm.

Long Tailed Meadowlark, Champina Pond, 20th Aug 2006. Photography: Steve Copsey.

Crested Caracara, MPA, 11th Oct 2006. Photography: Steve Copsey.

Champina Pond was a favourite for the wildfowl. Six species of duck and two of goose were seen at Champina on most visits. The most common species is speckled teal and occasionally up to 50 of these birds could be seen. Silver teal, a very attractive species was also common to both Sand and Champina. Flying steamer duck, a relatively rare bird on the islands was also seen on every visit to Champina. Unlike the teal species we never saw evidence of the steamer ducks breeding.

Both upland and ruddy headed goose were familiar birds on our visits. The upland goose is well known by all personnel stationed at the airfield as they are ever present in all areas of the camp, the white male usually in attendance of the brown female. The ruddy headed goose has seen a severe restriction of its range in South America and is now classified as threatened. The Falklands population however, continues to grow and is very important in world terms.

The margins of both ponds also produced a number of land based birds. Grass wrens are ever present in the surrounding scrub, as are long tailed meadowlarks; the remarkable scarlet breast of the male always catches the eye. Falkland pipit is another common bird constantly carrying out its song flight as the ponds are circumnavigated.

Crested caracaras are one of the larger birds of prey breeding on the island and we were fortunate that a pair was nesting in the complex. In fact a pair raised one chick in the non-native coniferous trees at the west end of the main runway. This is quite an achievement bearing in mind that 'extremely noisy' jets passed over the nest site daily. The scarcity of suitable nest sites had to be the primary reason for the bird's choice. At the opposite end of the runway a platform has been erected for a pair of red backed hawks that regularly nest in the area. The platform was built and erected to draw the hawks away from nesting on a one of the RAF ground radio aerials - I am glad to say successfully. Both these species are regularly encountered hunting over MPA. Young caracaras have also taken to scavenging along with turkey vultures and the numerous gulls outside the kitchen areas of the mess, and particularly around the back of 'Ronokes Cafe'.

I hope this brief report has whetted the appetite for any MOD personnel that are fortunate enough to visit the islands. Over the six month tour we saw sixty-four species of bird. This included all birds that regularly use the islands whether to breed or migrate from the harsh northern winter. Forty-two of these birds can be seen on MOD land, or adjacent to it in areas such as the beaches around Mare Harbour. I hope that anyone visiting in the future gets half the pleasure from the wildlife as we got in our six months.

CPO Steve Copsey, RNBWS.

Cyprus

The Ancient Maritime Landscape of Pyla

The Pyla ranges stretch from the eastern edge of Larnaca's suburbs to the boundary of Dhekelia Garrison, along a coastal plain flanked by three imposing cliffs. A slight dip in the fields that run alongside the shore is all that remains today of a once substantial, but now infilled, bay. While this natural harbour silted up and was eventually drained for agriculture during the early 20th century, it previously served as a major maritime resource for the region's inhabitants, providing safe anchorage at a strategic junction of ancient Mediterranean trading routes. Its presence led to the development of two major maritime settlements, one on the hilltop above the harbour at Kokkinokremos during the Late Bronze Age (c. 1200 BC), and another on the coastal plain below at Koutsopetria during the Late Roman period (c. 400-700 AD).

Free from the pressures of urban development, the Pyla ranges constitute a rare island of preservation within the otherwise crowded environs of Larnaca Bay, providing a unique window into the development of this ancient maritime region. The role of the British Army in protecting this archaeological inheritance through effective environmental impact assessment in cooperation with the Republic of Cyprus (RoC) authorities is central to its long-term survival. By educating the public, academics, and policy-makers alike about the importance of this historic landscape, the primary goal of the Pyla Koutsopetria Archaeological Project (PKAP) is to help conserve this rich cultural legacy for generations to come.

Pyla Koutsopetria

In 2003 an international team of archaeologists began the PKAP to document ancient remains along this 2.4km stretch of coastline. The principle method used has been intensive pedestrian survey, which involves walking over the entire region at close intervals, collecting a representative sample of objects visible on the surface. This information is then entered into a Geographic Information System (GIS) to analyse the relative distribution, density and composition of artefacts in the various collection areas. This approach has allowed for the recording of archaeological remains over a wide area, producing a more holistic impression of the ancient landscape than would have been possible through excavation alone.

Pyla-Kokkinokremos from the air, June 2007. Photography: Pyla Koutsopetria Archaeological Project.

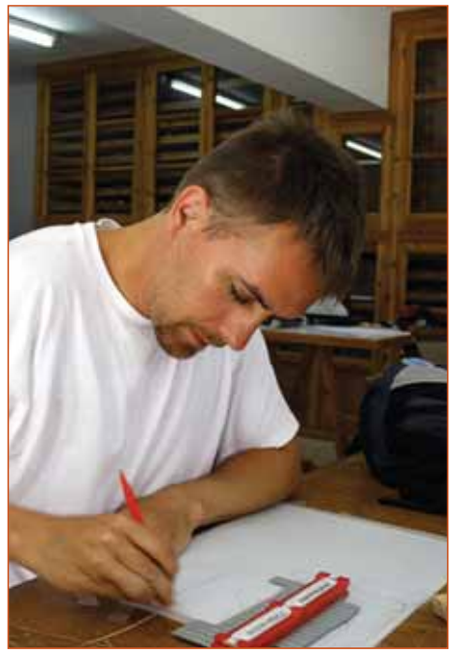
PKAP has also worked closely with the Cyprus Geological Survey to drill five boreholes down to a depth of 15-25m, to determine the dimensions and chronology of the now vanished bay. The resulting cores have demonstrated that this would have been of sufficient depth and size to serve as a substantial harbour from the Neolithic through to the Ottoman period.

During the 2007 field season PKAP added remote sensing and geophysical survey to its list of investigative techniques. In addition to electrical resistivity which was used to map architectural features below the ground surface, the project also benefited from the assistance of 84 Sqn RAF Akrotiri, who took a series of oblique aerial photographs of the project area following rain, which had exposed numerous diagnostic crop marks in the normally dry and undifferentiated June soil. When used in combination these data-sets allowed the PKAP team to identify archaeological features essentially invisible at ground level.

The results from the Late Roman site of Koutsopetria revealed the remains of a bustling coastal town. Geophysical survey was used to map a surviving section of the town grid. This evidence of archaic 'town-planning' is significant, and complements the results of previous excavations by the RoC Department of Antiquities, both suggesting a community of significant wealth and status. On the surface, the distribution of pottery cast-up through ploughing allowed the survey team to measure the approximate extent of settlement, suggesting a total area of 15-20 hectares in size.

During the course of this work PKAP collected over 10,000 sherds, which have been used to analyse the wide-ranging connections between Pyla-Koutsopetria and other contemporary sites across the Roman Empire. The pottery has allowed us to demonstrate that the site's wealthiest residents ate off fine red-glazed plates and bowls imported from modern day Tunisia, Turkey, and the western half of Cyprus. The presence of large quantities of amphora (transport vessels) also suggests that the site exported olive oil to the wider Mediterranean market and imported wine from as far away as southern Greece.

Planning on the fortification wall on Pyla-Vigla.
Photography: Pyla Koutsopetria Archaeological Project.



Artefact recording at Larnaca Museum.
Photography: Pyla Koutsopetria Archaeological Project.

Buried late Bronze Age storage vessel, scale 1m.
Photography: Pyla Koutsopetria Archaeological Project.

In 2007 geophysical survey on a prominent coastal bluff overlooking the late Roman town also revealed, with amazing clarity, the presence of a large building which appears to be an Early Christian basilica around 40m in length complete with an apse, aisles, and an outlying annex. These results proved to be even more remarkable when they were correlated with the new aerial photographs provided by the RAF, which revealed the course of a monumental fortification wall encircling the hilltop, which was in turn separated from the adjacent massif by an 18m wide dry-moat.

Pyla Kokkinokremos

High above the site of the harbour and overlooking the army rifle range, stands the Late Bronze Age fortified settlement of Pyla-Kokkinokremos. Survey work at this Grade II listed ancient monument concentrated on contextualizing the results of previous excavations within their broader landscape context. The RAF again assisted with aerial photography of the site which revealed a large subsurface feature visible from the air as a pronounced linear crop mark. Correlating these results with electrical resistivity data has revealed the remains of an ancient terrace running beneath the surface of the now largely level field. In the summer of 2008, this major architectural feature will be investigated further through a small, targeted excavation. This will help to more accurately determine the urban character and origins of the site, which was abruptly abandoned c.1200 BC following a possible raid by the so-called 'Sea-Peoples', an enigmatic band of ancient pirates who wreaked havoc throughout the eastern Mediterranean at the close of the Bronze Age.

Conclusion

In addition to making an important academic contribution to our knowledge of the island's history during the Late Bronze Age and Late Roman period, the results of the ongoing PKAP survey have a practical application in revealing the extent, wealth and significance of archaeological remains located within the Pyla ranges. By using an integrated survey approach, this work has not only led to new discoveries, but has also enabled us to better understand the artefacts and monuments discovered by previous excavations in the area over the last half a century.

Artefacts previously discovered in the Pyla coastal region can be seen on display at the Larnaca District Archaeological Museum.

More information about the Pyla Koutsopetria Archaeological Project is available online at; www.pkap.org

Michael Brown, University of Edinburgh.
William Caraher, University of North Dakota.

Acknowledgements

The Pyla Koutsopetria Archaeological Project would like to thank Defence Estates Cyprus and RoC Dept. of Antiquities for their continuing support of the survey. Research at Pyla also benefited on a daily basis from the logistical assistance of range controller Costas Kouloumis and range WO Mick Delieu to whom the authors extend their sincere thanks. We also gratefully acknowledge the help of 84 Sqn RAF Akrotiri for providing new aerial photography of the survey area, which significantly enhanced the results of the project.

Around the Regions

With the Conservation Groups

There are over 150 Conservation Groups operating across the MOD. The following section provides an update on the dedicated work of some of these groups.

Isle of Wight

Newtown Ranges and Jersey Camp Conservation Group

A Day in the life of the Newtown Ranges and Jersey Camp Conservation Group

Sunset. Photography: Barry Angell.

Newtown Ranges and Jersey Camp is situated on the north west of the Isle of Wight. Covering around 328 hectares it is a Site of Special Scientific Interest (SSSI), a RAMSAR site and an Area of Outstanding Natural Beauty. The site also forms part of the Newtown Nature Reserve.

Acquired by MOD in 1911, the Ranges have been used to train predominantly reserve and regular forces throughout the First and Second World Wars. Today Jersey Camp and Newtown Range are managed by the South East Reserve Forces and Cadets Association and its main role remains the provision of a training facility for reserve forces and cadet groups.

