

Gloucester's Fishery

Frontlines in the
Battle for a
Sustainable World

THEY THAT GO
DOWN TO THE SEA
IN SHIPS
1623 — 1923

**This exhibit is dedicated to the heroic fishermen
of the **PRESENT** whose lives and livelihoods
are tossed by unpredictable seas
and regulatory confusion.**

Here in Gloucester, at the nation's oldest seaport, we have a front row seat in the epic global drama of our time to resolve the question:

How are we going to allocate limited natural resources?

With growing world population and consumption per capita, this is a question we have to answer for just about every natural resource - land, fresh air, meat, copper, oil – there just isn't enough for everyone to consume at the levels we have been consuming.

Fisherman are being forced out of business

In Gloucester, we have already been through the cycle of overharvesting, implementation of strict regulation, and partial resource recovery. To save the fisheries, government regulators have cut back the number of days each boat can fish down to 40 per year and half of that if one fishes close by. Many fishermen are leaving the profession and the shore side business that service the fishing industry are going under. Fishermen are complaining that the measures are so stiff that there won't be any fishermen or shore side services left by the time the government declares the fish stocks sufficiently rebuilt.

Why it is so Difficult to Regulate

Balancing the needs of the ecosystem vs. the needs of the human that depends upon the ecosystem is a difficult thankless task. Perhaps that's why it took 16 years of declining harvests before the government started to get serious about conservation. Even then, the halfway measures it took were not sufficient to rebuild stock and the industry. If serious measures were taken earlier, we would have had much less pain to the fishing industry and the fish might all be back by now. Humans seem poorly designed to respond to impending crashes before they happen.

Questions for Gloucester Fisheries = Lessons for the World

- How do we learn to accept limitations today to prevent much more painful limitations later?
- What are the fairest ways of sharing the limitations so they are more acceptable?
- How do we equitably distribute rights while also reward those who have more because they are more efficient and hardworking?
- How do you reward people who stick by the allocation rule and punish those who don't? What if they go over quota by mistake once? Twice? Three times?
- How many crises do we need to go through before we recognize growth as an unsustainable trend?

We are wrestling with all these questions in Gloucester as we try to find a way to rebuild stocks and allocate fishing rights in ways that are fair and deal with natural human tendencies to push limits and ignore consequences that are in the distant future.

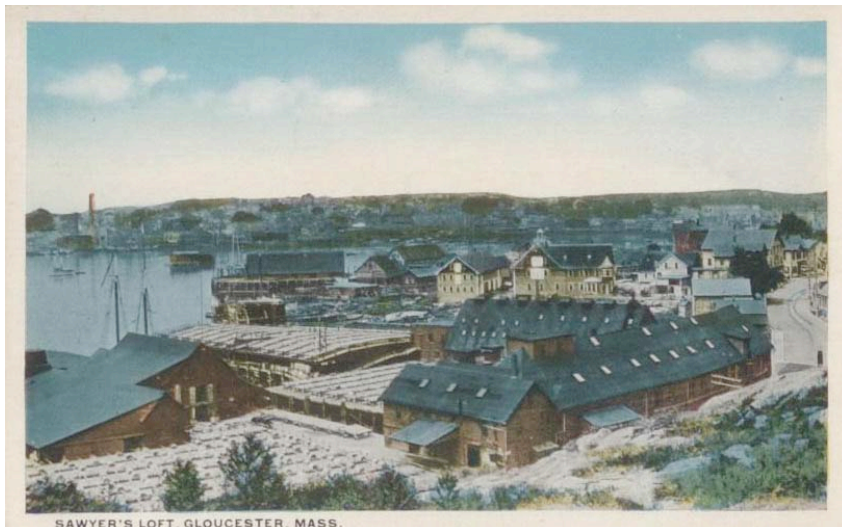
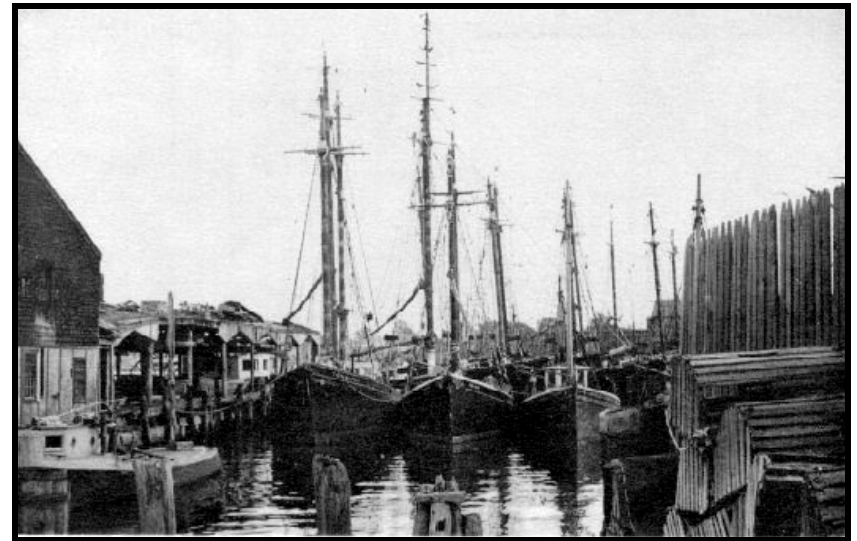
The lessons we are learning here are applicable to regulation of financial markets, CO² emissions, and all the thousands of other allocation issues we will be dealing with in this century.

