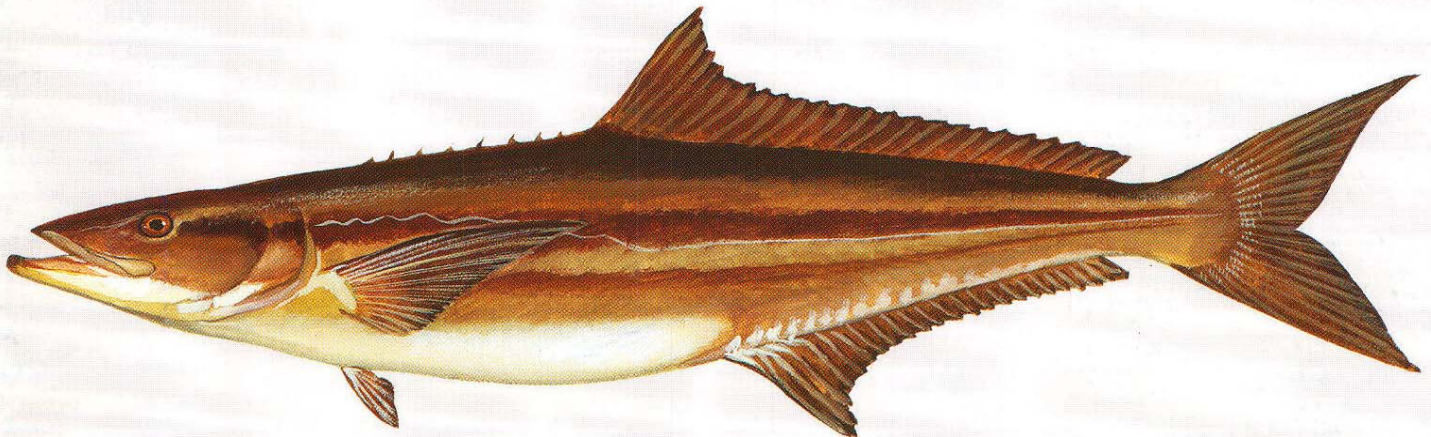


Virginia

MARINE RESOURCE

BULLETIN



Spotlight on Cobia .

Virginia Sea Grant College Program
Virginia Institute of Marine Science
College of William and Mary
Volume 32 • Number 1 • Spring 2000

Spotlight on Cobia

This issue of the Bulletin highlights the scope of research and culturing activity taking place at VIMS on the finfish, cobia. The cobia work is important for many reasons both inside and outside the VIMS community.

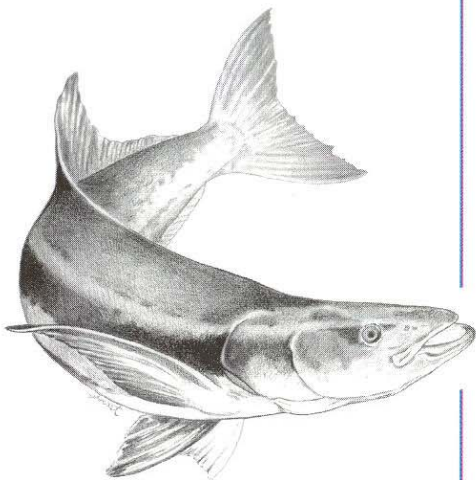
Here on campus, the expertise of several departments has been brought together, most notably, Advisory Services, Fisheries, and the Aquaculture Genetics and Breeding Technology Center. The resulting synergy has mutually benefited the researchers involved and greatly accelerated our knowledge of this impressive fish. Much of the research money comes through Virginia Sea Grant and the Virginia Marine Resources Commission's recreational fishing development fund. Virginia watermen and recreational fishers have also been active, reliable partners at every step, providing specimens for research and spawning, and participating in an ongoing tagging program.