Conservation at Newtown Ranges

The Newtown Ranges Conservation Group was established by Lt Col Norman Clayden in 1977. Regular Sanctuary readers will know that Lt Col Clayden was also MOD's first Conservation Officer and founder of Sanctuary. Following his death in 2003, Lt Col Clayden's ashes were interred by the pond named in his honour and a memorial bench is now in place. The pond was enlarged through the need to obtain soil to carry out remediation work on the SSSI site. The soil was removed and transferred within the SSSI site and the current pond filled the gap left behind and extended the range of habitats the site provides. This again emphasises the commitment of the site's management to continue the conservation programmes started by Lt Col Clayden.

Although providing a well maintained and well run training facility is the key function of the Range staff, conservation is a high priority. The three permanent range staff are enthusiastic and highly committed to conservation work, much of which they carry out themselves. They are supported and assisted in this by a very active Conservation Group, which still boasts four founder members and consists of some of the island's leading conservation experts who undertake a range of surveys and recording activities on the site throughout the year. Conservation priorities for each year are planned at the Group's Annual General Meeting in September.

Memorial Bench for Lt Col Clayden. Photography: Dave Maidment.

Given the site's designations strong links are maintained with Natural England to ensure that they are content with the work being undertaken and that specialist advice can be obtained when necessary. Close links have been formed with the Newtown National Nature Reserve Consultative Committee. Representatives from each group attend the other's Annual General Meetings.

There are no public footpaths across the Camp or the Ranges and no public access is allowed except by application or for those attending the annual Orchid and Wildlife Walk. Applications from those wishing to visit the site to carry out research projects or study a particular species found on the site are welcomed and bring positive benefits as they contribute to the knowledge and understanding of the site and the species that live there.

THE ORCHID AND WILDLIFE WALK

This annual event is one of the few days in a year that the site is opened up to the public. This year, on 13 May, around 70 people, including the Sanctuary editor, gathered at Jersey Camp to take part in this walk. After refreshments, a welcome by the Range Officer and an opportunity to look round displays illustrating the range of conservation activities taking place on the site, the attendees divided into groups ready for the walk. The groups were divided on the basis of area of interest, botany, butterflies, birds and a general walk to learn about the area, and were led by a subject matter expert from the Conservation Group.

Isle of Wight

Newtown Ranges and Jersey Camp Conservation Group

Green Winged Orchid. Photography: Barry Angell.

Red Squirrel. Photography: Barry Angell.

I took the general walk, led by Terry Rolf. This began at Jersey Camp and progressed through to Locks Copse where we saw examples of the coppicing work that is carried out by the range staff. Arrangements are made to accommodate the area's red squirrels by leaving longer branches at the top so that the squirrels can cross between trees without having to come down to ground level. At regular intervals throughout the site are nest boxes, which are mainly occupied by blue tits, great tits and dormice! Range staff suspect that a buzzard is nesting in Locks Copse and to ensure that it can continue to do so undisturbed by users of the ranges a path through the Copse had been blocked off.

On a beautiful, sunny day the walk was made interesting and entertaining by the personal recollections and stories from our guide. He explained the military history of the site and answered questions on its current use as well as detailing the conservation work undertaken. All of which helps to integrate the site into the local community and increase understanding of the balance MOD maintains between its operational role and stewardship of the estate. Amongst the more unusual sights that he pointed out was an intricate carving of Kaiser Wilhelm in the bricks of one of the range buildings.

Crossing the creek we walked up to the ridge beyond the range and took in the spectacular view out to sea and over the open countryside, which demonstrated the diversity of the habitat making up the site.

Passing Clayden's Pond on the return journey, we progressed back through the meadow near the Camp. Traditionally this has been a sea of green winged orchids, hence the name of the walk. However, whilst to a new visitor there seemed to be a large number of orchids in bloom, the Conservation Group have recorded a substantial drop in numbers over recent years. No-one is sure of the reasons for the decline or whether it is reversible. The good news is that although numbers are dropping here, the orchids are starting to appear elsewhere on the island. The 2008 orchid count was due to take place after the walk so I am sure that an update on the numbers will appear in Sanctuary 38. Unfortunately the famed red squirrels were conspicuous by their absence on this occasion.

Newtown Ranges and Jersey Camp is a prime example of how MOD land can provide a protected and secure haven for wildlife and plants. The lack of public access to the site means that wildlife is left undisturbed. The range staff and the Conservation Group are enthusiastic, dedicated and determined to continue the work that their founder began 30 years ago. I would like to take this opportunity to thank them for an informative and entertaining visit and the warm welcome that they gave to me.

Wendy Sephton

Aerial View of Jersey Camp. Photography: Dave Maidment.

Cumbria

Eskmeals Range

The Eskmeals Range in West Cumbria is operated by QinetiQ on behalf of MOD. The Range forms the southern end of the Drigg Coast Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) and is comprised of sand dunes and associated heaths, grasslands and slacks. The Ravenglass Estuary European Marine Site forms the northern boundary. Part of the Range is managed as a local wildlife reserve by the Cumbria Wildlife Trust (CWT). During 2007 the Range has contributed to several local environmental activities, particularly the development of the Ravenglass Coastal Partnership (RCP) which fulfils many functions of an MOD Conservation Group.

The RCP was formally created in January 2004 and covers the whole area designated as Drigg Coast SSSI/SAC. It is comprised of 12 organisations, namely QinetiQ, Defence Estates (DE), Muncaster Estate, CWT, Natural England, Lake District National Park Authority, Environment Agency, Cumbria Sea Fishery Committee and four parish councils, working as a partnership of equals with a common interest in ensuring co-ordinated good environmental management.

During 2007, the RCP Steering Group started to become a significant player on the north west coastal scene. Considerable efforts have been made to strengthen and clarify the position of the Group including the production and agreement of a formal Constitution and the exploration of funding opportunities for a possible Partnership Manager to carry out some of the work which is currently done on a voluntary basis. It is recognised that this work is becoming more time consuming and that any larger scale environmental projects will require dedicated management.

The RCP partners have been particularly successful in achieving its objective to 'promote understanding and enjoyment for all'. This was done through summer and winter events which attracted both locals and visitors. The summer events explored both the dune habitats and sea, through such enticing 'titles' such as 'Go with the Flow..' (of the tide) and 'Spectacular Bottom of..' (of the sea) where you get to go in a boat – great fun!

Eskmeals Range. Photography: Sarah Jupp.

For the winter a series of 'topic-talks' on subjects such as local archaeology and birdlife was introduced. A similar programme is underway for 2008.

Practical projects have included construction of parts of the Ravenglass High Tide Route path; removal of sea buckthorn on the CWT Reserve and, during the past two years, the creation or enhancement of four natterjack toad ponds. The natterjack toad is a specialist amphibian of sand dune systems which is in serious decline and, as a consequence, is both a UK Priority Biodiversity Action Plan species and a European Protected Species.

On the range, DE has produced a detailed Management Plan for improving the condition of the SSSI/SAC, namely the removal and future control of sea buckthorn which will include the introduction of grazing by sheep in some areas. In line with this plan, the Herpetological Conservation Trust (HCT) kindly offered to undertake some sea buckthorn removal where the dune heath is particularly rich in lichen. The work complements that undertaken by CWT and local volunteers on the reserve. Some of the adjoining MOD and CWT fields of damp improved grassland have been entered into a Higher Level Stewardship Scheme with the introduction of cattle grazing which should result in considerable benefits for wildlife and the coastal landscape.

Young Natterjack Toad. Photography: Crown Copyright.

Lastly, some excellent news from HCT and Tony Warburton, one time Conservation Officer at the range. After many years of believing that the population had become extinct, natterjack toads have been seen at the southern end of the range. MOD and HCT hope to create a couple of new pools in this area early in 2008, next to some superb heath, rough grassland and rubble which provide excellent foraging and hibernating habitats for natterjacks.

Sarah Jupp MRICS CEnv
Environmental Advisor
Defence Estates

Cumbria

RAF Spadeadam

Viper's Bugloss. Photography: Iain Perkins.

European Otter. Photography: Iain Perkins.

The Electronic Warfare Tactics Facility at RAF Spadeadam, Cumbria, comprises 3885 hectares of Border Mire and forest and attracts an abundance of flora and fauna. The RAF Spadeadam Conservation Group meets twice yearly, providing excellent advice, support and practical delivery of projects. For example, the removal of young trees from internationally important peat bogs; supporting on-going research regarding the important red squirrel population in Kielder Forest and helping to limit grey squirrel 'incursion'; monitoring of raptors and owls and surveys of unusual flora and beetles.

As part of the Commanding Officer's Challenge 2007 a team of RAF personnel cleared young regenerating conifers from part of the Border Mires Site of Special Scientific Interest (SSSI) /Special Area of Conservation (SAC) at Priory Lancy mire. This arduous task on tussocky terrain went a long way to maintaining the good ecological condition of the deep peat bogs.

As part of the SSSI improvement programme for the area, Forestry Enterprise England has undertaken extensive tree felling on some of the Border Mires within RAF Spadeadam. Gordon Simpson on behalf of FCE has surveyed re-stocking areas for plants, invertebrates, fungi and birds. On one of the tenanted farms, Natural England and the farmer are experimenting with ditch blocking, as recommended by a comprehensive hydrological survey commissioned by the RAF in 2005.

The Cumbria Wildlife Trust botany ladies continued their excellent work of surveying different parts of the site, noting uncommon or unusual flora along the main tarmac road and forest tracks. Discoveries included viper's bugloss, rest harrow, several species of orchids, small adderstongue fern and moonwort. Some such species are not usually associated with upland peat habitats, but it seems that the hardcore for the tracks and the former Blue Streak missile infrastructure has provided a far more diverse substrate.

Mick Ayre is continuing with the identification of beetles found during earlier surveys of the man-made water tanks mentioned in Sanctuary 36. It is likely that uncommon or unusual species are present.

In late 2007, Group members contributed to the BTO Bird Atlas 2007-2011. The aim is to contribute to the forthcoming winter and breeding season surveys. The annual monitoring of the owl boxes continues with eight new boxes erected during 2007, bringing the current total to 24. During 2007, three boxes were occupied by barn owls producing 10 chicks and two by tawny owls producing four chicks.

The otter survey continues to gather more information on the use of different riparian and other habitats. Fresh activity was noted in December on both flowing water and almost completely frozen ponds – it is interesting to consider if the animal was foraging or simply moving through the area. The currently identified holts were still being used during 2007. Occasional sightings of a group of animals by site staff suggest that it is highly likely otters are breeding on or very near to RAF Spadeadam.

Sarah Jupp, MRICS CEnv
Environmental Adviser
Defence Estates

Cumbria

Warcop

Rural Estate Strategy

Various conservation projects continue at Warcop enabling us to meet our estate management obligations. Forestry landscaping works are on going and various tree planting initiatives have been conducted as part of a landscape screening process. This will allow existing buildings on the estate to fit into the natural rural surroundings and not appear obvious. Way marking of the public footpaths in the Danger Area is now complete.

Wetland safari at Warcop

There was an opportunity for families and local schools to find out more about the wildlife of Eden wetlands when Eden Rivers Trust, Cumbria Wildlife Trust and the RSPB offered half-day "wetland safaris" near Warcop as part of the Eden Rivers Festival in the summer.

