EASTER-ROSS
PHASE 1 HABITAT SURVEY
1996 to 2000

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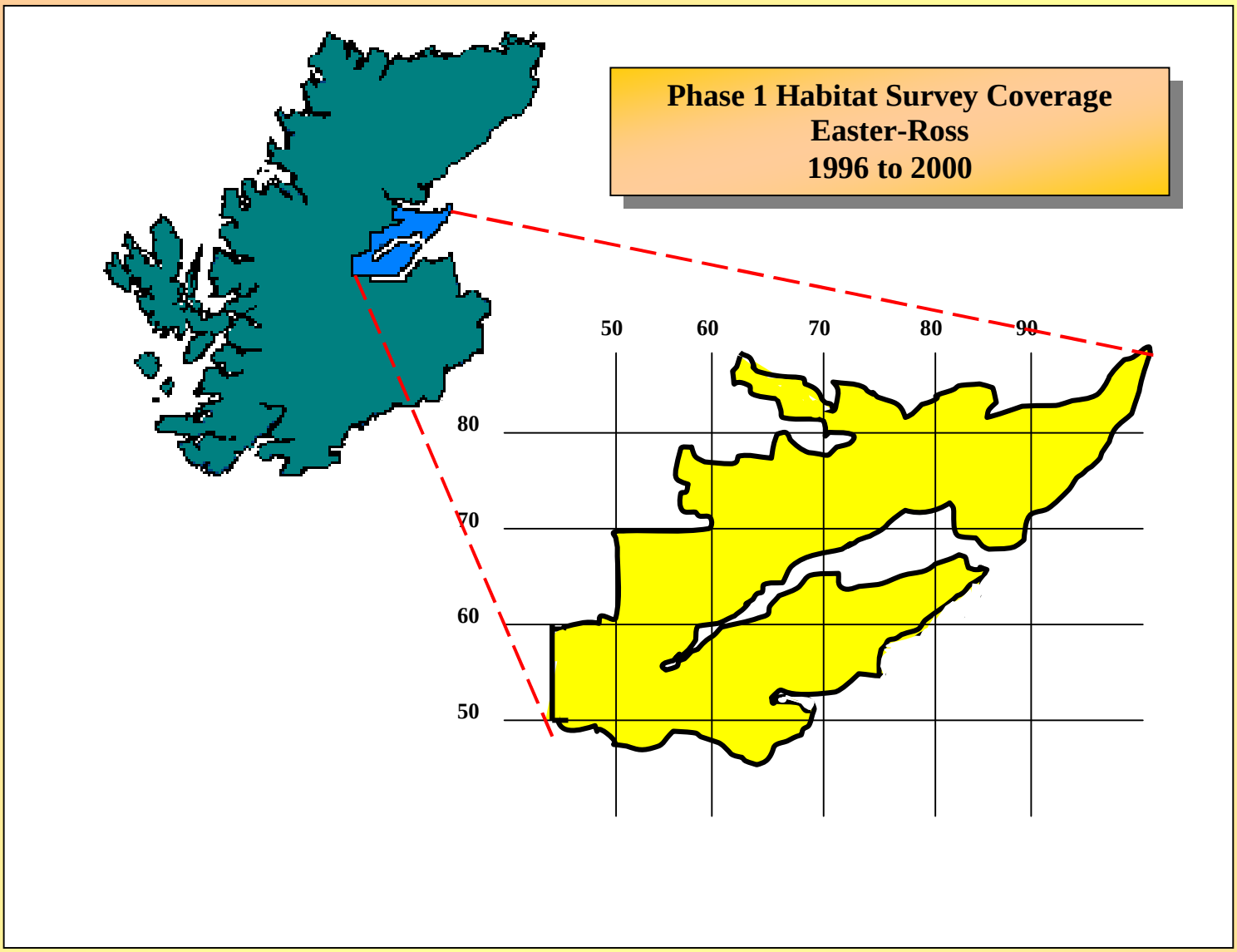
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I. WILDLIFE HABITATS

Woodland and Scrub

Semi-natural broadleaved
Mainly birch (*Betula* sp.) woodland with alder (*Alnus glutinosa*) in wetter areas such as by rivers and lochs.

Examples of birch woodland are widespread as, wherever conditions are favourable, the species can regenerate rapidly. However, under natural conditions, mature woodlands composed entirely of birch would be rare in lowland areas. It is only the selective extraction of oak over the years which has led to woodland which support little other than birch. When one examines the composition of the ground flora (wherever overgrazing has not already obliterated the evidence) the community is frequently shown to be an oakwood without oak. The only woodlands in which birch naturally dominates are found in wet areas. These occur mainly on the west coast, but fragments can be found at Monadh Mor (NH585534). (These are W4 *Betula pubescens-Molinia caerulea* woodland (NVC) and are pure birch because they are too wet for oak to establish.)

