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Fisheries in the Gulf of Mexico

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COSEE Summer Institute 2003



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WHAT IS A FISHERY ???

A fishery can be defined as all the activities involved in catching a species of fish/shellfish or a group of species.

WHO OWNS THE FISH ???

Marine fisheries are common property resources. They are held in trust and managed for the people by state or federal government agencies.

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WHY ARE FISHERIES CONSIDERED TO BE RENEWABLE RESOURCES ???

Renewable resources are able to replenish themselves naturally and can be harvested at a certain level, over time, without being eliminated.

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“The Gulf of Mexico is one of the world’s great national treasures.

- **Its rich fishing grounds supply a large share of the world’s fish, shrimp, oysters and crabs.**
- **Its swamps, marshes and bayous nurture an incredible diversity of plants and wildlife.**
- **Its waterways, beachfronts, and bays are a recreational and sporting paradise.**
- **Its culture and lifestyle draw tourists and new residents from around the world.”**

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“But those attractions may also prove fatal:

- **commercial and sport fishers are battling over a shrinking resource;**
- **pollution and development threaten the ecosystem and its inhabitants and;**
- **population growth is adding new pressures daily.**

Are we finally demanding more than the Gulf can produce?”

1997, The Times-Picayune, New Orleans

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Historically, marine fishery resources were thought to be almost limitless



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Fishing was thought to have little impact on fish stocks and marine ecosystems



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We now know that fishing can have profound impacts on marine fish stocks and the ecosystems they inhabit.....
Photograph of the bottom before and after trawling activities



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Gulf of Mexico Fisheries Facts

- 1.7 billion pounds of fish and shellfish landed with an ex-vessel value of \$991 million in 2000
- In dollars, 10 of the top 20 US fishing ports are located within the Gulf
- Nearly 40% of total US commercial fisheries landings are from the Gulf
- Approximately 50 species of fish or shellfish are harvested for consumption



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Benefits of Fishing

- Food
- Employment
- Recreation
- Socio-cultural; tourism

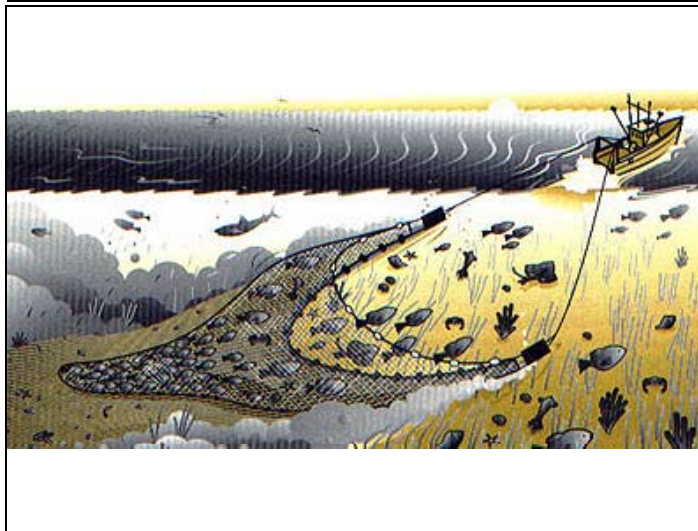


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Deleterious Effects of Fishing

- **Gear can dramatically alter habitat**
- **May affect biodiversity**
- **Can alter food chain dynamics**
- **May deplete target species through overfishing**
- **Ghost fishing by derelict/abandoned gear**
- **May alter age structure and affect population sustainability**

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Deleterious Effects of Fishing

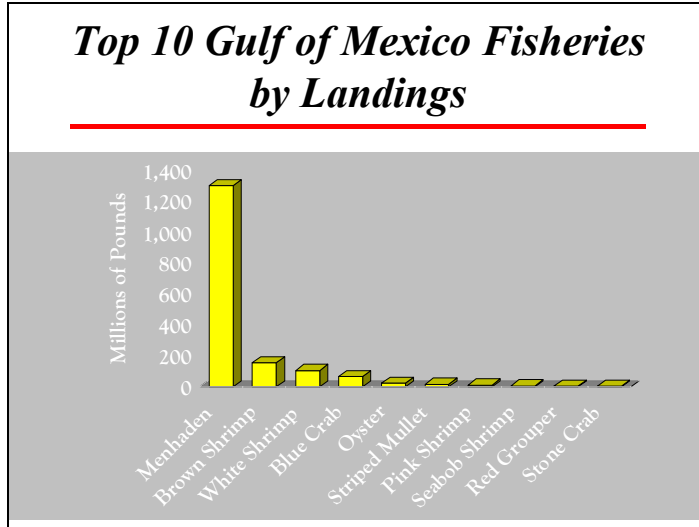
- **Bycatch- unintended capture of non-target species**
 - 30 million tons discarded each year in world fisheries compared to 85 million tons landed catch
 - Most bycatch consists of finfish and crustaceans; marine mammals, sea turtles, and seabirds also captured
 - Catch of marine mammals and sea turtles regulated by the Marine Mammals Protection Act and the Endangered Species Act, respectively

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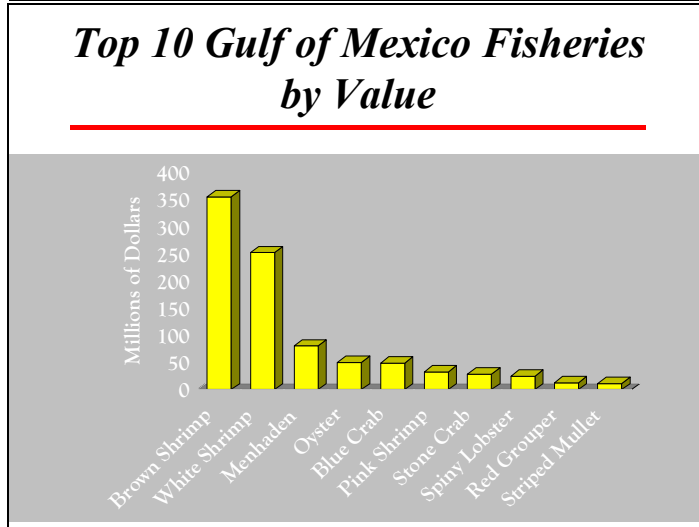
The Magnuson-Stevens Fishery Conservation and Management Act

- **Provides the tools to build sustainable fisheries and includes requirements to**
 - **Reduce bycatch,**
 - **Stop overfishing**
 - **Rebuild overfished stocks**
 - **Protect essential fish habitat**

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***The Next Slides Review Some of the
Important Fisheries in the Gulf of
Mexico***

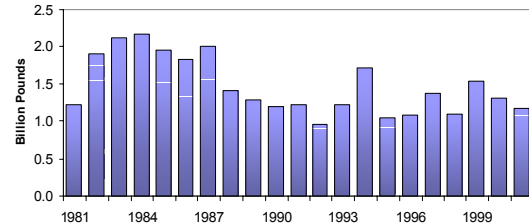
GULF MENHADEN

Menhaden is one of the oldest and the highest volume fishery in the Gulf of Mexico. Menhaden occupy coastal and estuarine waters and feed near the bottom of the food chain. Industrial processing of menhaden yields three products: fish meal, fish oil, and condensed fish solubles. Meal and solubles are used for animal feeds. Oil is used in edible products (Europe) and in marine lubricants and greases (US). Menhaden are also important as bait in crab fisheries.

