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Elements for selection of 3 species for developing population models and implementing Adaptative Harvest Management mechanisms[1]

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INTRODUCTION

Task 5 of the service contract "Supporting the recovery of bird species of Annex II of the Birds Directive in non-secure conservation status" (09.0201/2022/886665/SER/D.3) involves assessing sustainable harvest levels for 30 species of the Annex II of the Bird Directive, using the specific R software package `popharvest`[2]. The results of the first assessment of 15 species were presented to the Task Force on the Recovery of Birds (TFRB) at its 6th meeting (28 June 2024); a second assessment of the 15 remaining species has been carried out and its results presented at the 8th meeting of the TFRB (8 November 2024). Following the agreed methodology[3], species are classified into three categories, following a traffic light or 'RAG' rating system: Red (harvest within the EU most likely unsustainable under most management objectives), Amber (between green and red: harvest may or may not be unsustainable depending on the population objective and the species' conservation status) or Green (low probability of harvest within the EU being unsustainable under most management objectives).

Tables 1 and 2 below summarise the results for both assessments. In total, only 27 species and 49 biogeographical populations could be assessed; the remaining 3 species either lacked harvest data (Spotted Redshank) or have been under moratoria in recent years (Eurasian Curlew, Black-tailed Godwit), so the analysis could not be run. The results of the preliminary assessments show that most populations (34 of 49 = 69%) and species (18 of 27 = 67%) fell into the green category. The 15 populations that do not (= red or amber) belong to ten species: Common Pochard (*Aythya ferina*), Eurasian Wigeon (*Mareca penelope*), Northern Shoveler (*Spatula clypeata*), Northern Pintail (*Anas acuta*), Common Teal (*Anas crecca*), European Herring Gull (*Larus argentatus*), Common Quail (*Coturnix coturnix*), and Redwing (*Turdus iliacus*), plus the small S Italy population of Skylark (*Alauda arvensis*); in addition, the Great Black-baked Gull (*Larus marinus*) fell into the amber category only when assessed against total offtake, i.e., including killings through derogations. In the latter two cases, there may be local or circumstantial factors at play, so they are not considered further in this report.

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[2] *Eraud C, Devaux T, Villers A, Johnson F A & Francesiaz C. (2021).* `popharvest`*: An R package to assess the sustainability of harvesting regimes of bird populations. Ecology and Evolution 11, 16562–16571.* *https://doi.org/10.1002/ece3.8212*

[3] *"Approach for assessing the (un)sustainability of hunting in the context of the Birds Directive". Doc. TFRB 23-12-01, 4th Meeting of the Task Force on the Recovery of Birds, 01 December 2023. Available at* *https://circabc.europa.eu/ui/group/e21159fc-a026-4045-a47f-9ff1a319e1c5/library/e491ff89-c352-4c92-9c19-c4d56fdb5c05/details*

The remaining eight species have high probabilities of being harvested unsustainably in the considered flyways, according to the Popharvest assessment and currently available data and are, therefore, potential candidates for the development of population models and Adaptive Harvest Management Mechanisms (AHMM) to ensure that any exploitation is compatible with the conservation objective to recover their populations. AHMMs are an important tool for species conservation as they provide a framework that responds to changing ecological conditions and improved scientific knowledge. They allow quick adjustments to harvest quotas and practices, promoting sustainable use of wildlife resources.

Table 1. Summary of the results of the assessment of the (un)sustainability of hunting for the first batch of 15 species, for the identified biogeographical or flyway populations. The last two columns show the result of the assessment considering hunting bag data only and considering hunting bag plus derogations data combined.

