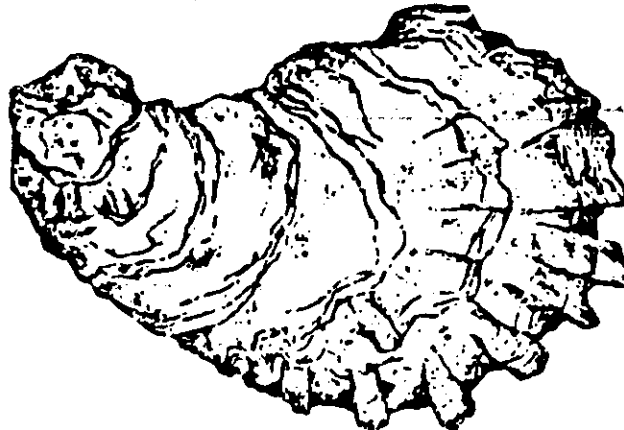




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SEA GRANT PROGRAM



LAGNIAPPE

CAERNARVON FRESHWATER DIVERSION EFFECTS

The diversion of freshwater and sediments from the Mississippi River is widely viewed as one of the most effective tools in reversing the loss of coastal marshlands. River waters are fresh and much of Louisiana's wetlands are brackish or salt marshes. The diversion of river water into these marshes will change salinities and therefore the fisheries of these areas. How large these changes will be has been the subject of some debate.

Several freshwater diversion projects are currently in operation, the largest of which is at Caernarvon on the east bank of the Mississippi River. Recently, the agencies involved in the Caernarvon Project released a report on the first three years of operation of the project. The report summarizes the results of biological monitoring for the three years (1988-90) before the diversion began operating, and the four years after (1991-1994), and compares the two periods. I will summarize the report's results for salinity and oyster changes.

Salinity

As could be expected, the Caernarvon Diversion did impact salinity levels in the area. Flows of 3000 cubic feet per second for 10 days or more freshened the area out to Bay Gardene and western Black Bay. Open-water areas did not experience as much

salinity reduction. Eastern Black Bay and California Bay remained saltier than inside marsh areas.

Even when the diversion was operated at its full 8000 cubic feet per second level, the flow could not entirely overcome natural factors such as low rainfall or strong winds that increase salinity. On the open waters of the public oyster seed ground, salinity levels moved up and down a great deal.

Oysters

The effects of the Caernarvon Diversion on oysters was measured five ways, survival, growth, spat set, seed oyster availability, and sack oyster availability.

To measure survival, oysters were placed in trays at various stations throughout the area affected by the diversion. Across the board, oyster mortality (death) was lower in the 1988-1990 period before the project was built (preconstruction), than the 1991-1994 period after the project was built (postconstruction). During the preconstruction period, oyster mortality was gradual through the year and ranged from 13 to 14% by the end of the year. During the postconstruction period annual oyster mortality ranged from 31 to 80%. Areas closest to the diversion had the highest mortalities. Wherever salinities were lowest for long periods of time, oyster mortalities were highest.

In order to measure oyster growth in the preconstruction and postconstruction periods, the oysters placed in the trays were measured every 3 months. The results showed growth rates were higher in the preconstruction period than the postconstruction period. The growth rates were lowest in the areas with the highest mortalities due to low salinity during the postconstruction period. Interestingly, during the preconstruction period, salinity did not seem to be the biggest factor in oyster growth. Rather, it seems that other factors such as food supply, currents, and water temperatures were more important.

Spat are baby oysters, 2 to 3 weeks old, that have settled on hard surfaces to grow. The results of the research on oyster spat set did not produce any conclusions. Some of the plates set out to sample spatfall had very little, but the reefs themselves produced a large number of seed oysters, and vice versa. Previous research by other scientists also indicated sampling spatfall does not provide a good guide to the later production of seed oysters.

Seed oysters are small oysters that are too small to harvest for sale, but rather are harvested by oystermen to be moved to other areas for growth to reach sack oyster size. Previous research has shown peaks in seed oyster availability in the year following a freshwater flood year.