Outside of VIMS, cobia research and culturing efforts continue at several research institutes and states within the Sea Grant College Program. Cobia has long been a research priority at the University of Southern Mississippi's Gulf Coast Research Laboratory and at the University of Texas. And through a less formal arrangement, North Carolina encourages commercial fishermen and recreational anglers to report tagged fish, providing critical links to Virginia's work.

So it is not surprising that during a recent meeting the idea of pooling talents and experiences through a regional, cooperative cobia project should surface. A general meeting was held at the World Aquaculture Society meeting in New Orleans this past February and, during the discussions, plans for a more focused gathering among researchers unfolded. That meeting is scheduled to take place in late summer in Ocean Springs, Mississippi, at the campus of the Gulf Coast Research Laboratory.

The benefits of working together are not insignificant. Through planning, current and future projects can be tailored to fit together, to complement each other, and to advance our shared knowledge base. Research dollars will be stretched further in the process, and research results will be more widely and rapidly disseminated. Positive effects reveal themselves in other ways too. Scientists are learning to talk to each other and to share their work for the benefit of the resource. The whole is, indeed, greater than the sum of the parts.

And that, it seems, encapsulates what Sea Grant does so well. By providing an umbrella for research while allowing individual states to set program priorities, Sea Grant promotes flexibility and, at the same time, spirited cooperation. With such a positive approach and alignment of resources from Virginia, to Mississippi, to Texas, the cobia effort is sure to make great strides!



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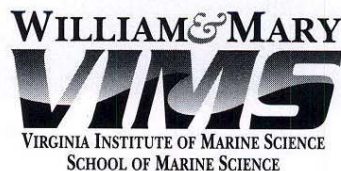
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The *Virginia Marine Resource Bulletin* is a publication of the Marine Advisory Program of the Virginia Sea Grant College Program, which is administered by the Virginia Graduate Marine Science Consortium with members at the College of William and Mary, the Old Dominion University, the University of Virginia, and the Virginia Polytechnic Institute and State University. Subscriptions are available without charge upon written request. Comments and questions about the *Bulletin* may be directed to the editor at (804) 684-7167, or by e-mail to mills@vims.edu.

The *Bulletin* is intended as an open forum for ideas. The views expressed do not imply endorsement, nor do they necessarily reflect the official position of Sea Grant of the Virginia Institute of Marine Science. Sea Grant is a partnership of university, government, and industry focusing on marine research, education, and advisory service. Nationally, Sea Grant began in 1966 with passage of the Sea Grant Program and College Act.



This work is the result of research supported in part by the NOAA Office of Sea Grant, U.S. Department of Commerce, under Grant No. NA56RG0141 to the Virginia Graduate Marine Science Consortium and the Virginia Sea Grant College Program.

A Cobia By Any Other Name...

By Sally Mills

Few fish elicit such animated reactions among recreational anglers as mention of the elusive cobia. Known here in the states as crab-eater, lemonfish, and ling, across the globe cobia (*Rachycentron canadum*) are commonly referred to as sergeant fish or kingfish. Regional nomenclature aside, the excitement of the pursuit is of *universal* appeal to anglers who've tried their hand at cobia fishing. It is the fighting nature of their personality that has propelled the cobia to popularity, especially among tournament fishers along the Gulf and Florida coasts.

Worldwide cobia citations date back to the year 1939, the year that

the International Game Fish Association was founded. According to those records, the largest recorded fish was caught in Shark Bay, Australia in 1985, and weighed 135 lbs., 9 oz. The largest recorded catch in Virginia occurred near Mobjack Bay in 1980 and weighed in at 103 lbs., 8 oz.

