

“The future ocean will be bursting with life.”

RAINER FROESE

The future of fishing: Looking ahead to 2100

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Assuming that common sense prevails, fishing in 2100 will have very little in common with the industry as it is today. The future ocean will be bursting with life, with extensive oyster beds and **kelp forests**, immense shoals of fish, families of whales, and an abundance of seabirds. Only a small proportion of the sustainable fish stocks will be fished, and yet fishing will supply more protein for human consumption than it does today. Fish stocks will only be fished until they reach 75 per cent of their natural population size, to ensure that they can continue to play their important role in the ecosystem as predators and/or prey despite fishing activities. Individual fish will only be caught after they have reached their maximum growth rate and have already reproduced, thus minimizing adverse effects on fish stocks and avoiding unnatural selection. The fishing gear of the future will mainly consist of “smart” traps operated by remote control, which will only catch the target species of the desired size and quality. In this future scenario, dealers can inspect the fish in the trap and select those they wish to purchase. Fish that do not find a buyer quickly are released back into the wild. The fish that are sold are removed from the traps, killed swiftly and humanely, and reach the consumer within 24 hours. The traps and fishing vessels that provide this service are powered by renewable energy and rely on a high level of automation and remote control. In future, by far the majority of fishers will be technicians who operate and maintain their systems from an onshore base.

Dr. Rainer Froese is senior research scientist at GEOMAR. His research areas are fisheries biology and biodiversity structures of fish. One aim of his work is the accurate presentation of fish species and other marine animals in the internet and on other platforms.

Kelp forests are diverse and complex ecosystems and a component of certain marine coastlines. Kelp, from which they take their name, is a large, multicellular type of algae. Kelp forests provide a habitat for many mammals, fish and invertebrate species and are regarded as the underwater equivalent of terrestrial rainforests.

THE FUTURE OF FISHING:

The swim bladder is an organ that only bony fishes possess. The fish can use it to match its specific weight to that of the water, and thus remain suspended.

Although all these technologies already exist on fishing vessels today, albeit for other purposes, today's fishers think in ways that would be familiar to the whalers of the 19th century. The fishing lobby is still demanding unrealistically high quotas and more opportunities to use destructive equipment, even in protected areas. Agriculture ministers, whose portfolios generally include fisheries as well, often see no problem with plowing up the seabed in an effort to catch plaice or cod. The general public often still harbors romantic notions of its fishers resting beside their nets spread out to dry beneath a setting sun, even though the reality of industrial fishing is very different. Consumers who wouldn't dream of buying anything but free-range eggs often have no idea of the suffering inflicted on fish before they get to market. They don't realize that the fish could well spend up to 12 hours in the net, being dragged along the ocean floor, or 24 hours struggling on a hook, or might be pulled up from the depth so quickly that their expanding **swim bladder** bursts out of their mouth. They may be crushed to death under the weight of tons of fish, suffer the agonies of suffocation on board small fishing vessels, or be processed on factory ships while still alive.

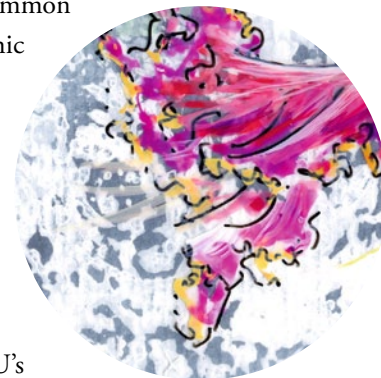
Unnecessarily large fishing fleets and destructive fishing techniques such as bottom trawling are only possible because the fishing industry receives massive subsidies from the taxpayer. In Germany, the subsidies paid for fuel, innovation, safety equipment, etc. exceed the value of the landed catch. As a result, fish stocks worldwide are overfished and the number of severely depleted stocks is increasing. Since 1994, binding international agreements on sustainable fisheries have been in place, with New Zealand, Australia and the US being the first countries to enact their provisions in national law. The fish stocks in these countries' exclusive economic zones have now recovered, their fishing industry is making a profit, and most subsidies paid to the fisheries sector have run out.

