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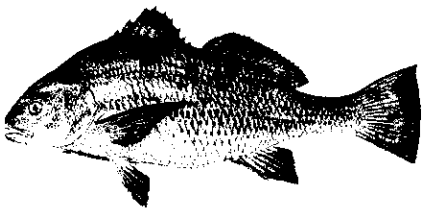
DRUM REPELLANTS

The Louisiana oyster farming industry is held up nationwide as a model for successful molluscan aquaculture. The system involves well over 8 thousand leases with over 400 thousand acres under cultivation. Typically, small "seed oysters" are taken in the fall by oystermen from publicly-owned seed grounds, where oyster spawning success is high. These seed oysters are then moved to private leases with good growing conditions. Seed oysters planted in the fall can be harvested in their second spring.



One of the major problems in oyster culture is heavy predation (feeding) by black drum, *Pogonias cromis,* on small seed oysters after planting. A detailed survey conducted by the Louisiana Department of Wildlife and Fisheries in 1999 showed significant seed oyster losses to black drum on 55% of oyster leases. Almost 80% of oyster leaseholders who had recently seeded oysters reported significant losses to black drum. Most oysters were lost in March, when groups of fish returned to coastal lease areas to feed after spawning, or in October, immediately after small seed oysters were bedded.

Many methods of reducing black drum predation have been discussed. Several bills that would have allowed the use of nets on oyster leases to take black drum predators have been considered by the Louisiana Legislative but not passed. The use of scents and sound have also been considered, and a significant study was done on scent deterrents in Louisiana. In this study, the bodies of dead black drum were used to see if their smell would keep live drum away from seeded oysters.

Before beginning their field studies the biologists worked in the lab. They held individual live black drum in 530-gallon tanks. Fish in two size groups, over 28 inches, and under 28 inches, were exposed to large, medium, and small oysters. Black drum over 28 inches long ate 4 times as many oysters as these under 28 inches. Three times more small oysters than medium oysters were eaten. No large oysters were eaten. Surprisingly, salinity had no effect on feeding, although salinities lower than 13 parts per thousand (full strength seawater is 35 ppt) were not used.

Next, black drum over 28 inches long were held in four 12,000-gallon tanks that received flowing, filtered sea water. Two drum were held in each tank, and 75 small and 25 medium oysters were added. Each day, missing oysters were counted and replacements were added. A dead black drum in a burlap sack was hung in 2 of the tanks and 2 tanks had nothing added. The number of oysters consumed was compared for the tanks with the drum carcasses to those without.

The number of oysters eaten in the tanks with the drum carcasses was less, but not significantly so. Feeding rates were more dependent upon the differences in individual fish than upon the presence or absence of a drum carcass.

The research was then moved into the field, to two leases in Barataria Bay. One lease was in Lake Grand Ecaille, an area with historically high black drum predation problems, and the other in Creole Bay, which has had moderate levels of predation in the past.

At each site, four 200-foot plots were seeded by the leaseholder with oysters in numbers typical for normal seeding. Immediately after seeding, 2 black drum carcasses were hung in a burlap sack from a PVC pole placed in the center of two of the plots. No black drum were placed on the other plots.

In the same place in each plot, 6 trays containing 100 oysters each were put in place. The trays were checked weekly and the eaten oysters counted and replaced. The drum carcasses were also replaced. These experiments were conducted in March and then again in October. Each plot was sampled with an oyster dredge as well.

At the Creole Bay plots, black drum were quickly attracted to the seeded leases, but moved away as the oysters were depleted, especially in the fall. At the end of 4 weeks, survival of planted oysters was 7.5% in the fall and 8.9% in the spring. The presence of black drum carcasses had no effect at Creole Bay.

In Lake Grand Ecaille, oyster survival rates were high at first in the fall, but dropped as black drum moved to the plot. At the end of 4 weeks, oyster survival was at 36.9% in the fall, but only 9.7% in the spring. The plots at Grand Ecaille that had dead black drum on them did have 10-20% higher weekly survival of oysters, but only in the fall.

