Threat Response Plan

Otter *Lutra lutra*

2009 - 2011

Comhshaol, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government

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Summary
This plan is prepared as part of Ireland's response to the judgement of the European Court of Justice in case C-183/05, and the requirement to establish a system of strict protection for the otter, as one of the animal species listed in Annex IV(a) of the Habitats Directive.

The otter is strictly protected in Ireland and a person who deliberately captures, kills or disturbs a specimen in the wild, or who damages or destroys a breeding site or resting place of such an animal, is guilty of an offence.

Although the range of the otter has remained stable in Ireland, the results of national surveys suggest that otter densities have declined from nearly 90% in 1980 to 70% now.

A number of significant steps have been take in recent years to secure the long term future of the otter in Ireland:

- 44 SACs have been designated for the otter. Most of these are large sites incorporating extensive river/lake or coastal systems.
- A comprehensive programme of otter surveys, at both the national and catchment level, has been instigated.
- Extensive monitoring of water quality and fish biomass is underway.
- The National Roads Authority have prepared strict guidance for the protection of otters during the planning and construction of national roads.
- Environmental schemes in both forestry and agriculture are providing incentives to landowners to manage land to the benefit of riparian species such as the otter.

Nonetheless, the otter continues to face significant threats. In particular habitat destruction, water pollution, accidental death and persecution have been implicated in otter declines across Europe and these threats are discussed in detail in this plan. While measures are already in place to address some aspects of these threats, further action is required in certain areas. This three year plan sets out those actions, identifies who is responsible for implementing them and provides a time frame for delivery.

Continuation of the current monitoring schemes (of water quality, of fish biomass, and of the otter itself) together with implementation of the additional actions identified in this document, should ensure the long term favourable conservation status of the otter in Ireland.

1. Introduction

This three year plan supersedes the otter species action plan published by NPWS in January 2008. It is prepared as part of Ireland's response to the judgement of the European Court of Justice in case C-183/05, concerning *inter alia* Article 12 of the EU Habitats Directive 92/43/EEC and the requirement to establish a system of strict protection for the animal species listed in Annex IV(a) of the Directive. The otter is one of the species named in Annex IV(a).

Article 12 of the Habitats Directive reads as follows:

> *1. Member States shall take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV (a) in their natural range, prohibiting:*
>
> > *(a) all forms of deliberate capture or killing of specimens of these species in the wild;*
> > *(b) deliberate disturbance of these species, particularly during the period of breeding, rearing, hibernation and migration;*
> > *(c) deliberate destruction or taking of eggs from the wild;*
> > *(d) deterioration or destruction of breeding sites or resting places.*
>
> *2. For these species, Member States shall prohibit the keeping, transport and sale or exchange, and offering for sale or exchange, of specimens taken from the wild, except for those taken legally before this Directive is implemented.*
> *3. The prohibition referred to in paragraph 1 (a) and (b) and paragraph 2 shall apply to all stages of life of the animals to which this Article applies.*
> *4. Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a). In the light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned.*

The otter (*Lutra lutra*) ranges from Ireland in the west to Japan in the east and from the Arctic to North Africa (Mason, 1990). It is widespread in Ireland throughout all fresh-water and most coastal habitats (Chapman & Chapman, 1981; Lunnon & Reynolds, 1991; Bailey & Rochford, 2006). Dramatic declines occurred in many European otter populations during the latter half of the 20th Century (Macdonald & Mason, 1994) and otters remain threatened, declining, rare, or extinct in many European states. However, in a third of European countries, environmental improvements and focussed conservation efforts have helped to re-establish widespread healthy populations (Conroy & Chanin, 2001).

The otter is an opportunistic predator that exploits prey in proportion to its availability in the environment (Ottino & Giller, 2004). In Ireland, as throughout Europe, diet is predominantly of aquatic origin. In freshwater areas, spraints commonly contain stickleback, salmonids, frogs, and eels (Bailey & Rochford, 2006), while crayfish can be a dominant prey species locally (MacFadden & Fairley, 1983). Terrestrial prey is taken infrequently, with birds occurring in just 3% of spraints, and mammals occurring even more rarely (Bailey & Rochford, 2006). Otter diet has not been studied on a national basis for coastal areas, but a survey on Inis Mór found that rockling and wrasse dominated the diet, while eel, sea scorpion, blenny and molluscs were also important (Kingston *et al*., 1999).

2. Range

Three national surveys of otters have been conducted in Ireland. The first national otter survey found signs of otters throughout the country, at 88.2% of 2,042 sites (Chapman & Chapman, 1982). A smaller follow-up survey of 246 sites carried out a decade later found that otters were still countrywide although a highly significant decrease in otter presence to 75.2% was recorded (Lunnon & Reynolds, 1991). The most recent otter survey, carried out in 2004/05, searched 525 sites and found that otter presence had declined by a further 5% to 70.5%, but that the species was still present throughout the country (Bailey & Rochford, 2006). The current range has been calculated as 66,500 km² from 2004-2007 distribution records held by the National Parks and Wildlife Service (NPWS) (Appendix 1, Map 1). The majority of these records come from the NPWS survey of 2004/05; additional records come from otter researcher Lughaidh O'Neill (TCD) and NPWS staff. Expert opinion has been used to fill in some blank squares in the midlands where otters are known to occur as these areas were not covered in the 2004/05 survey.

Despite the decline in status from 88% in 1980/81 to 70% at present, the otter remains widespread throughout the country with no apparent reduction in overall range. The current range of the species - 66,500 km² - is therefore considered to be the favourable reference range.

3. Habitat

The habitat of the otter has been well described (e.g. Kruuk 1995; Kruuk *et al*. 1998; Mason & McDonald 1986). The basic requirements are for aquatic prey and refuge from predators. Coastal otters also require sources of freshwater to wash their coats. In general, where aquatic prey is abundant and the adjacent habitat offers plenty of cover, healthy otters populations can be expected.

An otter usually maintains numerous couches and holts within its territory. Under-ground holts can take many forms – among falls of rocks, in caves, excavated tunnels in peat banks, within root systems of mature bank-side trees. Even man-made structures, such as drainage pipes and rock-armouring, can be used (Kruuk 1995; Mason & McDonald 1986). Cubs are born in natal holts. These tend to be especially well hidden, usually far from other otter traffic to avoid potential intra-specific aggression (Kruuk 1995). The normal sprainting associated with other otter resting places is generally absent. As a result natal holts are difficult to locate and easily overlooked.

Above-ground couches are often on islands, or hidden in extensive reed beds, or in dense scrub, brambles or nettles (Kruuk *et al*. 1998; NPWS data). Holts and couches may be found some distance from freshwater, but most are within the immediate area of riparian vegetation. Along coasts holts are often found adjacent to freshwater streams. In the extensive coastal holt systems described from Shetland, freshwater pools were often found within the holts themselves arising from underground springs and Kruuk (1995) concluded that this association of holts with fresh-water was an important reason why few otter signs were found near well-drained agricultural areas.

Otters can occasionally be found some distance from a stream or lake. In certain areas the availability of frogs, particularly in springtime, will draw otters to marshes and ponds several hundred metres from their usual territory. Natal holts may also be sited some distance from the normal areas of activity. In general, however, otters exploit a narrow strip of habitat at the aquatic – terrestrial interface (O'Neill, 2008). The extent of otter habitat in Ireland has been estimated on the basis of four classes of water bodies: rivers, streams, lakes and coast (high water mark).

Rivers are measured as the length of the midline. However, because otters have been observed not to forage beyond 80m from the coast, rivers greater than 80m wide are considered as comprising two separate strips of otter habitat and both banks are measured rather than one. The average width of rivers (as presented in the vector OSI data) was calculated by combining the ground-truth data gathered by Chapman & Chapman (1982) and Bailey & Rochford (2006). In addition to the width of the rivers, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat.

Streams are measured as the length of the midline. The average width of streams (as presented in the vector OSI data) was calculated by combining the ground-truth data gathered by Chapman & Chapman (1982) and Bailey &

Rochford (2006). In addition to the width of the streams, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat.

Lakes and coast are measured as the length of a single shore where less than 80m wide, and both shores where greater than 80m wide. Any shore within 80m of another shore gives access to the same foraging habitat and should not therefore be counted twice. The width of lake and coast habitat was estimated to be an 80m strip of water from the length of shore calculated above. In addition to this 80m strip of water for lakes and coast, a 10m terrestrial buffer was considered to comprise part of the otter habitat.

Results

The ground-truth data gathered by Chapman & Chapman (1982) and Bailey & Rochford (2006) divided river width into the following classes; <2m, 2-5m, 5-10m, 10-20m, >20m. Using the following mid range values; 1m, 4m, 8m, 15.5m, 30m[1], the average width of river features comes out as 12.9m (n = 893), and the average width of stream features comes out as 4.2m (n = 955). The total habitat may thereby be calculated by simple multiplication of the lengths of various habitats available (table 1).

Table 1 – the total length and area of otter habitat present in the Republic of Ireland.

	Total rivers	Total Streams	Total Coast	Total Lake
Width of water body (m)	12.9	4.2	80	80
Width of habitat (m)	32.9	24.2	90	90
Length of habitat (km)	13326	64458	8107	4299
Habitat areas (Sq. km)	439	1560	730	387
Total habitat size (Sq. km)	**3115**			

Table 2 – the total length and area of otter habitat protected within candidate SACs selected for otter in the Republic of Ireland.

[1] a conservative estimate based on the midpoint of the next logical division 20-40m.

	Total rivers	Total Streams	Total Coast	Total Lake
Length of habitat (km)	3344	5025	4493	837
Width of water body (m)	12.9	4.2	80	80
Width of habitat (m)	32.9	24.2	90	90
Habitat areas (Sq. km)	110	122	404	75
Total habitat size (Sq. km)	**711**			

Habitat trends and favourable reference value

While there has been some localised reduction in otter habitat quality, due mainly to water pollution and clearance of riparian vegetation, this has been balanced to some extent by the reduced occurrence of severe water pollution episodes (e.g. those causing fish kills) and the abandonment of pastoral systems which has led to increased scrubby vegetation and reduced disturbance of river corridors. The area of suitable habitat available at present (3115 km^2) is considered favourable for the long term viability of the otter in Ireland.

4. Population

Despite the generally favourable status of the range and the habitat of the otter in Ireland, the overall conservation assessment for the otter in the 2007 Article 17 report was "unfavourable – inadequate" (NPWS, 2008). This reflects the current unfavourable status of the otter population in the country and, in particular, the decline in otter population seen during the 1980s.

The current otter population in Ireland is estimated to be in the region of 5,866 female animals (not including juveniles), with an upper confidence interval (CI) of 6,888 and a lower CI of 5,336 (O'Neill, 2008). Females are used here because of their tendency to maintain stable home ranges.

These population estimates were calculated from average females home ranges derived from the following:

- Observations of seven adult females in mesotrophic Irish rivers (>4mg orthophosphate per l), showed females occupying exclusive home-ranges averaging 7.5 ± 1.5 km that were inversely related to river width ($R^2_{adj} = 0.68$, $F_6 = 13.5$, $P = 0.014$). The relationship was approximated by the equation [*(home range length) = 40.42/(river-width) + 5.284*] (L. Ó Néill unpublished data).
- Observations of ten female otters on oligotrophic rivers (<2mg orthophosphate per l) in Scotland showed no relationship between

home-ranges and river width, with home-ranges averaging 18.7±3.5km (Kruuk, 2006).

- Observations of 10 coastal otters on Shetland found that adult females occupied group ranges at densities of 2.6±0.9 km/individual (Kruuk and Moorhouse, 1991).

To account for the lack of data for watercourses with orthophosphate levels between 2 and 4mg per l, the fitted line was calculated as the average intercept and slopes for more and less productive rivers. Note that the oligotrophic group showed no relationship with river width so they had a slope of 0 and an intercept of 18.6. The confidence intervals for spatial requirements of otters in this intermediate class of river were taken to be the most extreme limits for the other two groups (O'Neill, 2008).