	YEAR	BARRELS
Before and after monitoring of the public seed grounds near the diversion showed the expected results. Since salinity influences on seed oyster availability involves a one year delay, the post-construction period is considered to be the years of 1992 to 1994. Total seed oyster availability in the postconstruction period was 12 times as high in the preconstruction period. It should be noted, however that the high oyster seed availability in 1992 (46 times the average for the previous 4 years) could not have been caused by the Caernarvon Project, since no water was diverted in 1991 until August, and then was limited to low flows until November. Seed oyster availability decreased in 1993, and then peaked in 1994. In addition to the increase, low salinities caused an eastward shift in seed oyster production, where dormant reefs once again began to produce seed.	1988	14,309
	1989	13,031
	1990	38,870
	1991	40,977
	1992	1,242,598
	1993	701,772
	1994	2,979,946

Sack oysters are marketable sized oysters. Since sack oysters take another year to produce, only 1993 and 1994 can be considered postconstruction years when measuring the diversion's effects on production. The annual average for 1993-1994 was more than 17 times the average for 1988-1992.

An eastward and slightly northward shift in sack oyster production was also noted. This was partly due to a Louisiana Department of Health and Hospitals (LDHH) harvest closure on private reefs, which are located generally closer to the diversion. The increase in fecal coliform bacteria (and lower salinities) began in late 1990 and early 1991, before the diversion structure was operated.

Coliform bacteria levels continued to increase in postconstruction years. It is difficult to link the diversion directly to those high fecal coliform bacteria numbers, as levels were actually higher in the marsh near the diversion than in the Mississippi River itself. The report speculates that these high coliform levels are most likely due to an increase in waterfowl, nutria, and muskrat populations. The lowered salinities may also have allowed any coliform bacteria present to live much longer than they would have in saltier waters. By November, 1994, LDHH was forced to close to oyster harvest the largest area in Breton Basin history.

In summary, the shift in area of oyster production moved production away from oyster farmers' leases toward public oyster grounds. Oyster harvest increased strongly in the postconstruction period. The increased numbers of oysters more than offset slower growth and higher mortalities in some areas in the basin.

This report also contains sections on shrimp, blue crabs, several species of finfish, as well as muskrats and alligators. Anyone wishing to obtain a copy of the report to read for themselves may do by writing the U. S. Army Corps of Engineers, New Orleans District. P O Box 60267. New Orleans, LA 70060-0267. Attention CEMVN - PD - RP.

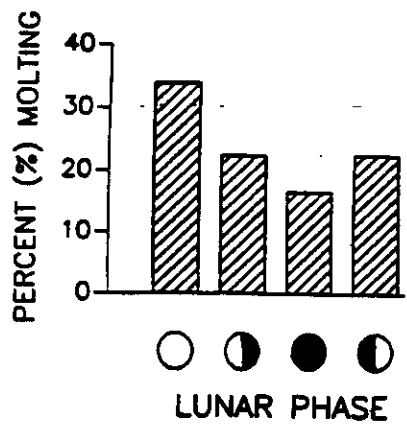
Source: *Caernarvon Freshwater Diversion Structure Biological Monitoring Program Postconstruction Report*. U. S. Army Corps of Engineers, Louisiana Department of Wildlife and Fisheries, and Louisiana Department of Natural Resources.

RESEARCH ON CRAB SHEDDING

Blue crabs shed (molt) their hard shells over 30 times in their lifetime in order to grow. While in the softshell stage, crabs have no defense against fish and other predators, except to hide from them. Researchers in Chesapeake Bay sampled crabs in underwater grass beds and on open bottoms to see if crabs used grass beds as shelter when shedding. Their results showed that blue crabs do indeed seek shelter during this period.

In grass beds, 54% of the sampled were very near shedding or had just shed their shells. On open bottoms, only 24% of the crabs sampled were in these stages.

Their research also showed that crabs do shed (molt) by the moon. The graph on the right shows that the highest percentage of crabs shed on the full moon and the lowest percentage on the new or black moon. Blue crabs feed heavily until they fill their shells with meat. Since their shells cannot stretch like skin, they must shed their old smaller shell for a new larger one. Immediately after shedding, the new larger shell only contains the meat of smaller shell. This crab is a "kite" or "clear crab." The crab will then feed and gradually fill the new shell with meat, and start the shedding process again.



