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President's Message

I am retiring on May 27 after 40 years in the Department of Fisheries and Oceans. I looked forward to coming to work every day of these 40 years. I plan to stay on as an Emeritus Scientist which means that I do not work as hard and I pay less attention to deadlines and no attention to some other things. There have been many discoveries in fisheries science over the past 40 years, but some fundamental processes remain to be discovered. In the North Pacific, we are getting historic high catches of Pacific salmon. I suspect that more records will be broken. However, after 100 years of research, we do not understand why the abundances are so high and increasing. It is amazing how much we found out about Pacific salmon in recent years, but this is also a positive way of saying how little we know about key processes that regulate abundances. I think that there are enough biologists around the Pacific, so the rate of discovery could be related to other issues. When our profession focuses on an issue such as an impact of a contaminant, we tend to find needed answers. Perhaps the answer for Pacific salmon is to find a way to focus a portion of the research that occurs in the United States, Canada, Russia, Japan and Korea. For the relatively small cost of organizing and coordinating the research effort, Governments would save money in the long term and win friends as each country publicized the collective discoveries. I suspect that this approach of coordinating teams of researchers would increase the rate of discovery in a number of areas across North America. I also suspect that teams of researchers, focused on key problems in fisheries science, would be good for moral among the team members and good for politicians as the public recognize their support.

The voting for President-elect closed on March 1. I am pleased to announce that Steve Cadrin, of the New England District, received 98% of the votes, and is now officially the President-elect. Steve has been a strong supporter of AIFRB and is organizing our next symposium in 2012.

We have some new initiatives that he will take over after our annual meeting in September. One event will be to begin to host major debates on key issues in fisheries science. Board members and Steve are anxious to include new members in our plans for AIFRB and this will be another major focus for Steve. Congratulations, Steve!

Dick Beamish February 2011

The Overfishing Metaphor

B. J. Rothschild

The term "overfishing"[1] seems to have first been used in 1854 at a meeting of the British Association for the Advancement of Science (Rozwadowski, 2002). The determination of whether or not a stock is overfished preoccupied fishery scientists for the next several decades. During this time no precise definition of overfishing could be developed, despite a prestigious inquiry by the International Council for Exploration of the Sea (ICES) (Petersen, 1903).

Progress seemed evident in the 1940s and 1950s with the development of quantitative theories of fishing. The theories created the belief that practical and concrete overfishing definitions could be developed from mathematical models linking fishing mortality and population abundance. These models could generate optimal values (maxima) of production, yield-per-recruit, and recruitment as functions of stock size or fishing mortality. Thus, if optimal values were exceeded—the stock size was too low, or fishing mortality was too high—the stock could be declared overfished.

However, the promise one-half century ago has dissipated. The connection between the theories and real fish populations has been disappointing for several reasons. The theoretical models:

1. do not in general correspond with real data;
2. do not exhibit well-defined optima or maxima for extensive portions of their parameter space (Rothschild *et al.*, 1997). As a consequence, generally arbitrary substitutes (so-called "proxies") are contrived to replace the optimization target;
3. are equivocal and generally not consistent with one another (e.g., growth overfishing and stock overfishing) (see Cushing, 1973);
4. focus on populations in equilibrium despite the fact that real populations are generally not in equilibrium (see, however, Rothschild and Jiao, 2009; Prager, 1994);

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5. ignore critical sources of variability in fish-stock population dynamics, such as interactions with associated species and effects of the ocean environment (Cushing, 1995).

Taken together, these deficiencies result in applications that do not describe the dynamics of fish populations. A consequence of this is that stock abundance and fishing mortality are not always tightly coupled, reflecting that the theories of fishing can only be considered to be metaphorical representations of the relationship between fishing mortality and fish population abundance and, as such, associated definitions of "overfished/overfishing" are also metaphorical. The fact that there is no unique definition of overfishing (except in the Schaefer model sense), and different overfishing standards are applied to different stocks, make it difficult to interpret overarching "mission accomplished" claims about the success or lack of success of fisheries management. Furthermore, the lack of environmental information in the overfishing calculus prevents any meaningful claim that overfished stocks will increase in abundance, if fishing mortality is reduced or terminated.

The spectacular collapse of the cod stock complex in the northwest Atlantic, which has been widely attributed to overfishing, is an interesting, somewhat typical case study (for reviews, see: Rothschild, 2007; Rice, 2002; Lilly *et al.*, 2008; Hilborn and Litzinger, 2009; Halliday and Pinhorn, 2009). The assertion that overfishing is the main cause of the collapse is not supported by the data. Five stanzas in the northwest Atlantic cod-population complex dynamics can be discerned (Figure 1). In the first stanza, the complex is stable despite increasing fishing mortality. In the second stanza, biomass decreases sharply under high fishing mortality. Note however that this major increase in fishing mortality occurs *after* the stock complex has declined in abundance. In the third stanza, the cod complex rebuilds at low fishing mortality. In the fourth stanza, the biomass declines sharply at low fishing mortality. In the fifth stanza, fishing mortality rises sharply *after* the complex has declined. In the second and most dramatic collapse from to 1984-1994 (stanzas 4 and 5), the cod complex begins to decline at relatively low levels of fishing mortality. Counter-indicating fishing intensity as a primary cause of the cod decline during this decade are observations that reflect a widespread deterioration of environmental productivity. These observations include: 1) a fishing moratorium imposed subsequent to the cod collapse did not result in a recovery; 2) the natural mortality rate (i.e., mortality independent of fishing) of cod increased by a factor of four; 3) cod growth rates declined substantially; 4) individual cod condition factors declined; 5) changes in the typical food of the cod were evident; 6) associated species exhibited declines in abundance, growth, and condition; and 7) abnormal quantities of cold, relatively fresh water were evident throughout the region. Altogether these observations point to a major environmental change as the primary cause generating and sustaining the 1984-1994 decline of the cod in the northwest Atlantic.

