



**TRANSPORT
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CÒMHDHAIL ALBA

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Biodiversity Reporting Duty 2011–2014

Introduction

Under the Nature Conservation (Scotland) Act (2004), all public bodies in Scotland are required ‘...in exercising any functions, to further the conservation of biodiversity so far as it is consistent with the proper exercise of those functions’ when carrying out their responsibilities. We must go beyond implementing measures to protect specific sites; we must also consider how we manage biodiversity in the wider environment through asset management, procurement and staff engagement. This report implements the requirements of the Wildlife and Natural Environment (Scotland) Act (2011) (commonly referred to as the WANE Act) which requires public bodies in Scotland to provide a publicly available report on the actions which they have taken to meet this biodiversity duty.

For the purpose of this report, biodiversity means ‘the variety and variability of life around us and includes every species of plant and animal in earth’s natural system, the genetic material that makes them what they are, and the communities that they form’¹².

We have undertaken a range of biodiversity conservation actions, as outlined in our ‘actions taken to improve biodiversity’ section, given that we are involved in the management and use of both land and natural resources³. This report captures a snapshot of our biodiversity actions since 2012.



¹ <http://www.snh.gov.uk/docs/B836048.pdf>

² <http://scotland.forestry.gov.uk/supporting/strategy-policy-guidance/biodiversity>

³ <http://www.snh.gov.uk/docs/A1882270.pdf>

About Transport Scotland

Transport Scotland is the national transport agency for Scotland. We are responsible for delivering a safe, efficient, cost-effective and sustainable transport system for the benefit of the people of Scotland. We operate within the remit of the National Transport Strategy⁴, which is endorsed by the Minister for Transport and Islands and sets a framework for enhancing transport in Scotland up to circa 2026.



⁴ <http://www.transport.gov.scot/strategy/national-transport-strategy>

The NTS offers five strategic objectives that inform our policy development, resource investments and measurement of our effects.

The NTS strategic objective to ‘protect our environment and improve health’ encapsulates and underpins our approach to biodiversity. The NTS highlights that the 2020 Challenge for Scotland’s biodiversity⁵⁶ and the accompanying Route Map to 2020⁷ focus on the need for action to halt biodiversity loss and restore our ecosystems. The NTS draws attention to the importance of managing Scotland’s transport network in a manner that contributes to improving biodiversity in Scotland, and draws attention to the provision and maintenance of green networks that both encourage walking and cycling whilst providing space for biodiversity.



Our Corporate Plan 2012-15, which was extended into 2016, reinforces this approach by stating that we ‘...will ensure that protection and enhancement of Scotland’s environment is a key consideration in the construction and maintenance of the transport infrastructure for which we are responsible....[to achieve] positive change...[in] biodiversity elements [and this] will remain a priority during the planning, design and delivery of all our activities’⁸.

Our annual business plans since 2012 have interpreted this goal as a delivery commitment to ‘demonstrate environmental sustainability through the delivery of environmental protection...across our operations, projects and maintenance activities’.



⁵ <http://www.gov.scot/Resource/0042/00425276.pdf>

⁶ As noted in the Scottish Government’s own Biodiversity Report 2012-14, the Scottish Biodiversity Strategy entitled ‘Scotland’s Biodiversity: It’s in Your Hands’ was published in 2004 with the aim to “conserve biodiversity for the health, enjoyment and well-being of the people of Scotland, now and in the future”. The 2020 Challenge for Scotland’s Biodiversity is a supplement to the 2004 Strategy.

⁷ <http://www.gov.scot/Resource/0048/00480289.pdf>

⁸ http://www.transport.gov.scot/sites/default/files/documents/rrd_reports/uploaded_reports/j232468/j232468.pdf

This means that our annual task between 2012 to 2015 has been ‘to manage the flora and fauna of our transport networks to protect the natural environment of Scotland and maximise biodiversity’⁹.

Our approach to biodiversity is captured within Fitting Landscapes¹⁰, which has been endorsed by our senior management team as our corporate landscape policy. Our ‘mainstreaming’ section provides more detail on the Policy, but the vision, aims and objectives relevant to biodiversity are as follows:

- The policy **vision** of Fitting Landscapes is ‘to promote the more sustainable design, implementation, maintenance and management of the transport estate and ensure that the landscapes we create and manage are of high quality, well integrated, bio-diverse, adaptable and deliver a meaningful contribution to national sustainability targets’
- Our key biodiversity **principles and commitments** can be summarized within aim 2 of Fitting Landscapes which is to ‘enhance and protect natural heritage [by delivering] effective mitigation of adverse impacts on species and ecosystems...[along with] the positive enhancement of biodiversity through the creation and management of new habitats and green networks’
- Project **objectives** should identify areas of opportunity for biodiversity protection and enhancement, such as supporting native planting and/or incorporating relevant national and local biodiversity targets into schemes. Objectives are required to be set at the beginning of each project development and can relate to any aspect of the intended works and outcomes. The objectives are a useful benchmark against which to measure the delivery of the scheme and are intended to be refined and adjusted as the works progress and more detailed information becomes apparent.

Governance, leadership and management

Our Environment and Sustainability professionals provide environmental advice and support across the Agency, with our Landscape Advisor offering technical, expert advice on landscaping and biodiversity actions across our schemes. Our project managers – and by extension our supply chain - are tasked with delivering the Fitting Landscapes policy vision, to turn design concepts and ideas into tangible action that can be viewed and measured across our transport network assets.

Biodiversity actions are integrated into the core work activities undertaken across the delivery cycle of our transport schemes and activities, with the following approach taken at appraisal, design, procurement, construction and maintenance stages.



⁹ http://www.transport.gov.scot/system/files/uploaded_content/documents/reports/Annual%20Business%20Plan%20-%202015_16.pdf

¹⁰ <http://www.transport.gov.scot/report/j279083-00.htm>

In this way, implications on wildlife and natural habitats, whether direct or indirect, can be explored at a stage where it should be relatively straightforward to make any necessary allowances to the emerging design. This includes avoidance and mitigation of any negative impacts as well as consideration of opportunities for biodiversity enhancement.

Transport Scotland has long championed the use of native species of local provenance for all new works within the Scottish trunk road network. This has since become a common policy in other delivery authorities and is now enshrined in legislation through the Wildlife and Natural Habitats (Scotland) Act 2011 which reinforced the provisions of the Wildlife and Countryside Act 1981 in this respect.