Becky Helm, Education Officer for Eden Rivers Trust, explained that wetlands such as the one created by MOD at Warcop provide fantastic habitats for a variety of wildlife, including water voles, invertebrates and birds. The safaris offered a range of activities such as pond dipping, bird footprint tracking and crafts to give everyone an opportunity to explore and to learn more about these precious habitats and their native residents.

There were also opportunities to explore parts of the Eden valley not normally open to the public when Clare Hetherington and her colleagues from the Defence Estates team and Landmarc Support Services led a series of walks on the Warcop Training Area. The aim is to try to offer a number of access opportunities to the public through the year, on this occasion three different routes were offered - a full day strenuous walk on Little Fell and two shorter walks, one on the range itself and one around the ponds and woodlands at Helbeck Site of Special Scientific Interest.

Wind Turbine Installed on Warcop Firing Range

Work to provide electricity to Warcop Firing Range utilising wind power has recently been completed at a cost of £0.1m. The requirement was to install and provide power to 24 Fixed Electric Targets linked back to a control building. Using traditional methods to provide an electricity supply to the remote range would have cost in excess of £0.2M. Installation of electrical infrastructure would have required significant excavation work in close proximity to a wood designated as a scheduled monument. Landmarc Support Services put the wind turbine option forward as an alternative. In addition to significantly reducing installation and through-life costs this provides a low carbon solution to the requirement. The 6.6 metre high turbine is designed and located so as not to be visually intrusive in this Area of Outstanding Natural Beauty. The turbine is able to provide sufficient power to operate all the targets and sufficient excess power to provide heat and light to the control building.

Water Voles

Jenny Holden has provided an update on the progress of the water voles released at Warcop in 2007 (see page 8). In April 2008 the Cumbria Water Vole Project began work at Warcop to explore possible sites for future releases. Following a comprehensive survey of streams and ponds at Warcop and on neighbouring land, six sites have been selected as possible locations for further releases. The aim of these releases is to create a larger meta-population of voles throughout Warcop and the surrounding area.

Range Officer

DTE North Annual Bonding Walk. Photography: WO1 (RSM) W Bean.

E22 Range with Wind Turbine.
Photography: Wilf Stone, Technical Support Manager.

Dipping Platform on Rossmede Trg Area.
Photography: Andrew Clarke, Rural Estate Advisor.

Dorset

Bovington Conservation Group

Eight Acre Coppice, which borders Bovington Camp, is jointly owned by MOD and Dorset County Council. The coppice is an ancient wood and is at least 400 years old. The coppice is recorded on the 1st Edition of the Ordnance Survey map and is now adjacent to Bovington Middle School. Four years ago the coppice became a Local Nature Reserve (LNR). The management board for the reserve includes the headmaster of the school, representatives from Defence Estates, a consultant ecologist and members of the LNR Friends Group. An experienced coppice worker and hurdle maker complete the team. The Royal Armoured Corps Centre has also developed close links with the LNR.

As the wood is very narrow in places one of the earliest management aims was to reduce its fragility by planting an extension along one side. The planting has now taken place led by Rory Gogan from Defence Estates, with members of the local community, members of the Friends Group and the International Tree Foundation (ITF).

The new wood has become a focal point for a Schools Conservation Project -"My Life, My Tree, and Growing Together". This new scheme, launched by the ITF in September 2006 encourages children from selected schools to collect local seeds, germinate them and form a school tree nursery. In September, Year 1 and 3 pupils of St Mary's Catholic First School in Wool collected seed from in and around Eight Acre Coppice and in National Tree Week (28 November) the oldest children in the school planted trees, adding them to the new extension. This work helped to link Eight Acre Coppice with Leys Coppice, another small ancient wood.

The Friends Group has also carried out important management work, including forming coppicing parties and clearing brambles to encourage and increase the spread of bluebells. Bird boxes have been put up and have so far been used by great tits, blue tits and robins. We hope that this year the tree creeper boxes made by the Junior LNR members will be used.

The Junior LNR Club meets once a month and is open to children throughout the parish. Club members have placed bat boxes in the wood, which seem to have led to an increase in bat activity. Last summer Club members saw two different species of bat patrolling above the wood. One was very small - possibly a pipistrelle - the other larger. Hopefully this year we will be able to have them identified.

Friends and club members attend joint meetings to learn more about the wide range of species dependent on the wood. These have included a dawn chorus (at 4.30am!), bird recognition sessions, small mammals, fungi (for which the wood is notably rich), light trapping moths and even lichens.

Recently graphic designers from Bovington Royal Armoured Corps Centre produced a new display board highlighting the lower plants present in Eight Acre Coppice including lichens, mosses, fungi and ferns. This was paid for from a grant to the LNR.

Whilst recent exciting finds include a ring of giant clitocybe, a broad-leaved helleborine, and a small false click beetle which is a Red Data Book species, Level 3, all plants and animals on the site are important because of their interdependence. Junior LNR Club members have constructed a diurnal and nocturnal food web of the species they have encountered. This work, which is the culmination of a year of spotting, identifying and observing, has been put on display at Bovington Middle School. We hope to transfer this to the village library where it will be seen by the wider community.

Brick Cap Fungus. Photography: Rory Gogan.

Display Board. Photography: Rory Gogan.

Rachel Palmer

Essex

Ministry of Defence Police and Guarding Agency, Wethersfield

Wethersfield Wildlife Group Members. Photography: Crown Copyright

Bee Orchid. Photography: Helen Wright.

An apple tree blossoms at the threshold of the old runway. The story goes that it probably grew from an apple core discarded by a Second World War US Air Force (USAF) pilot as he awaited permission to take off on a mission when the USAF operated from RAF Wethersfield, in north west Essex. Whether or not this is an urban myth, USAF arrived in 1941 and various US and RAF operational units were stationed here until 1990.

After a period on care and maintenance, the combined Ministry of Defence Police and Guarding Agency (MDPGA) established its HQ and Training College at Wethersfield. Today new recruits undergo initial training here, and officers from the Agency's stations and divisions across the country undertake a variety of training courses including management, firearms, and driver training.

The Wethersfield Wildlife Group (WWG) was formed in 2007. Currently membership includes staff and residents on the base, their families and friends. The Ecological Survey carried out on the site in 2006 gave an indication of the habitats and species we might find. The landscape of semi-improved grassland and fragments of hedgerow and scrub provides important habitat for resident species, including several families of woodpeckers and a pair of barn owls *Tyto alba*, who raised a family in a redundant outdoor shower facility!

Winter visitors to the site include redwing *Turdus iliacus* and fieldfares *Turdus pilaris* which flock on the open sports field. In summer 2007 we recorded a number of UK Biodiversity Action Plan (BAP) species, including meadow pipit *Anthus pratensis*, whitethroat *Sylvia communis* and turtle dove *Streptopelia turtur*. Brown hare *Lepus europaeus*, skylark *Alauda arvensis* and grey partridge *Perdix perdix*, which are all Essex BAP species were particularly welcome visitors.

Spring and summer evening forays revealed that cowslips abound. With the co-operation of Peter Yule, Head of Station Administration, an area was protected from frequent mowing and we were rewarded with the sight of 350 bee orchids *Ophrys apifera* in flower. Early purple orchids *Orchis mascula* were clinging on in Park Wood, our small remnant of ancient woodland. We hope that the installation of some rabbit proof fencing will give them the chance to set seed in 2008.

Weekend work parties were formed to tackle rank undergrowth around oil separator tanks. Blanket weed was removed and left on the side of the pond so that invertebrates could return to the water. This spring, with advice from a local expert, we will be carrying out surveys to look for the great crested and smooth newts identified in the Ecological Survey.

Feeding pipistrelles *Pipistrellus pipistrellus* were identified during a bat detection session using equipment borrowed from Essex Wildlife Trust, although to date no roost has been located on the base. A fascinating evening was spent learning tracking skills with group member Paul Mayne. The only disappointment was the BBQ held on National Moth Night in August – we all turned up but the moths stayed away. Although it was a poor year generally for moths in this area, the lack of nectar plants for insects in the grassland was highlighted. We aim to sow native wildflower seeds this year to attract more butterflies and moths.

Nothing goes to waste, discarded pallets and crates are made into owl nest boxes by WWG founder member and MDP officer, Craig Simpson. A mosaic of habitats has evolved around the former airfield. A disused area of concrete hardstanding now has a flourishing patch of reindeer moss *Cladonia sp* and redundant observation posts are roosts for little owls *Athene noctua*.

Plans for 2008 include a spring survey of migrating birds and, in summer, identification and recording of the grassland area and its species, particularly invertebrates and ground-nesting birds, to investigate its biodiversity.

Ros Gourgey
Chair, WWG

Hampshire

Sea Mounting Centre, Marchwood

One of our Conservation Group's key projects has been the renovation and enhancement of a small lake measuring around 0.5 hectare. The lake was originally formed from ground water in the 1970's when earth and gravel was extracted for use in a local construction project. Originally stocked with common carp and tench, it was fished by the 17 Port & Maritime Regiment RLC but had become overgrown. Our idea was to create a secluded wildlife haven in what is otherwise a busy port environment.

We have a very enthusiastic group comprising 15 members drawn from Defence Equipment & Supply (Port Directorate), Defence College of Logistics, REME, MOD Guard Service, and the Defence Fire & Rescue Service. All members have worked tirelessly on the project in all weather conditions, regularly putting in 4 to 6 hour stints.

In 2004 we took the first steps on the renovation project by commissioning Defence Estates to carry out a lake survey. Taking the findings of the survey into consideration, we then sought further guidance from English Nature (now Natural England) regarding reed management. Pooling this expert information with our own specialist knowledge, we designed a plan to renovate and regenerate the area. Our Director secured funding for a range of hand tools, bird nest boxes, bat roosting boxes and wood and gravel for walkways. The Pioneers supplied heavy plant and free labour (used for reed removal and bank profiling) and the contracted grounds maintenance team supplied a chipper and free labour for reducing brushwood.

Tasks carried out to date include the removal of surrounding climax vegetation such as silver birch and goat willow and low lying bramble and scrub. We have thinned and removed common reed and Canadian pond weed; removed silt from the lake and re-profiled the banks. Nearby logs have been cut and stacked to form hibernacula. Work has been carried out sympathetically taking account of wildlife breeding seasons.

View over the lake. Photography: Karen Rose.

Conservation Group members at work cutting and thinning. Photography: Tony Smith.

Since initial monitoring in 2004 there has been a steady increase in biodiversity at the lake. There are now regular sightings of kingfisher, reed and sedge warbler (nesting) and little egret. Migratory birds including black restart and wheatear have also been seen. Water voles have been recorded, along with grass snake, smooth newt, common frog and common toad (breeding). Many of these species were absent in 2003/04 because the area was overgrown and very shaded. Slender spike rush and fringed water lily are present (the latter being county notable). Work to add native plant species is underway and a bird hide will be installed in summer 2008. Use of a Robinsons Trap has recorded over 300 species of moth. We have also identified three breeding species of dragonfly and damselfly – the southern hawker, common darter and large red damsel. In August 2007 the Bat Conservation Trust carried out a survey of the area and discovered pipistrelle bats were present.

