

The GOLDEN MILES project
to the rescue of salmon, dolphins and fishermen



Abstract

The collapse of biodiversity threatens humanity in the same way as global warming. Marine resources remain largely overexploited, leading to the decline of many species such as salmon and sturgeon, but also of fishermen who are victims of an ultra-liberal policy that enslaves them rather than protects them. Small-scale coastal fishing is heavily involved in salmon catches along the coast and also that of protected species such as dolphins and seabirds. The GOLDEN MILES project consists of moving fishing nets beyond the first three nautical miles to significantly reduce these catches. A last-chance solution for salmon, it would also relieve the coastal nurseries of the main commercial species to the point of allowing a significant rebound in tomorrow's fisheries. This is the win-win strategy implemented for decades in all North American coastal states where it is fully validated. Bringing about a dramatic restoration of fish abundance and sizes, it has long ensured easier, more successful fisheries and ensured profits for coastal fisheries and other industries.

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Notice

The collapse of biodiversity

Human activities have gone beyond the limits of reason to the point of changing the climate. Global warming is seen as the most serious imminent danger threatening humanity. The collapse of biodiversity wrongly arouses less fear, while its already terrible consequences will be even more so if overexploitation persists.

Global warming and water scarcity legitimately refer to our own security, threatened by climatic hazards and thirst. But it is urgent to go beyond the image of the glass of drinking water and the scope of our own interests. We must worry about the security of all ecosystems since their endangerment threatens us directly and their restoration is part of the global solution.

The GOLDEN MILES project proposes to contribute significantly to the restoration of marine biodiversity, the collapse of which, although multifactorial, is first and foremost linked to overexploitation by fishing¹.

The project will significantly improve the situation of fishermen, salmon and protected species such as dolphins, sturgeons and seabirds.

The decline of sea fishing

Almost all of the indicators available to assess the French maritime fishing sector are worrying.

The overexploitation of the 70s and 80s is now being paid for by a decline in production that is still continuing. The necessary restrictions that were imposed at the birth of the Common Fisheries Policy in 1983 no longer explain the current decline in production, which shows that our oceans are fundamentally poorly exploited.

We fish too much but also very badly since a large majority of fish landed in the European Union have not had time to participate in reproduction. According to Philippe Cury and Yves Miserey² *"today, 95% of fish caught in the Bay of Biscay are smaller than 9 inches. We now eat almost exclusively juveniles, but we don't even notice it"*. Almost all minimum catch sizes are smaller than sexual maturity sizes. The mesh sizes of fishing nets are not even adapted to these minimum catch sizes so that many small unsaleable fish are nevertheless caught. They are thrown back into the sea dead, in defiance of the recent landing obligation. The capture of these "juvenile" fish is a huge failure of the common fisheries policy and one of the three justifications for the Golden Miles project.

In the wake of the continuing decline in landings, the number of vessels is doing the same, in a spectacular but not uniform way. The small vessels of less than 12 metres are disappearing but not the large ones of more than 24 metres. It is the small coastal fishing that is disappearing, in the same way as the small farms on land.

The number of fishermen fell very rapidly during the « *thirty glorious years* », while the cumulative power of fishing vessels continued an irresistible rise. The two curves intersect and form a spectacular X. In the same way, the number of peasants decreased while the surface area of farms continued to increase.

The industrialization of French fishing, decided after the second World War, at the same time as rural land consolidation and the uprooting of hedges, destroyed jobs for each kilowatt-hour installed. There were fewer than twenty thousand fishermen in the mid-1990s³. According to FranceAgriMer⁴, almost twelve thousand full-time jobs survived in 2005. In 2013, there were just over ten thousand. In 2019, the official figure is nine thousand five hundred and fifty-three.

Fishermen's morale is at its lowest. A parliamentary report⁵ evokes a "*deep pessimism*" among professionals, of whom "*only 44% would encourage their child or a relative to pursue this profession*" and "*60% are absolutely not confident*" in their future.

The report exposes "*serious recruitment difficulties which constitute a threat to the sustainability of the sector*". Very revealing is the "*exit rate*" of the profession, exceptionally high. A majority of people who entered the profession in 2013 left it five years later, especially in the first two years.

Since the 1970s, the profession has been regularly shaken by crises and riots, masterfully analyzed by Benoît Mesnil in 2008⁶. He concludes that French maritime fishing has been drowned by subsidies that sought to keep it out of the water. With a few exceptions, these subsidies were distributed without compensation, just to continue fishing as usual, without rectifying any of the many problems in the sector or engaging in more virtuous behavior.

No lessons have been learned from this endless litany of crises. The discourse of politicians and the administration on fishing has still not changed one iota.

Always interested and biased analyses, always aids, always exemptions from trawling in the three miles at the expense of coastal nurseries, always the avoidance of real relevant solutions on the grounds of a short-term cost that aid could precisely erase. Always this belief, totally false for fishing, that always more inputs and machines would be necessary to increase production. In short, an obsessive strategy, worthy of the greatest leaders of the manufacturing industry, while the fish

landed are not manufactured, but harvested. This dramatic error has persisted for three quarters of a century.

We must add to this an image that has been damaged for a long time by the persistence of a record rate of work accidents, often fatal, and recently by the necessary media coverage of dolphin captures and their strandings on the french coasts.

If the tonnages landed are decreasing, so is their quality. Under fishing pressure, fish are becoming smaller and smaller, due to a lack of time to grow. Around forty species are reproducing earlier and earlier, since fishing first removes the old genitors and thus selects the early genitors, considered less efficient. This worrying development can lead to permanent genetic alterations.

Slyly, after having made the predatory species located on higher levels of the food chains rare, fishing now targets what remains, that is to say species located lower and lower in the chains, until they are exhausted. With the degradation of marine biodiversity, the variety of fisheries, at the height of overexploitation in the 1970s, has become significantly impoverished, concentrated on the last species that survived in the marine environment. It remains very disrupted despite an improvement in the early 2000s.

In 2012, Guénette and Gascuel⁷ establish that catches, reduced to the unit of fishing effort, have been divided by ten since the post-war period, despite the all-out technological explosion. It must be understood that for the same engine power, a vessel today catches ten times fewer fish than after the war.

It is appropriate to paint this sad picture even darker. The decline in primary production linked to global warming is now a reality that is significantly reducing the biomass of the oceans. The lists of endangered species continue to grow and conservation statuses, with some exceptions, are worsening. The angel shark (*Squatina squatina*) was a small shark so common until the middle of the 20th century that ships fished for it from one end of the year to the other. Today, it is one of the 100 most endangered species in the world. The eel has been critically endangered for over 15 years, but there is still no question of stopping fishing for it, or even for its fry, the glass eels, which are too profitable according to the French Council of State⁸.

Let us add to this list the increase in coastal pollution of land origin, which results in the bloom of green algae in Brittany or the "*liga*" in the French Basque Country and hundreds of coastal "*dead zones*" all over the world.

It is time to radically improve fisheries management, although this will not eliminate all threats, far from it.

