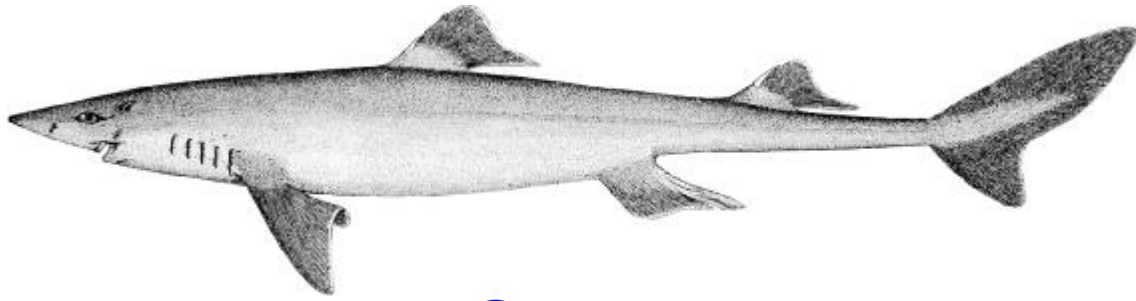




The Dogfish Follies

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*"Voracious almost beyond belief, the dogfish entirely deserves its bad reputation." (from **The Fishes of the Gulf of Maine**)*



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The Dogfish Follies

An overview

According to on-the-water observations by a multitude of commercial and recreational fishermen, there are so many spiny dogfish (*Squalus acanthias*) in the coastal waters from Cape Hatteras to Canada that they are significantly interfering with many of our major fisheries. The latest information from the National Marine Fisheries Service (NMFS) is that the total biomass (based on a 3 year average for 2003 to 2005) was 835 million pounds, but many experienced fishermen believe that these small sharks, which have always been known as nuisance fish, are now present in unprecedented numbers (in the middle 1980s their total biomass approached a million metric tons). They occur in huge schools that make it all but impossible to fish, clogging nets and damaging the commercial catch or taking baited hooks that are meant for targeted species.

Besides interfering with commercial and recreational fisheries, these small sharks – which are notorious for their voracious feeding habits – are efficient predators, both of more valuable fish species and of the organisms that these species feed upon. Dogfish were harvested in our waters by European fleets in the 1960s and early 1970s. This foreign fishery ended with passage of the Magnuson Act in 1976, but with the enthusiastic support and encouragement of the federal government, a domestic fishery aimed at supplying European markets was started in the late 1980s. Continuing into the early 2000s, it was at one point landing as many dogfish as the Soviet Block factory trawlers had been thirty years before. The primary targets of the commercial harvesters were large, predominantly female fish.

To the relief of just about everyone, and to the undoubted benefit of just about every commercially and recreationally important fish species in the western North Atlantic, the spiny dogfish stocks started to decline.

Seems like a classic win-win scenario in the making, doesn't it? A species that has always been considered at best a nuisance is being reduced in numbers, removing a significant source of natural mortality and reducing fishing pressure on more valuable species while pumping money into the economies of half a dozen coastal states and benefiting our balance of trade?

Not quite. Several years ago the directed commercial fishery for spiny dogfish was closed, the number of dogfish are again increasing dramatically, and each year the recreational and commercial fisheries targeting other species are being more heavily impacted by that increase. All to supposedly benefit a species that has been held in contempt by many generations of fishermen.

Dogfish stocks today

Going back to the 1960s, the Northeast Fisheries Science Center's (NEFSC) bottom trawl survey series is touted as one of the most comprehensive and reliable sources of information about those fish species living on or near the bottom in the waters off the New England and Mid-Atlantic states. The survey is composed of three annual sampling cruises, one in the spring, one in the fall and one in the winter. On each cruise from 100 (winter) to 350 (spring and fall) offshore stations are sampled with measured and monitored tows of a standardized net. The catch from each station is counted, weighed, measured and recorded. In recent years the various survey results have been made available on the Center's website (<http://www.nefsc.noaa.gov/nefsc/publications/online.htm>).

The individual survey reports specifically identify about two dozen separate species – usually the most common and/or those for which significant fisheries exist. The rest of the catch is lumped together into the catch-all category of "Total-other." Interestingly, and in spite of the doom and gloom predictions of the environmental industry, the total poundage taken each year

in the three surveys has been trending upward since 1999, the first year for which the reports are available on line (see Chart #1 below). Unfortunately, much of this upward trend is because of the proliferation of spiny dogfish.