Group members have gained a wealth of experience and nature conservation knowledge from this work and have become a highly motivated and focused team, skilled in aquatic and land management techniques. Increased numbers of site personnel are also taking an interest. This is partly due to our regular SMC Conservation Newsletter, which is packed with information. The lake has become an important wildlife haven and amenity for staff and visitors.

Tony Smith
Conservation Officer

Isle of Wight

Newtown Ranges and Jersey Camp

Compiling these notes yet again in shirt sleeves in the depths of winter. Climate change is certainly bringing everything, be it plants or wildlife, into the mood for an early start.

The 2007 orchid count was the lowest ever recorded. As normal the count was conducted on our open day in May, which allows the public to view the green winged orchid. Unfortunately, 2007's mild winter meant that the show was over. Analysis of the count suggests that either the soil is lacking nutrients (the orchids grow on an ancient meadow not grazed or fertilized), or the winters are too mild. Any experts out there, your thoughts are welcome! Despite the lack of orchids our visitors were not disappointed and, adequately dressed for the pouring rain, they were shown around the estate by Conservation Group members. Prior to the walk we received a certificate from Guy Hagg of the Defence Estates Environmental Support Team to mark the 30th Anniversary of the Conservation Group. Certificates were also presented to four of our senior members.

During the summer we commissioned Adam Wright a local consultant entomologist to carry out a survey for the illusive spider *Aulonia albimana*, which was last reported on the estate in 1985. (I would like to record our thanks to the Isle of Wight Natural History & Archaeological Society for a grant to secure the survey). Unfortunately, after many visits and much searching no trace was found. One positive to come out of the survey was Adam's acceptance of our invitation to join the Group.

It seems to have been a year of surveys! On one night Andy Butler, our moth man, recorded over 30 species, two of which were previously unrecorded on the island. Botany surveys were carried out by Bill Shepard and Sue Blackwell in Locks Copse. These produced a total of 132 species of flora, trees, shrubs, ferns, sedges and rushes. Richard Bernard, a Norwich University ecology student, carried out a cord grass *spartina maritime* survey on the salt marsh at Clamerkin/Spur lake for his MSc dissertation. The results were favourable as the environmental analyses indicate that the plant happily co-exists in niches of Newtown Estuary. We miss Richard's return from the salt marsh looking somewhat over camouflaged from his mishaps in the mud!

Summer bought some light relief. The 12 hectare meadow which is home to the rifle range has to be mown, baled and carried as set down in the management plan. A local entrepreneur and keen agricultural historian carries out the task at no cost using his reconstructed Fordson tractor. Ashley scurrying back and forth picking the odd component not secure enough for the rough terrain is a sight to be seen.

A group from Cornwall Army Cadet Force requested a presentation on conservation at Newtown Range as background to their Duke of Edinburgh Award Scheme. This proved to be a informative and somewhat funny event. At the end of the presentation I slipped in a slide of the European brown wolf, convincing the cadets that we have a breeding programme here on the island. They presented their studies to the Lord Lieutenant of Cornwall who, I understand, raised an eyebrow and questioned the presence of wolves on the island. All good fun and we await the return of the cadets in 2008.Mention must be made of the dormice who face an annual eviction order from the bird nesting boxes in Locks Copse and the camp area when these are checked and cleared. We recorded 16 this year.

Hay making August 2007. Photography: Dave Maidment.

Our AGM was held in September and was attended by Clare Backman, the new Environmental Advisor for the EST Conservation Group Team. This was an excellent opportunity for her to meet the majority of our Conservation Group members. 30 years of conservation work was celebrated with a glass of champagne and a slice of birthday cake.

In November, the Group were invited for the first time to display photographs and artefacts at the Conservation Group Chairman's Forum. The display was of interest to the other group chairmen and I hope enlightened everyone one what goes on here on the Isle of Wight.

Finally a claim to fame for Sanctuary Magazine - we have readership in the United States and eagerly await the next issue.

by Dave Maidment
Maj (Rtd) Range Officer & Estate Manager

Buzzard on sign. Photography: David Maidment.

Dormouse eviction! Photography: David Maidment.

Kent

Canterbury, Old Park Training Area

Across the Grassland. Photography: Mike Chittenden, Nature Table Ltd.

Reed Pond. Photography: John Port.

In the latter part of 2007, Natural England completed a condition assessment of the Site of Special Scientific Interest (SSSI) at Old Park. The condition of the acid grassland was determined to be declining unfavourable due to a high level of gorse scrub. However, the condition of the woodland and disused pit remained as favourable. Remedial action includes PriDE, the Regional Prime Contractor, incorporating clearance works within its maintenance programme and possibly the introduction of more intensive cattle grazing to help control gorse growth. Discussions on grazing are being held with a local farmer as part of works required under the Higher Level Stewardship Scheme.

The Kentish Stour Countryside Project and its volunteers led by Matthew Hayes have continued with their good work clearing gorse and broom from the training area.

As part of works to lay a water main across the SSSI, South East Water Limited and Natural England have agreed on a programme of remedial works that will benefit the affected grasslands. The aim of this work is to prevent any change of character of the grasses and promote the development of the woodland in the longer term.

In February 2007, the Environment Agency carried out a Fish Population Survey of the Reed Pond. The results of this survey indicated that roach was the predominant species in terms of species composition and biomass, with common bream, common and mirror carp, crucian carp, gudgeon, perch, rudd, tench and catfish also netted. Overall the results seem to concur with observations from local anglers that there was an abundance of small to medium sized fish. The Environment Agency concluded that, taking into account the relative maturity of the pond, it would be reasonable to say that it is currently stocked at or above the level required for a healthy course fishery. It was, therefore, recommended that the overall stock density is not increased.

During 2007, residents from the nearby housing estate have devoted a great deal of time and energy to clearing rubbish from the water and its environs. Following the grant of a licence to fish, the inaugural meeting of the Reed Pond Community Fishing Club was held in December. Whilst the membership is small at present, the Club is ambitious and has plans to improve the facilities. It is also working closely with the local constabulary to reduce fly-tipping and other anti-social activities in the training area.

Jan Pritchard reports that 255 birds were ringed over the year. Breeding birds include green woodpecker, wren, robin, blackcap, whitethroat, chiffchaff, willow warbler and bullfinch. Some 22 nest boxes were checked. These checks were extremely productive leading to the ringing of 91 blue tit and 54 great tit chicks. All but three successfully fledged. This survival rate seemed to be well above the national average as poor weather conditions resulted in a poor breeding year for tits.

The bad weather conditions also disrupted the main ringing season, preventing the ornithologists from undertaking as many mist-netting visits as they would have hoped. However, evidence indicates that the lesser spotted woodpecker, house martin, meadow pipit, linnet, redpoll and yellowhammer are all species in serious decline at this site.

Jenny Cole and Mike Chittenden of Nature Table Ltd are planning to survey the training area for insect life throughout 2008. The present situation is one of taking stock of potential habitats and ensuring that their value to wildlife is communicated to all parties. The severe lack of marginal plants at the Reed Pond may have an adverse effect on many families of insects, especially dragonflies and damselflies. However, the pond is surrounded by a diverse tree population including a few well established oaks as well as alder, willow, blackthorn, hawthorn and silver birch. Also of importance to indigenous species are the small nettle banks which yield good insect banks if left to become established.

Lepidopterist, Dave Gardner has been unable to undertake collections recently but is considering the installation of traps in the wet woodland areas during the forthcoming year. He has reported that parasitic wasps had generally diminished butterfly and moth levels in the locality.

John Port, Estates Surveyor, Land Management Services, Defence Operations South.

Northampton

Yardley Chase

Harlequin Ladybird back spines. Photography: D Manning.

This year the weather has had severe effects on both flora and fauna. The main cause was very heavy rainfall coming at the wrong time. This rainfall, together with our mild winter and generally colder summer nights has put flowering times out of balance with some plants flowering early and others late. Whilst most trees have fruited well, some have suffered. Similarly leaf fall has been erratic and in some instances new leaves appeared in the autumn. A pussy willow *Salix caprea* produced some flowering buds on the 1st November. The fresh outbreak of foot and mouth put some restrictions on movements over the area for six weeks in September and October but fortunately did not become a serious problem.

Weather

There was some measurable snowfall this year, 1.5cm on 23rd January, 10cm on 8th February, plus an unexpected fall of 2.5cm on 18th November, but as always it did not lay for long. Rainfall was up against last years 868.5mm; June had the highest fall 191mm and April the lowest at 2.5mm.

Ponds and Streams

The ponds and streams maintained high levels until well into the year. Fortunately, although large areas of the woodland floor became water logged, it did not flood. Some normally dry ponds held water for some time and produced a plentiful quantity of duckweed. This was very noticeable on the surrounding ground when the water level dropped and gave a good indication of the high water mark that had been achieved.

The ponds have also produced some interesting micro organism records. Last year, when one of our members, Chris Carter, was studying a specimen of the uncommon liverwort *Ricciocarpus natans* he discovered a rare diatom *Didymosphenia geminate*. The results of this finding have been publicised in this year's journal of the Quecket Microscopical Society.

Insects

This year insect sightings have been very low and some species have not been seen at all. Again the volume and force of the rain has been the problem. The heavy showers have flattened a lot of the blooming flowers and drowned many emergent insects before they were able to dry out and fly. The generally colder summer nights this year also contributed to the problem. Whilst insect numbers normally peak and trough over the years, this year's decline does not follow the 'normal' pattern as indicated by surveys carried out over the past twenty years.

Northampton

Yardley Chase

Bumblebees mainly nest on the ground in tussocks of vegetation or below ground in abandoned mouse or vole holes. Only the young fertile queen survives the winter. Most emerge from hibernation between February and May and seek out nectar to build up their strength for nest building and egg laying. Heavy rain reduces the amount of nectar available and can also flood newly built nests.

Bumblebees are now our main sources of pollination for wild flowers as the honey bee is now rarely found in the wild due to the recently arrived parasitic Verroa mite.

The failure of a number of trees to produce fruit, particularly oaks and field maple, would seem to indicate that they have not been successfully pollinated. Flies, which are also good pollinators as well as a food source for dragonflies, spiders, small birds, also showed a reduction in number.

Whilst we have seen all of our seventeen recorded species of dragonfly, this season has been one of mixed fortunes. The unseasonably warm temperatures during April, severe wet weather for most of June and July, and prolonged, warm autumn severely affected dragonfly behaviour. Eight species emerged significantly earlier than normal followed by a 60% drop in expected numbers by mid July.