Oyster numbers in dredge hauls showed a decline similar to that in the trays at both leases. The researchers were forced to conclude that scent from dead black drum was not an effective way to prevent black drum damage to seeded oyster reefs.

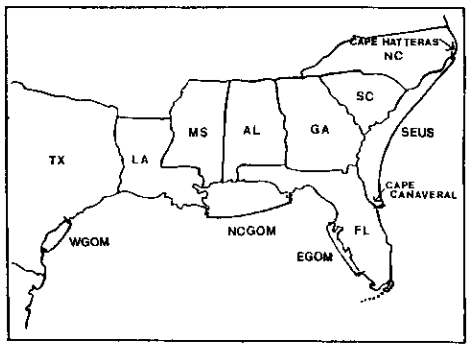
Follow-up laboratory research on sound as a deterrent found that "drumming" by male black drum in the frequency range of 40-60 Hz did not affect drum predation on oysters. The researchers said that sounds in the range of 10-30 Hz may deter fish, but

are not practical to use because of the great amount of power needed to broadcast the sound over leases.

Sources: *Olfactory Deterrents to Black Drum Predation on Oyster Leases.* Kenneth M. Brown, Gary W. Peterson, Patrick D. Banks, Brian Lezina, Charles Ramcharan and Michael McDonough. Journal of Shellfish Research, Vol. 22, No. 2. 2003. *Deterrents to Black Drum Predation on Oyster Leases.* Kenneth M. Brown, Gary Peterson, Mike McDonough, Patrick Banks and Brian Lezina. National Shellfisheries Association, 95th Annual Meeting. April 13-17, 2003.

LEMONFISH LOVELIFE

Cobia, or lemonfish as they are often called, are one of the more popular offshore recreational fish. Although harvest is tightly regulated, it is also a valuable commercial fish, Compared to some other offshore species, the biology of cobia is becoming rather well-researched. Mississippi scientists working out of the Gulf Coast Research Laboratory have conducted a lot of work on the species.



A recent paper discussed cobia reproductive biology. The biologists analyzed 530 cobia (147 males and 383 females) caught from the southeastern United States (SEUS), the eastern Gulf of Mexico (EGOM), the north-central Gulf of Mexico (NCGOM), and the western Gulf of Mexico (WGOM). Fish were obtained from cobia fishing tournaments and from recreational and charter fishermen. They were collected primarily during the spring and summer spawning season. They ranged in size from 14 to 55 inches and 1.4 to 76.8 pounds for females, and 15 to 51 inches and 2.0 to 89.8 pounds for males.

Spawning of cobia in all areas began in April, although egg development seemed to start in March in the Gulf of Mexico. Egg development and spawning peaked in May in NCGOM and July in EGOM. Some "spawned-out" females were found in the Gulf of Mexico in July, while other females remained in spawning condition through September. In SEUS, spawning activity occurred at least through June and probably into August. The length of the spawning period was not connected to the size of the fish.

Like other offshore fish species, cobia spawn frequently during the spawning season. Cobia were found to spawn every 4 to 5 days in NCGOM and SEUS, and every 9 to 12 days in WGOM. No estimate was made for EGOM. The data for WGOM was taken from fish caught during a shorter period of time, as compared to NCGOM and SEUS. This may have affected the estimates. By comparison, southern bluefin tuna spawn every day, yellowfin tuna every 1-2 days and wahoo, every 2-6 days during their spawning period.

The scientists used three different methods to estimate the amount of eggs released per spawn (batch fecundity). The number varied widely, not just because of the use of different counting methods, but because females do not release the same amount of eggs each spawn, and the females were of different sizes. Estimates ranged from 2,700 to 17,848,800 eggs released per spawn. Cobia from SEUS and NCGOM were estimated to be capable of spawning up to 36 times per six-month spawning season, and cobia from WGOM were estimated to be able to spawn 15-20 times per season. Using average numbers, a 44-pound female cobia from SEUS or NCGOM could produce between 20,952,000 and 38,232,000 eggs per season. A WGOM fish of the same size could produce between 8,730,000 and 21,240,000 eggs in the same time period.