Alder woodland forms along riverbanks and in other areas where the water table is close to the surface. The best example an of alder woodland in Easter-Ross is Talich Alder Wood, a Scottish Wildlife Trust nature reserve (NH854788) on the Fearn Peninsula to the south of Loch Eye.

Oak (*Quercus* sp.) woodland is relatively scarce though in a natural state much of the dryer, low-lying areas would support the species in abundance. One of the best examples of this can be found at Drummondreach Oakwood, another Scottish Wildlife Trust nature reserve (NH581574). Fairy Glen (RSPB) is also diverse and interesting.

There is also some planted but well established beech (*Fagus sylvatica*) woodland. However, due to the dense shade often cast by this species, and the fact that it is not a true native of the Scottish Highlands, such woodland is usually far poorer in species than those considered above.

Broadleaved tree regeneration is confined to but a few discreet locations within the district due to grazing. The planting of broadleaved trees appears to have increased in recent years. However, while this is immensely important in the long term, in the short term it does not recreate the conditions found in a mature woodland and is no substitute for protection of existing woodlands. The problem is exacerbated by the fact that, while many woodlands appear intact, they are actually heavily overgrazed. Thus the future of much of the remaining semi-natural woodland is uncertain unless active management to encourage regeneration is undertaken soon.

Semi-natural coniferous
Mainly confined to remnants, some quite small, often within other woodland or conifer plantations, but important as refugia for certain species. A good example can be found at Scotsburn Wood (around NH716771). Elsewhere, although under more natural conditions it would be widespread, the habitat is under-represented in the area. This habitat is of

international importance and one for which a U.K. biodiversity action plan has been published (Usher 2000).

With so little native pinewood remaining, some areas of Scots pine plantation are now also of considerable importance. See below.

Semi-natural mixed (broadleaf and conifer)
The smaller stands are mostly birch (*Betula* sp.) with some Scots pine (*Pinus sylvestris*), sometimes within conifer plantations. Most native pinewoods would, under natural conditions, support a broadleaf component. Even in the best examples at Glen Affric, Glen Strathfarrar and Strathspey, broadleaved trees are often far less frequent than they would be had the woodlands not been managed in certain ways in the past. The remaining semi-natural mixed woodland remnants are therefore possibly the only areas which approximate to truly natural woodland in Easter-Ross. (Most of the birch woodland under natural conditions would include a large proportion of oak (*Quercus* sp.) with other species such as hazel (*Corylus avellana*). Selective removal of oak for timber over the years has led to the woodlands being currently dominated by birch. See above.)

Plantation broadleaved
Confined to small areas, recently planted. Some areas too small to map or hidden from view may not be recorded here. While still a relatively small category such planting is clearly on the increase. As much of the semi-natural broadleaved woodland in the Easter-Ross is over grazed by livestock or deer, showing little or no signs of regeneration, the future of such woodland may rely heavily upon planting schemes. However, it must be remembered that, while this is immensely important in the long term, in the short term it does not recreate the conditions found in a mature woodland and is no substitute for protection of existing woodlands.

Plantation coniferous
Conifer plantations cover large areas of Easter-Ross. Some large examples not recorded on the available 1:10,000 Ordnance Survey maps were noted during this survey. Although some conifer plantations appear to have been planted on heath of only average species richness others have been planted within existing semi-natural woodlands, or over other interesting habitats (the calcareous heaths of the Black Isle for example). These have shaded out native trees or otherwise modified conditions, leading to greatly impoverished habitat. The practice of planting conifers within existing broadleaved woodland has declined in recent years but needs to be acknowledged as yet another potential threat to a dwindling native woodland resource.

Another effect of conifer planting has been to reduce the overall area available to herds of red deer. This further exacerbates problems of overgrazing and lack of woodland regeneration. The fact that forestry grants go to fence private plantations from unsustainable levels of deer populations appears to be subsidising poor environmental management. Deer fencing is also strongly implicated in the deaths of birds (including economically important game birds) as they fly into unseen wires. Recent encouraging trends in deer management may lead to a situation where deer fencing is no longer required in many areas. The timber crops frequently frowned upon by conservationists may then blend more readily into the environment. This is particularly the case where native Scots pine (*Pinus sylvestris*) is planted. Parts of the Black Isle (for example around NH675605), and including some areas of Ord Hill by North Kessock (NH663490), give some idea of how a conifer plantation can attain semi-natural status,

valuable both as a timber crop and to wildlife as well as providing areas suitable for recreation.