For every year that we examined, the species that made up the bulk of the samples – by a significant margin – has been the spiny dogfish.

As demonstrated in Table #1 and Chart #2, in the years from 1999 to 2005 spiny dogfish have made up from 49% to 66% of the total sample weight (we took the average of the spring, fall and winter surveys each year to smooth over significant seasonal differences). In 2000, the year that the commercial fishery was essentially closed, the poundage of dogfish in the trawl survey began to increase dramatically.

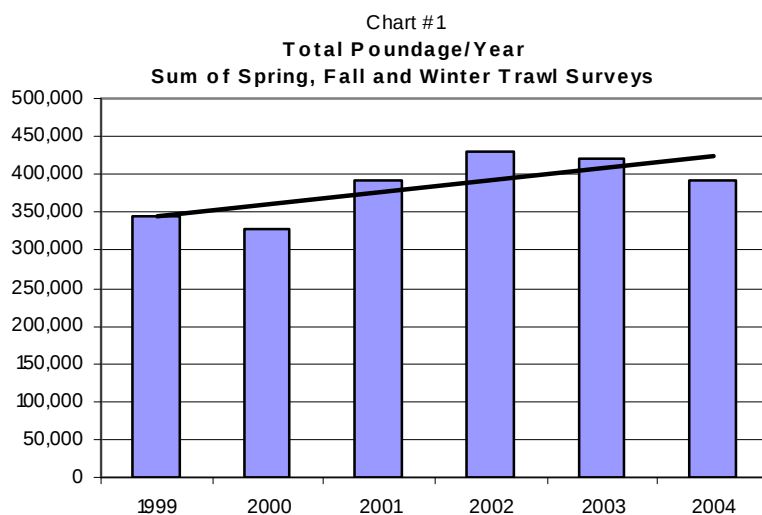


Table #1

Survey	Dogfish (lbs)	Total (lbs)	% Dogfish
Spring '05	46992	83465	56%
Winter '05	79900	121062	66%
Fall '04	58923	145430	41%
Spring '04	32341	94848	34%
Winter '04	89932	150237	60%
Fall '03	32661	124099	26%
Spring '03	55654	133134	42%
Winter '03	86862	163578	53%
Fall '02	33668	153542	22%
Spring '02	49496	111770	44%
Winter '02	88233	164748	54%
Fall '01	58062	128892	45%
Spring '01	26321	75564	35%
Winter '01	91686	186301	49%
Fall '00	57018	140280	41%
Spring '00	24961	96789	26%
Winter '00	45923	91674	50%
Fall '99	34720	118596	29%
Spring '99	36434	87783	42%
Winter '99	88268	139124	63%

Are dogfish good neighbors?

In the classic **Fishes of the Gulf of Maine** (Henry B. Bigelow and William C. Schroeder, 1953), dogfish are described as “voracious almost beyond belief, the dogfish entirely deserves its bad reputation. Not only does it harry and drive off mackerel, herring, and even fish as large as cod and haddock, but it destroys vast numbers of them. Again and again fishermen have described packs of dogs dashing among schools of mackerel, and even attacking them within the seines, biting through the net, and releasing such of the catch as escapes them. At one time or another they prey on practically all species of Gulf of Maine fish smaller than themselves, and squid are also a regular article of diet whenever they are found.” And the Food and Agricultural Organization of the United Nations, in its **Global Information System Species Fact Sheet**, says of dogfish “this shark is a powerful, voracious predator that feeds primarily on bony fishes, and is capable of dismembering rather large prey with its strong jaws and clipper-like teeth. Its bony fish prey includes herring, sardines, menhaden and other clupeids, true smelt (*Osmeridae*) and their eggs, hake, cod, pollock, ling, haddock and other gadoids, mid-shipmen, blennies, sand lances, mackerel, porgies, croakers, flatfish and sculpins. It is thought to prey on most available bony fishes smaller than itself, and will often prey heavily on abundant schooling fishes, but newborn dogfish attack herring larger than themselves, as may

adults with cod and haddock.” Ranging up to four feet in length, spiny dogfish may be larger than all but the very largest of the listed prey species.

