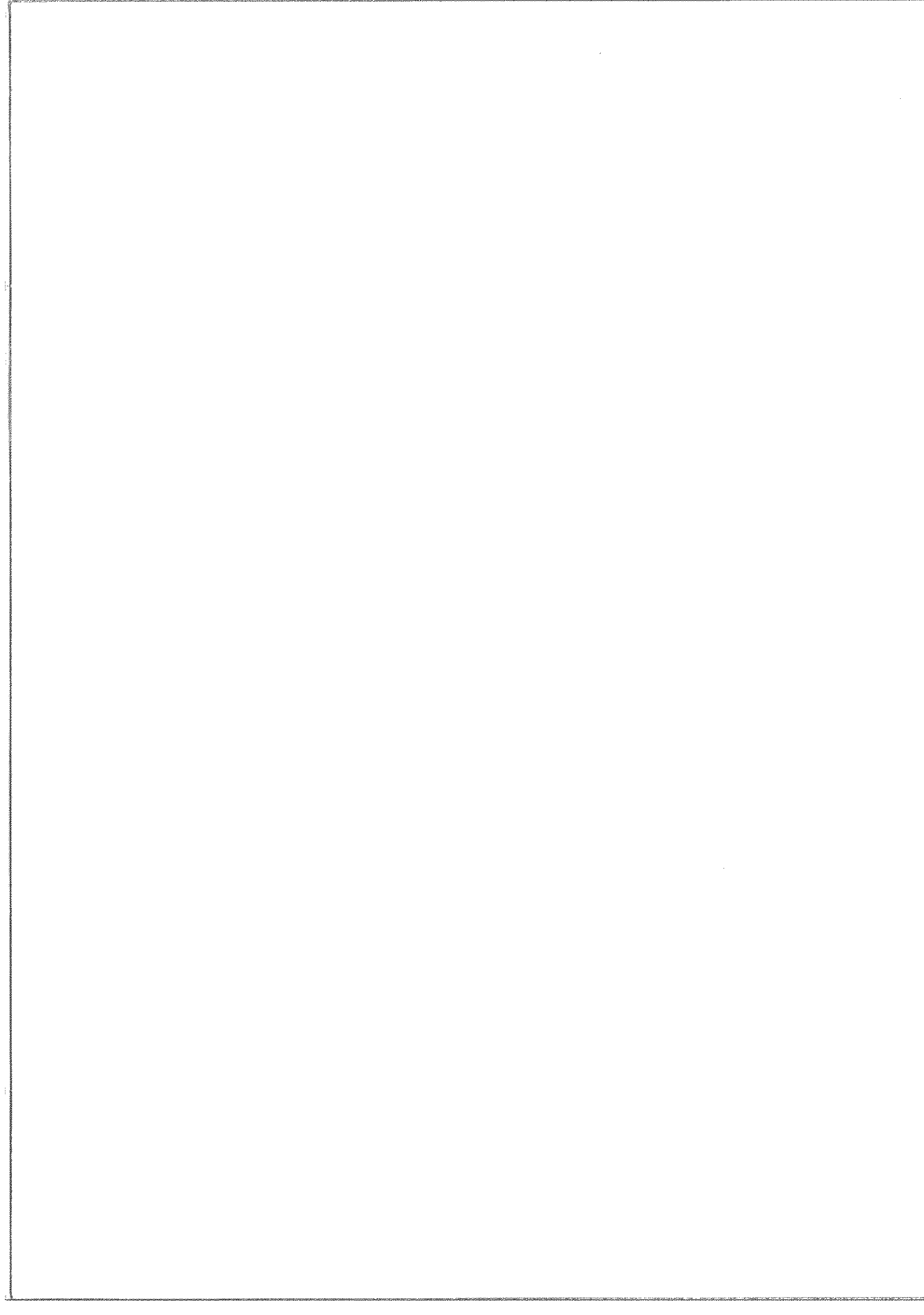


AP2/2015

Shot Head

Otter





Aquaculture Licences Appeals Board

Appeal Ref No. AP2/2015

Technical Advisor's Report: Supplementary Briefing Note

Otter (*Lutra lutra*) impact assessment

24th November, 2017

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Introduction

An application for a salmon fish farm at Shot Head, Bantry Bay, Co. Cork, was granted by the Minister (Ref: T5/555A). Subsequently, fourteen appeals were submitted under Section 40(1) of the Fisheries (Amendment) Act 1997. Following consideration of the appeals and the production of an interim Technical Advisor's Report, the Aquaculture Licences Appeals Board decided to hold an Oral Hearing in order to benefit from the participation of the key stakeholders and from having the relevant technical submissions presented and examined.

