Recommendation on the predation by birds in relation with shellfish farming

AAC 2022-13

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1 Background

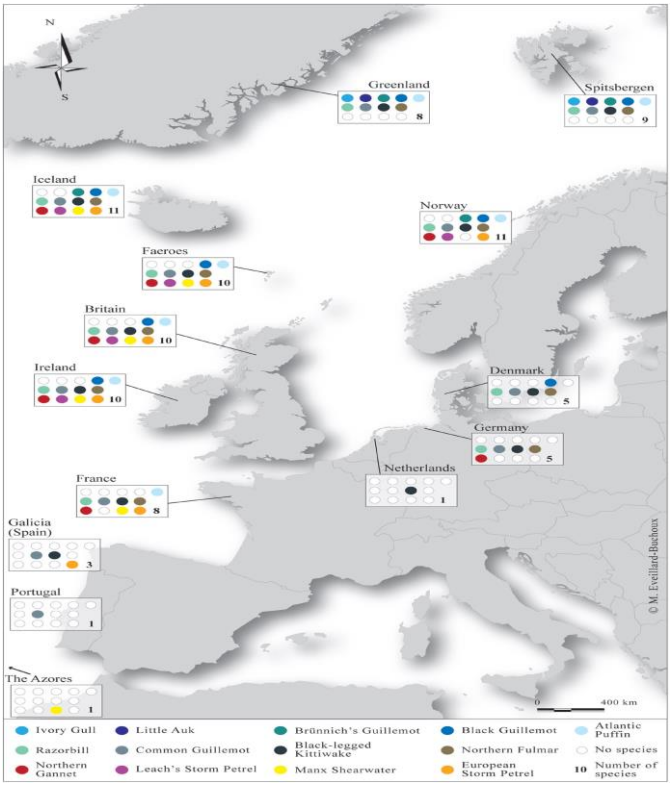
As it is practised in an open marine environment, European shellfish culture is exposed to many predators: gulls, scoters, eiders, oystercatchers, starfish, periwinkles, sea snails, green and blue crabs, spider crabs, sea bream, sabre fish, flatworms, etc.

The financial impact of these predations is more or less significant depending on the predator and the production area. Passive and proactive protection methods are currently showing their limits, particularly concerning avian predation, especially by species protected under Directive 79/409/EEC on the "conservation of wild birds", recently consolidated in Directive 2009/147/EC, for which Regulation (EU) 2019/1010 has simplified the reporting requirements relating to the environment.

This recommendation concerns such avian predation and proposes, after analysing the impact on a textbook case, based on the herring gull in French Normandy, recommendations to support the businesses affected and to ensure that the economic sustainability of shellfish farming is not hampered by the environmental sustainability of the protected avian species, while taking into account the sustainability and social and societal acceptability of these phenomena.

The recommendation does not claim to add any knowledge to that of seabird specialists. It therefore proposes the recent synthesis that is the subject of a publication of "The Waterbirds Society", of Eveillard-Buchoux, Marie; Beninger, Peter G.; Chadenas, Céline; and Sellier, Dominique, of 24/03/2021 in the journal "Waterbirds" relating to bibliographical works concerning seabirds.

The state of knowledge on nesting areas is summarised in the infographic below:



Nesting areas of cliff-nesting pelagic seabirds in the European Atlantic.
The nesting distributions of individual species are represented by coloured dots.
The nesting distributions are grouped by country or regions.

2 The bird species concerned

2.1 The main predatory species of shellfish products at sea

The table below shows the species of seabirds that cause the most significant losses in different types of shellfish farming at sea (oysters, mussels and others such as cockles, clams, etc.)

Breeding	Oystercatcher	Common eider	Velvet scoter	Common scoter	Herring gull	Great black-backed gull
Oysters	X				X	
Mussels		X	X	X	X	X
Others	X	X				

2.2 The species considered for discussion in this recommendation

The recommendation analyses in particular predation on mussel farms, which are the most widespread in Europe. Indeed, in 2018 Europe produced a volume of 485,000 tonnes of mussels, representing 40% of European aquaculture production[1]. The farming techniques of the two European mussel species (*Mytilus edulis* and *M. galloprovincialis*) are as follows:

- On ropes (floating in the sea under the surface or suspended under tables in the French Mediterranean or bateas in Spain);
- Flat on the ground or in pockets raised off the ground by tables;
- On bouchots, which are wooden stakes planted in the ground on the foreshore in parallel rows.

Mussels raised on ropes are mainly eaten by sea bream but also by some diving birds.

Ground-grown mussels are rare on the French foreshore which is exposed according to the rhythm of the tides. This is not the case for Dutch farms on the seabed, which remain permanently immersed. These farms on the seabed are predated by crabs, spider crabs, starfish and periwinkles; farms raised flat on the upper foreshore are also predated by certain birds during low tide exposure.