We must note here that the Atlantic States Marine Fisheries Commission, the interstate organization responsible for managing spiny dogfish in states’ waters (out to three miles) on the Atlantic coast, describes their diet as consisting of “*of several commercially important species, such as Atlantic herring, Atlantic mackerel, Loligo and Illex squid, and to a lesser extent cod and haddock.*”

Having a school of dogfish hanging around seems like the marine equivalent of having the Donner Party spending the winter camped in your back yard.

The dogfish fishery

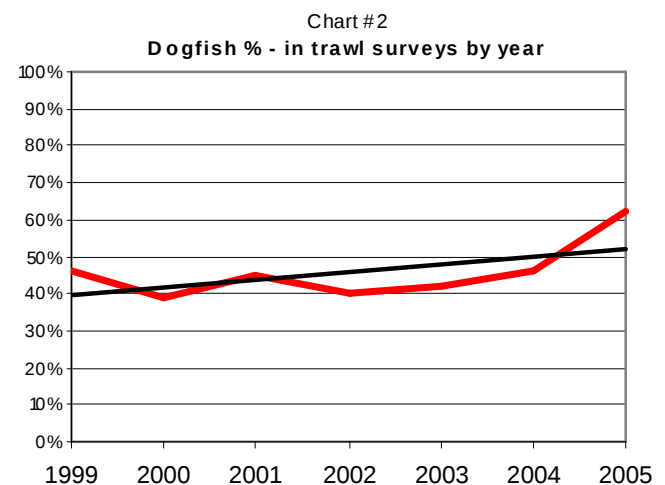
Recognizing all of this, and that some of the more traditional fisheries were getting a bit crowded, the National Marine Fisheries Service started to encourage the development of a dogfish fishery in the Northeast in the late 1980s. This was accompanied with an ambitious marketing program aimed at identifying spiny dogfish as “Cape shark” and establishing a domestic market.

While the domestic market never took off, a number of U.S. companies became quite successful in catching the larger female dogfish and exporting them to Europe. They were so successful, in fact, that by 1996 the domestic fishery had expanded to the point that over 50 million pounds were landed.

The effect of all those dogfish on other fish stocks?

You’ve already read about the impacts of spiny dogfish on recreational and commercial fishermen – though much of it has been dismissed as “anecdotal information” by the fisheries management establishment. What of their effects on other fish stocks?

Not too surprisingly for anyone with a grasp of ecosystem dynamics in our coastal waters (and in complete agreement with Bigelow’s and Schroeder’s and the FAO’s description of these pint sized eating machines), the overall abundance of those species that dogfish prey upon has plummeted as dogfish stocks have increased and this isn’t a phenomena that’s been restricted to recent years.



Going back almost 50 years, dogfish and their cousins, the various species of skates (which make up a large part of the “Total-other” category in the NEFSC’s trawl surveys and probably have a similar though less dramatic effect on other species) have been undergoing a prolonged population explosion in the waters off the Mid-Atlantic and New England (see Chart #3). While there was a small decline in the skates and spiny dogfish from 1990 to 1997 which can be attributed to the domestic dogfish fishery, this decline has since been reversed.

Chart 4 below illustrates the 35 year trends, from a relative abundance perspective for the spiny dogfish and from a relative harvest perspective for 11 commercially important fish species, for fisheries from the waters off the Mid-Atlantic and New England. Ten of the eleven species were chosen because they were identified either in Bigelow and Schroeder or by the FAO as being preyed upon by spiny dogfish. We added striped bass because of that species’ importance to our recreational fishing colleagues. The annual biomass and harvest levels are expressed as a percentage of the aggregate biomass/harvest for the period. During thirty-five years of stringent management measures involving major reductions in fishing effort, ten of the eleven fisheries (black trend lines) have trended downward, and when the expected rebuilding doesn’t take place, the management “solution” is to reduce harvest even further. Of the eleven species, only the landings of croaker were trending upward.

(Note that we didn’t include two prey species, mackerel and herring, that were mentioned in Bigelow and Schroeder and by the FAO. Landings in both of these fisheries have been on an upswing, but both species are far more abundant than the others and their landings aren’t approaching maximum levels.)

The landings of these other species have been declining in spite of managers continuously ratcheting fishing effort downward for all of them for well over a decade. It’s difficult to imagine that predation by 400,000 metric tons of voracious spiny dogfish doesn’t have a significant effect on all of those prey species, each of which only support total (recreational and commercial) landings in the range of 10 to 20 thousand metric tons a year. Could it be that dogfish predation is more than keeping pace with these efforts at reducing fishing effort?