On completion of the Oral Hearing the Chair's Report concluded that several issues remained incompletely addressed, one such issue being the potential impact on otter, in particular in respect of its status as a species of interest in the nearby Glengarriff Harbour and Woodland Special Area of Conservation (SAC). The Oral Hearing Chair Report recommended the following should be undertaken:

"An otter survey of the Dromagowlane and Trafrask catchments, and (if necessary) assessment of potential impacts on otters, including the potential impact of declining wild salmon stocks."

This Supplementary Briefing Note has drawn on available scientific literature in order to further evaluate the risk to the Bantry Bay otter population and to determine the level of threat to the conservation status of the Glengarriff Harbour and Woodland SAC. It is also intended to establish whether an otter field survey is indeed necessary to determine whether the proposed fish farm will have an unacceptable impact on otter conservation status.

Legal protection

Within an international context, the Eurasian Otter (*Lutra lutra*) is currently classified as "Near Threatened" under the IUCN Red List system, is listed in Appendix 1 of CITES and Appendix II of the Bern Convention (Council of Europe, 1979), predominantly because of historical population declines. Accordingly it is also listed in the Irish Red List (IUCN criteria applied at a regional level).

Otter has been afforded domestic protection in Ireland under national legislation for over forty years under the Wildlife Act of 1976, although this Act did permit hunting under licence. Subsequently, the Wildlife Amendment Act (2000) removed the hunting clause and made it illegal to hunt, disturb or intentionally kill otters.

The EU Habitats Directive (92/43/EEC) includes otters under Annex II and Annex IV. Annex II requires Member States to establish Special Areas of Conservation (SACs) for the protection of the species. Ireland has designated 44 SACs for otter (NPWS, 2013), covering a range of coastal and freshwater habitat types, reflecting the geographical range and habitat diversity used by otters.

The Glengarriff Harbour and Woodland SAC is the only site designated for otter within the Bantry Bay catchment and is approximately 9.5 km (straight line distance, but approximately 12 km following the coastline) from the proposed salmon farm sites at Shot Head.

Annex IV of the Habitats Directive required Member States to put in place a system of strict protection for the species, which in Ireland is achieved under Regulation 23 of the Habitats Regulations 1997, which states:

"(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."

NPWS (2009) points out that the wording of this Act is closely aligned to the provisions of Article 12 of the Habitats Directive, but that Section 23(5) of the Wildlife Act 1976 (as amended) is required to be invoked in order to secure a conviction in the case of uncertain intent in the event of otter injury or killing.

Pressures and threats

The Irish National Parks and Wildlife Service (NPWS) published an otter threat response plan in 2009, in which they identified three primary pressures on otter populations; habitat destruction, water pollution and accidental death & persecution (NPWS, 2009). A further evaluation, reported in 2013 as part of the Habitats Directive Article 17 conservation status assessment amended the primary pressures/threats to:

- mortality from roads and motorways (medium importance),
- professional passive fishing (low importance), and
- pollution to surface waters (low importance)

Habitat degradation was additionally mentioned as a non-qualifying, but on-going issue (NPWS, 2013). This revision is likely to be a reflection of improved environmental management and the measures put in place to tackle water quality issues, such as the application of the Water Framework Directive (WFD). It is noted that neither of the pressure assessments identify otter food resource loss from aquaculture activities as a possible threat to otter populations. The possibility of habitat disturbance from mariculture activity is, however, raised in NPWS (2009), but the authors go on to dismiss it, stating that there is little evidence in recent studies to support this activity as a significant source of pressure.

Population status

The Eurasian Otter suffered a considerable decline in range and population throughout Europe after the 1950s, a situation largely attributed to the rise in concentrations of toxic aquatic contaminants (Macdonald & Mason, 1994; Mason & Wren, 2001). While European otter populations have staged a strong recovery in recent years, populations are still considered to be in a fragile state in many parts of continental Europe. Otter populations across the island of Ireland, however, did not suffer the same levels of decline, despite similar water quality issues, the reasons for which remain unclear (Reid *et al.*, 2013).

At the last Habitats Directive assessment, otter in Ireland is judged to be in "Favourable Conservation Status", with a national population level, having suffered a possible minor decline in the 1980s and 1990s, returning to that determined for 1980 (NPWS, 2013). Previous Habitats Directive assessments had returned an "Unfavourable" status, but expert opinion, citing improved knowledge, has subsequently indicated that this was probably incorrect.