Due to the height of the poles above the ground, mussels reared on bouchots, a method which is protected by a European Traditional speciality guaranteed label,[2] are the most exposed to all of the predators mentioned above and intensively to seabirds.

The species concerned and considered for this recommendation are therefore:

- Eider (*Somateria mollissima*)
- common scoter (*Melanitta nigra*)
- Velvet scoter (*Melanitta fusca*)
- Herring gull (*Larus argentatus*)
- Great black-backed gull (*Larus marinus*)

[1] STECF 20-12 - EU Aquaculture economics.pdf (Version 1.1)

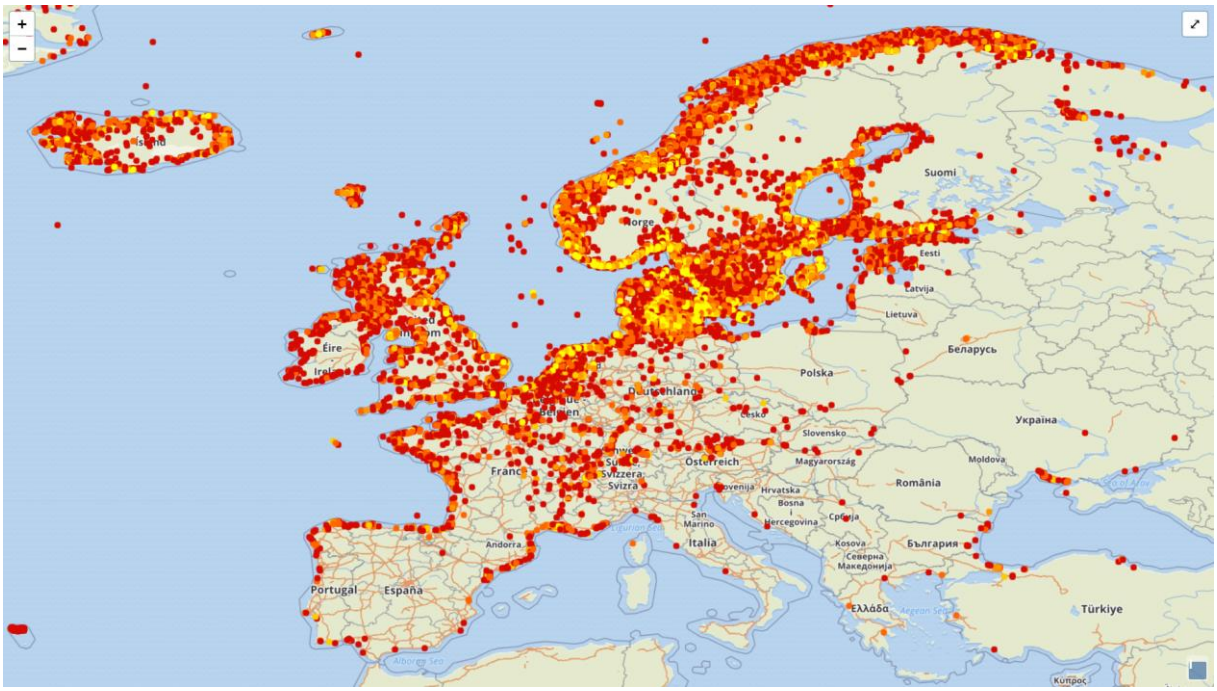
[2] Regulation (EC) 1151/2012 on quality systems for agricultural products and foodstuffs

