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Earth Crash

Documenting the Collapse of a Dying Planet

Ecosystem Destruction: Overfishing, Bycatch, and Destructive Fishing Practices

(03/16/2002) British construction industry plan to turn almost 400 square miles of the English Channel into a gigantic quarry to provide sand, gravel, and crushed rock for building everything from skyscrapers to roads further threatens region's already severely overfished scallops, whiting, sole and plaice fisheries. See **Ecosystem Destruction: Oceans**.

(03/10/2002) Leading U.S. marine biologist Jane Lubchenco says problems facing world's oceans - including global warming, overfishing, and "dead zones" due to fertilizer runoff from farms - are so serious that scientists must become activists to protect them. See **Ecosystem Destruction: Oceans**.

(03/06/2002) Wild Atlantic salmon on their way to becoming extinct in Ireland's River Nore and other rivers within 10 years due to pollution, commercial driftnet fishing, and dams. See **Endangered Species: Salmon**.

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Young people respond to Earth's crisis...

Vigil for Earth

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(02/26/2001) Northeast Atlantic's coldwater coral reefs are being destroyed by deep-sea trawling nets dragged over the ocean floor; Norway has already lost 50% of its reefs. See **Ecosystem Destruction: Coral Reefs**. [includes photo]

(02/16/2002) Record 1,337 endangered sea turtles died on Florida beaches in 2001, most after drowning in shrimp nets or hit by boat propellers and hulls. See **Endangered Species: Sea Turtles**.

HOT **(02/16/2002) Scientists warn current rate of overfishing in the North Atlantic will result in an ocean-wide collapse within 10 years, leaving nothing but jellyfish and plankton.** The entire North Atlantic is being so severely overfished that it may completely collapse by 2010, according to scientists who have just completed the first comprehensive assessment of fish stocks in the North Atlantic Ocean. If current overfishing continues in the North Atlantic, trawlers could soon be left chasing jellyfish and even plankton to make "fake" fish products. "We'll all be eating jellyfish sandwiches," says Reg Watson, a fisheries scientist at the University of British Columbia who participated in the study.

While the disastrous collapses in areas like New England and Newfoundland have appeared to be local in scale, the new ocean wide synthesis reveals that the collapse applies to the entire North Atlantic Ocean. The study shows that across the region as a whole, the North Atlantic now has only about one-sixth the number of high-quality "table fish" like cod and tuna that it had in 1900 and is being fished eight times as intensively, scientists say. Fishermen are also chasing species ever lower on the food chain as bigger fish are depleted.

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"We have looked at the entire North Atlantic - Canada, USA, Europe - and what we have found is that the situation in the region is far worse than people had anticipated," project leader Dr. Daniel Pauly, from the University of British Columbia, Vancouver, Canada, said.

"With few exceptions, we are going to lose most fisheries in the next decade if we don't quickly mend our ways," said Pauly. "It may sound like a doomsday scenario, but the decline is actually accelerating. Even where stocks are doing better, they are still hovering at the bottom of a pit."

"The jellyfish sandwich is not a metaphor - jellyfish is being exported from the US," says Pauly. "In the Gulf of Maine people were catching cod a few decades ago. Now they're catching sea cucumber. By earlier standards, these things are repulsive."

The group of 10 scientists and about 50 consultants undertook the 2-1/2 year analysis after becoming frustrated by the lack of any oceanwide fisheries information. The group is composed of fishery scientists, biologists, and economists from research institutions in Europe and North America.

Most researchers and regulators tend to focus on only one species or geographical area and little of the information has been pieced together. The scientists, however, did just that, synthesizing millions of numbers regarding fish species, catches, and populations over generations to come up with a model of the North Atlantic.

The researchers divided the North Atlantic into 22,000 grid cells, each measuring ½° of latitude by ½° of longitude. Data from the past century were then painstakingly "retrofitted" on to this grid in order to calculate each cell's biomass of high-value "table fish" (ie, species preferred by humans, such as cod, haddock and halibut). The

biomass in each cell was reconstructed using a mathematical model that distributes individual species according to known environmental and physical variables, and also historical records of what fish were caught where and when. Then the researchers were able to calculate the fishing intensity as the ratio of the catch data to this biomass.

The result is a clear picture of how fishing expanded from the coasts of North America and Western Europe, pushing out farther and farther into the ocean - something known as serial depletion. This continued until catches peaked in 1975, after which the catch began to decline. Dr. Villy Christensen estimates that over the past century the intensity of fishing in the North Atlantic has increased eightfold, while the biomass of table fish has fallen by 85%.

Watson, who helped produce the study, said the crisis is evident in the collapse in catches. "If you look at those prime table-fish - the ones we value the most, the fin fish - in the 1960s, we had about 21 lbs (9 kg) per person, now we're down to a third of that; we're down to about 7 lbs (3 kg) per person. If you extrapolate that very straight linear trend, within 10 years we'll be talking about fish as if they were a myth; as if they were fond memories," said Watson.

In the last 50 years, the catch of popular fish species such as cod, tuna, and haddock has decreased by more than half despite a tripling in fishing across the North Atlantic, the study found. It is not just that there are more boats; sophisticated technology also makes the fish easier to catch. Countries spend $2.5 billion in taxpayer's money each year to "search out the last fish left" in the North Atlantic, said Rashid Sumaila of the Michelsen Institute in Norway, who conducted an economic analysis as part of the study.

At the same time, fish gets more expensive

every year, Sumaila noted. U.S. seafood prices, especially for lobsters and shrimp, have increased 20-fold since 1950. New Englanders can continue to eat their favorite fish because much of the seafood is imported from developing countries, a practice that the scientists said should not be allowed to continue.

The spiraling costs also include the price of fuel. Fishers burn more and more fuel as they increase their efforts competing to capture the last of the dwindling resources. "The fuel energy needed to capture a ton of fish has doubled over the last twenty years," says Peter Tyedmers of Dalhousie University.

Faced with dwindling stocks and rising demand for seafood, fishers are employing new technologies that leave no safe haven for fish, including the application of military technologies, spotter planes and round the clock exploitation. For most of human history, fish and other marine species had naturally protected areas: places inaccessible to fishing because they were too remote, too deep or too dangerous to fish. But civilian applications of military technologies, such as those developed for submarine warfare and espionage, have grown by leaps and bounds since the end of the cold war. These transferred technologies include sonar mapping systems that reveal every crack and contour of the seabed in exquisite detail.

The U.S. Geological Survey is now publishing maps that are enabling fishers to penetrate deep into regions once considered too difficult to fish. Private companies are also weighing in, selling the secrets of the seabed for short term profit. Guided by precision satellite navigation systems, fishers can now drop nets into previously unseen canyons, or land hooks on formerly uncharted seamounts.

"Such places may be the last refuges of vulnerable species like skates or rockfish," warned Dr. Callum Roberts, a Harvard

University ocean ecologist.

"When it comes to fisheries, we've always been moving from one thing to another," said Roberts. "If you look at the kinds of fishes that were in cookery books in the 19th century, many of them aren't even known now. For example, a large flatfish called brill was one of the most popular fish in Victorian England. It's gone. Turbot is much rarer than it used to be. The cod, which once defined the ecosystems of the North Atlantic, is at the edge of disappearance. The most important thing about deep-sea fisheries is that they are bailing us out from the problems we've created in shallow water by intense fishing. Governments are offering incentives to do it."

Fishers are also looking to the skies for better catches. Off the U.S. East coast, the Atlantic swordfish fleet receives daily faxes from the National Oceanic and Atmospheric Administration, showing satellite images of sea surface temperatures on the fishing grounds. These maps, along with temperature and depth sensors carried by boats, allow the fleet to target the places where swordfish are most vulnerable. The same technology guides the bluefin tuna fleet to the best fishing areas, and spotter planes help boats pursue schools to the last fish.

"The modern fishing armory has vastly expanded," said Yvonne Sadovy of the University of Hong Kong. "The boats of today are larger, faster, stronger and can fish in conditions that would have been impossibly dangerous 100 years ago."

They fish deeper, for longer and employ nets that can penetrate areas of rough seabed, moving rocks up to three meters (10 feet) in diameter and weighing up to 16 metric tons.

In islands throughout the Pacific, fishers have long valued the huge and docile bumphead parrotfish. By day, these wary

fish would keep their distance from spearfishers, so the take was never very high. But in recent years, spearfishers equipped with scuba equipment have begun targeting the parrotfish at night when they sleep in shoals in shallow reef lagoons.

"Spearguns and nightlights are as lethal to bumphead parrotfish today as rifles and railroads were for American Plains bison in the 19th Century," said University of Hawaii researcher Charles Birkeland.

The unsustainable pursuit of larger and more desirable coral reef species is also being fueled by the growth of international markets, and even as fish stocks steadily dwindle, there are no signs that commercial fishing companies will voluntarily change their practices since the soaring demand for fish continues to push up prices.

"Greater prosperity and demand for live food fish in South-East Asia has driven prices so high that it is profitable to pursue fish to the farthest corners of the world," noted Sadovy. "Because so many species are targeted, fishing operations can remain economically viable far beyond the point where the most vulnerable species have been eliminated."

"Fish is rapidly becoming a luxury in so many places that the prices are rising as dramatically as the harvest is falling," said of Andrew Rosenberg of the University of New Hampshire. "This means the big fishing operations have big incentives to extract even small fish - and it enables them to invest in even more technology and more powerful boats."

In Asia, reef fish are paying the price, according to Sadovy. In the past, most of the locally consumed fish came from South China Sea waters. "As economies boomed and local fisheries became overfished, fishing boats began traveling farther away from Hong Kong - as far east as Fiji and into the Indian Ocean - looking for supplies to keep

up with the growing demand," Sadovy said.

Imports of live reef fish to Hong Kong have increased from about 4,000 million tons in 1988 to about 30,000 million tons by 2000, Sadovy said, adding that demand is particularly strong in China. With improved net design and underwater imaging, live-fish carrier vessels, called viviers, can carry up to 30 million tons of fish a year from ocean habitats previously too rugged to be accessible, Sadovy explained. The giant vessels also deploy smaller boats, as many as 20 per trip, to reach inner reef sites. "The high prices paid for luxury live reef fish make such expensive operations possible," she said.

It is not only the amount of fish taken that matters. Fishing alters ecosystems, as well as depleting them, because fishermen favour the largest and most valuable specimens. Alida Bundy of the Bedford Institute of Oceanography in Nova Scotia, described this process for the Eastern Scotia fishery region off the coast of Canada.

The Eastern Scotia fishery used to yield cod. Lots of them. But catches dwindled until they suddenly collapsed in the early 1990s. Cod of catchable size simply vanished. What is more, a moratorium on cod fishing has failed to lure them back. The whole ecosystem seemed to have shifted, so that adult cod, once the top predator in the region, had no place in it.

Bundy and her colleagues used Ecopath and Ecosim, two computer programs, to track energy flows through the various species in an ecosystem and explore what had happened. They showed that there had been a shift of top predator from cod to hake and seals. More baby cod were being eaten as a result, so adult cod populations could not recover.

Ironically, this has turned out to be good for those fishermen who are willing to bend to

altered circumstances. The new food web favours invertebrate species such as prawns and lobsters, and their numbers have grown. These are worth more than the fish they have displaced. That does not, however, detract from the fact that, in the North Atlantic as a whole, the productivity of table fish has plummeted and there is no guarantee that profitable invertebrates will fill this gap.

"When there is no place for fish to hide, we can devastate entire populations. There is evidence that severely overexploited species may not recover, even decades after depletion," said University of Dalhousie scientist Jeff Hutchings.

"We are pushing fisheries off the edge of viability, and species to the edge of extinction," added Birkeland.

"The only way we are maintaining yield is by increasing effort," said Pauly. "But you need fish to make fish, and so we have created a massive reduction in productivity."

"We are realizing, too late in some cases, that severe depletion can undermine population resilience by impairing reproduction, reducing recruitment of young animals, degrading habitat integrity, and altering behavior and interactions with other species," said Howard Choat of James Cook University.

For example, more than 100 tons of black-lipped pearl oyster were taken from Pearl and Hermes Reefs in the Northwest Hawaiian Islands in 1927. Just six individuals were found during an intensive survey late in the year 2000, 63 years after the harvest.

In Canada, northern cod were depleted to a few percent of their former abundance in the early 1990s, and there is still little sign of recovery.

The common skate is becoming very rare in UK shallow seas and in European waters. Once one of the most abundant of the ray family in the north-east Atlantic and Mediterranean, it is now endangered, and extirpated from many areas. It "has probably been fished to extinction in the Irish Sea and is extremely rare in the central and southern North Sea," according to the Marine Conservation Society (MCS).

Atlantic salmon stocks have been halved in the last 20 years and are disappearing from many traditional breeding areas due to over-fishing, plus pollution, climate change and dams.

Hake has also been over-fished and is now relatively scarce. Many stocks are at risk of collapse, in particular the northern hake stock in EU waters which extend from the Skagerrak (between Norway and Denmark) to the Bay of Biscay.

A thick-set, right-eyed flatfish, Atlantic halibut is particularly vulnerable to over-fishing because of its slow growth rate and late age of sexual maturity (not until 10 to 14 years old), and is now officially listed as "endangered."

Monkfish or angler fish possess a type of fishing "lure" on top of their heads. Females do not reach sexual maturity until 9-11 years of age and are particularly vulnerable to over-exploitation. Mature females are now extremely rare.

Atlantic populations of swordfish have fallen markedly since 1980 and are still in decline, with breeding populations dropping by more than half in the last 20 years.

Worldwide, sharks are being removed from the seas at an alarming rate: more than 730,000 tonnes are landed every year, directly threatening their long-term survival. Some species long-lived and slow to mature,

while others have low reproductive rate. Many shark species are now at risk of extinction.

Chilean sea bass, also known as Patagonian toothfish, is a deep-water species from the Southern Ocean, threatened by large-scale illegal fishing which began in the mid-Nineties and has now driven stocks to the brink of collapse. Commercial extinction expected soon.