Source: *Utilization of a Seagrass Meadow and Tidal Marsh Creek by Blue Crabs Callinectes sapidus. II. Spatial and Temporal Patterns of Molting*. Clifford H. Ryer, Jaques Van Montfrans, and Robert J. Orth. *Bulletin of Marine Science*, 46(1): 95-104.1990.

FROGGING SEASON CLOSED

Even though Louisiana has had an annual closed season on bullfrogs for several years, a lot of people are still not aware of it. In 1997, Wildlife and Fisheries enforcement agents made 23 cases of frogging during closed season during the month of May. Each year, frogging season closes during the months of April and May and reopens at 12:01 a.m. on June 1. Frogs may be harvested with frog grab or gigs, including those that break the skin. Possession of firearms while hunting or taking frogs is prohibited.

MORE ON RED SNAPPERS AND BYCATCH

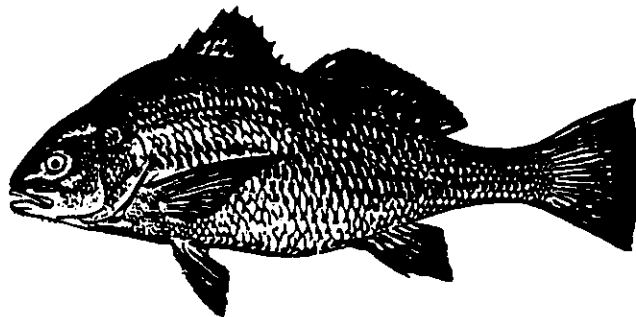
Last month's newsletter explained part of the dilemma concerning red snapper management in the Gulf. It has gotten more complicated. I have been informed that the state of Florida has notified the National Marine Fisheries Service (NMFS) that they plan to sue them for failure to put Amendment 9 to the Reef Fish Fishery Management Plan into effect.

This is the amendment that would require the use of bycatch reduction devices (BRDs) in offshore shrimp trawls, primarily to release small red snapper. The amendment has been approved by the Gulf of Mexico Fishery Management Council for months, but action by the U. S. Department of Commerce to put the amendment into effect has not taken place.

The state of Florida has also informed the Gulf Council that it wants to take over all fisheries management (including red snapper) in federal waters off of their coast. This is not as unusual of an idea as it sounds, since Florida already has a similar agreement with the Feds on lobster and stone crab.

BLACK DRUM PREDATION ON OYSTERS

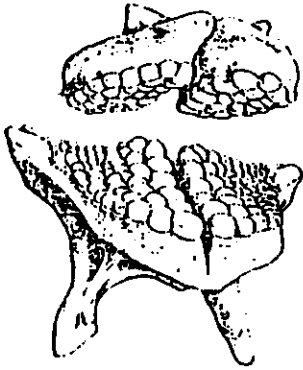
At the Louisiana Oyster Industry Convention and Gulf Oyster Initiative Workshop held in Kenner in March, oyster predation by black drum was the subject of a great deal of interest. According to the oyster farmers present, large schools of black drum cause very heavy losses of seed oysters after they are transplanted to growing grounds.



Scientific research seems to support this belief strongly. Young black drum under 8 inches long feed mostly on marine worms and small fish. After 8 inches, they switch their diet to mollusks such as oysters, clams, and mussels. Research has shown that drum captured from oyster reef areas prefer to eat oysters over clams and mussels. Research in 1955 named black drum as the number one predator of planted oysters in Terrebonne Parish.

More recent research shows that black drum average consuming one oyster per pound of body weight per day. A 20 pound drum averages eating 20 oysters per day! Over the course of the year this can be a substantial amount of oysters, especially when one considers the large number of drum present in coastal Louisiana. At the height of the gill net fishery, almost 11 million pounds of black drum were harvested by commercial

and recreational fishermen combined. Current harvest (1996) is less than 3 million pounds due to gear limitations and other restrictions.



Feeding black drum swim with their heads slightly lowered, drifting their barbels (chin whiskers) over possible food items. When the barbels touch a possible food item, the drum stops swimming and inhales in the food item by creating a suction with its gill covers and mouth. The drum slowly swims forward while crushing the food item with its massive pharyngeal teeth shown at left. As the food item is crushed, small shell particles fall from the drum's gills. After finishing, the drum ejects the rest of the shell from its mouth. Black drum can break apart and crush oyster clusters, but seem to select singles for ease of feeding.

