Aquaculture News and Information from Around the World
SeaWeb Aquaculture Clearinghouse
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1. Race underway to craft rules for U.S. fish farming

Naples Daily News
www.naplesnews.com/npdn/news/article/0,2071,NPDN_14940_2726066,00.html
By Cathy Zollo
March 13, 2004

The race is on to write the rules that will govern fish farming in U.S. waters, particularly the Gulf of Mexico.

Over recent weeks, the Gulf of Mexico Fishery Management Council has sought comment from fishermen, environmentalists, fish farmers and aspiring fish farmers on what they'd like to see in the rules.

About 100 fishermen and others showed up for a scoping meeting in Key West on Monday, but only about a dozen stayed late to talk about fish farming.

Wayne Swingle, executive director of the fishery council, said it was a hot topic at other meetings around the Gulf.

All the effort ˜ eight meetings in all five Gulf states ˜ might be for nothing. The National Oceanic and Atmospheric Administration has been crafting legislation that would streamline the permitting process and open U.S. waters to leasing by aquaculture entrepreneurs, though insiders and observers say the effort is stalled.

Such legislation would pre-empt any rules put forth by the fishery council, but the groups that want a say in writing any fish farming rules showed up anyway to make suggestions, including one to just drop it.

That came from environmentalists, entrepreneurs and those with social and economic concerns, but their opposition arose from different concerns.

Environmentalists say not enough is known about open ocean fish farming to proceed so hastily with rule-making. Those rules add up to several dozen pages of regulations that address everything from the kind of fish aquaculturists could raise or modify to where facilities could operate and what kinds of permits they would require.

Marianne Cufone, program manager with The Ocean Conservancy in St. Petersburg, said now is not the right time to begin such rule-making for several reasons.

"I'm confused by the sudden push for open ocean aquaculture in the Gulf of Mexico," she said. "There is not yet the right science. Everything is fragmented."

Going ahead with something that seems harmless at first blush is a mistake, environmentalists say, and point to the draining of the Everglades for proof.

Fish farmers who've already cleared the financial and bureaucratic hurdles that come with such ventures don't want to fix what isn't broken for them.

Ed Cake, chief scientist for Gulf Marine Institute of Technology, the research and development arm of a 14-year-old Gulf Breeze, Fla.-based fish-farming operation, said his company has the necessary U.S. Army Corps of Engineers and U.S. Environmental Protection Agency permits to operate a farm. But the effort became complicated in recent years with a legal battle after Texas rescinded a permit to allow GMIT to operate off a converted gas platform near Port O'Connor, Texas. While that argument rages, the company moved to another site seven miles off Perdido Bay in Northwest Florida.

Cake said the proposals brought by the fishery council will hurt an industry that is just taking off in the United States.

"We found their proposal highly discriminatory against a new industry," Cake said. "If it never gets off the ground, (the fish-farming business) will continue to go overseas with our money and our jobs, and at some point you have to be pro mariculture."

Cake reserves the word aquaculture to freshwater operations. He insists ocean operations should be called mariculture.

But it's a minor point among many that he and his company make to the fishery council regarding the proposed aquaculture policy.

Cake said the business needs the fewest rules possible, with an eye toward adapting them as time goes on to give the industry its best chance for success.

It's an industry he says the United States needs to encourage, he said.

Fish stocks continue to decline in the face of rising demand for seafood. The United States imports 60 percent of its seafood, making it the second largest trade deficit item after oil, according to the Department of Commerce.

That annual deficit stands at $10 billion but likely will rise. The demand for seafood s expected to grow 70 percent by 2025.

Cufone said that while she is hopeful aquaculture is all its proponents claim, that doesn't mean the country should rush into an environmental unknown.

Cufone said as well that rules requiring "best management practices" ˜ bureaucratic jargon for doing the least polluting possible with current technology ˜ have no teeth without anyone to enforce them and little punishment for violators.

"There's no way to deal with something that might go horribly wrong in aquaculture," she said.