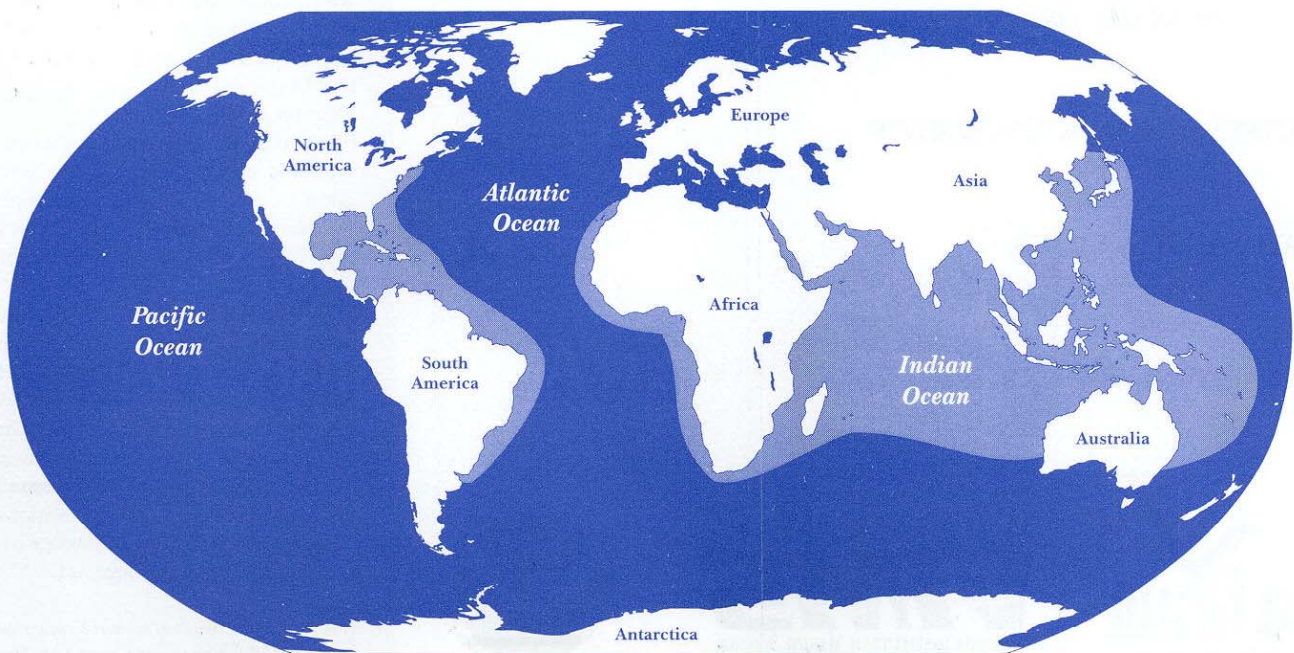
Cobia represent the single species of the family Rachycentridae, but are believed to be closely related to the dolphinfishes (*Coryphaena* spp.). The fish are found in temperate zones worldwide from Indo-Pacific waters to the southern Atlantic Ocean. Until recently, little was known about their life history or migration hab-

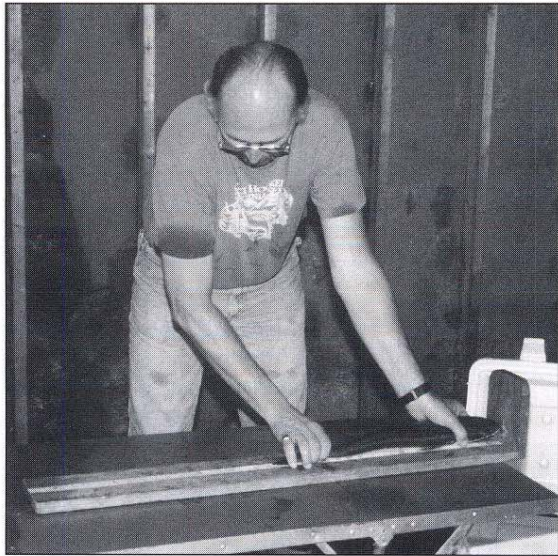
its along the U.S. East Coast or about the status of cobia stocks in the Atlantic and Gulf of Mexico. Ongoing research funded by Sea Grant and VIMS continues to fill in the gaps.