Recently felled
Still part of the plantation system for practical purposes but future uncertain as no signs of management after felling. Some such areas show signs of reverting to a more natural state as they develop scrub, bramble, grasses and herbs. Such areas are often important for invertebrates, birds and small mammals. However, as plans for future management are uncertain, and often involve re-planting with conifers, these sites are recorded simply as recently felled.

Scrub - Dense/continuous
Mainly gorse (*Ulex europaeus*) with some broom (*Sarothamnus* [*Cytisus*] *scoparius*), but occasionally juniper (*Juniperus communis*). Every effort is made to include dominant species codes on the maps. Where none is given the species can be taken to be gorse and/or broom. Juniper is less common in most parts of Easter-Ross and, as it is closely related to locally native woodlands, it is recorded wherever found and sometimes target noted.

Grassland

Semi-natural acid
Mainly small areas on the upland fringe where grazing has reduced heather cover, but not to the extent where plant species richness is seriously reduced. The relatively high abundance of mat grass (*Nardus stricta*) is the most obvious indicator of such areas in much of Easter-Ross, although other species such as the bent grasses (*Agrostis* spp.) and red fescue (*Festuca rubra*) are equally as important.

Semi-natural neutral
Relatively small areas in lower lying parts where grazing levels are near optimum for floral richness. Indicated by a greater number of plant species. If completely un-grazed such areas turn to rank grassland dominated by species such as cock's foot (*Dactylis glomerata*). This shades out less aggressive species and reduces species richness. Eventually succession can proceed towards woodland or scrub. Maximum species richness is only maintained by suitable levels of grazing. As most grasslands show levels far in excess of this, species rich, semi-natural neutral grassland is exceedingly scarce in Easter-Ross.

Marsh/marshy grassland
A category which covers a range of conditions from the wetter parts of improved fields still dominated by soft rush (*Juncus effusus*) to relatively species rich areas which represent a transition from marsh to dryer conditions through attempts at drainage. Much of that recorded in Easter-Ross is of limited wildlife interest but of little use for grazing. Thus any areas showing greater species richness (indicated by target notes) represent a relatively scarce plant community.

Land improved for Agriculture and Amenity

Improved and poor semi-improved grassland
Grassland for animal feed, of limited wildlife value in itself. However, such areas adjacent to other habitats, woodland in particular, may form an important part of the home range of a number of animals including badger. Thus developments such as building for example, on grassland adjacent to woodlands can have serious consequences for wildlife even though the trees themselves are not touched. The provision of buffer zones in these cases can help prevent such problems.

All Cultivated/disturbed land
(arable land and amenity grassland)
Arable land is of limited value as a habitat in itself in that few species of plant or animal live there. However, in the same way as improved grassland it often forms part of a larger system. It is frequently utilised for food by a number of bird species for example and may thus be an important component of a larger ecological system. Amenity grassland is that developed for recreational purposes. This includes the well tended grassland of graveyards but excludes lawns in private gardens. In terms of wildlife interest this is probably no greater than arable land. However, the importance to both locals and visitors can be high.

The wildlife value of the agricultural land of Easter-Ross should not be underestimated. However it is seriously reduced by the lack of hedgerows or shelter belts of trees. Hedgerows and shelter belts do not only provide valuable habitats in themselves but represent corridors along which wildlife can disperse to the wider area. Isolated sites are generally more vulnerable and poorer in species. Hedgerows can provide corridors for re-colonisation following disturbance and thus improve the wildlife interest of the area as a whole. They also greatly reduce topsoil erosion, a problem which affects not only agriculture but also air quality and visibility for motorists at certain times of year. The tendency to plough fields to the maximum (sometimes to within centimetres of trees or fences) reduces the area available for field edge species to thrive. Much could be gained for wildlife by leaving slightly wider margins. Methods of improving agricultural areas for wildlife are widely documented and cannot be dealt with in detail here.

Continuous Bracken

Bracken (*Pteridium aquilinum*) is an invasive species and a known carcinogen that is hard to eradicate. In dense bracken the wildlife value is limited to the cover which it provides. In this it may be more useful than agricultural land or dense plantations of exotic conifers. However, it is of little agricultural value and in general its presence represents an area which could be usefully managed one way or another. Again the importance of such areas depends heavily upon what lies adjacent.