2.3. Status of the selected species

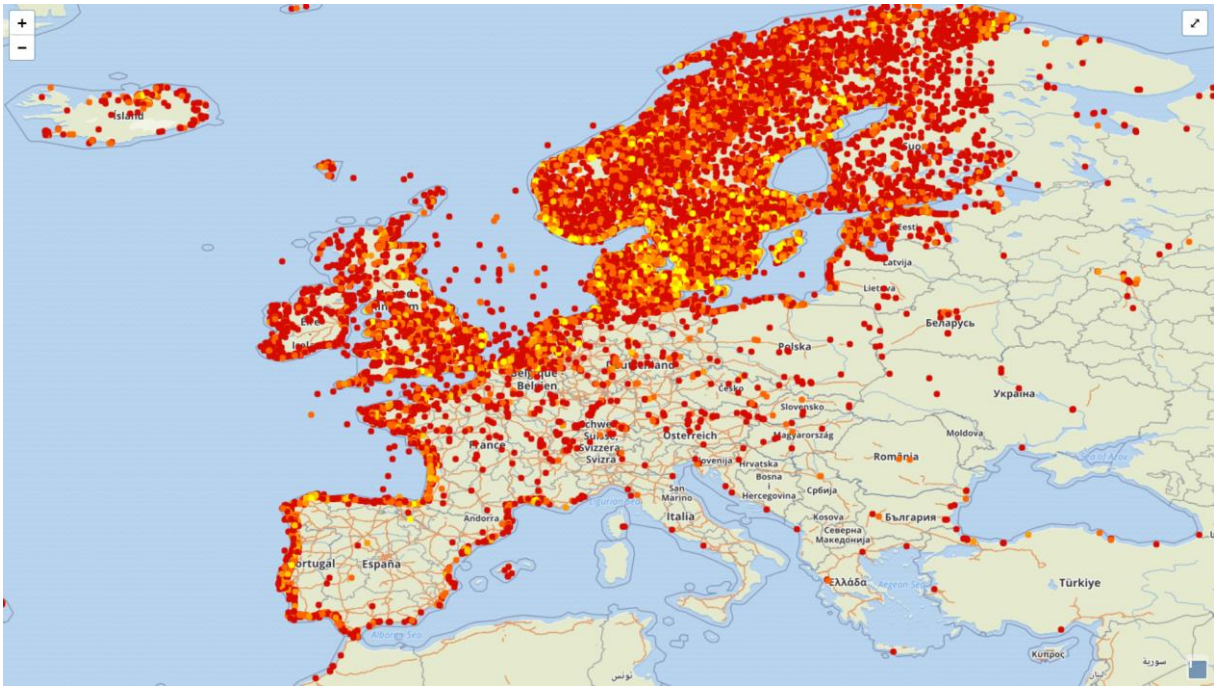
The sources cited in this chapter are those of the *Inventaire National du Patrimoine National* (The National Inventory of Natural Heritage) which is one of the tools of the *Observatoire Français de la Biodiversité* (French Biodiversity Observatory) (OFB).