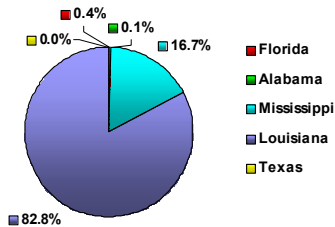
Primary Gear: Purse Seines, Gill Nets



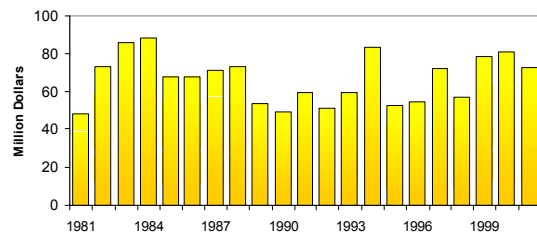
Menhaden Landings by Weight, Gulf of Mexico



Menhaden Landings, 1981 - 2001



Menhaden Landings by Dollar Value, Gulf of Mexico



TUNA

Early fishery dominated by the Japanese. With declaration of the 200 mile fishery conservation zone (FCZ) and later the exclusive economic zone (EEZ) American fishermen now harvest the total allowable catch

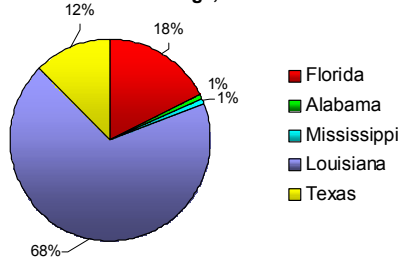
Primary Gear: Long Lines, Troll Lines, Purse Seines



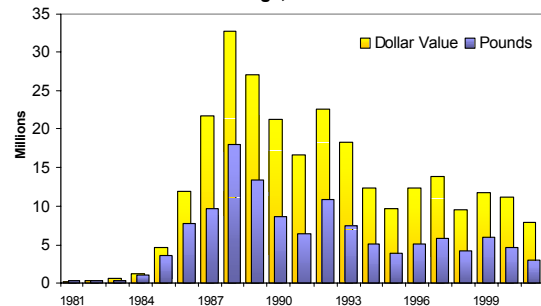
Species Include: Albacore, Bigeye, Blackfin, Bluefin, Little Tunny, Skipjack, Yellowfin



Tuna Landings, 1981 - 2001



Tuna Landings, Gulf of Mexico



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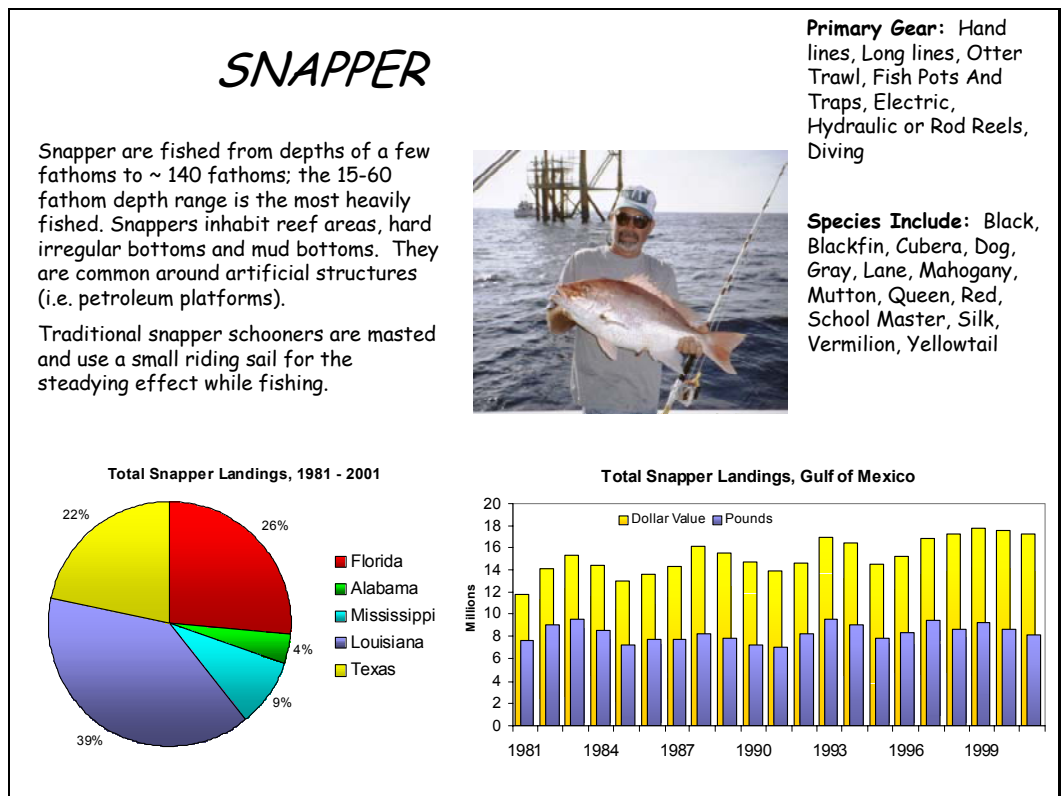
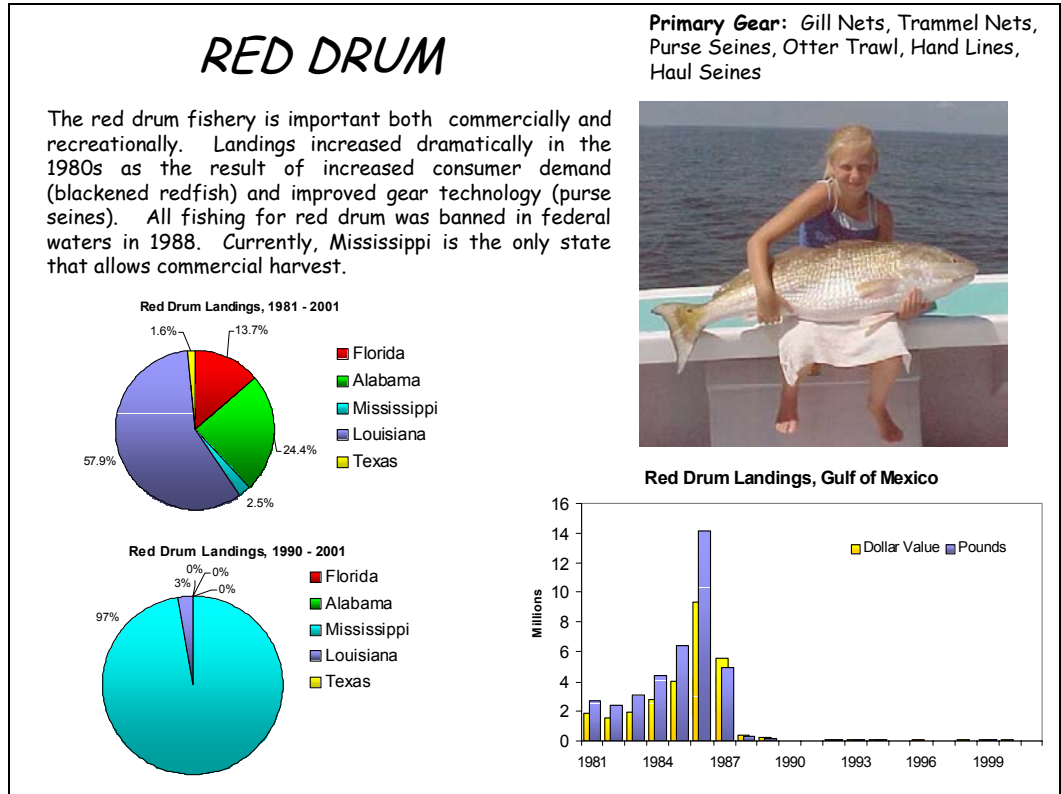
Little Tunny in Purse Seine