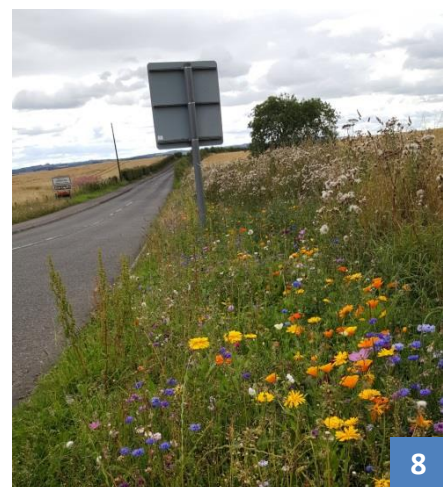
During procurement

Our procurement process takes account of biodiversity through clear statements of instructions to our supply chain. For example, with respect to road maintenance works, the Fourth Generation term maintenance contracts provide instructions to our Operating Companies within Schedule 7 Part 4 Landscape Development. Extracts from this contract are shown below:

‘When developing the Landscape Development Plan, the Operating Company shall take account of Transport Scotland’s commitment to the protection and enhancement of biodiversity through all relevant legislation and documents including (i) the Trunk Roads Biodiversity Action Plan, and (ii) the Scottish Government’s biodiversity strategy Scotland’s Biodiversity – It’s in your hands. The Landscape Development Plan shall include (i) recommendations in accordance with the landscape strategy; (ii) recommendations resulting from the annual landscape management report, and (iii) recommendations resulting from the Operating Company’s landscape opportunities inspections referred to in this Part. The annual landscape management report shall record details of the Operations undertaken in support of enhancing biodiversity and nature conservation, including works associated with creating, repairing or improving any wildlife mitigation measures within the Unit.’

A number of appendices on landscaping and ecology in the 4G contract provide specific instructions for specific elements, with extracts such as:

- The Operating Company shall give at least 48 hours’ notice to the Overseeing Organisation of the intention to commence any of the Operations at...Special Areas of Conservation including candidate sites...or Sites of Interest for Nature Conservation.
The Operating Company shall also ensure that the appropriate advisory body (for example Scottish Natural Heritage, Scottish Environmental Protection Agency and Historic Scotland) shall also be advised of the intended Operations prior to the Operations commencing on Site



- The Operating Company's programme of weed control shall ensure there shall be a significant reduction in the occurrences and extent of these species each successive year for the duration of this Contract wherever they occur. Within wildflower areas or areas of nature conservation value the Operating Company shall eliminate any injurious weeds that cannot be effectively controlled by chemical means without causing damage to other vegetation by hand pulling
- The Operating Company shall carry out rabbit, hare and deer control in all areas of new planting or seeding undertaken under this Contract. Areas of brambles and herbage that interfere with the control of rabbit or deer shall be cut
- The Operating Company shall maintain all the grass and wildflower grass areas within the Unit in accordance with the Landscape Inventory categories. No grass cutting shall be carried out within 250 mm of unprotected trees and shrubs
- Wildflower seeding shall be undertaken typically in early Spring or early Autumn and following best horticultural practice appropriate to the species involved

Our major road scheme's also take account of biodiversity. For example, extracts from the A737 Dalry Bypass Employer Requirements from May 2016 state that:

'Notwithstanding any other provision of the Contract the Chartered Landscape Architect shall inspect the Site monthly throughout the Period of Establishment Maintenance and report accordingly. Not more than two weeks after each visit the Contractor's Chartered Landscape Architect shall make written recommendations to the Contractor regarding deficiencies and opportunities for improving the landscape maintenance and exploiting environmental opportunities that become apparent during the Period of Establishment Maintenance to enhance biodiversity and reduce pesticide application. A copy of the Chartered Landscape Architect's written recommendations shall be provided simultaneously to the Engineer. The Contractor's Chartered Landscape Architect shall confirm, without limitation, the requirements for plant replacement, establishment of woodland, shrub and hedgerow planting and all seeded grassland and wildflower areas and remedial Works associated with the landscape Design. The recommendations of the Contractor's Chartered Landscape Architect shall be carried out by the Contractor.'

An annual biodiversity fund of £40,000 is embedded within the ScotRail Franchise. In May 2016, ScotRail launched, in partnership with Keep Scotland Beautiful, the Biodiversity Fund scheme.

Individuals or groups already involved in the ScotRail 'Adopt a Station' scheme were invited to apply for funding for projects that aimed to increase biodiversity in stations and the local area. The fund is managed by Keep Scotland Beautiful, with schemes addressing the following areas:

- Biodiversity planting (such as wildflower meadow or woodland)
- Provision of physical aides such as bird boxes
- Information and communication
- Planting of native species in accessible areas for the enjoyment of the public and/or ScotRail employees
- Educational events
- Protecting and enhancing existing native flora and fauna

During construction

It is fundamental to the success of all schemes that implementation of biodiversity actions are carefully monitored by appropriately qualified individuals to ensure that the aims and objectives embedded in the design are realised. This includes the delivery of all committed mitigation. At the same time, and despite the most carefully prepared design documentation, it is in the nature of projects involving excavations and other ground works that unexpected issues can often arise. Such issues can present significant problems for the Design Teams to overcome and it can sometimes be challenging to find appropriate solutions to protect against increased environmental impact.



However, the discovery of unexpected issues and overcoming practical problems during implementation can also be used as an opportunity to maximise scheme benefits through the development of alternative solutions, whether in relation to landscape integration and/or enhancement of the natural heritage. Contractual and regulatory obligations will still be required to be satisfied but the potential for the delivery of alternative, creative solutions is encouraged.

Safeguarding the natural resource, delivery of the agreed proposals and the exploitation of onsite opportunities requires regular monitoring of implementation by suitably qualified and experienced staff, and Transport Scotland ensures that this is clearly detailed in the relevant contract documentation (whether as part of the Management and Maintenance Term Contracts or for new scheme requirements). This is helped by ensuring a clear understanding of the project objectives across the other project professionals involved and supported by good communication.

During maintenance

A common issue with the development of schemes within the public realm, however well delivered initially, is the commitment to a long term maintenance regime. All major scheme interventions will ordinarily include a 5-year project maintenance period post completion. This is a contract requirement and covers the defects liability on built elements and the establishment period for any new planting and seeding works. The requirement allows for the employment of suitably qualified individuals to undertake regular inspections of the works throughout each year of the maintenance period to check that the scheme is performing as required. This also provides a chance for an assessment of how the site is developing in general and in relation to the local characteristics of the adjacent landscape. This, in turn, gives rise to the possible introduction of small amendments to the maintenance regime if there is an opportunity to improve biodiversity integration – for example, the minor adjustment of a wildlife fence alignment following evidence of conflict with migrating mammals or changes to a mowing regime to encourage a more diverse sward development.