The harlequin ladybird *Harmonia axyridis* whilst not found in large numbers, has now been recorded in all sections of the area at all stages of development, larva, pupa and adult and can be considered as permanently established. There has been much publicity about the adult beetle but the larva and pupa are also markedly different from our native species. Photographs of both larva and pupa are shown and illustrate the row of spines alone the back of the larva which are transferred to its rear end when changing into a pupa.

Butterflies and Moths

These were very noticeable by their absence. Whilst some species hibernate as adults over the winter most exist as eggs, pupa or larvae. The recent wet humid winters have caused both eggs and pupae to become infected with mould and fungus. Those that do survive the winter come on the wing in April-July. Some have a short adult life of just five to seven weeks and if this coincides with adverse weather then breeding is at risk. Sightings of species such as wood white, black hairstreak, white hairstreak and white admiral, were severely down in number due, I suspect, to drowning on emergence from the pupa.

Fungi

In spite of the generally wet year fungi have not done well. In the early fungi season the ground was dry. Rain in April only created ideal conditions for around two weeks and few species chose to take advantage of this. Mid October brought good conditions again and there was a late flush of fungi but this time species were affected by ground frosts preceded this date.

Reptiles and amphibians

Frogs were active in February with the first spawning taking place on 2nd March. The toads followed later on 29th March. There were very few sightings of grass snakes and slow worms as there was little opportunity for sun basking.

Ornithology

In 2007, 71 birds were recorded, two fewer than in 2006. This included a pair of ravens and both grasshopper and sedge warblers, which were new records for the area. The open meadowland, complete with bunker ponds, has a wide range of resident birds including barn owl, common buzzard, Canada goose, coot, great crested grebe, grey heron, hobby, little grebe, little owl, meadow pipit, moorhen and tawny owl. A red kite was spotted flying overhead in April, as was a small flock of redpoll in October. A pair of spotted flycatchers and a turtle dove were among the best of the summer visitors.

Harlequin Ladybird Pupa. Photography: D Manning.

Open Day

Our open day was held on 28 June and was organised jointly with Natural England. The day was open to members of conservation groups from around the Anglia region and was well attended and enjoyed by all. Visitors were given guided walks by members of the local conservation group, pointing out the various aspects of the area. We hope to repeat it in 2008.

A bulletin board has been erected by the entrance to the training area showing a map of the area features, the reverse shows literature and photos relating to the wildlife of the area.

Tony Richardson
Compton Estate Conservation Officer

Pembrokeshire

Pembrokeshire Ranges

2007 was yet another busy year for the military and conservation users of the Pembrokeshire Ranges.

There has been a substantial increase in operational pre-deployment training on the ranges over the past 12 months and a number of combined arms live firing exercises have been held. New, less visually intrusive, granulated rubber bullet catchers have been installed at Penally. At Manorbier night firing (firing in hours of darkness, to be more exact) took place for the first time in over a quarter of a century. Whilst obtaining planning permission for this generated some local resentment, a positive outcome has been the successful development of the Pembrokeshire Ranges web-site which informs the public of firing times and access opportunities.
See www.pembrokeshireranges.com

On the conservation front, the birds of Castlemartin experienced mixed fortunes this year. The choughs have fledged 41 chicks from 13 nest sites, which is the highest number ever recorded. Guillemot and razorbill numbers were higher than in 2006. On the negative side, kittiwake and fulmar records were half those of previous years. The BTO national ringed plover survey launched in 2007 recorded the only nesting pair in Pembrokeshire at Castlemartin. An additional pair was seen displaying in the area. On 3rd June we hosted the Army Ornithological Society in celebration of their 40th Anniversary. 50 members were given a tour of the ranges and recorded a wide variety of birds including whitethroats, dunlin and peregrine.

Otters continue to visit Frainslake Mill pond and beach on a regular basis and, although it is not used for breeding, cubs have been seen playing in the pond. Grey seal pups arrived very late this year. A total of 16 were born, the latest of which arrived in November.

On 28th August the Countryside Council for Wales (CCW) launched a pilot study on the ranges to locate suitable habitat for the shrill carder bee. Transects were laid out and the number of nectar producing plants recorded at 10m points along them. A number of bees were recorded during the survey. Monitoring of the marsh fritillary also took place and determined that it has now colonised most of the coastline of Castlemartin Range. A survey of bryophytes by CCW revealed a total of 149 species, 11 of which were nationally scarce and two were Red Data Book species.

The introduction of cattle grazing at Penally Ranges continues to improve the habitat within the SSSI. Monitoring of the Red Data Book species including galingale, bog myrtle and royal fern is ongoing.

The discovery of a new area of pyramidal orchids at Manorbier led to the site being fenced off and mowing delayed until the flowers had seeded. The first sighting of a small blue butterfly was also recorded here.

Pembrokeshire Coast National Park (PCNP) organised 27 guided walks on Castlemartin Ranges during 2007. These included visits to geological and archaeological sites as well as general wildlife tours. PCNP also organised their second annual walk around Manorbier which was very well received by the public.

We were thrilled to win the prestigious MOD Sanctuary Award in 2007 for the archaeological excavation of Brownslade Barrow. Full details of the project were published in Sanctuary 36 but even now research into the finds is ongoing and we hope to report further in due course. In addition to the Sanctuary Award, soldiers from 14th Signal Regiment were also recognised by the presentation of a "Special Commendation" at the Keep Wales Tidy National Awards for their work in clearing up Bullslaughter Bay on Castlemartin Ranges. 9 skips worth of flotsam, jetsam and general debris were removed, at times having to be hauled up 80ft cliffs!

Finally, staff at Castlemartin Range were saddened by the death last year of its Range Officer, Lt Col (Retd) J E R Bulkeley MBE, whose last appointment before retiring from the Regular Army was Commandant of Castlemartin Range. He died in post having been on the staff since 1988. He will also be missed by the local community having served on the Committees of the Angle Life Boat and the South Pembrokeshire Hunt.

Lt Col J J Rogers,
Commander DTE Pembrokeshire

Shrill Carder Bee marked for study. Photography: CCW.

Chough. Photography: CCW.

Bog Myrtle. Photography: Tom Prescott.

Staffordshire

Leek and Upper Hulme Training Area

Stone walling in state of collapse. Photography: Edward Pomfret.

Stone wall completed 2007-08. Photography: Edward Pomfret.

Close-up shot showing consruction detail. Photography: Edward Pomfret.

Much is said about the requirements on landowners to manage land in a sustainable way to protect, maintain or enhance its special features. The programme of maintenance and restoration of the traditional dry stone walls within the Leek and Upper Hulme training area is a prime example of putting these ideals in to effect.

Located within the Peak District National Park, the training area comprises 1094 hectares of rugged open moor rising to just over 488 metres above sea-level. Under the terms of a management agreement with the Peak District National Park Authority (PDNPA), MOD has agreed to maintain and restore a proportion of dry stone walling each year. Funding comes from the Rural Element of the Estate Strategy (REES) Maintenance Projects budget, whose stated objective with respect to stone walls is to restore significant cultural landscape features as part of the joint management plan with the PDNPA.

Originally of agricultural importance, the dry stone walls on the training area are a special feature of the landscape, likely to have been built as a result of the 18th and 19th century Enclosure Acts. They were built using stone taken from local outcrops or dug from shallow quarries and were used to enclose large tracts of open moor and divide the in-bye land (better quality improved land) next to the farmsteads. The variety of construction styles and type of stone used gives a distinct regional identity.

A dry stone wall, if properly constructed, is capable of lasting over a century and very often much longer. However, deterioration leading to a loss of integrity and eventual collapse will set in if walls are not maintained. In view of their distinctiveness repairs must be undertaken sympathetically, using appropriate techniques to preserve their landscape and cultural value. Similarly, where walls are to be restored, appropriate methods of construction and materials are required. Ideally restoration should be carried out using as much of the original material as possible.

Identification of the walls to be repaired or restored on the training area requires co-operation between PDNPA and Defence Estates. Once this has been done Landmarc Support Services are responsible for coordination and delivery of the programme. The specialist nature of the work means that contractors must be accredited members of the Dry Stone Walling Association and be recommended by the PDNPA.

Restoring a dry stone wall on the training area typically costs in excess of £30 per metre and whilst this might seem a high price to pay, the longevity of the wall must be borne in mind. Aside from its intrinsic value to agriculture and innate historic and cultural value, dry stone wall restoration has been shown to benefit conservation objectives, the local economy and help in retaining skills which might otherwise be lost.

Maintenance and restoration of dry stone walls can fulfil many of the attributes of sustainable land management. In managing the training area this way MOD is also demonstrating stewardship of the land - maintaining what is there and improving it for future generations.

Edward Pomfret
Assistant Rural Surveyor,
Landmarc Support Services
Swynnerton Training Camp

Suffolk

RAF Lakenheath

Stone Curlew Nest. Photography: Mr R Southgate.

RAF Lakenheath is the largest United States Air Force (USAF) base in England and is located 113km northeast of London and 40km from Cambridge. It is home to around 5,700 military personnel and 2,000 British and US civilian workers who support three combat ready squadrons of F-15E Strike Eagle and F-15C Eagle fighter aircraft.

Habitat

The airbase is an internationally important site for wildlife. Situated in Breckland, one of the last remaining lowland health environments in Europe, the majority of the land is designated as a Site of Special Scientific Interest (SSSI). Over 30% of the base is part of the Breckland Special Area of Conservation (SAC). Conservation efforts are focused on preserving the lowland habitat and its flora and fauna.

Flora

The base is currently home to eight rare and scarce Breckland species, all of which are thriving according to a survey carried out in 2007.

The base supports the largest population of wild grape hyacinth *Muscari neglectum* in the British Isles. This is a smaller and much rarer relative of the cultivated form found in garden centres. The plant is thriving because of a grounds maintenance contract which mimics a traditional grass meadow regime. Each year the base delays grass cutting until after the hyacinth has set seed, to ensure an expanding sea of blue the following spring.

Suffolk

RAF Lakenheath

The rarest plant on the base is a red list sub species of perennial knawel *Scleranthus perennis ssp prostratus*. RAF Lakenheath is known to have the largest population in the world. Recently a new area has been discovered and designated as a proposed SSSI by Natural England (NE). This area is already being managed as a SSSI whilst we wait for NE to complete designation. DE has provided assistance to USAF in relocating a new lorry inspection site and service road to prevent damage to the new site. Perennial knawel was also identified on the site allocated for a new Flight Simulator building. As the contract had already been signed at the time of discovery, DE, USAF, NE and the contractor's ecologist translocated the plants to the new SSSI location without damaging the ecological value of the receptor site. Other rare Breckland species protected on the base include the Spanish catchfly, *Silene otitis* and Breckland thyme, *Thymus serpyllum*.

Perennial Knawel. Photography: Mr R Southgate.

Fauna

RAF Lakenheath has a thriving population of stone curlew *Burhinus oedicnemus*. The stone curlew breeds in the UK between March and October before migrating back to Northern Africa for the winter. Successful breeding at Lakenheath has been monitored by the RSPB since 2000. We have two pairs that regularly nest here and lay two eggs each. Some years we are fortunate enough to get a second clutch. Each year we ring the chicks prior to their journey south.