Heathland

Both wet and dry heath. Dominated by heather (*Calluna vulgaris*) but separated by species due to better drainage resulting from different topography. Generally, steeper slopes support dry heath, gentle slopes support wet heath and relatively flat areas turn to bog (mire), (see below). In this survey the recording of heathland is limited to that adjacent to or surrounded

by lowlands. The wildlife interest of such areas varies considerably but, being relatively poor in nutrients, quite large areas are needed to support the full potential range of wildlife. Most dry heath would support areas of woodland in a natural state. Overgrazing (mainly by deer) is preventing tree regeneration throughout most of the heathland of Easter-Ross. Heath/grassland mosaic is not common, and many areas which appear as such from a distance are not always what they seem. A common error with less experienced people in considering such areas has been to assume that prominent sedge species such as hare's tail cotton sedge (*Eriophorum vaginatum*) and deer sedge (*Trichophorum cespitosum* [*Scirpus cespitosus*]) are grasses. However, lessons learned in the early days of the survey of Inverness and Nairn districts were applied in Easter-Ross and such problems should not have affected the habitat maps for this area.

Mire

Blanket bog and Raised bog

Fairly un-modified, intact mires supporting a relatively high number of plant species. The definition of blanket and raised bog, and distinctions between the two, can often lead to confusion. Although altitude can also play a part, this is primarily because the distinction is based on topography and hydrology rather than the species which the habitats support. Furthermore, the Phase 1 method, developed as it was in England, does not fully consider the conditions found in the north of Scotland. It is important to attempt to clarify this as these habitats are amongst the most important in Europe.

Bogs form on level areas or gentle slopes where drainage is poor and precipitation is high. As Sphagnum, cotton sedge and other plants grow, peat forms beneath and drainage is slowed or halted as water is retained. Raised bogs occur where drainage is particularly poor and the growth of Sphagnum, cotton sedge and other plants, and subsequent peat formation beneath, causes the water table to become raised above its normal level. At this point the bog relies for moisture exclusively on direct precipitation, and the ability of Sphagnum to retain water in its large cells. If the bog fails to raise then it is usually called a blanket bog. The fact that blanket bogs tend to cover much larger areas than raised bogs is due to the fact that conditions favourable for the formation of the latter are usually confined to discreet areas, often associated with vegetation succession filling in shallow lochans. In most parts of Britain raised bogs are now relatively isolated habitats, surrounded by agricultural land, and vulnerable due to the attention of would-be commercial peat extractors. In the Highlands they are difficult to define and lie within areas which are equally as rich in species even if the peculiarities of hydrology and topography cannot be confirmed.

In Easter-Ross raised bog can only be confirmed if at all as very small fragments within areas of lowland blanket bog. However, it must be remembered that bogs lie on a continuum from very wet heath through the wettest “quaking bogs” to swamp and open water. It is often difficult to ascertain the hydrology, and the possibility of a raised topography, particularly within bog woodlands such as those found at Monadh Mor and Pitmaduthy Moss.

Perhaps the easiest way to clarify this rather confusing situation is to refer to the National Vegetation Classification (NVC). This uses indicator species to distinguish between one form of mire and another. This is particularly appropriate as it is ultimately species rather than just topography and hydrology which we are aiming to protect. NVC divides the mires which we are most interested in here into four major communities, each with a number of sub-

communities. (The remainder are more closely associated with transition to open water, flushes and seepage zones or discreet bog pools.) The following table should clarify this:

NVC	Phase 1	Description
M17 *Scirpus cespitosus- Eriophorum Vaginatum* blanket mire	Unmodified or wet modified bog	Mainly confined to the west coast, none occurred in the area surveyed.
M18 *Erica tetralix-Sphagnum papillosum* raised and blanket mire	Unmodified bog	Intact, most species rich, wettest.
M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire	Wet modified bog	Modification has led to a reduction in biodiversity but not to the exclusion of a range of Sphagnum mosses.
M20 *Eriophorum vaginatum* blanket mire	Dry modified bog	No longer active as a bog. Most of the Sphagnum has disappeared and bare peat is beginning to show.

With NVC the definition here becomes clearer as raised bogs and the more species rich blanket bogs are grouped together. Thus classification relates directly to biodiversity/species richness and thus the need for protection. (The Phase 1 equivalents given are approximate but show how these communities have been divided for the purposes of this survey.)

NB. This detailed discussion is not repeated in the reports for Inverness and Nairn districts. Refer back to here as required.