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Little Tunny Caught in Purse Seine





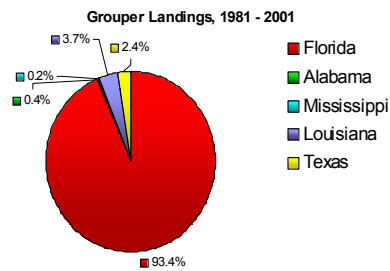
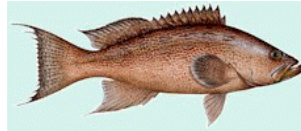
GROUPEL

Grouper are fished from depths of a few fathoms to ~ 140 fathoms; the 15-60 fathom depth range is the most heavily fished. Grouper inhabit reef areas, hard irregular bottoms. Grouper maintain close contact with the bottom and utilize holes and crevices for cover. They are common around artificial structures (i.e. petroleum platforms).

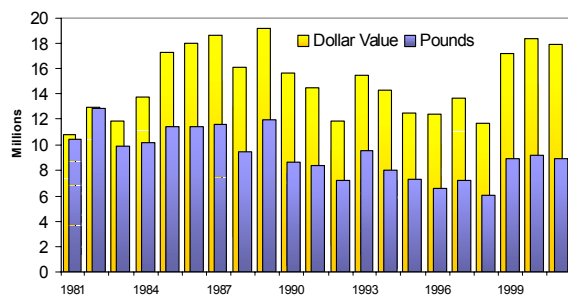


Primary Gear: Long Lines, Hand Lines, Pots And Traps, Electric or Hydraulic or Rod Reels, Otter Trawl Bottom, Diving Outfits

Species Include: Black, Marbled, Misty, Nassau, Red, Snowy, Warsaw, Yellowedge, Yellowfin



Grouper Landings, Gulf of Mexico

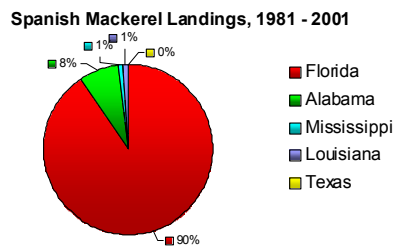


SPANISH MACKEREL

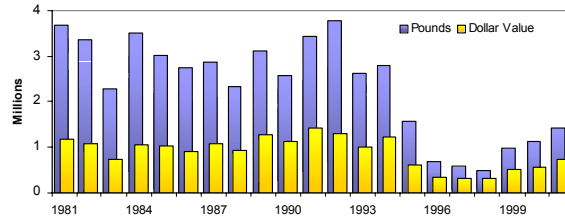
Spanish mackerel are fished both in and offshore with their center of abundance in Florida. Scientists were warning of elevated levels of mercury in these fish as early as 1976.