2.3.1. Observations and occurrences in Europe

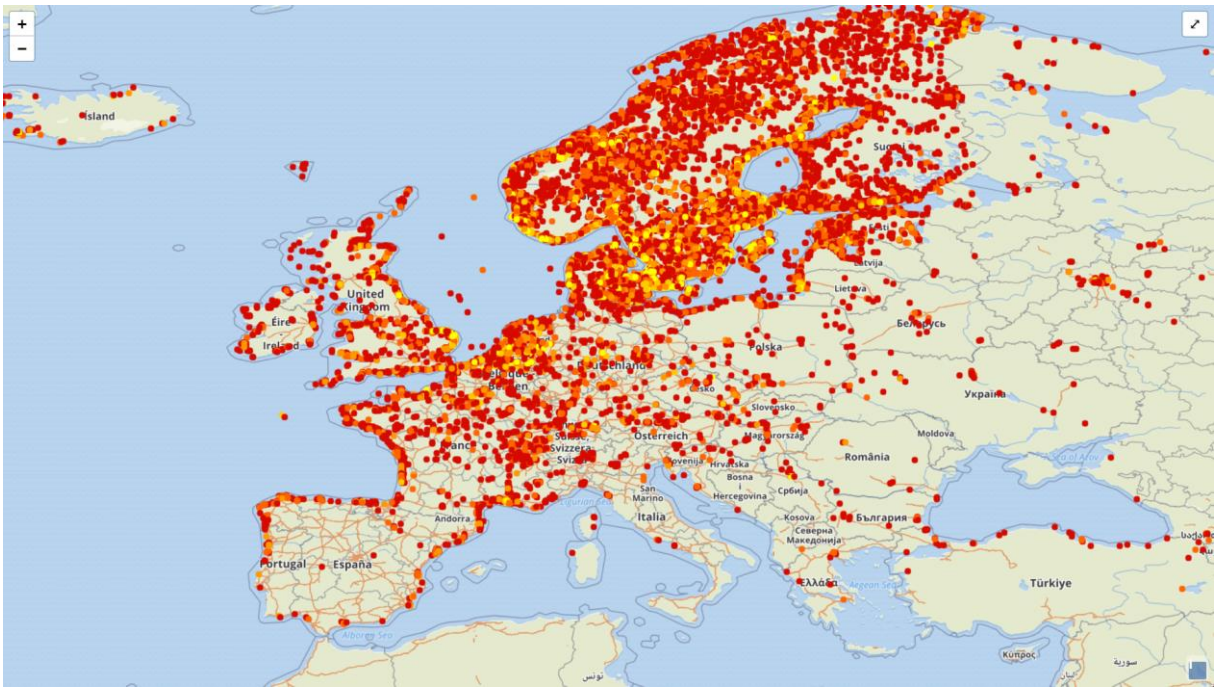
Somateria mollissima, eider



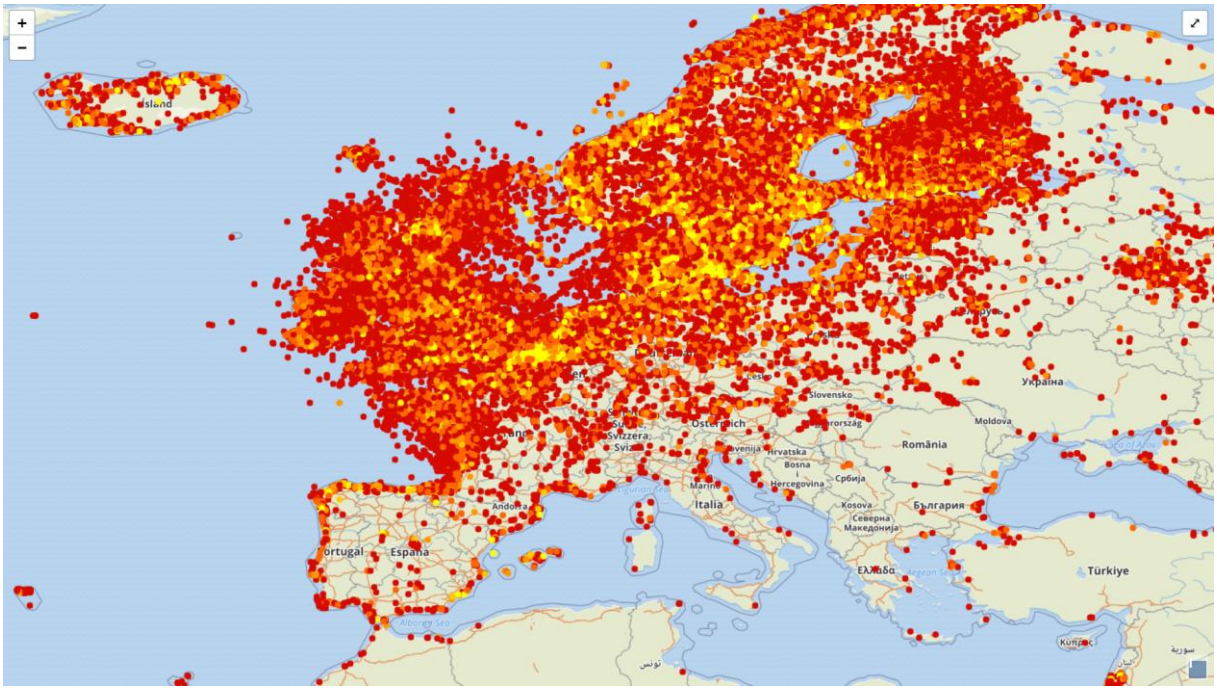
Melanitta nigra, common scoter



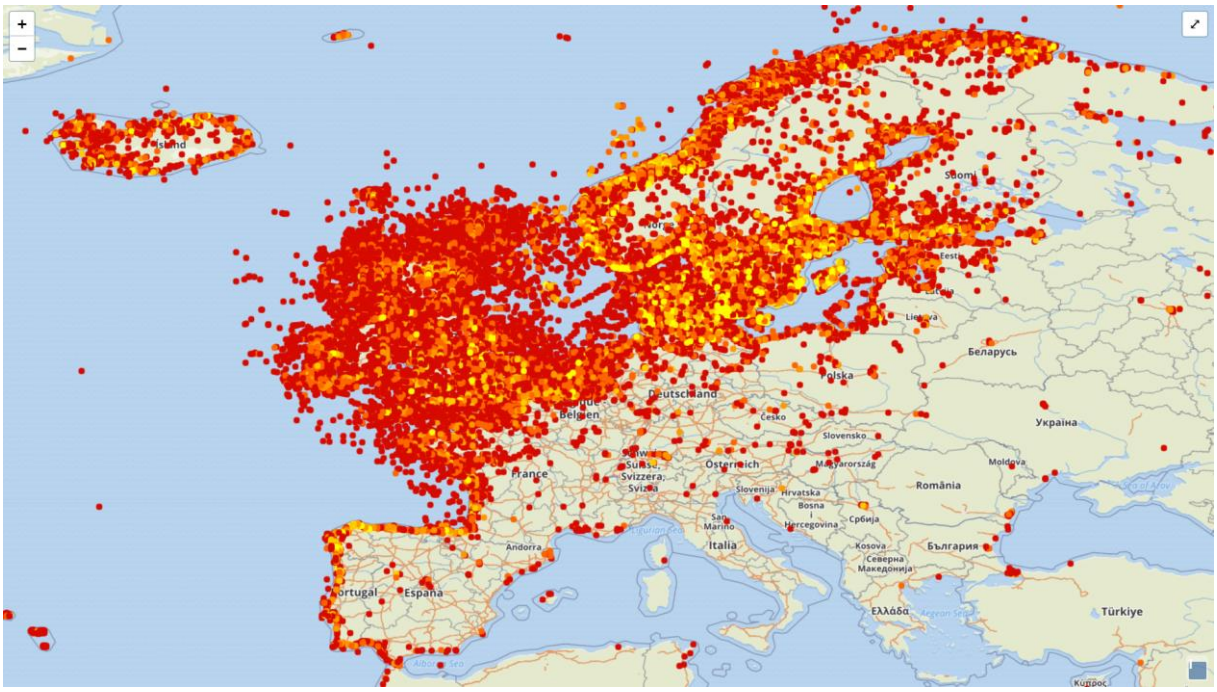
Melanitta fusca, velvet scoter



Larus argentatus, herring gull



Larus marinus, great black-backed gull



2.3.2. IUCN status

Annex 5.2 details the different categories and statuses of the IUCN Red List. The 5 species included in this recommendation are classified as follows, in Europe and worldwide, by the increasing level of risk: LC (Least Concern), NT (Near Threatened) and VU (Vulnerable).

Species	EUROPE	WORLD
Larus marinus, great black-backed gull	LC	LC
Melanitta nigra, common scoter	LC	LC
Larus argentatus, herring gull	NT	LC
Somateria mollissima, common eider	VU	NT
Melanitta fusca, velvet scoter	VU	VU

The situation of the stock of great black-backed gulls and common scoters is not problematic.

The situation of the stock of herring gulls has clearly improved and should return to LC, like that of the great black-backed gull. However, this situation varies from one Member State to another.

The situation of the stock of common eider ducks is better at global level than at the European level, where this species remains in a vulnerable situation, like the velvet scoter.

All of these situations suggest a focus on the most problematic seabird species for mussel farming - the herring gull -although it is in a special situation with regard to the state of its stock in Europe and still has a protected status in this respect. This situation seems to be above all a consequence of the open landfill sites that, a few decades ago, enabled the herring gull to become established. Since then,

the open waste sites have disappeared and herring gulls find it more difficult to find food, leading them to concentrate more on shellfish farms than they did in the past. The shellfish farmers often find animals in poor health, undernourished and weak. Bird welfare conservationists acknowledge that the stock is naturally regulating itself but that the "predator/prey" balance needs time to be achieved.

3 Case study: herring gulls in mussel farming

3.1. Study of predation in Normandy

The study was conducted in Normandy the French North Sea in 2017[3], from Mont Saint Michel to the Belgian border, 130 farms were investigated. Two sectors were monitored more closely (Donville Les Bains and Ile de Chausey). The data collected are also the work of the *Groupe de Travail sur la Prédation des Oiseaux de la Manche* (Working group on avian predation in the English Channel) since the year 2000. The study aims to answer the following three questions:

- To characterise the predation of mussels by herring gulls;
- To assess the economic impact of predation by herring gulls on mussels farms;
- To identify and diagnose the means used to limit predation.

It seems that predation is heavier between June and September but it continues throughout the rest of the year. The study made it possible to differentiate, by characterising it, predation by herring gulls from that of other mussel predators. The herring gull has a clear impact on spat and juvenile mussels, while predation on adults remains limited. So the analysis of the single stage of spat attachment to the poles and the start of their growth shows losses of more than 50% of the quantity of spat put into growth.

The economic losses linked to all predation amounted to 27% over the study period, while the "average" of previous years show a loss level of 15%. It should be noted that shellfish farmers in Normandy report for 2020, beyond this 2017 study, an exceptionally high level of combined gull and spider crab predation, estimated at a 50% loss of turnover.

The specific contribution of the herring gull to these losses, in the 2017 study, is estimated at 30%. This represents a 27% x 30% loss, or an 8% loss of turnover attributable to herring gulls alone, mainly due to the purchase and placement of spat to compensate for the predation of juveniles on the poles.

Passive systems (such as means of protection and nets) are limited in their effectiveness, which depends on a complex balance between their ability to protect from the predator and their impact on limiting the growth of the products they are protecting, as well as the cost represented by their implementation.

An analysis of proactive means reveals a limited effectiveness of scaring methods over time, probably due to the gull's ability to learn and get accustomed to them. Culling by lethal shooting, in addition to scaring, shows greater efficacy, as the learning capacity of the gulls enables them to apprehend the danger. A study from the University of Louisiana in 2020 demonstrates the ability of birds to learn from their environment; Kelly *et al.* explain that it is essential to understand how quickly new information can be transmitted among a bird population, which can affect how a species, as a whole,

[3] Study of the predation of mussels by herring gulls, assessment of its economic impact on mussel farms and the effectiveness of the means of control employed - GOULARD, Amélie, August 2017 - CNCNMN

will develop with human-induced environmental changes.[4]. The aim of these culls is not to regulate the populations but to restore the effectiveness of scaring.

