FISHING RESPONSIBLY FOR DOGFISH

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(NOTE: Go to http://www.fishnet-usa.com/lovgren_graphics.pdf for charts, tables, etc.)

What an interesting concept. Fishing responsibly for dogfish. As we all know the directed dogfish fishery is for all intents and purposes shut down in federal waters. Although a bycatch trip limit is in place, it is too small [300 and 600 lbs] to justify their being landed. An annual hard TAC has been set at 4 million pounds for this year, which is a drop in the bucket compared to the landings of the late 90's, which were in the 40 to 50 million pounds a year range. How could such a huge drop in catch take place? Over fishing. Was this over fishing caused by irresponsibility on the part of fishermen? No! In the late 1980's NMFS encouraged any and all fishermen to catch alternative species, other than the NE Groundfish stocks, so that the overfished stocks of cod, haddock, and flounders could recover. There was a huge biomass of elasmobranches that were crying out to be caught and eaten, and commercial fishermen successfully did what they were told to do, they developed markets and fisheries for skates and dogfish. Unfortunately, according to the science, we were too successful in our efforts, and we soon found that we were overfishing skates and dogfish.

All of a sudden, after millions of dollars of investment by industry, the rug was yanked out from under industry and the fishery was effectively closed. Now the implementation of stringent management measures is nothing new when it comes to rebuilding an overfished stock. It is a requirement of the law under the Magnuson Stevens Act. What sets the dogfish management measures apart from all previous Northeast FMP's , is that this rebuilding plan was put in place despite a huge total biomass of dogfish, estimated to be near a billion pounds and more then twice the level of dogfish observed in the 1960's before there was any directed fishery for them. Ask any fisherman today what he thinks of the dogfish population and he will answer he cannot understand why we are trying to increase their population any more then they are already.

Fishermen cannot avoid dogfish. They are everywhere. The science center itself has watched over the last 40 years as their autumn trawl survey has went from catching 20 or so percent of their total weight per tow of dogfish, to catching 75 % total weight of dogfish per tow. They frequently encounter so many in a tow that their cod end gets ripped up and the liner destroyed. In my mind this is poetic justice. Welcome to the real world and the problems real fishermen encounter because of the huge biomass of dogfish.

If there are so many dogfish in the ocean right now, that not only can the survey vessels catch them, but they are so plentiful that last summer they chased people out of the waters of the Narragansett Bay, why then is a management plan needed? That's where it gets tricky. The market for dogfish utilizes fish larger then 80 centimeters. These fish are primarily females of the species, as males rarely grow larger then 85 centimeters, [at least in the northwest Atlantic]. Hence over the last dozen years of the fishery a large proportion of the female spawning stock biomass was removed, leaving a lot of lonely males to commit suicide by intentionally swimming into nets. It is estimated that there are around 19 million pounds of dogfish caught as bycatch annually. The true mortality of that catch is not known, and that catch amounts to 5 per cent of the total biomass a year. Since 1992 the total biomass of Dogfish has dropped by over 30%. Almost all of that percentage comes from a reduction in the female spawning stock biomass, which is estimated to have declined by around 75% since that time. Predictably, recruitment of young pups has seen an alarming drop since 1997. [See table 4]. Further complicating the matter is the fact that dogfish are long lived, 30 to 50 years by some estimates, slow growing, slow maturing, [50% maturing at age 17 years], and they have a long gestation period of 18 to 24 months according to who's counting, while giving birth to anywhere from 4 to 14 live pups. Its not a rosy scenario if you're a dogfish.

There are clear warning signs of potential stock collapse that cannot be ignored. That is why a management plan has been implemented, and the directed fishery shut down.

So as a fisherman, what are you to do in order to fish responsibly and help the dogfish stocks recover? First, avoid them. If there are dogfish present where you want to fish, try somewhere else. If, after trying as many places as possible and there are still dogfish present, go home. Wait a week, and try again. Continue doing this until you are out of business. This will help the stock recover. If, while fishing, dogfish are unintentionally caught, efforts can be made to reduce their mortality. A codend full of dogfish should be tripped overboard without being brought on deck. Gilled dogfish should be handled gently to avoid further damage to their gills, and gently placed overboard one at a time. Care should also be taken in the removal of hooks from their mouths, and if the fish is guthooked the leader should be cut. As stated earlier, dogfish bycatch is estimated to be around 19 million pounds a year, if this figure can be reduced the stock can recover faster.

DOGFISH MANAGEMENT BY SCIENCE OR POLICY?

After laying out the facts about why we need to manage dogfish, and how we, as fishermen can help in their recovery, I would be remiss if I didn't question some of the science that is guiding the hands of management. As a fisherman and a former Mid Atlantic Fishery Management Council member I am well versed in both the science driving the plan, and the observations of fishermen that leave them incredulous about the supposed imminent collapse and "extinction" of the dogfish stock.