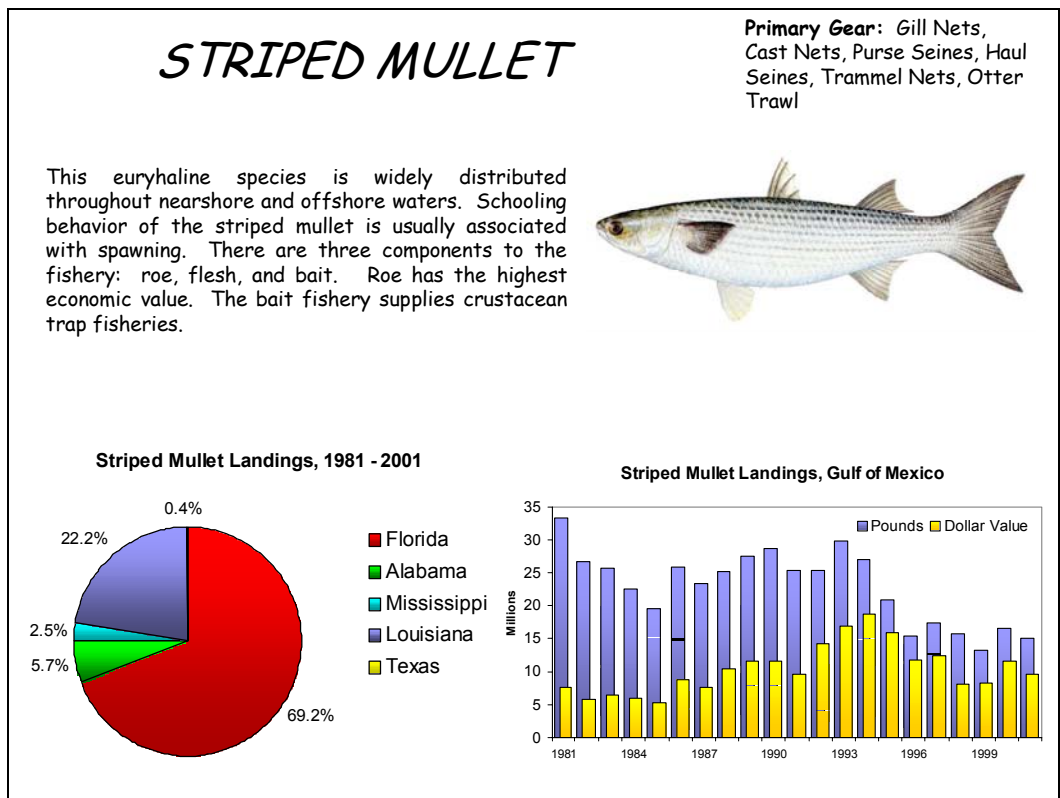
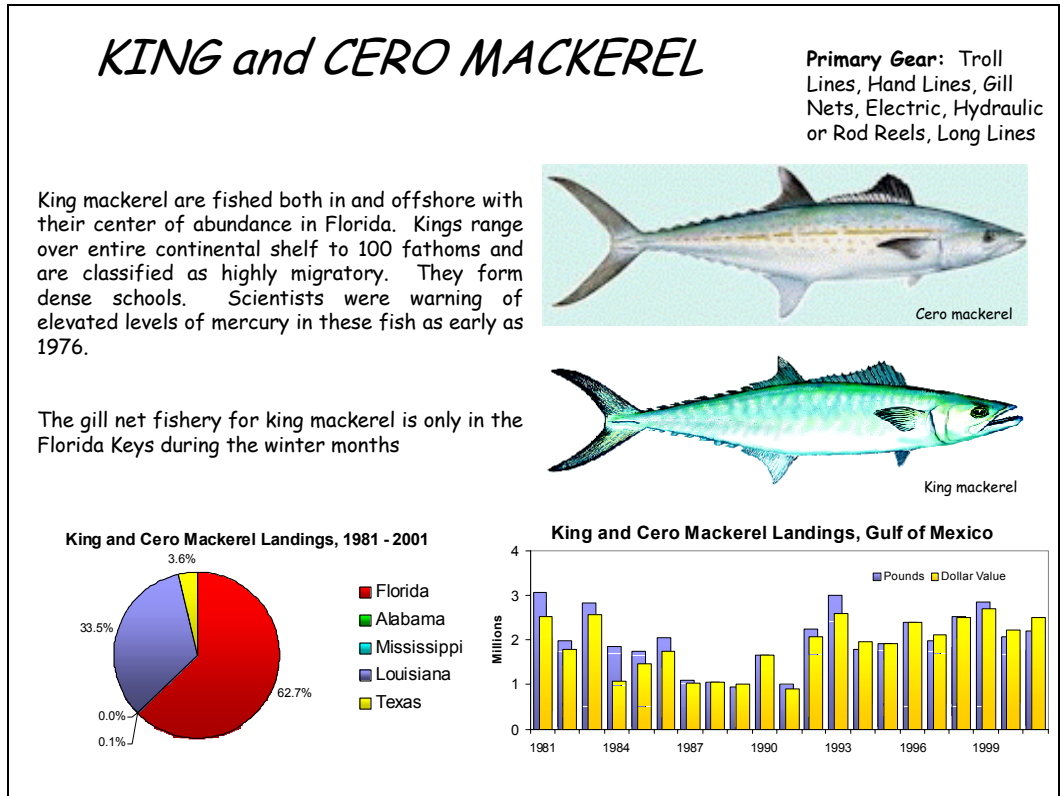
Landings dropped for Spanish mackerel during late nineties due to market demand change and the gill net ban in Florida.

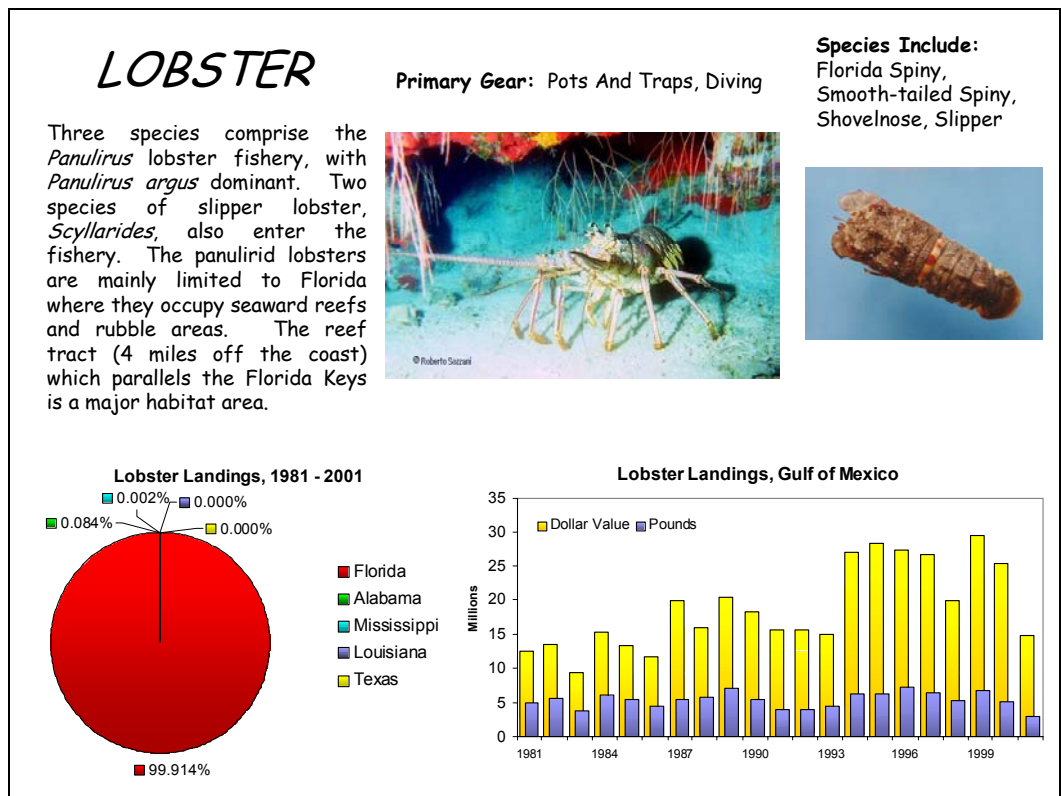
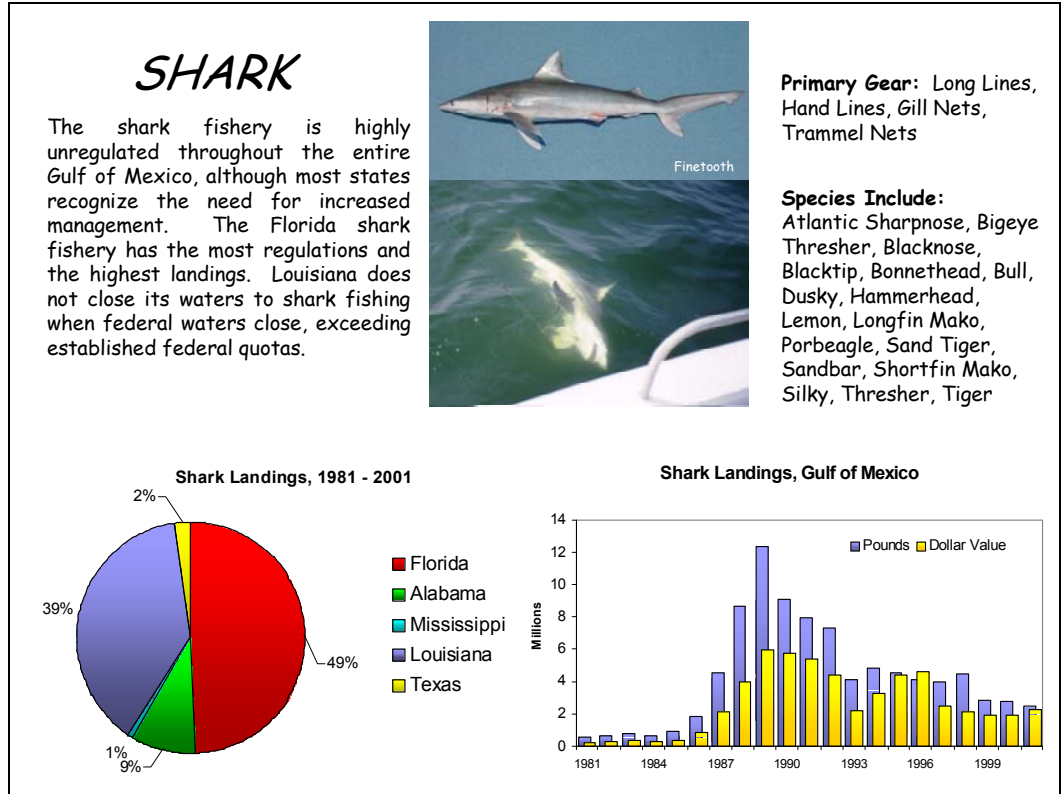
Primary Gear: Gill Nets, Hand Lines, Otter Trawl, Cast Nets, Haul Seines, Troll Lines, Purse Seines, Trammel Nets, Long Lines