If the differences are not due to the difference in sampling time, the biologists speculated that they may be due to habitat differences. Both the SEUS and NCGOM have large river discharges into their areas, compared to the WGOM. The freshwater input may spur these systems into producing more food supplies. It is also possible, they said, that the NCGOM cobia are closer to their main spawning location than WGOM fish are, so they spend less time traveling between spawning and feeding grounds.

On the basis of when their eggs start developing, cobia are thought to spawn during the day, probably in the late afternoon. Exactly where they spawn is not known. Some researchers suggest that spawning is done nearshore in the Gulf of Mexico. More evidence points to it taking place 30-54 miles offshore. Previous genetic research done shows that cobia from the south Atlantic and throughout the Gulf intermix and are not separate breeding stocks.

Source: *Reproductive Biology of Cobia Rachycentron canadum, from Coastal Waters of the Southern United States.* N. Brown-Peterson, R. Overstreet, J. Lotz, J. Franks, and K. Burns. Fishery Bulletin 99:15-28. 2001.

VOLUNTEERS NEEDED TO CLEAN-UP DERELICT CRAB TRAPS

Blue crabs are one of Louisiana's true seafood delights and the modern commercial blue crab fishery couldn't compete with other states and countries without crab traps. Additionally, over half of all licenses for crab trap use are sold to recreational fishermen. However, 50 years of crab trap use have left areas of the coastline dotted with derelict or abandoned crab traps.

In a remarkable display of cooperation, the commercial crab industry, through the Louisiana Crab Task Force, the Louisiana Wildlife Federation and the Coastal Conservation Association are working with the Louisiana Department of Wildlife and Fisheries and other agencies to do three clean-up projects across the Louisiana coast and VOLUNTEERS ARE NEEDED!

The three clean-up projects are scheduled as follows:

- February 18 to February 27 in Sabine Lake.
- February 26 to March 13 in Breton Sound estuary.
- March 5 to March 20 in Terrebonne Parish.

All crab traps left in the area during the closure will be considered abandoned and can be removed during daylight hours by anyone and discarded at one of the four disposal sites. Although abandoned crab trap removal may occur on all days, volunteers are most heavily needed for saturdays.

All volunteers with boats are welcome – shrimpers, crabbers and recreational fishermen. **Airboats are especially welcome.** Anyone wishing to volunteer to do their share in keeping Louisiana's coast clean should contact Vince Guillory at 985/594-4139, 504/568-7621, or by e-mail at guillory_v@wlf.state.la.us.

Louisiana Department of Wildlife and Fisheries personnel will be present at each disposal site on the main volunteer days to collect data and assist with the traps. Instruction sheets, maps, and volunteer gifts and supplies (tarps, trap hooks, and gloves) will be distributed. More information on the program and detailed volunteer instructions can be found on the Internet at www.derelictcrabtrap.net.

MORE CONTROVERSIAL M.P.A. RESEARCH

Marine protected areas (MPAs) go by a lot of names, marine reserves, no take zones (NTZs), and no fishing zones (NFZs). By whatever name they go by, the concept of using them in fisheries management has strong supporters and maybe even stronger opponents.

A growing body of scientists support the creation of such zones. According to them, such areas would serve as places where protected adult fish can stock areas outside the MPA with eggs and small fish. Also, some fish that have been protected to grow to large size will wander or "spillover" into areas open for fishing. MPAs are also promoted to protect areas of undisturbed habitat and to maintain genetic variability in fish populations.