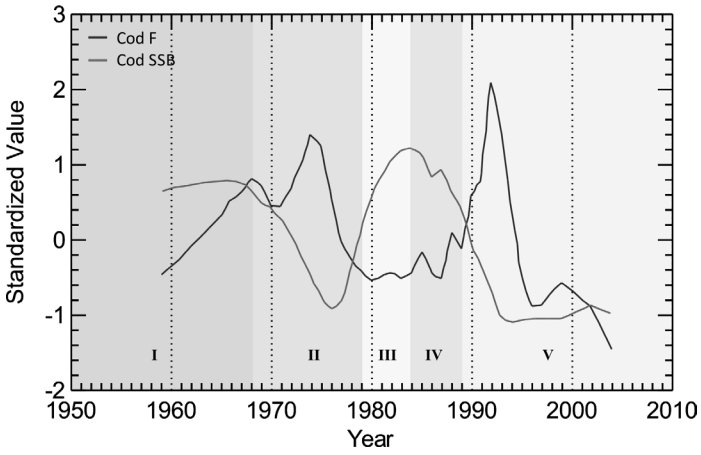

Figure 1. Trajectories of northwest Atlantic cod spawning stock biomass and fishing mortality for five stanzas of time. The data have been normalized in standard deviation units. The trajectories are smooth curves fitted through the data using the Loess smoother (tension = .35).

Two forms of decoupling are apparent. In the first, decoupling appears to be associated with a fish population reaching its "carrying capacity"—either because the size of the stock exceeded the capacity of the environment, or because the capacity of the environment deteriorated. This type of decoupling is evidenced by the not uncommon situation where a stock "crashes" at relatively low fishing mortality. The second form of decoupling relates to the unorthodox concept that *declines* in fish-stock abundance *cause* increases in fishing mortality, rather than the conventional view that increases in fishing mortality cause decreases in fish stock. This is easy to explain inasmuch as nominal fishing mortality (e.g., the number of fishing vessels) tends to decrease more slowly than the number of individuals in a rapidly declining population, generating a sharp post population-crash increase in fishing mortality.

A more plausible model is that fish stock abundance is often coupled with fishing intensity. However, exceptional abundance of a fish stock or decadal transients in ocean productivity (e.g., Steele, 2004) generate a decoupling between fishing intensity and stock abundance. In cases where the stock declines, the slower dynamics of fishing effort causes fishing mortality to increase rapidly, and it is reasonable to argue that this can impede the stock from recovering. Nevertheless, for recovery to take place, both a reduction of fishing mortality *and* a restoration of ecological productivity must take place.

An underlying theme to all of this is that we have been attempting to smash a 19th century concept into a 21st century mold, apparently forgetting basic scientific principles of constraining the complexity of theory by the information content of the data. It would be interesting to test the notion or hypothesis that it would be simpler and less expensive (particularly in multiple-species fisheries) to target on sustained yield rather than ephemeral maximum sustained yield by tracking catches and correcting nominal effort when catches exceeded or did not meet control bounds. This would obviate the need to define stocks as subject to overfishing or overfished while concentrating on obtaining a socio-economic acceptable sustained yield from either single stocks or from a mixture of stocks in a mixed species fishery.

D. H. Cushing, Population Production and Regulation in the Sea: *A Fisheries Perspective* (Cambridge University Press, 1995), xii, 354p.

D. H. Cushing, Dependence of recruitment on parent stock. *J. Fish. Res. Board Can.* **30**, 1965-1976 (1973).

R. B. Halliday, A. T. Pinhorn, The roles of fishing and environmental change in the decline of Northwest Atlantic groundfish populations in the early 1990s. *Fisheries Research* **97**, 163-182 (2009).

R. Hilborn, E. Litzinger, Causes of decline and potential for recovery of Atlantic cod populations. *The Open Fish Science Journal* **2**, 32-38 (2009).

G. R. Lilly, K. Wieland, B. J. Rothschild, S. Sundby, K. F. Drinkwater, K. Brander, G. Ottersen, J. E. Carscadden, G. B. Stenson, G. A. Chouinard, D. P. Swain, N. Daan, Decline and recovery of Atlantic cod (*Gadus morhua*) stocks throughout the North Atlantic. In Resiliency of Gadid Stocks to Fishing and Climate Change. Edited by G. H. Kruse, K. Drinkwater, J. N. Ianelli, J. S. Link, D. L. Stram, V. Wespestad, and D. Woodby. Alaska Sea Grant College Program, AK-SG-08-01, Fairbanks, Alaska. pp. 39-66 (2008).

C. G. J. Petersen, What is overfishing? *Journal of Marine Biology Association (UK)* **6**, 587-594 (1903).

M. H. Prager, A suite of extensions to a non-equilibrium surplus production model. *U.S. Fishery Bulletin*. **92**, 374-389 (1994).

J. Rice, Changes to the large marine ecosystem of the Newfoundland–Labrador Shelf. Pages 51–104 in K. Sherman and H. R. Skjoldal, editors. Large marine ecosystems of the North Atlantic: changing states and sustainability. Elsevier, Amsterdam (2002).

B. J. Rothschild, A. F. Sharov, M. Lambert, Single-species and multispecies management. In Northwest Atlantic Groundfish: Prospectives on a Fishery Collapse. Edited by J. Boreman, B. S. Nakashima, J. A. Wilson and R. L. Kendall. American Fisheries Society, Bethesda, MD. 141-152 (1997).

B. J. Rothschild, Coherence of Atlantic cod stock dynamics in the northwest Atlantic Ocean. *Trans. Am. Fish. Soc.* **136**, 858-874 (2007).

B. J. Rothschild, Y. Jiao, The structure of complex biological reference points and the theory of replacement. *Trans. Am. Fish. Soc.* **138**, 949-965 (2009).

H. M. Rozwadowski, *The Sea Knows No Boundaries: A Century of Marine Science under ICES* (ICES in Association with Univ. of Washington Press, 2002) pp. 448.

J. H. Steele, Regime shifts in the ocean: reconciling observations and theory. *Progress in Oceanography* **60**, 135-141 (2004).

Ice Fishing Anyone?

VANCOUVER - University of British Columbia researchers say that Canada, the U.S., and Russia have not been accurately reporting fisheries catches in the Arctic. In a study published this week in the journal Polar Biology, they estimate that fisheries catches in the Arctic totaled 950,000 tonnes from 1950 to 2006, almost 75 times the amount reported to the United Nations Food and Agriculture Organization (FAO) during this period. “Ineffective reporting, due to governance issues and a lack of credible data on small-scale fisheries, has given us a false sense of comfort that the Arctic is still a pristine frontier when it comes to fisheries,” lead author Dirk Zeller, a senior research fellow at UBC’s Fisheries Centre, said in a statement. “We now offer a more accurate baseline against which we can monitor changes in fish catches and to inform policy and conservation efforts.”