English name	Scientific name	Population	Hunting only	Hunting + derogations
Long-tailed Duck	*Clangula hyemalis*	W Siberia/N Europe	🟩	n/a
Velvet Scoter	*Melanitta fusca*	W Siberia & N /NW Europe	🟩	n/a
Common Pochard	*Aythya ferina*	NE Europe/NW Europe	🟥	n/a
		C & NE Europe/Black Sea & Med.	🟧	n/a
Tufted Duck	*Aythya fuligula*	NW Europe	🟩	n/a
		C Europe, Black Sea & Med.	🟩	n/a
Garganey	*Spatula querquedula*	W Siberia & Europe/W Africa	🟩	n/a
Northern Shoveler	*Spatula clypeata*	NW & C Europe, W Siberia, NE & E Europe/S Europe & W Africa	🟥	n/a
Eurasian Wigeon	*Mareca penelope*	W Siberia & NE Europe/NW Europe	🟥	🟥
		W Siberia & NE Europe/Black Sea & Mediterranean	🟧	🟧
Northern Pintail	*Anas acuta*	NW Europe	🟥	n/a
		W Siberia, NE & E Europe/S Europe & W Africa	🟩	n/a
		W Siberia/SW Asia & E Africa	🟩	n/a
Eurasian Oystercatcher	*Haematopus ostralegus*	Europe/S & W Europe & NW Africa	🟩	🟩
Northern Lapwing	*Vanellus vanellus*	Europe, W Asia/Europe, N Africa & SW Asia	🟩	🟩
Ruff	*Calidris pugnax*	N Europe & W Siberia/W Africa	🟩	n/a
Common Snipe	*Gallinago gallinago*	Iceland, Faroes & N Scotland/Eire	🟩	🟩
		S & W Europe & NW Africa	🟩	🟩
Common Redshank	*Tringa totanus*	Iceland & Faroes/W Europe	🟩	🟩
		Britain, Ireland, France	🟩	🟩
		C & E Europe	🟩	🟩
		N Europe	🟩	🟩
Mew Gull	*Larus canus*	NW & C Europe/Atlantic c. & Med.	🟩	🟩
Great Black-backed Gull	*Larus marinus*	N & W Europe	🟩	🟧

Table 2. Summary of the results of the assessment of the (un)sustainability of hunting for the second batch of 15 species, for the identified biogeographical or flyway populations. The last two columns show the result of the assessment considering hunting bag data only and considering hunting bag plus derogations data combined.

English name	Scientific name	Population	Hunting only	Hunting + derogations
Greater Scaup	*Aythya marila*	N Europe/W Europe	green	n/a
		W Siberia/Black Sea & Caspian	green	n/a
Common Teal	*Anas crecca*	North-west Europe	red	n/a
		W Siberia & NE Europe/Black Sea & Mediterranean	red	n/a
Red-breasted Merganser	*Mergus serrator*	NW & C Europe	green	green
Common Coot	*Fulica atra*	NW Europe	green	green
		Black Sea & Mediterranean	green	green
Water Rail	*Rallus aquaticus*	Europe & North Africa	green	green
Eurasian Curlew	*Numenius arquata*	Europe, North & West Africa	Under moratorium	
Spotted Redshank	*Tringa erythropus*	N Europe/S Europe, N & W Africa	Unable to assess	
Black-tailed Godwit	*Limosa limosa*	Iceland/W Europe	Under moratorium	
		W Europe/NW & West Africa		
		E Europe/C & E Africa		
Black-headed Gull	*Larus ridibundus*	W Europe, W Mediterranean, W Africa	green	green
European Herring Gull	*Larus argentatus*	*argenteus* Iceland & W Europe	green	green
		argentatus N & NW Europe	orange	red
Common Quail	*Coturnix coturnix*	Western	red	red
		Central	red	red
		Eastern	green	n/a
		Azores	orange	orange
Rook	*Corvus frugilegus*	Britain & Ireland	green	green
		NE Europe/Central Europe	green	green
Eurasian Skylark	*Alauda arvensis*	Britain & Ireland	green	green
		C Europe	green	green
		S Italy	red	red
		Black Sea	green	n/a
Redwing	*Turdus iliacus*	Europe	orange	orange
Common Starling	*Sturnus vulgaris*	NE Europe/NW Europe	green	green
		Central/SW Europe	green	green
		Black Sea	green	green

SELECTION OF SPECIES

Based on the results of both sets of assessments, a minimum of three and a maximum of five species will be selected for the development of population models and AHMMs in the current contract, and join the Turtle Dove, Common Eider and Taiga Bean Goose, for which AHMMs are ongoing under the auspices of the European Commission for the former and AEWA for the latter two.