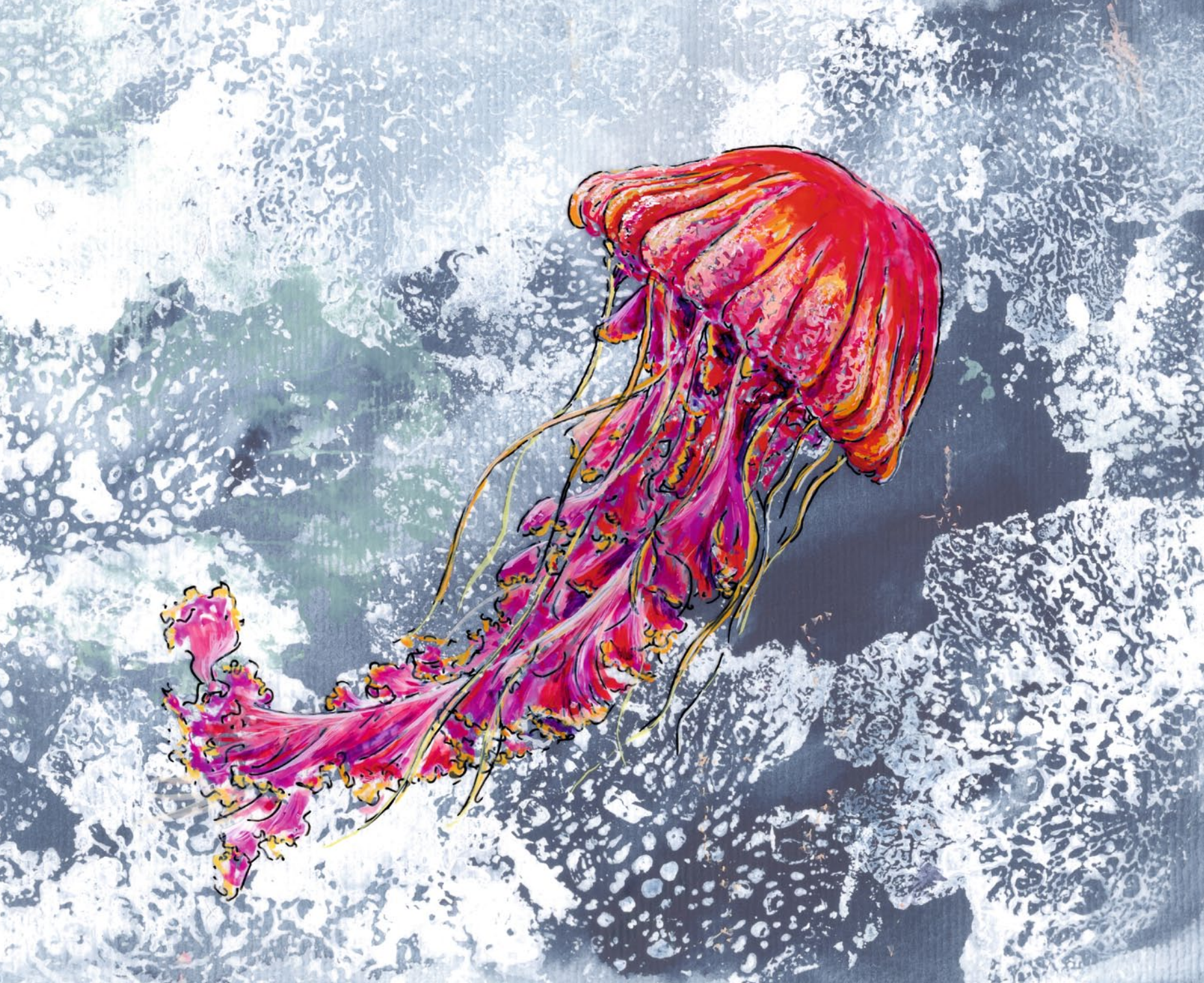
In Europe, too, decades of overfishing and the use of destructive equipment have resulted in severe depletion of stocks and inflicted massive damage on the marine environment.

In the past, at their annual meetings, the European agriculture ministers adopted ever higher catch quotas, effectively legalizing overfishing. However, campaigns launched by environmental organizations such as Greenpeace and WWF to raise public awareness, for example with brochures on sustainable fish consumption, combined with the far-sighted reaction of some market players who opted to cultivate a “green” image, have changed the political landscape in recent years. The European Commission has now presented a radical proposal for the reform of the Common Fisheries Policy, which is based on international standards for sustainable fisheries. The proposal would bring Europe into line with the standards in place in the restructured fishing industries in New Zealand, Australia and the US. It would also have a significant impact on global fish trade and would bring the world much closer to the vision for fisheries in the future ocean described above.

With its basic research, the Kiel Cluster of Excellence “The Future Ocean” is playing its part in promoting sustainable fisheries. A team of scientists at the Helmholtz Centre for Ocean Research Kiel (GEOMAR), the Kiel Institute for the World Economy, the Walther Schücking Institute for International Law, and the Faculty of Economics and Social Sciences at the University of Kiel have produced a critique of the Common Fisheries Policy, analysing the weaknesses that, from a biological, economic and legal perspective, meant that it was “designed for failure”. In a paper published in the academic journal *Marine Policy*, they conclude that “excessive quotas ... and payment of direct and indirect subsidies by both the EU and Member States have resulted in too much fishing effort and excessive exploitation rates, resulting in low stock sizes, low catches and severely disturbed ecosystems”.

In a second study, the scientists investigated whether Europe is likely to reach the goal of rebuilding its fish stocks by 2015, in line with the EU’s pledge made in 2002 at the World Summit on Sustainable Development in





Johannesburg. The analysis shows that if current fishing pressure continues, 91 per cent of the European stocks will remain below target. Together with scientists from Australia and the US, the Kiel teams then carried out a third study to develop harvest control rules that are economically sound, compliant with international fishery agreements, supportive of ecosystem-based fisheries management and compatible with the biology of European fish stocks. Compared to the current **fisheries policy directives**, these rules would lead to higher long term catches from larger stocks at lower cost and with less adverse environmental impact. A fourth study shows that the yields from cod stocks in the eastern Baltic Sea will increase threefold over the next five years if the stock is managed according to the control rules. In recognition of these successes, the scientists were invited by the leading academic journal Nature to publish an article about Europe's Common Fisheries Policy in its influential World View column.

The findings of all the studies have been shared with decision makers and stakeholders on various occasions, including presentations to European Parliament working groups, at WWF in Brussels, at meetings with representatives of Germany's Agriculture Ministry, and at expert hearings in the Dutch Parliament. Our hope is that this interplay between science, decision makers and the general public will contribute to making our vision of a healthy future ocean a reality.



Fisheries policy directives are adopted by states or communities of states. They often stipulate catch quotas for specific fisheries that are developed through difficult negotiations among stakeholder groups, but do not necessarily consider the state of fish populations.