"Horribly wrong" would be a mass escape of genetically modified fish or exotic species and the diseases that might arise from fish living in close quarters with, perhaps, the introduction of antibiotics and chemicals to treat the cages.

"If there's a major event, you might not even know about it," she said, because the cages are in open water.

Some aquaculture proponents say these are concerns that they can and will address.

Dan Benetti, director of the University of Miami's aquaculture program, offers some assurances that have come with research he's done with the university's Rosenstiel School of Marine and Atmospheric Sciences.

Benetti says there should be certain givens for any aquaculture operation to be successful and sustainable, those being that the operation is in a strong current, grows native fish, works toward feeding a vegetable protein-based food and uses "pro-biotics" ˜ friendly bacteria ˜ instead of antibiotics to prevent disease.

Benetti says there is no reason to genetically modify fish when there are cobia, similar in taste to cod, that grow up to 20 pounds a year.

All Benetti's answers don't do much for Mike Skladany, senior associate at the Institute for Agriculture and Trade Policy, a group that seeks to promote family farms, rural communities and ecosystems.

While some groups concentrate on the environment and business impacts of aquaculture, others worry about the social and cultural implications of what uses of the ocean might arise from fish farming, including the lease and perhaps sale of land that belongs to the public but is held in trust for them by the government, the EEZ.

That's the 3.4 million-square-mile Exclusive Economic Zone that begin where state waters end ˜ three to nine miles offshore depending on the state ˜ to 200 miles offshore.

That's where much of the fish farming will happen.

Skladany says the opening up of those waters to business without the proper safeguards could easily lead to a privatization of the oceans.

"It's all about making money at our expense," he said, adding that smaller operations run inland might cost more, but they would employ more people and sustain more small communities.

----------BACK TO INDEX----------

2. Salmon company crippled by court decisions put up for sale (Maine)

Maine Today
>From GROWfish.com
www.growfish.com.au/content.asp?contentid=1346
3/12/2004
By David Sharp

A salmon-farming operation crippled by a lawsuit, natural disasters and regulations prompted by the Endangered Species Act has been put up for sale, officials said Thursday.

Rumors that Atlantic Salmon of Maine was for sale were confirmed in documents filed in U.S. District Court in Portland.

"There are potential buyers, and there are negotiations," Jeffrey Thaler, an attorney for Atlantic Salmon of Maine, said Thursday. An employee buyout is among the possibilities, Thaler said.

Steve Page, general manager for Atlantic Salmon of Maine in Belfast, declined to comment on any potential sale other than to say he hoped the matter would be resolved in at most a few weeks.

It´s unclear when the company was put up for sale. Page indicated in court documents as far back as Dec. 29 that the Norwegian parent company, Fjord Seafood, was considering selling Atlantic Salmon of Maine.

Atlantic Salmon of Maine, one of the state´s three largest salmon companies, has struggled under a judge´s rulings in a federal lawsuit accusing the company of violating environmental regulations.

U.S. District Judge Gene Carter ordered the company to abandon its broodstock program, forcing it to look to its competitors for salmon eggs. It also ordered the company to leave its salmon pens fallow for two years.

But the problems began long before then.

There is a worldwide glut of salmon, and Atlantic Salmon of Maine was further hurt by a 2001 storm that allowed 100,000 salmon to escape and by the slaughter of thousands of fish required because of a fish disease in 2002.

But the judge´s rulings may have hurt the most.

Carter´s decision to require the immediate elimination of broodstock created with European fish strains forced the destruction of more fish and left Atlantic Salmon of Maine looking to Canadian competitors for fish to stock in its pens.

"Maybe the parent company didn´t see any light at the end of the tunnel," said Andy Goode of the Atlantic Salmon Federation.

Atlantic Salmon of Maine already has closed one of its freshwater hatcheries and it will close another this spring. The company will continue to harvest 950,000 fish growing to maturity in pens off the coast, but won´t be stocking any additional fish this year, Page said.

The company owns 14 leases for prime sites off the Down East coast for raising salmon to maturity.