The disappearance of the Atlantic salmon

On August 6, 1990, my line was suddenly stopped just a few meters from the shore. My lure had been intercepted by a fishing net, stretched about ten meters from the land. A hundred meters further north, my fishing companion was no luckier than I was. All we had to do was move away a good distance. But some surfers got into the water because the ocean was starting to break. They too would discover the net, across their spot, which had become impassable. During the morning, the net would be removed by an angry human chain, which would bring together several dozen people. We returned to the scene hoping to recover our lures. Instead, an extraordinary discovery awaited

me. A small, shiny salmon weighing just over 2 kg, a “grilse” that had spent only one winter at sea, was fatally swaddled in the sinister net. Astonished, I wanted to know what the “*King of Fish*” is doing so close to the beach, but so far from the estuaries, more than twenty kilometers from that of the Adour and even further from the Spanish rivers? This question will haunt me for more than twenty years, until I discover the explanation almost by chance.

The Atlantic salmon (*Salmo salar*) is born upstream of rivers which it leaves a year later to grow in the open sea, in the cold waters north of the Atlantic where it will multiply its weight by a factor of ten, twenty or thirty during only one, two or three winters at sea.

The round trip to the fattening areas, in the Norwegian Sea, facing Europe, or in the Labrador Sea, corresponds to journeys of the order of several thousand kilometers. This species has chosen to entrust its offspring to the purest and safest waters, the fresh waters upstream of the watersheds, but also to take advantage of the incomparably more abundant food resources of marine waters. It thus achieves a rapid and efficient transfer of energy between the marine environment and the river environment.

The female will thus be able to lay eggs in her gravel nest which are, by far, with the exception of the coelacanth, much larger than those of all marine species, invariably of the order of a millimetre. These eggs, of the order of eight to ten millimetres, thus give the embryo a much better chance of survival, thanks to much greater yolk reserves.

Not only does the Atlantic salmon, capable of moving alternately from a hypotonic environment, such as fresh water, to a hypertonic environment, such as sea water, defy osmotic pressures, but it also does not go anywhere in the sea. For millions of years, it has identified the richest areas, those where upwellings of deep cold waters bring the nutrients that allow a profusion of life and in particular these small crustaceans, the famous krill naturally rich in astaxanthin, which colors its flesh orange. This is how it can gain a lot of weight in such a short time, as few other cold-blooded species are capable of doing. It is certainly an incredible life strategy, which seems much less surprising, thanks to Richard SHELTON ⁹, which makes us notice that the Atlantic Ocean, very narrow at the time of the appearance of the first ancestors of salmonids, more than a hundred million years ago, has continued to widen since then, at the speed of the width of our thumb each year, so that the Atlantic is today the second largest ocean in the world, after the giant Pacific.

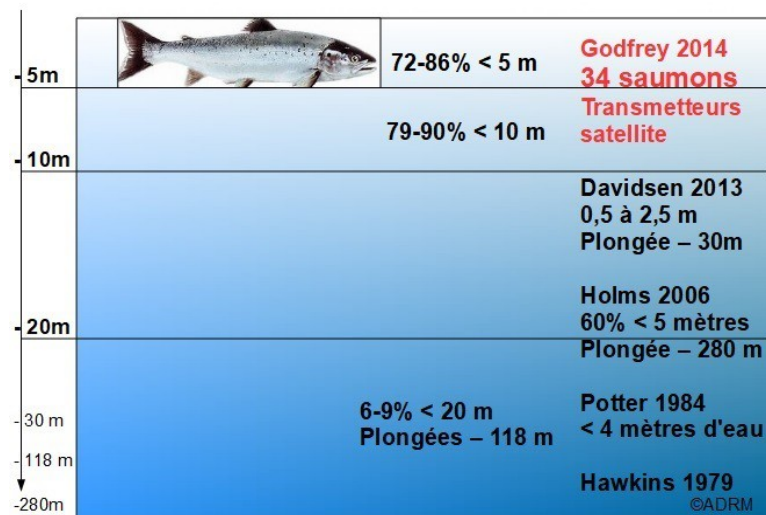
The salmon is able to follow the course that will allow it to reach the development zone in the open sea, then, on the way back, it will be able to find the coast where its native river ends. The compass system that allows it to achieve this feat could well be these magnetite crystals, a tiny quantity of which is found in each of the scales of its lateral line. Magnetite is the most widespread of iron minerals, very present in the sediments carried by rivers.

The juveniles will capture these minerals, essential to their navigation system on the high seas, but also to their system of recognizing their native river. The dependence of the state of the magnetite crystal on the Earth's magnetic field suggests that each fish, informed by the two alignments of hundreds of small electric dipoles along its sides, would know at all times the position of magnetic north. It would manage, probably thanks to a memorization included in its genes, to use this information to swim in the right direction. These feats are beyond our understanding, we who need an electronic device to do the same thing.

But, once back on the coast, the adventure is far from over.

To find their native river without making a mistake, each individual would be able to recognize, to “smell” this water that saw them born and also the smell of their immature congeners, present upstream in the river.

But how does he go about it? Since a first study, dating from 1979, scientific literature has accumulated evidence¹⁰ that salmonids circulate in the sea overwhelmingly (90%) in the layer of the most superficial ten meters of water and even closer to the surface at night. The study by *Godfrey and al. (2014)*¹¹ studied the behaviour of thirty-four adult salmon fitted with satellite transmitters in Scottish coastal waters. All of these fish spent between 79 and 90% of their time in the first ten metres. *Dauidsen and al. (2013)*¹² followed fifty-six adult salmon in northern Norway, which followed the coast, moving under twenty inches to two and a half meters of water. All studies also converge on the subject of kelts¹³, these rare salmon capable of spawning a second time in their native river, as revealed by their scales. These unusual fish are most often females. Exceptionally, fish would come to reproduce a third time, while, in the mass of data from 36,000 French catches, two fish would have achieved this feat four times! We observe the same surface behavior for sea trout¹⁴ and post-molts¹⁵, that is, young salmon that have just left their native river and reached the sea.



It should be remembered that all migratory salmonids preferentially swim just below the surface. This swimming behavior is easy to understand : salmon and trout are born in fresh water, in the oxygenated riffles at the ends of the pools of our most preserved rivers, that is to say in very little water, i.e. depths of only a few dozen centimeters. The young fish has therefore lived for one or two years, sometimes three, with the celestial bodies permanently above its head, the sun during the day, the stars and the moon at night. This juvenile has therefore imprinted in its genes and its experience from the very beginning of its life this swimming behavior below the surface. It also keeps its feeding behavior and continues at sea to feed on the surface of insects that the onshore wind carries offshore.

It is therefore not surprising that adults retain this behavior. But we will see later that this dependence on the sea surface contributes today to their setbacks.

Another characteristic of their behaviour has serious consequences for their survival. It is probably

tempting - but wrong - to believe that salmon converge towards their estuary, as a navigator would with a compass. In reality, salmon seem to arrive almost everywhere along the coast, as evidenced by the dissemination of capture sites. Their navigation system, based on magnetite microcrystals, more approximate than our GPS, leads them to sometimes land at considerable distances from the estuary of their native river. For example, concerning Ireland, tagging studies¹⁶ have proven that fish that reach the west coast must indeed go around the Island when it comes to finding their natal estuary on the east coast.

Once they reach these coastal waters, salmonids must find their natal river again, and this is where their analytical abilities, no doubt astonishing, come into play.

They explore freshwater inlets and look for the “*smell*” of their natal river, which could be the mineral signature of these fresh waters, but also the pheromones of juveniles of their own species, living upstream. This quest leads them to “*follow the coasts in search of landmarks to locate their birthplaces to reproduce there*”¹⁷. The coastal marine strip thus appears as the natural path that the salmon will follow to recognize the maritime extension of its native river.