The Good Ole Days

Gloucester is America's oldest commercial fishing port. This part of Gloucester – Harbor Cove and the Fort - was the center of Gloucester fishing.



A View of Harbor Cove and the Fort -early 1900's



Cod maintains nutrition when dried. Fortunes were made on dried cod.



Drying of the nets - now they are plastic and don't need as much TLC

You can see more historic photos like this at the Cape Ann Historical Museum and at the Cape Ann Cinema before the start of every movie.

Gorton's of Gloucester - The Most Famous Name in Fishing

Slade Gorton & Company, founded in 1868, was the first to package salt-dried fish in barrels. Gorton's cod became the first nationally advertised fish; its billboards lined railways and roads across the continent.

Fish Wasn't Always a Popular Food

Fish was not a common staple of the American diet in those days, but Gorton's emphasized its innovative preparation of its product. Billed as "Absolutely Boneless Codfish" in 1901, the fish--which sold for nine cents a pound--was dried, salted, wrapped, and packed. After the fish was purchased, it needed to be soaked before preparing. It was the first of many industry innovations for the company.

Gorton's Frozen Fish Made it a Hit

In 1944 Gorton's introduced the first frozen fish steak, a forerunner of what has become the famous "Gorton's fish stick". Until the mid-1900s, fish had little appeal to Americans, especially to those further inland from both coasts. Fish's main advantage over meat products was its low price. The health benefits associated with fish had not yet been discovered. More homes tried fish during the war's meat shortage, but it wasn't until seafood merged with the era of super convenience that it became a household essential.

Gorton's Fried and Frozen Codfish, the first modern convenience frozen seafood, was introduced in 1952 and became a huge hit with housewives.

History courtesy of:

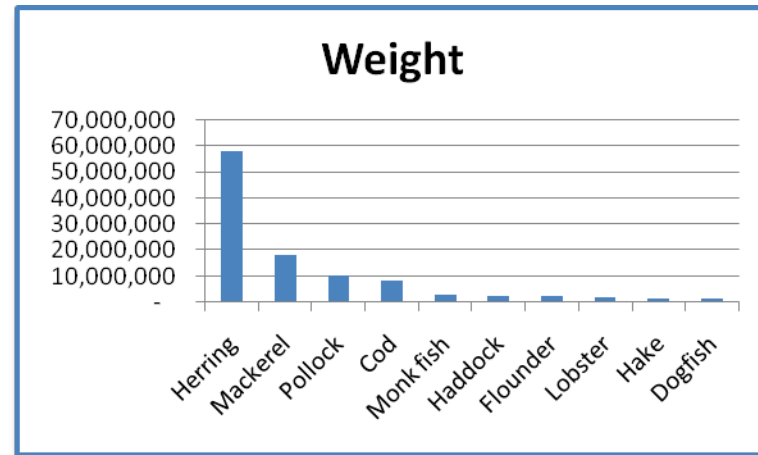
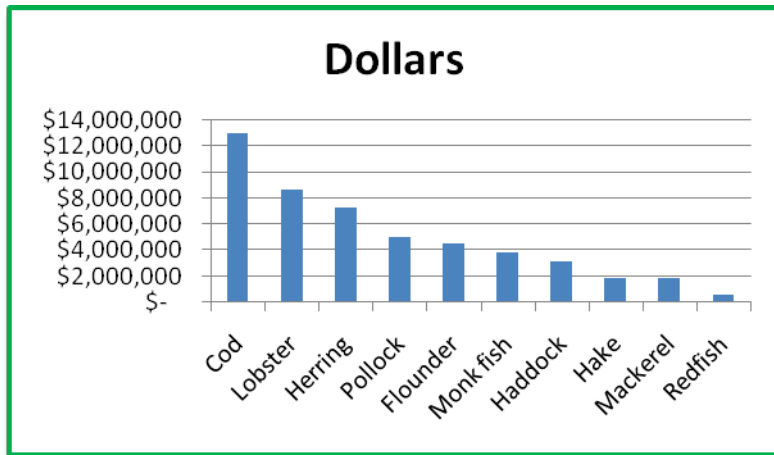
<http://www.fundinguniverse.com/company-histories/Gortons-Company-History.html>



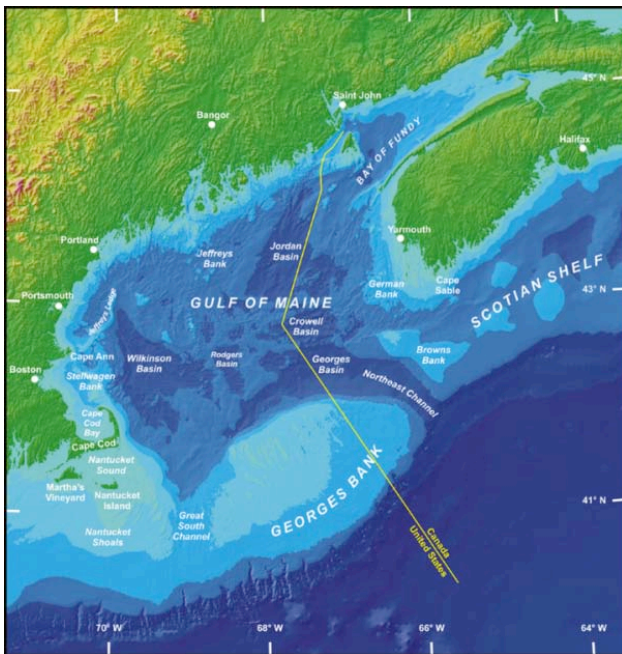
Don't miss the **Gorton's Seafood Gallery** display "Fitting Out" focusing on the shore side industries that supported the local fishing fleet at the turn of the century. You can see it at the **Gloucester Marine Heritage Center** three blocks down on the right.