As well as the maintenance period associated with major new interventions, Transport Scotland has a remit to manage the existing rail and trunk road networks. Scotland has a total of 3,405 kilometres of trunk road and 2,776 kilometres of rail track. Assuming a typical average maintained ‘soft’ landscape corridor and supporting infrastructure, this combined network brings the order of 90-120 square kilometres of land area under management. In terms of the trunk road network this management is delivered via Operating Companies; contractors working under a term contract arrangement (as shown in the ‘procurement’ sub-section above).

Actions taken to improve biodiversity

Action to protect and enhance biodiversity is a common theme across our transport schemes and operations, with a particular focus on our road and rail activities. Examples of actions we have taken, and outcomes we have delivered, are shown below, with the examples sub-divided across the five stated objectives of the 2004 Scotland’s Biodiversity Strategy¹¹:

¹¹ Note that these objectives cross-reference to the three aims of Scotland’s 2020 Challenge

Species & Habitats - To halt the loss of biodiversity and continue to reverse previous losses through targeted action for species and habitats;

A830 Borrodale am Port compensatory habitat

The A830 trunk road stretches between Fort William and Mallaig and, prior to the construction of the Skye Bridge, was known as the Road to the Isles. Despite its previous status in Scotland's transport infrastructure and the fact that it supports a number of settlements and a busy fishing industry, the road included many single carriageway sections where oncoming vehicles could only get past each other by using strategically located passing places. The Scottish Government determined



that the road needed to be upgraded and this was achieved via a number of sequential improvement schemes around 2010. Although this project occurred before 2012 – which is the starting point for this Biodiversity Report – the approach presented here provides an ideal example of how we have approached biodiversity. The last of these was the section between Loch nan Uamh and Arisaig which passes through the Glen Beasdale SAC and a National Scenic Area.

In order to take this scheme forward, Transport Scotland was required to prepare material for an Appropriate Assessment to determine the potential effects on the SAC. It was concluded that there was no alternative option to the proposed route and an application was made to the European Union under the IROPI criteria (Imperative Reasons of Over-riding Public Interest).

The qualifying interests for Glen Beasdale are old sessile (Atlantic) oakwood with holly and hard fern; otter; and freshwater pearl mussels. The proposal included the following measures for avoidance/reduction of impacts on these features through route choice:

- Reduced land take from that normally required through changes to road design standards
- Precise containment of vegetation damage to within the required corridor during construction period
- Retention of standing and fallen deadwood at the corridor margins
- Control of *Rhododendron ponticum* invasion

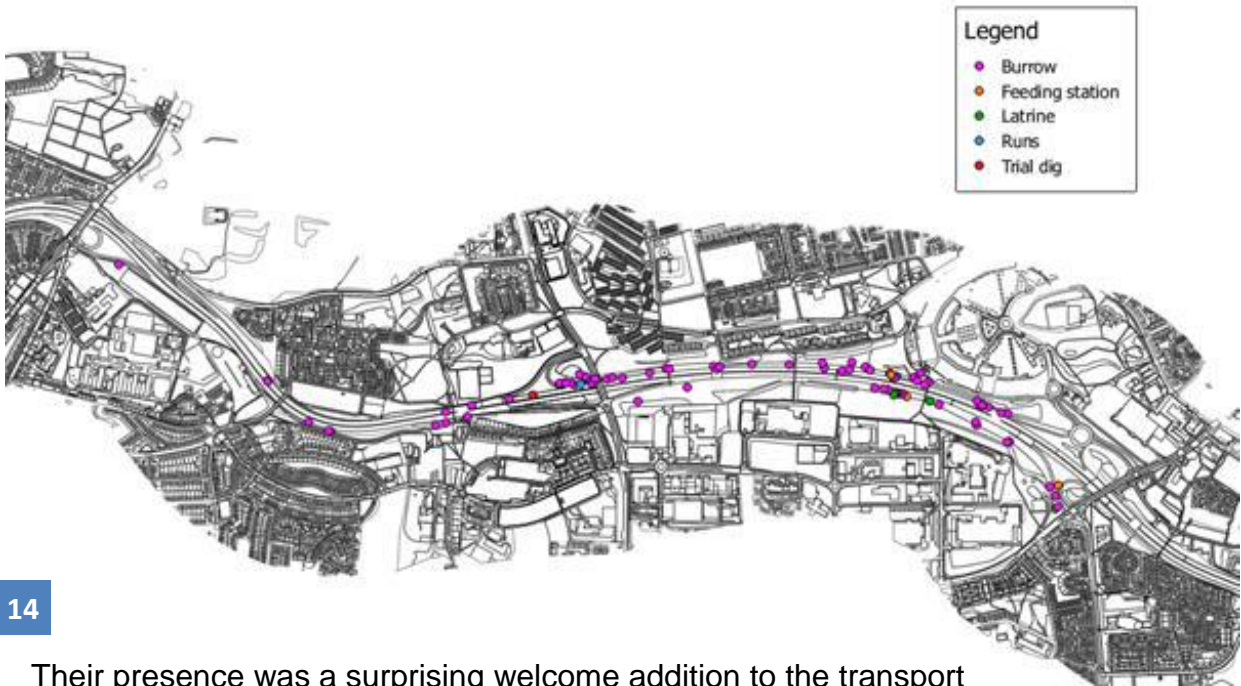
In addition, there was a requirement to locate an area of compensatory habitat in the vicinity of the original Glen Beasdale boundaries which could be managed over an agreed tie period to reach a similar qualifying status as the SAC. As this was the first time an application affecting a Natura site had been proposed within the UK, there was limited guidance on the exact proportionate size the compensatory habitat should be in relation to the area of the existing SAC affected by the scheme. Transport Scotland arranged a 25 year lease with a local landowner for a suitable site, contiguous with Glen Beasdale that is almost four times the size (30 ha) of the impacted area of SAC (7.9 ha).



The site is known as Borrodale am Port and management operations undertaken so far have included the clearance of a very significant area of highly invasive *Rhododendron ponticum* allowing a varied native ground cover flora to begin to establish. Two large deer exclosures have been erected to create non-grazed areas for natural regeneration of the Atlantic Oak woodland and there are promising signs of this occurring. By the end of the 25 year period it is widely anticipated that 30 Ha of over grazed, rhododendron-covered coastal land will be re-established as a viable part of an expanded Atlantic Oak wood SAC.

M8 Water Vole location and management

Scotland's wildlife is beautiful but can also be ingenious. In February 2014, Scotland TranServ were alerted by Scottish Natural Heritage (SNH) to the substantial presence of terrestrial water vole colonies near to the verge of the M8 motorway between junctions 10 and 12.