Based on interpolation of the EPA point data for orthophosphate levels, each section of river within the contours of a particular orthophosphate level was assigned that orthophosphate value. The length of each water course type (oligotrophic river, meso-oligotrophic river, mesotrophic river, oligotrophic stream etc.) within each river basin district was converted into a number of otters by dividing it by the spatial requirements of female otters in that habitat. For otters in rivers the appropriate spatial requirements was for watercourses 12.9m wide, for streams 4.2m wide, for lakes 80m wide (see Habitat above) (O'Neill, 2008).

4.1 Population trends

Taking the 1980/81 survey results (88.2%) as the baseline, the decline in otter population to 2004/05 (70.5%) is equivalent to a net loss of 20%. The rate of decline was greatest between 1981 and 1991 at an average of 1.48% per annum. Thereafter the rate of decline decreased to an average of 0.34% p.a.

The decline in the otter's status between 1980/81 and 1990/91 was not exposed in Lunnon & Reynolds (1991) because of the extent of re-surveying and over-surveying conducted in the later survey (see Bailey & Rochford 2006 for full discussion). However, detailed analysis following the most recent national survey exposed the true extent of the decline and was able to identify the 1980s as the period of greatest loss.

It is assumed that the decline in status between the first survey (Chapman & Chapman, 1982) and more recent surveys is a result of population decline. To calculate the decline in the otter's population since the original otter survey,

the proportional change in status[2] within each river basin district was recorded for the 1991 survey (Lunnon & Reynolds, 1991) and the 2006 survey (Bailey & Rochford, 2006). Then the otter population calculated above was multiplied by the change in status. Upper CI for status was multiplied by upper CI for population estimators etc.

The change in status within each river basin district and nationally is presented in Fig 1.

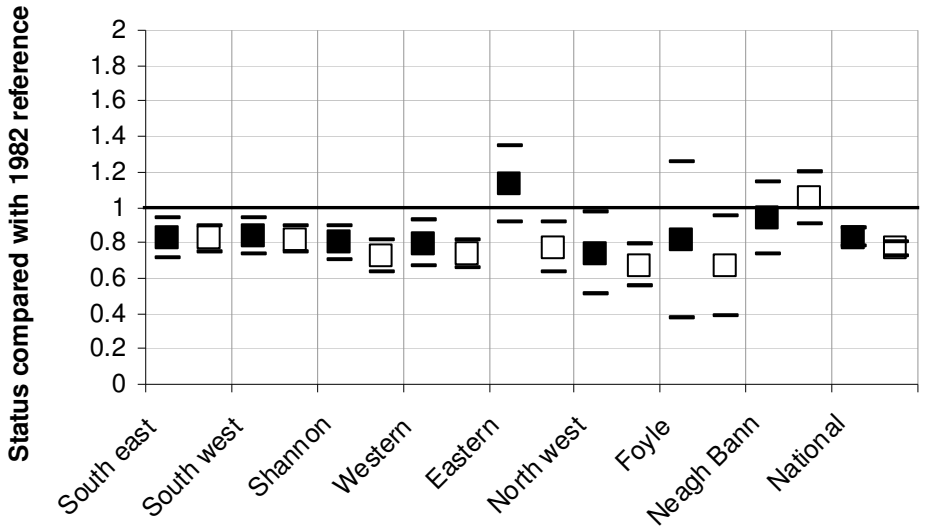

Fig. 1 – Status of the otter within each river basin district and nationally as recorded in 1992 (Lunnon – filled symbols) and 2006 (Bailey – open symbols) by comparison with the 1982 result (Chapman – '1' line).

Note that the Bailey & Rochford (2006) survey shows a 20% decline even for the upper confidence limit for the national situation. The Shannon, Western, and North Western river basin districts show the greatest declines (according to the upper confidence intervals). How these declines in status are likely to effect population sizes is shown in Fig. 2 and Table 3.

[2] It is unlikely that any survey will ever find 100% regardless of the status of otters. Hence, it makes more sense to look at trends using 1982 as the reference. A drop from 88% in the reference survey (1982) to 70% in the latest survey therefore equates to a 20.5% decline (rather than 18%).

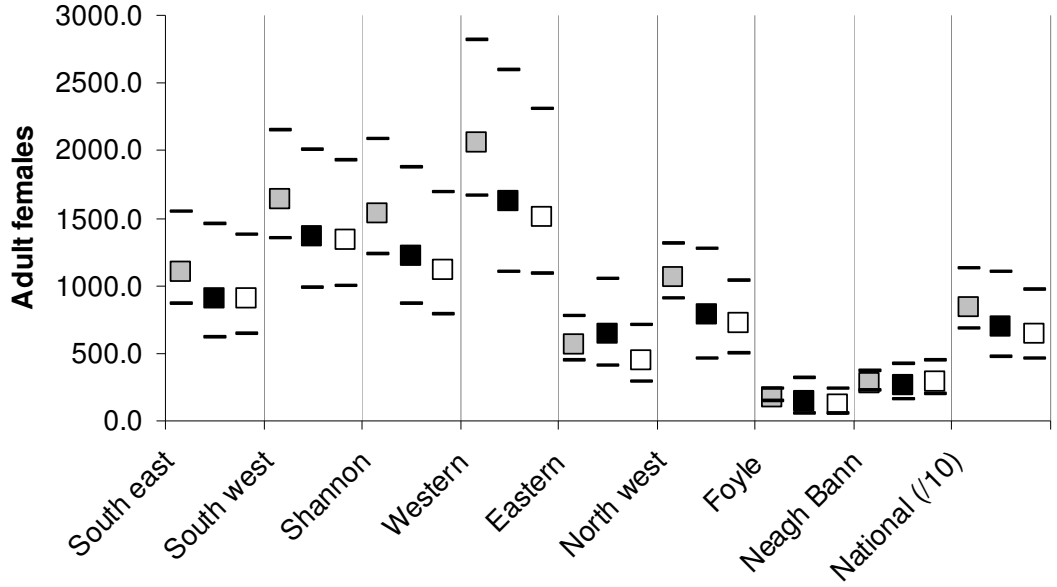

Fig. 2 – Changes in the estimated otter population taking into account changes in status as recorded by the national otter surveys. Chapman & Chapman (1982) – Grey; Lunnon & Reynolds (1992) – Black; Bailey & Rochford (2006) – White.

Table 3 – Population estimates of adult females based on the status recorded in 1982 and 2006 (from O'Neill, 2008).

	CHAPMAN			**BAILEY**		
	Estimate	LCL	UCL	Estimate	LCL	UCL
South east	1024	918	1295	856	712	1110
South west	1204	1121	1384	1010	864	1206
Shannon	1515	1401	1779	1123	949	1369
Western	1784	1664	2073	1347	4455	1621
Eastern	552	497	684	437	309	595
North west	1116	1036	1219	524	410	660
Foyle	161	142	215	109	41	187
Neagh Bann	121	107	153	129	89	179
National	**7476**	6965	8687	**5866**	5336	6888

4.2 Favourable reference population

The current population estimate (5,866 adult females) is 21.5 % below the 1982 figure (and approximately 8% below the 1991 population estimate). However, despite these decreases it would appear that the otter population in Ireland remains healthy; population modelling for the south-eastern river basin

district has shown that even the present otter population in that area is sufficient to maintain the otter within that district for up to 100 years, assuming that there is no further decline in status (O'Neill, unpublished data). Similar modelling has yet to be done, however, for the other river basin districts.

The Habitats Directive requires that the favourable reference population be no lower than the population in 1994. However, given the significant decrease in status before 1994 and the extensive network of SACs now designated for the otter, it has been decided that a higher target is justified and can be achieved. Consequently, the target for the otter population is to return all SACs to the status that was recorded during the Chapman & Chapman (1982) survey, while simultaneously ensuring that no further loss of status occurs outside SACs.

Table 4 – Population estimates of adult females within otter SACs based on the status recorded in 1982, 1992, and 2006.

	CHAPMAN			**LUNNON**			**BAILEY**		
	estimate	LCL	UCL	estimate	LCL	UCL	estimate	LCL	UCL
South - east	244.1	192.9	299.2	202.4	138.3	281.7	200.2	144.3	267.0
South - west	398.9	328.2	511.4	332.7	240.5	478.2	326.6	243.2	458.6
Shannon	370.8	300.5	484.2	295.8	210.0	434.3	267.8	190.4	392.6
Western	583.1	479.1	764.2	463.1	319.7	703.9	428.5	312.7	624.3
Eastern	45.4	36.4	56.6	51.2	33.3	76.1	35.1	23.1	51.7
North - west	734.5	608.0	936.5	542.5	309.2	907.3	493.0	334.0	742.8
Foyle	12.2	7.8	31.6	9.9	2.9	39.7	8.1	3.0	29.9
Neagh / Bann	0.0	0.0	7.4	0.0	0.0	8.5	0.0	0.0	8.8
National	**2389**	1952.9	3091.1	**1897.6**	1253.9	2929.7	**1759.3**	1250.7	2575.7

Table 5 – Target future population of female otters based on all SACs returning to the status observed in the reference survey (1982) while the rest of the habitat remains at the current status.

	Estimate	LCL	UCL
Current population	5866	5336	6888
Predicted increase if SACs return to 1982 status	597.7	702.2	515.4
Target population	6464	6038	7403

The favourable reference population is therefore set at 6464 female otters, a 10.2% increase on the present level.

5. Scientific Monitoring

In its judgment C183-05, the European Court of Justice found against Ireland that the monitoring in place for the otter was inadequate. The Court concluded that, for the purpose of challenging the Commission's complaint, Ireland had referred to a number of initiatives which had not yet been concluded. Since the time to which the judgment relates, important steps have been taken to rectify the deficiencies to which the Court referred.

Baseline monitoring of the otter was first carried out in 1980/81, with follow up nationwide surveys in 1990/91 and again in 2004/2005. The next national survey of the otter will take place in 2010/11. Because of concerns raised in the 2004/05 report about otter declines a system of rapid assessments has now been initiated for the otter in representative catchments throughout the country. These rapid assessments will take place every two years (see Table 6 and Appendix 1, Map 2 for details). These catchment surveys are designed to provide a more immediate indication of population change and, given their geographical spread, they will help to indicate any regional differences in otter population trends.

The rapid assessments will be run alongside the larger, national surveys. The national survey methodology is based on similar surveys carried out elsewhere in Europe (see Mason & McDonald, 1986). These large-scale surveys (the 2004/05 survey involved almost 50 NPWS staff together with a number of contractors) will continue to provide a complementary nation-wide overview of otter status and will also allow comparison with otter status in other European countries.

Table 6 - Schedule of rapid assessment and national surveys for otter 2005-2010. [The actual catchments to be surveyed in the mid-west and north-midlands regions will be confirmed in early 2009.]

	2005	**2006**	**2007**	**2008**	**2009**	**2010**
National survey	X					X
Leannan		X		X		X
Slaney		X		X		X
Corrib			X		X	
Roaringwater Bay			X		X	
Munster Blackwater				X		X

Boyne				X		X
North-midlands (tbc)					X	
Mid-west (tbc)					X	

Note: Interpretation of the results is ongoing.

6. Protection

The otter has been protected in Ireland under national legislation since 1976 (Wildlife Act 1976), although a limited number of licenses to hunt otters were issued under this Act until the 1990s. The Wildlife Amendment Act (2000) removed the hunting clause entirely and it is now illegal to hunt, disturb, or intentionally kill otters.

The otter is listed on Annex II and Annex IV of the EU Habitats Directive (92/43/EEC). The Annex II listing requires Member States to designate Special Areas of Conservation (SACs) for the protection of the species. 44 such SACs have been designated in Ireland. These sites comprise extensive stretches of river channels and coastline (including off-shore islands) as well as lakes and blanket bog systems. The sites were selected to represent the geographical spread and diversity of habitat used by the otter in Ireland.

6.1 Regulation 23 - Strict protection

Annex IV listing requires Member States to implement a system of strict protection for the species. Under the provisions of Regulation 23 of the Habitats Regulations 1997, the following offences relating to Annex IV (a) are set out:

(2) A person who in respect of the species set out in Part I of the First Schedule—

> *(a) deliberately captures or kills any specimen of these species in the wild,*
> *(b) deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,*
> *(c) deliberately takes or destroys the eggs from the wild, or*
> *(d) damages or destroys a breeding site or resting place of such an animal,*

shall be guilty of an offence.