----------BACK TO INDEX----------

3. Fast-growing genetically engineered salmon raise the specter of environmental calamity (US)

Union Tribune
www.signonsandiego.com/news/business/20040314-9999-news_mz1b14fishes.html
By Terri Somers
March 14, 2004

A new creature, slick and scaly and swimming around in saltwater tanks near the Massachusetts coastline, threatens to escape into the ocean where it could propagate madly and ultimately kill off the world's wild salmon.

That's the fear of a far-flung group of individuals who oppose the creature's existence and sometimes refer to it as "Frankenfish."

It looks innocently enough like an Atlantic salmon. But it has been altered through biotechnology to contain the genes of an ocean pout, a fish that does not freeze in waters that

would kill a meeker species. The transplanted genes trigger the salmon's growth hormones, making the fish grow five times faster than normal.

The scientists whose work created the salmon say the nightmare scenarios are greatly exaggerated. They tout the fish as affordable protein that could help feed starving nations.

But while few critics say eating the fish would be dangerous, some suggest its effect on nature could be irreversibly negative. Should it escape, the critics say, this uber-fish would beat wild salmon to the food and the mates, forever polluting the salmon gene pool and obliterating some wild species already on the endangered list.

Fish that receive transplanted genes of another organism, also called transgenic fish, are the latest genetically modified organisms at the center of a debate pitting scientist against scientist; bottom-line businessmen against environmentalists; and consumers seeking affordable, healthy food against the shopper who seeks out organic products. Genetically modified vegetables and cotton previously have been approved by the Food and Drug Administration.

California, home to the nation's largest number of biotechnology companies, became the first state to take a stand on the fish issue last fall by banning the introduction of transgenic fish into its waters in anticipation of products soon to hit the market. Researchers must apply for a permit to import the fish to their labs for study. Washington, Oregon and Maryland have followed California by passing their own regulations on transgenic fish.

California's ban prevented the importation and sale of the GloFish, an ornamental aquarium fish genetically altered with the genes of a sea anemone so that it fluoresces under ultraviolet light. A Texas-based company began selling the warm-water, freshwater fish in January.

"A chemical spill, as terrible as it is, can often be contained and its damage dilutes over a period of time," said Joseph Mendelson, legal director for the pure food advocates: the Center for Food Safety. "It's the exact opposite for these transgenic fish. They can escape and mingle with the native populations, pass on genetic traits, and their presence will just continue to grow and grow. You can't reverse it."

That's rubbish, said Elliot Entis, chief executive of Aqua Bounty Technologies, the Waltham, Mass.-based company that is the first to ask the FDA to approve transgenic fish for market. The company's genetically altered salmon are no less healthy than the wild ones and the environmental risks are, at most, minimal, Entis said.

"For environmental groups, nothing sells like fear," he said. "Rather than have a rational discussion about benefits and acceptable risks, they'd rather scare the bejeezus out of the rest of us."

If approved, the salmon, called AquAdvantage, would be the first transgenic animal approved for human consumption. Federal regulators have already ruled that ingesting the fish poses no harm to humans. The agency is still studying whether the fish pose a threat to the environment.

If the fish is approved, Entis said his company would begin selling them to fish farmers across the nation, allowing them to double their production of salmon without expanding. And the fish, which reach full size in 18 months rather than four years, would further reduce the farmers' costs because they require half the amount of feed, he said.

Theoretically, reduced cost to the farmer and increased production could mean lower prices in the supermarket. Entis and biotechnology insiders who support his technology said it could help feed the hungry of Third World nations.

"Fish farming is inescapable," Entis said. "If we had to rely on the wild, we wouldn't be eating fish. West Coast fish does not exist in large enough numbers to provide a significant amount of food for people."

For years now, salmon farms have dotted the East Coast and coastal waterways in Latin America, Asia and Europe. Inland farms grow fish in tanks.

The science that led to the salmon, now being reviewed by the FDA, started about 20 years ago in a remote Newfoundland lab. Scientists who are now with Aqua Bounty were studying proteins in certain fish that allow them to live in deep, frigid waters without freezing.