Gloucester Fishing Today

In 2008, Gloucester landed 121 million tons of fish worth \$54 million. This is a third of the landings of the heyday 70's. The current fishing regulation scheme is limited fishing now to increase fishing stocks later. The goal is to get to a "the maximum sustainable biomass" for sustainable yields equal to the 70's by 2015. Here are the top ten Gloucester landings in 2008.



Data provided by John Witzig, Fisheries Statistics Office, NOAA NMFS



Where We Get Fish

There are two main fishing grounds for Gloucester fishermen – the Gulf of Maine and George's Bank. The Gulf of Maine extends from the tip of Cape Cod to Yarmouth, Nova Scotia. It is a discrete body of water that is almost entirely enclosed by land on three sides and George's Bank along the Southeast border. George's Bank keeps the Gulf Stream from spilling into the Gulf of Maine. Our fish like it cold.

The Major Fishing Ports of New England

Gloucester is a full service fish hub for fishing boats throughout New England. The only four other fishing ports of note in New England are New Bedford, Boston, Portland ME, and Port Judith RI. The fishing industry can get (just about) everything it needs to go fishing here in Gloucester. Fishermen can get ice, fuel, gear, bait, and grub; dockage, hauled outs, repairs, unloading docks, fish buyers, settlement agents, and maritime attorneys. These shore side businesses are under great duress during this time of limited fishing.

Commercial Fishing Boats in Gloucester

There are five main types of commercial fish boats that work out of Gloucester – trawlers, long liners, lobster boats, slime eel boats and gill netters

Trawlers



Trawlers or draggers tow large funnel-shaped nets either on the bottom to catch shellfish and ground fish including cod, haddock, flounders and monkfish or up in the water column to snag small pelagics – herring and mackerel. Sets of steel trawls weigh down and spread apart the bottom nets. The nets are towed around 3 mph for a few minutes or up to five hours, then hauled in with hydraulic winches and the fish emptied on deck for sorting and cleaning. The fish are stored below deck in ice or refrigerated sea water.

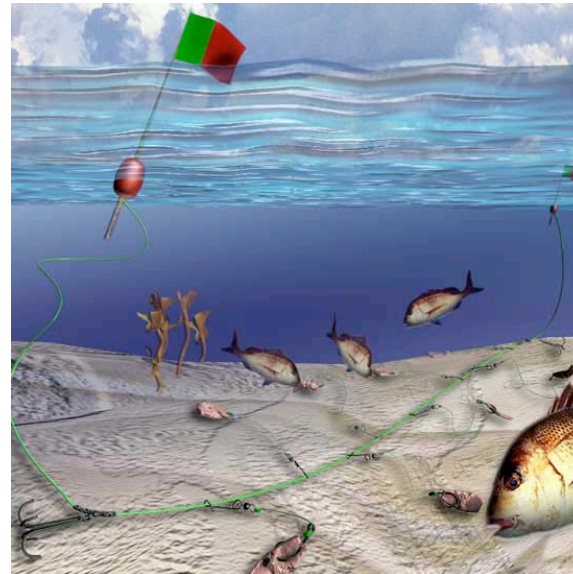
Unlike the large trawlers in Alaska and many foreign fisheries, New England trawlers are generally smaller, lower horsepower, family owned vessels. Most Gloucester trawlers are day trawlers between 35' and 50' in length.

Some people are concerned that bottom trawling is causing low fish counts because it disturbs the bottom floor, but if this were so the effects would have been felt fifty years ago when trawling began. Draggers are working to leave more of a breeding population by increasing the minimum size of the mesh to 6.5 inches square at the end of the net. This is ten times larger than the mesh size twenty years ago.

Longliner



Longlines can be up to a mile in length and have thousands of baited hooks on branch lines called “snoods”. This is the form of fishing depicted in the “Perfect Storm.” The lines are anchored at each end of each “set.” Lines at the ends run to the surface and are marked with a buoy and flag. Longlines are set on the surface to catch swordfish and tuna or on the bottom to catch cod and halibut. Long lines are generally least destructive to the environment and have the least bycatch (non-targeted species). Long lines are dangerous for fishermen who can get hooked on the thousands of bait hooks.



Long line on Ocean Floor

Lobster Boats



F/V Stanley Thomas – Gloucester homeport

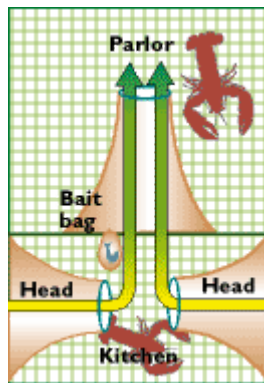
Lobster boats are wide and long to stow lots of traps and have low sides to make it easier to pull traps out of the water. Traps are set individually with a single buoy or in groups of 5-35 on a line with a buoy on each end. Each buoy has a color pattern that is unique to each lobsterman.



Modern lobster traps are made of vinyl coated wire mesh with netting inside to create compartments. Lobsters enter the “pots” through cone shape side openings allow easy entry, but make it difficult to back out.