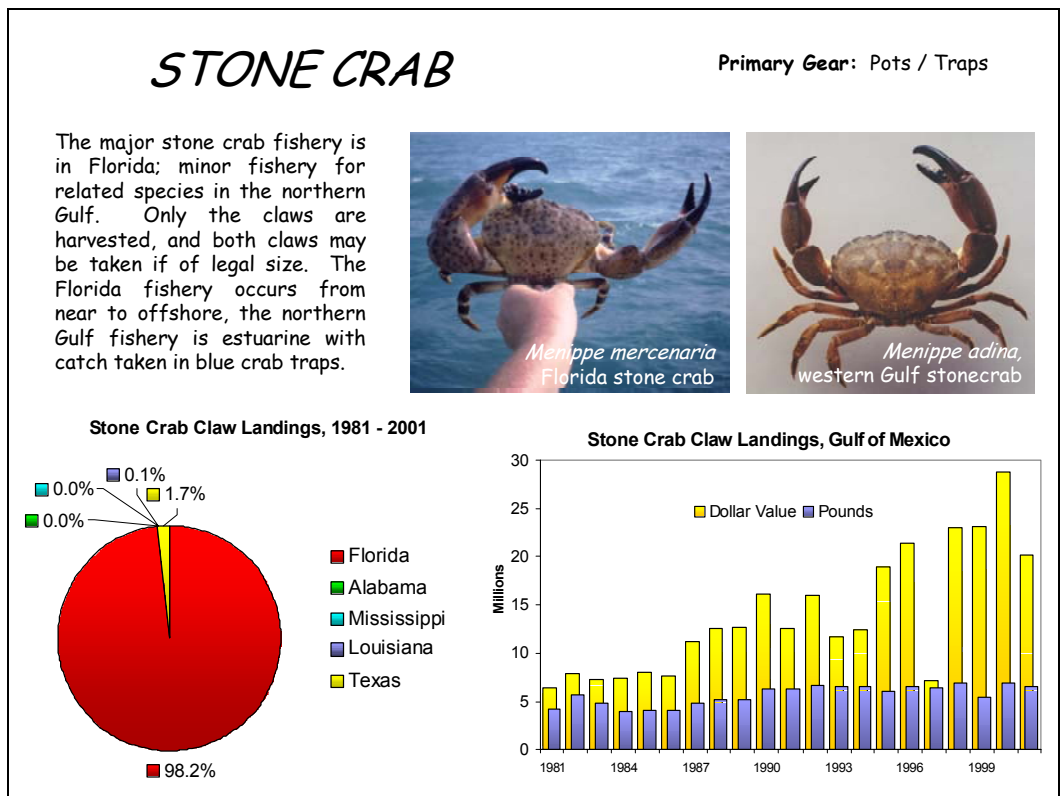
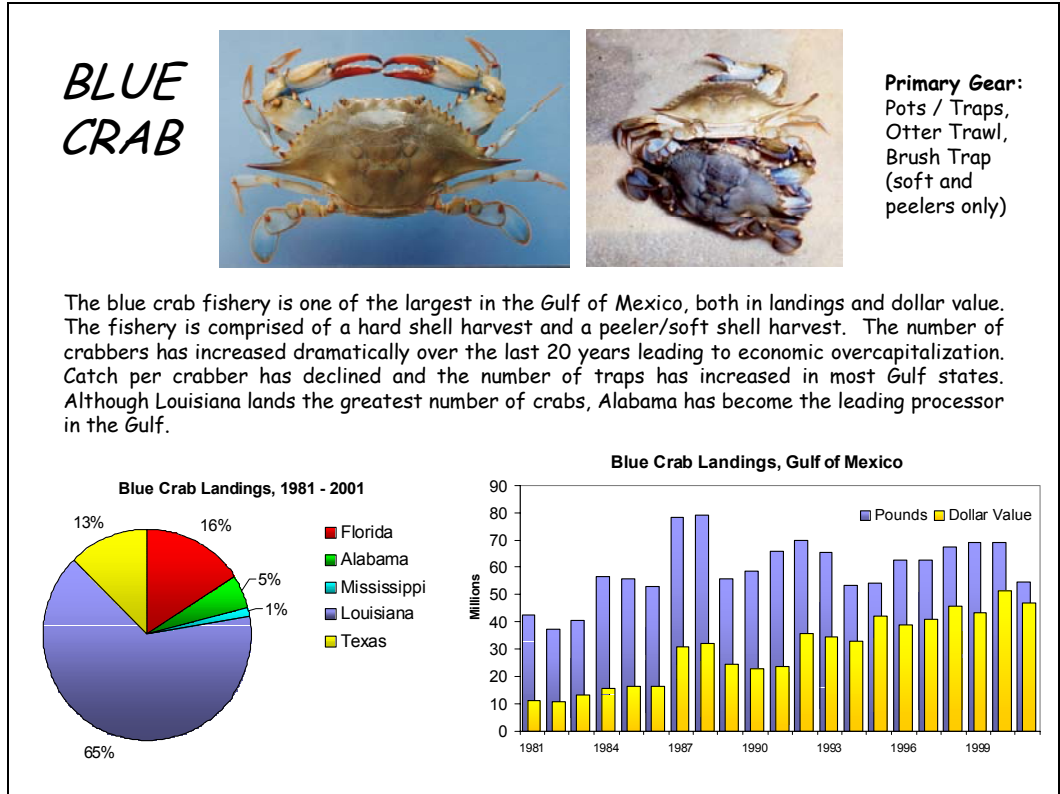