Researchers from UBC’s Fisheries Centre and department of earth and ccean sciences reconstructed fisheries catch data from various sources, including limited governmental reports and anthropological records of indigenous people, for FAO’s Area 18, covering Arctic coastal areas in northern Siberia (Russia), Arctic Alaska, and the Canadian Arctic. Official FAO data on fish catches in the Arctic area studied from 1950 to 2006 were based solely on statistics supplied by Russia and amounted to 12,700 tonnes.

The UBC study found that while the U.S. National Marine Fisheries Service’s Alaska branch currently reports zero catches to FAO for the Arctic area, the Alaska Department of Fish and Game has collected commercial data and undertaken studies on 15 coastal communities in the Alaskan Arctic that rely on fisheries for subsistence. The estimated fish catch during this period in Alaska alone totaled 89,000 tonnes.

While no catches were reported to FAO by Canada, the research team shows commercial and small-scale fisheries actually amounted to 94,000 tonnes in catches in the same time span. Meanwhile, Russia’s total catch was actually 770,000 tonnes from 1950 to 2006, or nearly 12,000 tonnes per year. “Our work shows a lack of care by the Canadian, U.S. and Russian governments in trying to understand the food needs and fish catches of northern communities,” said Daniel Pauly, whose Sea Around Us Project at UBC has shown a trend of fish stocks moving towards polar regions due to the effects of climate change.

By Larry Pynn, Vancouver Sun February 4, 2011

Gary Sakagawa Announces His Retirement

Gary T. Sakagawa, a long-time employee of the U.S. National Marine Fisheries Service (NMFS), announced his retirement on November 19, 2010. As part of his retirement plans, he had been gradually cutting back and transferring his responsibilities to colleagues. In retirement, he will be serving for a time as an advisor to the senior managers of the Southwest Fisheries Science Center, La Jolla, CA, and attending to his many personal interests in La Jolla and elsewhere.

Gary earned his Ph.D. degree from the University of Washington in 1972, after having received his B.S. degree from the University of Hawaii in 1963 and his M.S. degree from the University of Michigan in 1967. His first employment in fisheries was as a fisheries aide for the U.S. Bureau of Commercial Fisheries in Honolulu, HI, in 1963. After completing the requirements for his Ph.D. degree, he was hired by the U.S. NMFS in La Jolla, CA, in 1971, and he has remained there throughout his career.

He has worked almost entirely on tunas, billfishes, and sharks in the Pacific, Atlantic, and Indian Oceans. The research that he has participated in has produced more than 30 papers in peer-reviewed journals and more than 35 presentations at scientific meetings. Also, he has edited or co-edited two books, Proceedings of the ICCAT Conference on the International Skipjack Year Program (1986) and Assessment Methodologies and Management: Proceedings of the World Fisheries Congress, Theme 5 (1995). In addition, he has participated in hundreds of meetings and served as a member of numerous committees, to which he has contributed his expert advice. These include:

- member of the U.S. delegation to the International Commission for the Conservation of Atlantic Tunas, 1972-1986;
- scientific advisor to the U.S. delegation to the Inter-American Tropical Tuna Commission, 1973-2010;
- member of Expert Consultation on Stock Assessment of Tunas in the Indian Ocean, Indo-Pacific Tuna Development and Management Programme, 1986-1993;
- scientific advisor to the U.S. delegation to the U.S.-Canada Albacore Treaty, 2002-2010;
- member of U.S. delegation to U.S.-FFA Consultation on the South Pacific Tuna Treaty, 1993-2004;
- scientific advisor to the U.S. delegation to the Multilateral High Level Conference on the Conservation and Management of Highly-Migratory Fish Stocks in the Western and Central Pacific Ocean, 1994-2001.

Most recently, his job title has been Assistant Center Director of Fishery Management Programs for the Southwest Fishery Science Center. He was responsible for coordinating the Southwest Fishery Science Center's studies and activities in support of the requirements of the Pacific Fisheries Management Council and international regional organizations involved with highly-migratory species of the Pacific Ocean.

Gary's contributions to the profession of fishery science and the community have been exemplary. These include:

- Director, Southern California District, AIFRB, 1977-1979;
- President, Marine Fisheries Section, American Fisheries Society, 1981-1982;
- President, International Fisheries Section, American Fisheries Society, 1991-1993;
- President, AIFRB, 1998-2001;
- member, Board of Directors, Japan Society of San Diego and Tijuana (JSSDT), 1998-2008;
- Chairman, International Science Committee for Tuna and Tuna-like Species of the North Pacific Ocean, 2005-2010;
- Associate Editor, American Fisheries Society,1986-88;
- member, Steering Committee, 1st World Fisheries Congress, 1987-1992;
- convener or organizer of more than six significant symposia.

He has been particularly supportive of professional development of non-U.S. scientists by organizing and facilitating recent American Fisheries Society (AFS) symposia such as the 2003 Western Division of the AFS symposium, "Biology, Ecology and Management of Sharks of the Pacific Coast of Mexico and the US," which has helped facilitate collaboration between Mexican and U.S. scientists.

Gary believes strongly in giving back to the community. He gives generous financial support to the universities that have awarded him degrees, and he has supported outreach work of the JSSDT, including its hosting of the Kyoto Prize event in San Diego.

The awards he has received include Best Paper Award, Fishery Bulletin of the U.S. NMFS, 1974; Award of Excellence, Western Division, AFS, 2003; and U.S. National Oceanic and Atmospheric Administration Silver Medal, 2005.

Gary's wife, Ellen, is a dentist with an office in La Jolla, CA. They have two grown daughters, Bryn, who is a public health official with U.S. AID in Almaty, Kazakhstan, and Tamara, who is a city planner with the City of Lakeland, FL.

AIFRB Hubbs Research Award Recipients

Sally Roman is a fisheries research technician and Master's student at the University of Massachusetts Dartmouth, School for Marine Science and Technology. Her research focuses on cooperative work with the fishing industry in the Northeast U.S. region with a concentration in fishermen self-sampling programs, industry-based surveys and bycatch reduction.