This follows closely the provisions of Article 12 of the Directive. In relation to (a) to (c) above, it is clear that to obtain a conviction in a court, it would be necessary to establish that the person concerned committed the action deliberately. However, under Section 23(5) of the Wildlife Act 1976, as amended, it is an offence to injure a protected wild animal otherwise than while hunting it. As the hunting of otters is itself an offence under both the Wildlife Acts and the Habitats Regulations, this would allow for a prosecution in cases in which otters were being injured or killed. It should be noted that the derogation provisions of Section 23 (7) of the Wildlife Act do not apply to Annex IV animals (see Regulation 2(3) of the Habitats (Amendment) Regulations 2005, which amended the Wildlife Acts).

Given that Irish Constitutional law gives no latitude for extending the scope of offences beyond that specified in the Directive itself outside primary legislation, any further extension of the legal protection of the otter would require primary legislation.

In the case of Regulation 23 (d) of the Habitats Regulations, it is not required that the person damaging or destroying a breeding site or resting site should have done so deliberately or knowingly. This places an onus of due diligence on persons concerned to inform themselves of the risk of such damage or destruction that their plans, operations or activities might cause. If they consider that, notwithstanding such a risk, they want to proceed with such a plan or operation or activity, then they must seek a derogation licence from the Minister under Regulation 25 of the Habitats Regulations.

6.2 Regulation 25 – Derogations

The criteria under which a derogation licence can be issued by the Minister are narrow:

25. (1) Where there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range, the Minister may, in respect of those species, grant a licence to one or more persons permitting a derogation from complying with the requirements of the provisions of section 21 of the Principal Act and Regulations 23 and 24 where it is—

> *(a) in the interests of protecting wild fauna and flora and conserving natural habitats, or*
> *(b) to prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property, or*
> *(c) in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment, or*
> *(d) for the purpose of research and education, of repopulating and re-introducing these species and for the breeding operations necessary for these purposes, including the artificial propagation of plants,*
> *(e) to allow, under strictly supervised conditions, on a selective basis and to a limited extent, the taking or keeping of certain specimens of the species to the extent (if any) specified therein, which are set out in the First Schedule* (Annex IV(a) species).

(2) The Minister shall forward to the Commission every two years a report, in accordance with a format established by the Commission, on the derogations to which paragraph (1) relates.

(3) The report referred to in paragraph (2) shall specify—

- *(a) the species which are subject to the derogations and the reason for the derogation, including the nature of the risk with, if appropriate, a reference to alternatives rejected and scientific data used;*
- *(b) the means, devices or methods authorised for the capture or killing of animal species and the reasons for their use;*
- *(c) the circumstances of when and where such derogations are granted;*
- *(d) the authority empowered to declare and check that the required conditions obtain and to decide what means, devices or methods may be used, within what limits and by what agencies, and which persons are to carry out the task;*
- *(e) the supervisory measures used and the results obtained.*

A person convicted of an offence shall be liable on summary conviction to a fine not exceeding £1,500 or to 6 months imprisonment or to both.

The Eurasian otter is also the subject of further international protection. It is classified as 'near threatened' by the IUCN (2006) and is listed as a strictly protected species under Appendix II of the Bern convention (Council of Europe, 1979). Because of concerns about the impact of fur-trading, the otter is also listed in Appendix 1 of CITES (1979), consequently trade in otter is only permitted in exceptional circumstances.

7. Enforcement

NPWS Conservation Rangers, whose number now stands at 81, are the main enforcement body for wildlife offences including offences relating to Annex IV species. Rangers regularly patrol within and outside areas designated for nature protection and are in regular contact with interested members of the public as well as colleagues in other enforcement agencies in order to combat breaches of wildlife laws. Rangers also carry out survey work on a wide range of species, including aquatic species such as the otter, but also including waterbirds and the freshwater pearl mussel.

The maximum penalty for summary conviction under the 2000 Wildlife Amendment Act has been increased to €1,904 and/or 12 months imprisonment and, on indictment, is €63,487 and/or two years imprisonment. It should be noted that fines may be imposed in relation to each offence committed, so operations involving many animals or repeated offences can potentially accrue large fines. In addition, items which may constitute evidence of the commission of an offence may be seized and detained. However, as in any Member State, prosecutions must be taken within the constraints of the law and with sufficient evidence to support a prosecution.

Cooperation between agencies provides for synergies with regard to enforcement patrols and compliance surveillance. The Regional Fisheries Boards (RFBs) employ approximately 200 staff who undertake enforcement work as part of their remit. In particular they conduct patrols of estuaries, lakes and rivers i.e. habitats of particular importance for the otter. These patrols are focused on detection of illegal fishing activity. They have a strong seasonal element. Extensive foot patrol work is undertaken in autumn – winter-spring in areas of prime spawning activity by Atlantic salmon and of brown trout. Staff walk river banks to enumerate location and extent of spawning (redd counting) and investigate illegal taking of adult spawning fish. In summer and early autumn, surveillance activity is focused on boat patrols in estuarine and inshore waters, detecting use of illegal netting and liaising with commercial netsmen.

Patrols in freshwater areas involve meeting with anglers on-site, checking permits and ensuring compliance with fisheries by-laws. Walking of channels is undertaken in the context of investigating actual or reported discharges of materials to waters and in the context of fish kills. While RFB staff are not responsible for enforcement of legislation which protects the otter, good communication between local RFB and NPWS officers means that infringements of the Wildlife Acts and Habitats legislation are quickly identified and can be followed up where appropriate.

8. Threat and pressures

Introduction

Otters are subject to pressures in both the terrestrial and the aquatic (freshwater and marine) environments. Impacts that reduce the availability or quality of, or cause disturbance to, these habitats are likely to affect otters. These factors may act directly (e.g. through road kills or the removal of holt sites) or indirectly (e.g. by reducing prey availability).

The IUCN's Otter Action Plan (Foster-Turley *et al.* 1990) identified the major and specific threats facing otters in 29 European countries ranging from Ireland to Siberia. These threats were subsequently summarised by O'Sullivan (1996 - see table 8). Habitat destruction (in particular river and wetland drainage) followed by water pollution were the most cited.

Table 8. The major and specific threats (percentage of times listed) to otters in 29 European countries/regions (from O'Sullivan (1996) after Foster-Turley, 1990).

Major threats	%	Specific threats/areas of conflict	%
Habitat destruction	28	River/wetland drainage	17
Water pollution	25	Sand/gravel abstraction	3
Mortalities/illegal killings	19	Water abstraction	1
Recreation/disturbances	13	Urbanisation	5
Hydroelectric schemes	5	Organic pollution	14
Aquaculture/fisheries	5	Industrial pollution	14
Oil spillages	1	Acidification/forestry	3
American mink	1	Poisonous marine algae	1
		Aquaculture/fisheries	8
		Fyke nets/fish traps	7
		Mammal traps	5
		Hunting/killing	8
		Road traffic	9
		Angling	2
		Boating	1
		Tourism	2

(The criteria used to classify threats are not necessarily mutually exclusive.)

Of those listed, Foster-Turley *et al.* (1990) considered four to be significant in the Irish context:

1. *Direct and indirect habitat destruction, drainage being a major factor.*

2. *Pollution, particularly organic pollution resulting in fish kills. Agricultural sources of pollution of particular concern.*
3. *Disturbance of habitat by increasing recreational activities, especially angling, boating and mariculture.*
4. *Accidental deaths (traffic and fish traps) and persecution.*

Little evidence has come to light in recent studies to suggest that disturbance by recreation is a significant pressure. The other three threats are dealt with individually below. An introduction to each threat is followed by a statement of the actions recently completed or currently underway to address the threat. This is followed by a section on future actions. These are actions deemed necessary to ensure that any outstanding elements of the identified threat are fully managed and that no significant negative impact to the favourable conservation status of the otter arises.

Threat 1 Habitat destruction

Background

River and wetland drainage, together with clearance of riparian vegetation, are the main causes of otter habitat destruction in Ireland. Specific actions, such as dredging, arterial drainage and flood defence works, which result in an extensive loss of riparian habitat and decreased fish biomass have been blamed for otter population declines and population fragmentation (O'Sullivan, 1996).

Drainage works have a long history in Ireland stretching back to the mid 19th century. Ireland by nature is liable to flooding and drainage problems, principally due to the fact that the country has high rainfall and a relatively low-lying interior surrounded by coastal uplands.

A large scale programme of catchment-wide Arterial Drainage Schemes was carried out by the State between 1945 and 1995; 34 arterial drainage schemes on river catchments, together with 5 estuarine embankment schemes, were completed, affecting over 260,000 hectares of land (source: www.opw.ie).

There is a statutory obligation on the State to maintain these schemes "in proper repair and effective condition". The State exercises this responsibility through the Office of Public Works (OPW) which is now the State's Lead Agency in relation to flood management. In total there are some 11,505km of channels and 733km of tidal and river embankments to be maintained [source: http://www.opw.ie/services/eng_ser/fr_eng.htm]. However, the European Court of Justice, in its judgment C 418-04, has made it clear that such maintenance works, where they could impact on a Natura 2000 site,

must be subjected to an appropriate assessment of their impact in accordance with Article 6 (3) of the Habitats Directive. It is equally clear that if such works could result in infringements of Article 12 of the Directive, in particular 12(1)(b) or (d), then if OPW considers the works to be essential, they must seek a derogation licence to cover those works.

Since the 1995 Amendment to the 1945 Arterial Drainage Act, the only large scale drainage schemes have been flood relief schemes undertaken to mitigate, in the main, serious urban flooding.

In recent years the OPW has become more aware of the effects of its activities on the natural environment. The OPW recognises the need to fully understand the impacts of drainage maintenance operations with the aim of both minimising negative impacts and focusing through studies and research on identifying future positive impacts (OPW 2006).

The loss of riparian habitat structure has been reported to be a factor in declines of otter populations throughout Europe (O'Conner et al. 1977; Chanin and Jefferies 1978; Macdonald and Mason 1983). Large riparian trees are important for otter breeding and resting sites (O'Sullivan, 1993). Undisturbed areas, often in impenetrable scrub or reeds, and occasionally removed from the main channel are also important refuges (Liles 2003). Any activities which impact on riparian habitat (e.g. agricultural intensification, forestry) can have negative effects on local otter populations.

Current Action - Within SACs

Drainage

In accordance with Section 31 of the European Communities (Natural Habitat) Regulations 1997, where an operation or activity is carried out by the State that is likely to have a significant effect on a European Site, an appropriate assessment must be carried out on the implications for that site, in view of its conservation objectives. The operation or activity shall only be undertaken when it is ascertained that it will not adversely affect the integrity of the site and then, having regard to conclusions from the assessment (OPW 2006).

To ensure compliance with the EC Habitats Directive (Council Directive 92/43/EEC), transposed into Irish law through the European (Natural Habitat) Regulations (1997), the OPW, or any other agency responsible for drainage or maintenance of navigation (e.g. Waterways Ireland, Barrow Drainage Board), is required to carry out an appropriate assessment for European Sites (Natura 2000 network), which overlap with drainage operations. European Sites under

the Habitats Directive include Special Areas of Conservation (SACs) and Special Protected Areas (SPAs).

In its judgment C 418-04 of December 2007, the European Court of Justice referred to drainage maintenance works that had been carried out by the Office of Public Works in the Glen Lough SPA. The Court's judgment in this case makes it clear that even maintenance works require an appropriate assessment, under Article 6(3) of the Habitats Directive, of their potential impact on a Natura 2000 site. It is also clear that any such works that could constitute disturbance of otters, particularly during their period of breeding or rearing, or the deterioration or destruction of breeding sites or resting places of otters, would be subject to a derogation licence under Article 16 of the Directive (see 6.2 Regulation 25 – Derogations above).

The OPW now implements an extensive mitigation programme for otters during drainage maintenance operations within SACs (OPW, 2006a). The OPW's EcIA for otters is at Appendix 2.