Orange roughy (*Hoplostethus atlanticus*) dwells deep in the ocean and travels long distances to spawn above seamounts in the Southern Hemisphere. Protected in the deep, it can grow to 150 years old. In the 1980s, fishing fleets discovered the fish's spawning grounds off New Zealand and southern Australia, setting off a scramble to exploit the species. Because the spawning sites attracted large concentrations of fish to a small area, catches were often remarkable - as many as 60 tons in only 20 minutes of trawling. But today, stocks of orange roughy in that region have been reduced to less than 20 percent of what they were only a decade ago. Orange roughy have a long lifespan and don't mature and reproduce until relatively late, when they've reached a size that makes them a prime target of the fishing industry. This means they can't breed fast enough to ensure the species will be available for future generations.

Serial depletion of large predatory fishes at the top of all marine food webs means the major fisheries are now invertebrates. "We are fishing for bait and headed for jellyfish," warned Pauly.

The dramatic decline in North Atlantic fisheries is also having a disturbing impact elsewhere, as more and more fish are imported into Western Europe and North America from other parts of the world, effectively "hiding the crisis" from their consumers. "Yet today, the large fish we find in our local markets are being imported from

developing regions of the world such as West Africa, South East Asia and other areas masking our own crisis," says Watson. "We are paying fishers in other oceans to grind down their marine ecosystems for our consumption. This is a serious concern for global food security."

While the study focused on the North Atlantic, similar depletion is occurring worldwide, said fisheries expert Andrew Rosenberg, a dean and fisheries scientist at the University of New Hampshire and former deputy director of the National Marine Fishery Service who spearheaded the partial fishing closures on Georges Bank. "Around the world the percentages [of fish declines] may differ, but there is no question that overfishing is a global problem," he said.

The example of Georges Bank illustrates the severity of the overfishing. Once, fishing off New England's coast was the stuff of legend. Georges Bank, an ancient submerged island, was considered one of the most important fishing areas in the world. Cod, haddock, herring, clams, and lobsters thrived there. Europeans came to Massachusetts in part for the cod, and until the 1990s the supply seemed limitless.

But overfishing led to one fishery after another in the 1990s being declared exhausted. After cod and haddock were fished out, fishermen began harvesting "trash fish" they used to throw away, such as the spiny dogfish. Britain created a hot market for that whitefish, using it in fish and chip dinners.

Soon, however, those stocks also collapsed, and federal regulators came under fire for not doing their job to help all fish populations' recovery. In January 2002, U.S. District Judge Gladys Kessler ruled regulators weren't doing enough to prevent overfishing, a finding that could lead to further restrictions.

Authors of the new study echoed the judge, saying regulators have "largely failed" to prevent overfishing in large part because they looked at fishing as a problem of individual species, not an oceanwide one.

The only hope for the fishery is to drastically limit fishing, for instance by declaring large portions of the ocean off-limits and at the same time reducing the number of fishing ships, the scientists say. Piecemeal efforts to protect certain fisheries have only caused the fishing fleet to overfish somewhere else, such as west Africa.

"That's essentially moving around the deck chairs on the Titanic," said Rosenberg. "Systematically we have a huge problem. We can’t keep addressing this one symptom at a time."

The researchers say that only comprehensive action can save the North Atlantic from an ocean-wide collapse in fish. They urge the immediate introduction of marine reserves, cuts in fishing fleets and the abandonment of subsidies (now around $2.5 billion a year). EU fishermen are subsidised to less than a fifth of the value of their catches, while subsidies to American and Canadian fishermen amount to a third of their catches' value.

If these measures are not taken, the researchers say, the fishing industry could soon have to turn to species like jellyfish and plankton to make alternative fish products.

"If we continue the way we are, in a few decades our definition of fish will have to change; people will not know real fish, they will only know processed stuff that is shaped like fish," Pauly said.

"The national and international institutions mandated to control and to prevent the growth of excessive fishing effort have largely failed in their mission," says Pauly.

"Our study shows this."

Pauly warned that marine reserves work only if done in tandem with strong reductions in fishing pressure. And he warned against the urge to reopen closed areas after stocks make initial recoveries.

"We rebuild it again, reopen it, and then we fish it again," said Pauly. For example, he said, while New England cod stocks are larger than they were 10 years ago, they are still dramatically lower than in the 1960s.

"You may think we are making headway with a few individual stocks, but overall we are unequivocally losing the battle to manage fisheries in the North Atlantic," says Pauly. "Unless you have both long term and large spatial scales, as we have mapped, you cannot see the big picture. The problem is profound at an ocean-wide scale."

The National Marine Fisheries Service, one of the prime regulators of fishers in the U.S., declined to comment on the report, saying it had not yet seen it. However, Mike Sissenwine, director of the agency's Northeast Fishery Science Center, agreed regulators usually have not pushed for more stringent fishing restrictions because of "economic and social backlash" from the public.

Rosenberg is pessimistic that anything will be done to save fish stocks. "There are some treaties in the UN now which are for joint enforcement and monitoring agreements, but I think the timescale is far too long. Things like the International Plan of Action, which is a voluntary agreement, has a timescale that is still probably a decade. But there is no reason why it cannot be accelerated if the political will is there to do it."

Pauly added: "The only thing that might work is if there is an act of revulsion on the

part of the public similar to that which brought an end to whaling. For me, unless the public catches the fire, it won't happen." (Sources)

(02/15/2002) Report warns Mediterranean blue-fin tuna could disappear within just a few years due to unregulated "post-harvesting." A loophole in rules governing Mediterranean blue-fin tuna fishing means the species could disappear from the region within just a few years, according to a report from the WWF.

The European Union sets tuna quotas for direct fishing and farming, but there are no quotas for the number of fish that can be killed through a practice called "post-harvesting" which involves catching wild tuna and keeping them in cages before slaughter. Twelve Mediterranean tuna "post-harvesting farms", in the waters off Spain, Italy, Malta and Croatia, for example, produced 11,000 tonnes of tuna over the past year, the WWF report says. This compares to an estimated 24,000 tonnes caught in the Mediterranean by direct fishing. The total allowed quota for direct fishing in the Mediterranean and East Atlantic regions is 29,000 tonnes.

More than 90 per cent of post-harvested Mediterranean blue-fin tuna goes to Japan to make sushi. But the increasing popularity of sushi in Europe is also increasing post-harvest catches, says WWF. Post-harvesting produces fattened fish that are more suitable for sushi.

"Blue-fin tuna is the new 'foie gras' of the Mediterranean," says Paolo Guglielmi, head of the marine unit at the WWF Mediterranean Programme Office. "If nothing is done, wild blue-fin tuna will completely disappear from the Mediterranean Sea, perhaps with no possibility of rebuilding stocks."

WWF fisheries officer Sergi Tudela says it is very difficult to monitor wild blue-fin tuna populations because fishing companies do not accurately report catches. (**Sources**)

(02/15/2002) Scientists warn deep-sea trawling is rapidly driving fish such as orange roughy to collapse and destroying critical biological habitats such as deep sea coral reefs, seamounts and canyon walls. Fishing vessels that trawl thousands of feet below the surface may be wiping out the exotic creatures of the ocean depths even faster than scientists can discover them, researchers are warning. Deep-sea trawlers are destroying populations of fish and other creatures in the ocean at an alarming rate, according to research presented at the American Association for the Advancement of Science annual meeting.

The deep-sea fish crisis has arisen because stocks of surface fish - such as cod and herring - have been reduced by overfishing to dangerously low numbers. Even stocks of monkfish, swordfish and skate have been reduced to danger levels and are no longer considered to have sustainable populations, the Marine Conservation Society warned recently, and stocks of whiting, haddock and mackerel are also being decimated at an alarming rate. As a result, trawlers are being forced to look further afield. Many of these boats trawl the depths of the Atlantic and Pacific, dropping their nets down to a kilometre or more below the surface.

In the search for new sources of fish, ships are trawling deeper than ever before and removing whole populations in a single net. In recent years, sturdier winches, stronger cable and more powerful engines have allowed fishing trawlers to extend their reach to depths of 3,000 feet and beyond, and

fishers are now using military sonar to hunt deep sea fish. Deep ocean trawlers have been known to pull in up to 60 tonnes of fish in just 20 minutes.

Over the past century, overfishing has caused the collapse of species as different as the great whales and the Atlantic cod. But ocean biologists say that the push to exploit the deep oceans, which cover 62per cent of the planet, poses a far bigger threat than the overfishing of waters close to shore. New research suggests deep sea trawling isn't sustainable or economic. The slow life cycles of the species that live hundreds of metres below the surface mean their populations will collapse if they are exposed to industrial-scale exploitation. At those depths, growth is so slow that harvested fish can take decades to be replaced and damaged corals may require centuries or more to grow back. By contrast, cod reaches sexual maturity at the age of three, which means depleted stocks of deep-sea fish could take ten times longer to return to normal. Soon our oceans will be drained of life, say experts.

"As the shallow water fisheries everywhere have collapsed, there has been a worldwide scramble to exploit the resources of the deep ocean, with devastating consequences," Dr. Callum Roberts, a Harvard University ocean ecologist, warned. "Forty per cent of the world trawling grounds are now in waters deeper than the continental shelves," he told the American Association for the Advancement of Science in Boston. "And some new technology is so efficient that these deep-sea trawlers are not just harvesting fish, they are literally mining them."

The new technology has "led to the wholesale destruction of many deep-water environments and to a kind of fishing that was more like strip mining than harvesting," says Roberts. "In the past, there was luck to deep-water fishing. If you can't really see the sea bed, it's like fishing with a blindfold

on. While dragging your net into the unknown, you might lose it. And the nets are very expensive. But once you could see the sea floor, get pictures of sea mounts - the feeding and spawning grounds for deep-water fish - the guesswork was gone. Trawlers could go in and clean out one community after another."

The impact of fishing in the deep sea goes far beyond just removing the fish. Fisheries are concentrated into places that have the greatest biological significance; places like seamounts and canyon walls where materials that are wafted in on currents support rich communities of species - corals, sponges, seafans and hydroids. Deep-sea fishing is said to be inflicting terrible collateral damage on these species as trawl meshes plough through the water.

"[W]ith deep-sea trawling, the nets often clear-cut the communities of life the fish existed in," Roberts says. "In the sea mounts where the orange roughy is hunted, there were once sea fans, black corals, hydroids, invertebrates. Yet these centers of life have frequently been stripped down to the rock. So this is the kind of collateral damage being done to those places. On land, if we thought we would destroy an entire forest just to catch a few deer, there'd be an outcry. Yet, we are doing something like that in the deep sea."

"Deep water corals that took 5,000 years to grow can be destroyed with the single pass of a trawl net," Roberts said. "What we are destroying today will take centuries to recover. Off the East Coast of North America bizarre and beautiful fields of glass sponges have been trawled to oblivion. In the Southern Ocean lush forests of invertebrates have been literally stripped from the top of seamounts by trawlers targeting orange roughy."

A recent study by Australian scientists found that 95 percent of the trawled bottom in

deep water off Tasmania are bare rock, compared with 10 percent of untouched areas.

"You can go with ROVs (remotely operated vehicles) and take pictures before and after a trawl's gone through and see the devastation," said Cindy Lee Van Dover, an oceanographer at the College of William and Mary in Virginia.

"In the deep sea, fishing gear is encountering species and habitats that are much less able to bounce back from the effects of fishing than those that live in the fast lane of the shallow seas," Roberts said. "The pace of life in the deep sea is literally glacial. Species grow extremely slowly and they live to extraordinary ages, so, for example, on the west coast of North America, orange roughy (*Hoplostethus atlanticus*) can reach 150 years old and they don't reproduce until they are in their mid-20s to mid-30s."

Now often served in upscale restaurants, orange roughy was virtually unknown in supermarkets and restaurants until recently because it lives well below the traditional trawling depths of 1,000 metres. Once almost as plentiful as the cod off Newfoundland, orange roughy stocks off New Zealand have collapsed to one fifth of levels in the 1980s. French fleets have also over-fished roughy in the North Atlantic, with heavy subsidies from the European Community, Roberts said.

"The same thing has happened to the pelagic armorhead, which aggregates onto sea mounts in the Hawaiian chain. That fishery went from 35,000 tons to 3,500 tons per annum in only a few years. It never recovered," said Roberts.

Similarly, fishing for parrot-fish, black scabbards, blue ling and other deep-sea species began only a couple of decades ago. Yet populations have already fallen to danger

levels, say experts. "We could be losing deep-sea species far more quickly than we can describe them," Roberts said.

In a study published in the journal Trends in Ecology & Evolution, Roberts compared the current situation in the deep oceans to the clear-cutting of ancient redwood forests in the western United States.

Licensing fishing or introducing quota schemes to preserve stocks is unlikely to be effective, said Roberts. Marine reserves, he believes, are the only answer, but the problem is that deep-sea fisheries are in international waters and getting many countries to agree to a proposal that would close off thousands of square kilometres of ocean to trawlers will be extremely difficult.

"What is more, the move to deep-water fishing is being encouraged by governments who are offering subsidies to alleviate the hardship that has been brought on by the collapse of shallow-water fish stocks," Roberts said. "There is a worldwide scramble to exploit deep-sea fish. Forty percent of the world's trawling grounds are now waters that are deeper than the edge of the continental shelves."

The early rewards from deep-sea fishing can be extremely high. The orange roughy fisheries that took off in the 1980s around seamounts in the waters off New Zealand and Australia were said to be producing catches of 60 tonnes from a 20 minute trawl.

"But the decline came very swiftly and today there is less than 20% of the roughy there were 10 or 15 years ago," Roberts said.

Roberts said, "It is clear the biology of deep-sea organisms compels us to rethink attitudes to exploitation that we have developed from experience with organisms living in the 'fast-lane' of shallow seas. We must consider deep-sea fish stocks as non-

renewable resources." (Sources)

(02/14/2002) New study warns pollution, destructive fishing practices, and global warming are turning the world's coral reefs into "seaweed-covered piles of rock and rubble" and driving marine species to extinction. See Ecosystem Destruction: Coral Reefs. [includes photo]

(02/14/2002) Pollution from farms and industry, dams, and overfishing blamed for loss of 94 out of 294 fish species in Thailand's Chao Phya river over last 5 years. See Ecosystem Destruction: Rivers.

(02/13/2002) Scientists warn pressure of too many anglers is pushing freshwater sport fisheries to collapse throughout much of Canada. See Population: Recreation.

