Piscivorous Bird Management Plan - River Ythan

Photo credit Ron MacDonald

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1. Background

Piscivorous bird management on the Ythan is about salmon and sea trout conservation and restoration. We are very familiar with the relationship of predator and prey which normally creates a balance, ebbing and flowing but returning to an equilibrium. In a healthy system this process can help improve prey populations by removing the weak or diseased with only the fittest surviving to reproduce. In an unhealthy system, predation can have a significant impact on prey populations.

Atlantic salmon stocks are now at a crisis point, where cumulative impacts from climate change, habitat degradation and exploitation have reduced stock components throughout their range. Additional pressures from an unbalanced predator prey relationship within the Ythan could result in irreversible consequences for the Ythan stocks.

The Ythan is home to a range of freshwater species, which include Salmon, Sea trout, Eels and Lamprey, with its specimen Brown Trout. Salmon are protected under the EC Habitats Directive. All lamprey species are protected under the EC Habitats Directive whilst river and sea lampreys are additionally protected under the UKBAP priority list. Eels are a UKBAP priority species, critically endangered under the IUCN red list and protected under CITES. Trout have conservation value particularly in situations where their (freshwater and saltwater) migration has been prevented, as isolated conditions leads to genetically and phenotypically distinct populations.

The Ythan DSFB has a key role as a statutory body charged with the protection of Atlantic salmon and sea trout stocks within its district, the Ythan DSFB has a duty to ensure that there are no significant adverse impacts upon the populations of these species.

Declines in Atlantic salmon stocks are well documented, particularly in recent years. The Conservation of Salmon (Scotland) Regulations 2016 has led to the production of stock assessments for all Scottish salmon rivers, based on catch data. For the Ythan, like other north-east rivers, the assessments have shown a declining trend in catches since 2012 (Pirie 2020). The Ythan has been categorised as a grade 3 river. This means that exploitation of stocks is not sustainable and mandatory catch and release is required alongside a host of other measures to protect stocks.

Further assessment of the juvenile salmon stocks in the Ythan through the National Electrofishing Programme for Scotland (NEPS) programme has identified that juvenile stocks in the Ythan have been assessed as being a Grade 3, suggesting that there are significant issues with recruitment and survival within the catchment, (Malcolm *et al* 2020). With greater pressures on marine survival and approx. 4% of smolts returning as adults, it's clear that we need to address any additional pressures within the freshwater environment of the Ythan.

The Ythan is of international importance as a rod & line fishery attracting visiting anglers from the UK and beyond. As well as the conservation value of the Ythan, the Sea trout fishery is of huge importance to the local economy. An economic impact assessment of the neighbouring River Dee is estimated to generate approximately £15 million to businesses and people throughout the Dee District. This income supports around 500 jobs throughout the valley - much of which is a fragile rural economy - and these are entirely dependent upon the tourism industry the fishery generates. If the Ythan generates one fifteenth of this figure (based on approximate catch returns between the two rivers in the past ten years and smolt predation data from piscivorous bird counts) the Ythan could contribute £1 million to local economy. Without these salmon and sea trout there would be no income and no jobs.

This plan sets out our measures with which we will monitor and manage piscivorous birds to protect and enhance Atlantic salmon and sea trout stocks on the Ythan.

2. Bird Species

Goosanders (Mergus merganser)

Goosanders are a relatively recent arrival in the UK. The first confirmed breeding goosanders in UK were recorded in 1871 in Perthshire, by the early part of the twentieth century goosanders had spread slowly into Aberdeenshire (Holloway 1996) and it's now estimated that there are in the range of 2,000-3,000 breeding pairs in Scotland (Humphreys *et al* 2016). Reasons for the natural range expansion into the UK, and the subsequent population increase, are unknown.

Counts on the Ythan show no specific trend at this time, although only three years of data has been collected. Concern over predation of salmon smolts and parr has been well documented in the neighbouring River Dee, where salmon comprise approximately 70% of goosander diet (Marquiss *et al* 1991). This is the equivalent to 10 salmon smolts or parr per day (Feltham 1995), based on metabolic studies of captive goosanders released on the Dee.

Scottish Government acknowledges that birds can have a significant impact on salmon in the North East. Tracking programmes show that high losses of smolts occur in many Scottish rivers. Evidence from acoustic tracking of neighbouring rivers Dee, Don and Deveron shows high losses of smolts too, and most likely caused by goosander predation.

The Ythan DSFB is applying for a license based on advice from Nature Scot and SASA to gather a more substantial dataset following an initial application several seasons ago. The application would allow the Ythan DSFB to license to shoot to scare activities, with a small number of birds shot to reinforce the scaring technique.

Cormorants (Phalacrocorax carbo)

Cormorants are typically associated with coastal and marine environments; however, many resident and overwintering populations seek refuge inland during the winter months on the rivers and waterbodies of the Ythan catchment.

On the Ythan, cormorants are far less prevalent than goosanders and they tend to only pose a threat for a limited time during the winter, particularly in February and March. However, they are becoming more abundant and expanding in distribution across the catchment.