Notifiable action process

Although most drainage activities are licenced by authorities other than the Minister for the Environment, Heritage and Local Government, there are certain related activities or operations that can only be carried out in Natura 2000 sites with the permission of the Minister. These are called Notifiable Actions and vary depending on the type of habitat or the species that is present on the site. Landowners are sent copies of the Notifiable Actions that are relevant to their lands. The activities listed in the Notifiable Actions are not prohibited but require the landowner/occupier to consult (in practice with the local Conservation Ranger) in advance.

Notifiable Actions relevant to the otter include:

- removal of soil, mud, gravel, sand or minerals
- construction of fences, buildings or embankments
- use of any pesticide or herbicide, including sheep dip
- creation of new tracks or paths
- burning of vegetation
- reclamation, infilling, ploughing or land drainage
- rock removal
- alteration of the banks, bed or flow of watercourses

For further information see
http://www.npws.ie/en/ConservationSites/ImplicationsofSiteDesignation/NotifiableActions/

Planning process

Article 32 of the EU (Natural Habitats) Regulations, 1997, requires planning authorities to ensure that an appropriate assessment of the environmental implications of a development proposal for the SAC in view of its conservation objectives is undertaken. Planning permission can be granted only after ensuring no detrimental effect, save under a small number of special circumstances.

Under the Planning and Development Regulations, a planning authority must refer all planning applications that might have significant effects in relation to nature conservation to the Minister for the Environment, Heritage and Local Government. NPWS examine applications for impact on the qualifying interests of designated sites and taking into account the provisions of domestic and European legislation. On the basis of this appraisal, the Department may recommend to the planning authority that further information should be requested from the developer (for instance, assessment of impacts on specific species) or that certain planning conditions should be included in a grant of permission. In cases where significant negative impacts on nature conservation may not be mitigated the Department may recommend to the planning authority that planning permission not be granted.

The Department circulated a letter to all Planning Authorities in February 2008 advising them of their obligations with regard to Article 6. Further guidance on Article 6 assessment is available at: http://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm#art6

Current Action - Outside SACs

Article 23.2 and Article 25 of the EU (Natural Habitats) Regulations, 1997 apply as do the Wildlife Acts (see 6. Protection above). A letter issued to all Local Authorities from NPWS in May 2007 reminding them of the need to consider Annex IV species when considering planning applications and providing guidance on compliance with Regulation 23.

Arterial drainage

All proposed arterial drainage and flood relief schemes now require a full assessment of all biodiversity and environmental implications (Planning and Development Act (2000)). In practise there have been no new arterial drainage schemes since 1995, although a number of localised flood relief schemes have been undertaken to mitigate, in the main, urban flooding. The Central

Fisheries Board has been engaged with OPW over a number of years in studies examining the environmental impacts of OPW's channel maintenance programme. The new Environmental River Enhancement Programme (EREP) has two major strands – one dealing with enhancement or restoration of the pre-drainage hydraulic regime and one dealing with robust implementation of OPW's recently-developed environmental protocol on channel maintenance. The OPW has developed, for routine use by its machine crews, a 10-point guidance note on environmental issues in channel maintenance. The Central Fisheries Board itself has conducted extensive research on the ecological impacts of drainage schemes and has instigated a programme of stream rehabilitation (O'Grady 2006).

Furthermore, CFB staff, working with RFBs and/or angling clubs or private fishery owners, engage in a range of works along river corridors. These include development of angling waters and habitat restoration or rehabilitation proposals for localized or extensive channel lengths under different programmes. All such activities may impact on the river corridor and its biota and due cogniscence is taken of the requirements of all Annex IV species.

Agriculture

REPS (Rural Environment Protection Scheme), is a scheme designed to reward farmers for carrying our their farming activities in an environmentally friendly manner and to bring about environmental improvement on existing farms.

The objectives of the Scheme are to:

- Establish farming practices and production methods which reflect the increasing concern for conservation, landscape protection and wider environmental problems
- Protect wildlife habitats and endangered species of flora and fauna
- Produce quality food in an extensive and environmentally friendly manner.

Participants in REPS are required to carry out their farming activities for a five year period in accordance with an agri-environmental plan. They must comply with 11 basic measures, 5 of which are particularly relevant for the conservation of the otter:

- follow a farm nutrient management plan prepared for the total area of the farm
- protect and maintain all watercourses and wells
- retain wildlife habitats

- cease using herbicides, pesticides and fertilisers in and around hedgerows, lakes, ponds, rivers and streams, except with the consent of the Minister
- produce tillage crops: without burning straw or stubble; leaving a specified field margin uncultivated where no nutrients or sprays are applied

Approximately 2 Million hectares are being managed under REPS in Ireland at present with 58,000 participating landowners (source: DAFF).

Additional payments may be made to a farmer for participating in Supplementary Measures (SM) one of which is particularly relevant to the otter: SM 4 - Riparian zones. Participants in this measure create a zone of between 10 and 30 metres (for salmonid or crayfish rivers), or of between 20 and 50 metres (for pearl mussels rivers), in which vegetation is allowed to develop naturally, with additional planting of native trees where necessary to bring the tree cover to 50%. The riparian zone must be permanently fenced to prevent livestock encroachment and the application of fertiliser or pesticide is prohibited without permission from the National Parks and Wildlife Service or the Central Fisheries Board. Lands managed in this way can provide ideal terrestrial habitat for otters. 256 farmers have opted for this additional measure to date with 427ha being managed specifically as SM 4 riparian zones (source: DAFF).

Forestry

The Forestry Environment Protection (Afforestation) Scheme (FEPS) encourages farmers to combine the establishment of high nature-value woodland with their participation in the Rural Environment Protection Scheme (REPS). The objectives of the Scheme include:

- To encourage farmers to establish and maintain high nature-value forestry through measures such as increasing biodiversity and protecting water quality;
- To support, establish or provide habitat for wildlife;
- To encourage the provision of protective forestry, for example riparian planting;
- To produce a commercial crop of timber while making an enhanced contribution to the environment;
- To increase Ireland's woodland cover to contribute positively towards climate change mitigation.

In FEPS an applicant must undertake 12 mandatory measures plus either six of the optional measures as outlined in Annex 3 of the Scheme document or plant as per the terms and conditions of the Native Woodland Scheme. The

primary objective of the mandatory and optional measures is to make an enhanced contribution to biodiversity, archaeology or landscape. Under the Mandatory measures 18%- 20% of plantation must qualify as Area for Biodiversity Enhancement i.e. areas that must be treated with particular regard to biodiversity, comprising open spaces and retained habitats. The ABE may be tailored to ensure the protection of otters and to enhance its habitat. FEPS optional measures that conserve otters and enhance their habitats include:

- Create new habitat such as ponds, or extend existing ponds or wet areas. The creation of additional aquatic habitats or the improvement and enhancement of existing habitats can be targeted to favour otters.
- Create wildlife corridors between habitats. This measure can be used to increase the connectivity between existing aquatic habitats, thus benefiting otters.
- Where appropriate, increase riparian zone and plant with suitable species. Consult with Forest Service.
- An alternative environmental option may be used. This option includes measures to protect and enhance conditions for a particular species.
- Develop woodland to a Native Woodland Scheme standard.

The Native Woodland Scheme

The Native Woodland Scheme (NWS) provides support for the protection and enhancement of existing native woodlands and to establish new native woodlands. NWS applications involve a site specific Native Woodland Plan (NWP) prepared jointly by an ecologist and a forester in consultation with the applicant. Part 2 of the NWP requires the identification of special habitats and species by seeking answers to the following questions:

- Are any of the habitats and species listed in Annex I or Annex II of the EU Habitats Directive or in Annex I of the EU Birds Directive, known to occur on the site? If so, specify and, where appropriate, show location.
- Are there any known protected species or Red Data Book species present? If so, specify, and where appropriate, show location.
- Are you aware of any other species on the site that may be considered rare, either regionally or nationally? If so, specify, and where appropriate, show location.

The NWS has a particular role in the development of native riparian woodland along streams, rivers and lakes and is highly relevant in relation to the Freshwater Pearl Mussel.

Native Riparian Woodlands

The Forest Service and Woodlands of Ireland in conjunction with other relevant authorities and bodies have published an information note entitled *Native Riparian Woodlands – A Guide to Identification, Design, Establishment and Management*. The purpose of the information note is to provide guidance on the identification, design, establishment and management of native riparian woodlands. The document recognises the importance of the aquatic buffer zone (ABZ), which should comprise natural ground vegetation, strategically planted groups of appropriate native trees and shrubs. The document also provides advice on the management of riparian woodland, especially in the aquatic buffer zone (ABZ), with a recommendation of approximately 20% tree/shrub cover to ensure excessive shading due to tunneling is avoided.

Controls of forestry practice

In Ireland, under the 1946 Forestry Act, the Forest Service (Department of Agriculture, Fisheries and Food) licenses the felling or removal of trees with some exceptions[3]. All initial afforestation requires prior approval as do all forestry grant aided projects.

Ireland is committed to the principles of Sustainable Forest Management (SFM), an inherent part of which is protection of the environment, both designated and non-designated habitats and species. As the national regulatory body for forestry, the Forest Service of the Department of Agriculture, Fisheries and Food implements SFM through its environmental guidelines and Requirements, the *Code of Best Forest Practice – Ireland* and its inspection, referrals and monitoring procedures. Forest Service Guidelines and Schemes have provided for the protection of biodiversity in general. To date, guidelines for specific species or habitats have not been published with the exception of the Forestry and Freshwater Pearl Mussel Requirements that were published in March 2008.

Adherence to the Forest Service guidelines and Requirement is a condition for all grant aided, approved and licensed forest activities. The Forest Service has provided information days on biodiversity, the Forest Biodiversity Guidelines and national and European legislation and obligations (e.g. Wildlife Act, 1976; Wildlife (Amendment) Act 2000; Habitats Directive, Birds Directive) to

[3] A Felling License is not required for the felling or uprooting of the following trees: (a) any hazel, apple, plum, damson, pear or cherry tree grown for the value of its fruit or any osier, also, (b) a tree standing in a County or other Borough or an urban district; (c) a tree standing within 100 feet of any building other than a wall or temporary structure; (d) a tree which is being felled under Section 70 of the Roads Act, 1993, or Section 98 of the Electricity Supply Act, 1927; (e) a tree certified by a Local Authority as dangerous to road traffic on account of age or condition; (f) a tree uprooted or cut down by direction of the Minister for Public Enterprise because it is a danger or obstruction to telegraph or telephone wires; or (g) a tree cut down by a local authority in connection with road construction.

Registered Foresters and Forestry Companies. The most recent information days were on the 11th – 13th of November 2008.

The protection provided in the current Forest Service practices, schemes and guidelines for otters and other Annex IV species includes:

- Forest referral system – all applications (approvals and licenses) in or within 3km upstream of a designated area (SAC, SPA, NHA, pNHA) are referred to NPWS for comment
- Forest Service inspection procedures (all sites receive a desk inspection backed up by GIS data, selected sites field inspection)
- Sub-threshold EIA assessment is part of all afforestation prior approval procedures
- all Forest Service grant aided sites, regardless of the scheme, is that they must be stock proof, which has the additional benefit of preventing stock encroachment especially in and around the aquatic zone
- Forest Service Biodiversity Guidelines whereby approximately 15% of the forest area (18 –20% under FEPS and NWS) must be treated with particular regard to biodiversity. These Areas for Biodiversity Enhancement (ABEs), which comprise open spaces and retained habitats, are aimed at encouraging the development of diverse habitats, native flora and fauna and biodiversity. If otters are present on site, the ABE can be targeted at protecting and enhancing habitats used by the species. All grant aided afforestation sites must have an ABE, and this must be shown on the Biodiversity/Operational Map which is submitted with the application.
- The Forestry and Water Quality Guidelines require the provision of buffer zones, the width of which depends of the site slope and soil, with a minimum width of 10m. Within the buffer zone, which includes the riparian zone, natural ground vegetation is allowed to develop, with additional planting of suitable riparian tree species. No operations occur within this aquatic buffer zone, thus protecting holts and water quality while also providing undisturbed potential resting sites.