Collaborative working

The RAF Lakenheath Conservation group draws on expertise from US representatives as well as MOD personnel and assistance from the regulators. Many years of working together has built a common understanding and pragmatic approach to maintaining the delicate balance between ensuring that the mission of this important military airfield is not disrupted and conserving the sensitive environment around it. Long may this continue.

Claire Staddon
Environmental Advisor

Stone Curlew Chicks. Photography: Mr R Southgate.

Wiltshire

Bulford Conservation Group

Brown Hairstreak. Photography: A W Jolland.

2007/8 has been another busy year for the group, in spite of the level of military activity on the Plain. A highlight was the clean up of the Bulford Kiwi which involved Conservation Group members, members of Bulford Garrison staff and local schools (see Set in Stone - Monumentalising the Military on page 32).

The winter walks organised by Jenny Amor and the Botany/Small mammals subgroup were well received. A full programme of summer walks has been organised.

Our AGM on 18th October 07 was attended by about 60 members. The guest speaker was Mr Paul Castle, who gave a vivid insight into his work of mapping the bird populations of Wiltshire, and the resulting book. Other contributors included Lorna Russell of ASPIRE, and the new commander of the Salisbury Plain Training Area, Lieutenant Colonel Mike Beard.

Finally, after almost eight years as Chairman of the Group, I am handing over to Lieutenant Colonel Simon Ledger, Light Dragoons, who has recently taken up appointment as Commanding Officer of the Bulford and Tidworth Garrison Support Unit. I wish him and the Group all the best possible luck and progress in the future.

Tom Lort-Phillips

ARCHAEOLOGY SUB-GROUP

Badgers continue to be a huge problem. Despite major protection efforts at the Midden, they are continuing to dig and destroy more of the area. Unfortunately, another setback has been caused by somebody cutting the heavy mesh protection, and breaking the badger gates, not only here but at the Sling Camp cemetery as well. This is disappointing for those who have put so much work into the protective measures, and raises concerns for the future safety of the scheduled ancient monuments.

It is good to see that the scrub has been cut on the Chisenbury Warren village. Now it has been grazed the features are much clearer. Lack of grazing continues to be a problem on other monuments, notably the Weather Hill Henge. Scrub cutting has revealed damage to the Haxton Down Lynchets. A site meeting with the military and Defence Estates, identified the damage as being due to local agricultural practices. The site will be monitored closely to gauge the effectiveness of the measures adopted following the meeting.

It is brilliant that the Silk Hill netting has worked so successfully – all credit to Richard Osgood and many thanks to him for his support of and involvement with the Bulford Conservation Group. I would also like to record thanks to our retiring chairman, Tom Lort-Phillips. He has fought our corner on many occasions, and we are deeply grateful for all his hard work on our behalf over the years.

Finally, we extend a warm welcome to our new chairman, Lieutenant Colonel Simon Ledger.

Nell Duffie

BADGER SUB GROUP

Last September many of our well established badger setts seemed to have been abandoned. At the time, despite carrying out a widespread survey, I could find no evidence of new setts being dug where occupants could have decamped to. As badgers are so territorial the only conclusion was that there had been a consolidation into main setts within their own areas for the autumn/winter period. This was something I had not noticed in previous years on such a large and widespread scale.

Early in 2008 I carried out a similar survey and happily found almost all the setts seemingly deserted now showing plenty of signs of occupation. Badgers have a social order and all ages and sexes will live together for a while before yearlings, especially males, are required to leave the sett. Sows often like a bit of solitude before giving birth. It is probably the natural order of things that the setts have been reoccupied at this time.

Wiltshire

Bulford Conservation Group

Male Raven Flying. Photography: Geoff Kaczanow.

I have found two new setts towards the top end of Nine Mile River and new holes are being dug along a fair length of the ditch running through the penning in Tiger Wood on Bulford Ranges. It is difficult to tell how active some of the holes are as cattle are trampling them but badgers are certainly present.

Yet another mild winter will mean that well nourished sows will produce strong litters of cubs. I hope I am able to get out and see some this year.

Alan Telfer

BOTANY SUB GROUP

We have, at last, some positive news on the dormouse situation in Everleigh Woods. When we checked the boxes in October we found one was full of shredded honeysuckle bark in a loose mass which was notably different from anything we had found in the past few years. This was shown to a dormouse expert who thought that it may be a dormouse 'duvet'. As the nest boxes have become rather dilapidated, we approached Aspire who have provided 50 new boxes which will be installed over the coming months with some assistance from the DE Conservation team. A volunteer from the group will monitor the boxes on a monthly basis and record the findings.

Participants in the brown hairstreak egg search in February found a total of 15 eggs on a gloriously sunny day. Whilst we were unable to enter the range area on the day as firing was in progress, subsequent random finds lead us to believe that butterflies may spread widely through the area.

Work on the site and at Figheldean Bridge continues. With a large part of the ditches now cleared of unwanted vegetation, we have put some of our efforts into re-digging the ditches. We intend to conduct a survey here during summer to establish what species are present.

ORNITHOLOGY

Robert Hayden's ringing team report that little work was carried out in the Sling Yard Hut due to access problems. Some ringing of starlings was carried out and at the two main farm areas a few yellowhammer, meadow pipit, robin and wren were also ringed.

Recorded sightings this year included two ravens flying over Bulford Camp. We also saw a white-tailed eagle, usually found in Scandinavia, circling over Perham Down. Short-eared owls have been spotted across the area, with 10 seen at Perham Down and five near Chisenbury Warren. We have a covey of 12 grey partridge at Lidbury Camp and around two to three lapwings have been spotted around Leckford Cross. Hen harriers have been regular visitors.

We have also had small groups of golden plover flying through the area and a ring ouzel was seen at Chisenbury Warren.

Our expert team took part in the MOD bird count in May 2007, and await the results of their labours. Our annual Bird Counts will now be amalgamated with the BTO Atlas records. We will continue to operate a Constant Effort Site (CES) at Chisenbury Warren, with work commencing later in the year.

Leslie Bond

Wiltshire

Imber Conservation Group

In December 1977 a group of enthusiasts came together in Heytesbury to form the Imber Conservation Group (ICG) and so last year we celebrated our 30th Anniversary. As time passes we risk forgetting the enormous contribution made by the initial ICG members to our understanding of the Plain. I take this opportunity to pay tribute to Beatrice Gillam MBE, Michael and Godfrey Smith, Rob Turner and Eileen Curtis whose early studies and records formed the most comprehensive of Site Dossiers that is still referred to today.

2007/2008 was a year of consolidation following the changes in Sub-Group leaders as they found their feet and began to generate interest and enthusiasm amongst members. In the summer we had great hopes for our first Field Day and BBQ supported by HQ DTE Salisbury Plain and Warminster Garrison, but I am sure that you will recall the wonderful weather we had and inevitably it poured with rain and the day was cancelled. We hope for better luck in 2008. Our AGM which was held for the first time in the autumn was attended by nearly 100 members and guests. Our speaker was the British explorer Robin Hanbury-Tenison OBE, who gave a wonderfully vivid and interesting talk on his research on "Mulu: the Rainforest", which over 30 years ago started the international concern for tropical rainforests.

Landmarc and Aspire Defence have continued to support our activities. We are particularly grateful for the new trailer and ladder for the Raptor Project funded by Landmarc and the cheque for £1000 from Aspire Defence resulting from the sale of nest boxes made by Geordie Ward and his team over the first year of the Redstart Project to raise money for conservation.

Archaeology

Roy Canham, the sub-group leader, has really taken the 'bull by the horns' and generated great interest amongst his team, giving them areas of responsibility to monitor. During the winter months he held a series of walks and evening sessions to develop their knowledge of the archaeology on the West. We have been very fortunate to gain such expertise and knowledge of the archaeology of the Plain. Certainly there is no shortage of opportunity to develop our knowledge of this historic landscape and to assist DE with the monitoring and maintenance of archaeological features. Work has been done to repair scars near Chapperton Down caused by a temporarily disorientated tank that found itself amongst some lynchets, mistakenly thinking they were anti-tank ditches! The damage was spotted quickly by a group member enabling action to be taken before further damage could occur.

Badgers

Badger activity is a major concern on the Plain and surrounding area. Louise Adams and her team have been monitoring activity at the Tinhead Neolithic long barrow where generations of badgers have caused considerable damage to this rare archaeological site. However, creating a new sett and encouraging the badgers to move home is a difficult task both politically and physically and I suspect the issue will be still with us in 12 months time.

Botany

Sharon Pilkington has done much to encourage a new beginning for the Botany Sub-Group. She has had some good support for the walks and searches that she has organised, but there is room for more to join in.

Entomology

Activities within this group have been fairly quiet over the last year, but we hope that they will be involved in this year's Butterfly Survey on the West. There are many long standing butterfly and moth enthusiasts within the ICG so it is important to see a revival in this group's activities if we are to really be in a position to help DE.

Work party taking a break during repairs to tank scars at Chapperton Down. Photography: Mike Jelf.

Wiltshire

Imber Conservation Group

Preparing to install dormouse boxes at Ranscombe Bottom. Photography: Mike Jelf.

Ornithology

Major Andrew Bray has set about drumming up renewed interest amongst our many ornithologists. In 2007 they conducted the MOD Bird Count on the West for what I believe was the first time and they will be out again in 2008. Andrew feels that there are quite large areas of the West that have been somewhat uncharted in respect of bird populations in recent years and he has started to put that right.

Owls and Raptors

After an awful 2006, 2007 had to be better and in fact it was really quite good especially for the many barn owls that took a sabbatical in 2006. Raptors and owls are at the head of the food-chain so to have so many of both on the Plain speaks volumes for the habitat and its management. We are seeing a continuing expansion in the buzzard population, which means we now have a top predator to take into account. Buzzards will prey on barn owls especially if the owls are out in the crepuscular light of the morning and evening. This tends to happen when food is scarce, or when the owls have hungry young or adverse night weather compels them to continue hunting in daylight. With the limited choice of decent sized trees, buzzards are building nests in the same tree as, or very close to, the nestboxes. For example, in 2006 a buzzard built its nest in an overgrown hawthorn bush within 25m of a nesting barn owl. Despite the proximity both species successfully raised their young.

Other factors that have an effect on raptors and owls are grassland management as this provides food and cover for voles and shrews, the fires on parts of the Impact Areas in summer and winter and finally the weather.

It is interesting to compare the number of breeding pairs of barn owls on SPTA (West) with SPTA (Centre) particularly as we started nest boxing in the West moving later to the Centre. Initially all the owls were in the West but by 2000 the Centre was catching up. In 2007 the Impact Area in the Centre had eighteen nesting pairs with another four just outside, whereas the West had five pairs.

