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Lagniappe Sea Grant LOUISIANA

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COBIA AGE & GROWTH

Cobia, or lemonfish or ling as they are also called, are found from Massachusetts to Argentina, but are most common along the U.S. South Atlantic Coast and in the northern Gulf of Mexico. Recreational fishermen take 87% of the U.S. catch, the majority of which comes from the Gulf.

In spite of excellent research done on the migratory and spawning habits of cobia in the Gulf, little has been done on age and growth of the fish. Between 1987 and 1995, Mississippi biologists sampled 1,005 recreationally-caught cobia. These fish were weighed, measured to fork length (from the tip of the nose to the fork in the tail), and an otolith (ear bone) was removed from each fish.


Otolith

Each otolith was cut in a very thin cross-section to allow the researchers to read the age of the fish. Cobia, like other fish, lay down a ring of bone for each year of growth. A total of 565 fish produced readable otoliths. The table below provides the results of the aging.

Age	Number of Males	Average Fork Length of Males (inches)	Number of Females	Average Fork length of Females (inches)
0	5	17.6	28	16.4
1	14	28.2	28	28.5
2	47	35.4	103	36.6
3	47	38.8	116	42.2
4	35	41.4	64	47.3
5	16	42.8	31	50.8
6	1	45.6	7	53.6
7	3	47.9	5	55.6
8			8	57.2
9	2	50.0	3	58.4
10			1	59.3
11			1	60.0

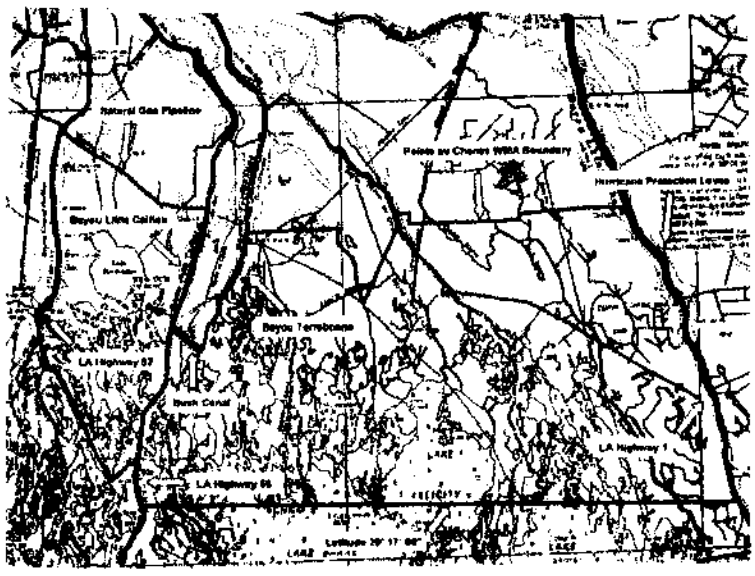
Age 0 fish are young-of-the-year, those that have not yet reached their first birthday. Age 0 fish ranged from 13.4 to 20.4 inches long. Age 1 fish ranged from 19.7 to 36.4 inches long, and 10 of the 42 age 1 fish were over the 33-inch minimum size limit. Fish 6 years old and older were not common. Females both outnumbered and out-grew males.

The results showed that it was very difficult to age cobia based on their size. For example, at age 4, males ranged from 34 to 50 inches, and females ranged from 36 to 50 inches. Looking at it another way, in the 40 to 48-inch group, fish from 2 to 9 years old were found. The largest fish was 136.8-pounds, a cobia larger than the IGFA all-tackle world record. At a fork length of 64.4 inches and at age 8, this fish was neither the longest fish, nor the oldest fish in the study.

Source: *Age and Growth of Cobia Rachycention canadum, from the Northern Gulf of Mexico.* James S. Franks, James R. Warren and Michael V. Buchanan. Fishery Bulletin 97 (3), pp 459-471. 1999.