Spanish Mackerel Landings, Gulf of Mexico









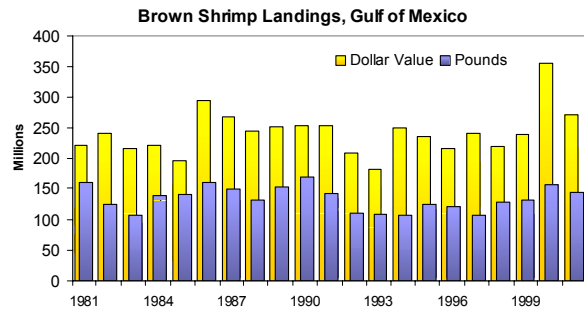
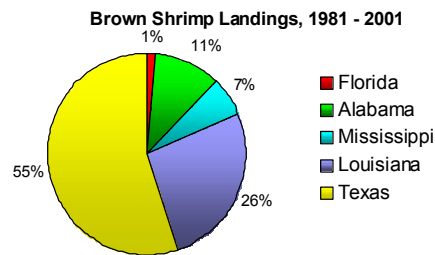
BROWN SHRIMP

Primary Gear: Otter Trawl, Butterfly Nets, Chopsticks, Beam Trawls, Cast Nets

The brown shrimp is the second most abundant species harvested in the Gulf and is the highest in dollar value. There is a bay and offshore fishery. The shrimp enter estuaries as postlarvae in March and April and grow to commercial size by June. Brown shrimp are nocturnal so most fishing is done at night.



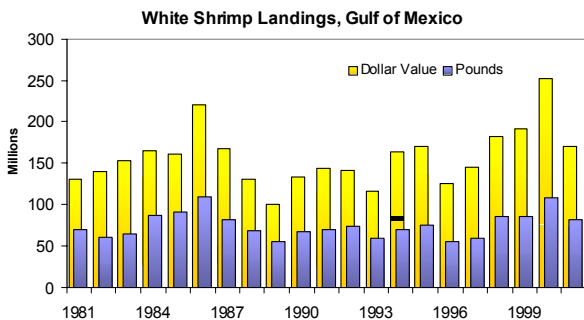
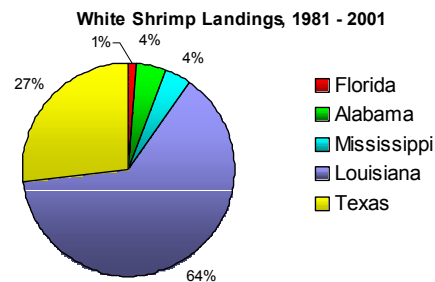
Highest offshore densities of brown shrimp between 15 and 30 fathoms. Brown shrimp show a definite preference for mud / silt bottoms.



WHITE SHRIMP

Primary Gear: Otter Trawl, Butterfly Nets, Chopsticks, Beam Trawls, Cast Nets

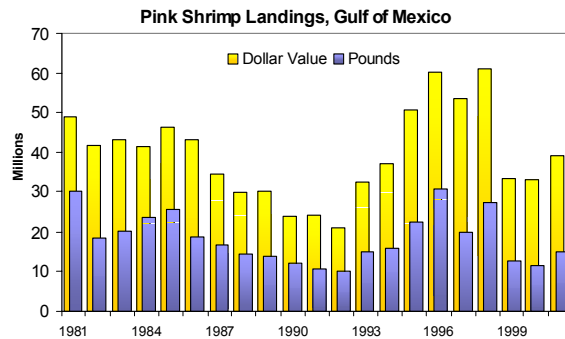
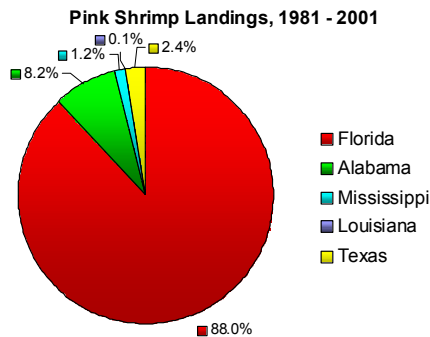
White shrimp follow brown shrimp in both landings and value in the Gulf. White shrimp extend to a depth just beyond 20 fathoms, rarely found deeper. White shrimp remain in estuaries longer than do brown shrimp. Adult white shrimp show a definite preference for mud / silt bottoms.



PINK SHRIMP

Primary Gear: Otter Trawl, Beam Trawls, Butterfly Nets, Chopsticks

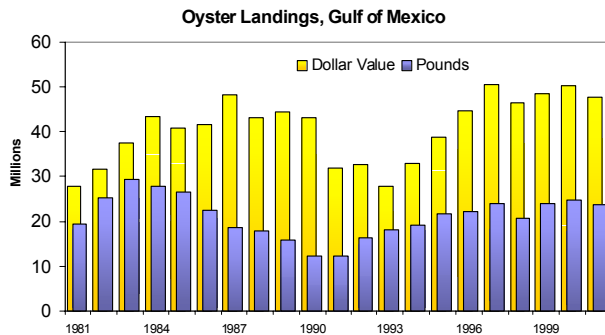
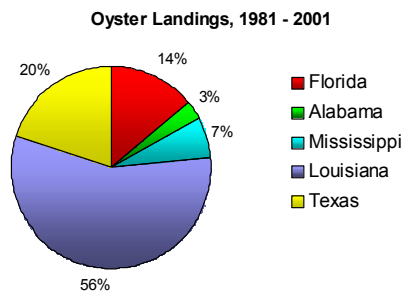
Pink shrimp form the smallest penaeid fishery with landings dominated by Florida. Greatest concentrations of pink shrimp are between 6 and 20 fathoms but are sometimes abundant deeper. Pink shrimp prefer sand, shell-sand, and coral-mud bottoms with moderate to high salinities.



EASTERN OYSTER

Primary Gear: Oyster Dredge, Tongs and Grabs


Eastern oysters are one the oldest Gulf harvests and were used extensively by the Indian tribes inhabiting coastal areas. This oyster, an intertidal/subtidal estuarine species, is able to tolerate wide ranges in temperature and salinity; however, successful setting and growth occur in intermediate salinities. Oysters exist in every major bay system along the Gulf of Mexico. Fishery closures occur when waters over the reefs contain high levels of coliform bacteria. Oysters are harvested year round in some states and seasonally in others. Reefs are either a common property resource or privately owned.