The conclusions of the first assessment, discussed at the 6th meeting of the TFRB[4], recommended that the Common Pochard (*Aythya ferina*) and the Eurasian Wigeon (*Mareca penelope*) should be selected for developing a population model that would allow understanding the population dynamics of the species and the contribution of the different vital rates to population growth, hence helping to identify relevant management actions. For two other species, Northern Shoveler (*Spatula clypeata*) and Northern Pintail (*Anas acuta*), the technical recommendation was to put them on hold for population modelling because the results of the assessment were inconsistent with observed positive wintering flyway trends, which shed doubts about the validity of the data available for the assessment; in the meantime, the immediate priority identified was to improve the quality of the distribution, abundance and harvest data, to allow due assessment with the approved methodology.

Building on the results of the first assessment, the second assessment has identified four additional species (excluding Skylark *Alauda arvensis* for the reasons explained above) with biogeographical population classified as either red or amber. Of those, the results for Common Teal (*Anas crecca*) reveal further inconsistencies with the data, in a similar way to Northern Shoveler and Pintail, so it is not considered suitable for prioritising for population modelling. The other three species, Common Quail *Coturnix coturnix*, European Herring Gull *Larus argentatus* and Redwing *Turdus iliacus*, remain as potential candidate species.

All non-green species from both assessments are discussed below.

DISCUSSION OF SPECIES RESULTS

1.1.   Northern Shoveler *Spatula clypeata*

The result of the preliminary assessment point to a high probability of harvest being unsustainable (= red). However, this is contradicted by the fact that the wintering population is showing a moderate increase. This may indicate that either bag size and/or population size are very poorly estimated, or that other processes are involved, such as population turnover with unsurveyed areas, exchange with neighbouring populations or climate change causing a redistribution of birds towards areas where they can be more easily surveyed during winter (i.e. western Europe), hence a positive trend in numbers. Given the data deficiencies and contradictions, as well as the relatively low risk of extinction (according to IUCN criteria and total population sizes), this species is assessed as lower priority for the development of an AHMM, according to expert opinion. As a first step, the priority for this species should be given to promoting research programs to delineate the populations, to estimate the level of exchange between them and to assess population and bag sizes in the full flyway ranges. Additionally, and in accordance with the precautionary principle, management measures may be considered in the meantime (including the possible introduction of hunting quotas) to reduce hunting pressure until more information is available.

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[4] *Document TFRB 24-06-03 Assessment of hunting (un)sustainability. Available on the CIRCABC website* *https://circabc.europa.eu/ui/group/e21159fc-a026-4045-a47f-9ff1a319e1c5/library/4cd2fc71-71b5-4051-b9df-db21caa2ea43/details*

1.2. Eurasian Wigeon *Mareca penelope*

The results of the preliminary assessment show a a moderate to high probability of unsustainable harvest for the intermediate values of F_{obj}, but a lower probability of harvest being unsustainable for higher F_{obj} values for the W Siberia & NE Europe/Black Sea & Mediterranean population (being classed as amber), and a high probability of unstainable harvest for the W Siberia & NE Europe/NW Europe population (being classed as red). This implies that harvest should be managed, and likely reduced, to make it more sustainable, while other measures may be needed to improve some vital rates. The recommendation is therefore to propose Eurasian Wigeon for developing a population model and, based on that, an AHMM to enable its population recovery. Research and monitoring programs are already in progress for this species, which can provide some initial data to parameterize demographic models in such an AHMM. Meanwhile, it is necessary to reconsider current management practices, in line with the approach developed by NADEG and the precautionary principle.