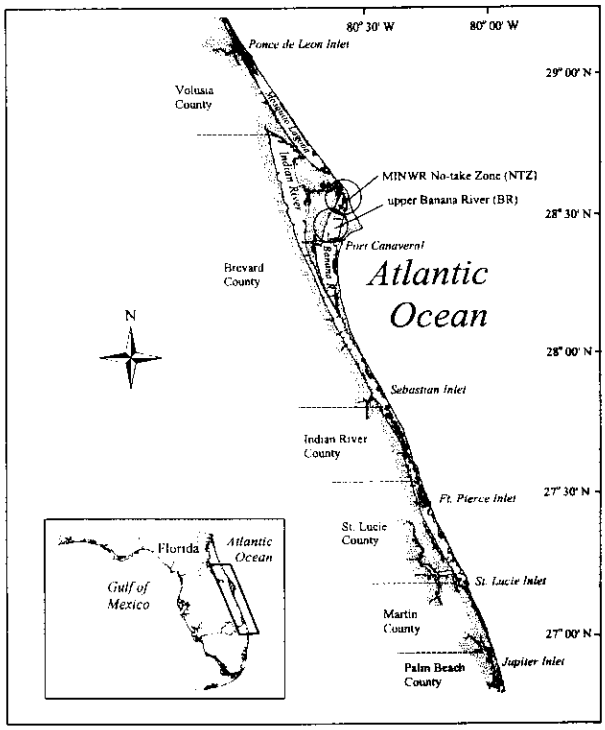
Opponents of MPAs include a virtual Who's Who list of recreational fishing interests. All of them advocate the use of more traditional management methods, such as size and bag limits and seasons, rather than closed areas. Their opposition to MPAs has resulted in the introduction of federal legislation, frequently referred to as the "Right to Fish Bill".

A substantial amount of research has been done on MPAs, with most of the results supporting the positive benefits of MPAs. One problem with the research, however, is that most of it simply either compares the amount of fish on an MPA to the area around it, or measures the movement of fish from an MPA to outside areas.

Fish also certainly can and do move from fished waters into MPA waters, where they are protected from fishing pressure. If more fish move onto an MPA than off of one, the MPA can serve as a "sink" rather than a supply of fish. Spillover would then not be an MPA benefit. Before this study, there was no research that measured fish movement onto and off of an MPA at the same time.

The Meritt Island National Wildlife Refuge (MINWR) on the east coast of Florida is an MPA that was originally created for security purposes for the NASA site at Cape Canaveral in 1962. The Indian River Lagoon, within which MINWR is located, is a shallow 152-mile long estuary protected from the Atlantic Ocean by a barrier island. It has three separate basins, Mosquito Lagoon, Banana River and Indian River itself. All the basins are connected to each other by narrow channels.

The MPA is at the northern end of Banana River. It is separated from the rest of the Banana River by a levee with two openings in it. These openings allow fish to move to and from the MPA.



Two studies of MINWR as an MPA have been made, one in 1999 and another in 2001. The studies showed that the MPA did protect fish populations and that fish moved off the MPA to areas open for fishing. However, all the fish tagged were tagged on the MPA, so it was impossible to determine if fish also moved from open areas to the MPA.

For this study, biologists with the Florida Marine Research Institute tagged 5,662 net and hook-caught fish of 27 different species. Of the total, 2,307 (41%) were tagged inside the boundaries of the MPA. The remaining 3,355 fish were tagged in waters surrounding the MPA. Redfish, black drum, sheepshead, snook, speckled trout, crevalle jacks, and bull sharks made up 95% of the tagged fish.

Migration rates were calculated by comparing recapture of tagged fish inside the MPA to an area of similar size and habitat type in nearby Banana River. The recapture rates of fish tagged in those two areas was equal, at 2.4%. Redfish and black drum made up the majority of tagged and recaptured fish and were the only two species that had migrated both into and away from the MPA.

For both species combined, migration rates were higher for fish moving into the MPA (52% immigration) than for fish moving out of the MPA (5% emigration). Each

species showed more movement into the MPA than out of the MPA. For redfish, the immigration rate was 27% and the emigration rate was 3%. For black drum, the immigration rate was 90%, compared to a 25% emigration rate.

The researchers stated that their results showed that fish do migrate into as well as out of protected areas and that these movements have the potential to remove catchable fish from surrounding populations. They caution, however, that determining the net result of these migration patterns would require accurate assessments of the populations of fish, which was beyond the scope of this study. They said that if the fish population in the protected area is much higher than the population outside the area, even the low emigration rates shown in this study could result in more individual fish moving from the protected area into fished waters than vice versa. Such a big difference in the fish populations could be caused by strong production of fish in the area or by fishermen catching and keeping large numbers of fish outside the area.