At the convention and workshop, a researcher with the LSU Coastal Fisheries Institute, Dr. David Stanley, discussed two methods of controlling black drum predation on oysters—sonic deterrents and increased drum harvest. Stanley concluded that sonic deterrents (noise makers that scare fish) have some use under certain conditions, such as at water intakes for power plants and at decommissioned oil platforms before explosives are used to remove them.

He did conclude that sonic deterrents would not work well on oyster leases because of their high cost (over \$100,000 per lease), the delicacy of the equipment, and that they would not likely keep black drum from all but a very small area. He also pointed out that fish get used to the sounds after a period of time and that the equipment may lose its effectiveness.

Reducing black drum numbers with increased harvest was also discussed by Stanley. He concluded that increased drum harvest is highly unlikely due to the elimination of the use of gill nets. Members of the audience questioned Stanley about the possibility of a regulated strike net fishery targeting black drum. Stanley answered that only the state legislature could create such a fishery.

Sources: *Evaluating the Potential Effectiveness of Sonic Deterrents and Review of Black Drum Harvest in Louisiana*. David Stanley. Coastal Fisheries Institute CCEER, Louisiana State University. *Predator-Prey Relationships Involving the American Oyster, Crassostrea virginica and the Black Drum, Pogonias cromis in Mississippi Sound*. R. Neil Cave. Masters Thesis. University of Southeastern Louisiana. 1978. 43pp.

NEW LIMITS FOR FALSE RIVER BASS

The Wildlife and Fisheries Commission has approved a 14-inch minimum size limit and 5 per day creel limit on black bass in False River. The regulations replace the 15 to 19 inch slot limit and 8 per day creel limit. The change was due to Department of Wildlife and Fisheries research that indicated that environmental and habitat problems were affecting False River bass negatively.

The new plan should allow bass in the lake to spawn at least once before they are harvested and should increase the survival of one and two-year old bass. Department biologists do not believe that False River will return to its former highly productive condition until the habitat problems have been corrected.

HYPOXIA

Hypoxia, a condition where very little oxygen exists in water, is becoming the subject of national attention. What is often called the "Dead Zone" in the Gulf of Mexico is an hypoxic area.

At a recent workshop *Effects of Hypoxia on Living Resources in the Northern Gulf of Mexico*, coordinated by Dr. Nancy Rabalais of LUMCON (Louisiana Universities Marine Consortium), scientists from around the U. S. and the world presented their views on hypoxia.

- * Periods of extremely low oxygen (hypoxic events) in marine waters are not just found in the Gulf of Mexico, but are occurring worldwide. The scientists at the workshop linked increasing hypoxia to the human-caused increases in discharges of nutrients by rivers. These nutrients cause microscopic floating algae (phytoplankton) to produce large spurts of growth, followed by die-backs that result in oxygen depletion.
- * Research in other parts of the world indicates that if conditions causing a **seasonal hypoxic event** are not corrected, that they may progressively lead to **permanent hypoxia**, which may give way to **permanent anoxia** (no oxygen).
- * Research in the Baltic, Yellow, Black, Mediterranean, and Adriatic Seas has shown a change in fisheries associated with increased nutrient levels. Generally speaking, the more valuable demersal (bottomfish) resources have declined and less valuable (open-water) pelagic plankton-feeding fish have increased in these areas. In the Black Sea, a 50% decline in valuable demersal resources has occurred since the 1960's. Of 26 such fisheries conducted in the 1960's, only 6 still exist. Examples of demersal shelf species in the Gulf of Mexico are snapper, grouper, croaker, flounder, and

sea trout. Examples of pelagic plankton-feeders are menhaden (pogies), and herring. All of the seas studied showed an increase in fisheries production, rather than a decrease, but harvest shifted to species that are less valuable to fishermen.

- * Global warming may likely lead to more hypoxia, as may population growth and improved human standards of living. The connection between activities on land and their effects on oceans are not fully understood or appreciated.