1.3 Northern Pintail *Anas acuta*

The results of the assessment for Northern Pintail are somewhat contradictory with the observed trends. The assessment indicates clearly unsustainable levels of harvest inside the EU (SHI>1 in 100% of simulations, red category) for the NW Europe flyway, which contradicts the observed increase in wintering numbers. In contrast, there are no signs of unsustainable hunting (green category according to available information) in the W Siberia, NE & E Europe/S Europe & West Africa flyway, which appears to be in decline. This suggests a considerable exchange of individuals between both flyways and and/or biases in population and harvest estimates. Similar to the Northern Shoveler above, a more thorough survey of population abundance and of bag size is clearly needed, as well as further work in the delineation of flyways or in assessing the exchange of individuals with neighbouring populations, and a possible redistribution of birds towards western Europe in response to climate change.

Because of all these issues, the recommendation is to provisionally propose this species as lower priority for developing a population model and an AHMM until more information is available, and to support research on the questions above as well as data collecting schemes. As a first step, and in accordance with the precautionary principle, management measures may be considered in the meantime (including the possible introduction of hunting quotas) to reduce hunting pressure until more information is available.

1.4. Common Pochard *Aythya ferina*

The results of the assessment for Common Pochard show that the current levels of harvest are most likely unsustainable in the NE/NW Europe flyway under most scenarios (red category). The situation is better in the Central & NE Europe/Black Sea & Mediterranean flyway, but results indicate that the probability of SHI>1 is high (over 60%) if F_{obj} = 0.3 or lower. Given these results, and the ongoing deterioration in population structure[5], this population is classified as amber.

Common Pochard is classified as case 3 (productivity rather than survival is the main driver of population dynamics) in the species data review[6]. This implies that, theoretically, a co-ordinated sustainable hunting

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[5] *Brides et al. (2017) Changes in the sex ratio of the Common Pochard Aythya ferina in Europe and North Africa* *https://wildfowl.wwt.org.uk/index.php/wildfowl/article/view/2667*
Homolková M, Musil P, Pavón-Jordán D, et al. (2024). Changes in the adult sex ratio of six duck species breeding populations over two decades. Avian Research 15(2): 100187. https://doi.org/10.1016/j.avrs.2024.100187.
[6] *Stroud, D.A. (ed.) (2023). Review of data on Birds Directive Annex II species with non-Secure status. Report from the Natura 2000 Group and Institute for Game and Wildlife Research (IREC) to the European Commission. 190 pp.*

could take place if combined with the implementation of other key actions (e.g., on habitat management). Therefore, the recommendation is to prioritize this species to develop a population model and establish an AHMM to regulate hunting of this species, as well as other measures to enable its population recovery. Research and monitoring programs are already in place for this species, which can provide some initial data to parameterize demographic models in such an AHMM. Meanwhile, it is necessary to reconsider current management practices, in line with the approach developed by NADEG and the precautionary principle.

2.1.   Common Teal (*Anas crecca*)

In view of the results of the assessment, both populations of the species are classified as red. However, this assessment contradicts the fact that the wintering population size is reported to be increasing. This contradiction could probably be caused by the estimates of population size being very imprecise. The minimum estimate of harvest is greater than maximum estimate of population size in one of the flyways, so it seems logical to conclude that one of those parameters may strongly biased. IWC counts might be underestimated for various reasons analysed in the assessment. The reliability of available data entails a huge uncertainty and the poor delineation of the flyways, perhaps coupled with exchanges of individuals, contribute to the inconsistent results of the assessment. Therefore, it is particularly important to dedicate effort, as a priority, to re-assess population size of both populations before undertaking further work.