14

Their presence was a surprising welcome addition to the transport network in Scotland! Water voles are a species of conservation concern, with their burrows being protected under the Wildlife and Countryside Act 1981 (as amended).

A joint planning exercise was initiated between SNH, Transport Scotland, Scotland TranServ and University of Glasgow to investigate habitat enhancements. Collectively, two objectives were identified (1) to understand how best to adapt road maintenance operations and activities on the M8 adjacent to the habitats in the immediate aftermath of discovery and in the long term, to preserve the species at the M8 location, and (2) to understand the scope of the existing habits and movement, to inform motorway maintenance activities.



15



16

The immediate goal (for objective 1) was to ensure that verge maintenance by Scotland Transerv on the M8 was not inadvertently causing an offence to recklessly disturb a water vole occupying a burrow. Within 1 hour of being informed about the water vole colony, Transport Scotland had informed Scotland Transerv, and their maintenance teams were made aware immediately of the special conservation issue. No maintenance activities caused any impact on the habitats, and a clear instruction was provided for maintenance activities to be aware of the new habitat (whilst still continuing with essential maintenance on this critical piece of road infrastructure). Tool box talks were provided to all supervisors and operational staff.

To meet objective 2, Scotland TranServ carried out an extensive set of surveys between junctions 10 and 12 of the M8 which provided evidence that the water voles presence was much wider than was initially understood or expected by SNH and the University of Glasgow. The combined surveys showed that the water voles were using grassland and verges independent of any wetland habitat.

The surveys found that the habitats were thriving next to the urban motorway, which was most unexpected. In summary, approximately 380 burrows were discovered throughout the study area on both sides of the road, along with approximately 12 latrines, 9 feeding stations and 3 runs. The investigations by the project partners found that the water voles behaviour was unusual, in that they lived away from open water within dry grasslands. This fossorial way of life differentiates them from the more typical form of the species which tend to take up residence near water bodies and dig their burrows on the banks.

With respect to objective 1, Scotland TranServ have altered the local vegetation maintenance regime, in order to reduce disturbance and increase the grassland cover available. Cycles of grass cutting have been reduced, with cutting delayed until the water vole breeding season is complete. The outcome of the work is that the M8 verge has now been identified as a “Water Vole Habitat Improvement Area”, a first for the road network in Scotland.



A9 Kincaig to Dalraddy carriageway resurfacing - Wood Ant Nest preservation

In May 2013, Bear Scotland were undertaking carriageway resurfacing 3km north of the Kincaig junction. Several wood ant (*Formica* sp.) nests were found on the south-facing cutting, which resulted in an exclusion area being delineated to prevent access to the cutting by site personnel, plant, machinery and vehicles in order to protect the wood ant nests.

A85 Bridge of Awe bridge parapet repair – Otter couch protection

In February 2014, Bear Scotland were undertaking a bridge parapet repair 3.5 km east of Taynult.

Prior to the work commencing, otter resting places found in vicinity with one couch within 10 meters of works. An EPS otter licence was obtained from SNH, with mitigation included in the Site Environmental Management Plan such as ensuring that scaffolding did not damage the adjacent otter couch; the works were undertaken whilst the local otter population resting places were undisturbed. Similar approaches to otter couch preservation were also adopted by Bear Scotland at a number of schemes including the A83 Dunderave resurfacing works, the A82 Strath Duibh Uisge bridge parapet repair and the A828 Achara resurfacing works.

A9 Port Gower culvert replacement – fish migration and otter passageway

In April 2014, Bear Scotland replaced twin Armco culverts with a buried invert segmental precast concrete box structure 2 km south of Helmsdale. The engineering works resulted in improved access for migratory fish via a buried invert and a low flow channel was created by placement of boulders on the bed of the watercourse. Following construction, otter passage was confirmed, with sprainting under the bridge within two weeks of the construction completion date.



A9 Cromarty Bridge scour protection – wintering and breeding birds

In March 2016, Bear Scotland were undertaking scour protection works. The Cromarty Firth Special Protection Area (SPA) lay adjacent to the bridge, with this area designated for a number of wintering birds and two species of breeding bird – common tern (*Sterna hirundo*) and osprey (*Pandion haliaetus*). In addition, Arctic tern (*Sterna paradisaea*) were known to nest near the bridge with a colony of terns nesting on the shingle beach near the north abutment of the bridge.



Following consultation with SNH, Royal Society for the Protection of Birds (RSPB) and Marine Scotland, a 250 m exclusion zone was set up between the tern nesting colony and the bridge works. The engineering activities were programmed to start at the north end of the bridge and move southwards to avoid disturbance to the tern colony during their nesting period.

M90 North Queich Culvert – Indian Balsam exclusion zone

In order to repair scour impacts at a culvert near Kinross, Bear Scotland installed rock armour and flood bank reinstatement upstream of culvert in September 2014. During the works, the contractor did not undertake work within the North Queich River channel during the fish spawning season (from 1st October 2014 to 30th April 2015). In addition, a sediment management system was installed between the works and North Queich River to protect the fish population. Weed control was also applied on land, which was dominated by Indian Balsam. An Indian Balsam exclusion zone was setup along the rough margin (in-between the two works areas) surrounding North Queich River.

A96 Keith Dufftown Railway Bridge

In October 2015, Bear Scotland undertook refurbishment works of the bridge comprising repairs to existing substructure and existing deck. Japanese knotweed was identified along the railway embankment, with bat active along the railway line. The proposed construction activities also encroached into the Fife Keith Conservation Area. To mitigate the biodiversity impacts, a short-term exclusion zone of at least 7.0 m was setup around strands of knotweed, with biosecurity measures implemented such as cleaning of machinery and boots of contaminated soil implemented. To minimise impacts on bats, night-time working was avoided as far as possible, with temporary lighting positioning agreed with an ecologist onsite prior to works commencing to avoid light spill and thus minimise disturbance to bats.

Borders Rail Project

Network Rail achieved a CEEQUAL 'Excellent' Whole Life Cycle Award for this scheme, with biodiversity being a component part of this assessment. An artificial badger sett was constructed close to a known breeding sett to provide an alternative sett during the construction works. The project also created a badger tunnel at Falahill to allow badgers safe access beneath the A7, given that there are badger setts located on either side of the A7 at that location. Badger fencing was also designed to encourage the badgers to utilise the tunnel.