Earlier research in and around the MINWR protected area showed redfish populations 6.3 times and black drum populations 12.8 times higher on the area than off of it. Later sampling using different gear showed abundances that were only 1.8 times greater for redfish and 1.5 times greater for black drum. Which sampling was more accurate is debatable.

The researchers concluded that with high fish movement into a protected area and low movement off of the area, spillover may not be as important to building surrounding fish populations as the production and export of eggs, larvae and young fish produced by the adults on the MPA. They did note that such production would be limited unless the MPA has spawning and/or nursery habitat on it.

Finally, they caution that because of the small size of their study, the results of their study should not be generalized to other areas.

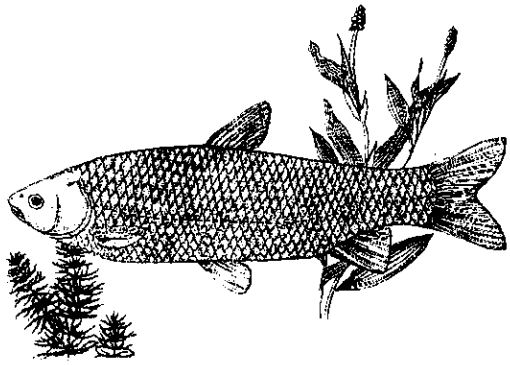
MPA opponents had no reservation in using the results of the research. An October 13 news release by the Florida Coastal Conservation Association (CCA) reads "The claims of replenishment and other fisheries management benefits made by no-fishing zone advocates are clearly undermined by this research," said CCA Florida Executive Director Ted Forsgren. "The results refute the theory that NFZs are viable fisheries management tools. It is also very significant that the research was conducted at the no-fishing zone near the Kennedy Space Center, the same area that NFZ proponents have been using to claim that replenishment does occur."

The MPA debate is a huge issue in Florida, where 29 such zones have already been established, according to the release. It states that more are being proposed all the time, and gave as an example a proposal by the South Atlantic Fishery Management Council to add 19 more (now reduced to 4) to Florida's East Coast.

"This no-fishing zone did the exact opposite of what proponents have been claiming," said Forsgren. "Instead of replenishing adjacent areas, the zone pulled substantially higher numbers of fish from adjacent waters into the no-take zone."

Sources: *Multidirectional Movements of Sportfish Species Between an Estuarine No-take Zone and Surrounding Waters of the Indian River Lagoon, Florida.* Derek M. Tremain, Christopher W. Harnden, Douglas H. Adams, Fishery Bulletin. US Department of Commerce. Volume 102, Number 3. July 3, 2004. *New Research Refutes Theories and Claims that No-fishing Zones Replenish Fisheries in Adjacent Areas.* CCA Florida Press Release. October 13, 2004.

TRACKING GRASS CARP



One of the most controversial fish in the southern U.S. is the grass carp, *Ctenopharyngodon idella.* This large, silver, torpedo-shaped fish is a native of Asia and a plant-eater with an endless appetite. Because of this habit, it is seen by many people as the answer to controlling infestations of introduced water plants.

Exotic plants can be difficult to control. Drawn-downs (lowering water levels) can be done in some waters to strand the plants on land and kill them, but many waters cannot be drawn down. Insect pests can be effective, but not every exotic plant has known control insects or the insects themselves can become pests. Mechanically removing plants is difficult and costly. Herbicides are expensive and like mechanical removal, are only temporary.

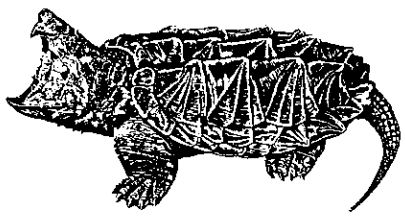
All these problems make the introduction of grass carp into a water body to control plants look very attractive. Unfortunately, some research indicates that grass carp don't want to stay put in the area they are stocked in. Tracking research in the Guadalupe River in Texas showed downstream movement of up to 130 miles by grass carp in both high and low water periods. In the Tennessee River, young fish were stocked. They showed little movement as small fish, but did move when they grew larger. On the other hand, in the Cooper River, 98% of the grass carp stayed within 12 miles of their stocking location.