Researchers Wetherbee and Cortés report that spiny dogfish consume between 0.4% and 2.6% of total body weight per day. If we assume a median level of 1.5% per day, that means each dogfish consumes its own weight in prey species every 60 days, or six times its body weight every year. Thus, it took 2,400,000 million metric tons of prey to support last year’s standing crop of 400,000 tons of spiny dogfish.

The 2004 commercial landings of the 11 listed species were 67,000 metric tons. That’s about 3% of the total consumed by spiny dogfish in 2004. How much of that 2.4 million tons was comprised of those 11 species, and what effect did that predation have on rebuilding efforts for those stocks?

When the spiny dogfish stock is fully “rebuilt” to 600,000 metric tons (see below) it will take over 3,000,000 metric tons a year to keep it going. In 2004 the total commercial landings of all species (finfish and shellfish) from the Atlantic coastal states was only 750,000 metric tons.

The influence of the overabundance of dogfish and other elasmobranchs (sharks, skates and rays) was noted by NMFS’ Steve Murawski (now NMFS’ Director of Scientific Programs and Chief Science Advisor) in 1992, when he wrote in **Multi species size composition: A conservative property of exploited fishery systems** (with J.S. Idoine in **Journal of Northwest Atlantic Fishery Science**, Volume 14: 79-85) “given the current high abundance of skates and dogfish, it may not be possible to increase gadoid (cod and haddock) and flounder abundance without ‘extracting’ some of the current standing stock.”

So we’ve got an ocean that’s filled with dogfish, each year they are increasing, they severely interfere with both recreational and commercial fishing, and they’re undoubtedly eating large – and increasing – amounts of