Specific areas were identified for the installation of bird boxes for dipper/wagtail boxes on structures associated with watercourses and jackdaw and tree sparrow boxes were installed where those species were recorded. Over 120 bat boxes were installed along the route and approximately 20% of the boxes have been utilised to date, mainly by pipistrelle bats.

Edinburgh Glasgow Improvement Programme (EGIP)

Established and extensive main sett located in the cess where Overhead Lines for Electrification (OLE) and foundations had to be installed for the EGIP rail project. Designs took account of the sett location and the OLE structure was re-designed to a twin track cantilever mast, sited in the opposite cess.

The outcome was that the sett didn't need to be excluded or closed which realised significant programme and cost benefits while mitigating risk of disturbance.

Phase 1 ecology surveys for EGIP identified that areas around the Avon Viaduct had high potential to support bat roosts. Phase 2 surveys were undertaken using rope access specialists and non-breeding soprano pipistrelle bats were identified in Pier 22.

Network Rail applied for a bat licence and an exclusion zone was established as mitigation. Monitoring by the Alliance Environment manager resulted in a positive intervention to halt possible disturbance and the site ecologist kept SNH informed of status.

Smooth Newts were identified at various sites across the EGIP scheme, particularly at level crossings, and as such works were suspended until ecological support could be mobilised and the amphibians subsequently translocated.



Renewals Collaborative Delivery Programme (RCDP)

At the Findhorn Viaduct refurbishment, Network Rail sought to prevent nesting on the structure. A bird of prey expert successfully helped to deter potential nest building birds whilst protecting a variety of bird species.

At Fishers Wood, the railway cutting had been badly degraded due to habitation and digging activities by badgers and rabbits. In order to facilitate earthworks repairs, Network Rail set up CCTV and wildlife motion sensor cameras during the six weeks prior to construction to confirm that no badgers were trapped within the sett complex. After six weeks, the badgers had re-located to another of their annexe sett complexes north of the earthworks location and permanent anti mammal mesh was installed to prevent recolonisation. The cutting was subsequently re-seeded and has now returned to the original grassland habitat.

At Wamphray Fish Passage Ladder, an existing weir and fish channel in the river Wamphray had proved impassable to fish due to high flow rates. Network Rail worked in close collaboration with SEPA, the Principal Contractor and the Annan Fisheries Board to install a temporary diversion to facilitate a newly designed shallow gradient fish ladder.

The ladder was constructed to tie into the course of the original waterway and consisted of natural and hard engineering components. The design included shallow pools and slower moving sections to allow fish to rest during passage upstream. The project also helped to deliver hydrological morphology improvements. Anecdotal reports were noted that fish had passed upstream during the flooding following storm Desmond in 2015.



RETB Next Generation project

As part of the RETB Next Generation project, Network Rail identified a number of locations where telecoms equipment buildings, antennae and masts had to be installed to support the introduction of the new tokenless block systems on the Highland railway lines. One such location was above the Glencoe ski lift, which is within the Glen Etive and Glen Fyne designated Special Protection Areas. Network Rail and principal contractor teams consulted with Scottish Natural Heritage to arrange ecological surveys and put in place a number of special safety arrangements for staff.

The works delivery included access by a tracked snow vehicle and logistical operations were specifically timed for parts of the year with good snow cover as this helped to protect the local habitat and biodiversity. With this location having 5% of the UK Golden Eagle population, Eyrie nest site records were reviewed and surveys undertaken to prevent risk of disturbance; one mitigation was to designate a no fly exclusion zone, as on occasions access by helicopter was required.

People - To increase awareness, understanding and enjoyment of biodiversity, and engage many more people in conservation and enhancement

ScotRail Franchise Biodiversity Fund



In the first year of the Franchise, we sought to educate volunteer station adopters about future planting regimes whilst also identifying some potential locations where ScotRail could develop their biodiversity planting. Six stations were identified for planting projects.

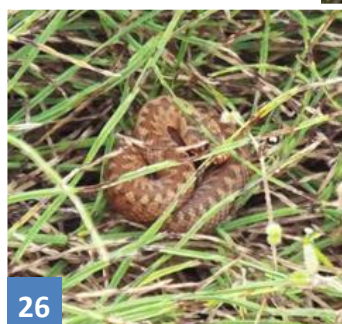
At Dalry Station, their Garden Group developed their local space as a bee-friendly environment, planting yellow rattle to control grass and cutting bushes, which also improved sight lines for the benefit of customers' security.

The adopters at Aberdour Station planted native species, and Buglife advised the adopters at Helensburgh Upper Station on how to improve the diversity of their planting. Buglife also supervised vegetation management around the recently-built carpark at Ladybank Station. At Pollokshields East Station, Hidden Gardens managed the station planters in a biodiverse fashion and installed interpretive panels that explained the role of the railway as a wildlife corridor. For all of these projects, Keep Scotland Beautiful provided a peer review of the projects.

A biodiversity workshop was delivered for 200 station adopters and Community Rail Partnerships in 2015. ScotRail worked in partnership with Keep Scotland Beautiful to create and deliver the biodiversity workshop that featured presentations from guest speaker with expertise knowledge. The aim of the workshop was for adopters to learn about biodiversity planting, and to provide groups with seeds and a guide to biodiversity.

Abington and Beattock Summit 650 volt Signalling Power Supply (ABS) project

Signalling power supply projects were an ongoing programme of works for this rail scheme. At the southern limit of the region, the Network Rail Hazard Directory identified a historical presence of adders. Surveys were carried out and adders were identified in the undergrowth and within the cable troughing route.



To help inform staff of reptilian behaviours and provide a level of confidence, Network Rail arranged a visit to site by Dr Pete Minting of the Amphibian and Reptile Conservation Trust (ARC). Briefings were delivered on board the Network Rail Scotland Safety Truck and staff were advised on how to minimise disturbance.

During onsite activities, vegetation was cut back to improve the adder habitat by providing clear grassland for basking. Sloughed skin was also collected, to assist in providing material to increase the ARC reptile DNA database research.

A9 Dualling – Academy 9 programme

The Academy 9 Education and Training Programme has been developed in 2016 to work in parallel with the A9 Dualling Project. It offers an invaluable opportunity for real community engagement at the grass-roots level. The basic premise is that local pupils currently attending schools adjacent to the A9 between Perth and Inverness will grow up alongside the Programme and develop their level of awareness, culminating in the chance to train and work on the A9 and/or pursue other related career opportunities as a result.



During the various events which have been held in schools since the launch of the initiative at Kingussie High School in August 2015, pupils have been working in teams tackling such subjects as construction, safety and traffic sense. It is these pupils who will experience the dualling of the A9 through its design and construction and the parallel Academy9 Programme will provide an opportunity to influence their career decisions. Due to the high quality landscape of the A9 corridor a particular focus of the Academy 9 programme has been on environmental and ecological issues.