Research

- A radio-telemetry study of the social structure and spatial requirements of otter populations on lowland rivers was completed in 2008 by the Wildlife Ecology Group at Trinity College (supported by NPWS and IRCSET) (O'Neill 2008).
- NPWS is funding a study of the genetic structure of the Irish otter population to establish the degree of connectivity of river basin districts.

Future Action

- By 2009, review with OPW their procedures and written guidance to ensure that it complies in all respects with the requirements of EU and national law for the protection of the otter and its habitats, breeding and resting places.

ACTION: OPW, NPWS

- To ensure that consideration of the habitat requirements of otters are included in the planning process, particularly in relation to operations involving physical alteration of the stream bed or riparian zone, training courses will be provided, by or on behalf of NPWS, to the planning sections of all Local Authorities, to An Bórd Pleanála, to the OPW and to local Drainage Boards. This training will begin in 2009.

ACTION: Local Authorities (LAs), An Bórd Pleanála, NPWS, OPW, Drainage Boards.

- Ensure that considerations of the habitat requirements of otters are taken into account in future REPS schemes and in all other agri-environmental schemes.

ACTION: Department of Agriculture, Fisheries and Food (DAFF), Forest Service (FS), NPWS, Teagasc.

- By 2011, in SACs where the otter is not meeting favourable conservation status, identify areas where scarcity of breeding sites is considered critical and provide artificial holts where appropriate.

ACTION: FS, NPWS, LAs.

- By 2010, ensure that suitable habitat in state and semi-state-owned lands is managed in a manner that is beneficial to the conservation of the otter.

ACTION: Coillte, FS, NPWS, Dept. of Defence, DCMNR.

- By 2010, ensure that all operations affecting watercourses, including 'bank improvement' for angling, take account of otters and retain features such as old trees, scrub, and overhanging tree root systems.

ACTION: CFB, FS, LAs, NPWS, RFBs, OPW.

- Ensure that NPWS rangers, fisheries officers and Teagasc advisors are trained in the identification of potential breeding holts for otters by 2009.

ACTION: NPWS, Teagasc.

- Ensure that REPS and FEPS advisory talks include information on the otter where appropriate by 2009.

ACTION: DAFF, NPWS, Teagasc.

- By 2010, evaluate the effectiveness of the current NRA-recommended mitigation guidelines for otter habitat and ensure that the guidelines are updated as required.

ACTION: NRA, NPWS.

- In 2009, publish guidelines for foresters in relation to otters. These Guidelines shall include the requirement for systematic surveys for the identification of the species, their habitats and resting places in areas where forestry activities are planned and for the monitoring of the impact of those activities on the species.

ACTION: Forest Service (FS)

- By 2010 ensure that considerations of the habitat requirements of otters are taken into account in all Forest Service grant aided, approved and licensed activities.

ACTION: FS, NPWS.

- Continue to provide regular information days on biodiversity, the Forest Biodiversity Guidelines and national and European legislation and obligations (e.g. Wildlife Act, 1976; Wildlife (Amendment) Act 2000; Habitats Directive, Birds Directive) to Registered Foresters and Forestry Companies.

ACTION: FS

Threat 2 Water pollution

Background

A number of Irish surveys have linked poor water quality to sites that proved negative for otter signs (Lunnon & Reynolds, 1991; Hamilton & Rochford, 2000). The acidification of watercourses, by coniferous forestry for example, decreases prey abundance, and, hence, otter populations (Mason and Macdonald, 1989). Serious pollution in Ireland, however, is most frequently caused by sewage discharges (Stapleton *et al.*, 2000).

Pollution may influence otters either indirectly or directly. Indirect effects include damage to food supply or habitat thus lowering the carrying capacity of an affected area. Direct effects impact of the animal itself, resulting in either rapid death (acute toxicity) or in lowered fitness (sub-lethal toxicity), reducing the animal's ability to reproduce successfully or to survive in inclement conditions (Macdonald & Mason, 1990).

Water quality is monitored in Ireland by the EPA. 13,200km of river and stream channel and over 440 lakes, are examined using a biological assessment method. The data are collected on a three-year cycle. Irish rivers were in near pristine conditions when the first national otter survey found otters at 88% of sites (Chapman & Chapman, 1982; Stapleton *et al.*, 2000). Since then the standard of water quality has declined substantially (Stapleton *et al.*, 2000). Although recent years have shown some improvement in the extent of river and lake water quality, 28% of river channels and 15% of lakes remain in an unsatisfactory condition (Lucey, 2006).

A worrying trend is the continuing decline in the number of river stations recording the highest biological water quality. Efforts need to be stepped up if Ireland is to meet water quality targets set out in the Phosphorus Regulations and indeed the more stringent targets of the EU Water Framework Directive. Tackling pollution from sewage treatment and agricultural sources remains the greatest challenges (EPA, 2006a). Concerns have been expressed for example that the 1.5m water-course buffer stipulated in the Rural Environmental Protection Scheme (REPS) is ineffectually narrow and that the level of monitoring of REPS is inadequate (Feehan, 2002).

Almost all of Ireland's urban waste water, irrespective of the level of treatment, is discharged to estuaries and freshwaters. The most recent report by the OEE (EPA 2006a) concluded that 18% of waste water received no treatment, 13% received preliminary treatment, 2% received primary treatment, 58% received secondary treatment, and 9% received nutrient reduction in addition to secondary treatment. It was evident that the frequency and method of emissions sampling was, in many cases, not to the standard required by law and was not sufficient to establish compliance with the relevant regulations.

Data on fish kills in Ireland are compiled annually by the Central Fisheries Board, based on returns from the Regional Fisheries Boards. A marked upsurge in fish kills occurred in Irish rivers in the 1970s coinciding with the intensification of agriculture. In response to this situation, a nation-wide public information campaign was launched and an enforcement strategy was put in place by the Regional Fisheries Boards and Local Authorities. The trend in fish kills over the past 21 years (Figure 3) shows that the years 1987 and 1989 were the worst with in excess of 100 fish kills reported. Recent years have seen a continued declining trend nationally. In 2006, 34 fish kills were reported while in 2007 this figure was at 22, its lowest level since records began (CFB unpublished data).

Based on investigations carried out by Fisheries Board environmental staff the following causes were attributed to fish kills in 2006 and 2007:

Year	Agriculture	Industry	Local Authority	Eutrophic-ation	Other	Unknown	TOTAL
2006	5	2	7	5	10	5	34
2007	4	2	10	2	3	1	22

As well as resulting from agricultural, industrial and sewage wastes entering water bodies, fish can be killed by other causes, such as instream drainage works (Lucey, 2006).

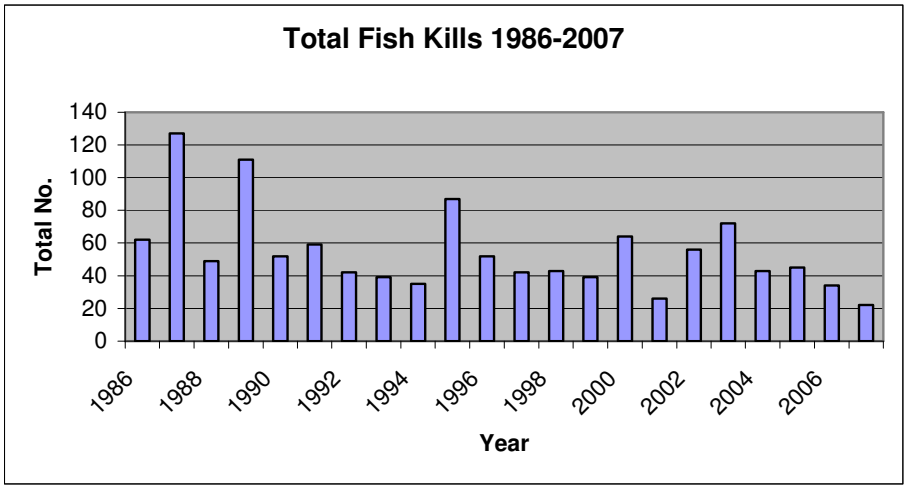

*Fig. 3. No. of reported fish kills 1986 – 2007(*source: CFB)

The EPA reports that oxygen depletion and nutrient enrichment, both of which impact negatively on fish biomass, are largely the result of agricultural runoff and urban waste water discharges (Stapleton *et al.*, 2000; EPA, 2008b). Where sources are small and adequately treated, organic discharges will do little damage and, by adding small amounts of nutrients to streams, may enhance fish populations to the benefit of otters (Macdonald & Mason, 1990). However, poorly treated effluents can wipe out fish populations for long distances downstream of the discharge, making otherwise ideal habitat unsuitable for otter.

Contaminants, such as biomagnified dieldrin, DDT/DDE, PCBs and Mercury, have been blamed for the dramatic decline of otter populations across Europe (Mason & Macdonald, 1986; Jefferies & Hanson, 2000; Kruuk, 2006). These compounds are persistent, accumulating in living tissue. Otters obtain these pollutants almost entirely through their food and if that is contaminated high

concentrations can quickly result (Macdonald & Mason, 1990). Levels of organochlorine pesticide residues and PCBs in otters were not a significant cause of concern in southern Ireland in the early 1990s at least (O'Sullivan *et al.*, 1993) and while there has been no subsequent monitoring of these substances in otters, progress has been made on the control and monitoring of potential PCB pollution.

Current Action

Waste water treatment

There has been major investment in water services over the past 10 years and this is set to continue in 2009 despite the economic downturn. The investment in municipal waste water treatment will yield improvements in the quality of receiving waters. While some dramatic improvements have been noted, such as the improvement in water quality in Dublin Bay resulting from the installation of secondary treatment at Ringsend, persistent problems remain, particularly at smaller plants around the country (EPA 2006a).

Improvement of wastewater treatment is being funded through continuation of the Water Services Investment Programme, funded by the Department of the Environment, Heritage and Local Government. The 2007-2009 Programme is made up of 955 projects that have an overall capital value of €5.8 billion. It includes 77 ongoing major schemes and 443 new schemes to commence construction in the period 2007 – 2009, while more schemes will advance through planning stages.

The OEE has conducted a detailed analysis of water pollution in Ireland to pin-point areas of rivers that are being polluted by discharges from municipal waste water treatment plants. Of the 1,222 river sites known to be polluted in Ireland in 2003, almost one quarter of these were suspected to have been effected by discharges from a waste water treatment plant. Of these 354 sites, 22 were seriously polluted. The OEE has prioritised the seriously polluted sites where a waste water discharge was the main suspected cause of serious pollution. All relevant local authorities have now been contacted and instructed by the OEE to prepare action plans to improve plant management.

The Office of Environmental Enforcement (OEE) within the Environmental Protection Agency (EPA) was established in 2003 to improve compliance with environmental legislation in Ireland and ensure that those who flout the law and cause environmental pollution are held to account. The OEE delivers enhanced enforcement in two ways:

- It is directly responsible for enforcing EPA licences issued to waste, industrial and other activities.

- It supervises the environmental protection activities of local authorities by auditing their performance, providing advice and guidance, and, in appropriate cases, giving binding directions. In this respect, the OEE is a resource for members of the public who have exhausted all other avenues of complaint.

The OEE established the Environmental Enforcement Network (EEN) in 2004. The network aims to harness the collective resources, expertise and investigative capacity of all public sector agencies and government departments that can contribute to enforcing environmental law and stamping out illegal waste activity and other environmental crime in Ireland. Over 900 staff from about 50 agencies are now involved in the network.

The Water Framework Directive

The EU Water Framework Directive (2000/60/EC) was transposed into national legislation by the European Communities (Water Policy) Regulations (S.I. No. 722 of 2003). The Directive requires catchments to be managed through the use of river basin management plans. The objectives for surface water bodies are to:

- prevent deterioration
- protect high and good status waters where they exist
- achieve the objectives of associated protected areas (where relevant) and restore waters of less than good status to at least good status by 2015.

Where improvements are necessary, the competent authorities must plan improvements through programmes of measures (POMs).

A nationwide monitoring programme of the water quality of rivers, lakes and coastal waters is underway as part of Ireland's implementation of the Water Framework Directive (see EPA 2006).