COASTAL WETLANDS WORKSHOPS

The Coalition to Restore Coastal Louisiana has announced its Spring, 1998 Coastal Wetlands Workshops. The Chenier Plain Workshop will take place on **May 9, 1998** in Creole, LA. Participants will visit and learn about coastal cheniers and beaches, the Cameron Prairie National Wildlife Refuge, the Cameron Creole Watershed Project and the wetland ecosystem of western Louisiana.

This workshop will be followed by the Barataria Basin Workshop in Westwego on **June 6, 1998**. Emphasis here will be on freshwater marshes and swamps, Bayou Segnette Waterway and State Park, Historic Salaville and Westwego Canal, the Jefferson Parish Christmas tree/marsh restoration project and the Jean Lafitte National Historical Park and Preserve's Barataria Unit.

Both workshops will include field trips by boat, land tours, speaker presentations and question and answer sessions. Lunch and an afternoon reception are included. Cost is \$45 per person. Educator discounts are offered.

For registration or information, call toll free 1-888-522-6278.

CLEAN WATERS MEAN CLEAN SEAFOOD

Seafood is important to the economy and culture of Louisiana. Clean productive waters are important for seafood production. In an effort to keep our waters clean, Carolyn Kass Falgout of the Jefferson Parish Marine Fisheries Advisory Board has taken on a campaign to keep human sewage wastes out of our waters.

Falgout, an oyster farmer, says that while the oyster industry is the first to feel the effects of the dumping of human wastes from boats, all fisheries should be concerned. Falgout will be working with waterside marine-related businesses to assist them in getting up to 75% of the cost of vessel dump station facilities paid for with grant funds. These grants, available through the Louisiana Clean Vessel Act, will apply to the purchase and installation of pumpout equipment, dump stations for portable toilets, holding tanks, and necessary electrical and plumbing work.

Items that can't be funded are dock and bulkhead construction, sewage treatment plants, and on-shore restrooms. The only requirements are that the facilities must be available to all boaters and that no more than \$5 can be charged per pumpout.

Falgout says that holding tanks on boats can be professionally designed or as simple as a 5 gallon bucket with a lid. The problem for responsible boaters is that they presently have very few places to dump their bucket or pump out their tank.

She states that seafood docks, fuel docks, public and private boat launches, docks, and marinas, and any other waterside marine business should be interested. Falgout further says "Business people should be leaders to improve conditions in their community. Wholesome seafood is everyone's business, and having a pumpout/dump facility can also be good for business."

Falgout will be directly contacting businesses and local governments in Jefferson Parish during the next two months. She plans to expand this effort to other parishes later this year.

Anyone interested in information on this program may call Falgout at 340-3900, 504/ 748-7053, or 504/747-7001 (car phone).

LOUISIANA FINFISH STOCK ASSESSMENTS

Act 1316 of the 1995 Louisiana Legislature requires that the Louisiana Wildlife and Fisheries Commission shall deliver to the legislature each year, a peer-reviewed report on the biological condition of mullet, black drum, sheepshead, and flounder.

The act further requires that if the spawning potential ratio (SPR) of any of these fish is below 30%, that the Department of Wildlife and Fisheries must close the season for that fish for one year. SPR is the ratio of the egg-producing ability of all the mature fish in a fished stock of fish as compared to the egg producing ability that would exist if the stock was unfished. SPRs are often used as targets for managing stocks of fish. Listed below are this year's results:

Striped Mullet	34% - 66% SPR
Black Drum	42% - 67% SPR
Sheepshead	42% - 72% SPR
Flounder	28% - 64% SPR

ANTI-TRAPPING LAWSUIT

The latest round in the fight that animal-rights groups are waging to stop fur trapping took place in Missouri this winter. There, the Animal Legal Defense Fund (from San Rafael, California), the Humane Society of the United States, based in Washington,

D. C., and the St. Louis Animal Rights Team sued the State of Missouri to prevent Missouri trappers from selling otter pelts.

Missouri Department of Conservation biologists produced good biological evidence that otters were well managed and that trapping was an effective management tool. As a result, the U. S. district court in Washington D. C. dismissed the suit saying the animal rights groups had failed to make their case.

At one time, fur trapping was more important than commercial fishing to many coastal Louisianans. While demand for fur and prices are still down, there are hopeful signs that fur prices will increase.