The aquatic plant hydrilla appeared in 1999 in Lake Austin in Texas, a first class bass-fishing lake. By 2002, the hydrilla had spread enough to cause problems. Twenty-four radio-tagged 15 to 18-inch grass carp were stocked in April 2002. The fish were relocated by biologists weekly from May through October of that year and monthly after that. In July, a massive flood occurred, with the river that feeds the lake carrying 13 times the average flow. After the flood, 23 of the 24 carp were relocated in the lake. Twelve of the fish were labeled as active, meaning that they averaged moving more than 65 yards between tracking and nine were labeled as inactive (three of these were confirmed as dead).

Lake Austin is a river-reservoir located between two dams. Of the active fish, seven had moved upstream from 200 yards to 6 miles after the flood and one moved downstream 540 yards. All of the fish were still in the lake, however. The biologists conducting the study believed that the lack of movement was due to the large amount of food and refuge areas present in the lake.

Source: *Response of Triploid Grass Carp to Flooding in a Central Texas Reservoir.* Chad Thomas, Timothy H. Bonner, Thomas L. Arsuffi and Brad Littrell. Silver Anniversary Meeting of the Louisiana Chapter of the American Fisheries Society. February 2004.

NO MORE COMMERCIAL HARVEST OF LOGGERHEADS



The alligator snapping turtle, or loggerhead, once a common sight in Louisiana markets, can no longer be trapped for commercial sale. Louisiana Department of Wildlife and Fisheries (LDWF) Secretary Dwight Landreneau has signed a regulation that not only bans commercial hardest, but also limits personal take of the turtles to one-per-day per boat or vehicle.

America's largest freshwater turtle was once processed by the thousands each year in Louisiana, ending up in turtle soups and stews. Although that market had waned during the 1980s, biologists were still concerned that loggerhead populations and their habitat were decreasing. In response, LDWF placed commercial size and recreational take limits on the turtles in 1993.

To determine population levels, the U.S. Fish and Wildlife Service funded a five-year study in which two Louisiana trappers caught, tagged and released nearly 550 alligator snappers. Those results, as well as numbers trapped in other states, satisfied the Fish and Wildlife Service that the turtles did not require federal regulation.

By 1998 Louisiana was the only state that still allowed commercial harvest of alligator snapping turtles. Concern about the harvest led Louisiana State Senator Robert Barham to ask the Louisiana Legislature for more regulations. Under laws which took effect on November 20, alligator snappers cannot be taken from the wild for commerce, and the sale of the turtles, their meat, shells and other parts will be prohibited. However, licensed turtle farmers will still be allowed to sell alligator snappers that hatch from their breeding stock, and Louisiana residents with a recreational fishing license can still satisfy their culinary desires and traditions by doing their own trapping under the one per day limit.

DOES VENTING HELP?

Most often, reef fish, such as snappers and groupers, are caught in depths of greater than 70 feet. The depressurization that the fish experience when being reeled

to the surface causes the gases in their swim bladders to expand, leading to bloating of the fish, the shoving of their stomachs out of their mouths, and ruptured swim bladders.

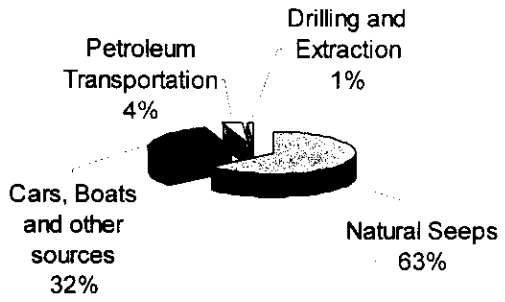
Research on groupers indicates that many of these fish will survive if they can rapidly return to their habitat depth. Unfortunately, their bloating and stomach protrusion prevent this. Venting, the piercing of bloated fishes' swim bladders, has been promoted as a method of allowing reef fish to quickly swim back down to deep water.