Lets look a little closer into the condition of the dogfish population. The NEFSC estimates the Dogfish biomass by using a swept area estimate from the spring survey which goes back all the way to 1968. In my handout I have included a page from the 37th SAW that provides two graphs showing the catch for each year from 1968 to 2003. the top graph shows total biomass, the lower graph shows the biomass of larger fish> 80 cm. These larger fish are primarily mature females. The first thing that a person notices is that the annual points, the actual estimated biomass for a given year, vary greatly, look at years 1984,85,and 86 in the top graph. The biomass swings from 250,000 metric tons to well over a million MT. And then back again to 250,000 metric tons. This clearly demonstrates the highly variable catch rates due to their unpredictable availability to the survey itself . Dogfish are a plentiful shark that school tightly at times resulting in large catches when encountered, much like Scup. By using a three year moving average of these annual data points a clearer picture emerges of the dogfish population, this is represented by the line in the graphs. What stands out here is the clear growth of the dogfish population from the initial date in 1968 until the early 1990's when we see the downward trend as the domestic fishery expanded. The estimated population increased from around 150,000 MT to almost 600,000 MT. This is over 1.2 billion pounds. When we look at the lower graph, which is basically the SSB, we see that today, the population of Mature females is exactly where it was, back in the 1960's, which is when there was no fishery for dogfish in the North East. Lets check out my next page which shows table 1 and table 2. Here we have graphs from the Autumn survey, which go even further back to 1964 and document the collapse of the groundfish stocks, and their replacement with elasmobranches, mostly dogfish. This phenomenon has been well documented by the NEFSC, and is the reason that NMFS encouraged the creation of the dogfish and skate fisheries.

Looking at these graphs it's clear that the dogfish and skate populations took advantage of an opportunity created by the depletion of the groundfish stocks and took over the ecosystem, a perfect example of regime change caused by overfishing. Table one clearly demonstrates the effects of management in the 1990's as the groundfish management measures resulted in a tripling of the groundfish population as the dogfish population steadily dropped from the effects of the newly created fishery. Is it a coincidence that the groundfish stocks started to recover as soon as the dogfish population started to be reduced? I don't think so, and neither does the NEFSC's own Dr. Steve Murawski, who states in ***Multi species size composition: A conservative property of exploited fishery systems*** *"given the current high abundance of skates and dogfish, it may not be possible to increase gadoid and flounder abundance without 'extracting' some of the current standing stock."* This paper was written in 1992 and Steve's observations certainly were proven to be correct.

The term ecosystem management has received much attention in the last decade as efforts to rebuild fish stocks has taken on increased public awareness. The carrying capacity of an ecosystem is the total amount of animals that can be biologically sustained within that ecosystem. There are natural highs and lows of different marine populations, usually caused by environmental conditions, and there are also manmade highs and lows such as the groundfish/ elasmobraches example. One thing is certain about ecosystem carrying capacity, there is an upper limit to how much biomass can be sustained, and this is predicated by how much food is available. The composition of the species may change but they cannot exceed the carrying capacity without causing a collapse.

What does this mean in terms of dogfish management? Our management system is based on biological targets that are set for each species that our Councils manage. These targets are formulated by the Fishery Science Centers using various complex mathematical equations to come to an educated guess of how many fish of each species should be in the ocean. The problem is that it is physically impossible for any Ecosystem to sustain the rebuilt populations of every fish species at the same time. Unless of course, the rebuilt targets are realistic. In the case of the Northeast region's fisheries, the Biological targets of many of the managed species are based upon the three year moving average of the highest observed populations of these species. Ask any scientist at the NEFSC if they think it is possible to have all of our fish stocks recovered to the desired Btargets at the same time and they will tell you : its impossible. Yet this is what we are attempting to do. There is presently a billion pounds of dogfish swimming around off of the U.S east coast, more then twice as many as were present in an unfished population during the 1960's, and we are forced to "rebuild" the population to an level that is unsustainable unless other stocks are not allowed to rebuild. By law that is impossible, the stocks must be rebuilt within a certain timeframe or fisheries can be shut down. This whole system ignores the basic tenet of ecosystem carrying capacity. There simply would not be enough food to feed all of the fish that NMFS insists should be in the ocean according to their unattainable Biological targets. If it's a consensus opinion of the scientists about the inability to have an ocean full of every species at the same time, then we are not dealing with management by science, but with management by Policy. I will not speculate on why NMFS insists on ignoring the best available science when it comes to biological targets in relationship to ecosystem carrying capacity, but they are required by law to use it. That is National Standard #2. The fact that they insist on attempting to reach all of these B targets at the same time without acknowledging their impossibility or attempting to figure out rational targets in relationship to ecosystem management, and the corresponding carrying capacity of the ecosystem shows a disdain of the fishing industry that must suffer the economic consequences of this policy. This is also ignoring a National Standard, and that is National Standard #8. "Conservation and management measures shall, consistent with the conservation requirements of this act [including the prevention of overfishing and rebuilding of overfished stocks], take into account the importance of fishery resources to fishing communities in order to A] provide for the sustained participation of such communities, and B] to the extent practicable, minimize adverse economic impacts on such communities.