Despite a “*sense of smell*” reputed to be a thousand times superior to that of a hunting dog, this recognition is not immediate. At each estuary, even a small one, this exploration is made up of hesitations, aborted attempts, or even returns to the sea, which reflect the laborious nature of this quest whose objective is to find the spawning grounds to generate life there. The salmon thus seems to explore the slightest arrival of water at the coast.

The lower density of fresh water leads it to “*float*” on the surface in coastal areas. What could be more logical, for the genitor in search of its native fresh water, than to circulate just under the surface, where the presence of fresh water is most likely, but also close to the coast, where dilution has not had time to occur?

This is probably why salmon have been swimming along the coasts below the surface for millions of years.

But since the beginning of the industrial era, humans have taken over salmon rivers, blocking them with dams and other weirs, plundering the gravel from the spawning grounds to build our own houses and roads, diverting water for irrigation or industry, or polluting it by discharging polluted water. At the same time, throughout Europe, fishing has heavily exploited salmon.

The Atlantic salmon is undoubtedly an athlete, but not a magician. Under the repeated and combined blows of overexploitation and the degradation of its habitats, a rich scientific literature¹⁸ recalls how it disappeared from the largest rivers where it flourished at the beginning of the 20th century, for example from the Rhine basin. “*All over the world, examples of the disappearance of migratory fish populations have confirmed that overexploitation played a crucial role in the fall of the stock.*”¹⁹

The decline is global and affects all migratory species capable of living alternately in fresh and salt water. According to a report from the World Migratory Fish Foundation in July 2020²⁰, the population of migratory fish has fallen by 76% worldwide and 93% in Europe since the 1970s.

In December 2023, the global conservation status of Atlantic salmon has just been downgraded to the “*near threatened*” stage²¹ on the occasion of the 28th Conference of the Parties on Climate Change (COP28), new evidence showing that the global population decreased by 23% between

2006 and 2020. In France, it has already been classified as "*near threatened*" since 2019 with a downward trend. The National Museum of Natural History classifies it as "*critically endangered*" in Alsace and Limousin. It is classified as "*endangered*" in Upper Normandy, in the Centre region and in the Loire basin where its fishing was banned in 1994. The IUCN confirms this local status²² and notes that "*restoration programs are underway in river basins where the species had disappeared or declined but without real success (...).*"

The North Atlantic Salmon Conservation Organization (NASCO) also considers the Loire salmon to be "*threatened with total extinction*". Although fishing is banned, it is still caught, the vast majority of which is linked to the use of drift nets, which are unfortunately authorized for sea fishing in the estuary and for fishing upstream for shad and lampreys and are perfectly capable of intercepting salmon, as they did until 1993 on the basis of an annual quota of 50 salmon maximum per professional fisherman. The same situation applies to the Nivelle, in the French Basque Country, where sea fishing with fixed nets is tolerated in the tiny bay of Saint-Jean-de-Luz-Socoa. Only 35 salmon were counted in the Nivelle in 2022. The situation is just as shocking in the Vilaine estuary, where 21 salmon fishing licenses are granted while the local population is considered extinct, with only a few handfuls of fish counted each year at the Arzal dam...

The return rates of salmon to French rivers have been steadily decreasing since 1971, as established by the International Centre for the Exploration of the Sea (ICES). Regularly above 40,000 individuals until 1994, they are now thought to be less than 20,000 individuals²³. The surviving fish are also smaller and lighter, and therefore less fertile.

In France, only two groups of populations survive, in about twenty small Breton basins and also in the Adour basin where salmon are still exploited by professional driftnet fishing. In the Loire basin where extinction threatens the species, only 107 salmon were counted in 2023 by the LOGRAMI Association, despite a stocking program as colossal as it is ineffective inaugurated in Chanteuges in 2001 (43,300).

In may 2023²⁴, the ICES advises to minimize all mortalities of anthropogenic origin, to restore salmon habitats, ecological continuity and the quality of river water. The decline accelerates in 2024 with a general collapse of counts. NASCO finally changes its tone. The Norwegian Environment Agency announces the closure of salmon fishing in 33 rivers from June 24, 2024. The prefectures of Landes and Pyrénées-Atlantiques close fishing prematurely at the request of amateur and then professional fishermen²⁵. As with global warming, each year erases the previous year's sad record.

It is important to remember that, despite significant efforts to reduce the barrier effect of dams and improve water quality, there are clearly causes of decline that we cannot control. But there are also other threats that the administration has chosen not to address.

Mortalities of dolphins and seabirds

Dolphin strandings

Since the end of the 1980s, significant strandings of small cetaceans, especially common dolphins (*Delphinus delphis*), have been monitored by the PELAGIS observatory²⁶ from La Rochelle city, attached to the French National Center for Scientific Research (CNRS), which collects and publishes this stranding data in an efficient and educational manner.

PELAGIS Observatory Stranding Report for 2019²⁷ recalls that as early as 1989, nearly 700 small cetaceans were found stranded, mainly in the Landes and Gironde departments. Since then, multiple stranding events have been observed almost every year, with some winters experiencing particularly intense events.

External and internal examinations carried out by the National Stranding Network confirm in most cases death in fishing gear (60% and up to 90% of animals during peak periods).

Based on stranding data, the observatory estimates total mortality, taking into account a median probability of stranding of 18% [11%;27%]. Strandings must therefore be multiplied by five to get an idea of actual mortality. From several hundred each year, strandings regularly exceed a thousand individuals from 2011 and have worsened further since 2016.

"Nevertheless, since 2016, the estimates remain very high, since on average over the last four years 7,800 [5,200; 12,760] common dolphins have been estimated to have been accidentally captured in the Bay of Biscay".

"But since 2016 the average annual mortality due to accidental capture has been 3.5 times higher than the annual average for the past 30 years."

In 2017, strandings broke all previous records with two totally unusual peaks in February and March, during the sea bass spawning season, during which some eight hundred specimens were counted, 80% of them bearing fishing gear marks. These events were reported by PELAGIS²⁸ and its scientists²⁹, without there being any doubt as to the direct cause-and-effect relationship between fishing and these hecatombs. The ICES "Marine Mammal Ecology" working group³⁰ concludes with the usual scientific reserve: *"This is a relevant reminder that the phenomenon of bycatch of common dolphins is significant in the Northeast Atlantic."*

The year 2019 once again erases all previous records:

"The estimated mortalities during the winter of 2019 are the highest since 1990, especially since in 2019 only the first four months of the year were analyzed (Figure 3). Indeed, estimates of bycatch already reach 11,300 [7,550; 18,530] individuals."

Scientists estimate that nearly 90,000 common dolphins died in fishing nets in the Northeast Atlantic between January 1990 and April 2019³¹. As early as 2012, during the first inventory under the Marine Strategy Directive³², There has been evidence of a decline in the dolphin population at a steady rate³³ :

"In the absence of anthropogenic disturbances, the population would increase at a maximum rate of 4.8% per year. In the current situation, it decreases by 5.5% per year. If this level of accidental catches is maintained, the common dolphin population would be divided by 5 in 30 years and close to extinction after 100 years."