(02/02/2002) French "pair trawling" for sea bass being blamed for the deaths of hundreds of dolphins whose mutilated bodies have washed up onto the coasts of Britain and France. French fishermen trawling sea bass are probably responsible for the deaths of hundreds of dolphins off the coasts of Britain and France, according Britain's Whale and Dolphin Conservation Society. In the past month, 80 dolphins have been washed up dead off England's south coast, three times the number last year, while 300 dolphins were found dead on the beaches of France's Atlantic coast in nine days in late January. The Wildlife Trusts group says the actual figure of sea mammals killed in the approaches to the English Channel this winter is likely to be 2,000, with only a fraction washing ashore.

Nearly all are thought to have been illegally

killed in giant trawler nets. It is illegal to fish where protected mammals are likely to be swimming, but there is no European watchdog to prevent it happening or take action. The Whale and Dolphin Conservation Society, based in Bath, has said that Europe's common fisheries policy fails to protect sea mammals because it leaves individual nations to control their own crews and waters. It says there is no effective monitoring of by-catch aboard the growing number of pair-trawlers that head for the English Channel.

In the past, dolphins have been found with ropes round their tails, apparently tied on by trawlermen when dumping them at sea. Others have their internal organs removed to make them sink, to prevent them being washed ashore.

The number of dead dolphins being washed ashore on the beaches of Devon and Cornwall has risen every year since 1990. The rise has been linked to the use of giant nets strung between trawlers - mostly foreign boats.

Devon campaigner Lindy Hingley, of Brixham Seawatch, said: "This is not a new problem. I have been seeing this carnage on our beaches for 12 years and we are not dealing with it. I would like to see a ban on the very large boats in these waters. We are looking at thousands of dolphins suffering terrible deaths in these huge trawls."

The dead animals included common dolphins, striped dolphins, Atlantic white-sided dolphins, and, occasionally, pilot whales. Many of the bodies bore clear signs that they had been caught in fishing nets, and some had been deliberately mutilated, which is what fishermen sometimes do when they want a dolphin's body to sink and not to wash up, incriminatingly, on a beach.

Peter Tinsley of Purbeck Marine Wildlife Reserve said: "They've been caught in nets

and drowned in the nets, then they'll have been thrown back overboard. They float around in the sea and because of the weather they end up on the beaches."

The deaths are occurring during the winter hunt for sea bass - for which there is now a huge demand - in the waters south-west of the British Isles by about 50 French trawlers. The French boats are operating as pelagic (open sea) pair trawlers, a technique in which two boats rapidly pull a net near the surface. Research shows this technique can produce a large unintentional entrapment of dolphins, porpoises and small whales. The French boats will not allow observers on board.

The conservation group is calling for the EU to monitor pelagic pair trawling closely. Ali Ross, of the group, said: "We think the finger of suspicion points at the French sea bass fishery over the recent dolphin kills, but pair trawling for all species presents dolphins with a serious threat."

Twenty-five years ago, most people in Britain other than sea anglers had never heard of sea bass, *Dicentrachus labrax*, a handsome member of the grouper family. Before then, people ate cod and haddock if they were poor, and sole and turbot if they were rich. Then, at the start of the 1980s, came nouvelle cuisine and food as fashion for the first time, and fish was in. With monkfish and scallops, sea bass became one of the star items in the kitchen. Demand for it skyrocketed everywhere, including in Britain, and has never fallen back. The sea bass combination of desirability and scarcity meant that its price shot past that of salmon, and fishermen began to turn their attention to it seriously.

Such was the assault on the bass stocks that they quickly became threatened and the European Union had to regulate catches. But what has not emerged until now is the scale of the threat not just to the fish from the

catch, but to the other living things that accidently get caught in the nets - so-called "bycatch", with dolphins at the top of the list.

The fishermen pursuing sea bass are using a technique known as pelagic (open sea) pair trawling, in which two powerful boats draw a big net rapidly through the water, fairly near the surface. Pair trawling is growing in popularity, partly because drift-netting - letting a huge, fine-mesh net hang in the water, into which fish become entangled - was banned completely by the EU on January 1 because of the enormous bycatch it produced of everything from seals and seabirds to dolphins and turtles.

But, says the Whale and Dolphin Conservation Society, no one has yet assessed the bycatch effect of pelagic pair trawling; and it may be as indefensible. A recent study by the Irish Sea Fisheries board for the EU concluded that pair trawling was a viable alternative to drift-netting, even though the report showed that in a single season four pairs of trawlers killed 145 dolphins.

Ali Ross, of the conservation society, said: "We have known for years that these pelagic trawl nets are responsible for major dolphin kills. But these findings provide some of the strongest independent and scientific evidence yet of the scale of the problem. The appallingly high dolphin kills and the sea bass fishing are coinciding. We think the finger points at these boats as the main culprits."

One of the problems is that the French boats will not allow observers on board, so no one can be sure of what happens one way or another. The conservation group is calling on the EU to address the problem by requiring the pelagic trawlers to be independently monitored, with those fisheries responsible for unacceptable bycatch levels subject to strict management programmes to reduce

the damage or face closure.

Ross said: "This is a major conservation and animal welfare issue, and the EU is in the process of reforming the Common Fisheries Policy by the end of 2002. This is an ideal opportunity to address the issue, but the Government seems to be doing nothing about it."

Only four boats from Britain, all from Scotland, took part in pelagic pair trawling for sea bass in the Western Approaches last year, and they did not begin fishing until March. They did carry observers, from Britain's Sea Mammal Research Unit at the University of St Andrews, but their report has not yet been released.

Sea bass are also farmed, but the taste of wild-caught fish is much preferred to that of the farmed ones: they tend to be larger, are said to have a better flavour, and fetch double the price, so the intensive effort to capture them continues.

Alistair Davison, the marine policy officer for the World Wide Fund for Nature, said: "I think for far too long we have been managing fisheries in isolation from the rest of the marine environment. We need to reform the Common Fisheries Policy to deliver a sustainable future for fishing communities and sustainable fish stocks, and at the same time avoid the needless killing of beautiful animals such as dolphins." (**Sources**)

(01/23/2002) Beluga sturgeon are tottering on the edge of extinction due to overfishing and poaching as new survey is able to find only 28 in the entire Caspian Sea; critically endangered fish probably no longer reproduces in the wild. See **Endangered Species: Freshwater Fish**.

(12/12/2001) Investigative report warns illegal fishing controlled by Russian organized crime groups is devastating the Bering Sea, driving it to near collapse. Illegal fishing, much of it controlled by organized crime in Russia, is devastating the Bering Sea, which supplies the United States and Russia with more than half their seafood, according to a new report by TRAFFIC, the wildlife trade monitoring network of the World Conservation Union (IUCN) and World Wildlife Fund. The report warns that the fishery is nearing collapse, with several species threatened.

With one species, Alaska pollack, both the number of fish and the catches landed have been declining since 1982, yet the official annual quota has risen steadily since 1996. The amount caught is estimated at 150% of the quota. "The outlook for Alaskan pollack is bleak," said report author Alexey Vaisman. "This clearly reflects a significant level of poaching as well as government's inability to prevent it."

Organized crime in Russia controls poaching operations that net as much as $4 billion each year from the western Bering Sea, according to the report. The abuses listed in the report are many, including fishing in restricted waters, using prohibited gear, and concealing harvest amounts. The most common illegal activity was distorting data relating to the size and weight of harvested fish and the composition of the species.

Another practice of unlawful fisherman is to secretly transport fish to other countries such as Japan, South Korea, China, the United States and Canada. Fish smugglers often take their catch to the port city of Pusan in South Korea, where inspections are rare. "The most widespread violations include the distortion of data by fishermen on the volume and size of fish caught and the species composition of the catch," the

report says. "For example, Russian vessels recorded exporting seafood from the Kamchatka region worth $113m (£78m) to Japan in 1997, while Japan recorded importing seafood from that region worth $442m (£305m) the same year."

The report says there is increased demand from Japan, China and Korea for fish. The European Union is also trying to encourage imports of Alaska pollack, and two years ago reduced the tariff on it from 15% to 3.5%.

The report's findings are based on interviews with fisheries inspectors and scientists, and an examination of customs data, trade statistics and population assessments. Vaisman, works for Traffic in Moscow, said, "Inappropriate legislation, weaknesses in the enforcement system and widespread organised crime in Russia all contribute to the current situation."

The report also says shipowners are alleged to bribe fisheries inspectors with money, alcohol and prostitutes. "On the Russian side, management systems have fallen into such disarray that virtually every level of the fishing industry is involved in illegal activities," the report concludes.

The Bering Sea is enclosed by the Siberian and Alaskan coastlines, the Aleutian Islands and the Bering Strait. The sea spans almost one million square miles (2.5 million square kilometres) and harbors many commercial seafood species like pollack, cod, rockfish, halibut, flounder, crab, shrimp and squid. The waters also support marine mammals such as whales, polar bears and walruses. (**Sources**)

(12/04/2001) EU proposes drastic new cuts in fishing quotas for North Sea cod and other species, warns continued overfishing will drive some fish species

to extinction in the North Sea within two years. Dramatic new cuts in fishing quotas have been put forward by the European Commission, which says some species of fish will completely disappear from the North Sea within two years. The heaviest of the proposed cuts would hit the Kattegat strait between Denmark and Sweden, where EU officials want to axe catches of cod by 60%.

EU fisheries commissioner Franz Fischler acknowledged the drastic cuts will hit fishers hard, but also insisted that tough action was essential. Stocks of all main species, including cod and haddock, were now in "an alarming state", he warned. His other proposals include cutting catches in and around UK waters, such as:

* Haddock in the Irish Sea by 52%.
* Sole in the North Sea by 25%.
* Plaice off the west of Scotland by 20%.
* Cod in the Irish Sea by 10%.
* Langoustines in the Bay of Biscay by up to 50%.

New quotas for North Sea cod and hake will be announced later this month, as negotiations with Norway, Iceland and the Faroe Islands are still going on.

Years of reductions in catch quotas and mandatory cuts in the fishing fleet in the 15-member EU have failed to stop the decline of several species, forcing painful cuts on an industry in crisis. Fishing accounts for less than 1% of the EU's gross domestic product, but it is of critical importance in regions like Scotland, northern Spain and France's Atlantic coast. The EU has 250,000 fishermen, with many more working in secondary industries.

"We can now see the results of too many years of excessive fishing, due to the substantial overcapacity of the EU fleet. If we are serious about securing the future of the European fisheries sector, there is no

way around significant reductions," said Fischler.

Fischler said too many boats are still competing for too few fish, and he added that the European fleet had a "substantial" overcapacity. "The situation is still alarming," he said. "We now have our backs to the wall. The stocks are down and fishing pressure is too high. If we are serious about securing the future of the European fisheries sector, there is no way around significant reductions in catches and fishing."

European ministers will meet later in December to decide whether to adopt the quotas. Fischler said they should show "courage and resolve" and go ahead with the cuts to ensure a sustainable industry. (**Sources**)

(12/02/2001) Scientists suspect global warming is cause of "deeply worrying" 80-90% drop in Atlantic zooplankton; loss of bottom of marine food chain threatens to cause widespread starvation and death of all levels of marine life from fish to dolphins and whales, destroying entire ocean ecosystem already being devastated by overfishing. See **Global Warming: Oceans**.

(11/28/2001) Study finds global seafood catch dramatically declined by almost 800 million pounds per year during 1990s, raising troubling questions about the long-term impacts of overfishing and the world's future food supply. A new study by Canadian scientists has found that overreporting of fish catches by China and other countrieshas masked dramatic declines in global fish catches for more than a decade. The amount of seafood landed each year has actually

been decreasing during the 1990s by nearly 800 million pounds per year, rather than increasing by 700 million pounds annually as previously thought, scientists based at the University of British Columbia discovered.

Moreover, by subtracting just one fish from the equation, the abundant Peruvian anchoveta, which is used only for fish meal and whose population fluctuates due to El Nino, an even more striking decrease was apparent: 1.5 billion pounds a year less seafood available for human consumption.

The new evidence, published in the journal Nature, means that the true state of the oceans is far worse than anyone has previously realized. Over the past 30 years there have been steep increases in the exploitation of world fisheries. More species are being marketed and new fishing areas have been opened. But the increased Fishing pressure is devouring what study co-authoris Reg Watson and Daniel Pauly, both of the University of British Columbia Fisheries Centre, call "the accumulated old growth riches of the sea."

The two fisheries scientists say that "vast over-reporting by the People's Republic of China combined with the large and wildly fluctuating catch of a small fish, the Peruvian anchoveta, have painted a false picture of the health of the oceans by inflating the catch statistics and implying that business as usual is sustainable."

Watson, a senior research fellow at the university, said the world is "playing with the food supply of the planet" and that "the global catch trend is not increasing, it is not even stable, but rather it has been decreasing steadily since the late 80's."

"The best thing we can do is shake ourselves out of our complacency," said Watson. "The FAO has been saying things are all right but things have in fact been getting progressively worse since 1988."

Watson said that the food chains for fish resemble a pyramid: "We've fished out many of the fish right at the top of the pyramid and now we're going after the rest. But they can't sustain it and the seas can't. We aren't going to be able to get back to the 1988 levels. The oceans aren't in the same healthy state that they were."

"I have been troubled a long time by the mismatch between what we know is the case for various fisheries - that they are going downhill - and the triumphalist reports of a global catch that continues to increase," said Pauly, an international authority on global fisheries. "This study reconciles what we see at the local level, failing fisheries, with what is happening at the global level - falling catches," he said.

Pauly said the world community must end overfishing if it was to meet future food demands. The new study, he said, "dashed hopes that the sea can continue to meet our growing demand for fish."

Professor Jane Lubchenco of Oregon State University, one of the world's leading marine biologists and former president of the American Association for the Advancement of Science, called the study's findings "earthshaking" and said that they "call into question the very basis of international fisheries management."

"The results are stunning," added Lubchenco. "We're on a trajectory of significant decline," one that only a drastic overhaul of fishery management can halt.

"Regardless of whodunnit the message here is that our overfishing problems are far more urgent than we even realized," says Andrew Rosenberg, Dean of the College of Life Sciences and Agriculture at the University of New Hampshire and the former deputy director of the National Marine Fishery Service. "It's not a case of, let's gradually

phase in some solutions. It's rather more urgent than that. Overfishing is not a just a Chinese problem. We have serious overfishing problems here as does Europe, and we need to come to grips with them as urgently as the Chinese do. This is a global problem, not a case of a few bad actors."