Source: Missouri Conservationist. Missouri Department of Conservation. February, 1998.

HOW GREEN WILL YOUR OUTBOARD MOTOR BE?

Green is the color that environmental groups (and even a political party in Germany) use to represent environmental friendliness. Traditional two-stroke outboard motors have long been considered to be very environmentally unfriendly.

This is because they exhaust very high levels of unburned fuel (hydrocarbon emissions). Unburned fuel escapes through the open exhaust port as the incoming charge of air and fuel enters the combustion chamber. At low speeds, up to 40% of the fuel may escape unburned. Even at high speeds, 8% of the fuel may escape unburned. Two-stroke outboards have remained popular because they are inexpensive to build, lightweight, and powerful. They reach high or maximum rpm quickly, allowing the boat to "get out of the hole" or plane quickly.

This year marks the beginning of the Environmental Protection Agency (EPA) cleanup of outboard motor emissions. Under this plan, outboard exhaust emissions must be reduced by 75% by the year 2006. The regulations are gradual, with targets for each year. For 1998, the target is a 9% drop in average emissions overall on new outboards sold.

Outboard manufacturers can average emissions on all of their outboards sold. This means that while some companies will eventually discontinue producing much of their line of traditional two-strokes, many of them are still available now. This year, new outboard motor buyers will have several options in most horsepower categories: traditional two-stroke, direct fuel injection two-stroke, and four-stroke.

Direct fuel injection (DFI) two-strokes are an idea that a couple of manufacturers are working hard on. DFI injects fuel directly into the combustion chamber **after** the exhaust port is closed. Only fresh air and a very small amount of oil push the exhaust

out of the combustion chamber. DFI is built to deliver just the right amount of fuel for any engine load. DFI fuel economy may be up to 80% better than a traditional two-stroke at low rpm and 10-25% better at high speeds. The performance of the traditional two-stroke is still there.

DFI two-strokes are more complicated, however. This translates into higher construction costs and, of course, higher prices. A buyer can expect to pay 10-15% more for a DFI outboard than a traditional motor of equal power.

Four-stroke technology has been around for some time, but only recently has been refined. Four-strokes produce low hydrocarbon emissions because they use moving valves to seal the emission chamber and no unburned fuel escapes in the exhaust. Lubricating oil is stored in a crankcase like in an automobile engine, rather than being added to the fuel.

Some boaters believe that four-strokes are slightly slower than comparably rated two-strokes. Some variation does exist from brand to brand. This may likely change as research produces better four-stroke technology. Some manufacturers are now even using parts from automobiles and motorcycles. Four-strokes are very smooth and incredibly quiet, which makes them a pleasure to operate. Fuel economy is also very good, being similar to DFI two-strokes.

Like DFI two strokes, four-stroke outboards are more costly to build. This is largely due to their valve-train parts. Also, because four-strokes produce power on only every other stroke of each piston, they must either have larger displacement or operate at higher rpm than two-strokes to make equal power.

Thanks to George Haydel of Metro Boating for reviewing this article for technical accuracy. Original source material: Meet the New Green Machines. Outdoor Life, March 1998.

MARINE ADVISORY BOARD NEWS

The Jefferson Parish Marine Fisheries Advisory Board has received a commitment from the Department of Wildlife and Fisheries (DWF) to begin a several year Florida bass stocking program west of the Mississippi River. This includes the area near the La-Reusitte Freshwater Diversion Siphon east of the Pen. The Board is hoping to receive 300,000 Florida bass this spring.

According to DWF District Biologist Howard Rogillio, similar stockings of Florida bass near the Caernarvon Freshwater Diversion Project east of the river have been very successful. Apparently conditions created by these diversions create ideal habitat for survival and growth of these fish.

OYSTER EXPORT OPPORTUNITIES

Oyster exports from the U. S. to Asia have increased 400% in the last 3 years. Nearly one million pounds of oysters from Washington and Oregon valued at \$7.6 million have been exported to Japan, Taiwan, Hong Kong, and China since 1994.

In an effort to get some of this export trade for Louisiana, the Louisiana Seafood Promotion and Marketing Board sent a team to Asia in November. According to Karl Turner, Executive Director of the Board, block frozen, IQF Oyster meat as well as frozen half shell oysters offer the greatest export potential.