At that time, when it was estimated that fishing mortality corresponded to at least 30-40% of strandings, i.e. half the rate currently recognized today, the synthesis establishes³⁴ :

"Bycatch remains a major pressure on marine mammal populations in France. The additional mortality by capture of the porpoise and the common dolphin corresponds to at least 30-40% of the observed stranding population, which makes it extremely worrying with regard to the maintenance

of populations in this context. This implies almost a doubling of the mortality rate, if we assume that all other causes of mortality are natural."

In its 2019 report, PELAGIS states that 85% of the corpses whose condition allowed a thorough internal and external examination showed traces of death in the fishing gear. This current fishing mortality rate of around 80% of strandings implies a fivefold increase in the natural mortality rate. At this rate, the species is being pushed towards extinction.

The year 2020 will also erase the 2019 records. Then, PELAGIS masterfully demonstrates that the apparent declines of 2021 and 2022 can only be explained by anticyclonic winter weather that carried the corpses offshore...

Historically, these strandings were first identified as the consequence of the activity of pelagic trawls specifically targeting sea bass, and not other species also sought after by these pelagics (red sea bream, mackerel, horse mackerel, etc.).

The gatherings of spawning sea bass in winter trigger the spectacular gathering of fishing vessels that track them, visible on the location maps generated by satellite systems. Spawning sea bass are very exposed and therefore, cetaceans too since all these predators are looking for the same small pelagic fish. The phenomenon is not calming down since no effective measures are taken. The following years were worse and the media took over the phenomenon of "accidental" captures of dolphins. In reality, these captures were not accidental and must all be considered "intentional", as the Court of Justice of the European Union has long recognized³⁵ about a species of turtle.

Public opinion reacts and becomes aware of a real massacre. The general public discovers that hundreds of corpses are washing up on our beaches, the vast majority of which bear traces of fishing gear. Today, we know that pelagic species are far from being the only fishing gear involved and other gear is also concerned, as suggested for example by the positive correlations published by PELAGIS with the nets set in the 2010s.

The matter is complicated by the recent summer strandings in Brittany involving coastal nets since 2016:

"Indeed, during this year, around ten fresh common dolphins dead by accidental capture have been found stranded every week since the end of July. The drift conditions in summer, as well as the absence of decomposition of these animals, suggest an interaction with coastal fishing."

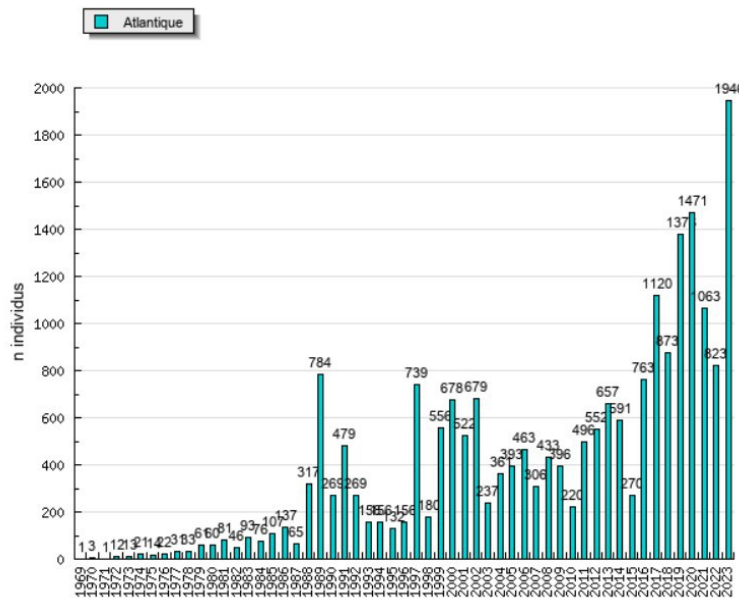
Indeed, set nets are perfectly capable of intercepting diving dolphins, all the more easily as the height of these nets in the water column continues to increase, from the seabed to the surface, due to technological progress on nylons:

"Across the world, these fisheries [set nets] probably constitute the greatest pressure on populations of small cetaceans (Brownell et al., 2019). In the Bay of Biscay, the net fishing effort is very extensive and one of the most intense among all the professions practiced. (...) The evolution of individual strategies as well as certain characteristics of the gear used (such as the height of the net fall) are not measurable by observers considering the data collected on fishing gear (...). Nevertheless, these elements could make it possible to identify changes since 2016, which could shed light on the high numbers of accidental catches in the Bay of Biscay."

Pelagic trawls no longer represent the largest share of bycatches. It is even suspected that fixed nets are the largest providers, due on the one hand to their increasing height in the water column, which no regulation controls and no study has yet taken into account, and on the other hand to the contribution of thousands of small gillnetters of less than twelve meters, which have still not been

taken into account either. The observation is now official: fixed nets are the cause of at least half of dolphin fishing mortality.

The situation is so serious that the Council of State had to impose a one-month moratorium at the request of several environmental protection associations in December 2023 (CE, 22 December 2023, no. 489926, 489932, 489949).



The silent slaughter of seabirds

As much as dolphins are highlighted by the press, their corpses counted by PELAGIS and collected by coastal communities, seabirds are simply ignored, their corpses abandoned on the beaches, delivered to predators and other scavengers.

On Saturday, September 23, 1995, I was kayaking along the coast, north of the town of Moliets, in the Landes departement, on a very calm sea. I discovered many corpses of white and black birds, in a very limited area. They were all common murre (*Uria aalge*).

Gathered in a handkerchief, their corpses float at the end of a *baïne*¹ and the end of low tide. While handling these still flexible corpses, I noticed that a wing was often disarticulated at the shoulder. There were about 25 birds.

Two months later, on Sunday, November 19, the sea was like a table. There is not even a surf. The silence is impressive. A gillnetter pulls up a “*straight*” net just off the beach before my eyes. The net is dotted with black and white drowned birds, formally identified with binoculars, then with a telephoto lens. They are again common murre. The untangling is long and laborious. The fisherman seems irritated, he tears more than he untangles.

I have just understood the drama of these diving seabirds.

Among the fifty or so species of seabirds that pass through the Bay of Biscay, it is easy to recognize

¹ Local french name for a water hole along the beach

the shearwaters, skimming the surface like hunting squadrons, the majestic northern gannets (*Morus Bassanus*), which multiply their vertiginous and spectacular dives like a rain of arrows, visible to the naked eye several miles from the coast, and the common murre (*Uria aalge*), floating in small groups in their beautiful black and white coat.

Mortality inflicted by fishing gear has long been considered the most serious immediate cause threatening birds in the marine environment³⁶.

Historically, it is baited hooks, mounted in single file on huge lines called “longlines”, which have demonstrated their capacity to retain seabirds in large numbers, as effectively as fish.

Concerning trawls, the bird catches described for more than fifteen years are so important³⁷ that the United Nations have issued mitigation rules designed for these trawls.

Opportunistic seabirds typically circle in all directions behind the vessel, hoping to catch a fish. In competition with each other, they are preoccupied by the vital need to detect and catch their target before their fellows, unaware of the danger of the trawl maneuvers and especially of the cables, all the more dangerous because they are difficult to detect, especially at night.

Birds can be stunned by the chains or other equipment of the trawl³⁸. Some are "*dragged underwater by the warp cable while feeding on factory discharges at the stern of the vessel*"³⁹.

Many birds collide with one of the different cables. A proportion of birds slide down the cable and become impaled on a splice in the cable. Sometimes birds are killed when they become stuck to lubricated cables and dragged through trawl winches⁴⁰.