The West is 25% larger than the Centre but the two areas are differently managed both in farming and military use. Whereas the West has a higher level of troop movement bringing potentially more disturbance and areas of quite intensive grazing, the Centre has more unmanaged rough grassland. It has a large Impact Area (Area 15 and 16 comprising fifty map squares) against the West's relatively small WDA (ten map squares) forward of the Small Arms Ranges. Both have a degree of grazing management but in the main it is 'wild' country.

Nigel Lewis has now been joined by Peter Green, who is proving a most valuable addition to the Raptor Project team. For the next 3 years the team will also be supporting a PhD student studying the activities of the little owl at sites within Warminster Garrison and along the southern edge of the Danger Area.

Small Nest Boxes

Geordie Ward and his team have continued to make, monitor and maintain hundreds of nest boxes at the Land Warfare Centre, Warminster and in the immediate area of SPTA(W). Aspire Defence have been hugely supportive of the nest box production and the Redstart Project has already raised over £3000 for conservation groups on the Plain and at Aldershot.

Dormice boxes have been placed out in Ranscombe Bottom over the winter, again sponsored by Aspire Defence. Bat boxes are now available for use once the Bat Group gets underway later this year.

Geordie produces high quality durable nest boxes from recycled timber which have been supplied to the RSPB and Highgrove as well as to other training areas and conservation groups. There can be no higher recommendation than that, so if it is nest boxes you want, get in touch with Geordie Ward on 01985-222299 and place your order.

Lieutenant Colonel (Retd) Mike Jelf and the Sub-Group Leaders

Wiltshire

Porton Down

The Old Lodge at Porton Down. Photography Crown Copyright.

Before its compulsory purchase by MOD in 1916 a large part of the Porton Down site was a country shooting estate. In 2007 we began to improve this part of the estate. The first step was to restore the yew hedge that had run along the front of the main house. After 80 years without maintenance the hedge had developed into a line of yew trees. Contractors were employed to shorten the trees to a height of around 1.5 – 1.8 metres so that the new growth would re-establish the hedge line. The new hedge has now taken shape with the added bonus of an increase in light levels which has resulted in much higher numbers of primroses and other plants growing. It is hoped that this will benefit some of the invertebrates such as the Duke of Burgundy butterflies and narrow-bordered bee hawkmoth which live here. In the future we hope to build on this work and uncover the foundations of the buildings which once stood here.

Elsewhere on Porton Down four hectares of conifer plantation has been thinned and the resulting waste wood sold for posts and rails. During the operation a goshawk was seen drinking at a trough which, perhaps, explained the piles of pigeon feathers noted through the plantation. In the late autumn, after thinning, a large number of earthstar fungi were noted, presumably a response to increased moisture reaching the ground.

The Dstl Conservation Group has been involved in a number of surveys during the year including a search for the early gentian which has been recorded here sporadically. Unfortunately sporadic seems to be an apt word as none were found. The third year of a survey of farm field margins was completed with four Biodiversity Action Plan species being recorded, the dingy and grizzled skippers, small heath and, most surprisingly, marsh fritillary. A new initiative, to record snails on the site has begun and interesting species have been recorded. People with a bird interest (including Sweeper of the Yard) were amazed at the arrival of a white-tailed eagle on the site, this was in addition to the great grey shrike, hen harrier and a group of up to 9 short-eared owls so the winter of 2007/08 has been a good one.

Well, you have read this far so you may as well complete the agony.

It is with superabundant reticence that I introduce once again, at no-one's insistence but his own, our resident officer of the law, Sweeper of the Yard.

"Thank you for your introduction Mr Conversation Officer (I shall be looking up those long words later in my copy of 'Your First Dictionary').

I know that, after last years Sanctuary article, you recognise the need for a repeat, detailing the misguided 'interests' of the Dstl Conversation Group. Well this year, I'm sorry to say, things have not improved. The long list includes immigrants on the site, single motherhood amongst the gentry and, worst of all, a young lady who likes to be nibbled by sheep!!!
(I have tried to sell a few of these stories to the media to supplement my meagre salary but they fobbed me off, saying they print such stories every week).

Wiltshire

Porton Down

I will start by updating you on a previous investigation into nocturnal trappers with a bread roll fetish. This crew have now completed an extensive survey of the site, stating that they were trapping moths. On further questioning, however, not only did they admit to catching 176 species of moths but also that 19 were BAPs. At this point I was totally confused. How many types of BAP are there and what fillings can be used?

So, onto current concerns.

While patrolling the range in February I found rabbit carcasses entangled in thorn bushes 2.4 – 3m above the ground. My razor sharp intellect deduced that foxes had evolved and, after finishing their meals they tossed the carcass over their shoulders, in the manner of medieval lords, where they became lodged in bushes. The Conversation Group disagree and have come up with a hare-brained explanation. They say that a young white-tailed eagle visited Porton Down between January and March 2008, having wandered from Finland, where it was ringed. I finished their conjecturing with two, rather clever, points. (i) Would an eagle-eyed Inspector have missed a bird with a seven foot wingspan and (ii) if someone rang it in Finland, why would it bother coming here, it would have said everything necessary on the phone. Case closed, methinks.

Now the delicate matter of, ahem, unfortunate consequences befalling a member of the upper classes wot should've known better. The tale, as told to me, concerns a certain Lady Orchid (with relatives living in Kent). She was first seen, by members of the Conversation Group, in 2002, all alone in the Isle of Wight woods. "The dear little petal looks like a Victorian lady's petticoat" a member told me. Dear little petal maybe but she has recently been seen with two offspring by a Group member. Well, what do you expect, living in the woods dressed only in a petticoat!

And, finally, a very strange case came to my attention when I overheard a conversation between two Conversation Group members. Perhaps you will now see why I keep both ears close to the ground around this lot. Apparently there is a tump called Moll Harris at Porton Down, named after a highway woman. Now, I don't know what a tump is but I can only guess it is a sort of deviant. Her parents weren't much better, naming her after a law breaker. Now, one member said to the other "Moll Harris is in desperate need of sheep. She will look a treat if she is nibbled all over". Imagine my surprise at hearing this and, also, my selfless desire to see the sheep in action.

In the New Year 400 sheep arrived and were let loose in an area of the range where the grass was long. They spent the winter here, most of the time just eating the grass. I kept a close watch but did not see anything unusual despite being there day and night with my video camera. All that I have noticed is that the grass is a lot shorter. Now I hear that the sheep will remain at Porton Down for a while due to Blue Tongue movement restrictions. Well, as I've always said 'there's nought so queer as folk'. I hope Moll Harris' tongue recovers. Perhaps when it does she will join the Conversation Group.

Well, that's it for another year. It's just as well I'm here otherwise things could really suffer.

Even'in all.

Stuart Corbett
Dstl

Marsh Fritillary. Photography: Stephen Davis.

Sheep Grazing with Moll Harris Tump in the background. Photography: Stuart Corbett.

East Yorkshire

Leconfield Carrs

Alder Moth. Photography: Dr David Chesmore.

Wheat (Spelta)
Photography: Crown Copyright

We have continued to work on the project set up in 2005 between the Defence School of Transport (DST) Leconfield Carrs Conservation Group and the East Riding Archaeological Society (ERAS) to grow Iron Age crops. At the beginning of November 2006 the Project Team: Allan Maskell, Mick Bassett, Pete Crowhurst and Caroline Jackson, selected soil for the tubs where samples of Spelta, Emmer and Einkorn (all species of wheat) would be sown. The crop would stay in tubs until it was strong enough to be planted out.

Growth was slow throughout the winter months so natural fertiliser was added to the tubs which led to a marked improvement in growth.
By March 2007, the crop was ready for planting out. Whilst the area was cordoned off to prevent damage from walkers, we could not protect against nature and within a short time the crop was attacked by slugs, rabbits and eventually eaten by roe deer. The team then concentrated their efforts on the remaining crop left in the tubs, which survived the long dry spell during May and June and also the heavy winds and rain. Regular visits, weeding and TLC eventually paid off as July and August showed a vast improvement.

Friday 24 August was chosen as harvest day. Machinery was not required as the project team was able to cut and separate the crop by hand. Although the team were disappointed in the outcome after all their preparation and dedicated work, they were still able to produce enough DST grown seed to cultivate and hopefully plant out again in 2008.

East Yorkshire

Leconfield Carrs

On the night of 6 June, I accompanied Dr David Chesmore on a Moth Count at a site close to an old radio tower on the Training Area. It was a productive night with over 30 species recorded, including seven species new to the site such as peach blossom, diamond back, and notably the alder moth, which extends our total count to 218.

On Saturday 1 September, Fiona Wilson, Chair of ERAS, and myself, delivered a joint presentation on the Iron Age Cornfield Project to around 100 members of the CIA at their AGM. Not our mysterious colleagues from across the pond! – but the Council for Independent Archaeologists.

Wednesday 5 September 2007, was definitely a day to remember at Leconfield when Air Marshal Stephen Dalton, Deputy Commander in Chief Personnel and Air Member for Personnel RAF, kindly accepted our invitation to be the principal guest at DST, to formally witness the Dedication of our new site memorial and declare it open.

This event marked the successful completion of the Memorial Project which had started only a few months earlier. Hangar 4, used by 202 Squadron RAF (Search and Rescue), was scheduled for demolition as it was deemed to be too expensive to bring it up to modern standards. About 5 years ago, Squadron Leader Jon Stanley had shown me strafing damage from World War II, with bullet holes in both a stanchion and the hangar blast doors. As Conservation Officer I asked if it was possible for this metalwork to be retained.

The idea for the Memorial Project and Garden really took off when the DST Commandant, Colonel Paul Brook, and the contractors demolishing the hangar became involved. 2007 also marked the 70th anniversary of the RAF at Leconfield and 30 years since the Army School of Mechanical Transport took over the site in 1977. A small project team was established and headed by Squadron Leader Tara Mcluskie Cunningham, Flight Sergeant Mark Dobie, senior contractor Bill Barnett, and of course myself.

Work on the Memorial was completed on time, with the old stanchion remaining in place as the focal point. It had six aircraft silhouettes cut from the hangar blast doors attached to it – two with bullet holes in the wings.

Throughout the afternoon we witnessed some spectacular events. Preceding the flypast we had the privilege of watching a Tiger Moth flown by Peter Jackson, (in association with the Yorkshire Air Museum at Elvington), arrive and land. This is the first time that a fixed wing aircraft has landed at the airfield since the early 1980s. This was followed by a thrilling flypast by Hawk Advanced Fast Jet Trainers from 19 Squadron at RAF Valley; a spitfire from the Battle of Britain Memorial Flight at RAF Coningsby and Tucano Fixed Wing Basic Fast Jet Trainers from 72 Squadron at RAF Linton-on-Ouse. Events continued with a Champagne Reception and a formal Dinner Night attended by many veterans including some from World War II.

Finally on this subject, on 21 November I delivered a presentation to ERAS on the history behind the Memorial Project. This included a Roman 2nd Century fibulae brooch, found whilst we were preparing the Memorial Garden.