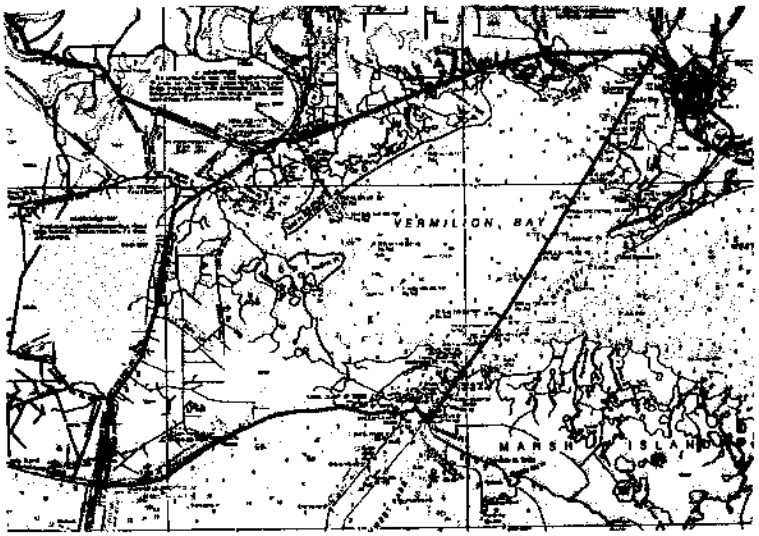
ABANDONED CRAB TRAP REMOVAL PROGRAM

At its September meeting, the Louisiana Wildlife and Fisheries Commission (LWFC) gave notice of intent to develop two pilot abandoned crab trap removal programs. The Commission's actions were authorized by Act 48 of the 2003 Louisiana Legislature. The clean-up programs involve localized closures on the use of crab traps in two different areas. They were designed to allow crabbers to move their traps out of the area by water.



During the first closure, called the "winter closure", the use of crab traps would be prohibited for 16 days, from 6 a.m., February 28 through 6 a.m., March 14. The closure area is in the part of Lafourche and Terrebonne Parishes from a point originating from the southern boundary of the Pointe au Chenes Wildlife Management Area at the South Lafourche Hurricane Protection Levee, then west along the southern boundary of the Pointe aux Chenes Wildlife Management Area to the Humble Canal, then west along the northern shoreline of Humble Canal to its intersection with Bayou Terrebonne, then south along the western shoreline of Bayou Terrebonne to its intersection with Bush Canal, then west along

the northern shore line of Bush Canal to its intersection with Bayou Little Caillou, then north along the eastern shoreline of Bayou Little Caillou to the Gulf South/South Coast Natural Gas Pipeline in Chauvin, then northwest along the Gulf South/South Coast Natural Gas Pipeline to LA Highway 57, then south and then southeast along LA Highway 57 to its intersection with LA Highway 56, then south along LA Highway 56 to latitude 29 degrees 17 minutes 00 seconds N, then east along latitude 29 degrees 17 minutes 00 seconds N to LA Highway 1, then north along LA Highway 1 to the South Lafourche Hurricane Protection Levee, then north along the South Lafourche Hurricane Protection Levee and terminating at the southern boundary of the Pointe aux Chenes Wildlife Management Area.



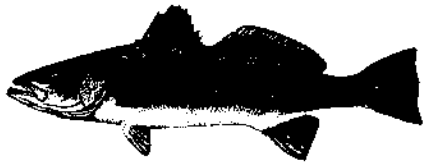
In the second closure, called the "spring closure", the use of crab traps would be prohibited in a portion of Vermilion Bay for a 14-day period beginning at 6:00 a.m. five days before the opening of the 2004 spring inshore shrimp season in the bay and ending at 6:00 a.m. nine days after the opening of the season. In the event that the LWFC approves opening the 2004 spring inshore shrimp season in Vermilion Bay before a five-day minimum notice can be provided for the crab trap closure, then the use of crab traps shall be prohibited for a nine-day period beginning at 6:00 a.m. on the opening of the 2004 spring inshore shrimp season in Vermilion Bay and ending at 6:00 a.m. nine days after the opening of the season in Vermilion Bay within the area described below:

From a point originating from the intersection of the Acadiana Navigational Channel and the Gulf Intracoastal Waterway, then southwest along the Acadiana Navigational Channel red buoy line to the red navigational marker number 12 on the Marsh Island shoreline near Southwest Pass, then south along the eastern shore of Southwest Pass to a position which intersects the inside/outside shrimp line as defined in R.S. 56:495, then west along the inside/outside shrimp line to the western shore of Freshwater Bayou, then north along the western shore of Freshwater Bayou to its intersection with the Gulf Intracoastal Waterway, then east along the northern shore of the Gulf Intracoastal Waterway to the intersection of the Gulf Intracoastal Waterway and the eastern shore of the Acadiana Navigational Channel.