Anyone interested in a copy of the report and export trade leads may call the Board at (504) 568-5693.

UNDERWATER OBSTRUCTION REMOVAL TO BEGIN

The Louisiana Department of Natural Resources (DNR) will soon begin an organized effort to remove underwater obstructions from coastal Louisiana waters. These obstructions, whether sunken boats, oil and gas debris, or natural, have posed an increasingly serious hazard to shrimp trawlers and to recreational and commercial boaters.

The effort was kicked off by a March 26 meeting held by DNR in Grand Isle to get assistance from fishermen in identifying the worst obstructions. The area near Grand Isle-Barataria Pass will be the first area in the state to have obstructions removed. This area has the largest concentration of obstructions in the state and also the one of the heaviest seasonal concentrations of shrimpers and boaters. Obstruction removal is planned for other parts of the state after this area.

Underwater obstructions have cost shrimpers, boaters, and the oil and gas industry millions of dollars in damages to nets and boats. In 1980, the Louisiana Legislature created the Fishermen's Gear Compensation Program to compensate commercial fishermen and shrimpers who suffered losses due to underwater hazards. (No compensation fund is currently available to recreational shrimpers or fishermen.) The program has paid out millions of dollars, but the obstruction problem has only gotten worse.

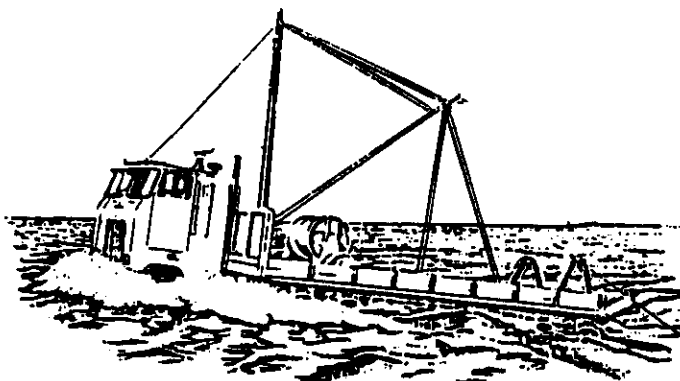
The Underwater Obstruction Removal Program was created by Act 666 of the 1997 legislature. This landmark legislation was introduced by Senator Chris Ullo of Marrero at the request of the Jefferson Parish Marine Fisheries Advisory Board and the Gulf of Mexico Underwater Obstruction Clearance Coalition. The budget consists of \$1.6 million in funding dedicated by the Louisiana Department of Wildlife and Fisheries from fishery resource disaster funds made available from the federal level.

According to DNR officials, actual obstruction removal work is expected to start in May. Additional information about the program can be obtained by contacting Program Manager Bruce Ballard, DNR Office of Conservation, PO Box 94275, Baton Rouge, 70804. (504) 342-6293.

Editors Note: This is a sparkling example of how concerned volunteers and responsive state agencies can solve people's problems in a democracy. The Jefferson Parish Marine Fisheries Advisory Board consists of 15 voting members, half commercial and half recreational, and 7 technical nonvoting advisors. All are unpaid volunteers. The group was formed by the Jefferson Parish Council. The Gulf of Mexico Underwater Obstruction Clearance Coalition is made up of oil and gas industry representatives, commercial shrimping representatives, and individuals from state agencies and universities. The group is self-formed under the leadership of an employee of Exxon International Oil Company. All members volunteer their time over and above their normal duties.

The Department of Natural Resources aggressively tackled the problem of Underwater hazards with their creation of the removal program in the shortest possible time. The Louisiana Department of Wildlife and Fisheries unselfishly directed federal monies that they could have used elsewhere into this program with very little chance of getting credit for the effort. Finally, nothing could have been done without the personal interest of a concerned legislator and a responsive state legislature.

YOU EITHER MAKE DUST OR YOU EAT DUST



KEEP ON TRUCKIN'

Sincerely,

[Handwritten signature]

Jerald Horst
Area Agent (Fisheries)
Jefferson, Orleans, St. Charles, St. John

LOUISIANA COOPERATIVE EXTENSION SERVICE
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