Normandy good practices, which are the subject of a consensus with ornithologists, permit a maximum of 30 lethal shots in each area per year, after June (to allow reproduction) then for 4 months to protect young mussels.

Members of the Aquaculture Advisory Council (AAC), including shellfish farmers, are against lethal shooting in principle and are looking for alternative methods. In this respect, the presentation made by the University of Wageningen to the CAA in October 2021 on the potential use of natural predators is an avenue that everyone agrees to investigate. AAC members note, however, that no practical experimentation is yet in place and that these considerations are, by the researchers' own admission, at a very early stage.

Shellfish farmers also note that the use of a natural predator or lethal shooting both result in some gull mortality. They estimate that lethal shooting is probably a more controllable stock management method than the introduction of a natural predator. Indeed, there are reports of foxes killing baby gulls in Normandy nesting areas, without, of course, respecting any management quota.

In Pays de Loire, another important production area for bouchot mussels in France, 50 lethal shootings are authorised per year. However, in 2021, in 4 months only 16 effective lethal shootings took place from July to December and they were sufficient to reinforce the effectiveness of the scaring carried out in parallel.

The position of bird conservationists is more nuanced: they are all in favour of reducing the plastic used to protect mussels. Some would favour natural protection rather than lethal shooting but this introduction of avian predators is not unanimously supported by the various animal welfare representatives. Some consider that the concentration of farmed mussels particularly attracts birds. This situation is also notable in the Netherlands, where certain wild banks left abandoned in a former production area classified as Natura 2000 have since become a source of food for birds which prefer to feed there, abandoning the other farming areas (also protected by a certain height of water above the flat farms). Others note that, in the context of the introduction of avian predators, suffering is part of nature, but concede that the balance between the two stocks: predators and prey, is slow to arrive.

Normandy shellfish farmers make the point that the Normandy Ornithological Group authorises lethal shooting on the grounds that herring gulls kill other bird species that are also protected but much more endangered. So human intervention is a necessary regulation between two endangered birds species, while also guaranteeing the economic balance of production companies.

There is therefore no consensus between the positions that environmental organisations support for the protection of certain species, even if they all recall, as a matter of principle, that it is worth protecting all animals.

Bird conservationists are prepared to consider the principle of extending the farmed areas to reduce stocking density and thus concentration, as a measure to manage predator density, without forgetting to continue working with researchers on alternative non-lethal methods. In fact, shellfish

[4] Louisiana State University. "Birds can learn from others to be more daring." ScienceDaily. ScienceDaily, 2 September 2020. T. R. Kelly, M. G. Kimball, K. R. Stansberry, C. R. Lattin. No, you go first: phenotype and social context affect house sparrow neophobia. Biology Letters, 2020; 16 (9)

farming should be encouraged in order to ensure food security in the Union and because it has little impact on the environment, while providing an excellent source of good protein.

Scaring by "blank" shots is reinforced by a few lethal shots in view of both the effectiveness (% reduction in predation) and the efficiency (cost/result ratio) of this method.

Shellfish farmers deplore this need for a few lethal shots and would be willing to consider any other method with similar effectiveness and efficiency. Animal welfare bodies consider that a single lethal shot is unacceptable and suggest a reduction in shellfish density by increasing the area of the farm to reduce the risk. Everyone wants more research to help protect the farms without harming the birds and to reduce the use of plastics used only to protect mussels from predators.

3.2. Economic projection at EU level

The STECF report on economic performance of the aquaculture sector in 2018 highlights the following European mussel production data:

Country	Number of enterprises		Total sales volume		Turnover		Employment		FTE		Average wage	
	number		thousand tonnes		million €		number		number		thousand €	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Bulgaria	31	27	1.6	1.3	1.1	1.0	87	45	75	43	4.3	3.6
Croatia	84	80	0.9	0.9	1.6	1.6	132	159	64	80	14.9	12.5
Denmark	4	6	2.4	3.1	1.4	2.3	17	22	12	16	57.8	53.6
France	351	351	48.4	49.6	116.1	133.9	1734	1734	1322	1322	23.0	27.1
Germany	8	8	18.6	15.9	25.5	32.5	110	117	96	104	56.8	52.2
Greece	201	193	16.6	20.9	6.1	6.5	325	325	199	199	34.9	25.2
Ireland	82	83	16.0	13.9	14.6	12.0	364	340	214	210	23.4	21.8
Italy	224	224	68.5	65.1	46.9	43.9	986	970	980	820	12.8	14.9
Netherlands	48	48	43.9	49.3	47.8	53.9	184	181	184	181	81.4	79.2
Portugal	3	5	0.1	0.3	0.1	0.2	20	26	19	22	18.4	17.2
Slovenia	6	6	0.7	0.6	1.0	1.0	17	17	13	14	16.1	16.5
Spain	1965	1974	241.6	243.4	130.8	134.6	7415	8005	2684	3138	32.0	27.7
Sweden	9	7	2.0	2.0	1.2	0.5	30	29	24	20	24.5	17.7
United Kingdom	100	98	21.4	18.7	37.3	24.0	373	363	255	238	38.0	29.4
Other none DCF			0.0	0.0	0.0	0.0						
Total DCF reported	**3,117**	**3,110**	**482.7**	**485.0**	**431.4**	**447.8**	**11,795**	**12,333**	**6,142**	**6,408**	**28.4**	**27.2**
Total EU			**482.7**	**485.0**	**431.4**	**447.8**						