The Ythan DSFB wishes to obtain a small license each year to help manage cormorant presence on the river.

Our preferred response to reduce predation pressure for both species is non-lethal. However, lethal methods can be justified to protect a salmon population that is heading towards crisis point.

3. Location

The River Ythan is home to Britain's 5th largest Estuary with the river draining a catchment of 690km squared. The river rises from the Wells of Ythan flowing through Fyvie, Methlick and Ellon to the estuary at Newburgh a distance of 64km. The catchment is dominated by intensive agricultural land use and has suffered from pollution in the past as a result of these land uses. The Ythan Project was set up during the 1990's to tackle these pressures and has significantly improved the water quality of the catchment during that time

Monitoring of the bird population has taken place across the mainstem Ythan from the confluence of the Little Water and the mainstem Ythan above Methlick (NJ 84070 39280) to the Ythan Estuary (NK 00522 24508) as distance of approx. 24km, Figure 1 over the past three years.

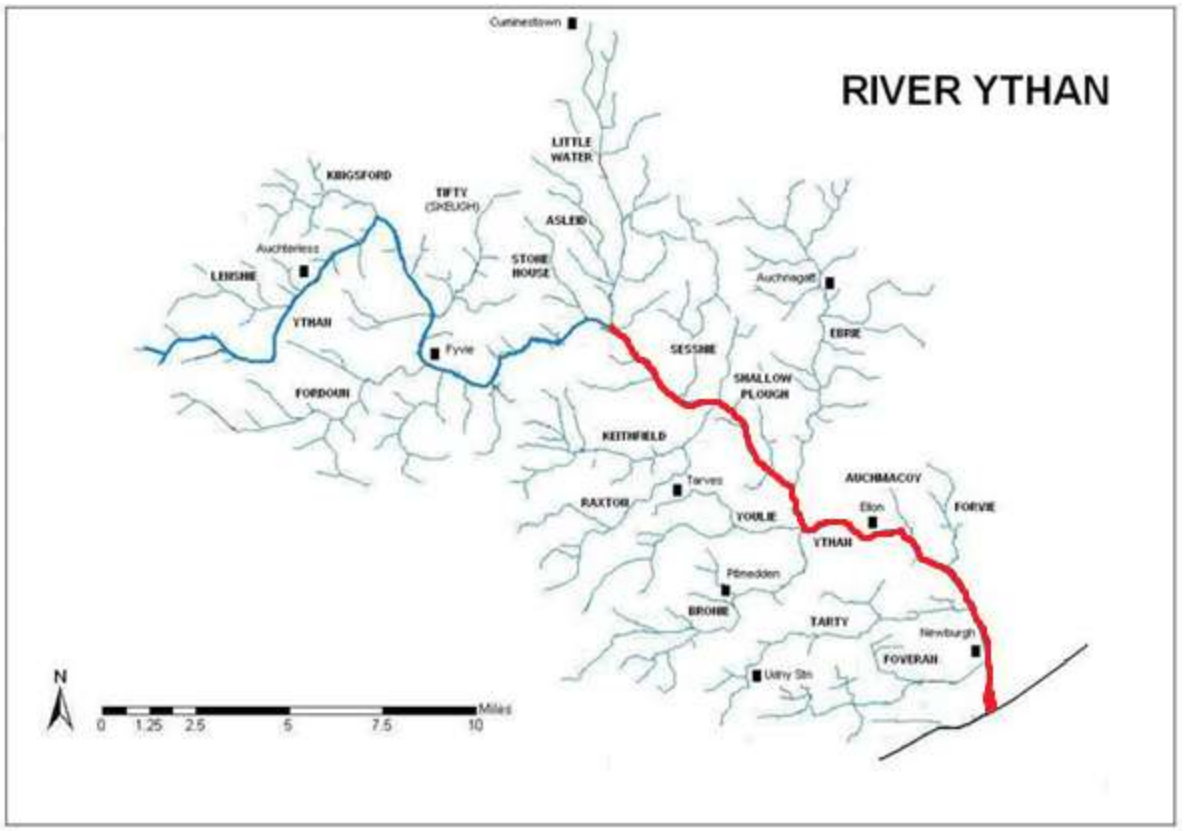

Figure 1. Map of the Ythan district with areas monitored for piscivorous birds since 2018 in red.

4. Monitoring

4.1 Existing strategy

The Ythan DSFB conducts counts for piscivorous birds six times a year, once each month during March to May and September to November on the mainstem River Ythan. The counts are conducted from The Little Water confluence downstream to the Ythan Estuary in 3 sections (24km) and include several local waterbodies, lochs and lakes in the district. The counts are carried out simultaneously on canoe and on foot using binoculars. As birds are encountered, they are recorded as settled, flying upstream, or flying downstream and the number in the group. Once the data sheets have been collated the count

is corrected to take account of birds that flew downstream / upstream and may have been double counted. These birds are removed from the total count.