A fish profile

The cobia is an elongated fish, with a pronounced dorsal fin preceded by a series of single, sharp spines. It has a slightly depressed head and extended lower jaw. Its mouth is large and wide; its eyes, small. With its small, plate-like teeth, it clamps down with extremely powerful jaws that will quickly crush a crab or draw an angler's blood. A fast-growing

Cobia Distribution Worldwide





Cobia being measured by Mike Oesterling

fish, adults frequently reach 110 cm FL (fork length) by the end of the second year, and can grow to 2 meters (or 6.6 feet) FL at maturity. The cobia's black-brown dorsal side and creamy-white ventral side are complemented in juveniles by two bands of white that run the full length of the fish, from snout to tail, and are easily observed shimmering in the water. The bands disappear in older fish. Cobia forage on bottom-dwelling (demersal) prey—primarily invertebrates such as shrimps and crabs (hence the name, “crab-eater”), and small fishes. Though little is known about their predators, dolphin (*Coryphaena hippurus*) have reportedly preyed upon small cobia.

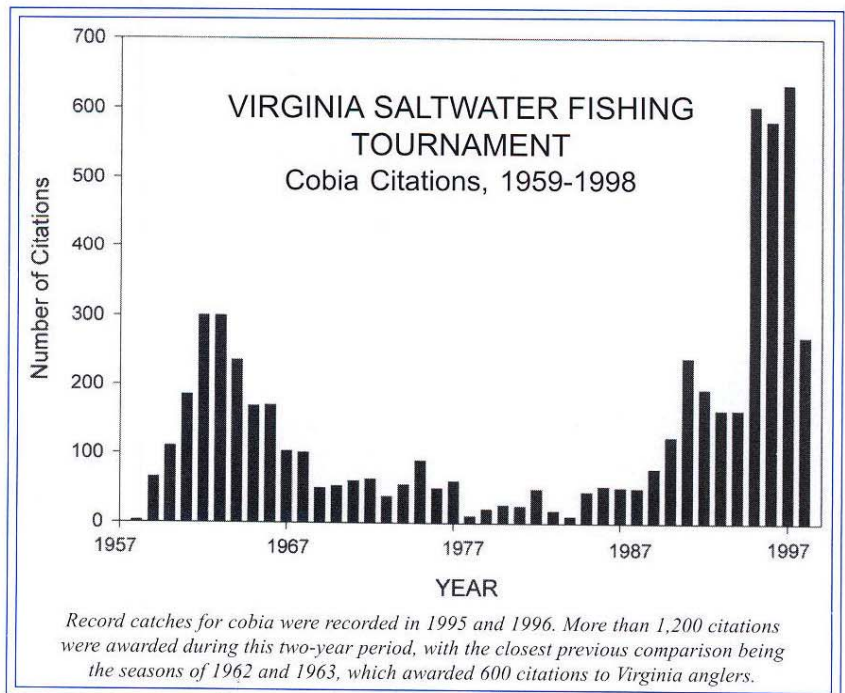
East Coast cobia stocks move up the Atlantic from the Carolinas and points south, reaching the Chesapeake Bay in late May and early June when water temperatures rise over 20°C. It is during June and July that the largest num-

ber of Virginia citations are awarded, and recent years have produced record numbers of large fish (see graph). Though they tend to move about as individuals and occasionally in small pods of two or three, cobia appear to favor structures such as pilings and wrecks and choose to congregate in the shade of these settings.

Cobia are good-tasting fish, with firm white meat similar in flavor to wahoo. The fish is eaten around the world, and is especially popular in Pakistan, Taiwan, India, Australia, and throughout the Philippines. Worldwide data are scant, but several sources cite Pakistan as the leader in annual landings.