The most recent (2010/12) Irish otter survey in support of the Habitats Directive Article 17 assessments appears to have recorded otters in the vicinity of Shot Head (Reid *et al.*, 2013), but the scale of the published map in the published report is too coarse to be certain.

Range and territory

Otters have been found to be largely ecologically distinct in their preference for riverine/freshwater or coastal areas. Within both habitat types, however, otters are territorial and maintain a complex system of social interaction which is related to availability of essential resources. Male otter territory will overlap with several females' territory and foraging behaviour is influenced by the wider population habitat utilisation and social organisation (Carss, 1995; Kruuk & Moorhouse, 1991).

Home ranges in coastal habitats are typically smaller than in freshwater ones, allowing a higher population density to be sustained (Kruuk, 1991; Scottish Natural Heritage, n.d.; Reid, 2013). This is possibly and primarily because of the high productivity of the inshore marine environment, particularly in the more favoured otter areas, where a range of exposure regimes and a larger submerged area will provide a greater diversity of prey habitats. In these very productive areas, otter home ranges may be as small as 4-5 km of coastline (Kruuk, 1991; Scottish Natural Heritage, n.d.). In contrast, an otter's home territory may extend over tens of kilometres along rivers (Chanin, 2003a). Within these ranges, otters will use a network of shelters which may vary considerably in their distance apart, perhaps ranging between 150 m and 2 km.

For a coastline to be suitable for otters an essential component is the presence of easily accessible freshwater for bathing, so that the sea-salt can be washed from the animals' fur which serves to maintain its insulative properties (McCaffrey, 2005; Reid *et al.*, 2013; Kruuk, 1995).

Along coasts, holts (hidden underground chambers) are particularly important as resting sites for otters, more so than for some inland areas. Where the substrate is sufficiently soft and peaty, holts may be excavated entirely by otters, otherwise they may adapt or enlarge existing cavities as necessary (Scottish Natural Heritage, n.d.).

As young otters develop and lose their reliance on their mother, they eventually disperse at around one year old and may travel several tens of kilometres in a single night, sometimes (but not always) subsequently establishing a home range at a considerable distance from its natal area (Chanin, 2003a).

Reproduction and population stability

Otters have a relatively low reproductive rate, with a single litter of 2-3 cubs per female per year. Otter life expectancy is low at around a median of 3-4 years (Chanin, 2003a) and the low population density and high dispersal means that otters are vulnerable to local events which can result in unusually high levels of mortality. New roads are a particular example where otter casualties can threaten the viability of local populations.

Disturbance

It is thought that disturbance does not have a strong influence on otter behaviour and population integrity, with ample recent evidence emerging for habituation to urban environments (Chanin, 2003a). Otters do not appear to avoid houses, industry, roads or campsites, but may simply withdraw to position where they can see a particular source of disturbance (Kruuk, 1995; McCafferty, 2005). They may often use man-made structures such as bridges and culverts as sprainting sites, a habit exploited by some surveyors as an opportunity for long-term population monitoring programmes (Chanin, 2003b).

Feeding and food preferences

Vulnerability to heat loss in cold water means that otters need to eat a lot to maintain condition requiring extended hunting periods, increasing in the winter months. Feeding and foraging throughout the year is variable, depending on whether the animal is hunting within a freshwater or marine setting. The most notable differences are foraging range (far greater in rivers and lakes than in marine habitats), the type of prey and the time of day that hunting takes place.

There have been a number of studies specifically examining the diet of both freshwater- and coastal-dwelling otters, predominantly from spraint (droppings) analyses, although there have been very few of such studies undertaken for Irish otter populations. Most of the information that can be considered as synonymous or relevant to Irish otter habitats has come from UK studies, notably on Scottish populations. These are summarised below.

Fresh water habitats

Almeida *et al.* (2012) in a study of dietary change across three decades in Norfolk, England, noted a strong decline in the taking of European eel *Anguilla anguilla*, a previously dominant prey item, suggesting that this reduction is a reflection of the parlous conservation status of this species throughout Europe. This change has been accompanied by a shift to the taking of brown trout (*Salmo trutta*) and cyprinids, such as tench (*Tinca tinca*), carp (*Cyprinus carpio*), roach (*Rutilus rutilus*) and rudd (*Scardinius erythrophthalmus*), resulting in increasing conflict with freshwater fisheries and recreational anglers. The authors conclude that the otter diet has diversified to accommodate the decline in their previously "preferred" food items of eel (and possibly threespine stickleback *Gasterosteus aculeatus*). They also point out that otter range expansion may occur in response to the increasing availability of invasive non-native species such as the American signal crayfish *Pacifastacus leniusculus*.