The next series of events will centre around an A9 Roadshow to target secondary and feeder primary schools along the corridor. As well as putting themselves in the shoes of engineers, pupils will be introduced to ecology by thinking about the challenges needing to be faced when considering the flora and fauna on their own doorstep and when looking at the possible route of the dualling. Another session on geology will also ask the pupils to consider the ground beneath their feet and how this relates to where the dualling route could go. We are also working with Perth and Inverness Colleges to expand the programme in the longer term into vocational training.

Landscapes & Ecosystems - To restore and enhance biodiversity in all our urban, rural and marine environments through better planning, design and practice

Fitting Landscapes policy

The new landscape document published by Transport Scotland in 2014 is an inclusive and mandatory policy which has application across all areas of the agency. It is specifically a high level policy rather than a scheme-based guidance document and it encourages all staff, consultants, contractors and other operatives to consider the potential implications their work and decisions may have on the environment.

The policy requires consideration of biodiversity, its protection, conservation and enhancement, as a primary element in the planning of all works, whatever their nature. In this way, even the preparation for the most mundane action will have considered whether there is a likely danger to the local environment, however small or unlikely, and appropriate mitigation can be included from the start.



Alternatively, on a more positive note, this pre-works review may determine previously unconsidered opportunities to enhance the local ecosystem or create new habitats. More about this innovative policy is outlined in ‘mainstreaming’ section of this Report.

Integration & Co-ordination - To develop an effective management framework that ensures biodiversity is taken into account in all decision making

The Forth Replacement Crossing project (FRC)

The FRC project includes the Queensferry Crossing and associated road networks, M9 J1A improvements (completed February 2013) and Fife Intelligent Transport System (completed December 2012). It is Scotland’s biggest transport infrastructure project in a generation and this means it has the potential to impact on local communities and commuting public as well as a significant area of the Forth Estuary and adjacent land. The estuary has a wide variety of natural habitats including inter-tidal habitats such as mudflats, saltmarsh and reed beds, which are important areas for wildlife.

The abundance and diversity of plants and animals to be found in these habitats make the Forth an internationally important wintering site for birds travelling from Scandinavia, Iceland and the Arctic, in addition to supporting breeding populations of seabird species of European Importance.

The importance of the Firth of Forth is legally recognised in the international designation of much of the area as a Special Protection Area and Ramsar site¹².



¹² <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/ramsar-sites/>

Development of the new bridge and supporting infrastructure within such an important natural resource required broad and meaningful coordination with the statutory authorities. The formation of the Environmental Liaison Group (ELG) was a joint initiative by Transport Scotland and statutory consultation bodies to achieve a collaborative and inclusive approach to ensure the management of environmental matters and mitigation of environmental impacts during construction of the FRC. The ELG has provided a positive influence in the way in which the Contractor has planned for and implemented construction operations. Separate Community Forums, Noise Liaison Group and Marine Liaison Group were also established for the duration of the project.

Biodiversity aspects that have been achieved or progressed during the construction of the FRC include:

- Replacement habitat and landscape planting: Approximately 66.4ha of replacement planting, including mixed woodland, scrub and grassland has been designed as part of the project. This compares with around 25.6 ha area of land lost to construction and operation of the scheme.

In June 2011, Transport Scotland established a contract with a plant nursery for the supply of trees for use in the landscape and ecological mitigation planting for the FRC project. This was to ensure the quality of the trees to be planted on site and to allow early establishment by planting as soon as areas became available. In particular, two areas of advance planting were completed in 2012 with a total of approximately 52,000 trees. Since then a further 236,000 trees have been planted with more remaining to be planted in the final year of the project. This will provide a benefit to local biodiversity throughout the area of the project due to the underlying ecological integrity and biodiversity benefits from procurement of native species of local provenance. Further benefits have included the flexibility with which plants can be delivered, as determined by the construction programme, and the ease of procuring plants for additional areas to be planted or to enhance existing planting.

- Replacement habitat for protected species including; 64 bat boxes, 3 badger setts, 1 otter holt, 4 mammal underpasses and extensive badger and otter fencing.
- Measures to avoid disturbance of wildlife during construction, including; restrictions on underwater noise and acoustic fish deterrent to prevent disturbance to migrating salmon in the Firth of Forth, restrictions on airborne noise to prevent disturbance to seabird populations and Passive Acoustic Monitoring to ensure no marine mammals were present prior to blasting or piling within the marine environment.

- The realignment of the Swine Burn as part of the M9 Junction 1a was designed and constructed to improve morphological diversity, habitat complexity and the habitat quality of the burn. This was achieved through the inclusion of meander bends and areas for riparian zone to establish.



- The management of St Margaret's Marsh SSSI is a long-term commitment for Transport Scotland, the aim of which is to enhance existing habitats and bring the SSSI back to favourable status. Access to the site is also being improved to increase its amenity value. Construction of a number of sea-wall and internal sluices has already been undertaken to increase the sea-water inundation rate of the marsh with the intention of controlling expansion of the reed bed and enhancing biodiversity. Path construction around the eastern lagoon has commenced with further path clearance still to be undertaken. A steering group has also been established to seek input from Scottish Natural Heritage, nature conservation groups and the local community.



Knowledge – To ensure that the best new and existing knowledge on biodiversity is available to all policy makers and practitioners

Deer management

An example of biodiversity knowledge exchange and use of best practice techniques in the course of our everyday work would be the recent requirement for the production of Deer Management Plans for the entire trunk road network.



This paved the way for the Scottish Trunk Road Network to require active deer management planning in the form of annually-prepared Deer Management Plans (DMP).



This is still a relatively new area for many public sector organisations, particularly in the case of a transport agency where deer are a very real threat to the safety of the road user and the related management objectives are very different to, say, a Highland estate. Each of the Scottish Trunk Road Operating Companies is now required to prepare a DMP each year as part of their contract obligations. This preparation requires the contractors to liaise with SNH deer officers and other relevant organisations including any Deer Management Groups in order to fully understand the local context of the deer populations and related movement patterns. They are also encouraged to collaborate with local landowners although this is a challenging task considering the length of the trunk road network and the multiple ownerships involved, particularly in the lowlands where the land is fragmented into many small holdings.

Mainstreaming

We seek to mainstream our approach and good practice on biodiversity through the promotion, communication and implementation of the vision and aims outlined in our landscape policy, Fitting Landscapes. The policy title is designed to outline the overarching objective of this document.