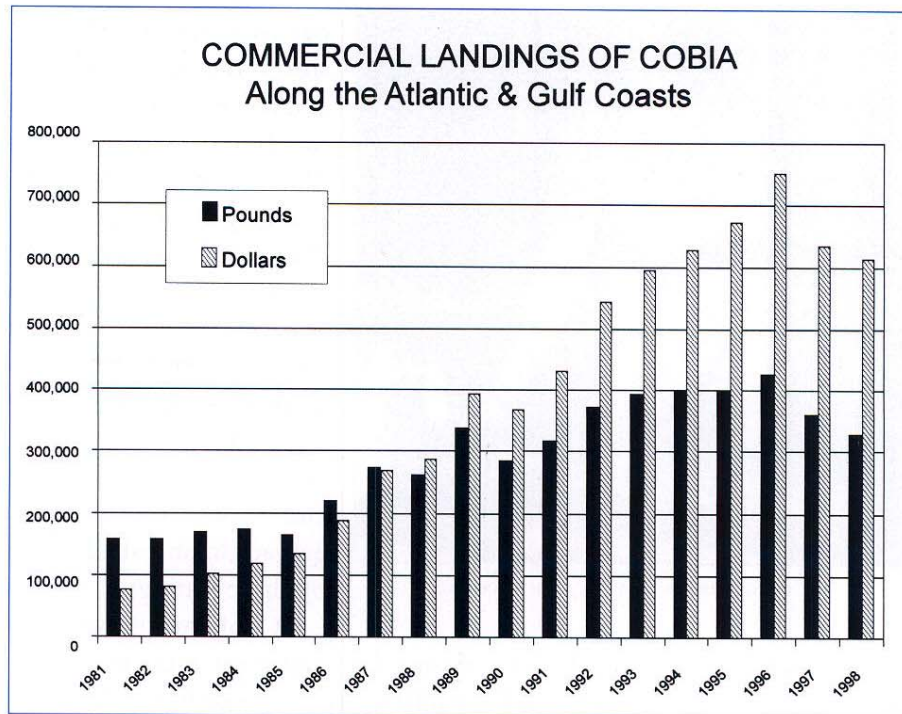
Not far away in the Mindanao region of the Philippines, juvenile cobia are being grown in cages in a promising aquaculture venture under development by the Filipino-Taiwanese governments. According to the trade newspaper, “Fish Farming International,” about 150 tons of whole fish averaging 6 kg were marketed in 1998 in Japan. The fish fetched prices between \$4.80 and \$5.70 a kg (which translates to \$2.20 to \$2.60 a pound). Success in growing cobia out to 6-10 kg (13.2-22 lbs.) over a period of just 12 to 18 months is attracting the attention of a growing number of private investors, who are now looking to expand their export markets.

In the United States, landings are a bit easier to come by, but compiled for commercial fishers only. That is because of the nature of the recreational fishery. Charter boats going out for other



species often come back with cobia on board, but the information is hard to track because success is highly variable. Recreational catch is speculated to be much greater than commercial harvests, however. In Virginia, for example, the Marine Resources Commission calculates that commercial landings from haul seines and pound nets comprise less than 4% of total landings. Virtually all of the cobia activity comes from recreational fishers on charter trips and party boats and fishing from piers and jetties.

Commercial data compiled by the National Marine Fisheries Service for the Gulf and Atlantic coasts show a steady increase in both weight and value of cobia landings over the period 1981 to 1998. The ex-vessel, or dockside, numbers in 1998 were totaled for the region at 327,448 pounds val-



ued at \$613,242, or \$1.87 per pound. That compares to a \$.48 per pound value in 1981.

Virginia-specific data reveal mixed results in landings since 1950. After a relatively healthy supply during the 1950s and early '60s, landings plummeted throughout most of the next two

decades. The past ten years have witnessed higher landings in general, and during 1995 and 1996, landings reached 22,011 and 20,796 pounds respectively—the highest numbers since 1963. During the last two years for which numbers are

available, ex-vessel commercial landings dropped to 11,710 pounds (1997) and climbed slightly to 13,419 pounds in 1998.

Landings data aside, little was known about the nature of the cobia stock in Virginia, and researchers at the Institute launched a series of focused studies aimed at building a more detailed composite. Because it is a fast grower with worldwide distribution and appeal, it has piqued the interest of several scientists here as a potential aquaculture species.