McCafferty (2005) examined the prey of otters hunting within the freshwater portion of the Loch Lomond and The Trossachs National Park, Scotland and found that diets were similar to that reported for other parts of Britain, with fish dominating, but amphibians being particularly common between late winter and spring. The fish component was particularly high in ruffe (*Gymnocephalus cernua*), eel and cyprinids, with salmonids, powan (*Coregonus clupeoides*), pike (*Esox lucius*), perch (*Perca fluviatilis*), threespine stickleback and lamprey (*Lampetra* spp.) making up the remainder.

Carss *et al.* (1990) examined otter feeding on salmon (*Salmo salar*) in the River Dee, Aberdeenshire, Scotland observing that otters forage in the margins of rivers and streams, avoiding the strongest current and exploiting shallow "riffles" (rocky areas where water flow is disrupted) when feeding on large salmonids. They concluded that otter predation behaviour on salmon was not selective in terms of age and size, but that they were simply exploiting the longer residency and greater movement of male fish along rivers and tributaries as they move between spawning sites, rendering them more vulnerable to being caught. Carss *et al.* (1990), however, concluded that their

observations indicated that otter impact on salmon populations is relatively small, because the majority of kills were made after spawning had taken place and a bias towards males reduces the impact on salmon breeding success. They also point out that most otter predation occurs outside of the angling season, and thus it is unlikely to affect this particular activity. In a subsequent study in the same river, Durbin (1997) found that otter consumption of salmon and trout was non-selective; being simply correlated with the relative abundance of these fish species.

A national survey undertaken in Irish river habitats (Reid *et al.*, 2013) found that in predominantly riverine habitats, remains of salmonids were a relatively frequent occurrence (approx. 22%) in spraint samples, being a dominating feature in south-western Irish catchments. There was, however, evidence for crayfish forming an increasingly important dietary element, particularly in central regions. Diet in freshwater locations is largely opportunistic and includes insects, freshwater pearl mussels (*Margaritifera margaritifera*), eels, birds, mammals and sometimes fruit. Survey results indicate that salmonids (brown trout, sea trout, rainbow trout and salmon) formed a high proportion of the diet, but statistical analyses suggest that this may simply be because these species are comparatively common and that otters do not preferentially select them over non-salmonid prey. While otter abundance might reflect salmonid occurrence over a very coarse scale, at a regional scale there is little correspondence between riverine otter and salmonid populations (Reid *et al.*, 2013).

All of the above concurs with the conclusion of Chanin's (2003a) review of the wider literature which similarly concluded that:

"Variations in the composition of the diet are more likely to be related to changes in the availability of different prey species than to preferences by otters."

Coastal habitats

In coastal areas otters feed within 100 m of the coast (Kruuk & Moorhouse, 1991), diving to depths not exceeding 10 - 12 m, with most dives within less than 3 m depth (Kruuk *et al.*, 1985) and lasting less than 20 seconds. Coastal otters commonly take small benthic fish, eels and crustaceans and have a strong preference for hunting in areas with dense seaweed cover in shallow, inshore rocky areas, which may improve their success in capturing prey (Kruuk & Moorhouse, 1990).

Studies undertaken in Scotland indicate that coastal otters are active during the day (Kruuk & Moorhouse, 1991) in contrast to freshwater dwellers (McCafferty, 2005). This is probably because marine prey is less active during daylight and is therefore easier to catch (Kruuk *et al.*, 1988; Kruuk & Moorhouse, 1990). It has been suggested that for optimal exploitation of seasonably variable food resources, an otter's foraging territory needs to incorporate a range of coastal exposure regimes which would correspond to different types of fish habitat (Kruuk & Moorhouse, 1990).

Detailed visual observation studies from otters foraging along the coast of Shetland, Scotland, together with an examination of the annual abundance of potential prey, indicated that particular fish species were important food items for otters. These include eelpout (*Zoarces viviparus*), butterfish (*Pholis gunnellus*), five-bearded rockling (*Ciliata mustela*) and sea scorpion (*Taurulus bubalis*), with a large range of other fish species, together with crab and rabbit taken at considerably lower frequencies (Kruuk *et al.*, 1988; Kruuk & Moorhouse, 1990).

McMahon & McCafferty (2006) evaluated the diet of otters in the marine sea lochs of the Loch Lomond and The Trossachs National Park, Scotland and found that the most frequently occurring prey items were eelpout, goby, eel, wrasse and butterfish, with lower incidences of crab, gadoids,

flatfish (sole *Solea solea*, dab *Limanda limanda*), blenny (*Chirolophis ascanii*), sea snail, stickleback, salmonids, birds and mammals. They concluded that their results indicated that otters in this location selected bottom-dwelling fish, the range of species being in broad agreement with other studies.