All crab traps remaining in either closed area will be considered abandoned and may be removed by anyone. The Department of Wildlife and Fisheries will be coordinating the program and will depend heavily on volunteer efforts. Volunteers are what made the abandoned trap removal programs successful in other states.

During the winter closure, crab traps may be removed only between one-half hour before sunrise and one-half hour after sunset and they may only be possessed within the closure area and disposed of at approved sites. During the spring closure, shrimpers will be allowed to possess unserviceable traps outside the closed area that were taken from within the closed area.

LOUISIANA SPECKS, A to Z



The newly released book, *Biology of the Spotted Seatrout* by CRC Press is close to being the bible of speckled trout biology. Three Louisiana biologists have contributed a lengthy chapter to the book, that summarizes the biology of the fish in Louisiana. They say "fishing for (and dining on) spotted seatrout has been a way of life for residents of southern Louisiana. The success rate for recreational trips is often phenomenal by the standards of other places. Until recently, one major newspaper rated popular fishing areas by the number of boxes (ice chests) of fish reported as caught on daily trips." What follows are aspects of the biology of this popular fish broken down by subject from their chapter.

Habitat

The high productivity of speckled trout in Louisiana estuaries is partly due to a combination of factors fairly unusual in the northern Gulf of Mexico: shallow, turbid (not clear) waters, large marsh areas heavily broken by watercourses and ponds, and a low tidal range. The turbidity of Louisiana's coastal waters plays on important role because it increases the survival of small trout. Birds and other predators have a difficult time seeing the young fish in the shallow waters that they need to use to stay away from the larger fish predators in the deeper waters.

Growth & Maturity

More females than males are found at all ages and females average larger than males at all ages. At ages 1 through 5, males average 8.5 in, 12.1 in, 15.2 in, 16.5 in, and 17.8 in. Females aged 1 through 5 average 8.8 in, 14.5 in, 18.1 in, 20.4 in, and 21.8 in. Speckled trout have a six-month spawning season. Trout hatched early in the season have more time to grow before the winter slow-growth period than do those hatched late in the season. Strangely, late-spawned fish seem to have a higher survival rate than early-spawned fish.

Some fish reach sexual maturity at age 1. Earlier reach indicated that during the spawning season, females spawn about every 21 days. However, the latest research indicates that females can spawn every 4 to 5 days, with each spawn (for 2 to 4 year old fish) producing 102,000 to 512,000 eggs, or 9-11 million eggs per season. Some biologists believe that the heavy spawning activity of speckled trout leads to the slower growth rate of males. Females spawn only once every 4 to 21 days during the May-October spawning season, but males may spawn every day, leading to a significant energy drain on them.

Spawning

Speckled trout spawn in large groups called aggregations. Research in Louisiana indicates that most spawning takes place in man-made or natural channels and deep passes near open water. Spawning has also been reported in bays near passes and in the open Gulf. Spawning aggregations can shift as much as 18 miles over a 1 to 2 week period to take advantage of local conditions. Spawning activity peaks in July.

Spawning begins when males aggregate at a site, usually before sunset. There, the males begin drumming by vibrating their tough swim bladders with surrounding muscles. It is assumed that the drumming is done to attract females. Four types of sounds are made: a grunt followed by a series of knocks, several grunts strung together, a long grunt, and a staccato of rap-rap-raps. Drumming begins at about 6 p.m. and increases to a peak between 8 or 9 p.m., then decreases. By 11 p.m. drumming is almost over. During spawning, the trout in the school constantly mill, with light side-to-side body contact between the fish. Fertilized eggs are buoyant and float toward the surface, while unfertilized eggs sink.