In the 1970s, fish ecologists predicted catch figures would level off in the 1990s, said Rosenberg, when the biological capacity of the oceans was reached. But despite local evidence that fishing industries are over-exploiting the seas, global fish stocks have seemingly looked rosy, with rising catch sizes consistently reported by the FAO. The anomalously healthy catch statistics were conventionally put down to discovery of new stocks, explains Rosenberg, even though many fish stocks, such as North Atlantic cod, have already crashed. The FAO currently deems nearly 70% of major marine fisheries - industries based around a particular fish type or region - fully or overexploited.

But since 1988, when the world's seafood supply peaked at 34 pounds a person each year, the combined effects of overfishing and increasing human populations have actually reduced the amount of fish and shellfish available to only about 25 pounds a person per year now, according to the new findings. The trend is projected to continue rapidly downward to less than 17 pounds a person each year by 2020.

The new study, reported in the journal Nature, calls into question the veracity of FAO figures and its reporting system. The FAO relies on voluntary reporting of catches from countries to estimate the amount of fish the oceans hold. Until now, the statistics had never been subjected to an exhaustive independent analysis.

"Misreporting by countries with large fisheries, combined with the large and widely fluctuating catch of species such as the Peruvian anchoveta, can cause globally

spurious trends," study authors Watson and Pauly said. "FAO must generally rely on the statistics provided by member countries, even if it is doubtful that these correspond to reality."

The new picture of the world's oceans raises serious concerns about the supply of fish and the world food supply. Some believe that aquaculture, or fish farming, can make up the difference. However, Watson and Pauly warn warn that it is a fallacy to believe that fish farming can make up the shortfall, and they caution against their results being used to call for more aquaculture. "Aquaculture cannot replace wild seafood because so much farmed seafood relies on wild fish for fishmeal," Watson says. "Currently a third of all fish landed globally goes into fishmeal and oil. Half is used for aquaculture and half is used for agriculture. The aquaculture component is increasing rapidly because we are using fishmeal to raise carnivorous fish like salmon. If aquaculture is going to help the situation, you have to raise vegetarian fish - like carp, tilapia and shellfish - and not supplement their food with fish meals or oils."

Using statistics gathered by the FAO since 1950, the scientists created maps of world fisheries catches and then built a computer model to predict catch size in different ocean regions. The model showed China's reported catches were unrealistically high when compared with catches from other ocean areas that have similar characteristics such as depth, temperature and biological productivity.

In China, the government relies on local officials to provide catch figures. Wan Cheng, a spokesman for the Chinese Agricultural Ministry's Fisheries Department, said the government had offered county and provincial officials job promotions based on growth in those figures, giving them incentive to inflate numbers. That practice ended two years ago, when the government

put into effect a "zero growth" policy saying catch reports from oceans should not exceed 1998 levels of about 35 billion pounds of fish and shellfish per year.

Unfortunately, the artificially high FAO figures have encouraged government investment in fisheries, which may have worsened over-fishing. International action to cut catch quotas and shrink fleets is required, the experts agree.

Fisheries are the most globalized food industry that exists. Over 75 percent of the world marine fisheries catch - over 80 million tons per year - is sold on international markets. This means that what happens in one country matters to another. Many people do not realize the extent to which fish sold in the U.S. are caught elsewhere in the world. "A lot of the fish eaten in the U.S. now are being imported from New Zealand, the Pacific, West Africa and Antarctica," Pauly says. In terms of value the U.S. catches shrimp, sea cucumbers and now even jellyfish, and exports much of it to East Asia."

Pauly hopes that the study will remove what he calls "a psychological weapon" - the distortions in the global reports submitted to the FAO - that industry has used to justify putting out more boats and building bigger trawlers. (**Sources**)

(11/18/2001) Scientists say 40% of world's reefs could be lost by 2010 due to pollution, global warming, overfishing, and other human impacts. See **Ecosystem Destruction: Coral Reefs**.

(11/11/2001) Scientists warn Atlantic marlin, sailfish, and swordfish numbers may fall so low within next few years due to overfishing and bycatch by industrial-scale commercial fishing that their extinction will

be inevitable even if all fishing stops. See **Endangered Species: Marine Fish**.

(11/10/2001) Documentation scheme to stop rampant illegal longline fishing from driving Patagonian toothfish and albatross and petrels caught as bycatch to extinction failing, but regional Antarctic fishery group still increases quota. The paper trail to which hopes were pinned of curbing rampant illegal Antarctic fishing appears to be failing. Huge pirate catches of Patagonian toothfish (also called Chilean sea bass) are still being made, and seabird by-catches are higher than ever. In fact, the so-called "catch documentation scheme" (CDS) may even be benefiting pirate fishers laundering their illegal catches, the region's fisheries organization, Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), has been told.

"As it stands the CDS does little more than document the annihilation of toothfish populations and the imminent extinction of species of albatross and petrels," said the Antarctic and Southern Ocean Coalition (ASOC). It said illegal fishers stand to profit from the higher prices received for laundered catch sold with appropriate documents.

The CDS, adopted by CCAMLR in 1999, was implemented more than a year ago to supposedly guarantee a "hook to market" paper trail that would starve illegal fishers of sales. But the recent 20th meeting of CCAMLR was told that estimates of illegal fishing for toothfish, known as Chilean sea bass, are now running at 7,599 metric tons in 2000 to 2001 - up 1,000 metric tons on the previous year.

Estimates of seabird deaths on longline hooks are now running at up to 90,000 annually, also up from last year. Scientists figure the total number of seabirds killed by

longliners over the past five years at nearly 400,000 - levels they say that are "entirely unsustainable," the CCAMLR delegates were told.

ASOC repeated its call for a moratorium on all toothfish fisheries and a temporary ban on international trade until the fishery is brought under control. Instead, the CCAMLR meeting authorized a nine percent increase in toothfish catches.

"CCAMLR was even unable to agree a simple resolution that would have prohibited landings from pirate vessels flying flags of convenience - the one single measure that could have substantially reduced the pirate trade," ASOC said. (**Sources**)

[Note: please see the rest of this page for other articles on pirate fishing and Patagonia sea bass.]

(11/07/2001) U.N. warns world's growing population is plundering the planet's water, forests, oceans, and other resources at an unprecedented and unsustainable rate that will lead to ecological disaster. See **Population**.

(10/25/2001) Scientists warn of serious ecological impacts from dramatic decline in numbers of American eels since mid-1980s due to dams, overfishing, other human impacts, fish may become extinct in Ontario and the upper St. Lawrence River. Commercial catches of the American eel (*Anguilla rostrata*) declined dramatically across the species' North American range from the mid-1980s and through the 1990s, to the extent that fisheries resources of the species are in jeopardy, according to a

presentation to the Advances in Eel Biology conference in Tokyo, September 28-30, 2001 presented by John M. Casselman of the Ontario Ministry of Natural Resources in Canada.

The American eel is an economically and ecologically important species for the entire east coast of North America. In Canada, major commercial eel fisheries exist from the east coast, inland to Lake Ontario. American eels are harvested at different life-stages that include elvers (young), juveniles ("yellow eels") and adults ("silver eels").

Recently, there has been great concern regarding dramatic declines in the numbers of American eels. Most importantly, the continued low recruitment (replacement of older eels by young eels) suggests that the commercial fishery in the upper St. Lawrence River and Lake Ontario may not be viable in another generation's time. Decline of the Lake Ontario and upper St. Lawrence River stock may have important consequences for the whole population. This stock has been estimated to represent 5% of the entire population, and 20% of all females. In addition to a loss of the fishery, there could be possible extinction of the Lake Ontario and upper St. Lawrence River stock, a species-wide decline, and serious local and regional ecological impacts of eliminating eels from the freshwater and marine ecosystems.

Eels are catadromous, living in freshwater and spawning in the ocean. Both the American and European eel (*Anguilla anguilla*) share the same spawning site in the Sargasso Sea. After spawning, the adults die and American eel larvae drift with the aid of the Gulf Stream from the Gulf of Mexico, north to the east coast of North America, including Labrador and Greenland. They develop into "glass" eels which are are attracted to freshwater and actively migrate into brackish estuaries and freshwater, where they grow for many years. The eels

become darker and develop into elvers that eventually migrate to freshwater rivers.

After about a year in rivers, eels enter a growth phase in which they are known as yellow eels. (Some eels do not migrate upstream as elvers and remain in estuaries where they also develop into yellow eels.) During late summer and fall some adult eels begin their spawning migration to the Sargasso Sea. They develop into the silver eel stage and are sexually mature. Their eyes enlarge, which is believed to give them better vision in the ocean.

The W. B. Saunders Hydroelectric Dam, at Cornwall, Ontario was built between 1954 and 1958. In 1974, an eel ladder was added to aid the passage of eels, and between the early 1980s and 1990s, a typical juvenile (yellow) eel ascending the ladder averaged 35 to 45 cm (TL) and weighed 80 to 150 g. The total number of eels ascending the ladder provides an index of recruitment to the Lake Ontario and upper St. Lawrence River stock, and from 1975 to 1985, there were relatively large and consistent numbers ascending the ladder (600,000 1,300,000 annually). In 1986, however, a declining trend began, reaching a low in 1993 when only 8,000 eels ascended the ladder.

From 1993 to 1996, the eel harvest declined for four consecutive years; except for the market closure due to mirex, this is the only four consecutive year decline over the entire 113-year record of commercial catch. From 1945 to 1978, increasing price sustained an increasing harvest, while from 1979 to 1984, price drove a decreasing harvest. Between 1993 and 1996, a new trend emerged: prices increased by 153%, yet the harvest decreased by 51%, indicating a substantial decrease in abundance of harvestable fish.

The Ontario Ministry of Natural Resources (OMNR) trawl index in the Bay of Quinte spans 25 years, from 1972 to 1996, but does not specifically target eels. Statistical

analysis of mean annual catches indicate a significant decline in relative eel abundance from the 1970s to the 1990s. In the 1970s, mean annual catches were greater than 2 per nautical mile, but in the 1990s dropped to less than 1 per nautical mile. The commercial electrofishing index spans 13 years, from 1984 to 1996, and represents the catch of one fisherman who kept extremely precise records on catch and effort. Mean catch per hour was relatively constant to 1991, after which a decline began which was significant in 1993 and which continues to date.

The commercial harvest data span 113 years, from 1884 to 1996. Over this period, the eel harvest fluctuated considerably, apparently in response to fisheries closures due to mercury contamination, marketing problems due to mirex contamination, and events such as WWII. By the mid-1980s, the eel market had recovered and stabilized at a decreased fishing effort after some commercial licences were bought out by the Ontario Ministry of Natural Resources (OMNR).

Casselman notes that records of American eels being harvested extend back to at least 1535, when Jacques Cartier alluded to the importance of native eel fisheries, particularly to the Iroquoians. In 1603, Samuel de Champlain documented that Algonkian-speaking tribes in the lower St. Lawrence River had substantial autumn eel weir fisheries.

Furthermore, observed Casselman, "Jesuit missionaries reported that the Onondaga of St. Lawrence Iroquois fished eels in tributaries of Lake Ontario with two-way dams and sluices and speared at night from canoes. Eels were so abundant that they could spear as many as 1,000 in one night, and eels were held in such high regard that the Onondaga had an Eel Clan. Prehistoric eel resources were heavily used, stable, predictable, and a valued natural resource

that served as a basis for sustaining economic tradition, and this cut across rigorously defined cultural boundaries."

The Iroquois' dependence on eels was shared by the early European colonists with whom they had contact; from the 16th to 19th centuries, until the construction of dams and canals affected eels' abundance in the region, the eel fishery of the lower St. Lawrence River was "large and valuable and has a long tradition." However, the construction of dams and canals throughout the region has affected habitat and eel abundance.

American eels are catadromous, spending most of their lives in fresh water and returning to salt water to spawn. This is in contrast to fish like Atlantic salmon and alewife which are anadromous, meaning they mature in saltwater and return to freshwater to spawn. American eels are believed to spawn in the Sargasso Sea, east of the Bahamas.

Eel larva called leptocephalus. The larva drift with ocean currents to the coastal areas of North America in six to eighteen months. At this stage the young eels are 55 - 65 mm (2.1 - 2.6 in) long and have developed into glass eels.

The American eel harvest in the United States and Canada is about equal. However, today, the bulk of commercial eel catches in the United States (80%) is in central coastal states, with less from northern (19%) and southern (1%) states. In the 1970s and 1980s, commercial catches in the United States were at an all-time high, with levels of about 2,000 tons a year.

In Canada, the St. Lawrence River-Lake Ontario system accounts for 57% of the commercial catch; throughout the 1990s, all provincial catches associated with the gulf region of the St. Lawrence "showed a synchronous exponential decline," with a

combined catch in the late 1990s 59% below the long-term mean. More than a century of commercial catch statistics exist for the distant Upper St. Lawrence-Lake Ontario region.

Casselman said that the "decline in the 1990s was the most prolonged ever seen and reflects substantially decreasing abundance. Yellow eels caught in the St. Lawrence River-Lake Ontario system are old and large. Catches decreased throughout the 1990s, in spite of an approximately 5x increase in value. In the central part of the population distribution range, eels are younger, with few old individuals persisting in heavily fished areas. Since the species is panmictic, there is considerable concern about heavy exploitation of all life stages, coinciding with a continent-wide decline in commercial catch."

Casselman further noted that: "Significant negative trends exist in half the scientific indices that describe abundance for various life stages throughout the range. More northerly and longer-term series provide the strongest evidence of decline. Long-term trawl indices for yellow eels from Chesapeake Bay and eastern Lake Ontario confirm significant declines and record-low levels in the late 1990s. The strongest evidence for decreased recruitment comes from the long-term index of daily eel-ladder passage at the Moses Saunders dam in the upper St. Lawrence River.

"From a peak in 1982-83 of a million a year, juvenile recruitment to the St. Lawrence River-Lake Ontario stock declined precipitously (by 3 orders of magnitude) from the 1980s to the 1990s (most significantly from 1986 to 1990). The few eels that ascended the ladder in the 1990s were very much older and larger than typical recruits in the 1970s to 1980s.

"Recruitment virtually ceased in the late 1990s. With recruitment failing, declines in

the St. Lawrence River-Lake Ontario stock are synchronous, fish are aging, and emigrating silver eels (maturing phase) are decreasing. This will have increasing and far-reaching ramifications on the reproductive potential of the species."