Blanket bogs and raised bogs are not only interesting due to their unusual characteristics, but because they are frequently home to rare and interesting species. Where found, these represent one of the most important wildlife habitats in Europe. This plant community (or range of communities) is scarce not only in Easter-Ross but also world wide. The most valuable areas are normally found at lower altitudes. In Easter-Ross the best examples occur at Monadh Mor (around NH585534) and Pitmaduthy Moss (around NH775774). However, smaller areas are widespread (for example to the west of Pitmaduthy Moss around NH763788 and NH758771), but remain unprotected by either statutory designation or planning policy. For this reason Pitmaduthy Moss in particular is of strategic interest as it lies in the heart of an area which supports other patches of bog in relatively close proximity. Land adjacent to both Monadh Mor and Pitmaduthy Moss has been planted with conifers which has already begun to degrade the habitat in parts as the water table drops. (See also maps and target notes.)

Intact blanket bogs, and any patches of raised bog are frequently confined to small areas, often within larger modified bogs, and are usually best developed where transition between open water and bog is encountered. Those found at higher altitudes, often covering extensive areas, are somewhat different although important in their own right, but were only considered during this survey where they lay in close proximity to lower lying areas. This habitat is of international importance and one for which a U.K. biodiversity action plan has been published (Usher 2000).

Modified bog

Blanket bog, usually over extensive gently sloping ground, altered by drainage, grazing and/or burning so that species richness is reduced. Though only very small areas occur along the upland margins these plant communities dominate very large areas of the uplands proper.

Flush
Discreet areas where nutrients are washed in from relatively nutrient poor upland areas. Only those found within or adjacent to enclosed lowlands were recorded.

Fen (valley mires)
Limited to discreet areas. Essentially a system of flushes confined within a small valley. Although the term is often associated with more alkaline conditions, in this context it largely relates to neutral or slightly acid areas. Distinguished from other "bog" communities by the clear influence of running water (ie. incorporating well defined channels).

Swamp (marginal vegetation)
Reed or sedge beds at margins of lochs or burns. Dominant species codes are given wherever possible. Bottle sedge (*Carex rostrata*) is one of the most common species. Common reed (*Phragmites australis*) and reed canary grass (*Phalaris arundinacea*) also fall into this category. Such areas often provide valuable nesting sites for water fowl.

Open Water

Standing
Lochs, reservoirs and ponds. The survey of standing water has been limited here to marginal vegetation and the occasional brief examination. A more detailed study of standing water in Easter-Ross would be useful, particularly in terms of identifying locations valuable for fauna such as amphibians and a range of invertebrates. However, this would be time consuming and is beyond the scope of this survey. A number of lochs and lochans were found to have fringing "marginal vegetation" of sedge beds and were important for waterfowl. Rare species such as Slavonian grebe, divers, and osprey are among those which benefit from such habitats.

Running
The wildlife value of running water is influenced not only by channel flow but by adjacent habitat. Most bodies of running water in Easter-Ross represent important wildlife corridors.

Coastland

Intertidal mud/sand
(with or without Zostera or Algal beds)
Most of this substrate within Easter-Ross was not studied closely. Such areas represent important feeding grounds for wading birds, part of a larger system incorporating the Dornoch, Cromarty, Beauly and Moray Firths and of international importance. Continued development of coastal areas as well as continued threats from pollution remain the greatest immediate danger to this habitat in the eastern Highlands. Any proposed development which infringes upon this (apparently lifeless but actually internationally important) mud must be considered very carefully.

Intertidal shingle/cobbles + boulders
(with or without Zostera or Algal beds)
Most of this substrate within Easter-Ross appeared to be bare and lying close to shore.

Dense/continuous saltmarsh
The most important areas of this habitat occur at Udale Bay (NH708655), Nigg Bay (for example around NH777730) and Inver Bay (eg. NH845820), with smaller areas near Dingwall (around NH551570). Often grazed or otherwise modified, and subjected to periodic erosion, these areas are a particularly important addition to local biodiversity.

All sand dune habitats
With the exception of the MOD bombing range at Morrich More near Tain (NH830840), and a few remnants between Inver and Portmahomack to the east (around NH880830), there are few areas of sand dune habitat in Easter-Ross. Most of the remaining coastline is unsuited to establishment of sand dunes or has been developed (for agriculture for example) for some considerable time.

The nearest other surviving sand dune habitats are in Nairn district (see 1993 report). These are now all the more important as they represent a resource which is under-represented in the Scottish Highlands as a whole.