Aquaculture beginnings

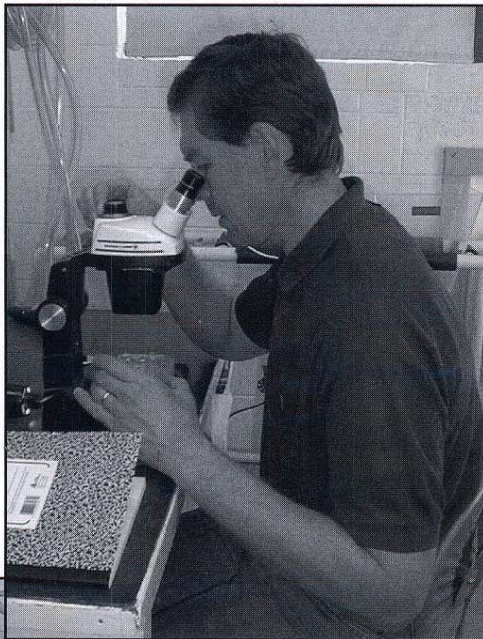
In the early '90s, a pair of cobia was introduced into the VIMS aquarium. Within months, the fish had nearly doubled in size, and they continued to grow steadily. They appeared to be hearty and quite adaptable to their captive environment.



Cobia often associate with sharks and rays and resemble the sharksucker (genus Remora).

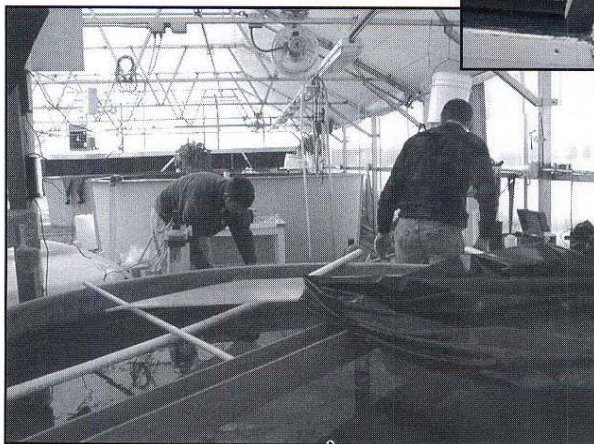
A few bells started to go off among not-so-casual observers. Would the fish make a suitable candidate for the marine finfish aquaculture movement under way at the Institute? If so, how could brood stock be obtained? How should the fish be handled and how could they best be kept alive?

Among the many conversations that ensued, it became clear that any cobia research would rely heavily upon Virginia watermen as a reliable provider of brood stock.



Researcher Jeff Tellock examines copepod culture (above), a potential food source for cobia larvae.

Here, he works with assistant John Olney, Jr. (left) at the cobia tank.



Haul seine and pound net fishers were contacted for potential interest in the project, and a timeline for learning how to manage and raise the fish was established.

According to Mike Oesterling, chief architect of the cobia culture project, the underlying goal has been to move forward incrementally while learning all that we could about the fish along the way. During the first year, researchers went after young-of-the-year fish, a mere 6-10" long, in an attempt to learn how to handle, transport, and care for them. That proved straightforward, since they could

targeted slightly larger fish, and adapted their transport scheme accordingly. This coming season, in late May/early June, researchers will attempt to rear the largest specimens ever: 20- to 30- pound fish. To accomplish this, they will use research vessels to meet the fishers on site, transfer the fish to a holding tank on the vessel, and return them to the aquaculture lab. These larger fish will initially be placed in a flow-through system that more closely mimics their natural environment and therefore reduces stress, and later transferred to a 7,500-gallon holding tank.