Possible causes of these declines, concluded Casselman, are many and cannot be individually ranked or indicated. They include oceanic effects: for example, the Gulf Stream weakened in the 1980s, and there is a negative correlation between the North Atlantic Oscillation Index and the eel ladder recruitment index for the St. Lawrence River-Lake Ontario stock.

At the same time, "cumulative effects of intensively fishing various life stages of this slow-growing, late-maturing animal must be important. Universally high harvest rates from 1978 to 1981 could have caused overexploitation, resulting in an inadequate spawning stock to sustain former levels of recruitment."

In addition, "Historic changes and loss of habitat through dam construction have been extensive," while hydroelectric turbine mortality of emigrating silver eels, which can reach 27% for some facilities, and even such varied issues as trophic (food chain) changes, the Asian swimbladder nematode, harvest of seagrass, and contaminants may also be involved. (**Sources**)

(10/10/2001) Black Sea severely declining due to overfishing, pollution, and introduction of non-native species - only 6 of 26 commercial fisheries still have enough fish to support commercial fishing. See **Ecosystem Destruction: Black Sea**.

(10/06/2001) Monkfish stocks

collapsing due to overfishing. Gourmets who spurn traditional fish dishes in favour of the more expensive monkfish have pushed the species to the edge of disaster. Scientists researching the deep-sea giant, which has become a favourite with TV chefs such as Delia Smith, and thereby with the middle classes, found that none of the 2,207 females commercially caught off the coast of Scotland were mature. This proves the stock has collapsed, experts claim.

Otherwise known as the angler fish, monkfish are found on the sea bed, along the coasts of Europe and eastern North America. They can grow up to 5 feet (1.5 metres) in length and are capable of swallowing other fish as large as themselves. However, the species' slow growth rate means that it can take at least 11 years before a female is mature enough to reproduce.

Sarah Jones, a fisheries expert with the World Wide Fund for Nature, said yesterday: "There is an urgent need for a proper management structure to deal with the fishing of slow-maturing species. It may mean we will have to consider a proper licence scheme and the introduction of prohibited fishing grounds, rather than the current quota system, which takes no account of the age of the fish caught. The current situation provides an excellent example of mismanagement of a slow-maturing species."

The Scottish Fishermen's Federation (SSF) said it agreed with many of the WWF's concerns and admitted the present quota system is more about allocation than conservation. Hamish Morrison, the SSF's chief executive, said: "It is true there are a hell of a lot fewer of them now than there were 20 years ago. Monkfish are victims of their own success. There has been a lot of commercial pressure on stocks precisely because they have become terribly fashionable in restaurants."

It was not until the mid-1980s, when monkfish became fashionable, that fishermen began to actively target tge species. Five years ago, 26,100 tons of monkfish, worth £44.8m, were landed at Scottish ports. Last year that figure fell to only 12,100 tons, worth £28.4m. (**Sources**)

(09/25/2001) Overfishing and fish farming to meet growing consumer demand are devastating ocean ecosystems around the world. The recent explosive popularity of sushi bars, from boutique restaurants to the seafood counter at local supermarkets, has made sashimi (which refers to the grade of fish; sushi refers to the rice) the new hot ticket. Recent estimates have it that there are now more than 45,000 sushi restaurants in the United States, one for every neighborhood in the country. Sales of sushi in the United Kingdom have nearly doubled in the past two years, and schoolchildren in Glasgow are getting fish and seaweed on their lunch menu.

Since it may take 10 years for a sushi chef to perfect his or her art, demand is high enough to warrant several Internet job boards where the budding itamai-san may seek gainful employ. Unfortunately, though, by the time the new generation of sushi masters can ply their trade, there may not be any fish left to filet.

Words bandied about in the environmental community - overfishing, marine meltdown, disaster - tend to be ignored by the general population. Fish, after all, is a renewable resource, isn't it? Unfortunately, though, fish aren't harvested like renewable crops. They're mined like coal by massive factory ships that ceaselessly prowl the seas.

The world catch of fish went from 19 million tons in 1950 to 90 million tons in 1997. The

United Nations says that almost three-fourths of marine fish stocks, and 11 of the 15 major fishing grounds, are either fully exploited, overfished or depleted. And the U.N. Food and Agricultural Organization says another 30 million tons are destroyed when fish caught "accidentally" are thrown away. According to the Audubon Society, for each pound of shrimp caught, seven pounds of other marine life, including sea turtles, are killed and discarded - what the shrimpers call "trash fish."

Long-range industrialized fishing fleets from Japan, Taiwan, Korea, Russia, Norway and the United States employ methods that catch the most fish, namely drift nets that are more than a mile long, and bottom trawling. Andrianna Natsoulas, of the Greenpeace Oceans Campaign, says, "Industrialized fishing from any corporation is incredibly destructive. Bottom trawling, dragging huge nets across the ocean floor ... it's like clear-cutting the ocean. If it continues ... no more fish."

Just like everything else on the planet, the sushi business is driven by economics. In September 2000, newspapers around the world took glee in reporting the Japanese sale of a 444-pound bluefin tuna for close to $175,000 - a fish that would have brought about $35 a decade ago. The North American domestic market for nori seaweed is in the $70 million per year range, while California's export trade in sea urchins is in excess of $80 million dollars annually.

Every aspect of industrial commercial fishing is devastating environmentally, and follows fashionable trends. Designer seafood like Chilean sea bass and monkfish (once a "trash fish") are severely over-fished, and orange roughy, a fish that wasn't considered palatable several years ago, is caught by bottom trawlers that destroy coral reefs and other fish habitat. Hydraulic dredges scoop up massive sections of ocean floor to sift out scallops, clams and oysters. Grouper is so

heavily fished that it's one of the few ocean fishes ever proposed for an endangered species listing.

We're already seeing the beginning of the end. Restaurants are now complaining that they're having to purchase teenagers instead of adult fish. The average swordfish weighs in at 90 pounds or less; in the 1960s it was typically over 200 pounds. Supply in the U.S. hasn't been affected - yet - because the federal government requires that all fish, except tuna, must be sold frozen to restaurants. Wholesalers are better able to stockpile frozen fish for times of the year when certain species of fish are out of season. "You don't see a shortage of product," says Vince Lombardi, of Lombardi Seafoods. "You see demand rising, which in turn is raising the price."

The answer, one might imagine, is commercial fish farms. Already, about half the shrimp, one-third of the salmon and almost all of the catfish and rainbow trout consumed in the U.S. is raised on aquaculture farms. But the farms, and salmon farms in particular, cast a deep and dark environmental shadow.

Natsoulas cites "coastal destruction, pesticides [and] virus spread" as just part of the problem. Salmon fisheries are usually located right on the natural waterways that are home to wild salmon, disrupting access to spawning areas and depleting the wild population. Not to mention that farmed salmon are raised on fish meal - that's right, food made from fish. Each pound of salmon from the farm requires three pounds of meal and oil, usually from wild salmon caught right outside their pens. And the latest European Union research found that fishmeal and oil carried the greatest contamination of dioxins in all animal feeds, while a BBC documentary reported that farmed salmon carried up to 10 times the levels of dioxins and PCBs as their wild counterparts.

Fish stressed by overcrowding - imagine an acres-wide, writhing sardine can - develop diseases such as infectious salmon anemia, which get spread to the native population along with the massive antibiotics used to treat the "herd." Friends of the Earth in Scotland has traced outbreaks of the salmon disease in sea trout, eel and farmed rainbow trout all across the country, an interspecies jump not previously thought possible. Pollution from Scottish salmon farms has been blamed for an almost total collapse of the local shellfish industry. Scientists have calculated the farms release nitrogen and phosphorus into the ocean in amounts equal to the pollution of twice the country's human population. Blooms of red tide created by runoff from fish farms along the southern coast of Norway may in fact end salmon farming permanently, and take the native cod population along with it.

And then there's the escapes. According to environmental watchdog SeaWeb, 300,000 farm-bred Atlantic salmon escaped into Puget Sound in 1997. The Office of the Auditor General of British Columbia estimates that more than 345,000 Atlantic salmon escaped from farms between 1991 and 1999 into rivers populated by native Pacific salmon. Escaped salmon now outnumber native fish in Scotland by seven to one, with more than 400,000 "breakouts" so far this year. Norway experiences as many as 1.3 million fish escapes every year.

While the mental image of salmon leaping for their freedom may be appealing, the new refugees put a load on the local environment that usually wipes out the wild population. Salmon are now extinct in 40 percent of the rivers along the North American Pacific coast.

Meanwhile, the fish that does make it to the sushi bar is almost flavorless and ribboned with layers of fat, and according to some experts, higher in cholesterol than a steak. More than one chef has said that, due to the

massive amounts of carotene forced into the fish to maintain color, farmed salmon can actually stain their cutting boards orange.

Seafood, to most folk, is healthy, and sushi is still such a novelty that it's not even considered fish. But look at the model we're emulating, the country that consumes 30 percent of the world's fresh fish: Japan. To the four basics tastes - sweet, sour, bitter and salty - the Japanese add a fifth: umami, the very attribute of how tasty food is. And apparently fish is mighty umami; the United Nations Food and Agriculture Organization estimates that every man, woman and child in Japan devours almost 180 pounds of fish a year. Americans, even the burgeoning sushi addicts among us, eat between 15 and 44 pounds.

In its appetite Japan has overharvested its sea urchin population (for the roe, a delicacy called uni) to such a point that it now must import most of its staggering intake from the United States. California's largest export item from the ocean is uni, which, according to the California Department of Fish and Game, is already showing signs of depletion. Maine harvests more than 40 million pounds a year for export to Japan, which is ironic considering that the sea urchin business saved the economy of the Northeast Coast after the collapse of the salmon industry.

Even if we all wake up tomorrow and decide to eat one less piece of maki, we'd still be guilty of decimation by tradition every time we pick up disposable chopsticks, called waribashi in Japan. Enormous tracts of aspen forest in the Philippines, Indonesia and Canada are clear-cut to produce several million pairs of chopsticks a day. The Rainforest Action Network has been calling for boycotts against Mitsubishi for years, saying that their deceptively-named Canadian Chopsticks Manufacturing Co. throws away 85 percent of the trees it cuts down to produce waribashi because "the wood is not white enough."

It's easy to point at Japan because most of the 25 billion pairs (about 200 a person) it uses annually are made from other countries' trees, but China holds the prize, making and throwing away more than 45 billion pairs every year, which takes as many as 25 million trees to produce. At that rate, China's forests will be gone in a decade, while still importing more than 60 million cubic meters of timber a year.

Is this any worse than the 25 billion Styrofoam cups Americans throw away every year? Apparently so, since even the Chinese government blames floods that killed more than 3,000 people on soil erosion due to excessive logging in river basins. (**Sources**)

(09/06/2001) Industrial-scale commercial fishing rapidly driving white marlin extinct - at present rate of decline, the billfish will be functionally extinct within 5 years. See **Endangered Species: Marine Fish**.

(09/02/2001) Populations of over a dozen fish along South Carolina's coast are severely declining due to overfishing. Two decades ago, commercial fishing boats hauled in steel traps full of red porgy, a fish once found in great schools along South Carolina's coast. Daniel LaRoche remembers unloading vessels stuffed with cages of the silvery-red fish. "It would take all day just to unload those boats," said LaRoche, a seafood packer.

But today, the red porgy is rare in South Carolina. So many of the small, tasty fish were caught that the population collapsed, government research shows.

More than a dozen deep-water species along the South Atlantic Coast are severely

declining because of overfishing, according to the National Marine Fisheries Service, including red snapper, speckled hind, warsaw grouper and golden tile fish. Many of these fish concentrate near rocks and reefs deep below the ocean's surface. Popular with commercial fishers and weekend anglers, some types of snappers and groupers are declining enough to prompt talk of no-fishing zones.

Closer to shore, in the shallow tidal creeks and salt marshes of the Southeast, red drum also has been overfished, scientists say. Red drum, also called spot tail bass, is best known as the main ingredient for blackened redfish, a tasty New Orleans dish.

And the swordfish, a feisty predator that migrates worldwide, has been under intense fishing pressure the past three decades. Scientists hope international catch restrictions will help replenish populations of swordfish, once among the most popular items on restaurant menus. Studies indicate that big swordfish are now hard to find because of heavy fishing around the world.

All of these species swim off the South Carolina coast, which, like other southeastern states, finds itself in the global debate over fishing regulations and declining fish stocks. Nationally, more than 40 percent of the fish studied are overfished, according to the Pew Oceans Commission, which is examining coastal issues. Species of greatest concern are fish such as groupers and snappers that take years to mature, meaning it also takes years for overfished populations to recover.

"Things we thought could not be overfished, we have done a good job of overfishing them," said David Cupka, a state marine resources official and vice chairman of the U.S. South Atlantic Fishery Management Council. "We've got more people chasing our resources."

Populations of enough fish species are collapsing - or at least in danger of depletion - that government officials and environmentalists say it's time for more aggressive action. "We have fish that are at risk, and that indicates the need to change our behavior," said Caitlin Winans, national issues coordinator with the South Carolina Coastal Conservation League.

But many fishers and seafood brokers are leery of plans to restore several species. They say tighter regulations are either too drastic or ineffective. Some even claim that overfishing is not really a problem. And for any declines they do agree upon, commercial and recreational anglers blame each other. "This whole issue is more political than anything," said John Tortorici, a Charleston seafood salesman.

Nonetheless, state and federal studies have found a 12 percent annual drop in red drum in South Carolina, a 90 percent reduction in the Atlantic dusky shark, and fewer grouper caught per trip by recreational anglers on the South Atlantic Coast. One federal study found that the number of speckled hind in the South Atlantic had, by 1990, dropped to only 10 percent of the species' 1973 population.

The red porgy, however, remains the prime example of a species that was overfished during the 1970s and 1980s, state and federal statistics show. Red porgy old enough to spawn declined along the Southeast coast by 97 percent from 1978 to 1997, according to the National Marine Fisheries Service.

In South Carolina, commercial fishers landed 603,000 red porgy in 1981, according to a recent state Natural Resources Department report. By 1998, the number had fallen to 68,000.

Big recreational boats also took their toll on red porgy from North Carolina to northern

Florida. Fishers on these boats landed 4.4 red porgy per angler in 1972. By 1998, they were reeling in less than one per angler, according to the federal Center for Coastal Fisheries Habitat Research.