The first compartment is called the kitchen – that’s where the bait is. After munching on the usual herring bait, they try to leave and find themselves in “the parlor”. This leaves the kitchen open for another hungry lobster

Most in-shore lobstermen can fish up to 800 traps; off-shore lobsterman can fish 2,000 traps. Traps are set and hauled on a cycle of about three days. Hydraulic “pot haulers” make the pulling up of traps much easier today.

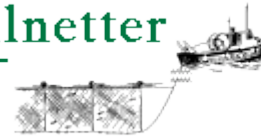


Lobster Pot Layout

Slime Eel Boats

Slime eel boats also fish much like lobstermen. They have special traps made of plastic barrels with entry cones. The eel traps are also baited with herring and even tuna fish scraps. The eels are sold for food in South Korea. Eel skins are used to make wallets, belts and hand bags.

Gillnetter



Gillnetters set curtain-like nets of monofilament perpendicular to the direction fish are traveling. Fish butt their heads through the net and can’t back out because their gills get caught.

Bottom set gillnets snag schooling fish like cod and pollack on the move. Surface gillnets also catch large pelagics – shark, tuna and swordfish. Fish are removed from the net by hand picking them as the net is hauled aboard by a hydraulic lifter. It’s back breaking work pulling fish out of the nets one by one.

The gillnet was introduced to Gloucester in the 1880s. It was a huge innovation because it did not require bait. Gillnets don’t stir up the bottom like bottom trawlers. They have little bycatch because small fish pass through and live fish can be removed and put back in the ocean. They also do not require as much fuel, but nets take much longer to fill up. Gillnets are set for several hours or days. Most gillnet vessels are 30-60 feet in length.

The Dragger Net on Fisherman's Wharf

Gloucester has about 100 mostly small groundfish vessels. Half of them use these funnel-shaped nets to catch the popular groundfish - cod, haddock, flounder and monk fish. The net is dragged over the ocean floor 80-500 feet down.

The Modern Dragger's Net

The groundfish net hung on Fisherman's Wharf measures 60' x 40'. The top of the net has floats and the bottom has 4 inch rubber discs. The rubber discs protect the "sweep" of the net while reducing the nets drag by allowing the net to gently traverse the bottom while maintaining contact. This advance in net design increases fuel efficiency, reduces wear on the expensive gear and produces a lighter footprint on the ocean bottom.

Bigger Mesh Sizes for a More Sustainable Fishery

The net shows the current minimal mesh sizes for sustainable fishing. The mesh is 6" square on the body and 6.5" square on the **cod end** – where the fish are collected.

This is a huge improvement over the twenty year old cod end with a 2" square mesh that is hanging below the big new cod end. That gives small fish 10 times more area to escape and breed. Bigger fish produce more eggs, so it is important to let them grow bigger before being caught.



Compare the Top and Bottom Nets
Mesh Sizes Today Let 10 X More Fish Escape

Cod

Cod can be distinguished by their large mouth, descending whisker, three rounded dorsal fins and two anal fins. They can be up to six feet long, but are usually about 3 feet long and 10-20 lbs. They live at depths of 200 - 400 feet and in temperatures ranging from 34 to 46 degrees F. Females release 3-9 million eggs.

The Atlantic cod which formed the mainstay of Gloucester fishery for several centuries is managed as two stocks, the Gulf of Maine Cod stock and the Georges Bank Cod stock. The most recent scientific information indicates the Gulf of Maine stock is near fully rebuilt while the Georges Bank Cod stock continues to be at low levels.



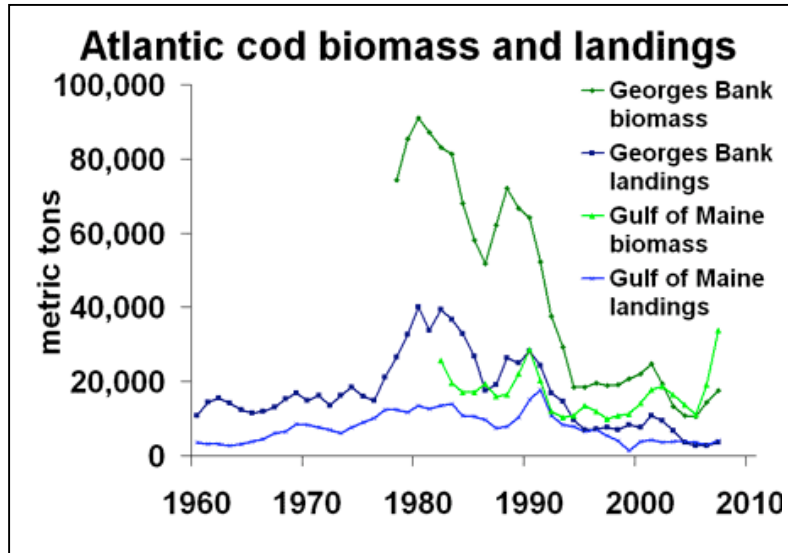
Haddock

Haddock are a close relative of the cod. Haddock can be distinguished by the black "thumbprint" or "devils mark" found on each side of its body. Few haddock exceed 20 inches and four pounds. Females weighing 2.2 pounds produce about 170,000 eggs, while largest females may release as many as 3 million eggs in one spawning season. The meat of the haddock is lean and white. It is less firm than cod and flakes beautifully when cooked.