Rock Exposures

Natural
This includes all natural cliffs and exposed bedrock including rocky ravines. The area recorded for this underestimates actual surface area due to abundance of vertical surfaces. In these areas rocky ledges in particular can be rich in species. However, difficulties of access often makes close inspection impossible.

All artificial and waste types
(quarries etc.)
Currently of limited wildlife value in many cases such sites may sometimes have inevitably destroyed other wildlife habitats. However, once operations cease interesting habitats often develop (although usually quite unlike those which were present before).

Miscellaneous

Wall
Stone walls functioning as stock proof barriers. These provide some habitat for smaller animals, cover for wild animals and livestock and may represent an important landscape feature in some areas. They can also support a range of lower plants including mosses, ferns and lichens and may substantially increase the botanical interest of an area. Walls in a poor state of repair no longer functioning as a barrier were excluded although some may have wildlife value and scope for restoration.

All built up areas

These include roads, caravan sites and bare ground. Private gardens also fall into this category, but grounds of larger properties such as castles or hotels are sometimes recorded under other categories. The wildlife value of such areas varies considerably. However this can be quite high in some places (where areas of garden are sufficiently large or numerous for example). The surprising richness of urban wildlife in some places is well documented. In parts of Easter-Ross, with such a high proportion of valuable wildlife habitats the potential is particularly high. However, recent trends in housing development suggest that developers remain unaware of this potential for a better living environment. One of the most worrying trends in recent years has been the practice of siting housing developments in semi-natural woodlands. While the practice goes some way to preserving the integrity of the general landscape in some areas, it destroys valuable wildlife habitats. Habitats such as woodland take decades to establish and cannot easily be replaced. They not only represent a community of potentially maximum biodiversity but also provide a local environment of great quality.

II. GEOGRAPHICAL AREAS

As habitats have so far been considered as discreet categories, it is now useful to consider particular geographical areas within Easter-Ross in terms of the habitats which they support. Division of the district in this way can pose a number of problems, as meaningful boundaries are difficult to identify. However, general topography has been used as this tends to have considerable influence on both plant communities and land-use and thus wildlife habitats. The most important single point however is that neither habitats nor geographical areas can be considered in isolation as Easter-Ross, as with other parts of the Highlands, forms an almost continuous, complex system in terms of wildlife movement. Manipulation of any one site may have an influence on a much larger area.

In this section information and evidence from a wide variety of sources have been used to present a reasonably holistic impression of the district, all be it from a wildlife survey point of view. Sources have included local knowledge through formal and informal meetings with residents during our survey activities; discussion with numerous visitors from both Britain and abroad, (including countries as far away as Japan, Hong Kong and the United States); consultation of planning documents; and discussion with a wide range of ecologists, geographers and others involved with the local environment. In this way it is hoped to bring the information contained within maps and target notes into a wider perspective. The observations are aimed to be constructive as well as critical. Comments are unashamedly biased towards development that intertwines wildlife with people to the benefit of both. This far north in Britain conditions are unique in that we still have a chance to get things right without having to pay a high price. This section thus takes the approach that Easter-Ross, supporting a concentration of populations both of humans and wildlife within the Highlands, provides unique opportunities to develop in a way which benefits all.

The Coast

The coastline of Easter-Ross is varied and interesting, but modified in many places.

The outer, south-east facing coast of the Black Isle and Fearn Peninsula runs parallel to the Great Glen fault-line. Topography ranges from steep escarpments to cliffs. The stretch between Rosmarkie and Shandwick, as well as the area around Tarbat Ness, is an SSSI and of particular importance to wildlife.

The inner coasts of the Beauly, Cromarty and Dornoch Firths tend to be more gently sloping. These support habitats including saltmarsh (usually adjacent to areas of mudflat), coastal grassland and some sand dune habitats. The latter is relatively scarce, concentrated around the coastal areas of the MOD bombing range at Morrich More (NH830840), with smaller remnants between Inver and Portmahomack around NH880830.

Large stretches of coast around the Beauly and Cromarty Firths are considerably modified by road construction or agriculture.

The whole of the adjacent marine area, with the exception of the inner Cromarty Firth, is (or shortly will be) a marine Special Area for Conservation (SAC). The inner Cromarty firth appears to have missed designation not because it is inferior to the rest, but because industry

already has a firm foothold there. All of the larger areas of mudflat are SSSI and of international importance for migratory birds as well as being rich, biologically productive habitats in their own right.