The richly varied landscape of Scotland is one of the primary attractions for the many thousands of people visiting the country every year. In the course of the work that we do, we have a duty to respect, protect and, where possible, enhance this natural resource ensuring it remains a valued part of the lives of future generations. Transport Scotland has developed a policy statement to address the landscape design and management of our transport corridors making sure any operations or interventions undertaken not only meet their functional objectives but also fit with the landscape through which they pass.

The vision of the policy is to promote the more sustainable design, implementation, management and maintenance of the transport estate and ensure that the landscapes we create and manage are of high quality, well integrated, bio-diverse, adaptable and deliver a meaningful contribution to national sustainability targets.

To achieve the vision, the policy supports the following key aims:

- Ensure high quality of design and place
- Enhance and protect natural heritage
- Use resources wisely
- Build in adaptability to change

Application of the policy is mandatory for the planning, design, implementation and maintenance of all Transport Scotland projects, whether associated with the construction of new infrastructure or the management of the existing resource.

It is a high level document which sets an agenda for policymakers, planners, designers, contractors, operational managers and maintenance teams; helping address the challenges of delivering and managing a transport network that offers a demonstrable contribution to national policy targets, supports the natural heritage resource and ensures a 'best fit' with the local landscape character.

The policy has been developed on the understanding that there is an inextricable link between landscape and biodiversity, and the boundaries and verges of Scotland's transport networks provide a range of valuable habitats that support a rich variety of wildlife – both flora and fauna. Some species are common throughout the UK whilst others are of national or international importance and carry the relevant protected status.

Road and rail verges and embankments provide a vital resource that supports plant and animal communities which, in some cases, may struggle to survive in the context of intensive farming practices and an increasing demand for development land.

Transport Scotland ensures, wherever possible, that any management interventions are designed to meet the complex balance which includes: protecting and enhancing roadside biodiversity; respecting and integrating with the wider environment; and responding to the needs and safety of drivers. Interventions need to promote high design quality and more sustainable outcomes for the transport estate by adopting approaches that support stronger integration of natural heritage and place quality based on a full understanding of landscape character and context. It is important that the outcomes seek to enhance natural heritage, ensure a high quality of design and place, use resources wisely and be adaptable to future change.

In order to achieve this the policy requires landscape and environmental objectives to be set to inform the planning, design, implementation and management of new transport infrastructure as well as the management of existing networks.

Objectives are established on a project-by-project basis and are seen as central to the design process. Engagement with statutory consultees is a key part of this process (see the 'partnership working and communications section').

For objectives relating to biodiversity and the protection of the natural heritage it is crucial that there is a keen understanding and respect for the local relevant ecosystems and natural processes. Designers are required to be aware of the conservation status and requirements of any relevant protected species and priority habitats and how these may be impacted by the proposed works. This, in turn, requires an appreciation of the project context and its capacity to support the local natural heritage and enhance and/or create a range of existing and new habitats.

Designers are encouraged to support local biodiversity action plan priorities and help address fragmentation issues, as far as this is practical. This could range from the addition of well-designed culverts and other crossing opportunities on new schemes, to the use of native species of local provenance in planting and seeding mixes. Depending on the site location and context it may also be appropriate to create the right conditions to encourage the re-establishment and re-colonisation of local species and habitats.

The default position will always be to protect the natural resource within the vicinity of the proposed works whenever possible. This should be followed by considered efforts to reduce all adverse impacts by the introduction of robust protection and more extensive retention of existing natural assets and habitats. It remains highly likely, however, that there will be some impacts on the environmental resource and designers are required to provide effective mitigation of residual impacts or, where this is not possible, explore opportunities for meaningful offset mitigation through habitat creation and enhancement in nearby areas.

Monitoring

Road infrastructure projects normally take a minimum of five to seven years to plan prior to the commencement of construction. It is not possible to know exactly what will happen when a project is opened, nor what would have happened had the project not been built, particularly when the project is opened a number of years after its assessment. Notwithstanding, we have set up our monitoring regime to cover both before and after aspects.

The evaluation of trunk road projects *prior to* their construction is set out in the Scottish Transport Appraisal Guidance (STAG). STAG advocates evaluation against indicators and targets derived for the Transport Planning Objectives originally set for a scheme or project. STAG criteria covers Environment, Safety, Economy, Integration and Accessibility & Social Inclusion, with biodiversity and habitats included in section 7.4.6 of the Environment section. STAG aims to identify:

- Whether the project is performing as originally intended
- Whether, and to what extent, it is contributing to established policy directives
- Whether the implemented project continues to represent value for money

With respect to biodiversity and habitats, STAG notes that transport infrastructure has a number of potential effects on biodiversity, including (1) Direct damage to important nature conservation sites or the habitats of protected species; (2) Fragmentation or loss of habitats (3) Creation of barriers to the movement and genetic interchange between populations; and (4) Disturbance of habitats and species due to factors such as noise, light pollution and contaminated run-off. The overall objective of a STAG appraisal is that schemes should aim to maintain biodiversity in the study area, including wildlife habitats and species and to improve the status of rare and vulnerable species wherever possible.

Qualitative assessments are recommended at both strategic and project level to appraise biodiversity. At the strategic level, this means that a study should broadly appraise biodiversity and identify the presence of designated sites in the study area. Typically, this evaluation may be undertaken at a broad-brush level based on desk study or initial site survey. At a project level, a more detailed assessment of the biodiversity may be required and this is likely to require a Phase 1 Habitat Survey, supplemented by specialist surveys of flora and fauna. For both strategic and project assessments, if there is the potential for an option to have significant effects on an European site (SAC or SPA) then the requirement for an appropriate Assessment under the Habitats Regulations (1997) should be considered at an early stage.

The evaluation of trunk road projects *after* construction is set out in Scottish Trunk Road Infrastructure Project Evaluation (STRIPE), where requirements for evaluation draw from Design Manual for Roads and Bridges and STAG. STRIPE was published in 2013. STRIPE states that two programmed evaluations should be carried out on relevant projects, as follows:

- A one-year after Evaluation (1YA) – prepared one year after opening, this report should “provide Transport Scotland with an early indication (as far as is practicable) that the project is operating as planned and is on-track to achieve its objectives. This includes a detailed assessment of the environmental objectives of the scheme, including delivery against any biodiversity targets. As this evaluation is within the establishment period of the works there is ample opportunity to redress any noted failings
- A Detailed Evaluation – undertaken three or five years after opening. This second evaluation considers a project’s impacts, whether it has achieved its objectives and reviews the actual impacts against forecasts and determines the causes of any variances. This is important as a ‘lessons learnt’ approach for the preparation, delivery and maintenance of future schemes

Partnership working and communications

Transport Scotland holds regular liaison meetings with other agencies and organisations, both public and private. Together, we aim to respond to all environmental matters, whether of a local, regional or national scale, in the swiftest and most appropriate manner. Any mitigation will always have respect for the natural characteristics and local distinctiveness of the environment within which we operate.