Worried that existing catch limits weren't working for red porgy, the South Atlantic Fishery Management Council imposed a temporary ban on fishing in 1999 and stricter catch limits last year. Now, the catch is restricted to one fish a day per recreational angler, down from five a day. Commercial boats can't land more than 50 pounds of the fish per trip.

Marine experts say the red porgy and many other species have been overfished by commercial and recreational anglers, who contribute tens of millions of dollars to the economy annually. Commercial fishing boats were allowed to harvest fish with huge nets in South Carolina more than 20 years ago. These nets dragged across the sea floor, indiscriminately picking up any species in the water. They also destroyed rocky bottoms that attracted many fish.

Fishing boats also were allowed to use traps, like those that hauled in red porgies. These steel cages, in some cases 6-feet long, allowed fish to swim in but not to escape. Nets and steel traps have been banned for more than a decade.

Billy Knight, a Charleston recreational boat captain, says the government and commercial fishers are to blame. Government programs once encouraged commercial fishing for grouper and snapper, which were considered "underutilized" stocks more than 20 years ago, he said.

Cupka, who runs the state DNR's fishery management office, acknowledged his agency encouraged commercial fishing for snapper and grouper in the 1970s. "It was a resource everybody thought needed to be utilized," he said. "But so many people got

into it that a lot more pressure was put on the fishery than it could sustain."

Some say recreational fishing is a greater threat to saltwater species today than it was in the past because more people are buying more boats equipped with sophisticated fish-tracking systems. These days, people have registered more than 80,000 recreational boats in South Carolina's coastal counties. That's nearly double the number of boats registered 20 years ago, DNR records show.

Nationally, South Carolina ranks eighth in the number of boats registered with more than 400,000, putting it ahead ahead of larger coastal states such as North Carolina, Virginia and Maryland.

Marine scientist John Dean, a member of the South Atlantic Fishery Management Council, said most boats purchased primarily for fishing are equipped with fish-finders and global positioning systems. This allows anglers to locate schools of large fish, then mark the spot so they can return to the exact place the next time they fish, he said. "Everybody has them," Dean said. "I don't know of an angler who doesn't use one of these."

Commercial fishers say recreational boats have a bigger impact on fish populations than people realize. And recreational anglers aren't shy about pushing for their share of the pie. A key dispute occurred about two years ago when recreational anglers persuaded the Legislature to limit the commercial mahi mahi catch. Commercial fishers were livid, arguing that the mahi mahi is a plentiful fish.

Rep. Chip Limehouse, R-Charleston, said the bill was a precautionary measure to prevent huge commercial fishing boats from exploiting the mahi mahi as other species, such as the swordfish, became more tightly regulated. The South Atlantic council is considering limits, as well.

The state DNR has not directly compared the economic impact of commercial to recreational fishing. Agency records indicate commercial fishing and shrimping contributes $56 million to the economy annually. Recreational fishing tops $300 million.

The South Atlantic Fishery Management Council is considering closing dozens of places from South Florida to North Carolina to give many deep-water fish a chance to recover from overfishing. The council sets offshore fishing regulations. Its authority extends to fish found in federal waters between three and 200 miles from shore. The council could limit fishing in up to 10 areas off South Carolina, the most proposed for any state in the Southeast. But Kim Iverson, a spokeswoman for the federal council, said the group might reduce the number of closed areas to three for South Carolina. Those are the spots with the deep-water species most at risk, she said after a recent meeting.

Proponents of closed zones, known as Marine Protected Areas, say traditional programs to manage fisheries haven't worked for many deep-water species. Those programs limit the number and size of fish that can be caught, which requires anglers to throw back those species that are too small or too large.

But deep-water species such as grouper typically don't survive when tossed back into the ocean, fisheries biologists say. Species such as the snowy and warsaw groupers live hundreds of feet below the surface and usually die when caught because of pressure changes when they are pulled to the surface. (**Sources**)

(09/01/2001) Scientists warn Gulf

of Mexico and Eastern U.S. coastal ecosystems are collapsing due to massive overfishing of menhaden, a key species in the marine food chain. First you see the birds - gulls, terns, cormorants, and ospreys wheeling overhead, then swooping down into a wide expanse of water dimpled as though by large raindrops. Silvery flashes and splashes erupt from thousands of small herringlike fish called menhaden. More birds arrive, and the air rings with shrill cries. The birds alert nearby anglers that a massive school of menhaden is under attack by bluefish.

The razor-toothed blues tear at the menhaden like piranhas in a killing frenzy, gorging themselves, some killing even when they are too full to eat, some vomiting so they can kill and eat again. Beneath the blues, weakfish begin to circle, snaring the detritus of the carnage. Farther below, giant striped bass gobble chunks that get by the weakfish. From time to time a bass muscles its way up through the blues to take in whole menhaden. On the seafloor, scavenging crabs feast on leftovers.

The school of menhaden survives and swims on, its losses dwarfed in plenitude. But a greater danger than bluefish lurks nearby. The birds have attracted a spotter-plane pilot who works for Omega Protein, a $100 million fishing corporation devoted entirely to catching menhaden. As the pilot approaches, he sees the school as a neatly defined silver-purple mass the size of a football field and perhaps 100 feet deep. He radios to a nearby 170-foot-long factory ship, whose crew maneuvers close enough to launch two 40-foot-long boats. The pilot directs the boats' crews as they deploy a purse seine, a gigantic net. Before long, the two boats have trapped the entire school. As the fish strike the net, they thrash frantically, making a wall of white froth that marks the net's circumference. The factory ship pulls alongside, pumps the fish into its refrigerated hold, and heads off to unload them at an Omega plant in Virginia.

Not one of these fish is destined for a supermarket, canning factory, or restaurant. Menhaden are oily and foul and packed with tiny bones. No one eats them. Yet they are the most important fish caught along the Atlantic and Gulf coasts, exceeding the tonnage of all other species combined. Menhaden make up approximately 40 percent of the catch of commercial fisheries in the United States. These kibble of the sea fetch only about 10 cents a pound at the dock, but they can be ground up, dried, and formed into another kind of kibble for land animals - a high-protein feed for chickens, pigs, and cattle. Nearly 98 percent of the menhaden catch is converted into fish meal, proteins, and oils and then used as fertilizer and animal feed and in cosmetics. Pop some barbecued chicken wings into your mouth, and at least part of what you're eating was once menhaden.

Humans eat menhaden in other forms too. Menhaden are a key dietary component for a wide variety of fish, including bass, mackerel, cod, bonito, swordfish, bluefish, and tuna. The 19th-century ichthyologist G. Brown Goode exaggerated only slightly when declaring that people who dine on Atlantic saltwater fish are eating "nothing but menhaden."

And that is one problem with the intensive fishing of menhaden, which has escalated in recent decades. This vital biolink in a food chain that extends from tiny plankton to the dinner tables of many Americans is disappearing. Some ecologists estimate that the menhaden population declined by more than 50 percent in just the last decade. The population of menhaden has become so depleted in estuaries and bays up and down the Eastern Seaboard that even marine biologists who look kindly on commercial fishing are alarmed.

Menhaden are a critical link in the coastal marine food chain, turning tremendous

quantities of plankton into biomass for a wide variety of predatory forage fish, seabirds, and marine mammals. "Menhaden are an incredibly important link for the entire Atlantic coast," says Jim Uphoff, the stock assessment coordinator for the Fisheries Service of the Maryland Department of Natural Resources. "And you have a crashing menhaden population with the potential to cause a major ecosystem problem."

Menhaden have an even more important role that extends beyond the food chain: They are filter feeders that consume phytoplankton, thus controlling the growth of algae in coastal waters. As the population of menhaden crashes, algal blooms have proliferated, transforming some inshore waters into dead zones.

To grasp how ubiquitous menhaden once were, you can read the journals of explorer John Smith. In 1607, he sailed across the Chesapeake Bay through a mass of menhaden he described as "lying so thick with their heads above the water, as for want of nets (our barge driving amongst them) we attempted to catch them with a frying pan." Colossal schools of menhaden, often more than a mile in diameter, were once common along the entire Atlantic and Gulf coasts of the United States. Since World War II, however, fishermen using spotter planes and purse seines have dramatically decreased both the population and the range of menhaden.

Bryan Taplin, an environmental scientist in the Atlantic Ecology Division of the Environmental Protection Agency (EPA), has witnessed the destruction of all the large schools of menhaden by purse seiners in Rhode Island's Narragansett Bay. During the last two decades he has also studied changes in the diet of striped bass in the bay by analyzing the carbon isotope signature of their scales. What he has discovered is a steady shift away from fat-rich menhaden to invertebrates that provide considerably lower

nutritional value. That has been accompanied by a loss of muscle and a decrease in the weight-to-length ratio of striped bass. The bass that remain in Narragansett Bay, says Taplin, are "long skinny stripers" that have been forced to shift their diet because "the menhaden population has crashed to an all-time low."

"You have to scratch your head and wonder - since we set quotas for bluefin and tuna - why we don't set quotas for this crucial part of the oceanic food chain," says Taplin. "Not to regulate a fishery that's so important is to ask for trouble. I wonder whether we are about to see something go wrong unlike anything we have ever seen."

Signs of what could go wrong are already obvious in the Chesapeake Bay, the tidal estuary that once produced more seafood per acre than any body of water on Earth. "There's nothing in Chesapeake Bay that can take the place of menhaden," says Uphoff of the Maryland Fisheries Service. "Menhaden are king."

Jim Price is a fifth-generation Chesapeake Bay fisherman. For 10 years he captained a charter boat specializing in light-tackle fishing for striped bass, also called rockfish by bay anglers. One day in the fall of 1997, Price caught a rockfish so diseased he still becomes upset when he talks about it. "I'd never seen anything like that in my entire life," he says, wringing his powerful, deeply tanned hands. "It was covered with red sores. It was so sickening it really took something out of me."

Price deposited several sick rockfish at the Cooperative Oxford Laboratory in nearby Oxford, Maryland, and then began his own independent study. When he cut some open, he was shocked. "I've been looking in the stomachs of rockfish for 40 years," he says, "but I couldn't believe what I saw - nothing, absolutely nothing. Not only was there no food, but there was no fat. Everything was

shrunk up and small."

An Oxford lab pathologist speculated that the fish might have been "decoupled from their source of food," but Price was incredulous. "I thought to myself, with all the food here in the Chesapeake, that's a stupid idea. Then I got to thinking. In years past, at that time of year I would find their stomachs full of menhaden, sometimes a half-dozen whole fish."

Price hypothesized that malnutrition, caused by the decline in the menhaden population, made the rockfish vulnerable to disease. Since then, his theory has been confirmed by research. Half the rockfish in the Chesapeake are diseased, with either bacterial infections or lesions associated with *Pfiesteria*, a toxic form of phytoplankton known as the "cell from hell." But that is only one symptom of the depletion of menhaden.

Dense schools of menhaden swimming with their mouths open slurp up enormous quantities of plankton and detritus like gargantuan vacuum cleaners. In the Chesapeake and other coastal waterways, the filtering clarifies water by purging suspended particles that cause turbidity, allowing sunlight to penetrate to greater depths. That encourages the growth of plants that release dissolved oxygen as they photosynthesize. The plants also harbor fish and shellfish.

Far more important, the menhaden's filter feeding limits the spread of devastating algal blooms. Runoff from many sources - farms, detergent-laden wastewater, overfertilized golf courses, and suburban lawns - floods nitrogen and phosphorus into coastal waters. Nitrogen and phosphorus in turn stimulate the growth of algal blooms that block sunlight and kill fish. The blooms eventually sink in thick carpets to the sea bottom, where they suck dissolved oxygen from the water and leave dead zones. Menhaden, by consuming nutrient-rich phytoplankton and

then either swimming out to sea in seasonal migrations or being consumed by fish, birds, and marine mammals, remove a significant percentage of the excess nitrogen and phosphorus that cause algal overgrowth.

Nature had developed a marvelous method for keeping bays and estuaries clear, clean, balanced, and healthy: Oysters, the other great filter feeders, removed plankton in lower water layers, and menhaden removed it from upper layers. As oysters have been driven to near extinction along parts of the Atlantic coast, menhaden have become increasingly important as filters.

Marine biologist Sara Gottlieb says: "Think of menhaden as the liver of a bay. Just as your body needs its liver to filter out toxins, ecosystems also need those natural filters." Overfishing of menhaden is "just like removing your liver," she says, and "you can't survive without a liver."

During the late 19th century, several dozen sailing vessels and a handful of steamships hunted menhaden in Gardiners Bay, near the eastern tip of Long Island, New York. The abundance of menhaden then appealed to another set of hunters: ospreys that nested in an immense rookery on Gardiners Island. As late as the mid-1940s, there were still 300 active osprey nests on the small island. But the ospreys fell victim to the DDT that was sprayed on the wetlands. Eventually, the number of active nests plummeted to 26. After DDT was banned, biologist Paul Spitzer observed a gradual resurgence of the osprey. However, in recent years he has watched the number of ospreys on Gardiners Island dwindle again. From 1995 to 2001, he says, "there has been an absolute steep decline from 71 active nests to 36."

Although no longer weakened by toxins, ospreys now have little to eat. "Migratory menhaden schools formerly arrived in May, in time to feed nestlings," Spitzer says.

In recent years, menhaden have disappeared, and the survival rate of osprey chicks has fallen to one chick for every two nests, a rate comparable to the worst years of DDT use. "The collapse of the menhaden means the endgame for Gardiners Island ospreys," Spitzer says.

Spitzer sees the same pattern of decline in other famous osprey colonies, including those at Plum Island, Massachusetts; Cape Henlopen, Delaware; Smith Point, New York; and Sandy Hook and Cape May in New Jersey.

The menhaden crash may also contribute to the decline of the loons that make an autumn migration stopover in the Chesapeake each year. Spitzer keeps statistical counts of flocks passing through a roughly 60-square-mile prime habitat on the Chesapeake's Choptank River, near where Jim Price found diseased striped bass. Between 1989 and 1999, Spitzer's loon count dropped steadily from 750 to 1,000 per three-hour observation period to 75 to 200. The typical flock fell from 100 to 500 birds to between 15 and 40. Menhaden are "the absolute keystone species for the health of the entire Atlantic ecosystem," says Spitzer.