In the European Union, according to a 2008 bibliographic study⁴¹ regarding protected species in Natura 2000 areas, gillnets are among the fishing gears that cause the highest rates of seabird catches.

Although they are known to be “*deep*” divers, common murre avoid pelagic waters and prefer waters where the depth does not exceed fifty meters. They can therefore be found very close to the Basque, Landes and Gironde coasts, precisely where the majority of the gillnet fishing effort is concentrated. Therefore, the following observation, written in 1998 about the multiple threats to the common murre is not surprising :

*“Let us mention the use of gillnets, which could be the cause of the fall in the number of alcids in several localities since the 1980s.”*⁴².

The diving bird, in pursuit of its prey, gets trapped itself and drowns. Of course, this capture does not suit the fishermen and the corpse will be unceremoniously unmeshed, which explains why it is often found with a disarticulated wing. In the case of the Aquitaine coastal marine strip, the gear that directly threatens the birds are gillnets, especially so-called "*straight*" nets which, like a wall, block the entire water column, then longlines, especially surface longlines.

These particularly large bird catches have been the subject of several reports from the International Center for the Exploration of the Sea ⁴³ who advocated 25 years ago the “*exclusion of gillnets*” in areas sheltering bird colonies.

In 2012, the initial assessment established for the Framework Directive “Marine Strategy⁴⁴ confirms that "*nets set in very coastal areas are likely to catch diving birds*". No preventive measures are

proposed, on the abusive grounds that "*no information is available on accidental captures of birds*".

For all these decades, nothing has changed and the birds continue to die in silence, year after year, drowned in the nets.

On Sunday, April 11, 2021, one hundred and eighty-four carcasses of Common murrelets were counted on six kilometers of beach, between Naujac and Hourtin, in Gironde department. These birds were in good physical condition and there was not the slightest trace of oil. Will this massacre, noted by involved and disgusted citizens, be taken into account and counted in a data collection system? No, don't dream.

The next day, an article in the regional press headlined: "*Gironde: dead birds, washed up by dozens on the coasts of the Médoc*" and accomplished the feat of not once mentioning the hypothesis of captures in fishing nets. The article prefers to consider mortality "*by exhaustion*", according to the association interviewed for the occasion, which insists on the hypothesis of "*bad weather, wind and strong swell, which contribute to exhausting them and would cause their death*". I fully observed this phenomenon in the middle of winter, during heavy westerly weather. This was not at all the case in the first half of April 2021.

Seabirds are in decline, for several reasons of course, including mortality inflicted by fishing nets for which no regulatory reduction measures exist in France.

Understand

The decline of coastal fishing

The objective of the Common Fisheries Policy is to land the "*Maximum Sustainable Yield*" (MSY), i.e. the highest tonnage that can be taken each year on average from a stock without significantly affecting the reproduction process.

Historically the first principle invoked to manage fisheries, the European Union only adopted it from the last reform of 2013⁴⁵.

Didier Gascuel, director of the Fisheries, Sea and Coastal Division of the Agro Institute of Rennes, observes that the exploitation of a stock according to the RMD criteria inevitably leads it into a situation where its abundance is very affected, and even divided by 2.5 to 3, compared to the virgin state⁴⁶. In the context of such fishing pressure, fish are indeed much rarer and smaller, with large fish having almost disappeared. This is because the fish do not even have time to grow. This is the definition of "*growth overexploitation*".

The RMD strategy is therefore very violent for the resource and recalls these forest exploitation strategies based on fast-growing species. It must be understood that fishing the same tonnages of fish each year, planned in the name of this famous RMD, requires an increasingly significant fishing effort compared to a situation where the abundance and size of the fish would be better preserved.

The RMD requires fishing longer, further, deeper, with more boats, more gear, and more technology. Indeed, as fish become smaller and smaller, more and more must be caught to land the same weight.

The RMD strategy is therefore also very violent for men. It is a lot more work and therefore a lot of expenses in fuel and equipment. Of course, if the expected turnover is reached, this fishing effort is very expensive and brings us closer to an even more serious overexploitation, the “*recruitment overexploitation*”⁴⁷ in the context of which, this time, it is the young fish themselves that are becoming rare. The RMD is synonymous with growth overexploitation and flirts with the dangerous recruitment overexploitation, with the risk of collapse.

The RMD strategy is therefore also very risky. The maximization of tonnages is reached at the expense of the optimization of profits which requires taking less. From the end of the 70s, experts like Professor Larkin⁴⁸ denounced that the RMD degrades the economic profitability of fisheries. Fishermen must fish more to land the expected tonnages since the fish are generally smaller, which reduces their individual profits. It is as if collectively, the profession confuses landings and turnover on the one hand and profits on the other. Clearly, the fishermen have still not understood that they are the turkeys of the farce, since they invariably demand ever higher quotas, believing that this will increase their immediate income, when in fact this will inevitably worsen their own situation and only benefit the most powerful among them.

Such a concept of RMD, even if the quotas are then distributed by countries and then by producer organizations, puts fishermen whose means are very variable, in an unequal competition, which results in a concentration of the means of production in the hands of a few. Small-scale coastal fishing, first victim of this system, which it denounces enough, also has its share of responsibility in the growth overexploitation because it is practiced in a very precious zone. This is the coastal marine strip and the estuaries which shelter the nurseries of around thirty commercial species which contribute to three quarters of the landings⁴⁹. This point is at the heart of the problem, one of the three motivations of the Golden Miles project. Juveniles should be able to develop there without being threatened by man since they are the ones who guarantee the fisheries of tomorrow.

But, contrary to what the public may believe, there is no minimum distance from the coast that fixed nets must respect in the European Union and in France. In fishing jargon, gillnetters can fish “*on land*”. Worse still, there are dozens of exemptions for trawling right next to our beaches. The Common Fisheries Policy is short-sighted and ignores the coastal nurseries that it has completely forgotten to protect.

Professional fishing ashore (Landes, France)



The nets of the "small" coastal vessels are not insignificant. Their number and density are very high. Their mesh sizes, lengths and heights make them very effective. The mesh sizes catch fish well before they are able to reproduce and, in order to sell them, minimum marketing sizes have been set that are much lower than the sizes of sexual maturity. Fish are therefore becoming increasingly rare.

Too many juveniles of multiple species (small turbot, small meagre, small edible crab, small red mullet, small sole and many others) are destroyed in coastal waters, which directly impacts the production of the marine environment and jeopardizes future fisheries. Faced with the scarcity of fish, instead of encouraging their growth, fishermen systematically increase the means to catch the survivors and thus worsen the situation. The nets are therefore becoming longer and higher.

Coastal fishermen are therefore involved in the destruction of juvenile fish. The report of the Agro Institute of Rennes of April 2024⁵⁰ speaks of an "absurd practice, in which young fish are caught, without letting them grow in the sea and thus benefit from the natural productivity of marine ecosystems." "Passive gear", essentially fixed nets, would represent 22% of the total juvenile footprint, of which 9% for coastal ones alone. It is of course the trawlers which are probably responsible for the majority (56% ?) of all juvenile catches by French fishing fleets.