Second Century Roman Fibulae brooch. Photography: Crown Copyright.

14 November saw the Fungal Foray on site, headed by Mervyn Nethercoat, from the East Riding Fungal Group.

Spitfire over flying the Leconfield Memorial Photography: Crown Copyright.

Last, but certainly not least, on our 2007 calendar was the formal opening of our three Nature Trails by Doctor Robert Stoneman, Chief Executive of the Yorkshire Wildlife Trust. The Leaf Trails, marked out by Allan Maskell and Mick Bassett, are of differing lengths and include some of the best features of the site. We've also filmed the trails and created virtual walks which are timed by a moving dot on a map and accompanied by a description, to allow people to familiarise themselves with the walks via their computer desktop. We believe that this is an innovative and excellent educational tool.

Alan Bakewell MCMI

North Yorkshire

Catterick

David Bellamy and the Foxglove Covert Team. Photography: MOD.

Over the past year the focus in the north east has been on archaeological issues with a considerable proportion of the Rural Element of the Estate Strategy (REES) funds being directed towards our historical structures and scheduled buildings. Restoration work has been carried out on the Old School House in Downholme village and we have finally been able to remove all the sheep handling facilities from Cordilleras Farmhouse (Grade 2 Listed Building) including the associated sheep dip pens which have been an eye sore there for some time. The REES funds have allowed us to replicate the enclosures elsewhere leaving the buildings free of livestock. The intention is to improve the military training facilities at the site whilst doing what we can to restore the fabric and character of this unique building.

With the cooperation of James and Joyce Sunter, tenant farmers on Downholme Moor, we have introduced native cattle to the drop zone. We hope that this will stem the invasion of purple moor grass on this upland area. The cattle are a welcome addition to the landscape and have produced the desired results elsewhere on the training area.

We have developed our links with Askham Bryan Agricultural College and extended the partnership to cover an area near Fishponds Lake where Land Management students are able to put their various skills to good use. This project benefits the students and makes a welcome contribution to the rural estate and training area generally.

During 2007 visitors to Foxglove Covert topped ten thousand for the first time. The Bird Ringing course attracted 40 students and trainers nationally and the Bee Keeping course was also very popular. Richmondshire held its Local Biodiversity Day here. The event which was opened by David Bellamy and attended by the local MP, The Right Honourable William Hague, attracted over 700 visitors.

Members of the Conservation Group and volunteers from Foxglove Covert will be contributing to the new British Trust for Ornithology Bird Atlas which will be completed over the next three years. Stuart Ogden, a Landmarc Support Services Range Warden, is also involved in this work. During 2008 around 14 2x2 km squares will be surveyed with around 16 remaining for future years.

One hundred and forty water voles were released onto Foxglove Covert in the autumn bringing another eventful year to a close. More voles will be set free in the spring.

Native woodland enhancement works continued on the Bellerby Ranges (which is a Site of Special Scientific Interest (SSSI)). 200 juniper trees have been planted in the area, with 300 native tree species enriching the Stainton Valley Wood. The restoration of an old moorland wall has commenced on Bellerby Ranges. Work on this ancient boundary will take several years to complete and will be a key factor in assisting the heather restoration and achieving the SSSI improvement target.

The training area hosted several events as part of the Richmond Walking Festival. Feldom Training area was the subject of an historical landscape interpretation walk led by Tim Laurie from the Conservation Group. The Thorpe Edge permissive path formed an integral part of a new circular walk from Richmond and is the final link in a series of five circular routes linking the town with Keld in Upper Swaledale.

Finally, work on the proposed “History of Catterick Training Area” has also begun under the critical eyes of Tim Laurie and Phil Abrahamson from the Conservation Group.

Plans are well established already for other new and exciting projects at Catterick in 2008.

Tony Crease, Secretary of the Catterick Training Area Conservation Group

Cordilleras Farmhouse. Photography: Jez Kalkowski.

North Yorkshire

Ellington Banks

Orange Footman. Photography: Dr Charles Fletcher.

Lesser Spotted Pinion. Photography: Dr Charles Fletcher.

Dingy Skipper. Photography: Stephen Worwood.

The warm spring, which led into the wettest summer on record, did little to dampen spirits in the Ripon area, with many projects continuing unabated.

The survey of veteran (ancient) trees, being carried out on the Ripon Parks Training Area by Colin Slator and Rob Adams has now been completed. This was a Herculean task involving the identification, mapping, measuring and photographing of every candidate tree. We hope that the results of the survey will be published in detail in a future Sanctuary. The team has now started work at Ellington Banks Training Area.

The Landmarc Rural Team continued with management work at both the Fox Covert and Round Hill Sites of Special Scientific Interest (SSSI). The objectives of this work are to keep the wetland areas open and encourage the grassland flora to develop, through the judicious removal of hawthorn scrub.

The moth trapping group of Charlie Fletcher, Steve Worwood and Jill Warwick visited both Ellington Banks and Laver Banks, recording more new species, particularly for the latter site where moth trapping only started in 2006. The species lists for the two sites have now reached 586 and 298 respectively, adding considerably to our knowledge of moths in the area. Highlights included pinion-streaked snout *Schrankia costaestrigalis*, tawny shears *Hadena perplexa*, barred rivulet *Perizoma bifaciata* and lesser-spotted pinion *Cosmia affinis*. The micro-moth *Dioryctria sylvestrella* was again trapped at Ellington Banks, its only known Yorkshire site, confirming that it is resident. An orange footman *Eilema sororcula* trapped on 20 June at Laver Banks was only the second record for the area and is an extremely rare species in Yorkshire.

The bird ringing group visited Ellington Banks during the spring and summer months. In early August the largest-ever Catterick Ringing Course was also held on the training area. It was noticeable that a number of breeding summer migrants had started to leave the area early due to the poor weather conditions, but nevertheless, 56 willow warblers and 27 chiffchaffs were ringed, including a number of juveniles. Bullfinches maintained a healthy population with 31 ringed during the year. A red kite *Milvus milvus* flew over the site in late May, another new species to the area.

The well-intentioned, but misguided, grazing of the magnesian limestone grassland at Ellington Banks may have proved detrimental to the population of the dingy skipper butterfly after the spectacular counts in 2005. It may be that the butterflies had emerged early due to the unusually warm spring but they were only recorded on two dates, and in very low numbers, during what would, in a normal year, be the peak period. Close monitoring of the situation will be carried out this summer.

Dragonflies are regularly recorded at Ellington Banks and early signs were encouraging with the warm spring. However, the sharp change to cold, wet weather in mid summer resulted in low counts of species normally on the wing at that time, such as broad-bodied chaser *Libellula depressa* and four-spotted chaser *Libellula quadrimaculata*. In contrast, later in the season, the emperor dragonfly *Anax imperator*, a recent coloniser, greatly expanded its presence on the site and black darters *Sympetrum danae* were also observed, the first records for a number of years.

Jill Warwick

North Yorkshire

RAF Fylingdales

Eller Beck by the former tracker site. Photography: Sarah Jupp.

Montagu's Harrier. Photography: Bob Glover.

RAF Fylingdales lies within the North York Moors National Park and North York Moors Site of Special Scientific Interest (SSSI), Special Area of Conservation and Special Protection Area. The Conservation Group continues to provide excellent advice and support as well as the practical delivery of conservation projects.

The detailed knowledge of Group members has been used to great effect in drawing up the comprehensive RAF Fylingdales Moorland Management Plan 2007. This Plan is of prime importance as it sets out the specific requirements for improving, maintaining and protecting the diversity of moorland habitats and bird species of particular note, principally merlin and golden plover. A thrilling life and death encounter occurred during a field visit when a female merlin pursued a meadow pipit. Both eventually disappeared behind the security fence so the outcome was unknown!

Several flora and fauna studies continue alongside new ones commenced through 2007. The dedicated 'birders' such as Mick Carroll, John Edwards, Wilf Norman and Ken Hutchinson undertook the annual RSPB/BTO surveys and carried out more detailed assessments of some particularly rare or unusual species. These included monitoring migratory Greenland wheatears in spring and mist netting operations which revealed the presence of nightjars near the recent conifer clearfell area and on adjacent Forestry Commission land.

The area is of particular importance for raptors as demonstrated by the establishment of the Fylingdales Moor Regeneration Programme by the Hawk and Owl Trust with the enthusiastic co-operation of the landowner and other interested parties. The RAF is a partner in this work which will develop an integrated approach to habitat management, predator control and species monitoring.

A very exciting development in 2007 was the arrival of a very rare pair of Montagu's harriers. The female laid four eggs and MOD Police maintained vigilant 'low key surveillance' of the nest site. Sadly the breeding attempt failed due to a spell of appalling wet weather. Sterling efforts by Wilf Norman helped ensure the survival and successful fledging of a brood of kestrel chicks

North Yorkshire

RAF Fylingdales

Adders Tongue Fern. Photography: Dr K Porter.

by delivering batches of voles and mice to the nest box: the rodents were caught over previous weeks by his cat and frozen for such emergencies!

Phil Shaw is continuing with his arachnid survey and has identified all the spider samples with just a few invertebrate ones to complete.
The diversity of habitats on the site may well produce some unusual or uncommon species.

Ken Trewren's plant survey during summer 2007 found the relatively uncommon and locally notable adders tongue fern. This discovery alongside the orchid surveys carried by MOD Police highlights the nature conservation value of the heath and grassland within the non SSSI HQ Site. A detailed assessment and revised habitat management regime for this area is included in the Moorland Management Plan.

Annual surveys of the important water vole population along Eller Beck have continued. Fortunately, there has been no evidence of American mink

The requirements of adders have not been forgotten. Most of the area including raised drain 'tunnels' will be managed to protect and improve their foraging, basking and hibernating area. The MOD Police dog handler and Wildlife Liaison Officer, Kevin Benton and Natural England specialists from Peterborough had an interesting time in 2006/07 trying to prevent contact between dogs and adders! A small area of grassland in the immediate vicinity of the kennels will be regularly mown to discourage adders.

2008 will no doubt prove equally interesting for the Group. Great crested newts are probably present in some interceptor tanks and bat presence has been proven, despite the windblown exposure. So, I feel the need for digging out the wellies, nets and other survey kit!

Sarah Jupp
Environmental Advisor
Defence Estates

Defence Estates Contacts

PROPERTY DIRECTORATE
The Property Directorate maintains the long-term strategy for the estate and develops best practice guidance on estate management issues. It is the policy lead for sustainable development, health and safety and environmental protection. The Directorate is responsible for Sanctuary Magazine and the annual Stewardship Report on the Defence Estate.

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DEFENCE TRAINING ESTATE DIRECTORATE
The Defence Training Estate Directorate is responsible for the provision of safe and sustainable facilities for the delivery of military training across the United Kingdom. This now includes most of the ranges and training areas formerly managed by the Royal Air Force and Royal Navy.
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Barn Owl. Photography: Barry Angell

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