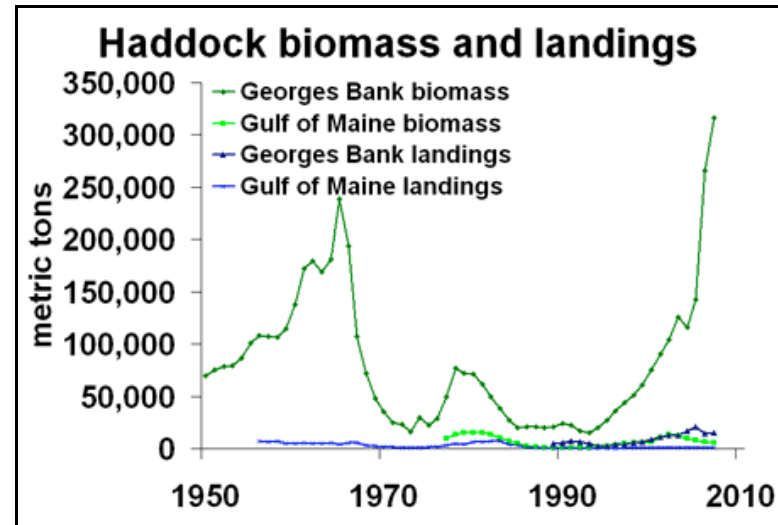
Since 2004, there have been large increases in haddock stock size. The two haddock stocks found in Northeast U.S. waters are no longer considered overfished and overfishing is not occurring.



Recovery Rates Vary Greatly



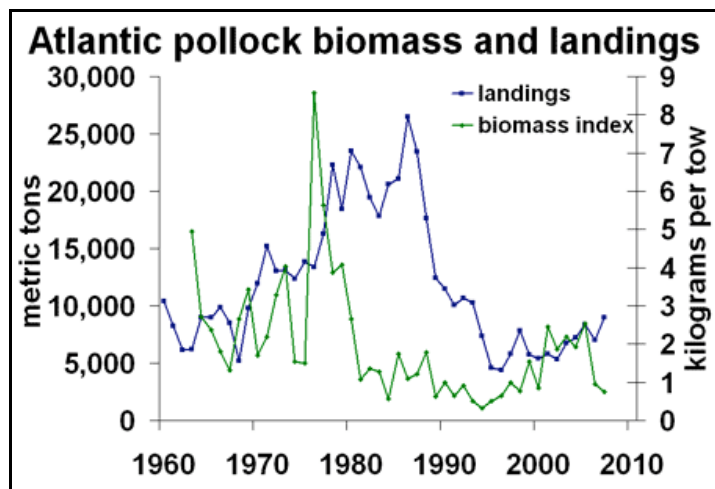
NOAA Fisheries Service estimates that the Gulf of Maine spawning mass is about **half** of what is needed to have a maximum sustainable fishery.



NOAA Fisheries Service estimates the Georges Bank biomass is about **twice** what is needed to have a maximum sustainable fishery.

Pollock

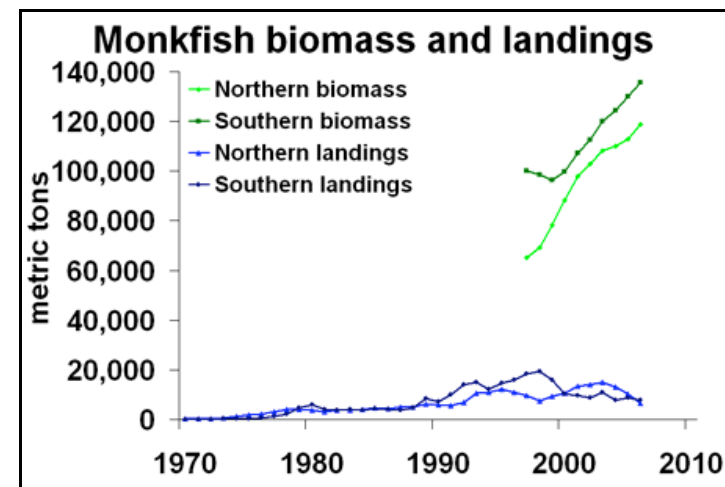
Pollock are found anywhere in the water column in large schools. They grow up to three feet long with a strongly defined silver streak down their side. Atlantic pollock is largely considered to be a white fish, although it is a fairly strongly flavored one. Pollock historically has ranked as the nation's largest commercial catch by weight. It is the principle ingredient in imitation crab meat and the frozen "fish sticks" made popular by Gorton's of Gloucester. Only about 2% of the pollock landed in the U.S. today come from Atlantic pollock stocks; the rest is Alaska pollock, a different species found in the Pacific Ocean.



The Atlantic Pollack has not recovered well.

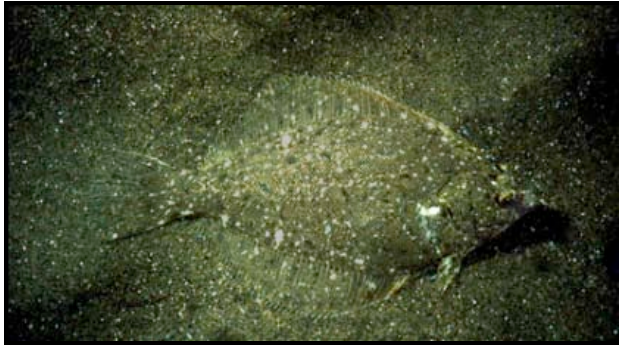
Monkfish

Monkfish are generally about three feet long and live on muddy bottoms as deep as 2,000 ft. They are considered a species of angler fish because they have a little "fishing rod" over their head that they can angle forward to lure other fish into its very large mouth. Monkfish are also known as "all-mouth" - the fish is mostly head and the head is mostly mouth. It's not a pretty fish and until recently was considered "bycatch" that just happened to end up in the net with more valuable cod and haddock. It is also known as "the poor man's lobster" because its large muscular tail meat has a dense, sweet flavor reminiscent of lobster.