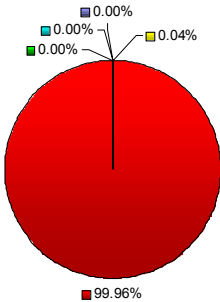
SCALLOPS

Primary Gear: Scallop Otter Trawl, Oyster Dredge
Species Include: Bay, Calico

The bay scallop fishery is very small and variable. It is considered an inshore/bay fishery and may only be harvested by hand or with dip nets. Calico scallops, a more offshore species, are subject to a protozoan parasite that can cause mass mortality. The fisheries are closely managed to prevent depletion of stocks.

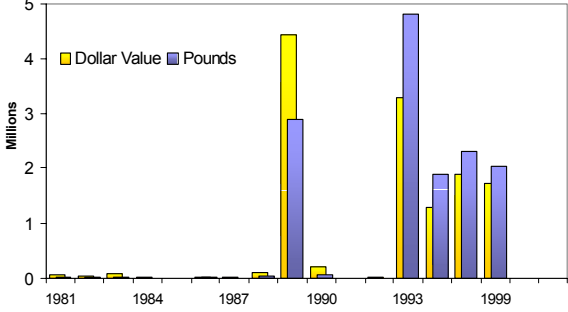


Scallop Landings, 1981 - 2001



State	Percentage
Florida	99.96%
Alabama	0.00%
Mississippi	0.00%
Louisiana	0.00%
Texas	0.04%

Scallop Landings, Gulf of Mexico



Year	Dollar Value (Millions)	Pounds (Millions)
1981	~0.1	~0.1
1984	~0.1	~0.1
1987	~0.1	~0.1
1988	~0.2	~0.2
1989	~4.5	~2.8
1990	~0.2	~0.2
1993	~3.2	~4.8
1994	~1.2	~1.8
1995	~1.8	~2.2
1999	~1.8	~2.0

Sponge Fishery of Florida

- The west coast of Florida is the only place sponges are commercially harvested in the United States.
- Five species harvested, first three most common-
 - Sheepswool
 - Yellow
 - Grass
 - Glove
 - Finger
- Tarpon Springs, FL, a community with Greek descendants, located the sponges off central Florida and began the fishery




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Overfished Species

- Species determined to be overfished according to the Gulf of Mexico Fishery Management Council and NMFS
 - Greater Amberjack
 - Red Snapper
 - Goliath Grouper
 - Nassau Grouper
 - Vermilion Snapper (approaching)

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The Next Series of Slides Review Fishing Methods Found in the Gulf of Mexico

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Fishing Methods

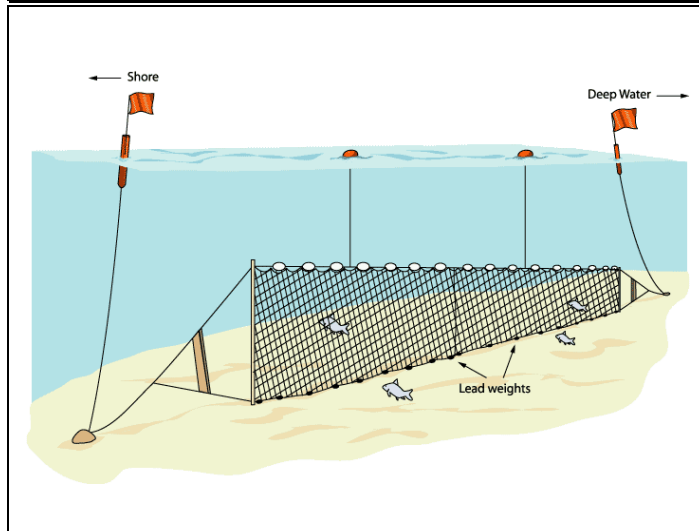
- **Active or Mobile – gear is towed or moved**
 - Otter trawls/beam trawls/midwater-trawls
 - Dredges/oyster and scallop
 - Purse seines
 - Trolling rigs/rod and reels/cast nets/gigs/haul seines
- **Passive – left in place and then retrieved**
 - Longlines
 - Pots/traps
 - Gillnets/trammel nets

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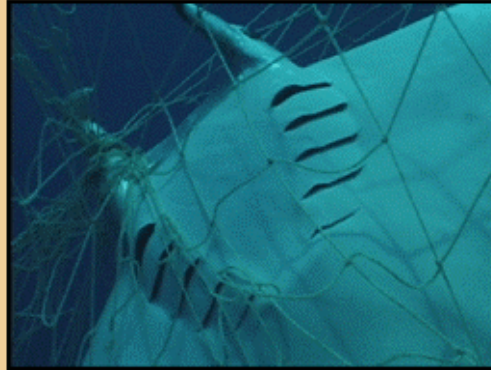
Gillnets

- **Anchored or free-floating; up to 1000' in length**
- **Fish swim into them and are caught by gills, tangled by teeth or spines, or become wedged with mesh around body**
- **Selective – size of mesh determines size of fish caught**
- **Can be fished at surface, mid-water, or bottom**
- **Newer nets designed to reflect sound waves and reduce catch of porpoises and other echo-locating species**

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Gillnet Bycatch



In the first net from the Tiburon Maco, checked 5.5 miles offshore, this manta was found entangled and dying. If it is verified that it was a Giant Pacific Manta killed in the Reserve, it will carry a \$10,000 fine.



This is one of over 150 sharks killed in the 2 mile long net of the Tiburon Maco on 5/3/00, while fishing 5.5 miles off the north end of San Benedicto Island in the Revillagigedo Marine Reserve.

Trammel Nets

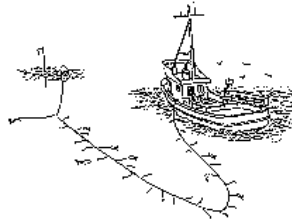
- Variation of gillnet with three layers of netting; small mesh inner panel sandwiched between two outer layers of net with larger mesh size
- Fishing technique and methods of capture similar to gillnet



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Longlines

- Fishing line with hooks attached along its length
- Can be fished at various depths with the use of individual floats that are attached to the main line by drop-lines; the length of the drop-lines determine depth fished
- For bottom longlines, the ends of the mainline are weighted



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Bottom Trawls

- **Trawl boards or “doors” spread net mouth and keep it open horizontally**
- **Headline has floats to open trawl vertically**