After isolating the genes that create those proteins, the scientists began working with colleagues to inject the "antifreeze" genes into Atlantic salmon. Not only would that help salmon survive frigid winter waters, but the gene triggers the year-round working of growth hormones. Growth hormones of wild salmon pulse only in warm seasons, when food is plentiful.

With growth turned on full time, the scientists found the salmon grew to full size about five times faster than wild salmon.

Fiddling with Mother Nature is the only feasible way to sustain the salmon supply, according to Aqua Bounty's Entis.

Demand for seafood worldwide has increased 12 percent annually in recent years and is expected to continue to grow along with the world's population.

In many areas, the demand led to unsustainable overfishing and the collapse of open-access fisheries, according to a study commissioned by the Pew Initiative on Food and Biotechnology. Fish farming has helped meet the demand, while allowing some natural stocks to recover, at least somewhat.

"If fish farming is inescapable, the question is how to do it better and leave a smaller footprint on the environment," Entis said.

Biotechnology, he said, has enabled fish farms to shrink their footprint.

Besides doubling fish production, the AquAdvantage are more feed efficient, he said. Wild salmon will eat 10 pounds of other fish to get to the size where they produce one pound of fish

for consumption, he said, while Aqua Bounty's salmon eat 1.3 pounds of fish to produce one pound for consumption. And less food in the front end means less waste out the tail end and into the seas, where too much can promote algae blooms and other environmental problems.

Genetic alterations are not a new concept, Entis said. Tomatoes and numerous species of flowers have all been hybridized to produce a stronger, more sustainable fruit and flowers, he said. Before scientists unraveled any secrets of the genome, cattle and chickens were improved through selective breeding. All of that is a form of genetic engineering.

Science, and the understanding of genes, now allows the process to be more specific, said Kurt Klimpel, president of Aqua Bounty Pacific in San Diego.

Genetically altered cows, pigs and livestock have been developed for scientific applications. The FDA has approved transgenic soybeans and corn for consumption, as well as milk from cows treated with growth hormones.

The environmental debate swirling around transgenic salmon echoes the controversy that still surrounds transgenic corn: Is the cross-breeding of a genetically altered organism with a wild or natural species a bell that cannot be unrung?

A study released in January by scientists at Purdue University in Indiana found that transgenic animals produced for human consumption could doom populations of wild species if they escaped.

The scientists, who studied a Japanese Mekada fish, found that the new genes make the fish grow larger, which gives them an advantage in hunting for food and a mate. However, the Purdue study also found that the offspring of these fish are less likely to survive to adulthood. As generations pass, a population of wild fish polluted by these transgenic fish would dwindle. Using a mathematical model, the scientists determined the wild salmon would die out in 50 generations.

This same arguments are being used to bolster opposition to the transgenic GloFish.

The Center for Food Safety filed a lawsuit in federal court in Washington, D.C., against the FDA, seeking to block the sale of the fish. The FDA declined to review the fish for regulation because they are not intended for human consumption.

"(The fact that) just because a company says that GloFish are ornamental it doesn't have to go through the (regulatory) system shows it is clearly a system that has got holes in it," Mendelson said. "It is not equipped to deal with these rapidly evolving scientific issues.

"Whether they're used ornamentally or in aquaculture, escapes happen. The rush to commercialize these things is way premature."

Yorktown Technologies, the Austin, Texas-based company marketing the GloFish, said fears about its product escaping and propagating with wild species are misguided.

The fish cannot survive in salt or cold water, and its color makes it an easy target for predators, according to the company.

As for the salmon, Entis said the fish used in the studies are not comparable to his company's product. Unlike the Mekada, AquAdvantage salmon are not engineered to grow larger than wild salmon. And unlike the Mekada, size is not a factor in mate selection.

When fish are grown in pens submerged in coastal waters, Entis conceded, the containers are susceptible to storms and other elements that could create opportunities for fish to escape. So Aqua Bounty sells only salmon that have been put through a sterilization process, he said.