River Basin Management

A practical guide to river basin management planning for public authorities was prepared by DEHLG (2008). This includes guidance on how the specific obligations in relation to nature conservation sites are to be addressed in practice within the overall river basin planning process. The guidance document is aimed at LAs, the EPA and other public authorities directly involved in the river basin management planning process and who are involved in delivery of WFD objectives. It describes steps that these authorities should take to integrate objectives of regional planning guidelines, county development plans (with constituent Local Area Plans), Water Services Strategic Plans, and other pollution reduction and/or control programmes (e.g. forestry programmes, farm inspections, review of IPPC licences) with objectives of river basin management plans. LAs and the EPA are the authorities with primary responsibility for implementing the WFD in

Ireland. The Water Framework Directive presents a major opportunity for strengthened protection of aquatic ecosystems and their associated terrestrial ecosystems.

Implementation of the Directive is achieved in part by the setting up of eight River Basin Districts in Ireland (RBDs). For each RBD, a "Significant Water Management Issues (SWMI) Report" has been prepared to provide an early overview of the water management issues affecting the district. Feedback to these reports informs draft River Basin Management Plans, which are due in 2008, and the final plans due in 2009. The reports describe the water management issues within an RBD, the activities which impact on water quality, the existing controls on these activities, and the additional controls and measures which may be necessary in order to meet the objectives of the Water Framework Directive (WFD).

Fish kills

Regional Fisheries Boards monitor the occurrence of fish kills throughout the country and instigate prosecutions where liability can be proven. The Central Fisheries Board collate national data on fish kills from all regions and the number of fish kills is one of a suite of Environmental Indicators reported on annually by the EPA.

Fish constitute the majority of the diet of the otter in Ireland and the monitoring of these stocks is an essential element in our understanding and protection of the otter. Fish stocks are monitored throughout the country through a number of different programmes :

- The Water Framework Monitoring Programme carries out fish stock assessment in a series of river segments, lakes and estuaries on a three-year rolling cycle. A total of 180 river segments, 80 lakes and 84 transitional water bodies are included.

- Within the Waterways Ireland-funded study an on-going programme of fish monitoring is undertaken by the CFB. Approximately 20 km of canal is monitored annually for fish community structure.

- The CFB is currently gearing up to undertake monitoring programmes for the Annex II fish species listed for Ireland – Atlantic salmon, shads, lamprey and pollan. The studies on shad and pollan will focus on SAC waters while those for salmon and lamprey will have a wider base, covering all catchments in the state.

- Under the Conservation Limit Attainment programme for Atlantic salmon, juvenile salmon populations in approximately 40 rivers are assessed annually by CFB working with RFBs. Shallow riffle areas are targeted as these will support juvenile salmon and are likely to best reflect fish population changes. Several rivers are sampled annually as index rivers.

- Other specific CFB projects generate fish stock assessments, at local or catchment level, on an occasional basis. These will generally be focused on salmon and trout stocks.

Where fish stocks are identified as being poor, the CFB examine the causative agents and perform remediation where appropriate.

Persistent pollutants

The possession, use, transportation and disposal of PCBs are now subject to extensive legislative controls in Ireland. The Waste Management Acts, 1996 to 2007, provide the framework for waste and hazardous waste management in Ireland. The transposition of EU waste directives is enacted for the most part through these Acts. The Environmental Protection Agency Act, 1992, provides the framework for several other EPA functions including the issuing of IPPC licences (EPA, 2008a). Extensive work on the screening and management of dangerous substances in watercourses is underway as part of Ireland's efforts to meet Water Framework Directive commitments. (e.g. National Dangerous Substances Expert Group, 2008). Further information on current controls and monitoring of PCBs and related substances in Ireland can be found on www.epa.ie.

Agriculture

The Nitrates Directive (91/676/EEC) and the Regulations for Good Agricultural Practices for the Protection of Water (S.I. 378/2006) are helping to reduce inputs of nitrogen and phosphorus to watercourses through better farming practices, including: limiting the amount, timing, and location of fertiliser application. New powers under the Regulations for Good Agricultural Practices for the Protection of Water enhance the enforcement tools available to local authorities to deal with agricultural pollution.

The Rural Environmental Protection Scheme (REPS) places a particular emphasis on preventing water pollution, and also aims to 'protect wildlife habitats and endangered species'. Subscribers to the voluntary scheme are required to maintain a clear buffer around watercourses of 1.5m for bovids, pesticides, insecticides, and artificial fertilisers, and 10m for slurry and animal manure.

Forestry

The Forest Service's *Forestry and Water Quality Guidelines* protect water quality through the provision of aquatic buffer zones. Under Forest Service Guidelines the minimum aquatic buffer zone is 10m, which may increase to 25m depending on site slope and soil. One of the optional measures under the Forest Environment Protection (Afforestation) Scheme is to increase the riparian zone and to plant with suitable species. Both FEPS and the NWS provide for additional measures to protect water quality. The role of riparian woodlands in protecting water quality is reflected in the recent publication entitled *Native Riparian Woodlands – A Guide to Identification, Design, Establishment and Management*.

Other measures to protect water quality, in particular to minimise sediment mobilisation and nutrient enrichment, include reducing soil disturbance through planning, for example timing of operations; the use of brash mats and appropriate machinery; the use of sediment traps and other sediment control measures; the amount and timing of fertiliser application; the reduction in the area harvested; the management of brash; low impact silvicultural systems; and the selection of species. Other relevant Forest Service publications include *Forest Harvesting and the Environment Guidelines*, *Forestry and Aerial Fertilisation Guidelines* and *Forest Protection Guidelines*.

Forest Service publications can be downloaded for free from: http://www.agriculture.gov.ie/index.jsp?file=forestry/publications/publications.xml

The application of herbicides and insecticides to forests in Ireland is ground based. Herbicides are used to control weed growth in young plantations but are only required in areas of intensive weed growth. The requirement to use insecticides is currently confined to the control of pine weevil in reforestation sites. In this regard, plants for use on restock sites are increasingly treated off site. Any chemical to be used in forestry must be on the up to date approved Pesticide Control Service list (www.pcs.agriculture.gov.ie or Pesticide Control Service, Department of Agriculture, Fisheries and Food Laboratories, Backweston Campus, Young's Cross, Celbridge, Co. Kildare) and used in accordance with Forest Service guidelines, in particular the Forest Protection Guidelines and the Guidelines for the Use of Herbicides in Forestry.

Forest Service actions aimed at the Freshwater Pearl Mussel (FPM) will also benefit the otter. The Forest Service published *Forestry and Freshwater Pearl Mussel Requirements, Site Assessment and Mitigation Measures* in 2008, which apply to all potentially impacting forest operations within the catchments of FPM populations in rivers designated candidate Special Areas of

Conservation (cSACs) for the species. These Requirements apply to a total of 27 rivers and measures include the provision of a 25m aquatic buffer zone, which includes five lines of native broadleaves on the section furthest from the aquatic zone, site permitting.

The Forest Service Guidelines and Requirements are a condition of all grant aided and licensed activities and the Forest Service ensures compliance through its inspection and monitoring procedures.

Future Action

Waste water treatment and water quality (from EPA 2006a)

- All local authorities should review the operation, maintenance and management of urban waste water treatment plants in their functional areas and prepare corrective action programmes for plants that are in breach of the standards. Priority should be given to implementing corrective action programmes at plants that are having a demonstrably negative impact on the waters to which they discharge
- Ensure that local authorities are giving priority to improving the management of waste water treatment plants.
- Seek to close identified gaps in the management of urban waste water sludges.
- Publish a revised manual on the treatment of waste water from single houses.
- Update guidance on discharges from small communities, businesses, leisure centres and hotels through the Environmental Enforcement Network.
- New powers under the European Communities (Good Agricultural Practices for the Protection of Waters) Regulations, 2005 enhance the enforcement tools available to local authorities to deal with agricultural pollution and the OEE recommends that local authorities fully enforce these Regulations.

Environmental Enforcement Network future actions

Key priorities for the future are:

- Consolidating and building on the regional approach to tackling unauthorised waste activity.
- Continuing to develop linkages between the OEE, local authorities, An Garda Siochana and the various other bodies enforcing
- environmental protection legislation, particularly in relation to the detection, investigation and prosecution of environmental crime.

- Building capacity within the network for water enforcement activities.
- Launching and implementing the national environmental complaints system, including awareness-raising so that members of the public will know how to avail of the system.
- Implementing a consistent approach to conducting environmental inspections in all relevant authorities and agencies, to include training for enforcement officers in how to conduct environmental inspections.
- Developing the water enforcement working groups by focusing on farm inspections and water quality issues related to sewage.

Fish kills

- Continue to monitor and collate fish kill data nationally and to bring individual cases to prosecution where possible.

ACTION: CFB, RFBs

- Continue the fish biomass monitoring program of the CFB and by 2010 examine the potential to produce biomass estimates in the SAC network to identify areas where fish populations are abnormally poor so that remediation can be carried out.

ACTION: CFB, NPWS

Persistent pollutants

- By 2010, review the results of priority/dangerous substances monitoring under the WFD and assess the likely implications for otter. If appropriate test otter cadavers for these substances and provide feedback to the EPA on any concerns arising.

ACTION: EPA, NPWS, WFD/RBD.

Threat 3 Accidental death / persecution

Background

Article 12(4) of the Habitats Directive requires Member States

"…to establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a)."

It can be difficult to identify the cause of death of an otter, although the number of otters reported dead from "unknown" causes is surprisingly low (Reuther, 2002). Explaining the absence of otters from certain sites can also pose difficulties.

A number of reviews of otter mortality have been carried out in Ireland. O'Sullivan & Fitzgerald (1995) reported, for a period between 1982 and 1992, a total of 628 otters found dead in Ireland. The vast majority of recorded otter deaths were caused by road traffic accidents. Poole *et al.* (2007) also concluded that roadkill was probably the most significant cause of direct otter mortality in this country.

Road traffic has increased substantially in Ireland. In the 24-year period from 1983 to 2007, the number of licenced vehicles on Irish roads increased from 897,381 to 2,441,564. It may reasonably be concluded that road traffic related pressures on otters will have increased significantly with this 270% increase in the number of vehicles using the roads. Where populations have been depleted by other causes, road traffic deaths could pose a local extinction risk or decrease population connectivity. New autoroutes are probably not a significant threat (because of modern mitigation requirements), however existing roads will continue to cause some deaths (L. Ó Neill pers. comm.).

Otter mortality due to accidental drowning in fishing gear has been reported from several countries. Fyke nets in particular have been reported to attract otters (Poole 1990, Madsen *et al*. 1991). Fyke nets are a fixed fishing gear used primarily in the commercial eel fishing industry. In 2005, 93 fishermen were authorised to use 2,340 licensed fyke nets in Ireland. They are also being increasingly utilised for scientific surveys and for the capture of coarse fish (i.e. tench) for scientific and relocation purposes. Fyke nets have the advantage of being a non-destructive fishing method, allowing the capture of a wide range of fish species without incurring significant mortality which makes them an important tool in fisheries science and management. However, occasionally otters enter fyke nets and become trapped and drown. Evaluating the relative impact of such accidents on the otter population is complicated. In Ireland there is no legal requirement for reporting of otter deaths by people engaged in fishing operations making it difficult to get evidence, or specific numbers, to evaluate the impact of fishing gear on the otter population. Information on the relative levels of mortality due to anthropogenic factors (i.e. fyke net, road traffic) compared to those of natural mortality are almost unknown.

While fur trapping is certainly a past threat, 'vermin control' continues and some accidental or even deliberate bi-catch of otter is possible.

Furthermore, otters can potentially cause problems at unprotected fish-rearing or fish-holding facilities. If unresolved, such conflict can lead to illegal killing of otters.