Coastal fishing and the disappearance of the Atlantic salmon

Atlantic salmon continue to decline despite efforts in watersheds. Scientists have therefore turned their attention to what is happening at sea. There is a consensus that salmon mortality has doubled at sea, despite the ban on fishing in the extra-territorial waters of the North Atlantic put in place by NASCO since 1983. Adult return rates are declining and are often less than 1%⁵¹.

This excess marine mortality remains to be explained. Global warming is regularly pointed out, and several scientific articles explain how salmon are having increasing difficulty feeding in the open sea.

The study by *Utne et al.* (2021)⁵² of the diet of two thousand five hundred and forty-six young salmon (post-smolts) collected over twenty-five years between the west of Ireland and the northern

Norwegian Sea establishes a clear reduction in the physical condition of young fish in the Norwegian Sea during the decade 2003-2012. Stomachs are less and less well filled, quantitatively but also qualitatively, with fewer fish larvae and fewer amphipods, which are high-energy prey that cannot compete with replacement prey such as zooplankton and insects.

Tyldesley and *al.* (2024)⁵³ found that the prey energy available to feed the fish that are prey of salmon at the beginning of their marine migration has declined dramatically across much of the Northeast Atlantic, particularly in key salmon migration areas, over the past 60 years.

Through a literature review of 350 articles, Dadswell and *al.*⁵⁴ question the supposed priority of that explanation linked to global warming, damage from salmon aquaculture or marine predation. They formulate the central hypothesis according to which the former official salmon fishermen on the high seas, those who fished in full view of everyone, before the 1983 moratorium, around Greenland, the Faroe Islands and in the Norwegian Sea, continue to fish as usual, by simply switching to fishing that is neither declared nor controlled, taking advantage of the absence of satellite or aerial surveillance by NASCO.

Fishing is carried out with driftnets or longlines in a banana-shaped area (“*banana box*”), between Greenland, Iceland, Norway and Spitsbergen, beyond all Exclusive Economic Zones, escaping national jurisdictions. The authors suspect a Japanese and Chinese fleet of 120 units, which regularly comes to stock up in Saint John's, the capital of Newfoundland.

I formulate the following central hypothesis. The French ultra-coastal fishermen, to whom the French administration prohibits the capture and marketing of salmon that it reserves only for licensed estuarine fishermen⁵⁵, simply continue to fish as usual, close to the coast, with nets particularly adapted to catching salmon, switching to fishing that is neither declared nor controlled, taking advantage of the lack of surveillance by the administration.

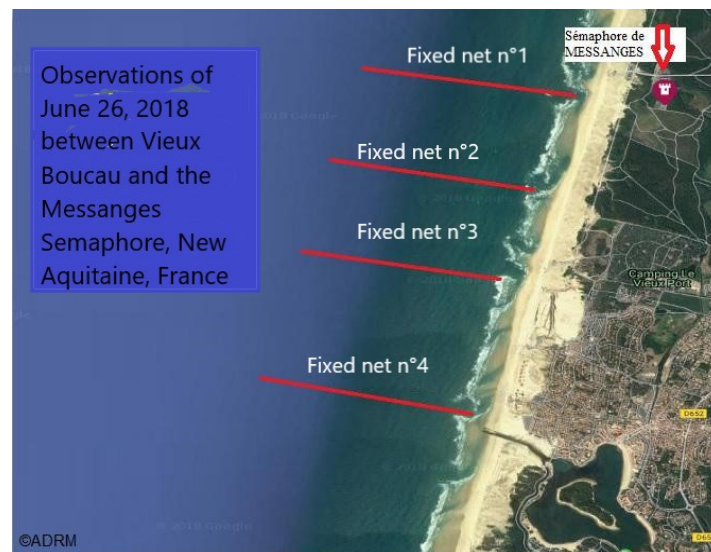
The evidence supporting this hypothesis is very serious.

Progress on nylons makes it possible to constantly increase the heights of nets that can now block the entire water column from the seabed to the surface where they emerge.



These so-called "*straight*" gillnets, as high as 14 to 16 meter walls, are adapted to intercept salmon that cross just under the surface, along our coasts. The serial laying is intentionally perpendicular to

the coastline and the swimming direction of the migratory fish, from land to open sea, that is to say "Land-Sea" in fishing jargon.



It has been 15 years since a Local Committee of Fishermen explained⁵⁶ : “Since 2009, coastal salmon fishing has been established at a level of fishing effort and over a period of time that is out of all proportion to what was previously practiced, mainly along the southern coast of Landes. This exploitation, which involves several dozen vessels, has developed both due to the use of a new type of net that is particularly effective, due to its height in fishing action, on salmon and other species (meagre, sea bream, etc.) and due to the high prices of salmon when it is first put on the market (one of the highest selling prices per kilo of all species caught by sea fishing)”

Fishermen rightly call them “fish-all” nets. Salmon, shad and sturgeon are caught too frequently by these coastal nets to not compromise the immense efforts made for them in fresh water. Dolphins, comon murrens and leatherback turtles are also affected.

According to two reports of observations taken on board in June-July 2000⁵⁷ and 2001⁵⁸, **3 salmon are caught on average per tide per ship**. The administration will simply have to never publish these reports. It can be deduced that each ship catches 132 salmon for the two months of June and July alone, which brings to more than 4000 the number of salmon intercepted along the Basque-Landes coast, before their return to the Adour ... or to Spanish rivers.

The coastal fishermen, authorized to fish exactly as they should and where they should so that the catches occur, beg the administration to grant them the right to sell these salmon, so many of which are found dead in their nets, in a pathetic letter dated August 8, 2013⁵⁹ :

“3 years ago, we accidentally caught 10 salmon in the entire season and sold them for €40/kg... This year, 2013, by-catches have increased 15-fold. There are salmon everywhere, from the coast to 2 miles, whether in the South (Labenne) or to the North (Messanges). Count how many we destroy!”

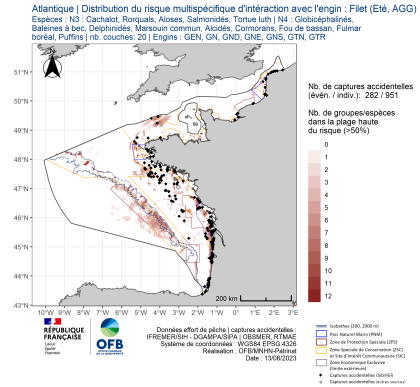
Faced with the inflexibility of the administration, the fishermen decided to no longer declare “accidental” salmon catches and the declarations were suddenly cancelled. Officially, almost none are caught at sea anymore, but salmon continue to die by the thousands along the French coast.

Scientists will then exploit a second source of information based on on-board observations.

In 2017, they estimated that accidental catches in the Bay of Biscay had "proven" harmful effects on salmon and sturgeon and "suspected" effects on shad. ⁶⁰.

End of 2022, a French multidisciplinary scientific article⁶¹ proposes to limit access to the coastal strip of gears capable of capturing anadromous migrants.

In 2023, the French Office for Biodiversity confirms ⁶² a "probably high proven impact" on salmon in the Loire and Gironde estuaries, "given the large number of catches observed for a small part of the fishing effort and the very low numbers of the populations concerned". Unsurprisingly, these catches are concentrated along the coasts.



In 2024, the MigrenMer Report⁶³ deduced from 169,000 on-board observations since the 1980s that salmon and allis shads are caught in coastal waters, and overwhelmingly by fixed nets.