The eggs are zapped with a shot of pressure that prevents the chromosomes from splitting, which means only sterile fish are produced.

"They're like a young teenager. They're not interested in sex and all they want to do is eat," said Klimpel. Studies show that their focus on feeding makes them easier prey, Entis said.

But a report released in January by the National Research Council of the National Academy of Sciences cautioned that no method of containment or sterilization is foolproof.

Aqua Bounty executives and biotech industry supporters scoffed at the notion of debating their inability to make their science 100 percent foolproof.

"You can't argue the negative away 100 percent. It's like guaranteeing that martians aren't going to land in the parking lot next week," said Joseph Panetta, president of Biocom, the San Diego biotech industry organization. "You know it is not going to happen, but you cannot guarantee it 100 percent.

"What we look at in assessing risk is the degree to which safeguards have been built into the process so that we can assure the probability of risk is minimized to an acceptable level," Panetta said.

Meanwhile, in Aqua Bounty's San Diego office, besides developing vaccines to protect shrimp and fish populations, scientists are developing a transgenic method of sterilizing the salmon, Klimpel said. It involves transplanting genes that would prevent the fish from developing reproductive organs, he said.

Would such a procedure, or any other, for that matter, satisfy opponents of the transgenic fish?

"We'd have to wait and see what the circumstances are before we can answer. Right now we are so far removed from even having a (proper) regulatory structure in place to consider these issues," Mendelson said.

His group is not alone in questioning whether the nation's regulatory procedures are adequate to deal with issues posed by rapidly developing sciences.

The Pew Initiative study points out these biotech-influenced organisms are being regulated under policy established in the mid-1980s, requiring the FDA, the Department of Agriculture and the Environmental Protection Agency to use existing laws, agency regulations and guidelines to direct them.

"Without a clear and transparent road map for regulation, not only is it difficult for developers to bring new products to market, it is also hard for the public to trust that a careful consideration of risks and benefits is taking place before, not after, new products come to market," wrote Michael Rodemeyer, executive director of the Pew Initiative on Food and Biotechnology.

The Center for Science in the Public Interest, a nonprofit consumer advocacy group, noted that at least there is a preregulatory process. But the group said the process is too secretive.

"Only after the process is completed and the product is approved will they release a summary," said Gregory Jaffe, director of the Center's project on biotechnology. "The process is really not one that allows a robust discussion of the issues."

And both Jaffe and the Center for Food Safety question the expertise of the FDA, an agency created to judge the safety of food and drugs, in evaluating environmental risks. They say the argument could end up in the courts.

"The FDA doesn't have explicit authority from Congress to assess and address environmental risks," Jaffe said. "One wonders whether they have the expertise regarding fish in particular."

----------BACK TO INDEX----------

4. Aquatic scientists divided on role of sea lice from salmon farms in decline of native salmon in B.C.

NRC Canada press release
www.cisti-icist.nrc-cnrc.gc.ca/media/sea_lice_e.shtml
March 2, 2004

Salmon farms in British Columbia may pose a threat to wild salmon stocks, a paper published today in the Canadian Journal of Fisheries and Aquatic Sciences claims. The paper presents evidence that native fish sampled near the farms are more heavily infected with parasitic sea lice. Lead author Alexandra Morton, a registered professional biologist and private researcher, believes the parasites multiply on the farms and are then transmitted to juvenile native salmon, causing recent drastic declines in wild fish populations. "If we don't do anything, we're definitely going to lose the wild salmon," said Morton.

Morton monitored the levels of infection of sea lice (unrelated to human lice), naturally occurring parasites that infect salmon only, on juvenile pink and chum salmon in British Columbia's Broughton Archipelago, a chain of islands between the mainland coast and the

northern end of Vancouver Island. She then compared infection rates on salmon from sites near to and far from the farms.

"We found 3 cases of sea lice in a sample of 1,018 juvenile salmon outside of the Broughton Archipelago. Within the Broughton Archipelago," where there are 28 Atlantic salmon farms, "we found 4,338 of this species of sea louse on 1,138 salmon," - a 1,000-fold difference, said Morton. Her study showed potentially lethal levels of infection in 90 percent of wild juvenile salmon.