The report on predation in Normandy highlights variable rates of loss of turnover depending on the professional concerned and the location of the farm, ranging from 3 to 40% and averaging 27%.

On this basis, and that of the data communicated by the national representatives of mussel farming, members of the AAC, it is possible to estimate the financial impact on European mussel farming companies as follows:

Member State	Average turnover loss rate due to avian predation	Mussel farm turnover in 2018 (millions of euros) [5]	Estimated loss (millions of euros)
Italy	0%	43.9	0.0
Spain	0%	134.6	0.0
France	27%	133.9	49.5
Ireland	6% [6]	12.0	0.72
The Netherlands	0%	53.9	0.0
Total of the top 5 European producers	13.28%	378.3	50.22

4. Recommendations

The Advisory Council on Aquaculture (AAC) therefore recommends:

4.1. To the Commission:

The AAC recommends that the European Commission:

1. Forward this recommendation to the various competent authorities in the member states, emphasising in particular the following points 2, 5 and 6, and inviting them to implement the AAC's recommendations set out in Chapter 4.2.
2. Remind member states that Article 9 of the Birds directive gives them the possibility to derogate from strict protection as long as there is no other satisfactory solution and the conservation status of the species is not endangered and suggest to them that the implementation of these provisions is a possible management tool for the herring gull pending a European management plan, in particular responsible egg collection.
3. Implement an EU-wide management plan for the herring gull (*Larus argentatus*), similar to the one that exists for the velvet scoter (*Melanitta fusca*), given the state of the stock, which now makes it possible to consider it.
4. Involve the AAC and all its stakeholders in the development of the management plan mentioned in point 3.
5. Remind Member States that a form of compensation for avian predation on farmed mollusc stock is possible under their national EMFAF operational programme.

[5] STECF 20-12-EU Aquaculture Economics, version 1.1 – 26/04/2021

[6] Dunthorn, A.A.. (2009). The Predation of Cultivated Mussels by Eiders. Bird Study. 18. 107-112

6. Maintain, in its proposal for the revision of state aid, the possibility of exempting financial compensation as a whole for the avian predation of farmed mollusc stocks.

7. Open a HORIZON EUROPE call for projects with a view to investigating the feasibility of alternative measures for the protection of farmed mollusc stocks to combat avian predation other than the use of "plastic" solutions, in particular the encouragement of natural predators.

Minority statement:

Please note: Compassion in World Farming and Vissenbescherming support the above recommendations in relation to non-lethal measures to protect shellfish from predators and compensation for shellfish farmers. In relation to nos 2,3 and 7, these groups do not support the use of lethal measures such as shooting. Eurogroup for Animals and ALI Europe support the above recommendations in so far as they support co-existence with predatory birds and prioritise non-lethal actions.

4.2. To the Member States:

The AAC recommends that Member States

1. Implement, in a proportionate manner, the provisions of Article 9 of the Birds directive, in close consultation with all the stakeholders concerned, in each farming area where avian predation on farmed mollusc stocks is reported.

2. Help shellfish farmers put in place measures to protect against predation through their EMFAF operational programme.

3. Support the European commission's proposal to revise state aid in order to make it possible to financially compensate avian predation of farmed mollusc stocks within the context of an exemption block.

4. To financially compensate avian predation of farmed mollusc stocks, either through their EMFAF operational programme or through an exemption block.

Minority statement:

Please note: Compassion in World Farming and Vissenbescherming support the above recommendations in relation to non-lethal measures to protect shellfish from predators and compensation for shellfish farmers. In relation to nos 1 and 2, these groups do not support the use of lethal measures such as shooting. Eurogroup for Animals and ALI Europe support the above recommendations in so far as they support co-existence with predatory birds and prioritise non-lethal actions.