Given the above and with the current data, Common Teal is not considered a strong candidate for the development of population models as a first step towards the establishment of an Adaptive Harvest Management Mechanism (AHMM). However, and in accordance with the precautionary principle, management measures may be considered in the meantime (including the possible introduction of hunting quotas) to reduce hunting pressure until more information is available.

2.2.   Common Quail (*Coturnix coturnix*)

The results of the assessment for Common Quail indicate that the western and central flyway populations, according to available data, are subject to levels of hunting that are highly likely to be unsustainable. Despite some issues with the accuracy of the estimates of population size (counts mostly reflect the abundance of highly mobile males, some birds breed in >1 countries), the assessment reflects the existence of high levels of harvest that may compromise the species' reproductive capacity. Notwithstanding the need to improve the accuracy of the estimates of population size for this species through a coordinated and synchronous census at the European level, the Common Quail remains a strong candidate for developing a population model and potentially an Adaptive Harvest Management Mechanism, to facilitate its population recovery. Meanwhile, it is necessary to reconsider current management practices, in line with the approach developed by NADEG and the precautionary principle.

2.3.   European Herring Gull, N & NW Europe (*Larus argentatus* ssp. *argentatus*)

The assessment for the *argentatus* population of European Herring Gull, distributed along the North & North-west Europe flyway, reveals a high risk of being unsustainable considering hunting bag data alone, and an even higher risk when offtake through derogation is taken into account. The species is long lived, and the results of the assessment indicate that offtake (through hunting and derogations combined) plays a critical role on survival. Therefore, it is considered a good candidate for developing a population model and possibly an Adaptive Harvest Management Mechanism to regulate offtake to enable a recovery. In the meantime, and in accordance with the precautionary principle, it may be necessary to review management measures and/or review the combined effect of hunting with the widespread use of derogations that imply the killing of fully grown birds, given the impact they are having at the population level.

2.4.   Redwing (*Turdus iliacus*)

The assessment for Redwing has concluded that current levels of harvest within the EU may be unsustainable and, although the situation may not be acute, the species is considered a candidate for further action, in the form of a population model and perhaps an Adaptive Harvest Management Mechanism. A population model would help understand the contribution of the different vital rates to population growth. The European population of Redwing is still large but undergoing a moderate decline, so this may be a reason to take action before it deteriorates further. As a first step, and in accordance with the precautionary principle, management measures may be considered in the meantime (including the possible introduction of hunting quotas) to reduce hunting pressure until a population model is available.

CONCLUSIONS AND RECOMMENDATIONS

The final conclusion of both assessments is that three species are strong candidates for developing population models and potentially Adaptive Harvest Management Mechanisms in the short term, and should be selected. They are:

> **Common Pochard** (*Aythya ferina*)
> **Eurasian Wigeon** (*Mareca penelope*)
> **Common Quail** (*Coturnix coturnix*)

In addition, for one species the assessment carried out leads to conclude that it might better be classed as Case 1, because survival is the main driver of population dynamics, and offtake (through hunting and derogations combined) most probably plays a critical role on survival). That species should be considered for further action from 2026, as part of the technical support to the TFRB beyond the current contract. That species is:

> **European Herring Gull, N & NW Europe** (*Larus argentatus ssp. argentatus*)

For one other species, the assessment has revealed that the current level of harvest may not be sustainable and is possibly contributing to the ongoing population decline. Because it has been classed as amber, developing a population model is considered to be less urgent and, therefore, it is suggested that it could be undertaken from 2026, as part of the technical support to the TFRB beyond the current contract. That species is:

> **Redwing** (*Turdus iliacus*)

Finally, there are three species for which the assessment is inconclusive, because the results of the analyses are contradictory with observed population trends, which strongly suggests that available data is largely inaccurate. The priority for them is to improve data quality to ensure they can be properly assessed in due course. In the meantime, they should be put on hold for developing population models Those species are:

> **Northern Shoveler** (*Spatula clypeata*)
> **Northern Pintail** (*Anas acuta*)
> **Common Teal** (*Anas crecca*).