Hall Watters, now 76 and retired, looks back ruefully on the role he and other spotter pilots played in the demise of the menhaden. "We are what destroyed the fishery, because the menhaden had no place to hide," he says. "If you took the airplanes away from the fleet, the fish would come back."

Watters was the first menhaden spotter pilot, hired in 1946 by Brunswick Navigation of Southport, North Carolina. He had been a fighter pilot during World War II and says he was "the only pilot around who knew what menhaden looked like." Brunswick had just converted three oceangoing minesweepers and two submarine chasers to menhaden fishing ships and was eager to extend the

range and efficiency of its operations. Menhaden usually spawn far out at sea, and the larvae must be carried by currents to the inshore waterways where they mature. Guided by Watters, Brunswick's rugged vessels soon began to net schools as far out as 50 miles, some with so many egg-filled females, he says, that the nets "would be all slimy from the roe."

Watters remembers that in the early postwar years, menhaden filled the seas. In 1947, he spotted one school about 15 miles off Cape Hatteras so large that from an altitude of 10,000 feet, it looked like an island. Although 100 boats circled the school, many fish escaped. "Back then we only fished the big schools. We used to stop when the schools broke up into small pods."

But things had changed dramatically by the time he quit in 1980: "We caught everything we saw. The companies wanted to catch everything but the wiggle."

The exact size of the Atlantic menhaden population in 2001 is impossible to measure, but industry statistics show a dramatic decline in catches over the years since 1946. The average annual tonnage from 1996 to 1999 was only 40 percent of the average annual tonnage caught between 1955 and 1961. Last year the catch was the second lowest in 60 years. Moreover, these numbers may not reflect the full scope of the decline because the catch is not necessarily proportional to the population. "The stock gets smaller but still tends to school," says Jim Uphoff of the Maryland Fisheries Service. "The fishery gets more efficient at finding the schools. Thus they take a larger fraction of the population as the stock is going down."

The large oceanic schools of menhaden are often too scarce now to chase profitably, so the fishing industry has moved into estuaries and bays, particularly the Chesapeake. Maryland has banned purse seining in its

portion of the Chesapeake. Virginia has not. Omega Protein, headquartered in Houston and the largest U.S. menhaden fishing firm, has almost unlimited access to state waters, including the mouth and southern half of the Chesapeake. By 1999, 60 percent of the entire Atlantic menhaden catch came from the Virginia waters of the Chesapeake.

These days Omega Protein enjoys a near monopoly fishing for menhaden. As the fish population declined and operational costs increased, many companies went bankrupt or were bought out by bigger, more industrialized corporations. Omega Protein's parent was Zapata, a Houston-based corporation cofounded by former president George Bush in 1953. Omega Protein went independent in 1998, after completing the consolidation of the menhaden industry by taking over its large Atlantic competitor, American Protein of Virginia, and its Gulf competitor, Gulf Protein of Louisiana.

Omega Protein mothballed 13 of its 53 ships last year and grounded 12 of its 45 spotter planes as the menhaden continued to disappear. Fewer than a dozen of the company's ships fish out of Virginia, but 30 ships fish the Gulf of Mexico.

The Gulf seems to be headed for the same problems that are obvious in the Chesapeake, but on a larger scale. Fed by chemical runoff, algal blooms have spread, causing ever-enlarging, oxygen-depleted dead zones. And jellyfish are proliferating, both a native species and a gigantic Pacific species. Researchers believe the swollen jellyfish population could have a devastating effect on Gulf fishing because they attack the eggs and larvae of many species. Monty Graham, senior marine scientist at the Dauphin Island Sea Lab in Alabama, says overfishing, "including aggressive menhaden fishing," seems to have allowed the jellyfish - "an opportunistic planktivore" - to fill the ecological void. He says the proliferation of both species of jellyfish indicates "something

gone wrong with the ecology."

More than a half century after he first took to the air as a spotter pilot, Watters fumes that "the industry destroyed their own fishery, and they're still at it." What galls him the most is that an increasing proportion of the catch consists of "zeros" - menhaden less than a year old. He advocates banning menhaden fishing close to shore, especially in estuaries, where the young menhaden mature. He also argues that if Omega Protein "enlarged the mesh size, they wouldn't be wiping out the zero class."

Since market forces are unlikely to curtail the menhaden fishery, governments may have to take action. Price thinks the fishing season for menhaden should be closed each December 1, "because after that is when the age zeros migrate down the coast." No matter what is done, most researchers agree the menhaden must be viewed not as a specific problem about a single species of disappearing fish but as a much larger ecological threat.

Bill Matuszeski, former executive director of the National Marine Fisheries Service and former director of the EPA's Chesapeake Bay program, says: "We need to start managing menhaden for their role in the overall ecological system. If this problem isn't taken care of, the EPA will have to get into the decision making."

Matuszeski believes estuaries like the Chesapeake Bay should be put off limits to menhaden fishing immediately. "That would be inconvenient for the industry, but it would be inconvenient for the species to be extinct." (**Sources**)

(08/15/2001) Endangered Patagonian toothfish (Chilean sea bass) still threatened with extinction by poachers

despite satellite monitoring of fishing boats and catch documentation scheme. Conservationists say illegal fishing is threatening the valuable stocks of endangered Patagonian toothfish (*Dissostichus eleginoides*) in Antarctic waters, with illegal, unreported and unregulated (IUU) catches are running at four times the level scientists had thought.

The total catch of the toothfish, known as the "white gold" of the Southern Ocean, is double the level believed previously and steps to protect the toothfish stocks, the conservationists say, are simply not working. Scientists fear the fish could be commercially extinct in a couple of years.

The warning comes in a report prepared by TRAFFIC, the wildlife trade monitoring programme of IUCN-The World Conservation Union and WWF, the global environment campaign. The report, Patagonian Toothfish: Are Conservation and Trade Measures Working?, says IUU fishing is "blatantly undermining the effectiveness of conservation and management of the species".

The body responsible for protecting the toothfish is the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). Since 1997 the Commission has introduced an automated satellite-linked vessel monitoring system, the blacklisting of vessels known to be engaged in IUU fishing, and a catch documentation scheme to monitor the toothfish trade. But the report says this increased surveillance "may have relocated rather than eliminated the IUU effort", which increased in 2000.

Glenn Sant, director of TRAFFIC Oceania, is the co-author of the report. He said: "Even a conservative estimate by TRAFFIC puts the IUU catch as accounting for half of the Patagonian toothfish traded last year. That's four times the amount of IUU catch estimated by CCAMLR.

"It is clear that measures implemented to date could not stem the tide of IUU fishing last year. Already in 2001 it is apparent that the problem continues, given the recent apprehension of a suspected IUU vessel, the South Tomi, after a 6,100 kilometres chase by Australian authorities.

"Much more needs to be done if the threat that IUU fishing poses is to be removed. All countries involved in the trading of Patagonian toothfish need to show more commitment to co-operating with CCAMLR's attempts to eliminate IUU fishing."

The report estimates the total toothfish trade at 59,000 tons in 1999/2000, with the IUU share as much as 33,000 tons. It says the illegal trade is dominated by Spanish-owned fishing interests through flag-of-convenience states, which take no responsibility for foreign vessels registered in their name.

The toothfish is caught for consumers in Japan, north America and the European Union, which together imported almost 30,000 tons last year, more than 90% of the estimated global trade. Patagonian toothfish goes by a variety of names - Chilean sea bass in the US and Canada, and mero in Japan. Mauritians know it as butterfish, while Chileans call it bacalao de profundidad.

The report identifies 14 countries which it says have been involved in IUU fishing in recent years. It says Mauritius was the primary site for landings of IUU-caught toothfish in 1999-2000. Four hot spots for IUU fishing, it says, are South Africa's Prince Edward islands; Crozet and Kerguelen, two French islands; and Australia's Heard and Macdonald islands.

Maija Sirola of TRAFFIC International said: "The report is saying that the very survival of the Patagonian toothfish is now in jeopardy. And it's become clear that this irregular and illegal fishing is worsening the

plight of the species."

Patagonian toothfish live on the sea bottom at 300m-2,500m, eating fish, squid, crabs and prawns. They can reach 2.2 metres in length and weigh up to 120kg. They can live for more than 45 years but do not breed until 8-10 years old. The fish are an important part of sperm whale and elephant seal diet. Some toothfish have antifreeze proteins to protect them in sub-zero waters.

As just one example of illegal fishing of Patagonian toothfish, in April, Australian and South African troops seized a Togo-registered fishing boat and its crew off South Africa, ending a 10-day international chase across the Southern and Indian Oceans. The South Tommy was found to have a cargo of rare Patagonian toothfish estimated to be worth more than $500,000.

An Australian patrol boat first spotted the 50 metre-long boat fishing in Australian waters near the Heard Island-McDonald Island group off Antarctica. It had no licence to be there and the patrol boat approached and tried to escort the boat to Australia. But as they approached land, the boat turned west and took off at high speed, heading for Africa. The patrol boat gave chase and a 3,000 km race ensued, with the two vessels sometimes less than 1,000 metres apart.

As they approached the Cape of Good Hope, the Australians requested South African support. The South Tommy was finally seized by 40 Australian troops using South African navy vessels. They found more than 100 tonnes of fish on board.

The Australian Fisheries Minister, Wilson Tuckey, said the action had averted a disaster. "Had we not intercepted it when we did, it would have gone on until the fish stopped biting, so it would have ended up with 200 or 300 tonnes, which would have been tragic," he said.

The captain of the 44-man crew, who is reported to be Spanish, could face a fine of up to $250,000 and confiscation of his boat if found guilty of poaching. (**Sources**)

[Note: please see the rest of this page for other articles on pirate fishing and Patagonia sea bass.]

(08/13/2001) Scientists say Chesapeake Bay blue crab fishery is "perilously close to collapse" due to overfishing, pollution, and habitat loss. See **Ecosystem Destruction: Chesapeake Bay**.

(07/29/2001) Over half of whale species are now threatened with extinction due to pollution, collisions with ships, entanglement in fishing nets, oil drilling, global warming impacts on ocean ecosystems, **overfishing**, and continued killing for commercial trade. See **Endangered Species: Marine Mammals**.

(06/01/2001) Wild Atlantic salmon numbers fall by more than 80% since 1973 due to **overfishing**, global warming and fish farming, now almost extinct throughout most of Europe, U.S. and Canada. See **Endangered Species: Salmon**.

(05/10/2001) Scientists warn Chesapeake Bay blue crab population near collapse, catch quotas cut 15% over next 3 years after female crab numbers plummet 80% over past 12 years due to overfishing and water pollution killing sea grasses. See **Ecosystem Destruction: Chesapeake Bay**.

(5/8/2001) Scientist warns massive **overfishing**, pollution, global warming, and

other human impacts are reducing world's once bountiful coastal habitats - coral reefs, kelp forests, seagrass and oyster beds - to microbe dominated ecosystems within 20 to 30 years. See **Ecosystem Destruction: Oceans**.

(05/08/2001) Scientist warns coral reefs may be close to worldwide collapse due to **overfishing**, global warming, changing ocean chemistry, pollution, increased sedimentation due to deforestation, and other human impacts. See **Ecosystem Destruction: Coral Reefs**.

(05/06/2001) Wild Atlantic salmon in U.S. Northeast on edge of extinction as less than 10% of fish needed for long-term survival return to spawn in Maine rivers due to **overfishing**, loss of habitat to dams and development, impact of escaped farm salmon, and water diversions for irrigating blueberry farms. See **Endangered Species: Salmon**.

(05/03/2001) Scientists warn numbers of Patagonian toothfish in Southern Ocean are crashing so rapidly due to illegal longline fishing it could become commercially extinct within 3 years. Somewhere in the expanse of the Southern Ocean, it is likely that pirates are at work. But instead of hunting treasures, these illegal fisherman are poaching the Patagonian toothfish - so valuable it's become known as "white gold." The British newspaper, The Independent, recently stated, "Illegal fisherman are known to make $500m (£347m) a year hauling in 110,000 tons of the fish, twice the legal catch."

The Patagonian toothfish live in very remote and deep parts of the Southern Ocean, as far down as 3,500 metres. It has tasty white flesh, which is very sought after around the

world and fetches high prices. Dr. Marcus Haward, of the Antarctic Cooperative Research Centre at the University of Tasmania, describes it as a valuable sea creature. "Its price is now £5 per kg, which doesn't sound like much, but that's a quantum above other comparable fish. Some people have described it as white gold... that may reflect the gold rush mentality."

The Patagonian toothfish can live at least 50 years. But it grows slowly and only begins to breed after ten or twelve years. Because the toothfish are being caught before it reaches its spawning age, stocks do not have the chance to replenish themselves. Numbers are therefore decreasing rapidly. The Cousteau Society reports that scientists believe stocks are crashing so quickly the toothfish could become commercially extinct in three years.

In a fact sheet published by Greenpeace, the current endangered status of the toothfish is partly due to the severe depletion of other kinds of fish. Greenpeace says overfishing during the mid-1980s forced Spanish, Korean and Japanese industrial fishing vessels into new waters beyond their national territories. Chilean waters, which supplied Austral hake and Golden kingclip, became one of several locations chosen by the industry.

When stocks of these fish were depleted, the fleets turned to catching toothfish. Once toothfish stocks in South American waters were became commercially extinction, the fishers moved away, towards the east. Now vessels are exploiting toothfish stocks around South Africa and Australia.

In April, after a ten-day chase across ocean waters, Australian and South African forces seized an illegal fishing boat carrying 100 tons of toothfish. The cargo was estimated to be worth £500,000, if sold in Japan and the US.

The illegal boat was seen fishing off Heard Island, near Antarctica. The area falls under the protection of the Convention for Conservation of Antarctic Marine Living resources (CCAMLR), which is responsible for the management of fisheries in the region. Boats found fishing there without a licence are flaunting the convention and are liable to be fined.

Governments have tried to stem the gold rush by controlling the number of fishing operators through licences. But as Alistair Graham, of the Tasmanian Conservation Trust, explains, the rewards are potentially so high that people are willing to operate without a licence - hence the existence of pirates.

"It's one of the quickest ways to make a million bucks ... take a boat down to the southern ocean, strike it lucky and catch some fish, and you've got a million bucks in your pocket. As long as that's true, there'll always be the shonky operators in the fishing industry who'll give it a try."

Illegal fishers paint out the names of their boats and some even equip their vessels with radar technology in order to evade naval patrols. Many vessels are registered in countries other than their own. This way, owners are unlikely to be prosecuted even if their vessels are seized.