Investigation of an "Observer Effect" on Data Collection by the SMAST Study Fleet

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Abstract

SMAST has managed a study fleet out of the port of New Bedford, Massachusetts in the United States since 2000. The project collects effort, catch, and biological data on the haul level from commercial offshore otter trawl vessels. Validation against other fishery-dependent data sources was conducted to assess the accuracy of the data. Similar results were obtained between sources. Examination into an "observer effect" was completed on a subset of vessels that had carried a fishery observer from 2006 - 2009. Data was inspected for differences in fishing location, effort duration, and catch. There was a difference in statistical area fished, but no statistical difference in trip or tow duration. There was little variation in the number of species reported between observed and unobserved trips. Catch increased linearly by year, statistical area, species and vessel for observed and unobserved trips alike. If an "observer effect" existed, than catch estimates or fishing behavior may have differed. The bias would have to be corrected with changes in sampling protocols or a correction factor to adjust errors in self reported catch. The analyses relate to the theme of innovative data collection strategies such as self sampling and reference fleets, including assessment of precision and bias, and integration of data.

Abigail Lynch is a doctoral student under the advisorship of Dr. Bill Taylor in the Department of Fisheries and Wildlife at Michigan State University. She is enrolled in the Ecology, Evolutionary Biology, and Behavior dual major program and the Environmental Science and Policy doctoral specialization. Her dissertation research focuses on climate change and fisheries. In particular, she is designing a decision-support tool for fisheries managers in the Great Lakes to assess the effects of climate change on fisheries resources using lake whitefish (Coregonus clupeaformis) as the model organism. By integrating science into the management process, the tool is designed to provide managers with access to current, relevant, and focused scientific data.

The Influence of Changing Climate on the Ecology and Management of Great Lakes Fisheries

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Abstract

The Great Lakes provides an excellent ecological system to evaluate the potential effect of climate change on production dynamics of fish populations and the management of their fisheries. In this paper, we describe the physical and biological mechanisms by which select fish populations will be affected by changes in the timing and duration of ice cover, precipitation events, and temperature regimes associated with projected climate change in the Great Lakes Basin. The regional climate is predicted to be warmer, with increased precipitation and a reduction in the extent and duration of ice cover. We use case studies of lake whitefish (Coregonus clupeaformis), walleye (Sander vitreus), and smallmouth bass (Micropterus dolomieu) to examine the potential effects of climate change on Great Lakes cold, cool, and warm water fishes (approximate optimal temperatures of 15oC, 24oC, and 28oC for cold, cool, and warm water species, respectively). Additionally, we modeled population changes (i.e., distribution and abundance) for the most sensitive cold water species, lake whitefish, with projected climate processes and discuss ecosystem-level implications with this species, its production, and the management of its fisheries. Overall, the projections are for warm water species to extend their range northward thereby increasing their abundance and overall productivity while cold water species will experience range contraction and less overall productivity given loss of suitable habitat. These projections, if realized, will challenge the flexibility of our current fisheries programs and require setting adaptive management expectations with the public to provide for a sustainable future for Great Lakes fisheries.

Canadian fisheries will thrive if they follow co-management model, researchers say

Global fisheries, including those in Canada, can be sustained by following a "community-based co-management" model, according to an American study that suggests input from local fishers would stop illegal fishing and increase resources. Researchers at the University of Washington investigated more than 130 fisheries in 44 countries to study how co-management practices affect fisheries around the world. The results showed that the framework, based on shared responsibility between the government and local fishers, is the "only realistic solution" to the problems fisheries face, said lead researcher Nicolas Gutierrez, who studies aquatic and fisheries science.

His team's findings, published Wednesday in the journal Nature, also examined small-scale and industrial fisheries in Atlantic Canada, on Vancouver Island and the West Coast, in the Arctic and Native fisheries. "Many people believe that having fishermen involved in the management process is letting the fox guard the henhouse. What (this research) shows is just the opposite, that the more involved the fishing industry is in management, the better the outcome," co-author Ray Hilborn said.

Major components identified in the co-managed fisheries studied included a leader who enforces guidelines based on community input, securing catch and ownership over an allotted space and protecting harvested areas for conservation. Incorporating these components resulted in less illegal fishing, a greater abundance of resources and higher profits, Gutierrez said. Hilborn said many fisheries can't succeed under government management alone because some are so small that officials can't devote the resources needed to monitor them. On the smallest scale, the co-management system would include mayors and fishers from different villages agreeing to avoid fishing in each other's waters.

Boris Worm, a marine biologist at Dalhousie University in Halifax, said the model "makes sense" because it provides fishermen, who have first-hand knowledge of the region, with ownership of a piece of the waters, so they'll take better care of that space. He pointed to Canadian lobster fisheries on the East Coast — an industry worth nearly a quarter of a billion dollars — that have adopted the community-based co-management method. "It's not by coincidence that it's one of the most successful fisheries we have. It's been sustained for more than 150 years and is economically very important to hundreds of fishers," he said. "When people have a sense of ownership over their resource, they absolutely want to make sure no one takes their lobster, and if somebody does, that person is ostracized in the community and that's a stronger penalty than a fine," he explained. He said he has seen successful fisheries around the world operate under this model, naming Chile as an example.

In the 1980s, Chilean fisheries were exploited because of open access, meaning anyone could extract seafood from the sea. By 1988, fishers, scientists and the government set up a co-management agreement in a fishing cove covering four kilometres of seashore, where only local fishers were allowed to fish. According to Gutierrez, the co-managed area now stretches along 4,000 kilometres with more than 20,000 fishers participating, making it one of the most successful abalone fisheries in the world. Worm said Canadian communities with crab, lobster and shrimp fisheries should also consider adapting to this model.

"There are new emerging fisheries with limited scientific knowledge, such as sea urchins and sea cucumbers. In a data-poor situation, using knowledge that fishermen have and working with them to conserve the resource is a viable option," Worm said.

Vancouver Sun

Note from Editor: There are no native abalone in Chile. The Chilean abalone or "loco" is Concholepis concholepis. Abalone, (Haliotis sp.) from California and Japan are, however, are produced in aquaculture operations in Chile.