Spawning takes place in sites with a current, but the fish tend to avoid areas with very strong currents. No spawning was found in currents over 2.3 mph. Most all spawning is done at water temperatures of 82°F to 86°F. No drumming occurs below 76°F. Most drumming and spawning occurs in water depths of 6 to 33 feet deep, although modest amounts of drumming can occur in waters as deep as 113 feet.

Most drumming aggregations form in salinities of 15 to 18 parts per thousand (ppt). Full strength seawater in the Gulf is 30-32 ppt. Scientists studying speckled trout spawning in Louisiana did not find any drumming in salinities higher than 25.8 ppt. Ideal salinities for hatching of the eggs is 15 to 25 ppt. Speckled trout also seem to prefer spawning in areas with the highest possible level of dissolved oxygen. Day length seems to be the major factor that triggers spawning and that also determines the length of the spawning season.

Juvenile Trout Biology

Juvenile (young) speckled trout seem to grow fastest and seem to prefer lower-salinity estuary waters. Fish from 1 to 6 inches long are more common in intermediate salinity marsh than brackish marsh, and more common in brackish marsh than saline (salt) marsh. Only fish under 1-inch long were less common in intermediate than saline marshes. This may be due to the saline marshes being closest to speckled trout spawning areas. Juvenile speckled trout seem to prefer shorelines with oyster grass (*Spartina alterniflora*). Lack of this type of marsh-edge shoreline may limit survival of juveniles. So can weather conditions that prevent tidal flooding of the *Spartina* marshes that the juveniles use for shelter and for feeding. Juvenile specks are found on 3 bottom types: silt/clay, sand, and organic detritus (coffee grounds). Growth rate is fastest on organic detritus.


copepod

High dissolved oxygen levels and the presence of a variety of food items seems to increase the growth rate of juvenile fish. Very small trout rely heavily on copepods as a food item, shifting to tiny mysid shrimp and amphipods when 0.4 to 0.8 inches long, and then later to brown and white shrimp and small fish. Low oxygen conditions, or large daily changes in dissolved oxygen seem to slow growth rates. Speckled trout under 2 inches long show a preference for water temperatures above 75°F.

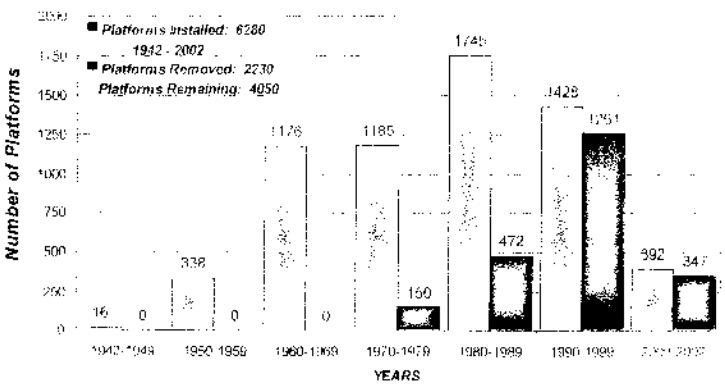
Adult Trout Biology

The biologists defined four biological seasons for speckled trout in Louisiana. Overwintering (October to March), prespawning (April), spawning (May to August), and postspawning (September). Sampling indicates that during the overwintering season, trout over 18 inches long prefer low salinities (1-11 ppt), while 12 to 18-inch fish preferred slightly higher salinities, During the prespawn season (April), trout over 12 inches long showed a preference for higher salinities. During the spawning season, the preference was for higher salinities, over 13-15 ppt. This preference for high salinities continued through the postspawn season.

Overwintering speckled trout avoid water temperatures below 61°F, when possible. During prespawn, the fish prefer water temperatures above 75°F. Both of these patterns are stronger for 12 to 18-inch fish than for fish over 18 inches long. The preference for waters over 75°F continues through the spawning season. During the postspawn month of September, all fish show some preference for even warmer waters, 79 - 82°F.

Source: *Spotted Seatrout Habitat Affinities in Louisiana.* Donald M. Baltz, R. Glen Thomas and Edward J. Chesney. Biology of the Spotted Seatrout, pp 147 -175. CRC Press. 2003.