Morton believes the young native salmon become infected when they swim near the farms during their migration from freshwater streams to the open ocean.

Morton said that to preserve native salmon stocks, "the farm fish have to be separated from the wild fish. There are alternative technologies that allow farmers to grow fish in facilities that provide a barrier to the marine environment." A barrier would prevent transfer of disease and parasites between the farmed and wild fish.

Because of concerns about possible effects of sea lice on native fish, 11 of 27 Atlantic salmon farms in the Broughton Archipelago were closed during the migration of the pink salmon in 2003 (a practice called "fallowing"). "It was a big economic loss to the farmers," said Morton. And it didn't entirely solve the problem. "We still had over 20 percent of the fish infected, and the farmers can not repeat this measure this year."

Scott McKinley, Professor and Senior Canada Research Chair of Animal Sciences at the University of British Columbia and Executive Scientific Director of AquaNET, a National Network of Centres of Excellence in aquaculture and environmental research whose mandate is to foster a sustainable aquaculture sector in Canada, disagrees with Morton's conclusions. He suggests that there is no evidence that native fish are declining due to farming.

"With any fish population, one or two years of surveys does not make a trend. . .. There have been drastic declines in pink salmon before, and that was before there were farms here," said McKinley. "There is no study published showing a cause-and-effect relationship between sea lice on wild and farmed fish. . . All the work that's out there is based on correlations."

McKinley suggests that other explanations for the population fluctuations in wild fish are also likely. For example, population crashes could result from limited resource availability or fishing pressure. Fluctuations in water temperature on a global scale, such as those caused by El Niño, could make the salmon sick and stressed. "If you happen to be weak or stressed in terms of general health, you tend to be more susceptible to parasite infection."

Pressures from environmentalist groups about sea lice are forcing the aquaculture sector to make sacrifices based on inadequate information, McKinley said. He said that in the Broughton Archipelago "the farms were fallowed because of pressure from environmentalists who believed that there was a problem with sea lice on the farms. Although this wasn't backed by scientific evidence, farms cooperated and likely lost a lot of money."

Morton argues that similar outbreaks of sea lice paired with declines in native salmon in Norway, Scotland, and Ireland corroborate her findings. "In Norway, there are very strict regulations about how many lice you're allowed on your fish."

However, McKinley stressed that environmental conditions in Europe are different from those in British Columbia, and he warns against global extrapolations. He said that AquaNET, in collaboration with other national and international scientists, plans to study how native and farmed fish are affected by sea lice and conduct risk analyses of lice treatments.

Morton insists that if regulatory action is delayed, the consequences to wild fish could be serious. "The Norwegian scientists have said to me that they expected this problem to arise on the Pacific coast and that we will have good years for sea lice and bad years, but in the end we will lose our wild stocks. That seems unnecessary. Wild salmon are ecologically critical, and we have other options."

----------BACK TO INDEX----------

5. Poraz recommends unchanged Eilat Coast Outline Plan with no fish cages (Israel)

Globes
www.globes.co.il/serveen/globes/docview.asp?did=779513&fid=942
March 11, 2004

Minister of Internal Affairs Avraham Poraz will submit the proposal at Sunday's cabinet meeting. There are disputes over the fish cages impact on the Gulf of Eilat.

In advance of Sunday's cabinet meeting on National Outline Plan 13 for the Eilat coast, Minister of Internal Affairs Avraham Poraz has proposed approving the plan without changes and without fish cages.

Poraz emphasizes that the Regional Planning and Building Board's decision to exclude the aquaculture fish cages followed ruling by the board appeals committee and courts that the fish cages were operating illegally and their continued presence in the Gulf of Eilat would damage the corals, tourism, and the town of Eilat.

Poraz added that the ministries directors general committee, headed by Ministry of the Interior director general Gideon Bar-Lev, had also decided that the fish cages should be removed.