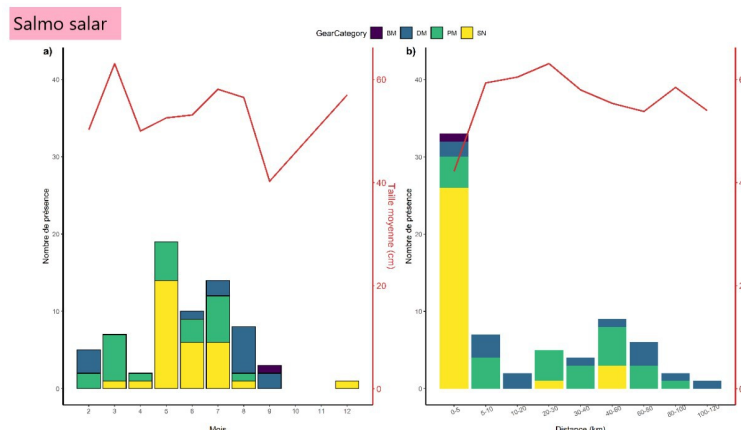


Figure S54. (a) Nombre de présence par catégorie d'engin et taille moyenne par mois. (b) Nombre de présence par catégorie d'engin et taille moyenne par distance à la côte. . BM = Mobile Benthique, DM= Mobile Démersaux, PM = Mobile Pélagique, SN = Filets statiques.

Source : Dubost Gaspard, Elliott Sophie, Rivot Etienne, Acou Anthony, Beaulaton Laurent, Deleys Noémie, Reveillac Elodie (2023). **Rapport du projet « MigrenMer » : Synthèse et valorisation des connaissances disponibles sur les migrateurs amphihalins en mer.** Rapport scientifique du pôle MIAME. 81 p. + annexes

In conclusion, while it is likely that the feeding difficulties linked to global warming for young salmon at sea are significant, it is certain that we will be powerless to alleviate them. This is a compelling reason to act on the pressures within our reach, that is to say, reduce the catches at sea of the unfortunate genitors who, after having succeeded in overcoming these difficulties, come back just to perish a few cables from their estuaries, in one of the countless fishing nets close to our coasts. We must also put an end to the commercial salmon fisheries still permitted with a driftnet in the Adour estuary and upstream in the Adour itself.

Coastal fishing and mortalities of dolphins and seabirds

The responsibility of coastal fishing nets in the capture of protected species, such as small cetaceans and seabirds, is clearly established.

The report of the Agro Institute of Rennes of April 2024 ⁶⁴ characterizes fishing fleets according to their environmental impacts (overexploitation, damage to the seabed, catches of protected species, catches of juveniles fish and carbon emissions) and socio-economic impacts (added value, employment, wage costs, gross operating surplus and subsidies). According to this report, coastal longliners and coastal gillnetters have a very strong "*protected species footprint*" (birds for the former, marine mammals for the latter):

"85% of the catches of birds and marine mammals are made by the dormant fleet (birds by lines, mammals by nets), and in particular by coastal vessels (70% of the total). Coastal longliners and gillnetters are responsible for 55% of the accidental catches of birds and marine mammals."

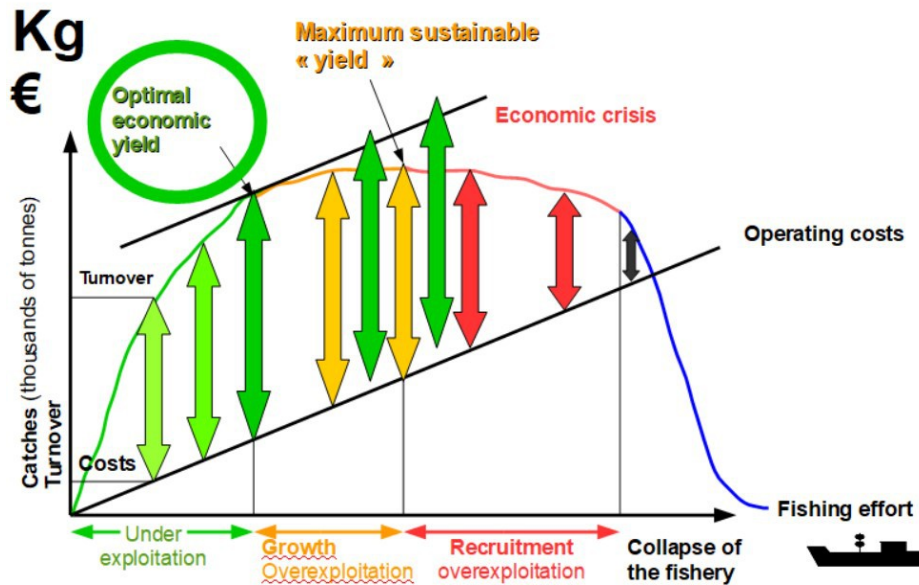
React

Towards optimal economic yield

Rather than maximising the tonnages landed in the name of the so-called "food autonomy" from which we are moving further and further away, the common fisheries policy should optimise the profits of fishing companies. The principle of Maximum Sustainable Yield is a permanent authorisation for growth overexploitation which has made the big fish disappear and forces fishermen to compete for juvenile fish. This outdated principle must be set aside in the dual interest of fishermen and marine biodiversity.

It is time to move to Optimal Economic Yield, as Larkin and others explained in vain half a century ago. This paradigm shift corresponds to much higher minimum catch sizes and correspondingly increased mesh sizes. It is expected that it will result in the capture of fewer but larger fish so that tonnages will be higher, valorization better and **above all operating costs much lower**. This will allow the abandonment of non-selective fishing techniques in favor of selective line and trap fishing⁶⁵ :

"Conversely, effective protection of juveniles, and more generally of young fish, would make it possible to maintain significant biomasses in the ecosystem. It would make possible catches that are just as significant as today, but made up of a smaller number of large fish and made with lower fishing pressure and therefore lower operating costs. And above all, the increase in biomass thus induced would open the door to the use of gear that has less impact on the seabed (lines, traps, etc. rather than trawls), and therefore to the development of a virtuous spiral towards abundant resources, ecosystems in good condition, and profitable fisheries with low impact. The protection of juveniles is therefore a key element in reducing the ecological impacts of fishing and an ecosystem approach to fleet management."



The Golden Miles Project, a proven Nature-based solution

This transition theory of course raises the problem of its implementation within the common fisheries policy, which should be modified. But locally, each Member State can legally implement the Golden Miles project under Article 19 of the European Regulation⁶⁶.

This project consists of creating a marine area reserved for selective fishing (hook⁶⁷, locker, harpoon, hand), professional and amateur, over the first 3 nautical miles.



The objective is to address the constant decline in sea fishing and anadromous migratory fish (salmon, shad, lampreys, sturgeons) and to react against the recurrence of captures of endangered

species (small cetaceans, seabirds and sea turtles). The choice of the three-nautical-mile coastal strip is justified by the presence of two fundamental biological functions in very coastal waters, namely:

- nurseries, where juvenile fish of the most important commercial species develop,
- and the migratory corridors of anadromous fish, salmon and sturgeon in particular.

The project is eligible for European funding, LIFE⁶⁸ or FEAMPA⁶⁹ in order to :

- support river and estuarine fishermen, possibly coastal fishermen,
- finance scientific monitoring by IFREMER / OFB / INRAE / MIGRADOUR / MIGADO⁷⁰,
- and the specific control of river recreational fishing and sea professional fishing (in the coastal strip).