RIGS-TO-REEFS REPORT



Recreational offshore fishing off of Louisiana revolves around offshore oil and gas platforms and the artificial reefs constructed from recycled platforms. At the last Louisiana Artificial Reef Initiative meeting, Les Dauterive of the U.S. Minerals Management Service gave a report on the Rigs-to-Reefs Program and trends in the number of platforms in the OCS (outer continental shelf or federal waters). The table above shows that numbers of platform removals have almost caught up to platform installations. An LSU Center for Energy Studies report in 2001 forecasting the number of OCS platforms, predicts a decline of 29% in numbers from 1999 to 2023. The decline is expected because the number of

removals is predicted to increase significantly over present, while the number of installations is predicted to only slightly increase.

According to Dauterive's report, the first OCS platform was installed in 1942, with the next two occurring in 1947. From that year, platforms were installed every year, hitting a peak in 1984 with 227 installations. The first removal took place in 1973. Removal numbers remained relatively low through 1987, then jumped to 100 in 1988. The number of removals passed the number of installations for the first time in 1992. In the ten years since then, removals have been higher than installations 4 years, although in the last three years, installations (392) have exceeded removals (347).

A total of 6,280 platforms have been installed in the Gulf OCS, and 2,230 removed, leaving 4,050. By depth, 68.6% of all structures and 50.7% of all major structures are located in waters 100 feet deep or less. (This doesn't include structures in state waters.) Waters 101-200 feet deep hold 19.2% of all structures and 27.9% of all major structures. Age-wise, the largest number of major structures, about 360, falls in the category of 21-25 years old, although about 2 dozen are 50 or more years old.

RIGS-TO-REEFS DONATIONS

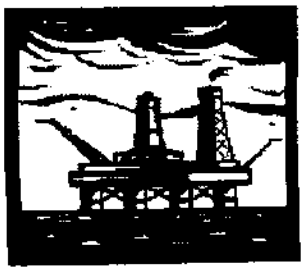
State	Tow and Place Platforms	Topple in Place Platforms	Partial Removal Platforms	Total
Louisiana	72	32	6	110
Texas	30	18	20	68
Florida	3	0	0	3
Alabama	4	0	0	4
Mississippi	3	0	0	3
Total	112	50	26	188

As of the end of 2002, Louisiana easily leads in the number of oil and gas platforms recycled into artificial reefs. "Tow and Place Platforms" are those removed from one place and moved to another area to be placed. "Toppled in Place Platforms" are tipped over where they are located, usually in an artificial reef planning area. "Partial Removal Platforms" are left in place but have had the upper portion removed to allow for vessel navigation clearance. The removed portion may be placed near the base or brought to shore. Most platforms used as artificial reefs are in water depths of 101-200 feet, followed by 201-300 feet.

RIGS-TO-REEF PLATFORMS BY DEPTH

State	0 -100 ft	100 – 200 ft	201 – 300 ft	301 – 400 ft	Over 400 ft
Louisiana	4	53	35	18	0
Texas	5	39	23	1	0
Florida	0	0	0	0	0
Alabama	0	4	4	0	0
Mississippi	0	0	0	0	0
Total	9	62	62	19	0

RIG FI$HING



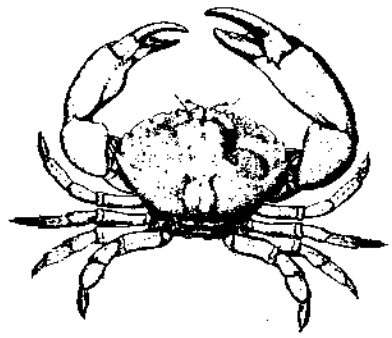
Last year, the U.S. Minerals Management Service released a report on the economic impact of recreational fishing and diving at offshore oil and gas platforms and the artificial reefs created from these platforms. The scientists involved in the study estimated that almost one million trips were taken to within 300 feet of these structures, out of 4.5 million trips in 1999.

Recreational fishermen spent $160 million making trips offshore to platforms and reefs and recreational divers spent another $13.2 million. These sums do not include the money spent on fishing and diving equipment that year, much of it intended for use at platforms and reefs. Using statistical analyses, they calculated that fishermen who fished near offshore platforms and reefs spent over $1,500 more annually than those who did not. The total economic output was calculated at $324.6 million.