However, Minister of Agriculture and Rural Development Yisrael Katz will ask the cabinet to allow the fish cages to remain for three more years. Katz says the fish cages' impact on the Gulf of Eilat would be studied during this period, and alternative plans for moving the fish cages to the land or Mediterranean Sea would be examined.

Meanwhile, former Attorney General Elyakim Rubinstein and current Attorney General Meni Mazouz have both ruled that the operation of the fish cages is illegal and the Attorney General's

Office would be unable to defend a cabinet decision to reject Outline Plan 13 and retain the fish cages before the High Court of Justice.

----------BACK TO INDEX----------

6. Profit ahead of conservation: tuna farming in the Mediterranean is out of control

WWF Press release
www.wwf.fi/english/kvtiedotteet/profit_ahead.html
3/1/2004

The booming tuna farming industry in the Mediterranean is spiralling out of control and threatens the survival of the highly-endangered bluefin tuna, WWF warned today. The conservation organization has left an international body on tuna farming practices for putting profit ahead of conservation, and is highly critical of the EU, whose subsidies boost tuna fishing and farming activities.

Tuna farming ˆ the fattening of wild bluefin tuna in cages ˆ has increased by close to 50 percent in the Mediterranean last year, to reach 21,000 tonnes. It is driven mainly by the Japanese market demand for "sushi". According to WWF, this has dramatically increased the amount of bluefin tuna caught from an already overexploited stock in the Mediterranean by a growing industrial fleet.

Because it was dominated by the industry and failed to come up with effective measures to address the problem, WWF has quit a working group on sustainable tuna farming coordinated by the General Fisheries Commission for the Mediterranean (GFCM) and the International Commission for the Conservation of Atlantic Tunas (ICCAT) ˆ the two most important bodies for the regulation of fisheries in the Mediterranean.

"Tuna farming is totally out of control in the Mediterranean," said Dr. Sergi Tudela, Fisheries Project Coordinator at the WWF Mediterranean Programme. "We have decided to quit this working group because it was clearly putting business interests ahead of the urgent need to conserve tuna stocks, and failed to listen to our concerns. This is very disappointing as WWF is a key actor in tackling the urgent problem of regulating tuna farming practices."

The working group on sustainable tuna farming was created in 2002, following a request by WWF to the GFCM to set up a formal process to address the sustainability of tuna farming in the Mediterranean and to produce guidelines for its sustainable regulation.

WWF also criticizes the EU for subsidizing both the expansion of tuna fishing fleets and the development of tuna farms. The conservation organization believes the EU is to blame for allowing tuna farms to benefit from aquaculture subsidies, arguing that tuna farming is not aquaculture ˆ where fish are bred and reared in captivity ˆ as it uses fish captured in the wild. WWF urges the EU to close such a loophole.

"The EU must stop subsidizing fishing fleets and tuna farms, and decide specific quotas for farming," said Paolo Guglielmi, Head of the Marine Unit at the WWF Mediterranean Programme. "Otherwise, wild blue-fin tuna will disappear from the Mediterranean. Scientists estimate the current fishing rate to be two and a half time higher than that which is sustainable."

Mediterranean countries where tuna farms are to be found are Spain, Italy, Turkey, Malta, Cyprus, Croatia, Tunisia and Lybia. Other countries, such as France, don't have tuna farms but are involved in the capture of tuna.

----------BACK TO INDEX----------

7. Dwindling stocks: how the city is helping to save the great British fish supper

The Guardian
www.guardian.co.uk/business/story/0,3604,1163430,00.html
Paul Brown and Hans J Marter
March 6, 2004

Cod farming is about to come to the rescue of the country's traditional fish and chip supper as city investors have backed a pioneering Shetland family who have proved that cod can be successfully reared in cages like salmon.

As wild cod stocks continue to dwindle in the North Sea to what scientists describe as dangerously low levels, the Johnson brothers hope to step into the breach with 6,000 tonnes of farmed fish a year by 2006.

Already 200,000 codlings have been placed in the sea off Shetland and another 1.5 million will be added over the next two years.