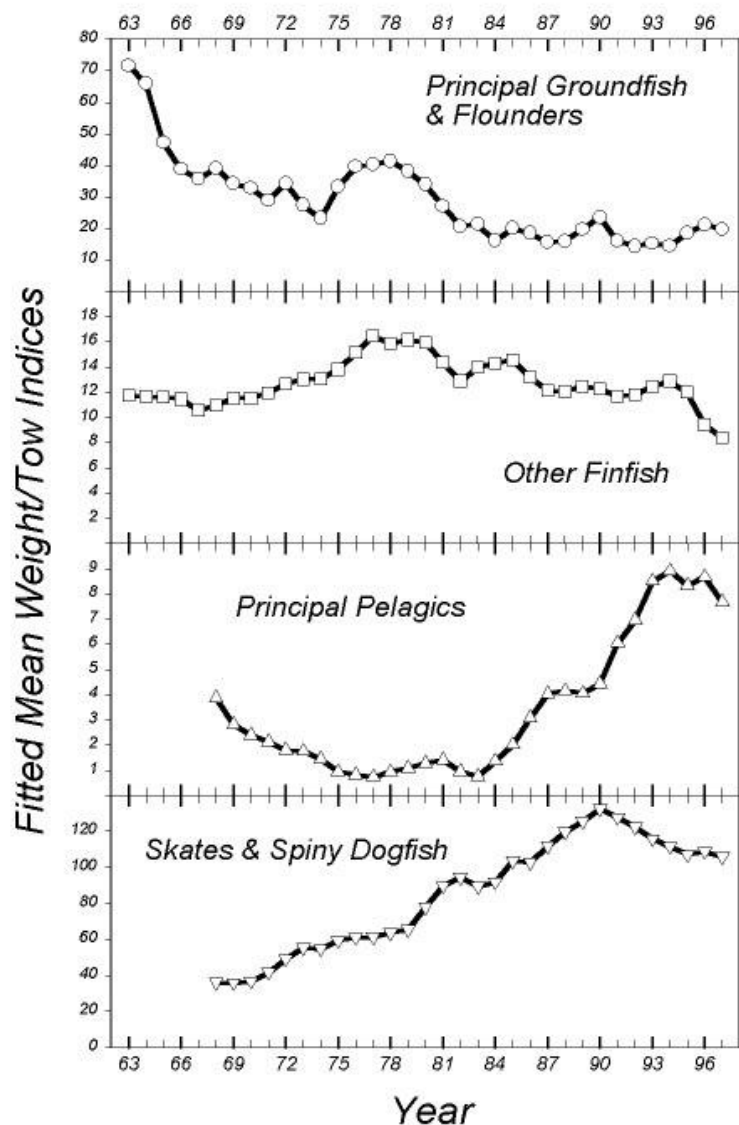
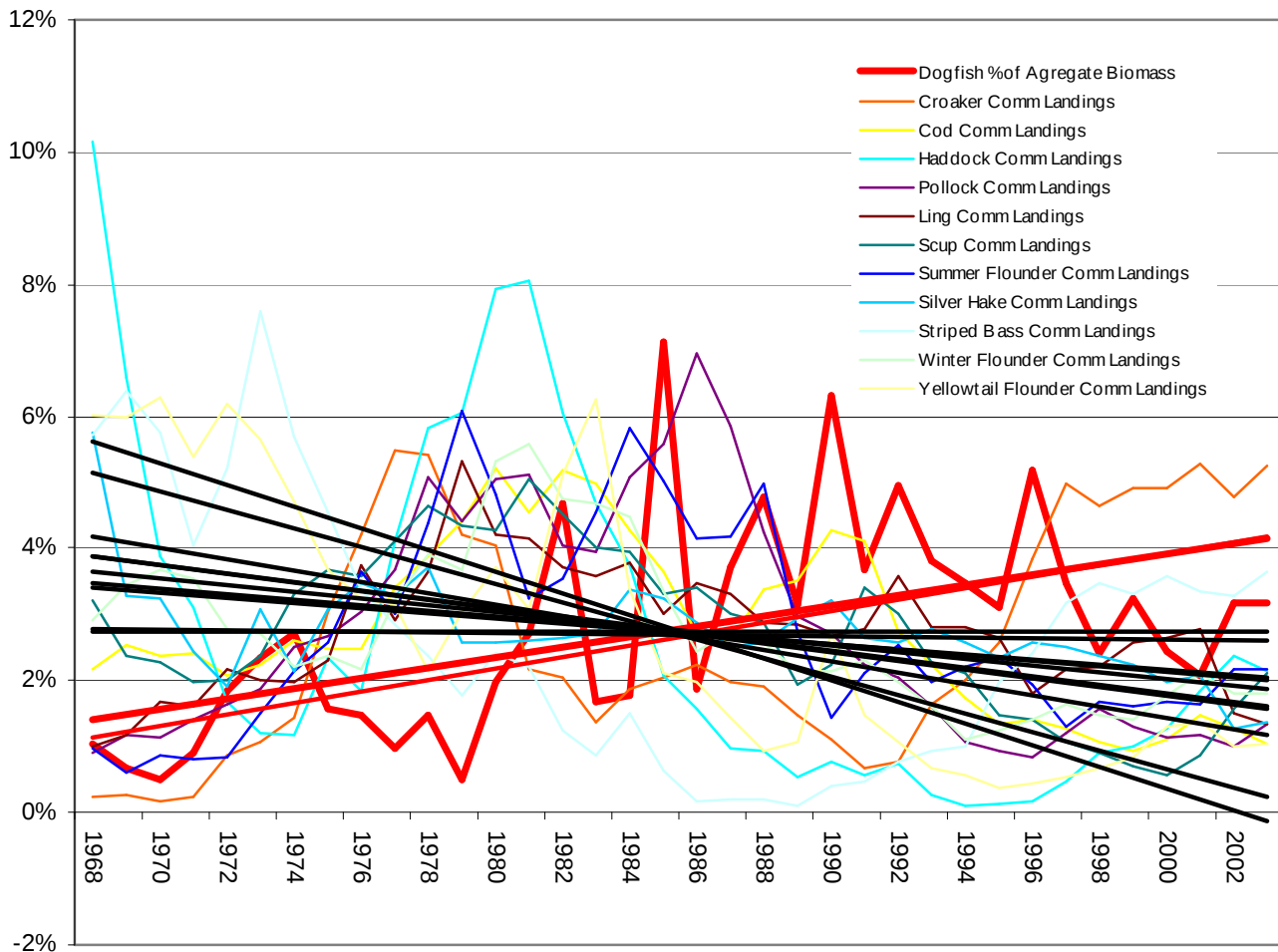


Chart #4

1968 to 2003 - Dogfish Relative Abundance/Relative Commercial Landings

much more valuable species as well as the food those species depend upon. It seems like the only logical solution to an obvious problem – unless we're willing to allow our waters to remain dominated by low-valued species – would be to increase the harvesting of spiny dogfish, doesn't it? Particularly when you consider the fact that some of the traditional and far more valuable fisheries have been in a protracted decline, despite every effort to reduce fishing pressure on them.