5. Annexes

5.1. IUCN criteria for assessing whether a tax on belongs to one of the red list categories (critically endangered, endangered and vulnerable species)

Grille de synthèse des critères de l'UICN pour évaluer l'appartenance d'un taxon à l'une des catégories du groupe « menacé » de la Liste rouge (En danger critique, En danger et Vulnérable)

Utiliser n'importe lequel des critères A à E	En danger critique (CR)	En danger (EN)	Vulnérable (VU)
A. Réduction de la population *mesurée sur la plus longue des deux durées : 10 ans ou 3 générations*			
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 et A4	≥ 80%	≥ 50%	≥ 30%

A1 Réduction de la taille de la population constatée, estimée, déduite ou supposée, dans le passé, lorsque les causes de la réduction sont clairement réversibles ET comprises ET ont cessé.

A2 Réduction de la population constatée, estimée, déduite ou supposée, dans le passé, lorsque les causes de la réduction n'ont peut-être pas cessé OU ne sont peut-être pas comprises OU ne sont peut-être pas réversibles.

A3 Réduction de la population prévue ou supposée dans le futur (sur un maximum de 100 ans).

A4 Réduction de la population constatée, estimée, déduite ou supposée (sur un maximum de 100 ans), sur une période de temps devant inclure à la fois le passé et l'avenir, lorsque les causes de la réduction n'ont peut-être pas cessé OU ne sont peut-être pas comprises OU ne sont peut-être pas réversibles.

en se basant sur l'un des éléments suivants :

(a) l'observation directe *(sauf A3)*

(b) un indice d'abondance adapté au taxon

(c) la réduction de la zone d'occupation (AOO), de la zone d'occurrence (EOO), et/ou de la qualité de l'habitat

(d) les niveaux d'exploitation réels ou potentiels

(e) les effets de taxons introduits, de l'hybridation, d'agents pathogènes, de substances polluantes, d'espèces concurrentes ou parasites

B. Répartition géographique			
B1 Zone d'occurrence (EOO)	< 100 km²	< 5 000 km²	< 20 000 km²
B2 Zone d'occupation (AOO)	< 10 km²	< 500 km²	< 2 000 km²

***ET** remplir au moins deux des trois conditions a, b ou c suivantes :*

(a) Sévèrement fragmentée OU nb de localités :	= 1	≤ 5	≤ 10

(b) Déclin continu de l'un des éléments suivants : (i) zone d'occurrence, (ii) zone d'occupation, (iii) superficie, étendue et/ou qualité de l'habitat, (iv) nb de localités ou de sous-populations, (v) nb d'individus matures.

(c) Fluctuations extrêmes de l'un des éléments suivants : (i) zone d'occurrence, (ii) zone d'occupation, (iii) nb de localités ou de sous-populations, (iv) nb d'individus matures.

C. Petite population et déclin			
Nombre d'individus matures	< 250	< 2 500	< 10 000
***ET** remplir au moins un des sous-critères C1 ou C2 suivants :*			
C1 Un **déclin continu** estimé à au moins : *(max. de 100 ans dans l'avenir)*	25 % en 3 ans ou 1 génération	20 % en 5 ans ou 2 générations	10 % en 10 ans ou 3 générations
C2 Un **déclin continu** **ET** l'une des 3 conditions suivantes :			
(a) (i) Nb d'individus matures dans chaque sous-population :	< 50	< 250	< 1 000
(ii) % d'individus dans une sous-population égal à :	90 - 100 %	95 - 100 %	100 %
(b) Fluctuations extrêmes du nb d'individus matures			

D. Population très petite ou restreinte			
D1 Nombre d'individus matures	< 50	< 250	< 1 000
OU			
D2 *Pour la catégorie VU uniquement :* Zone d'occupation restreinte ou nb de localités limité et susceptibles d'être affectées à l'avenir par une menace vraisemblable pouvant très vite conduire le taxon vers EX ou CR.			En règle générale : AOO < 20 km² ou nb de localités ≤ 5
E. Analyse quantitative *sur 100 ans maximum*			
Indiquant que la probabilité d'extinction dans la nature est :	≥ 50 % sur 10 ans ou 3 générations	≥ 20 % sur 20 ans ou 5 générations	≥ 10 % sur 100 ans

5.2. IUCN red list category

Les catégories de la Liste rouge de l'UICN	
Espèces éteintes	
EX	Espèce éteinte au niveau mondial
EW	Espèce éteinte à l'état sauvage
RE	Espèce disparue de la région considérée
Espèces menacées de disparition de métropole	
CR	En danger critique (CR* Espèce probablement éteinte)
EN	En danger
VU	Vulnérable
Autres catégories	
NT	Quasi menacée (espèce proche du seuil des espèces menacées ou qui pourrait être menacée si des mesures de conservation spécifiques n'étaient pas prises)
LC	Préoccupation mineure (espèce pour laquelle le risque de disparition de métropole est faible)
DD	Données insuffisantes (espèce pour laquelle l'évaluation n'a pas pu être réalisée faute de données suffisantes)
NA	Non applicable (espèce non soumise à évaluation car (a) introduite dans la période récente ou (b) présente en métropole de manière occasionnelle)

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