Current Action

Road traffic accidents

- All national roads are developed under guidelines produced by the National Roads Authority (NRA). The NRA, in consultation with NPWS, have published a number of guidance documents of direct relevance to the otter:

    - *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* [http://www.nra.ie/Publications/Environment/]

    - *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes* [http://www.nra.ie/Publications/Environment/]

    - *Environmental Impact Assessment of National Road Schemes - A Practical Guide* [http://www.nra.ie/Publications/Environment/]

    - NRA (2004) *Guidelines for Assessment of Ecological Impacts of National Road Schemes* [http://www.nra.ie/Publications/Environment

- A website was established by NPWS in January 2007 to collate data on the accidental roadkill of Annex IV species (www.biology.ie). Data on other species is also gathered. To the end of June 2008, 1204 records had been received, 25 of these were of otters.

Fishing gear

A study of otter mortality in Ireland, covering the period between 1982 and 1992, reported a total of 628 otter deaths, of which 14% were killed by fishing gear (approximately 9 animals per year) (O'Sullivan & Fitzgerald 1995). It is not clear, however, how many of these were in fyke nets. In a further study commissioned by NPWS, Poole *et al.* (2007) recorded otter mortality in fyke nets from lakes, rivers and estuaries. Within lakes, incidences were more common in shallows near shore and in areas adjacent to river outflow. This was consistent with other published data indicating that the chance of catching an otter was higher when fyke nets were set close to the shore (<60m) and/or in relatively shallow water (<2.0m).

In Poole *et al.* (2007) large scientific fisheries surveys reported between none and 2.5 otters per year being accidentally killed in fyke nets. The largest single survey, employing more than 45,000 net nights on the Erne system, was responsible for one otter death per year. During seven years of fisheries monitoring on the Shannon in the 1990s, 15 otters were observed as accidental

drownings, seven in lake fykes and eight in river nets. Other eel surveys of lakes in Connemara, Mayo, Donegal and Cork reported no otter mortality, although one was taken in a tidal estuary (Poole et al., 2007).

More recently, fyke nets have been used on surveys, for the Water Framework Directive, of lakes and transitional tidal waters with no otter mortalities being recorded in freshwater and five in tidal waters.

Otter guards have been trialled in some countries. Studies in Britain and Denmark have shown that the catch of eel was the same with or without otter guards. There was, however, a noticeable reduction in catch of other species such as roach, pike and bream (Vincent Wildlife Trust, 1988; Madsen 1991). Further study is required to determine how to avoid the possible drowning of otters in fyke nets being used to catch larger fish species.

Based on the findings of Poole *et al*. (2007), it seems that the level of otter mortality inflicted by fyke nets in Ireland is probably low compared to other causes, such as road traffic. However, he highlighted the lack of reliable statistics on any forms of otter mortality and the need for reporting of otter mortalities, including by fishing gear, to be improved.

Mink control programmes and mink hunting

No licence is required to trap mink – an unprotected species – but it is an offence under the Habitats Regulations (S. 23) and the Wildlife Acts to capture an otter during mink control operations. Mink control programmes are run at a number of important ground-nesting bird sites (e.g. tern colonies) throughout the country. These programmes are set up by, or in consultation with, NPWS. Baited cage traps are the standard method. Any accidentally caught otter is released unharmed, although these are very rare as cage traps are notoriously bad at catching otters (as attested by numerous scientific studies of otters).

Mink control programmes may also be run by local gun clubs or on private estates – e.g. to protect pheasant and wildfowl shoots. Again, non-destructive baited cage traps are the standard method used and any otters accidentally caught are released.

Mink hunting takes place on a number of rivers in the south of the country, particularly on the Rivers Suir and Blackwater and their tributaries. No specific study has been carried out on the impact that this form of hunting has on otters. However, in 2008 NPWS carried out an otter survey on the Munster Blackwater, including some of the tributaries that the mink hunts frequent,

and the otter appears to remain widespread there (92% of sites proved positive), showing no discernible effects from the hunting activities (Map 3).

A national review of mink control methods in underway. Dr Sugoto Roy, an international expert in alien mammal control has been commissioned by NPWS to identify best international practise in this field and establish best practise guidelines for Irish mink control operations. Final report is due by summer 2009.

Badger snaring programme
Badgers are caught annually under the nationwide TB control programme run by DAFF. DAFF are currently developing an IT system to record all bi-catch during this work. However, the restraints used are designed with a stopper so that the loop cannot shrink to below 20cms. Consequently, no otters are by-caught in the TB programme.

Future Action

Road traffic accidents

- Continue to collate rta data; identify patterns, if any, in locations and seasonality of mortalities. Where more than 2 mortalities occur at the same location within 2 years identify suitable mitigation measures in liaison with Local Authority or NRA as appropriate.

ACTION: NRA, LAs, NPWS

- Update NRA guidelines in line with international best practise as required.

ACTION: NRA

Fishing gear
During the last 20 years, recruitment of glass eels to European shores has decreased dramatically, and eel fishing is now facing an uncertain future in Ireland. Council Regulation No 1100/2007 requires eel management plans to be drafted for each river basin. Ireland is expected to submit its national management plan in January 2009. The anticipated reduction in the level of commercial eel fishing activity may help to alleviate some of the problem posed by fyke nets. Nonetheless, these nets will continue to be a valuable non-destructive fishing engine for scientific sampling. Poole *et al.* (2007) make a number of recommendations towards the reduction or elimination of accidental capture of otter by fyke nets and in 2009 these should be used to

form the basis of best practise guidelines for eel fisheries. The main points include:

- Avoid areas where fyke nets are more likely to come in contact with otters, such as rivers, river outflows from lakes, shallow areas (<2m), within 60m of the shoreline and estuaries..
- Ensure regular servicing of nets so that a build up of catch does not act as an attractant.
- An improvement in communication with fishermen is required in order to support otter conservation.

- During 2009, develop best practice guidelines for scientific sampling with fyke nets, to include recommendation listed above from Poole *et al*. (2007)

ACTION NPWS, RFBs, CFB

- From 2009, a national eel monitoring programme will commence as part of the EU eel recovery plan. By 2010 ensure that otter guards are fitted to all fyke nets used in this programme

ACTION NPWS, CFB, MI

- By 2010 conduct a review of the impact of coastal fisheries on otter mortality

ACTION NPWS, Marine Institute, BIM

- By 2010 establish a system of systematic reporting of otter mortalities in all types of fishing gear.

ACTION: NPWS, WFD/RBD.

Mink control programmes and mink hunting

- In 2009, publish review of best practise for mink control programmes.

ACTION NPWS

- From 2010, all future mink control programmes to be run under best international practise.

ACTION NPWS, Birdwatch Ireland, NARGC, CFB, RFBs

- By 2010 undertake a review of the impact of mink hunting on otters in southern Irish rivers.

ACTION NPWS

Persecution

- Review effectiveness of the primary legislation for the protection of otters.

ACTION: NPWS.

- By 2010, prepare and distribute publications containing information and management advice about otters for distribution to fish farmers, landowners, land managers, farmers etc.

ACTION: ENFO, NPWS.

Badger snaring programme

- Continue to monitor by-catch. DAFF to notify NPWS of any otter mortality.

ACTION: DAFF

Education / publicity

It is envisaged that a combination of guidance and training will enhance compliance by local authorities and other consent authorities, both in relation to their own operations and in their decisions and approval processes regarding plans and projects.

- During 2009 prepare and circulate guidance on the requirements of the Birds and Habitats Directive and of the Wildlife Acts to local authorities and other consent authorities.

ACTION: NPWS, EPA

- During 2009, organise training for professional staff of local authorities and other consent authorities to ensure that they are fully informed of the requirements of the Birds and Habitats Directive and of the Wildlife Acts.

ACTION: NPWS, EPA

General

- Undertake next national otter survey in 2010 and continue national otter surveys thereafter at 7-10 year intervals. Coordinate with surveys in N.I. where feasible.

ACTION: NPWS, EHS.

- Continue roll out of rapid assessment methodology for otters in 2009 and repeat all sites at 2 yearly intervals.

ACTION: NPWS.

- By 2010, support study of the social structure and density of otter populations in the Irish landscape.

ACTION: NPWS.

- By 2010, encourage and support a study of habitat connectivity for, and dispersal behaviour of, otters.

ACTION: NPWS, NRA, FS.

- Public awareness of the presence and needs of otters is often limited by the infrequency with which otters are seen because of their generally cryptic lifestyle. The potential for the development of otter observation sites similar to those on the Isle of Skye should be considered in SACs and National Parks by 2010.

ACTION: LAs, NPWS.

- By 2009, increase public involvement in otter conservation by preparing and distributing leaflets on the otter which also provide practical management tips for landowners e.g. the importance of providing areas of scrub and describing the construction of log-pile holts.

ACTION: ENFO, NPWS.

9. Review

This Threat Response Plan covers a three year period [2009 - 2011] and will be reviewed annually following publication. The reviews will examine progress on the implementation of actions and recommend updates where appropriate. The review will be organised and chaired by NPWS with input from other stakeholders as required.

10. Future Prospects

Although otter range has remained stable in Ireland, the results of the national surveys suggest that otter densities have declined since 1980. Most of this decline seems to have taken place in the 1980s, when levels of severe water pollution were at their worst, with a significantly lower rate of decline in the 15 year period between 1990 and 2005. Despite these declines, population modelling for the south-eastern river basin district has shown that even the present otter population in that area is sufficient to maintain the otter within that district for up to 100 years, assuming that there is no further decline in status (O'Neill, 2008).

A number of significant steps have been take in recent years to secure the long term future of the otter in Ireland:

- 44 SACs have been designated for the otter. Most of these are large sites incorporating extensive river/lake or coastal systems.
- A comprehensive programme of otter surveys, at both the national and catchment level, has been instigated.
- Extensive monitoring of water quality and fish biomass is underway.

- The National Roads Authority have prepared strict guidance for the protection of otters during the planning and construction of national roads.
- Environmental schemes in both forestry and agriculture are providing incentives to landowners to manage land to the benefit of riparian species such as the otter.
- Furthermore, fish kills are on the decline and under the Water Framework Directive, water quality is expected to improve.

Despite the steps highlighted above, the otter continue to face significant threats. While measures are already in place to address aspects of these threats, further action is required in certain areas. This plan sets out those actions, identifies who is responsible for implementing them and provides a time frame for delivery. In England, Scotland and Wales, the otter is showing strong recovery from previous low levels. Although the Irish population (North and South) has bucked this trend, population densities here remain among the highest in Europe. It is also clear from the experience in Britain that when water quality and terrestrial habitat needs are met, and protection from persecution is effective, this species is capable of strong and sustained population expansion. Continuation of the current monitoring programme, together with implementation of the additional actions identified in this document, should ensure the long term favourable conservation status of the otter in Ireland.