Well, not quite.

Spiny Dogfish management

Amending the Magnuson Fisheries Conservation and Management Act in 1996, the Sustainable Fisheries Act (SFA) implemented a number of measures that removed much of the discretion from the fisheries management establishment and, in many knowledgeable folks' estimation, resulted in ridiculously rigorous protections for spiny dogfish, formerly considered trash fish and a species that should most sensibly come with a government bounty, not government protection.

Because a commercial fishery has existed for dogfish, the dogfish fishery has to be managed. And because it has to be managed under the strictures of the Sustainable Fisheries Act, the stock has to be maintained at a level of high abundance.

According to the SFA, fisheries that can't be harvested at maximum sustainable yield are being overfished, and overfished fisheries must be rebuilt within 10 years. Unfortunately, because of the government encouraged and supported development of the commercial dogfish fishery, there is no way that the stock can be "rebuilt" by restricting the directed fishery. This is because there are so many dogfish that they have become a large part of the bycatch in virtually every other fishery.

The dogfish fishery management plan isn't based on estimates of the amount of dogfish in the ocean, it's based on the proportion of large female dogfish in the population. The Mid-Atlantic Fishery Management Council, which jointly manages the fishery with the New England Council, states on its website "*the most recent stock assessment data presented by NEFSC (1998) and the Dogfish Technical Committee indicate that total adult female spiny dogfish stock biomass is currently about 280 million lbs (127,000 mt), well below the stock biomass target of 397 million lbs (180,000 mt) based on a three year moving average of the most recent NEFSC survey data.*" The biomass target of 180,000 metric tons of large female spiny dogfish is the one the managers are aiming for.

If we assume that the total biomass of spiny dogfish increases at the same rate as the mature females, we're looking at a total biomass of about 600,000 metric tons before the stock is considered to be rebuilt.

In spite of the increase in the biomass of spiny dogfish, in spite of a drastically curtailed commercial fishery, and in spite of dogfish making up almost two thirds by weight of the fish caught in the three NEFSC bottom trawl surveys in 2004, there still isn't a high enough proportion of large females. Hence, in 2000 a yearly quota of 4 million pounds was set. Landings were almost 50 million pounds only four years before.

As the chart below shows, the total biomass of spiny dogfish in recent years has been much higher than it was in the late 60s and throughout the 70s, and it appears as if the spawning stock biomass (mature females) is at approximately the same level today as it was then. The level of landings attributable to foreign vessels in the 70s was at about the same level as domestic landings were during the 90s, and (and perhaps unfortunately for competing stocks) the stock, including females, "recovered" to staggering levels of abundance within 5 or 6 years.

Dogfish as a cause célèbre

The "plight" of the spiny dogfish was seized upon by anti-fishing zealots, people who are apparently always on the lookout for situations that can be turned into perceived crises, carrying forward their and their supporters' anti-fishing campaigns. So a few years back we saw the advent of a "save the spiny dogfish" bandwagon.

This resulted in ominous pronouncements along the lines of *"reproductive females have been mined out, pups are flat-lining and the population may not recover within our lifetimes.... this systematic extermination of a valuable part of the marine ecosystem represents a shameful waste of public resources and sets a dangerous precedent for other exploited ocean species"* (the Ocean Conservancy), and *"Fishermen and politicians teamed up to promote dogfish consumption.... Speak up for the much-maligned cape shark! Dogfish conservation continues to face an uphill battle due to industry opposition and rampant disrespect for dogfish"* (Center for Marine Conservation).

These appeals to save the dogfish, while conveniently failing to mention that a current total biomass of 80,000,000 pounds is pretty far from extinction, invariably include a reference to the species' supposed low fecundity. It's true that they, like all sharks, produce a relatively small number of young each year. While females of some species might produce millions of eggs annually, a dogfish will only give birth to a dozen or so live "pups." This might appear to put dogfish populations at risk, particularly when compared to other species. However, for every half million eggs released by a female cod, only an infinitesimal number will survive to the size of a newly born juvenile dogfish, 8 to 11 inches in length. The juvenile dogfish, on the other hand, is a completely functional and efficient predator from birth. While far fewer dogfish are produced per breeding female, each pup is many thousands of times more likely to reach maturity.