Once sex has been determined via a biopsy, females that are close to spawning will be encouraged to do so in captivity. Other females, less ready to spawn, will be held in tanks and fed prey based upon natural foods, including squid and capelin. Females will be given a hormonal implant to accelerate gametogenesis (the onset of reproduction) and maintained for several weeks until spawning occurs. Oesterling notes that the ideal capture this year would involve one ripe female for every two males. Anywhere from 5 to 20 specimens would be used

if available, to accommodate varying stages of spawning readiness among the captures.

The next step

If spawning is successful, eggs will be moved to the larval facility on campus and the captured fish, released back into the wild. The ultimate objective is the production of cobia larvae raised to fingerling size that can eventually be returned to a culture system for further grow-out. The final destination and size of captive fish depends entirely upon planned use: fingerlings would be held in a flow-through system until they become young juveniles (in cobia, about 3 months) and potentially, released into the wild in early fall to enhance existing stocks; larger specimens raised to become food

fish would be grown out in a recirculating system for a year or longer. The ideal size for this, according to Oesterling, is about five pounds, but that is one of many questions to be answered by a grow-out study.

While VIMS is at the cutting edge of cobia research in the United States, Oesterling is quick to point out that every research institution involved in marine finfish aquaculture is performing pioneering work. That's because the science is so new, and in this country very few marine species are being grown in artificial environments. As a result, basic questions need to be answered for every attempted culture endeavor—questions about spawning, raising larvae, maintaining a large number of juveniles, market opportunities, for example.

At VIMS, much of this work has proceeded hand-in-glove with the research of Dr. John Olney, Sr., who is looking at life history and ecology issues. That's good news for Mike Oesterling, who believes that the ability to raise cobia for stock enhancement purposes and as a food fish are very compelling reasons to move forward. He adds, "It is a desirable and palatable fish that is good to the taste. If a reliable supply can be developed, it should sell at a premium price."

Cobia Research in the Gulf

As a biologist working at the Gulf Coast Research Laboratory in Ocean Springs, Mississippi, Jim Franks has been studying cobia for almost 12 years and has garnered a tremendous amount of data on their migration habits, due to a long-running tag and release program there. Between 1988 and the end of the fishing season in 1998, more than 1,800 anglers participated in this cooperative effort that tagged and released over 10,500 cobia.

Here are just a few highlights from Jim's reports:

- The top two great-distance travelers swam more than 1,300 and 1,200 nautical miles respectively. According to Jim, "These two recaptures represent the only known recorded accounts of movement that far north up the U.S. East Coast of cobia tagged in the northern Gulf of Mexico."
- Referring to the number of days between tagging and recapture as "days-at-liberty," (DAL), during the same study period the DAL ranged from 1 day to 2,100 days (or 5.8 years!). However, 60% of the recaptures were made within one year of being tagged and released.
- Of general trends observed during the study, 81% of northern Gulf recaptures had been tagged in the northern Gulf and 57% of south Florida recaptures had been tagged in south Florida.

Jim has not yet found any Chesapeake-Bay-tagged fish in his study area, and there are few known examples of fish from the Gulf moving as far north as Chesapeake Bay. One tagged fish was released at Port Canaveral, Florida, and recaptured in the lower Chesapeake Bay 109 days later. Another tagged in the Gulf was recaptured off the South Carolina coast, and a South Carolina-tagged fish showed up in the Gulf.

Jim has also been part of a research team actively attempting to spawn and rear cobia in a culture system. By feeding cobia larvae a high-density diet of enriched rotifers, the team was able to raise them through day 13, post-hatch. Culturing research continues and Jim is hopeful that future genetics work will prove whether cobia stocks from the U.S. East Coast and Gulf of Mexico are, in fact, distinct sub-populations.

The Gulf Coast Research Laboratory, which is part of the University of Southern Mississippi's Institute of Marine Sciences, has been at the forefront of these efforts over the years. The lab will be hosting a regional meeting specifically set to bring together researchers working on cobia, sometime in late summer in Ocean Springs. Jim is excited about the development and notes, "This is an opportunity to discuss what we know about the biology of the fish and its real culturing potential. Those interested in cobia aquaculture will get together to identify research needs and discuss opportunities for collaboration on future research."