Several species and groups of threatened species will benefit from this MPA, including:

- Atlantic salmon (*Salmo salar*) and European sturgeon (*Acipenser Sturio*), a critically endangered species (IUCN), for which the efforts undertaken are still without results, but also shad (*Alosa spp.*) and sea lamprey (*Petromyzon marinus*). The latter species will benefit from an increase in the size of the fish on which it depends,
- marine mammals and birds and sea turtles,
- the angel shark (*Squatina squatina*), a shark that was once common on our Aquitaine coasts and is now a critically endangered species (IUCN).

For practical reasons, the first GOLDEN MILES project should be rolled out at the local level of the Nouvelle-Aquitaine region. Such a pilot project only corresponds to an area of around 1,000 km², compared to what exists in California for sea turtles (42,000 km²), in Australia for pinnipeds (17,000 and 18,500 km²), in New Zealand for delphinids (17,530 and 31,500 km²) and... in the French Southern and Antarctic Lands for seabirds (several tens of thousands of square kilometres)⁷¹.

The GOLDEN MILES project allows large proportions of juvenile fish of most commercial species to be saved without forcing fishermen to increase the mesh sizes of their nets but by encouraging them to fish selectively in the three-mile strip.

Avoiding the capture of juveniles by nets will lead to the same results as an effective increase in minimum catch sizes. The potential gains resulting from respecting the growth of fish are a great hope for all world fisheries. Many studies⁷² predict that landings and valuations will increase while operating costs will decrease significantly.

The GOLDEN MILES project will ultimately improve production, in accordance with the provisions of Articles L1, L2 and L911-2 of the French Rural and Maritime Fishing Code. It involves:

- (1) Moving fixed nets away from the coast⁷³,
- (2) Compensation for estuarine fishermen (end of drift nets) and possibly for coastal fishermen,
- (3) Scientific monitoring of the restoration of coastal nurseries,
- (4) Continuing the restoration of ecological continuity in the river environment (dams),
- (5) Monitoring compliance with the rules, including permanent monitoring of amateur salmon line fishing in the Gaves (reinforced local OFB team) and maritime fishing in the coastal strip.

Historically, several authors have already proposed measures to relieve coastal nurseries, rightly

aiming to move bottom trawling away beyond three miles. In 1981, Philippe Fournet, to whom we owe a history of the port of Arcachon⁷⁴, proposes that fishermen “*reconnect with the tradition of offshore fishing, which spares spawning grounds and nurseries*”.

In 1996, Jean-Claude Quero and Orestes Cendrero⁷⁵ document the vertiginous impoverishment of Arcachon's waters since the 18th century, identify bottom trawling as the primary culprit and advocate for reserves.

In 2015, Laurence Fauconnet's team⁷⁶ strongly suggests that the poverty of Arcachon's waters would be linked to this derogatory trawling.

Since the 90s, Ifremer has accumulated very negative opinions⁷⁷ against this trawling within three miles wherever the administration asks for its opinion in the name of protecting juvenile fish.

Professional fishing of anadromous migratory fish has been banned in rivers and at sea in the Nordic countries. For example, coastal nets were banned in 1989 in Norway, 2000 in Quebec, and 2007 in Ireland.

Ironically, the Golden Mile principle was introduced on the west coast of Ireland following a meeting organized in the French embassy in Dublin. At the initiative of the Icelander Orri Vigfússon, founder of the North Atlantic Salmon Fund who will receive the Goldman Environmental Prize in 2007, it brought together all the ambassadors of the coastal countries of the North Atlantic. Its success shows that it is possible to arrive at the right solution collectively⁷⁸.

In the USA, the ban on commercial river fishing dates back to 1948⁷⁹ while the distancing of maritime nets from the coast was gradually put in place between the 80s (for Texas) and 2010 for the last North American states.

This North American story is told in the first chapter of the book *GOLDEN MILES*. The *GOLDEN MILES* project is none other than this formidable win-win strategy implemented for decades in all the North American coastal states where it is fully validated by the administration. Causing a spectacular restoration of fish abundances and sizes, it has long guaranteed easier fruitful fishing and ensures the benefits of coastal fishing and other sectors of activity.

The key measure of marine restoration, it is a project of national ambition, capable of redressing the indicators and making the future of French coastal fishing and anadromous migrants finally optimistic.

The Golden Miles project, a solution that will have to come from citizens

To implement such a project, the greatest difficulty will perhaps be our indifference to the fish that we see dead and neatly arranged on a fishmonger's stall but never alive and interacting in their natural element. To speak only of salmon, the immense services that it provides should be better known.

Scientists estimate that the almost systematic death (90) of salmon after reproduction upstream of the watersheds created the supply of organic matter and nitrogen necessary to enrich the bottom of the exclusively mineral valleys at the end of the Quaternary glaciations and thus allow the establishment of the first forests. Conversely, the forests that we clear-cut are essential to the

regulation of water flows and quality.

Salmon and sea trout are the essential intermediate hosts of the pearl mussel (*Margaritifera margaritifera*), a critically endangered freshwater mussel that has been decimated by the search for pearls for Europe's royal families and that spends its life filtering river water. We would be well advised to reclaim this self-filtration system for our rivers.

Finally, salmon are themselves very demanding when it comes to water quality. Allowing them to recolonise our basins would be the best guarantee for the much-threatened quality of our surface waters.

If the European Union is now trying to backtrack by funding the creation of hedges and the re-meandering of rivers⁸⁰, if gentle forest exploitation methods oppose clearcutting by proposing irregular high forests with continuous cover⁸¹, correcting past mistakes is hardly relevant in marine fisheries, a sector still dominated by extractivism, inertia, data opacity and deliberately insufficient control. Contrary to what is often repeated, current management threatens the fisheries of tomorrow and employment, as demonstrated by the downward trajectory of all indicators.

We should not expect anything significant from the proliferation of marine protected areas as long as they remain fictitious and reduced to geometric surfaces on paper maps, because it is not square kilometers that should be simply designated but biological functions that should be protected for real.

The first marine area to protect both coastal nurseries and migratory corridors, the Golden Miles project has had such positive repercussions in the USA that it motivated a trip by the French national fisheries committee to see them on site. But the committee has refrained from publishing any report.

It is therefore naturally up to us, the citizens and NGOs, to give life to the Golden Miles while there is still time.

Philippe GARCIA,
DÉFENSE DES MILIEUX AQUATIQUES (DMA)

non-profit law 1901 environmental protection association

RNA number W332021802

EU transparency register number : 741860332287-62

address: Maison de la Nature et de l'Environnement,

2 quai de Brazza 33100 BORDEAUX FRANCE

mail: maigre42@gmail.com

website: [Préservation | Défense Des Milieux Aquatiques \(defensedesmilieuxaquatiques.org\)](http://Préservation | Défense Des Milieux Aquatiques (defensedesmilieuxaquatiques.org))

Facebook page: <https://www.facebook.com/maigre40/>



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Source : Salmon Group Established to Examine the Implications of Alignment with the Scientific Advice for the Commercial Salmon Fishing Sector in 2007 and Beyond, A Report to Minister for State at the Department of Communications, Marine and Natural Resources, John Browne T.D. Prof. Tom Collins, Mr John Malone, Mr Padraic White OCTOBER 2006

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