We work closely with Scottish Government, Historic Scotland (now Historic Environment Scotland), Scottish Natural Heritage, Cairngorms National Park Authority, Loch Lomond and the Trossachs National Park Authority, Marine Scotland, Forestry Commission Scotland and numerous local authorities, public bodies and third sector charities to incorporate biodiversity into our transport schemes.

This working partnership is partly derived from the statutory obligation for the agency to consult with many of these bodies during the preparation of road projects, but it extends further than this. We have established excellent connections with a number of key personnel within each organisation and maintain regular public sector liaison.

This helps to ensure there is a direct, two-way conduit for the consideration of environmental issues affecting the trunk road corridor and also means that more time is spent on practical delivery rather than extended dialogue.

As Scotland's statutory nature conservation organisation, Scottish Natural Heritage is a major partner of Transport Scotland when it comes to biodiversity issues on the trunk road network. The SNCO was a critical player when we undertook to review, revise and re-write our Landscape design and management policy and a representative sat on the project steering group. Transport Scotland is also a member of the Deer Management Round Table which is chaired by SNH and provides useful forum for a range of organisations with a remit for land and asset management across the country. On a connected but more local level, Transport Scotland and SNH have worked closely on three separate Deer Panels established to seek sustainable solutions to specific problems of deer – vehicle conflict.

Transport Scotland also provide advice and recommendations to Highways England, as the custodian of the Design Manual for Roads and Bridges. However, aspects around biodiversity have not recently been discussed in the Technical Project Boards which administer DMRB Volume 11 on Environmental Assessment.

Building Capacity

Transport Scotland staff maintain numerous contacts and professional relationships across a wide range of other organisations – from nature conservation groups (both statutory and non-statutory) to other infrastructure delivery organisations. This is both on an informal day-to-day level as well as more formal meetings, workshops and seminars. Each form of liaison is useful in terms of information exchange and partnering.



Transport Scotland runs a series of lunch time seminars and internal seminars that allows all staff, whatever part of the business they represent, to learn from and input to new areas of information.

Where appropriate, our staff have attended, and occasionally presented at, SNH Sharing Good Practice events and other events such as the RBGE trees and the law seminar.



36

Highlights of the past year

The main achievements for biodiversity over recent years (not just the last year) have been:

- Publication and implementation of Fitting Landscapes
- Protection and enhancement of ecology and biodiversity at the FRC.

We hope that this report has highlighted the depth and breadth of biodiversity actions undertaken by Transport Scotland. With the limitation of space, we have only been able to provide a selection of projects and scheme in our 'actions taken to improve biodiversity' section.

We are proud of the cooperation of our supply chain to go beyond our contractual statements, to make real practical differences to the biodiversity on the Scottish transport network, and to report on biodiversity actions in a manner which enables this Biodiversity Report to be produced. Examples such as the water voles at the M8 highlight how biodiversity on a live busy critical infrastructure asset can be unusual, unexpected or, in a few case, just unexplainable.

With the FRC being Scotland's biggest transport infrastructure project in a generation, we must highlight the importance of meaningful coordination instigated by our Environmental Liaison Group. This approach enabled a collaborative and inclusive approach to biodiversity management.

Going forward, the A9 Dualling project's inclusion of biodiversity and landscaping into the earliest stage of the appraisal process is an example of how we are setting the direction for biodiversity within a programme that will last until 2025.

APPENDIX

List of Illustrations

Number	Location	Description
1	Dunkeld, Perthshire	A9 trunk road and mainline railway crossing the River Tay
2	Kinross, Fife	M90 Motorway between Fife and Perthshire
3	Cockburnspath, Borders	North Coast mainline between Scotland and the South
4	Glen Dochart, Stirling	Mountain biking near the A85 trunk road
5	Tyndrum, Stirling	West Highland Way adjacent to the A82 trunk road
6	Carrbridge, Highland	Translocating Scottish wood ants in the road verge
7	<i>Scheme document</i>	Typical design development with environmental mitigation
8	Rosyth, Fife	A985 Wildflower road verge
9	Cromarty, Highland	A9 bridge scour protection with silt trap
10	Pollock, Strathclyde	M77 Grass cutting operations
11	Arisaig, Highland	A830 trunk road improvement scheme near SAC
12	Arisaig, Highland	Compensatory habitat area managed for the scheme
13	Arisaig, Highland	The newly aligned A830 along the boundary of the SAC
14	Glasgow, Strathclyde	Map showing location of water vole activity in road verge
15	Glasgow, Strathclyde	Image of some of the burrow entrances
16	Glasgow, Strathclyde	The M8 motorway in the vicinity of the water vole colony
17	Kincraig, Highland	A9 improvements - one of the wood ant nests protected
18	Portgower, Highland	A9 culvert improved for fish & otter movement
19	Portgower, Highland	The former culvert prevented migratory species movement
20	Cromarty, Highland	Scour protection works with suitable construction mitigation
21	Border Region	120 bat boxes were installed during the Borders Rail project
22	Edinburgh - Glasgow	Smooth newts found & protected during rail improvements
23	Beattock, Dumfries	Wamphray Fish Passage Ladder
24	Dalry, North Ayrshire	Community support for creation of bee-friendly garden
25	Abington, Dumfries	An adder found during Signalling power supply projects
26	Abington, Dumfries	A juvenile adder translocated during the scheme
27	Kingussie, Highland	The Minister meets school children involved in Academy 9
28	Glen Spean, Highland	A86 trunk road between Kingussie & Spean Bridge

29	<i>Policy document</i>	Transport Scotland's Landscape Policy, Fitting Landscapes
30	North Queensferry, Fife	North tower of the new Queensferry Crossing of the Forth
31	Kirkliston, West Lothian	Swine burn realignment at Junction 1A of the FRC scheme
32	Rosyth, Fife	St Margaret's Marsh has been enhanced by the scheme
33	Glen Shiel, Highland	Vehicle-activated deer warning sign on the A87 trunk road
34	Maybole, South Ayrshire	Roe deer on the A77 trunk road narrowly avoiding cars
35	Rannoch, Perthshire	Partnership working with other Scottish Govt. agencies
36	Glasgow, Strathclyde	Buchanan House - learning through lunchtime seminars



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