With cod already more expensive than prime Scottish beef and the once luxury fish salmon, the City has put £8.5m into the pioneering farm in Vidlin in Shetland.

High prices, currently at more than £12 a kilo for prime fillets, make it worthwhile for Icelandic fisherman to fly in fresh cod to satisfy a British demand that seems undiminished despite calls by Prince Charles not to eat what is classed in some places as an endangered species.

Catches for wild cod have dropped by two-thirds in the past three decades and prices in a fish and chip shop have risen to £2.30 for a single fillet.

Overfishing has caused a disaster for fish stocks in what were once the world's largest fishing grounds off Newfoundland which have now been closed for cod fishing. Scientists have demanded a ban in the North Sea too where stocks are "below safe biological limits", but EU politicians have bowed to pressure from fisherman allowing a quota of 27,300 tonnes to be caught this year. Some fear stocks may disappear completely as a result.

Ivor and Angus Johnson, from Johnson Seafarms Ltd in Shetland, were among the pioneers of salmon farming and have grown to one of the biggest producers in Britain selling more than 2 million salmon a year. However, they can no longer make a profit because of low prices, food scares and competition from Chile, Norway and North America. They have already diversified, farming sea trout and mussels, but a mass market and incredibly popular fish like cod has been the Holy Grail for fish farmers.

Previous attempts at cod farming have been thwarted by the cannibalistic tendencies of young codlings. Researchers in Shetland hatcheries managed to crack the problem by developing a food more tasty than the fishes' brothers and sisters, and can now rear codlings in large numbers ready to be placed in cages in the sea.

Farmed salmon has acquired a dubious reputation because of the use of chemicals to control sea lice, and the accumulation of toxic substances in the flesh, but farmed cod should be free of these problems. Ivor Johnson said they had learned a lot from the mistakes of the salmon farming industry.

He also believes that farmed cod will taste better than wild cod because it will be fresher, not having been in the hold of a trawler for 10 days. It will also be free of the parasites that can burrow into the flesh of bottom-dwelling wild fish.

To prove his point Mr Johnson offered the Guardian the first fillet from a farmed cod from an experimental batch of 12,000 grown just offshore. It was the quality of the fish he produced from this batch that convinced the City to invest.

"Cod has always been perceived a relatively low-value species compared to salmon, the 'king of fish'. But we look at it the opposite way," he said. Wholesale prices confirm his view. While the Johnsons can get £1.50 a kilo for salmon, roughly 30 pence below production costs, farmed cod can fetch as much as £4.20 a kilo in the UK and up to £4.85 in the US.

Organic certification

The Johnsons are so keen to avoid the mistakes make in salmon farming that they have invited the Soil Association and the Organic Food Federation to develop an organic certification. They are also in talks with the RSPCA regarding animal welfare standard certification.

Cod are grown in the same kind of cages as salmon and naturally feed in shoals, but are far less volatile fish.

Karol Rzepkowski, project manager for Johnson Seafarms, said: "We are taking the lessons from salmon farming on board. We see the cod as a golden opportunity to get the product right from scratch."

Although 6,000 tonnes a year will make only a small dent in the 170,000 tonnes of cod consumed in the UK last year, the Johnsons hope to ramp up production with their own hatchery and processing facilities to provide jobs and extra value.

Last year 132,450 tonnes were imported, the largest amount from the Barents Sea.

But there is debate about whether the cod stocks exploited by Russia can survive this level of catches, and the Norwegians, anticipating a problem, are setting up cod farms of their own.

Mr Rzepkowski said that the company's experience from going to the City in order to raise funds for a project on a remote Scottish island proved that in vestors had a lot of faith in the future of farmed cod. He and the team at Johnsons was convinced that aquaculture was the answer to future supply shortages for fish.

Worldwide, more than 36 million tonnes of fish and shellfish are being farmed. The industry has grown at a rate of 10% annually since the early 90s.

Some industry analysts suggest that by 2030 most fish we eat will come from a fish farm.

----------BACK TO INDEX----------

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