Lets look at a few more of the graphs that I included. If you were a fishery manager you would have been shown table 3 showing the collapse of the SSB from 1982 to 2003. This is certainly hard to ignore information. How come all of the years available weren't included from 1968 when the population was unfished and coincidentally at the 2003 level? Then it wouldn't look like a stock collapse would it? Tables 4 and 6 graphically illustrate the poor recruitment of the last 7 years, and also the highly variable catch rates of the Recruits. Young dogfish are primarily caught in waters deeper then 100 fathoms, yet less then 20 tows are made in those depths during a survey. The availability of juvenile dogfish to the survey is even more erratic then adult dogfish. If the juvenile population has moved into deeper water, due to environmental conditions then their availability to the survey would be even less then normal. Dogfish are frequently described as the worlds most studied shark, with every aspect of their life and biology documented. Yet in researching into their reproduction I find some serious discrepancies. Barry Jones and Glen Geen reported in 1977 that fertilized eggs are in the candled stage for approximately 4 months. This is the amount of time that a number of previous researchers also stated. They also pointed out this discrepancy in another paper, "Around april, rather then in the fall as suggested by Lucas[1930] the candles rupture and release embryos with large external yolk sacks into the uteri". This 4 month period for the

candled stage is quite different from the time period that Thomas Jones and Karl Ugland documented in 2001. Their research documented a candled stage for the embryos of 12 to 13 months. [See table 5, which shows the length of the various embryonic stages of dogfish pregnancy]. This certainly raises questions about the quality of research data throughout the years or the differences of the various dogfish stocks throughout the world, and assuming that what is observed in British Columbian Dogfish is the same as what might be observed in an Atlantic Dogfish. Also the Jones/ Geen paper mentions the intensive fishery for dogfish during world war 2 that collapsed the stock. That stock was fully recovered by the 1960's and this conclusion reached; "By iteration, A=1.08 or 8% increase in numbers per year, suggesting that the population of dogfish in the straight of Georgia has doubled its numbers every 9 years, thus increasing by 10 times since the end of world war 2". That observation mimics what is documented in the Northeast US between 1968 and 1990 when the dogfish biomass tripled in size. Somehow for a species that is slow growing, late maturing, and has small litters, they are remarkably successful at not just surviving, but at thriving regardless of the obstacles thrown their way.

WHAT ABOUT BYCATCH?

As I mentioned earlier there is presently an estimated 19 million pounds of dogfish discarded in the various US fisheries annually. This number could increase as the stock increases and fish that were normally landed, are no longer, because of season closures, or minuscule trip limits. Will NMFS close other fisheries because of unintentional dogfish bycatch? National Standard 9 requires that conservation and management measures shall, to the extent practicable, [A] minimize bycatch and [B] to the extent bycatch cannot be avoided, minimize the mortality of such bycatch. Clearly this issue could have serious consequences to a number of important fisheries if the bycatch mortality of dogfish is considered to be too high. But Although National Standard 9 is the law, is it the best science available? When we look at the effects of selective removal of certain species from a marine ecosystem we find that invariably the stock that is removed is replaced by a species that is not being fished, or whose natural enemy is no longer present due to its removal. Once again a person has only to look at the situation created by the removal of selective groundfish from Georges Bank. Elasmobranches found a very favorable environment since their chief competition for food was no longer present. Reducing bycatch as required under National Standard 9 may be the worst management measure that we can take, as we could be creating the opportunity for certain species to thrive in a protected environment while their natural competition, is forced out due to first, selective fishing, and then not being able to recover because the ecosystem, now overwhelmed by the protected "pest" cannot support anymore biomass. Clearly science should support the principle that when fish species are removed from an ecosystem, they should not be removed selectively, but rather all species should be removed in proportion to each other, so that ecological balance can be maintained. This is the only way that we can keep a repeat of the Georges Bank experience from repeating.

In conclusion I would say that responsible fishing by fishermen is a desirable goal, and certainly one that fishermen embrace as they recognize the effects and the limits of their fishing practices, and their wish to leave a healthy fishery and ecosystem for future generations to enjoy. But just as important as responsible fishing is responsible management, and this is up to the NMFS and the choices they make in regard to what is the best science available. Thank You.