The main threats to coastal habitats, including mudflats, are the possibility of disturbance through inappropriate development, including further extension of industrial areas, and pollution from a range of possible sources including sewage outfalls and industry. The most obvious threats to the immediate marine environment are again pollution, and disturbance from tourism, particularly in respect of dolphin watching by boat. Other, less tangible threats, will include national and international trends, in pollution control and over fishing, for example.

The Black Isle

A broad, central band of conifer plantations cover the higher ground, running approximately south-west to north-east. However, very large areas are planted with Scots pine (*Pinus sylvestris*) and, although relatively uniform, have become semi-natural in character (as evidenced by native pinewood species such as creeping lady's tresses (*Goodyera repens*) and a range of other plant and animal species). As this represents such a large area, loss of this valuable habitat when the timber is harvested could be devastating to local wildlife unless a carefully devised felling pattern is not followed, staggered over a number of years.

Most of the remainder of the Black Isle is improved for agriculture to some extent. However, pockets of wildlife habitat are abundant throughout. Unfortunately, in the long term, these may remain vulnerable to housing development and further agricultural improvement. The "Sensitive Areas Map" produced by Highland Council as part of the Local Plan goes a long way towards acknowledging this, but it remains to be seen if the resolve to protect the area will be carried through to the next plan.

The underlying old red sandstone of the area in places produces conditions favourable for calcareous (lime rich) groundwater to form, and issue as springs and seepage zones. This leads to the formation of particularly interesting wildlife habitat which is quite scarce in the Highlands. Belmaduthy Heath (NH643569) is the largest and best remaining example of this. However, such habitat was probably far more widespread prior to the large-scale conifer planting.

Beauly, Contin and Strathpeffer

A diverse area, defined more for convenience than due to any biological or geographical homogeneity.

The area between Beauly and Muir of Ord is dominated by the eastern end of an upland area which extends almost unbroken to the west coast, with an area of coastal plain stretching to the Beauly Firth. The slopes immediately to the west of the A862 support a liberal scattering of both human habitation and agriculture, interspersed by numerous small areas of wildlife habitat which remain vulnerable due to the possibility of further development. To the west a large conifer plantation separates this area from the main body of the uplands.

The lower-lying ground of the coastal plain is predominantly large, flat fields where waterlogging is discouraged by deep drainage channels. Associated with the outflow of the River Beauly, this area was almost certainly very marshy in the past, probably supporting reed beds and wet woodland of willow (*Salix* sp.) and alder (*Alnus glutinosa*).

The area between Contin and Conon Bridge contains the Rivers Conon and Blackwater. Bounded in the main by improved agricultural land, the area also supports a scattering of very wet woodlands, some of which are protected as the Conon Islands SSSI, but others which remain unprotected. The slopes, which surround this area to north, south and west support large areas of conifer plantation and also areas of broadleaved woodland. Throughout this area other wildlife habitats are widespread. A good example of habitat diversity lies around NH464581, above Loch Kinellan near Strathpeffer. This area supports birch woodland, bog, swamp, and wet and dry heath. A remnant of a much more extensive area which is now under conifer plantation. However, new deer fencing and some ground disturbance and conifer planting was reported in 2000. It is not clear whether this is an attempt to enhance the habitat or simply to extend conifer plantations into this last remnant.

Strathconon, although not surveyed, was visited. Essentially most of this glen is part of a much larger upland area. However, the lower reaches, around Loch Achonachie and extending over to Loch Achilty, support some interesting habitats in a lowland-upland transition zone.

Dingwall-Kildary-Tain-Edderton Area

A broad area of land, this is best viewed as an upland area bounded by a broad, 2 to 5 kilometre wide strip around the coast.

The coastal strip is considerably modified by agriculture, housing and industry. However, wildlife habitats abound and the close proximity of both the coastal habitats and the habitats of the lowland/upland transition zone has led to an area which is still rich in wildlife. Indeed there are few places in Britain where one could stand within an industrial complex such as Nigg or a town such as Invergordon and see dolphins, seals red kite and osprey. However, it must be remembered that this is the result of good fortune rather than planning. Development over the years has been managed piecemeal leaving many areas unnecessarily vulnerable. To maintain the current level of biological diversity in the face of continued development will require active management of wildlife habitats and a more holistic approach to planning.