Has overfishing ended? Top US scientist says yes

For the first time in at least a century, U.S. fishermen won't take too much of any species from the sea, one of the nation's top fishery scientists says.

The projected end of overfishing comes during a turbulent fishing year that's seen New England fishermen switch to a radically new management system. But scientist Steve Murawski said that for the first time in written fishing history, which goes back to 1900, "As far as we know, we've hit the right levels, which is a milestone."

"And this isn't just a decadal milestone, this is a century phenomenon," said Murawski, who retired last week as chief scientist at the National Oceanic and Atmospheric Administration's Fisheries Service.

Murawski said it's more than a dramatic benchmark — it also signals the coming of increasingly healthy stocks and better days for fishermen who've suffered financially. In New England, the fleet has deteriorated since the mid-1990s from 1,200 boats to only about 580, but Murawski believes fishermen may have already endured their worst times.

"I honestly think that's true, and that's why I think it's a newsworthy event," said Murawski, now a professor at the University of South Florida.

But fishermen and their advocates say ending overfishing came at an unnecessarily high cost. Dave Marciano fished out of

Gloucester, an hour's drive northeast of Boston, for three decades until he was forced to sell his fishing permit in June. He said the new system made it too costly to catch enough fish to stay in business.

"It ruined me," said Marciano, 45. "We could have ended overfishing and had a lot more consideration for the human side of the fishery."

An end to overfishing doesn't mean all stocks are healthy, but scientists believe it's a crucial step to getting there.

When fishermen are overfishing a species, they're catching it at a rate scientists believe is too fast to ensure that the species can rebuild and then stay healthy. It's different from when a species is overfished, which is when scientists believe its population is too low.

Murawski said it's a nearly ironclad rule of fishery management that species become far more abundant when they're being fished at the appropriate level, which is determined after considering factors such as a species' life span and death rates.

A mandate to end overfishing by the 2010 fishing year — which concludes at different times in 2011, depending on the region — came in the 2007 reauthorization of the nation's fisheries law, the Magnuson-Stevens Act.

Murawski said the U.S. is the only country that has a law that defines overfishing and requires its fishermen not to engage in it.

"When you compare the United States with the European Union, with Asian countries, et cetera, we are the only industrialized fishing nation who actually has succeeded in ending overfishing," he said.

Regulators say 37 stocks nationwide last year were being overfished (counting only those that live exclusively in U.S. waters); New England had the most with 10. But Murawski said management systems that emphasize strict catch limits have made a big difference, and New England just made the switch.

Fishermen there now work in groups called sectors to divide an annual quota of groundfish, which include cod, haddock and flounder. If they exceed their limits on one species, they're forced to stop fishing on all species.

About two-thirds into the current fishing year, which ends April 30, federal data indicated New England fishermen were on pace to catch fewer than their allotted fish in all but one stock, Georges Bank winter flounder. But Murawski said he didn't expect fishermen would exceed their quota on any stock.

In other regions with overfishing — the South Atlantic, the Gulf of Mexico and the Caribbean — regulators project catch limits and other measures will end overfishing this fishing year. Already, South Atlantic black grouper and Gulf of Mexico red snapper are no longer being overfished.

The final verification that overfishing has ended nationwide, at least for one fishing year, will come after detailed stock assessments.

It will be a "Pyrrhic victory" in hard-hit New England, said Brian Rothschild, a fisheries scientist at the University of Massachusetts at Dartmouth. He said regulators could legally loosen the rules and allow fishermen to safely catch more fish, but regulators have refused to do it, and fishermen have needlessly been shut out from even healthy stocks.

The science is far from perfect, Marciano said. Regulators believed fishermen were overfishing pollock until new data last year indicated scientists had badly underestimated its population, he said. And some stocks, such as Gulf of Maine cod, have recovered even when fishermen were technically overfishing them.

"To say you can't rebuild stocks while overfishing is occurring is an outright lie. We did it," Marciano said.

Tom Nies, a fisheries analyst for regional New England regulators, said stocks can sometimes be boosted by variables such as strong births in a given year, but they'll inevitably decline if overfishing continues on them.

Peter Shelley, senior counsel of the Conservation Law Foundation, an environmental group, said the industry's problems are rooted in years of overfishing, especially during the 1980s, not regulation.

"It was a bubble," he said. "Fishermen were living in a bit of a fantasy world at that point, and it wasn't something you could sustain."

That's why Murawski's projection about the end of overfishing is "a very big deal," he said.

"I think we're just starting to see signs of a new future," Shelley said.

What fisherman Steve Arnold, 46, sees in his home port of Point Judith, R.I., are fewer boats, older fishermen and "a lot of frowns on people's faces."

Overfishing might end this year, but the fleet has suffered and has an uncertain future, he said.

"I believe we can get to a better place, but the work isn't done," Arnold said. "We're living through something that we're learning as we go. It's not a comfortable feeling."

By Jay Lindsay, Associated Press

Pebbles Mine

The U.S. Environmental Protection Agency announced Monday that it will conduct a study of Alaska's Bristol Bay watershed to assess the potential impact of development projects on the area's commercial sockeye salmon fishery. The agency said it decided to perform the scientific review after being petitioned by the Bristol Bay Native Corp. and nine Alaska native tribes, which voiced concerns over the Pebble Mine development project.

The proposed gold, copper, and molybdenum mine would be located between two of the region's major salmon spawning streams and just west of the state's largest lake. "By 2006 estimates, the open pit mine would be two miles wide and produce up to 2.5 billion tons of acid-generating waste rock and discharged chemicals," the Bristol Bay Native Corp. said in requesting the study, according to seattlepi.com.

Opponents of the prospect also say the mine would have a footprint covering 15 square miles, and that its accompanying network of roads and power lines would effectively transform the landscape and locals' way of life, AP reports. John Shively, chief executive of Pebble Limited Partnership, called the review premature, saying the proposal is still in the planning stages. Gov. Sean Parnell also said he thought it would be better to wait for the permit applications, AP reports.

Republican Alaska Rep. Don Young slammed the EPA's decision on Monday, saying the agency is "blatantly circumventing" the state's permit process. "Gathering data and getting public input now, before development occurs, just makes sense," said EPA Regional Administrator Dennis McLerran. "Doing this we can be assured that our future decisions are grounded in the best science and information and in touch with the needs of these communities."