Similarly, slow-swimming demersal fish, such as gobies, flatfish and blennies, were the favoured prey in a study of coastal-dwelling otter diet in Wales, although it was noted that the taking of both terrestrial and freshwater prey was also frequent (Parry *et al.*, 2010).

Otters living along Irish coasts are known to have a broader dietary range than in freshwater habitats, with individuals taking a wide variety of intertidal and shallow subtidal prey, including demersal fish, crustaceans, urchins and even birds and small mammals, but rarely consuming pelagic fish (Reid *et al.*, 2013). Studies have, however, detected a positive correlation between coastal-dwelling otters and salmonid populations, suggesting that coastal otters may return to fresh water to feed on salmon and sea trout when available (Reid *et al.*, 2013).

Overall conclusion

Overall, it is clear that otters are omnivorous generalists, with an ability to utilise a very wide variety of species as food, adapting to whatever is available, which tends to vary on a seasonal basis. While otters from both riverine and coastal habitats will take significant numbers of salmonids, research and statistical analysis indicates that catches are a response to availability, rather than a dietary necessity.

Interaction with salmonid aquaculture and fisheries

Studies have recorded decadal shifts in otter diet in favour of the taking of brown trout and cyprinids, such as tench, carp, roach and rudd, resulting in increasing conflict with freshwater fish farms (Freitas, 2007; Jacobsen, 2005), fisheries and recreational anglers (Almeida *et al.* 2012). Lych and Čech (2017), however, maintains that diet analysis suggests that otters tend to prey on small-growing species of medium-to-no-value to anglers. Nevertheless, issues with angling stock remain, with the UK developing a programme of capture and relocation under licence for specific “well-fenced fisheries”, while there are continuing conflicts where otters constitute a nuisance to salmonids cultured in freshwater.

Otters are known to cause loss or damage to stock in marine salmon farms, although they are, in general, considerably less of a problem than seals, and probably as much of a nuisance as some bird species such as cormorant, shag, heron and gulls (Quick *et al.*, 2002).

Overall conclusions and implications for possible fish farm impacts in Bantry Bay

Disturbance impact:

Otters are less vulnerable to disturbance than previously thought, with observational studies showing that otters are highly tolerant of human activity. On this basis, the presence of periodic activity around fish cages at Shot Head, which will be over 200 m from the nearest shore on which otters might be present, is highly unlikely to have any impact on otter activity.

Potential impact on the site condition status of the Glengarriff Harbour and Woodland SAC:

Otter coastal range is known to be much reduced, when compared with riverine-dwellers, probably because the range and abundance of prey available is much greater. Studies indicate that a coastal otter range may be around 4-5 km, which would preclude a direct interaction between otters with a home territory in the Glengarriff Harbour and Woodland SAC (some 12 km distance along the northern Bantry coastline) and those that may be present at or around Shot Head. In addition, significant sections of this coastline constitutes exposed rocky cliffs or very steep escarpments, which are not suitable for otter foraging, which would present significant challenges for roaming individuals. There may, of course, be regular dispersal of individuals in both directions through more circuitous routes, but there remains no discernible mechanism for a direct population impact on the SAC.

Impact of salmon farming in Bantry Bay on otter food resource:

Given the otter's clear diet plasticity and resulting adaptability in accommodating prey availability, it would be logical to expect that during a theoretical scenario in which there is a fish farm-linked decline in wild salmonids, otters, either in freshwater or marine locations, would be unlikely to be significantly affected. Indeed, throughout the period when wild salmonid populations were declining, survey data for Irish otter populations has indicated either a stable or increasing trend, resulting in the currently "Favourable" status under the Habitats Directive. Reid *et al.* (2013) in their evaluation of pressures on Irish otter populations conclude:

"None of the factors that significantly influenced otter occurrence (river size, substrate type, bank elevation and slope or salmonid biomass) are likely to be limiting or impacted detrimentally by human activities"

Chanin (2003a) more definitively states:

"There is no evidence that declines in the number of salmon returning to spawn have any impact on otter number"

Thus, on the basis of the overwhelming scientific evidence, it can only be concluded that the operation of a fish farm at Shot Head is highly unlikely to have any detrimental impact on the otter population within the Glengarriff Harbour and Woodland SAC, or indeed throughout the entirety of the Bantry Bay catchment. It follows that the commissioning of an otter field survey, while doubtless providing useful scientific information on the distribution of the species, is unlikely to supply any further compelling evidence in support of a refusal to grant the Shot Head licence.

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