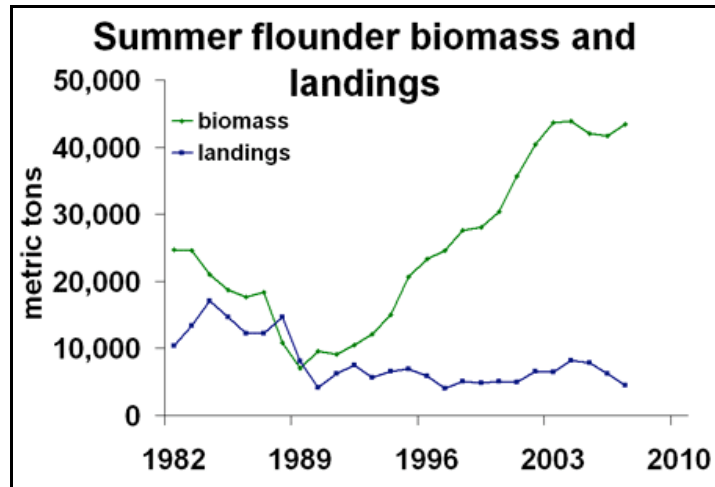
Monkfish are not overfished and no overfishing is occurring.

Tale of Two Flounders



Summer Flounder

Flounder have both eyes on one side of the head. They can change their skin color to match the bottom they are lying on. A 14 inch female produces about 40,000 eggs, and a 27 inch female about 4,200,000 eggs in a season. A newly hatched flat fish larva has one eye in each side of its head but within months it adapts to a bottom dwelling lifestyle, by which time one eye has moved to the other side of the head. Unlike most other bottom dwelling fish that rest by lying on their bellies, a flat fish rests on its side. Flounder grow to 2-3 ft long. The white flaky meat of the flounder is highly rated due to its delicate flavor and texture. It is frequently called "blackback" when it is smaller than 3 pounds and a "lemon sole" when it is larger.



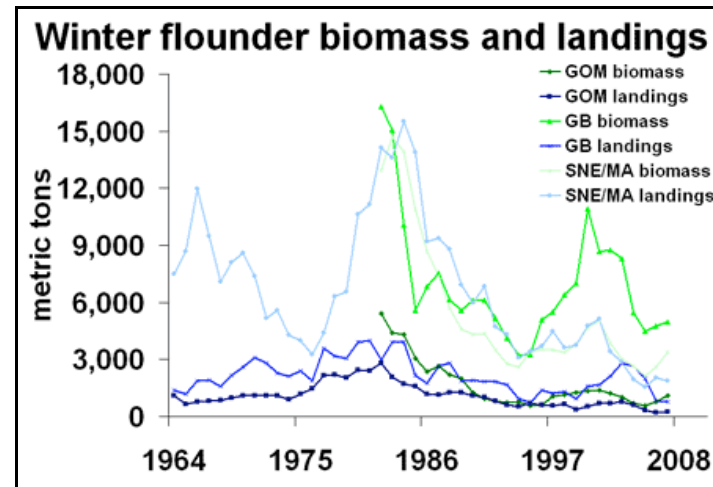
The summer flounder is at 72% of maximum yield and is expected to be at 100% by 2013.

Summer vs. Winter Flounder

The summer flounder comes close to shore in the summer time; winter flounder migrates close to shore in the winter time. Summer flounder have eyes on the left side of their body; Winter flounder have eyes on the right side of their body; The Summer flounder population is rebuilding well, the Winter flounder population is not.



Winter Flounder



In 2007, the winter flounder biomass on Georges Bank was at 31% of the target level biomass.

Lobster

Lobsters are solitary and territorial most of the year. They can live in a variety of habitats as long as there is a burrow or crevice for cover.

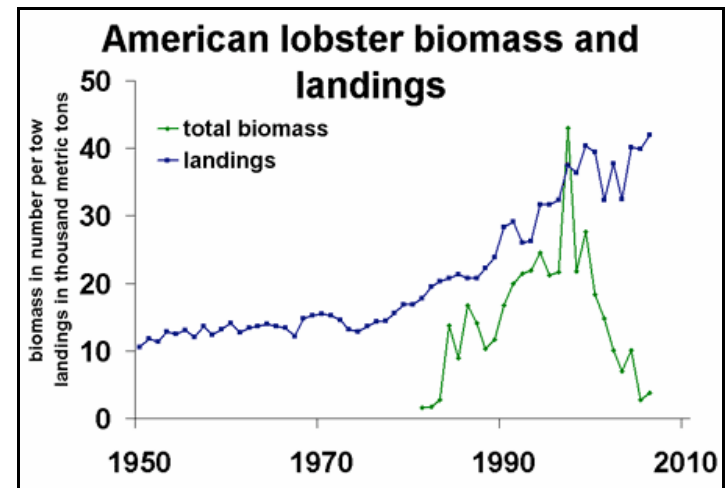
After lobsters molt, they eat voraciously, often devouring their own recently vacated shells. Eating their shell replenishes lost calcium and helps harden their new shell. Usually, lobsters mate after the females molt, or shed their hard, external skeleton. Males deposit sperm in the "soft" females. The female stores the sperm internally for a period of up to a year. Females can have 5,000 to 100,000 eggs, depending on their body size. The eggs are produced internally, and fertilized as they are extruded on the underside of the tail, where they are carried for a 9- to 11- month incubation period. The eggs hatch during late spring or early summer. The pelagic (free-swimming) larvae molt four times before attaining adult characteristics and settling to the bottom. They will molt over 20 times over a period of 5 to 8 years before they reach the minimum legal size.