The uplands support very large areas of conifer plantation in an almost continuous broad band from Dingwall to Kildary and then northwards to the west of Tain to Edderton. This has increased markedly in recent years. Although the planting has inevitably destroyed or degraded very large areas of wildlife habitat, patches remain throughout. As such, further disturbance when the timber is harvested, will need to be minimised to protect what is left. These remaining remnants of wildlife habitat are often substantial, including pinewoods (for example Scotsburn Wood around NH716771) and mire (bogs) (for example Pitmaduthy Moss around NH775774) as well as a wide range of others. Many are in sufficiently close proximity to one another to be considered as zones or systems rather than discreet sites. This offers opportunities for habitat protection, enhancement and creation (found in few places outside of the Highlands) which could lead to a far more robust environment for wildlife and a more diverse and interesting countryside for humans.

The Fearn Peninsula

With the exception of Hill of Nigg (around NH828712), a few smaller hills along the south-east coast, and the escarpment to the north of Loch Eye, the area is mostly low-lying and heavily improved for agriculture. In addition, the remains of two large WW2 airfields cover large areas of land around NH825820 and NH843759. With a few exceptions, much of the wildlife is therefore scattered rather than concentrated within specific patches of habitat. Nature conservation opportunities are therefore mostly limited to habitat creation or enhancement.

In addition to the coast (which was considered above), the largest or most significant areas of remaining wildlife habitat occur around Calrossie (around NH800787), west of Loch Eye (around NH818802), surrounding Loch Eye (around NH830879), Talich Alder Wood (NH854788) and Hill of Nigg (around NH828712). The MOD bombing range and other areas adjacent to the coast around Morrich More (NH830840) support some interesting areas of wildlife habitat. However, these are mostly coastal in nature and have been considered above.

Hill of Nigg deserves particular mention. Although the wildlife habitats are a little scattered, the area has links with habitats along the coast and supports some remnants of pinewood, the only ones in a fairly wide area. Other habitats are quite varied and there are clear opportunities for management and enhancement projects. In addition the coastal footpath from Shandwick to Nigg runs along the south-east margin of the area. This, along with relatively easy access via a number of tracks from the north, west and south-west suggest considerable scope for public access. The excellent views and the presence of picturesque Bayfield Loch make this a particularly attractive possibility.

Areas around Calrossie are also worthy of mention. However, with the exception of some areas of broadleaved woodland, these are best considered as part of a larger area to the west which supports pinewood, bog and heath habitats.

The Lowland/Upland Transition Zone

Although not discrete, this zone can be considered as a geographical area in its own right, with a unique set of habitats (or perhaps more accurately, combination of habitats) and potential threats. This zone obviously overlaps with the geographical areas already considered. The uplands here are defined as areas above the current limit of intensive land-use/cultivation. The lowlands are thus those areas, usually enclosed by stock-proof barriers of some form, which are being managed for agriculture and forestry in a more intensive manner. However, between the agricultural lowlands and the extensive, unenclosed uplands lies a transition zone where distinctions are not always easy to make. In Easter-Ross much of the transition zone is extensive but often difficult to define.

The transition zone is particularly diverse in habitats. It is also possibly the area most threatened from planting of conifers and attempts to drain and "improve" wetter parts. Areas of upland habitats currently surrounded by forestry plantations and/or land improved for agriculture, will be seen as having limited agricultural value at present. However, if such areas are eventually taken into more intensive management Easter-Ross will lose some important

wildlife habitats. While loss of habitat in the lowlands is usually confined to relatively small developments (such as a new dwelling), loss in the uplands can cover several square kilometres in a single season (through ploughing, planting of conifers or drainage). These areas can be located from the habitat maps as those coloured with yellow ochre and/or purple and occasionally magenta.

Some of the dryer parts of the open (un-wooded) habitats would benefit from efforts to encourage natural regeneration of native trees. The wetter areas however are usually more rich in plant species and careful inspection is advised before drainage is considered.

Of the woodlands which remain in the transition zone, (mainly birch (*Betula* sp.) but also smaller areas of other broadleaved species and Scots pine (*Pinus sylvestris*)), most are over grazed and thus show little signs of natural regeneration. As the woodlands are often confined by agriculture or forestry the natural tendency to shift, by regeneration outwith the denser woodland, is suppressed. This alone could lead to loss of woodland unless measures are taken to encourage regeneration by reducing grazing. (This could possibly be in the form of a cycle to allow new growth to mature to the point where it will not be killed by livestock.)

The transition zone is also the area most difficult to map and that where important species or habitats can be overlooked. To map this area in detail and search it thoroughly for smaller habitats and individual species would take a number of years. Regrettably a survey at the Phase 1 level cannot go into greater detail and it is at the transition zone, the area potentially most threatened, where important points can be overlooked. Thus care is essential in any proposed developments in this area.

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