In a study funded by Florida Sea Grant, 5,578 red grouper, 2,705 gag, and 340 red snapper were caught on offshore boats, tagged and released. Half the fish were vented and half were not. All were under the minimum legal size.

A total of 605 red groupers (10.8%), 274 gag (10.1%), and 36 red snapper (10.6%) were recaptured. For red grouper and gag originally caught from waters deeper than 70 feet, more vented than non-vented fish were recaptured. This was not the case for red snapper, where more non-vented than vented fish were recaptured for all depths, leading to the conclusion that venting was not beneficial for red snappers, but was effective fish with large swim bladders such as groupers.

Source: *Survival of Reef Fish After Rapid Depressurization: Field and Laboratory Studies.* Karen M. Burns and Victor Restrepo. American Fisheries Society Symposium. 30:148 – 151, 2002.

WHERE THE OIL COMES FROM



Commercial fishermen, recreational fishermen and environmentalists agree on few things. One point they do agree on is that water pollution is bad. Most feared is oil and other petroleum-product pollution. If the general public is asked, it is almost a sure bet that most people would rank the major sources of oil in the sea as coming from offshore drilling and/or oil tankers. But perceptions are often not reality. The pie-chart above reveals that those two sources contribute only about 5% of the oil that finds its way to the sea.

A surprising 63% is contributed by natural seeps from oil-bearing sands and rocks. Even if all human-produced sources of oil disappeared, these would continue to seep oil. Fortunately, unrefined oil is a natural product, produced from ancient living sources, and is (slowly) biodegradable.

The remaining 32% of the sources are largely preventable. Some oil washes off of roadways, where it drips from leaky auto engines. Amazingly, some people still discard used engine oil directly overboard, on land from which runoff occurs, or into storm drains. Spills during vessel refueling are also sources of pollution.

Source: MMS Ocean Science. US Minerals Management Service. Volume 1, Issue 5, September/October 2004.

UNDERWATER OBSTRUCTION LOCATIONS

The Louisiana Fishermen's Gear Compensation Fund has asked that we print the coordinates of sites for which damage has been claimed in the last month. The coordinates are listed below:

Loran Sites	Lat. & Long. Sites		
None	29 09.270	90 05.940	JEFFERSON
	29 12.080	90 01.290	JEFFERSON
	29 15.326	89 59.576	JEFFERSON
	29 23.720	89 53.810	JEFFERSON
	29 42.178	89 51.241	PLAQUEMINES

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THE GUMBO POT

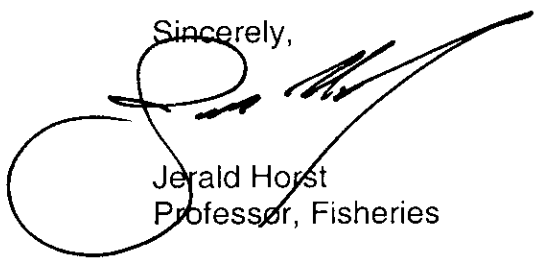
Cajun Poached Fish

Yeah, I know; South Louisianans don't poach fish, at least in the kitchen. For years, the idea of poaching fish was repulsive to me, mainly because I confused poaching with boiling. They are indeed different and when I got around to putting together a version of poached fish, I found it to be very good. I used mangrove snapper, but any white-fleshed fish would be good.

2	lbs fish fillets	3	tbsp diced pimento
⅔	cup thinly sliced onion	½	cup dry white wine
1½	cups chopped fresh mushrooms	2	tbsp lemon juice
⅓	cup chopped tomato	1	tsp salt
¼	cup chopped green pepper	¼	tsp dill weed
¼	cup chopped parsley	⅛	tsp pepper

Cut fish into serving size-portions. Arrange onion in bottom of 12 X 8 inch well-greased baking dish. Place fish on top of onion. Combine remaining vegetables and spread over top of fish. Combine wine, lemon juice and seasonings. Pour over vegetables. Cook at 350°F for 25 to 30 minutes or until fish flakes easily when tested with a fork. Makes 4 servings.

Sincerely,



Jerald Horst
Professor, Fisheries