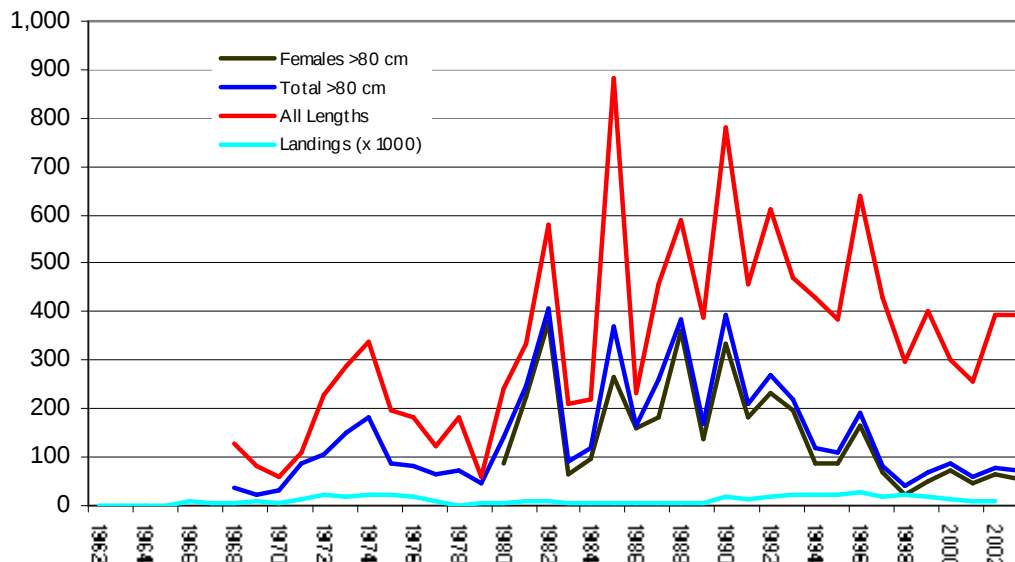
Many of the fish species that dogfish prey upon or compete with are tremendously important to both the commercial and recreational fisheries in the Northeast, and to the consuming public. When market conditions are right, codfish and haddock and the various flounders can return several dollars a pound to the fishermen that land them, and they provide sport – and table fare – to millions of sportsfishermen. Restored groundfish and other stocks would pump additional hundreds of millions of dollars into the coastal economies of the Mid-Atlantic and New England states. It seems inarguable that their stocks are being both directly and indirectly impacted by the presence of hundreds of millions of pounds of ravenous dogfish. But the anti-fishing campaigners have been hard at work convincing anyone who will listen – unfortunately, that

includes a lot of media folks – that those stocks aren't rebuilding solely because of continued overfishing.

The need for change

The dogfish dilemma that the recreational and commercial fishermen in the Northeast are facing is one of the most compelling examples of what we are doing wrong in fisheries management. Through the Sustainable Fisheries Act in particular we have forced managers into a lockstep ap-

Chart #5
Spiny Dogfish Biomass And Total Landings (X 1000 metric tons)
(from data in the 47th Stock Assessment Workshop at the NEFSC)



proach to managing our fisheries, based on the erroneous assumption that they all can be and should be managed in the same manner, with the same strictures, and to the same end. Thanks to successful campaigning by anti-fishing activists, most of the subjective judgment has been removed from fisheries management, and they are targeting what little remains.

You don't need an advanced degree in biology to know that competing species can't all be present in a given area at maximum population levels, yet that's what modern fisheries management – at least as it is practiced in the United States – demands. And if any management body attempts to recognize this fact, the guaranteed result is an immediate lawsuit funded by one or another of the “charitable” foundations supporting the various anti-fishing organizations.

You don't need an advanced degree in economics to know that development pressures along most of the 12,000 miles of U.S. coastline are such that once gone, commercial fishing infrastructure is never coming back, and that economic pressures are already threatening the future of much of that infrastructure. Yet rigid adherence to arbitrary rebuilding schedules – particularly if they are biologically impossible to meet – will do nothing but add to those economic pressures.

And you don't need a degree – advanced or otherwise – in any discipline to know that commercial fishermen are far less in need of protection from themselves than they are from the zealots who disingenuously proclaim that their multi-million dollar campaigns to “save” the fisheries will ensure that things will be better for those fishermen in the future.