American lobster is one of the most valuable fisheries in the Eastern United States, with landings of 75.2 million pounds valued at \$350 million in 2007. Maine and Massachusetts accounted for over 90 percent of these landings.

Federal management measures include minimum and maximum carapace (the body minus the tail) length limits, protection of egg-bearing females, and restrictions on the size and number of traps. Most populations of American lobster in the Gulf of Maine and Georges Bank are healthy and overfishing is not occurring. However, in Southern New England, lobster is overfished and overfishing is occurring.



Lobsters don't turn bright red until they are cooked.



N.B. Landings and Biomass are not on the same scale on the graph.

Overfishing in New England: How We Got Here

Kicking out the Factory Trawlers from Other Countries

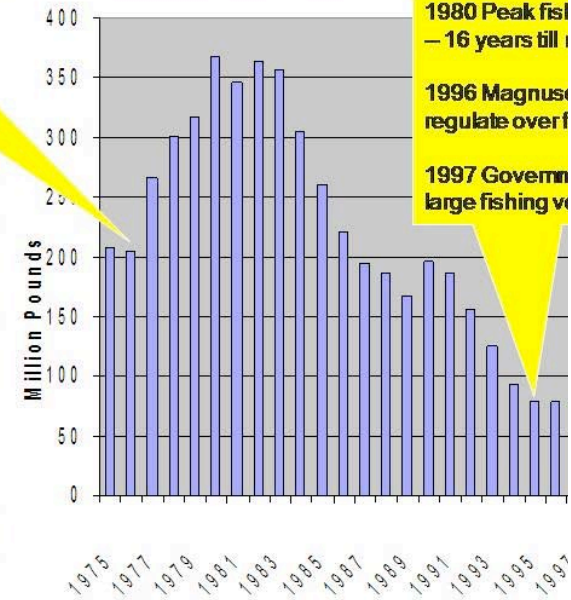


The first warnings that the fish supply was not inexhaustible came in the late sixties when fishermen noticed large factory trawlers and mother ships from the Soviet Union, Japan

and other countries fishing off the East Coast and leaving little behind. In 1976, congress passed the Magnuson-Stevens act to keep international factory trawlers 200 miles off American coasts.

New England Groundfish Landings

1976 Magnuson Act closed US Waters to foreign fishers due to overfishing & subsidizes buying better boats and equipment with low interest loans



1980 Peak fishings
- 16 years till 1996

1996 Magnuson-Stevens Act
regulate overfishing

1997 Government buyback program
large fishing vessels

Beefing up the American Fleet

Then the American fishing fleet got a major upgrade in numbers and sophisticated fish finding gear through liberal government loan guarantees. For the New England ground fish industry the party lasted about a decade.

Sixteen years of delayed response!

In 1981, fish landings (fish brought to shore) started to decrease. By 1986 landings were below the 1976 numbers. It wasn't until 1996 – after sixteen years of declining harvests - that congress updated the Magnuson-Stevens act to seriously address American overfishing.

It took 16 years of declining harvests before Congress started to seriously address conservation of the fisheries.

Today's Regulation

All Sides Agree that Current System is Defective

All of the stakeholders in the debate about how to achieve a sustainable fishery – the fishermen, scientists, and government regulators – agree that the current system is defective. There is too much distrust of each other's points of view and disagreement over the numbers. It's hard to achieve a consensus on such a daunting task as "counting the number of fish in the sea" and even harder to agree on how much fish is necessary to achieve a stable fishery. Hardest of all is arriving at a consensus on how to get to a target biomass (the total weight of fish in each species).

Effort Controls: Trying to Maintain Freedom under Regulation

To reduce the number of fish harvested the government and local regional fishery council opted for an "effort control" system that reduced the number of days boats could go fishing. It seemed safer than a race to get the most fish before an annual quota was reached and fairer than dictating what each fisherman could bring in each year. Despite the reduction in "effort" fish stocks continued to decline. Consequently the allowable days were further reduced, fishing grounds were given rolling closures, and individual trip limits were introduced. Fishermen are forced to buy up multiple permits to make a living. Even worse, the quotas have the outrageous consequence of encouraging fishermen to throw good marketable fish overboard to avoid the huge fines that come from going over their trip limits. They are not even allowed to donate the extra fish to charity.

Some Fish Stocks not Rebuilding Despite Fishing Under Quotas

Some fish stocks are not rebuilding as fast as predicted despite the fact that effort controls are causing fishermen to bring in less than their allowable yields. It frustrates fishermen to be branded as greedy poachers when they are actually under their allowable limits.

Quotas aren't all bad for fishermen. Fisherman get much more return for their work when the supply of fish is limited.

Regulate to the Weakest Link?

Regulators are loath to loosen restrictions before all the species have regenerated. Haddock are at twice the biomass target for a sustainable fishery, but cod are only halfway there. If you loosen haddock restriction you risk catching more of the endangered cod because they swim together. So the regulators are "managing to the weakest link." Imagine the frustration of seeing all that haddock that can't be touched while you are struggling to stay in business.