The Minerals Management Service is the agency that oversees offshore oil and gas drilling and production in federal waters.

Source: *Economic Impact of Recreational Fishing and Diving Associated with Offshore Oil and Gas Structures in the Gulf of Mexico.* OCS study MMS 2002-010. Minerals Management Service.

LOUISIANA STONE CRABS



In recent years, a small commercial and recreational fishery has developed for stone crabs in the high-salinity lower bays across Louisiana. Stone crabs began to attract attention in the 1980s, when more of them began appearing in blue crab traps in coastal lakes and bays. In early 1985, LSU biologists conducted a study into the possibility of developing a fishery for them. Before that could occur, however, the great Christmas freeze of 1989 severely reduced the number of stone crabs in Louisiana's coastal waters. Since then, stone crab numbers have increased to numbers even higher than before 1989. Modest numbers are landed in some parts of the state for sale in the wholesale trade or for retail sales directly to the public. In some areas, numbers are high enough for recreational crabbers to target.

The stone crab found in Louisiana is officially known as the Gulf stone crab, *Menippe adina.* It is closely related to the Florida stone crab, *Menippe mercenaria*, but smaller, with some color differences. The Gulf stone crab has a dark brown body, compared to the tan or gray color of the Florida stone crab, and it doesn't have bands or

stripes around its legs like the Florida stone crab. The range of the two species overlaps in the area of Apalachee Bay, Florida, where they hybridize.

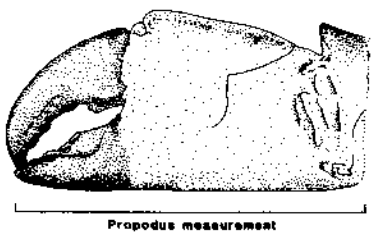
Gulf stone crabs seem to prefer slightly higher salinities than blue crabs, from full strength sea water at 35 parts per thousand (ppt) down to 10 ppt. They seem to prefer areas near or on oyster reefs, rock jetties, or debris-cluttered bottoms, where they build burrows in the mud. The burrows are used for shelter, cold weather refuge, and when molting their shell. During cold months, they seem to show a preference for deeper channels and passes. Research indicates that they can survive very low oxygen levels, at least for a day or so. Females seem to outnumber males, especially in deeper waters.

Mating is similar to that in the blue crab, taking place while the female is in the soft-shell stage, with the male cradling the female beneath him. A male will begin "guarding" a female before she molts and will continue to do so until her shell hardens. Mating seems to take place in the fall.

After mating, females will deposit fertilized eggs on the "hairs" under their belly aprons in a large mass called a "sponge". Hatching occurs in 7-18 days, depending on water temperature. Females may spawn several times between March and September with peak spawning occurring from May through July. After hatching, Gulf stone crab larvae go through 7 stages before they resemble the adults. During most of this time, they are planktonic, meaning that they are free-floating at the mercy of the currents and tides.

Once they settle to bottom, young stone crabs eat a varied diet, including oysters, mussels, barnacles, snails, clams, worms, jellyfish, blue crabs, hermit crabs, and plant matter. Shellfish of all kinds are staple foods of adults, with oysters being a major food item. Feeding is highest on spat and small oysters, but larger Gulf stone crabs eat oysters of all sizes. It has been estimated that they average eating 219 oysters per year and they may be more destructive to both spat and adult oysters than the oyster drill (conch).

Growth is fairly slow. Some females are mature enough to spawn by age 2, and by age 3, only 30% are mature. By 7 years old, almost all the females are mature. Only the claws on stone crabs are harvested, but claw removal does slow their growth rate.

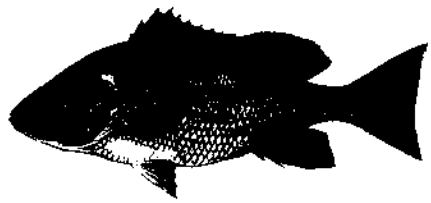


Stone crabs have a large crusher claw and a smaller pincher claw. Both can be harvested if they meet the minimum propodus (claw) size limit of 2¾ inches. Claws on males are more slender and longer than females and will produce legal claws at a smaller size than females will.