References:

NEFSC Spiny Dogfish Advisory Report - <http://www.nefsc.noaa.gov/nefsc/publications/crd/crd0317/spinydogfish.pdf>

NEFSC Status of Fishery Resources: Spiny Dogfish - <http://www.nefsc.noaa.gov/sos/spsyn/op/dogfish/>

Fishes of the Gulf of Maine - <http://www.gma.org/fogm>

United Nations' Global Information System Species Fact Sheet, <http://www.fao.org/figis/servlet/species?fid=2834>

Lovgren, Jim, Fishing Responsibly for Dogfish - <http://www.fishnet-usa.com/lovgrenpaper.pdf>

Wetherbee, B.M. and E. Cortes. 2004. **Food consumption and feeding habits.** pp. 223-244 in: Biology of sharks and their relatives. Musick, J.A., J.C. Carrier and M. Heithaus, eds. http://www.sefscpanamalab.noaa.gov/shark/pdf/1514_C08.pdf

The Oil Slick

With this edition of FishNet we are resurrecting The Oil Slick. This is where we will address those issues that are connected with what the general public refers to as Big Oil. For reasons which aren't apparent to us, many of the activities that most people in the commercial fishing industry would consider as counter to their own best interests and many of the researchers who they would not consider as their allies are funded by or in other ways connected directly or indirectly with the oil industry. We will use The Oil Slick to discuss some of this.

Pew SeaWeb – the start of something big?

The Pew Charitable Trusts, with \$5 billion or so in assets, is one of the largest charitable foundations in the United States. It consists of seven individual charitable funds established between 1948 and 1979 by two sons and two daughters of Joseph N. Pew, the founder of Sun Oil. Of its thirteen directors, five are Pews. In 2003 – 04 the Pew Trusts awarded almost \$140 million in grants.

In 1996, SeaWeb, a Pew Charitable Trusts initiated and funded organization that is in its words, “*a communications-based nonprofit organization that uses social marketing to advance ocean conservation*,” included on its website a report, since removed, that started off “*in 1996, SeaWeb commissioned the Washington, D.C.-based polling company The Mellman Group to conduct a major public opinion poll on U.S. public attitudes toward the ocean and ocean issues. Combined with a series of focus groups conducted the previous year, this collaboration provides the first and most comprehensive overview of the way in which the American public views the marine environment.*”

Among the conclusions reached by the Mellman group and reported by SeaWeb on its website, one of the least surprising was that “*Americans believe the ocean's problems stem from many sources, but oil companies are seen as a prime culprit - the publicity around oil spills in the ocean has undoubtedly led to the perception that these accidents account for the majority of the ocean's pollution. In fact, 81% of Americans believe that oil spills are a very serious problem. This is followed by chemical runoff from large corporate farms (75% very serious), improperly treated water from towns near the coast (69%) , contaminated seafood (65%) and trash, oil, and chemical runoff from streets (65%). In contrast, people believe the least serious ocean problems are air pollution from cars and industry (40%), and the killing of sharks (30%).*”

In 1996, which was a few years post-Exxon Valdez, it appeared as if the jury was no longer out on who, in the public's eyes, was responsible for most of the ills of the world's oceans. It was Big Oil

But since then, Pew SeaWeb seems to be doing it's part to convince the public otherwise.

The Ocean Citations page of the SeaWeb website contains “Selected Science Publications on Ocean Issues” (<http://www.seaweb.org/background/abstracts/>). There are 483 citations listed for publications dealing with fishing impacts, 96 dealing with coastal development and 43 dealing with oil pollution.

While hardly precise research tools, internet search engines can give you a broad idea of the “popularity” on the internet of various terms, and in recent years this can be taken as a measure of the popularity of and interest in particular subjects. Accordingly, we performed a Google search on some of SeaWeb’s categories of ocean issues. A search on “overfishing” yielded 1,900,000 hits, “trawling impacts” yielded 357,000 hits and “bycatch” yielded 523,000 hits. These three subject areas cover virtually all of the supposed negative fishing impacts that have so excited the so-called conservationists in recent years. They totaled 2,780,000 hits. A Google search on “coastal development” and “oil pollution” yielded 34,600,000 hits and 22,900,000 hits respectively. Interest in and communications about oil pollution and coastal development – at least on the web – are an order of magnitude or so greater than those for fishing impacts, yet in compiling the Ocean Citations list, SeaWeb neatly reverses this ratio.

Read what Activist Cash says about SeaWeb at http://www.activistcash.com/organization_overview.cfm/oid/192.