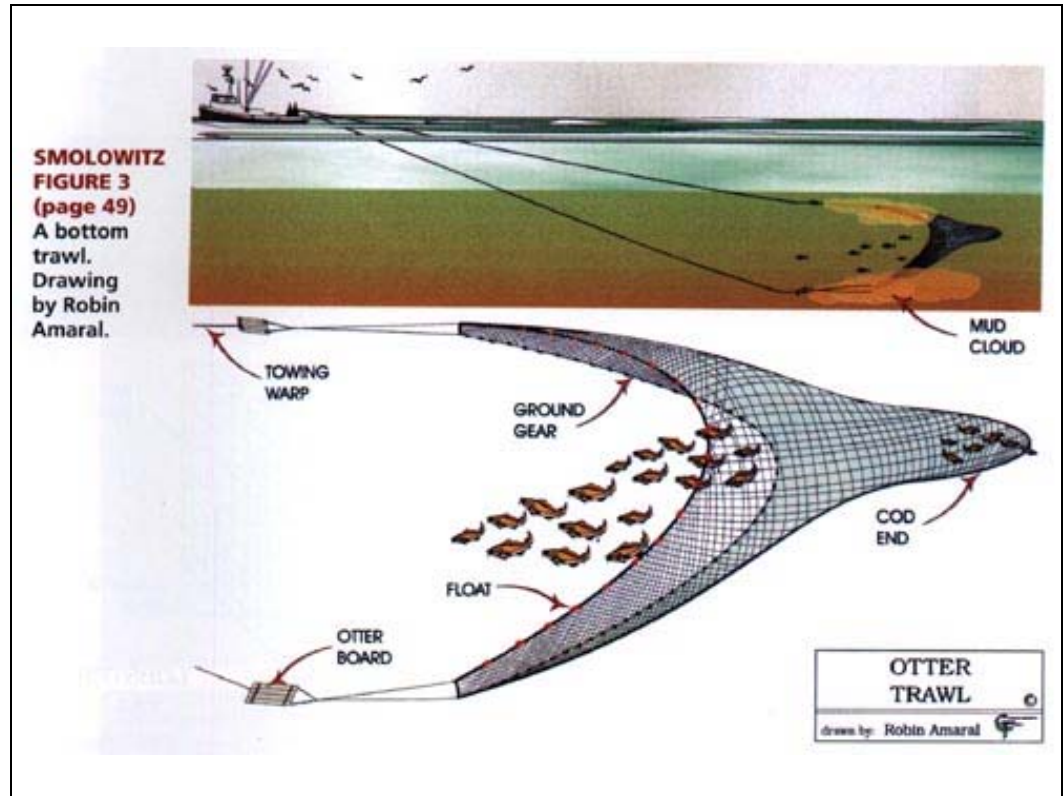


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Bottom Trawls

- **Bottom footrope usually weighted with steel bobbins or chain**
- **Can be equipped with rubber discs or rollers to ride over bottom obstructions**
- **Catch funneled into codend which is usually covered with heavy mesh or chafing**
- **Trawl with catch can weigh thousands of kg**

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Shrimp Fishery - Gulf of Mexico

- **25,000 vessels; vessel size variable**
- **4-5 million hours of fishing effort per year**



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Shrimp Fishery - Gulf of Mexico

- **Finfish bycatch high**
 - 115 species caught
 - Estimated ratios of bycatch to landed shrimp range from 2:1 to 10:1
 - Estimated catch from 9-46 billion fish/year
 - Bycatch primarily croaker, seatrout, longspine porgy, spot
 - 41 million red snapper caught annually



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Shrimp Fishery - TEDs

- **Sea turtle mortality high before introduction of Turtle Excluder Device**
- **Annual estimates of mortalities**
 - = 5,000 to 50,000 loggerheads
 - = 500 to 5,000 Kemp's ridleys
- **Use of TED's and protection of nesting areas has helped populations recover**

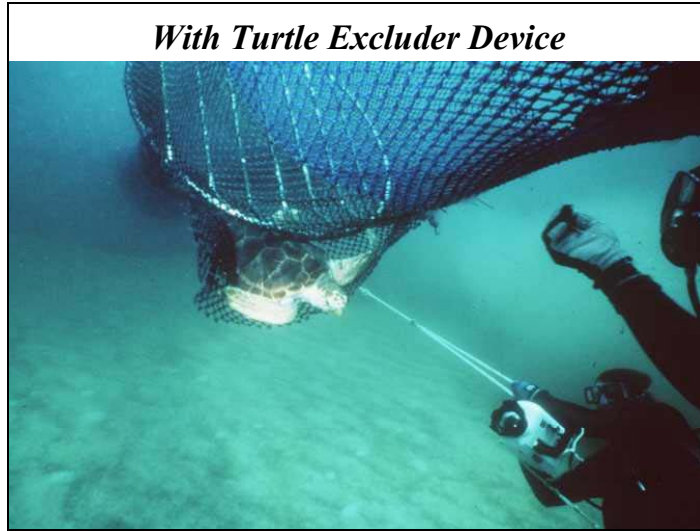


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Without Turtle Excluder Device



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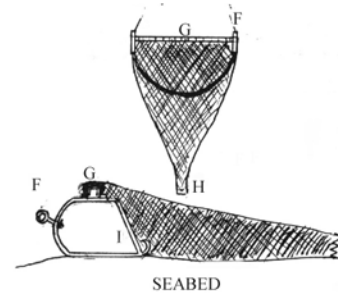
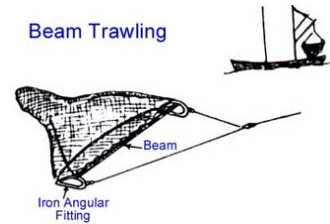


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Beam Trawls

- Net mouth held open by a steel beam instead of boards
- Beam may be fitted with chains
- Can be pulled in mid-water or as a bottom attached

Beam Trawling



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Purse Seines/Menhaden

- Spotter aircraft are used to locate schools of menhaden



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Purse Seines/Menhaden

- Seine is set by two purse or strike boats with a net stretched between them



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Purse Seines/Menhaden



- Fish school is encircled



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Purse Seines/Menhaden

- ...and the bottom of the net is closed to form a purse or bag



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Purse Seines/Menhaden


- Mother ship comes alongside and pumps fish from the seine into refrigerated holds



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Scallop and Oyster Dredges

- **Steel frames that have fiber or metal chain mesh bags**
- **Designed to dig into surface layers of the seabed and sift out target species**
- **Hydraulic dredges not used in Gulf**



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Oyster Tongs

- Tongs resemble two rakes attached by long poles
- The rakes scrape or “pick” the oysters off the reef



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W. Henry 2001

Lobster Traps

Rectangular wooden or plastic traps with entrance funnel at the top; fished inshore to depths of 200 feet

Traps have a poured concrete bottom and are heavily weighted

The image is split into two parts. The top part shows a large stack of wooden lobster traps, which are rectangular frames with a mesh top. A palm tree is visible in the background. The bottom part shows a view of many lobster traps floating in the water, connected by ropes. The traps are arranged in long rows, and the water is calm.

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Stone Crab Traps

Square or rectangular wooden or plastic traps with entrance funnel at the top, some plastic traps trapezoidal in shape. Traps have a poured concrete bottom and are heavily weighted.



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Blue Crab Traps

- Hexagonal or square mesh vinyl-coated wire traps with two or more entrance funnels along the bottom; fished inshore



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Bushline / Brush Trap

- Bundles of wax myrtle are fastened to a long line and fished for premolt or peeler crabs
- Crabs ready to shed seek shelter and move into the bundles
- Unique fishery to Louisiana