Louisiana law provides that only legal stone crab claws can be set on shore from a vessel and that whole stone crabs cannot be landed, except for a tolerance of one stone crab per crate of blue crabs. Since stone crab claws cannot be iced or refrigerated before boiling, fishermen often hold the stone crabs alive until near the end of their run before declawing them. Chilling stone crab claws before boiling will result in the meat sticking to the shell. Stone crabs may be boiled with traditional Louisiana seasonings, but are at their best when boiled in lightly salted water and served with melted butter.

Sources: *A Profile of the Western Gulf Stone Crab, Menippe adina*. Edited by Vince Guillory, Harriet M. Perry and Richard L. Leard. Gulf States Marine Fisheries Commission. 1995. *The Potential for a Stone Crab (Menippe mercenaria) Fishery in Barataria Bay, Louisiana*. Jerald Horst and David Bankston. Coastal Fisheries Institute and Sea Grant College Program. Louisiana State University. 1996.

TO VENT OR NOT TO VENT?



The survival of released deepwater reef fish is ever the source of controversy. Minimum size regulations force the release of substantial numbers of snappers and groupers. For these size limits to be effective management tools, a high rate of survival must occur after release. A bloated stomach sticking out of the mouth of a fish prevents it from swimming down and leaves it easy prey for sea birds and fish predators.

Venting, the piercing of fishes' swim bladders to release gas, has been proposed as a useful way of increasing the survival of released fish. Florida researchers conducted a study in which 340 red snappers, 2,705 gag grouper, and 5,578 red grouper were caught, tagged, and released off both coasts of the state. Half of the fish were vented and the other half not vented.

Of these, a total of 36 red snapper, 214 gag and 605 red grouper were recaptured. More vented than non-vented red grouper and gag were recaptured in waters deeper than 70 feet. This was not true for red snapper, where more non-vented than vented fish were recaptured at all depths. Analysis of the grouper data concluded that venting helped survival in the short term (under one month of release), but that in the long term (over one year), other factors were more important to grouper survival.

A lab study was done, in which red snapper and red grouper caught at depths of less than 90 feet were depressurized in a pressure chamber in the lab. As in the wild, the swim bladders on both species ruptured at the equivalent of 70 feet. The swim bladder ruptures could be quite severe, extending from one-third to one-half the length of the bladder. Red snapper ruptures were smaller. In both species, the ruptured bladders healed in 4 days or less.

The final conclusion of the study was that venting can provide a slight survival advantage for fish with large swim bladders. For others, such as red snapper, venting does not appear to be beneficial.

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.

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THE GUMBO POT

Cauliflower-Crab Casserole

The mild tastes of both cauliflower and crabmeat are perfectly accented and blended in this cream sauce. Be sure to taste the crab sauce after seasoning, remembering that it should be slightly overseasoned because the cauliflower has no seasoning. Too little salt and pepper turns this delicious dish into bland fare.

1	medium head cauliflower
½	cup butter
½	cup chopped onions
½	cup chopped celery
½	cup chopped red bell pepper
¼	cup minced garlic
½	cup flour
2	cups chicken stock
1	cup cream
	pinch of nutmeg
2	tbsp dry white wine
½	cup grated cheddar cheese
½	lb crabmeat
	salt and pepper
½	cup Italian bread crumbs

Preheat oven to 375° F. Cut cauliflower into small pieces and boil until tender, but not soft. Drain and cool under tap water, then set aside. In a 2-quart sauce pan, melt the butter over medium heat. Add onions, celery, red pepper, and garlic. Sauté until wilted. Sprinkle flour in and stir with a wire whisk until a smooth white roux is made. Do not brown. Add the chicken stock gradually, stirring constantly. Bring to a low boil. Add cream and continue to stir. Reduce heat if mixture sticks to the pan too much. Add the nutmeg, wine and cheese while constantly stirring. After cheese is melted, remove from heat and mix in crabmeat. Salt and pepper to taste. Place cauliflower in a baking dish and top with the crab sauce. Sprinkle with bread crumbs. Bake 15-20 minutes or until sauce bubbles and bread crumbs are browned. Serves 6.

Sincerely,

Jerald Horst
Associate Professor, Fisheries