It's Tough being a Fisherman

It's tough being a fisherman knowing that the government has a clear strategic objective to achieve a sustainable fishery by forcing the fishing fleet to get smaller.

It's Tough being a Regulator

It's tough being a regulator forced to play a high stakes game pitting fishermen's livelihoods vs. uncertain predictions about the health of the complex ecosystem upon which the fishermen depend.

There is no clear right answer and a lot of pain due to delayed enforcement in the past.

Future Regulation

Share Allocations to the Rescue?

The government is currently considering an alternate regulatory scheme that breaks up the total allowable catch (TAC) by “sectors” based on species and location. Each fisherman would be allocated a share of the sector TAC for certain fish in particular areas.

Effort Controls Reward Individual Effort, but It’s not Working.

After experiencing the negative consequences of the other regulatory schemes that seemed easier and more palatable, we are forced to consider creating a formula for assigning individual quotas based on boat size and fishing history. There will be winners and losers dictated by formula – not how hard you work.

Will Share Allocations put Family Fishing Out of Business?

Many fear a possible “Wal-marting” of fishing. Fishing has always been a trade of rugged individuals organized by family groups. Share allocations create the possibility that the smaller guys will sell their allocation to the bigger guys and the fishing industry would be run by a few large corporations. This is not the type of society that Gloucester wants.

Some Refinements

Vito Giacalone, owner of Fisherman’s Wharf, has proposed two refinements on this scheme:

- 1) if quotas were allocated to fishing cooperatives that would decrease the likelihood of big corporate interests overwhelming the small, family fishing businesses which would result in a loss of our fishing communities.
- 2) if fishermen were allotted quota by points (like frequent flier points) instead of pounds, then the point value of each fish landed could be adjust in real time as we got closer to the annual catch limit. This approach creates incentives to fish selectively and eliminates the current regulatory requirements causing today’s fishermen to throw perfectly good, already dead fish overboard before coming into harbor.

A Drama of Global Epic Proportions

Here in Gloucester, at the nation’s oldest seaport, we have a front row seat in the epic global drama of our time:

- How do we create restrictions that ensure extractions from the environment do not exceed regenerative capacities and discharges to the environment do not exceed assimilative capacities?
- How are we going to allocate limited natural resources?
- How will we keep the big guys from buying up rights to maintain community resilience and self-sufficiency?
- How will we compensate people who are forced out of an industry they love?

There are a lot of pain decisions to make and even more painful consequences if we delay making them. Stay tuned...



Vito at a fishing Rights panel



Vito discussing the fishing situation with Mayor Kirk, Governor Duval and Senator Tarr

References and Credits

Places to Visit to Learn More

Gloucester Marine Heritage Center

- The Gorton's Seafood Gallery is displaying "Fitting Out" – and exhibit focusing on the shore side industries that supported the local fishing fleet at the turn of the century.
- Sea Pocket Lab. This outdoor aquarium/marine display features exhibits focusing on the plants and animals that populate Cape Ann coastal habitats.
- Stellwagen Bank National Marine Sanctuary Exhibit which has lots of videos of the ocean floors and fishing boat exhibits.
- Oldest running marine railway
Three blocks away on Harbor Loop
<http://www.gloucestermaritimecenter.org>

Cape Ann Historical Museum

- Galleries of paintings and artifacts from Gloucester's Maritime history.
- Largest collection of the Fitz H. Lane paintings like the mural behind the Lat 43 Main Bar. Fitz H. Lane comes from the Luminist school which is an offshoot of the Hudson River School
- Photographs and artifacts from the great Cape Ann Quarries which built many cities.
Five minute walk to Pleasant St.
www.capeannhistoricalmuseum.org

Cape Pond Ice – The Coolest Guys in Town

- Tour the historic working ice house featured in the Perfect Storm
Five minute walk up the Fort
www.capepondice.com

Visitors Center @ Cape Ann Chamber of Commerce

- Brochures from every attraction on Cape Ann
Two blocks away across from St. Peter's Park
www.capeannvacations.com/

Websites

Joe Ciaramitaro's fabulous blog on Gloucester goes on Cool videos of real folks around town being their crazy wonderful selves.
<http://goodmorninggloucester.wordpress.com/>

Wonderful blog on the history and future of Gloucester
www.thegloucesterilove.blogspot.com/

Great old Photos
<http://www.downtosea.com/>

Fascinating and comprehensive information on commercially harvested fish – including nutrition, biological facts, regulation and the graphs we've displayed on biomass and landings. Most of the fish photos and facts come from this site. <http://www.nmfs.noaa.gov/fishwatch/>

Boston Globe article on the history of regulation
http://www.boston.com/news/local/maine/articles/2003/10/26/a_ once_great_industry_on_the_brink/

Latest assessment on the devastating impact of regulation on Gloucester Harbor fishing infrastructure services
<http://www.ci.gloucester.ma.us/localpages/mayor/harbor-plan/2005-report.pdf?2ed757879199e3a8b617afae48187d20=8fc8352ff64f7573a9962f06dd9b8786>

Compiled by Mark McDonough - owner of Latitude 43 and Alchemy Bistro with help from:

- Vito Giacalone - dragger, owner of Fisherman's Wharf and fishing advocate,
- Peter Prybot - lobsterman and fishing columnist for the Gloucester Daily Times
- Joe Ciaramitaro – owner of Captain Joe & Sons Lobsters, third generation fishing guy and Gloucester's most prolific blogger