The authorities are now intent on pursuing pirates on land too. A unique collaboration between conservationists and legal fishing operators has led to the formation of ISOFISH, a group that exposes the pirate operators, and more importantly, their owners.

The authorities are also trying to crack down on the trade in illegally caught fish. The idea is that if you deny the pirates a market for their produce, eventually they'll go out of business. Graham believes it's a scheme that could have implications for other threatened

species. He says: "There's no doubt whatsoever there are a lot of natural resources and animal and plant populations which are seriously at risk from exploitation through commercial trade. And this is a really important pioneering measure..."

The lesson from the South American waters is clear - unless they are carefully managed, stocks of fish can be wiped out very easily. The battle is now on to stop that same scenario from being played out in the waters of the Antarctic.

Most people have never heard about the Patagonian toothfish. However, they may have eaten it, unknowingly, at a restaurant, or purchased it at the fishmongers. Names for it differ around the world and this, to a certain degree, is part of its downfall. It is variously called: Chilean sea bass, Antarctic Sea Bass, Australian Sea Bass and Black Hake. In Japan, it is called Mero; in Chile, Spain and Argentina, Merluza Negra. Some traders in the fishing industry call it white gold. Scientists refer to it as *Dissostichus eleginoides*.

Most vessels catch toothfish with a long line. This line can measure as much as 12 kilometres in length. It is anchored to the ocean floor, on both ends. Fixed to it are thousands of hooks carrying bait. The system attracts both toothfish and other wildlife. One of its main victims is the albatross, a bird that has declined 50% in the last 20-30 years. Alistair Graham, of the Tasmanian Conservation Trust, explains: "That same bait is very attractive food for albatrosses. They dive on the hooks and get caught. Once they are caught, they get dragged down, and drowned, and killed." (**Sources**)

[Note: please see the rest of this page for other articles on pirate fishing and Patagonia sea bass.]

(05/01/2001) U.S. Northwest salmon now gone from 40% of their original habitat, almost half of remaining populations listed as endangered or threatened due to dams, overfishing, habitat destruction from irrigation, mining, logging, cattle grazing, other human impacts. See **Endangered Species: Salmon**.

(04/16/2001) With its population down as much as 99% due to fishing nets and destruction of its coastal habitat, once common smalltooth sawfish could be first marine fish listed under U.S. Endangered Species Act; globally, all sawfish species are now listed as endangered or critically endangered by IUCN. See **Endangered Species: Sharks, Rays, Skates and Sawfish**.

(02/22/2001) Rising demand for shark fin soup and "bycatch" putting world's shark populations in danger of collapse, 100 million sharks now being killed for their fins every year. See **Endangered Species: Sharks, Rays, Skates and Sawfish**.

(02/21/2001) World's governments dither while pirate fishing trawlers and longliners plunder oceans, illegal take includes endangered bluefin tuna and Patagonian toothfish. Japan is urging the EU to outlaw pirate fishing vessels which are plundering Atlantic fish stocks and putting legitimate fishermen out of business. It accuses the EU of soft pedalling because, although the pirate vessels ply their trade under notorious flags of convenience, many of the trawler owners live comfortably in Spain and the UK. Japan, one of the main recipients of illegally caught Atlantic tuna, has been trying to stop the traffic partly because it fears stocks will become exhausted and partly because its fishing unions believe they are being put out of

work.

Fearing a collapse in world fish stocks because of the pirate fishing, the UN Food and Agriculture Organisation is meeting to try to finalise an international agreement banning the landing of catches and clamping down on the owners. Without international cooperation to prosecute the owners, Japan believes it will be difficult to stamp out the global trade which accounts for more than 10% of total world catches.

Among the species being wiped out by pirate boats is the Patagonian tooth fish, sold in British supermarkets as Antarctic ice fish, and caught on long lines. Each line is spiked with 50,000 hooks which also kill albatross and other sea birds.

Estimates based on Lloyd's Maritime Information Services show there are around 1,300 industrial fishing vessels flying flags of convenience. Belize has 404 registered trawlers or "fishing vessels", Honduras, 395, Panama, 214 and St Vincent and the Grenadines 108. A flag registration can be bought over the internet for as little as £350.

The owners are often registered in the same country as the ship, at least on paper, although the real beneficiaries are far away. Taiwan tops the list of beneficial owners with 169 vessels while the EU has 168. Of these Spain and the Canary Islands have 116, Portugal 12, Greece 11 and the UK 10. Of Britain's 10, four were registered in St Vincent and the Grenadines, four in Panama and two in Belize.

In addition there is a fish-carrying vessel which collects the catch from industrial trawlers at sea and takes it to market, disguising its origins.

In October, at the last meeting on "illegal, unregulated and unreported" fishing, as it is known by the UN, attempts to reach

agreement were resisted by Mexico and Brazil, who said that clamping down on pirate boats was a restraint of free trade, and by the EU which managed to delete most provisions calling on governments to penalise or take other action against companies under their jurisdiction.

Greenpeace, which has followed illegal ships, watched them unload at sea and traced freezer vessels to ports in Japan, says pirate vessels are successfully evading all fishing conservation and management regulations. "We must close ports to these vessels, close markets to the fish, and penalise the companies involved in the jurisdiction of their home country," said Matthew Gianni from Grenpeace. "The EU has seriously weakened the agreement by removing the parts which allow member states to take action against the beneficial owners. All fishing agreements are made worthless if pirate fishing is allowed to continue."

Pirate fishing has doubled in the last 10 years. Patagonian tooth fish are worth £8 a kilo for sushi and sashimi and the illegal trade in this catch alone is worth £300m annually. Individual blue fin tuna, now an endangered species, have fetched up to £30,000 on the Japanese market. (**Sources**)

[Note: please see the rest of this page for other articles on pirate fishing and Patagonia sea bass.]

(02/13/2001) Lake Victoria fish stocks are collapsing due to overfishing by trawlers and the use of nets that catch juvenile fish. See **Ecosystem Destruction: Lake Victoria**.

(01/01/2001) Going, going, gone: Industrial longline, gillnet, and purse seine fishing rapidly driving marlin, swordfish, sailfish, bluefin and bigeye tuna, and sharks to extinction. See Endangered Species: **Marine**

Fish.

(12/28/2000) Galapagos Islands' shark, sea cucumber and other fishery stocks being driven to collapse by fishermen unwilling to accept any limits on their catches. See **Ecosystem Destruction: Galapagos Islands**.

(12/10/2000) Galapagos Islands' ecosystems at risk after Ecuador's government caves in to rioting fishermen demanding right to overfish in Galapagos nature preserve. See **Ecosystem Destruction: Galapagos Islands**.

(11/30/2000) Overfishing, pollution and non-native species killing Lakes Victoria, Tanganyika and Malawi. See **Ecosystem Destruction: Lake Victoria**.

(11/01/2000) Illegal longline fishing for Antarctic sea bass (Patagonian toothfish) depleting stocks and driving endangered seabirds closer to extinction. Dead seabirds and two tons of longline fishing gear greeted delegates to the annual meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), dumped by Greenpeace to illustrate the ineffectiveness of the commission in dealing with pirate fishing in the Southern Ocean. The group wants the commission to declare an immediate moratorium on commercial fishing for falling stocks of Antarctic sea bass, otherwise known as the Patagonian toothfish (*Dissostichus eleginoides*). The fish was virtually unknown until Chilean fishers caught a specimen off Chile in 1982. It quickly became a sensation in high end restaurants after the crash of two other fish species, the orange roughy and the North Pacific black cod, and is now being overfished.

The fish is particularly vulnerable to over fishing because it can live as long as 80 years and does not reproduce until it is eight to 10 years old. Its slow recruitment rate makes it nearly impossible for the fish to recover from over fishing. Since 1991, there has been limited legal fishing of the Patagonian toothfish, but in recent years, illegal and unregulated fishing has risen dramatically and the estimated illegal catch is thought to be least two to three times the legal limit.

The longline method favored by poachers is also killing seabirds. The dead birds presented to the commission, including endangered albatross species, are a sample of the 330,000 seabirds hooked and drowned in the Southern Ocean over the last four years, said Greenpeace. The birds are attracted to baits used in longline fishing for toothfish. Last year, CCAMLR scientists at Bird Island found that 79 percent of Wandering albatross chicks were contaminated with debris left by longline fishermen.

"Researchers found hooks, line and tackle in food regurgitated by the young endangered birds," said Greenpeace oceans campaigner Denise Boyd. "It's one thing to see the figures - it's another to be faced with the real thing. These birds died on illegal longlines. Greenpeace brought them here to force delegates to realize we are talking about real animals, unique creatures that may be wiped out entirely if they do not act now. This is the only way to show how critical the situation is. While delegates here in Hobart talk about conservation and protection, thousands of endangered birds are dying, tons of endangered fish are being smuggled onto the blackmarket and Antarctica's waters are being polluted with abandoned piratefishing gear."

CCAMLR was set up in 1982 in response to concerns that an increase in krill catches in the Southern Ocean could seriously effect

populations of krill and other marine life, particularly birds, seals and fish which depend on krill for food. Last year, the CCAMLR set up the Catch Documentation Scheme to deal with illegal fishing. Dr. Alan Hemmings of the Antarctic and Southern Ocean Coalition (ASOC), a worldwide coalition of 250 conservation NGOs in 50 countries, said the scheme has failed to stop the pirates finding markets for their fish.

"Illegal, unreported and unregulated fishing is still at levels high enough to continue to drive toothfish stocks to commercial extinction and some seabird populations to actual extinction in the Southern Ocean," Hemmings said. "CCAMLR's Catch Documentation Scheme for toothfish has not succeeded in closing lucrative markets to the poachers. Toothfish poachers are finding new ports prepared to take their catches, factories in new countries are prepared to process their catches and some states are not closing their markets to illegally caught fish."

ASOC representative Mark Stevens said that some of the governments responsible for the worst offenders in the trade in illegally caught toothfish are actually members of CCAMLR. "The time has come to name names," said Stevens before reeling off the following accusations against CCAMLR member nations:

* Spanish nationals, using fishing vessels and companies registered in other countries, are responsible for the bulk of the illegal fishing in the Southern Ocean.

* Uruguay allows Montevideo Port to be used by illegal fishers to land toothfish for export to other countries.

* Chile has not yet managed to stop factories processing illegally caught toothfish within its territory and still allows its companies to export products derived from illegally caught fish.

* Japan still allows fish and fish products derived from illegal, unreported and unregulated fishing operations to be imported into Japan and traded in its markets.

* Canada has been refusing to implement the Catch Documentation Scheme thus allowing toothfish products imported from Chile to be illegally re-exported to the United States.

Hemmings also named states that are not members of CCAMLR but are active in the illegal toothfish trade. "Pirates are turning to China as a major destination for illegally caught toothfish for processing and re-export to Japan and other countries," he said. "Belize and Panama continue to fail to prevent fishing vessels flying their flags from poaching toothfish, although Panama, at least, is showing some signs of wanting to address the problem. The time has come to institute a moratorium on fishing for toothfish in the Southern Ocean and to close the markets of the world to toothfish for as long as it takes for governments to fix the problem." (**Sources**)

[Note: please see the rest of this page for other articles on pirate fishing and Patagonia sea bass.]

(08/30/2000) Rampant overfishing threatening Galapagos Islands' sea cucumbers and marine ecosystems. See **Ecosystem Destruction: Galapagos Islands**.

(11/01/1999) Patagonian toothfish (aka Antarctic sea bass, Chilean sea bass) could be extinct within 2-3 years

due to uncontrolled longline fishing that is also killing critically endangered albatross species. Greenpeace campaigners are attempting to protect a species of Antarctic fish known by several names, including the Patagonian toothfish, the black hake and the Antarctic sea bass. It is sold in the US - where two companies have said they will stop buying it - as the Chilean sea bass.

The toothfish grows slowly, and can reach more than two metres in length. It lives for up to 50 years and does not breed until it is at least 10 years old. Greenpeace wants stricter protection for the toothfish because much of the fishing is uncontrolled, and because thousands of seabirds are killed in the process.

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) says half of the toothfish catch is taken by illegal pirate vessels, and it believes that the pirates have taken up to 90% of all the toothfish caught in some parts of the southern ocean. CCAMLR has authorised an annual catch limit of about 10,000 tons, but the pirate catch is believed to be more than twice as high.

Greenpeace wants CCAMLR to impose a moratorium on all fishing for the species as a matter of urgency. It says pirate fishing should be stopped, and more research done to see whether the toothfish catch is sustainable. The Australian Government said in 1998 that the continuation of pirate fishing at present levels would mean the toothfish became commercially extinct within two or three years.

Greenpeace asked several UK supermarket chains to back its campaign. Tesco said it strongly supported the moratorium call. But Sainsbury's, Waitrose and Asda stopped short of doing so, saying they believed their supplies were legally caught, and without risk to other species.

But CCAMLR says the fishing gear used by the pirates kills more than 100,000 seabirds a year, including endangered albatross species. The vessels set lines with up to 20,000 baited hooks, and birds which swallow the bait are dragged underwater to drown.

Some albatrosses live for up to 85 years, and mate for life. They spend most of their time in the air, relying on their 3.5m wingspan to ride the ocean thermals. (**Sources**)

[Note: please see the rest of this page for other articles on pirate fishing and Patagonia sea bass.]

(07/08/1999) Galapagos Islands ecosystem could collapse within 10 years due to "saturated" tourism capacity, over-population, introduction of almost 500 non-native species, and overfishing. See **Ecosystem Destruction: Galapagos Islands**.

(02/01/1995) Galapagos fishermen rampage after cutback in unsustainable sea cucumber harvest. See **Ecosystem Destruction: Galapagos Islands**.

Sources

(NOTE: Original news source(s) will open in a new window. Links were good on date posted here, but some news sources only allow free access to articles for a week or so, then articles are removed or a charge made for access. Some sites require registration.)

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(02/26/2002) National Geographic: Cold War Technology Helps Deplete Ocean Fisheries.

(02/21/2002) Economist: Stocks of the North Atlantic's most valuable fish are in trouble.

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(02/20/2002) UK Independent: Cod, haddock, halibut, sea bass, monkfish: the new deadly sins for ethical consumers.

(02/18/2002) Lycos/ENS: High Tech Methods Decimating Fish Populations.

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