Global fish consumption hits record high

Fish products provide the planet's population with almost 16% of its animal protein intake

The global consumption of fish has hit a record high, reaching an average of 17kg per person, a UN report has shown. Fisheries and aquaculture supplied the world with about 145m tonnes in 2009, providing about 16% of the population's animal protein intake. The findings published by the Food and Agriculture Organization (FAO) also stressed that the status of global fish stocks had not improved. It said that about 32% were overexploited, depleted or recovering. "That there has been no improvement in the status of stocks is a matter of great concern," said Richard Grainger, one of the report's authors and FAO senior fish expert. "The percentage of overexploitation needs to go down, although at least we seem to reaching a plateau," he observed. The authors added that it was estimated that the level of overexploitation had increased slightly since 2006, but 15% of the stocks monitored by the FAO were either "underexploited" or "moderately exploited". This meant that catches in these regions could increase in order to meet the demand for fish products.

Big business

The report also showed that fish continued to be the most-traded food commodity, worth US $102bn (£63bn) in 2008 - a nine percent increase on the previous 12 months. The authors forecast the status of tuna stocks will deteriorate further unless management improves. China remained the largest fish-producing nation, producing 47.5m tonnes in 2008 (32.7m tonnes from aquaculture and 14.8m tonnes from capture fisheries).

Globally, the data showed capture fisheries produced about 90m tonnes, with 80m tonnes from marine waters and a record 10m tonnes from inland waters. The authors said aquaculture remained the fastest growing animal food-producing sector, although growth rates were slowing. Per capita supplies from the sector had increased from 0.7kg in 1970 to 7.8kg in 2008 - an average year-on-year growth rate of 6.6%. Aquaculture was dominated by production from the Asia/Pacific region, accounting for 89% of global production and 79% in terms of value.

Closing the net

While aquaculture was set to become the main source for fish products in the near future, the authors were concerned about the growing percentage of marine fish stocks that were categorised as overexploited. They said that most stocks of the top 10 commercial species, which accounted for almost a third of global catches, were fully exploited. "Of the 23 tuna stocks, most are more or less fully exploited (possibly up to 60%), some are overexploited or depleted (possibly up to 35%) and only a few appear to be underexploited (mainly skipjack)," they wrote. "In the long-term, because of the substantial demand for tuna and the significant overcapacity of tuna fishing fleets, the status of tuna stocks may deteriorate further if there is no improvement in their management." Inland fisheries are vital lifelines, supporting and feeding tens of millions of people. They said another threat to the long-term sustainability of fish stock was illegal, unreported or unregulated (IUU) fishing.

According to Illegal-Fishing.info, managed by think-tank Chatham House, IUU was worth up to $23.5bn a year. In an effort to tackle the problem, the FAO established the Port State Measures Agreement (PSMA) that would require the "port state" to close its ports and ban the landing of fish of any vessel listed as being involved in IUU activities.

Last year, researchers writing in the journal Science warned that global measures to regulate the fishing industry lacked the capability to tackle illegal catches. During a six-year study, they said that only one third of the vessels listed on IUU registers could be tracked. The FAO report authors also highlighted another problem facing the world's fisheries: "high levels of unwanted and often unreported bycatch and discards... including the capture of ecologically important species". "The latest estimate of global discards from fishing is about seven million tonnes per year," they said. As a result, the UN agency will lead the "development of international guidelines on bycatch management and reduction of discards". The publication of the report, The State of World Fisheries and Aquaculture 2010, coincided with the opening of the 29th session of the UN Committee on Fisheries being held at the FAO's headquarters in Rome.

By Mark Kinver Science and environment reporter, BBC News

Tuna Fight Muddies Waters Over Damage From BP Spill

The bluefin tuna is one of the most majestic and prized creatures in the sea. Last week, one caught off Japan sold in Tokyo for $396,000, to be used as sushi. Now the fish is the subject of a scientific fight that shows how hard it will be to gauge the environmental fallout of the biggest offshore oil spill in U.S. history.

The U.S. government will wrap up public meetings next week on whether to recommend declaring the Atlantic bluefin an endangered species. If the government declared the fish endangered, it would bar fishermen from targeting the fish in U.S. waters. An environmental group filed the request last year, claiming in part that the western-Atlantic stock of the fish, long believed to spawn only in the Gulf of Mexico, would "be devastated" by last year's spill from a blown-out BP PLC well. But scientists disagree about what portion of last spring's crop of young tuna, or larvae, were hit by oil. They disagree about whether the Gulf is the only place where the western-Atlantic bluefin spawns. In short, they disagree about virtually every aspect of the spill's effect on the fish.

The decline in the world population of bluefin tuna is the subject of a debate among research groups. Scientists disagree about the environmental impact of the biggest offshore spill in U.S. history — the BP spill in the Gulf of Mexico. Hundreds of experts are studying the BP spill's impact on the Gulf, one of the richest ocean ecosystems in the world. What these scientists conclude will help determine how much money—potentially billions of dollars—BP will pay in environmental damages. Their conclusions also could shape future rules governing industries crucial to the Gulf economy, such as fishing and oil-and-gas drilling.

Among the marine life scientists are examining are ones vital to Gulf businesses, such as shrimp, oysters and snapper. But experts also are trying to put a price on whatever damage the spill caused to species from microscopic plankton to massive whales. Under federal law, the government can tally ecological harm from a spill, and push those responsible to pay for it—money that's in addition to compensation for losses to businesses and residents.

Measuring the ecological impact of oil spills and other industrial mishaps is notoriously difficult. A dizzying array of factors—natural and man-made—shapes an ecosystem. More than two decades after the oil tanker Exxon Valdez dumped some 260,000 barrels of oil into Alaska's Prince William Sound, experts continue to argue about whether the spill was responsible for a subsequent crash in the local herring population. "In hindsight, no one can say," said John Incardona, a scientist at the National Oceanic and Atmospheric Administration, who has spent years studying how oil spills harm fish. "It is a major challenge, trying to distinguish whether one pollutant overrides all of the others and causes an ecological effect."