This process has been refined over the years with advice from SNH and SASA with a considerable investment by the Ythan DSFB in terms of equipment and staff resources. We acknowledge that the license requires a minimum of two counts per annum, but by providing a more detailed dataset with a greater number of counts its hoped that a true reflection of the population of these birds can be achieved, removing erroneous counts due to conditions for instance and allowing the authorities to grant licenses with confidence in the data provided. As a result, a significant dataset has been established over these years supporting our understanding of these bird populations.

5. Goosander control and displacement measures

5.1 Non-Lethal control

Several alternative options for non-lethal piscivorous bird displacement have been trialled on the Ythan in previous seasons. They have mainly been focused upon but not limited to goosander displacement.

Shoot to scare has been used on occasion across the catchment to date but not in a uniform or coordinated manner. This approach reinforces the effects of disturbance locally but requires a certain level of control to maintain efficacy. The problems with this approach are that the effects are often temporary, its labour intensive, shifts the problem elsewhere and can be anti-social. It is presently our primary non-lethal method of control.

Ongoing methods of displacement alongside 'shoot to scare' include

- Use of automated sound emitting bangers to displace birds
- Physical disturbance by anglers
- Physical disturbance by Ythan DSFB staff during routine patrols and surveys of the catchment
- Targeted disturbance using a catapult by Ythan DSFB staff at key times of the year i.e. Smolt run.

Other options which we have considered and or trialled and discounted at this time are listed below.

Smolt shepherding -whereby the main body of the smolt migration is guided through the river by a series of marksmen over several days. Communications with the Deveron DSFB have intimated that this approach can be effective where there are a limited number of ghillies are available to provide comprehensive cover across the river. The variability in the timing of the smolt run apparent on the neighbouring River Dee is substantial and lasts for approximately 8 weeks, River Dee Trust (March 2020). Therefore, having the resources to deliver effective 'smolt shepherding' would not be possible for the organisation.

Lasers - The use of handheld, agricultural grade, lasers were tested with no significant effect recorded during spring 2016 (following advice from EA and Rivers Trust) by the Dee DSFB. It was found that the birds habituated to these devices very quickly with little scaring effect evident. This approach has been utilised by Ythan DSFB staff on occasion to supplement other methods of disturbance with similar results to those observed on the Dee.

Egg pricking – this is perceived to be primarily useful for goosanders and may prove to be unpractical on a catchment wide scale, although could be less intensive if applied locally and delivered by the authorised marksmen, such as ghillies, proprietors etc. A license would be required for this activity.

Roost removal – this is perceived to be primarily useful for cormorants and not applicable within the habitat management aims of the Ythan DSFB.

Automated bangers – previous studies have shown that birds can become habituated to these automated bangers given time and therefore the efficacy may be reduced. There is also the anti-social nature of the devices, with first light being the optimal times for goosander feeding.

Compensatory stocking – this action is not applicable within the management aims of the Ythan due to the negative impacts that would be created for wild juvenile salmon.

6. Habitat and Species Management

Alternative measures to reduce the impact from predation by piscivorous birds can take the form of habitat and species management activities. Here are some activities presently undertaken by the Ythan DSFB which can help to reduce predator impact.

6.1 Habitat Restoration

Habitat diversity and large wood in rivers has been shown to increase juvenile survival, fry density and spawning. The Ythan DSFB restore and enhance habitat across the catchment. A typical example would be through promoting 'green bank' engineering activities as part of developmental gain.

To date we have installed 1 individual 'greenbank' structures on a tributary of the Ythan, restoring tens of meters of degraded habitat using live willow spiling and brash bank protection to restore the riverbank and reduce erosion.

These measures are just part of a suit of approaches viewed as the beginning of a large, catchment-wide programme to reinstate river channels as part of wider restoration efforts to create significant improvements in fish numbers. A key aim is to restore bankside and instream habitat across the catchment.

6.2 Easing access for migratory fish

The Ythan DSFB have removed 2 obstacles, opening tens of kilometres of catchment since the programme first began in 2014. This habitat previously unavailable due to manmade obstacles such as weirs, dams, bridges and culverts can now support migratory fish populations once again. This

'additional' habitat can support new populations of salmon and sea trout where they were previously limited by carrying capacity of the waterbody.

6.3 Invasive non-native plants and animals

The Ythan DSFB in partnership with the River Ythan Trust has delivered an extensive 5-year programme to remove invasive non-native plants that if left unrestricted can dominate the riverbank severely limiting natural biodiversity and production within the river.

The Ythan DSFB continues to support American mink control across the catchment, since 2003. Mink can predate fish stocks and its thought that juvenile parr can be particularly sensitive to predation by mink.

7. Conclusion

Our preferred response to reduce predation pressure for both species is non-lethal. However, lethal methods are justified to protect a salmon population that is heading towards crisis point.

Lethal control under license by Nature Scot coupled with 'shoot to scare' activities would form the primary approach for managing goosanders on the Ythan.

Monitoring forms part of our ongoing refinement of piscivorous bird management within the catchment, whereby the Ythan DSFB seeks to demonstrate and manage predation impacts by;

- continuing to do coordinated surveys of birds throughout the river to monitor goosander and cormorant numbers and will provide this information to Scottish Government.
- Applying for and managing license

8. References

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