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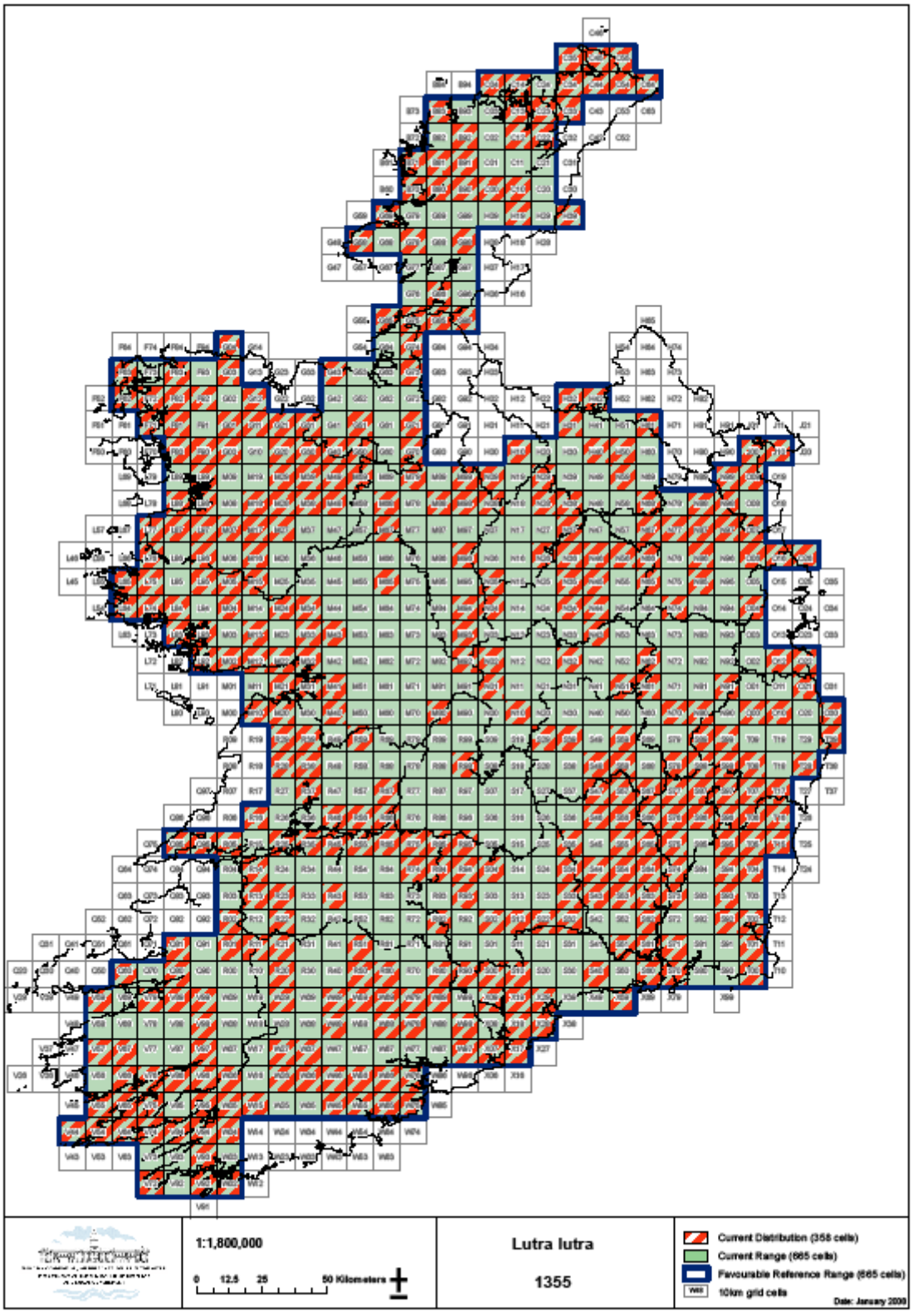
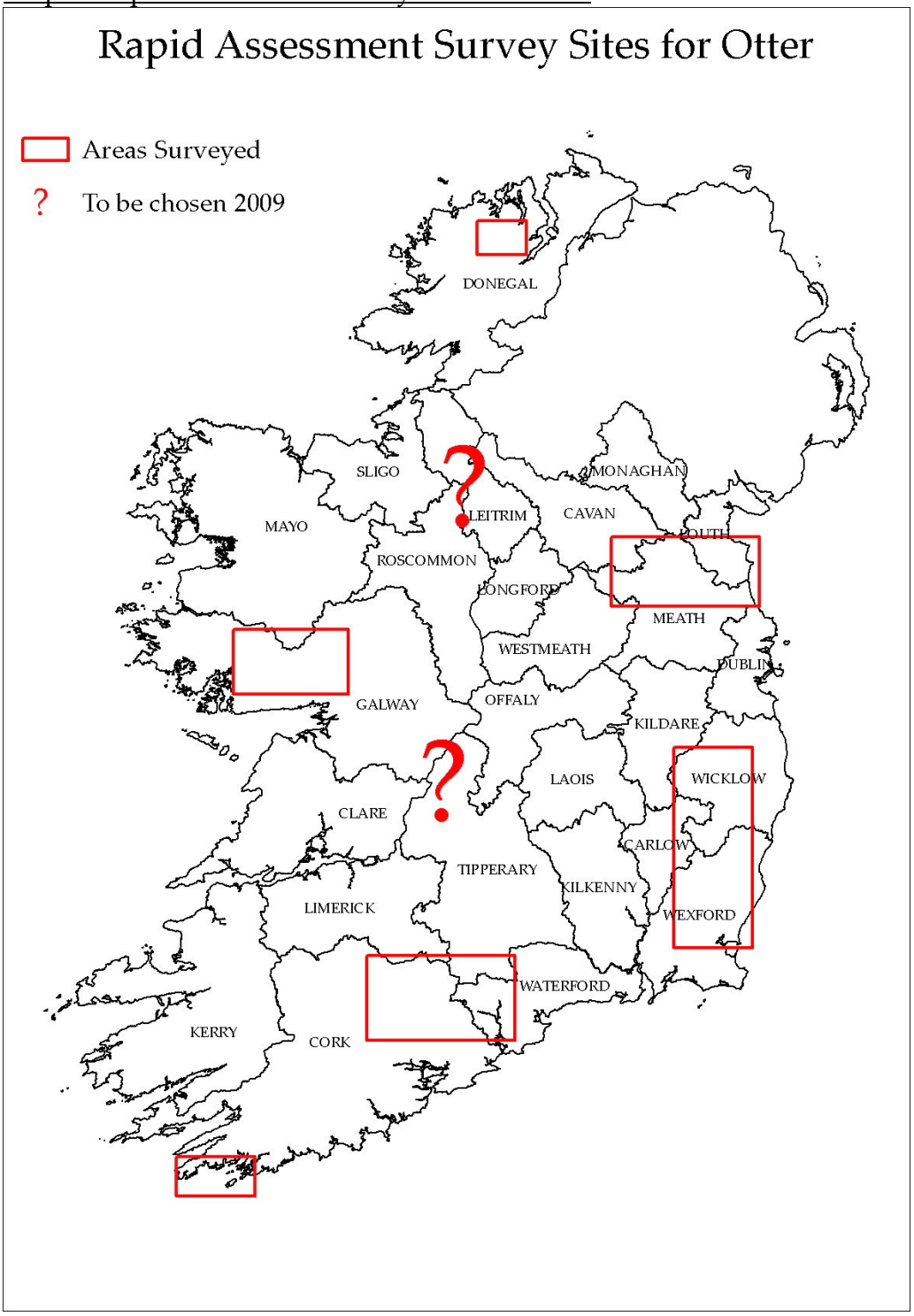
APPENDIX 1. Maps

Map 1. Distribution and range of the otter (*Lutra lutra*) in Ireland, 2007



(source: NPWS 2008).

Map 2. Rapid assessment survey sites for otter.



APPENDIX 2

Mitigating the effects on the Otter (*Lutra lutra*) of statutory arterial drainage maintenance activities

Direct habitat loss

Mitigation to avoid direct habitat loss includes:

• Training of front-line staff in the identification of otter field signs and resting places, or

preferably, the use of specially trained professional consultants.

• In instances where proposed works may interfere with riparian otter habitat, consultation with the NPWS should be undertaken. If then advised to do undertake an otter survey, the survey should be undertaken ca. two weeks prior to work commencing, during periods of suitable weather when otter signs are visible, in order to assess the need for disturbance licences. If surveys are carried out after a period of heavy rain and during high water levels, few signs will be visible and surveyors may inadvertently produce "false-negative" searches, potentially leaving otters in harms way;

• Ideally, surveys should also be conducted following maintenance activities to investigate site use by otters, and to monitor potential recovery time from maintenance activities. From this potential impacts can be quantified in more detail than is currently possible;

• Adhere, develop and regularly assess the EDM Work Practices (developed by OPW). • Where possible, mature trees within the river corridor should be retained. Similarly, large in-stream boulders and substrate should be retained where possible;

• No use of heavy plant and use smaller work parties, where otters are known to be sheltering (informed by survey work); and

• Regular communication should be maintained with the relevant nature conservation organisations, fisheries boards and countryside ranger teams who should review the annual works programme.

Severance

Mitigation to avoid severance includes:

• Training of front-line staff in the identification of otter field signs and resting places, or preferably, the use of specially trained professional consultants.

• In instances where proposed works may interfere with riparian otter habitat, consultation with the NPWS should be undertaken. If then advised to do undertake an otter survey, the survey should be undertaken ca. two weeks prior to work commencing, during periods of suitable weather when otter signs are visible, in order to assess the need for disturbance licences. If surveys are carried out after a period of heavy rain and during high water levels, few signs will be visible and surveyors may inadvertently produce "false-negative" searches, potentially leaving otters in harms way;

• Adhere, develop and regularly assess the EDM Work Practices (developed by OPW).

• Where possible, mature trees within the river corridor should be retained. Similarly, large in-stream boulders and substrate should be retained where possible;

• Regular communication should be maintained with the relevant nature conservation organisations, fisheries boards and countryside ranger teams who should review the annual works programme; and
• For future design, construction and maintenance of small bridges and culverts refer to the Design Manual for Roads and Bridges (Design manual for roads and bridges (DMRB). Volume 10, Section 4 Environmental Design and Management Nature Conservation. Part 4 ha81/99 Nature conservation advice in relation to Otters.)

7.1.3 Loss of life

Mitigation to avoid loss of life includes:
• Training of front-line staff in the identification of otter field signs and resting places, or preferably, the use of specially trained professional consultants.
• In instances where proposed works may interfere with riparian otter habitat, consultation with the NPWS should be undertaken. If then advised to do undertake an otter survey, the survey should be undertaken ca. two weeks prior to work commencing, during periods of suitable weather when otter signs are visible, in order to assess the need for disturbance licences. If surveys are carried out after a period of heavy rain and during high water levels, few signs will be visible and surveyors may inadvertently produce .false-negative. searches, potentially leaving otters in harms way;
• Adhere, develop and regularly assess the EDM Work Practices (developed by OPW).
• No use of heavy plant and use smaller work parties, where otters are known to be sheltering (informed by survey work);
• Regular communication should be maintained with the relevant nature conservation organisations, fisheries boards and countryside ranger teams who should review the annual works programme; and
• For future design, construction and maintenance of small bridges and culverts refer to the Design Manual for Roads and Bridges.

7.1.4 Physical disturbance

Mitigation to avoid physical disturbance includes:
• Training of front-line staff in the identification of otter field signs and resting places, or preferably, the use of specially trained professional consultants.
• In instances where proposed works may interfere with riparian otter habitat, consultation with the NPWS should be undertaken. If then advised to do undertake an otter survey, the survey should be undertaken ca. two weeks prior to work commencing, during periods of suitable weather when otter signs are visible, in order to assess the need for disturbance licences. If surveys are carried out after a period of heavy rain and during high water levels, few signs will be visible and surveyors may inadvertently produce “false-negative” searches, potentially leaving otters in harms way;
• Adhere, develop and regularly assess the EDM Work Practices (developed by OPW)
• Where possible, mature trees within the river corridor should be retained. Similarly, large in-stream boulders and substrate should be retained where possible;

• No use of heavy plant and use smaller work parties, where otters are known to be sheltering (informed by survey work);
• Regular communication should be maintained with the relevant nature conservation organisations, fisheries boards and countryside ranger teams who should review the annual works programme; and
• To ensure high water quality, guidance on this subject developed by relevant agencies such as the Environment and Heritage Service (NI) and Environmental Protection Agency (EPA), amongst others, should be maintained.

7.1.5 Noise disturbance

Mitigation to avoid noise disturbance includes:
• Training of front-line staff in the identification of otter field signs and resting places, or preferably, the use of specially trained professional consultants.
• In instances where proposed works may interfere with riparian otter habitat, consultation with the NPWS should be undertaken. If then advised to do undertake an otter survey, the survey should be undertaken ca. two weeks prior to work commencing, during periods of suitable weather when otter signs are visible, in order to assess the need for disturbance licences. If surveys are carried out after a period of heavy rain and during high water levels, few signs will be visible and surveyors may inadvertently produce "false-negative" searches, potentially leaving otters in harms way;
• Adhere, develop and regularly assess the EDM Work Practices (developed by OPW)
• No use of heavy plant and use smaller work parties, where otters are known to be sheltering (informed by survey work); and
• Regular communication should be maintained with the relevant nature conservation organisations, fisheries boards and countryside ranger teams who should review the annual works programme.

From: OPW (2006a) *EcIA of the Effects of Statutory Arterial Drainage Maintenance Activities on the Otter* (Lutra lutra).Pgs 22-24