Fishing for Atlantic bluefin isn't a big industry in the U.S., largely because of efforts to protect the fish. Limited fishing for Atlantic bluefin is allowed along the East Coast. But targeting bluefin is banned in the Gulf, mostly because the Gulf is an important spawning area for the fish. The oil spill in the Gulf hasn't so far hurt the catch, which in 2009 brought U.S. commercial fishermen $13.3 million, NOAA officials said.

The question is whether the spill hurt or killed enough young bluefin that it will reduce the population in future years. Bluefin hatch in the northern Gulf from roughly May through June—in the general area, and at the general time, of the BP spill. Eggs and larvae in the oil almost certainly died, scientists say. That doesn't address the bigger issue: how the spill affected the bluefin population as a whole. Answering that would require knowing all the places bluefin spawn—in the Gulf, and beyond. Accepted wisdom has held that there are different stocks of Atlantic bluefin. One, which regulators call the western variety, spawns only in the Gulf. Another, the eastern variety, spawns only in the Mediterranean Sea. As adults, both stocks forage for food in the Atlantic, where most bluefin are caught. But, the thinking goes, the two stocks are genetically distinct. An Atlantic bluefin tuna. Washington may declare the fish an endangered species.

That's the basis for the concern that the BP spill could decimate the western-Atlantic bluefin. Some scientists, though, increasingly question that view. Citing recent modeling, NOAA now concludes most of last spring's Gulf spawn was far from where the oil hit. "Some of the bluefin probably got hit a little bit, but [the oil spill] probably was not a significant impact on the population," said John Lamkin, a NOAA scientist. Other tuna experts cite evidence that large numbers of western-Atlantic bluefin may spawn beyond the Gulf—in the Caribbean, for instance, and as far away as the Azores. Still, for whatever bluefin did run into BP oil, the spill could prove enormously damaging, scientists say.

Research by NOAA scientists since the Valdez spill has found that even small concentrations of oil can be deadly for fish. It can cause heart problems that can kill fish years after a spill. And it can kill or taint organisms fish eat. Humans have caught bluefin for millennia. Archaeologists in southern Europe have found cave paintings of the fish they say date back several thousand years. By the 1960s, commercial-fishing techniques, including modern versions of massive nets known as "purse seines," vastly improved efficiency of the bluefin catch. By 1966, concerns about overfishing led to the creation of the International Commission for the Conservation of Atlantic Tunas, which works with governments to regulate the fishery.

Despite these efforts, the western-Atlantic bluefin population plummeted more than 70% between 1970 and 2009, the commission estimates. Gauging fish populations is an inexact and controversial science, relying in large part on reports of the number of fish caught. Last year, when the commission published its latest Atlantic-bluefin populations estimate, it noted

"uncertainty" in the calculations. Many environmentalists and regulators blame overfishing for the bulk of the fish's decline. Many in the fishing industry blame a range of factors including climate change, which they say is pushing the bluefin to waters the industry hasn't found.

Each side has sponsored scientists whose work bolsters its view. A major point of contention is whether western-Atlantic bluefin spawn beyond the Gulf. If they do, then under U.S. and international fishing rules, there might be less justification for declaring the fish endangered. Stanford University tuna expert Barbara Block's work has helped underpin the just-in-the-Gulf view. In the ocean, she and her research team catch bluefin, and ease the live fish into a boat. They insert tracking devices, either by incision into the fish's belly, or with a dart at the base of one of the fish's fins. Within minutes, they release the tagged bluefin. Since the 1990s, Dr. Block has plotted the tracks of hundreds of tuna. Dr. Block's research funders include the government and environmental groups. In a speech last spring, she said there was "outstanding science" for listing the Atlantic bluefin as endangered under the Convention on International Trade in Endangered Species, something the Obama administration also has supported. This week, Dr. Block said that "we can't really clearly establish how many tunas remain" until scientific models assessing the fish's population improve. "The Gulf of Mexico has a unique stock of bluefin," which raises concerns about the spill's effects on the fish, even if bluefin traditionally described as part of a western-Atlantic stock are spawning beyond the Gulf, she said. "There's absolutely a question of what the impact" of the spill on Gulf-spawning bluefin will be, she said.

In early May, two weeks into the spill, in a blog post titled "Hot Tuna and Oil" on the website of a tagging program she helps run, she featured a map of the Gulf with a black blob showing the area hit by BP oil. Through the blob ran a yellow line: the path that data showed one of Dr. Block's tagged tuna had traveled in 2009. On May 24, the Center for Biological Diversity, an environmental group, filed a legal petition asking the Obama administration to list the Atlantic bluefin as endangered—which would ban fishermen from targeting the fish in U.S. waters.

The bluefin population "will be devastated" by the spill, the document said. "The Gulf provides the only spawning ground known to the western-Atlantic bluefin tuna," it added. The document frequently cited Dr. Block's work. Two days later, another scientist fired off a contrasting view.

On May 26, Molly Lutcavage, a longtime tuna tagger now at the University of Massachusetts, Amherst, published with several colleagues a peer-reviewed paper reporting that some bluefin they had tagged were swimming beyond the Azores during the spring, when the fish are known to spawn.

Based on her research, Dr. Lutcavage thinks as many as one-third of all western-Atlantic bluefin tuna could be spawning outside the Gulf. "They are not putting all their eggs in one basket," she said. Dr. Lutcavage got her start in bluefin research in the 1990s with money from the New England fishing industry, which was fighting environmentalists' calls for tougher bluefin limits. She said her scientific conclusions aren't influenced by that industry backing. Since that initial project, she said, she has gotten all her research money from the government.

NOAA is growing increasingly persuaded by the possibility western-Atlantic bluefin may spawn in significant numbers beyond the Gulf. Each spring for three decades, the agency has dispatched a research ship to estimate the size of the annual spawn. Traditionally, it has sent the ship only to the northern Gulf—the only place where most scientists have said the fish spawns. "It's like the drunk looking underneath the light to find his keys," said Frank Muller-Karger, a scientist at the University of South Florida who helps analyze data from the NOAA cruise.

Two years ago, the agency began extending the cruise south, to the Gulf's Mexican waters. Sure enough, said Dr. Lamkin, NOAA's tuna-spawning expert, the cruise found tuna larvae there. This spring, he hopes to broaden the search to the western Caribbean. Even if scientists can determine conclusively that spawning takes place outside of the Gulf, that won't resolve how damaging the spill was to the tuna in the Gulf.

Last October, the European Space Agency published a study estimating the spill killed more than 20% of last spring's Gulf bluefin spawn. The agency did the study to tout its technology, Olivier Arino, an agency official, said. The study set off alarms within the Obama administration. Dr. Lamkin said a high-ranking NOAA official emailed him saying Jane Lubchenco, the agency's administrator, wanted a report within days on whether it was right.

Dr. Lamkin's conclusion: It was wrong. The European study was based on a computer model. One of the model's key assumptions was that bluefin like to spawn in waters full of organisms called zooplankton—waters that satellite data suggest were hit particularly hard by the spill.

The rationale: Young fish eat zooplankton, and adult fish tend to spawn where there's lots of food for their young, said Patrick Lehodey, an oceanographic modeler in France who worked on the study. But that assumption doesn't hold for tuna, NOAA's Dr. Lamkin said. For reasons scientists don't fully understand, he said, tuna tend to spawn in waters that aren't teeming with food. When Dr. Lamkin and his colleagues ran their own computer model, they concluded the spill probably killed less than 10% of last spring's Gulf bluefin spawn. A NOAA spokesman said the agency wouldn't release the analysis until it was peer-reviewed. Dr. Lehodey said he stands by his assumption that tuna like waters filled with zooplankton.

It's clear spills are "very bad news" for fish, NOAA's Dr. Lubchenco said. It's less clear how this particular spill affected this particular fish. "We probably won't know for a number of years," she said.

Wall Street Journal

A Look at How the Gulf Oil Spill Impacted Oysters in the Chesapeake

Local experts say they saw a decrease in both prices and demand in the 2010 oyster season. Local harvests of oysters had less competition from suppliers in the Gulf but that success was short lived. After the BP oil spill last April caused massive closures of fisheries in the Gulf of Mexico, the lack of competition from Gulf coast seafood suppliers was good for Maryland watermen as the season opened. However as the oyster season progressed, locals saw a slip in both prices and demand.

Maryland watermen often compete with Gulf Coast fisheries because some Maryland seafood distributors purchase crabs, oysters and shrimp from Gulf suppliers. Did the closures in the Gulf affect business here? The first closures occurred just over a week after the disaster and continued to expand following multiple failed attempts to stop the leak. According to Reuters, by early June, 37 percent of fisheries in the Gulf were closed to fishing. The most recent closure occurred on Nov. 24 when the NOAA announced that another 4,200 square miles would be closed to watermen due to risk of oil contamination.

Initially the outlook was good for Maryland watermen. News came about a month after the spill that there was little chance of any oil reaching the Bay-riding ocean currents. The DNR released a statement addressing public concerns on May 26 stating that the probability of oil reaching the bay and impacting wildlife was low. The closures did impact seafood prices though, particularly oyster prices. Bill Sieling, executive director of the Chesapeake Bay Seafood Industry Association said the spill did have an impact on the Maryland seafood industry. Sieling said this year he had to address numerous public concerns over possible contamination of the Bay. "I had calls all summer about the impact of the Gulf spill and I can tell you at that point there was virtually no impact," Sieling said. As far as the industry is concerned, Sieling provided some perspective on the issue. "Only about 10 percent of the seafood we consume here is not imported, so right away 90 percent of the supply was unaffected," Sieling said.

In an article published in the fall 2010 issue of the DNR's The Natural Resource, assistant director for the Fisheries Service Mike Naylor investigated possible impacts on the Chesapeake Bay oyster program caused by the spill. He explained that just over a week after the spill state officials in Louisiana closed many oyster beds in the Gulf region. It was well into July before many areas were reopened but Naylor writes that those closures had an immediate impact on the market. "The decreased supply led the remaining distributors to increase prices from $25 to as much as $40 per bushel."

Sieling also provided insight on the initial rise in oyster prices. Apparently because the oyster supplies were cut off from the Gulf, this artificially inflated prices here at home. "When oyster season started in the northeast in mid-September, early October, the price [for oysters] was artificially high because people anticipated a shortage from the Gulf," Sieling said.

Bob Evans is a local waterman and owner of Bob Evans Seafood in Churchton. He said the initial rise in prices caused by a lack of competition from the Gulf was short lived. As other oyster seasons opened elsewhere, particularly North Carolina, Maryland watermen saw their prices begin to fall. "This year oysters were priced higher at the beginning of the season because we were not competing with the oysters from the Gulf. But the oyster season opened in North Carolina and our prices came down," he said. Evans said that an unusually successful year in North Carolina meant there was even less impact on the supply of oysters on the market. "Virginia is the largest oyster shucking market in the country and when they start buying from other places our [watermen] prices come down," he said.

As the season progressed, prices continued to fall for Maryland watermen and by mid-November some had reached a breaking point. Just before Thanksgiving nearly all the watermen in Talbot, Somerset and Dorchester counties went on strike to protest the price drops. Apparently the closures in the Gulf did not have the anticipated effect on the supply of oysters. Couple that with overall low demand for oysters and perhaps Maryland watermen simply fell victim to economics. Sieling again clarified the issue saying that although the closures in the Gulf cut off the supply of oysters, there were still plenty of oysters to go around this year but demand was down. Now distributors are finding it difficult to find public demand for oysters to match the supply. "They're a glut on the market...now there's more oysters than ever and demand is way down," he said.

Seafood distributors here in Edgewater seemed relatively unaffected by the closures in the Gulf. Rick Bryant of Annapolis Seafood said the business did not really feel any impacts and offered an explanation for why demand was so low. "It didn't really affect us too much, but the negative news about seafood may have made people leery about what they are eating," he said.

Tim Fath owner of Chesapeake Seafood said there was little to no impact on his business related to the closures in the Gulf. "The Gulf didn't really affect us. The price of oysters started out quite high but it's come down a little bit at a time," he said. "On my end of it I really didn't see much, other than less people buying oysters…it's a demand thing." Despite the supply and demand issues in the oyster market, Sieling was confident the Maryland seafood industry remains strong. "Our industry is in fairly good shape here in Maryland. We had an excellent crab season, the clamming industry is coming back and oysters are still available," he said.

David Pecor, Annapollis Patch

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