Heavy-weight rods are a necessity when fishing for cobia.

Cobia ecology

Understanding more about the ecology of the cobia is critical to the success of ongoing work in the aquaculture lab. And obtaining specimens for such research happens where the action is – at the dock at Wallace’s Bait & Tackle in Foxhill, Virginia. During the summers of 1996 and 1997, Susan Denny and assistants from the VIMS Department of Fisheries Science examined cobia specimens from recreational fishers as they came off their boats. Specifically, they collected otoliths (ear bones) and gonads (sex organs) from fresh cobia in order to conduct histological analyses to learn more about growth and reproductive

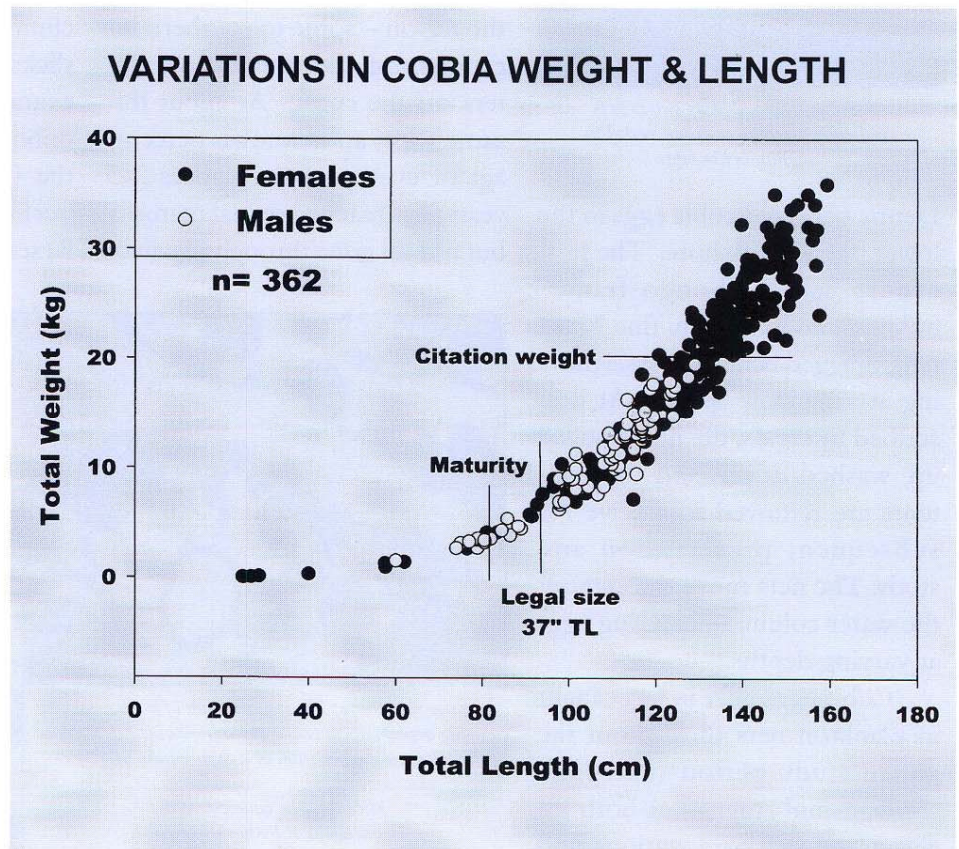
ecology. They were assisted in this effort by a handful of individuals throughout the lower Chesapeake Bay: Captain Jim Jenrette from Cape Charles, Donnie Wallace in Foxhill; Jimmy Lewis in Gloucester Point, and over 100 anglers who responded to local ads.

What Denny has discovered in her work with Dr. Olney is of interest to cobia fishers in Virginia and throughout the southeast. By examining growth rings in cobia otoliths, scientists have aged all of the fish sampled at 12 years and under. In their survey of more than 500 fish over two fishing seasons, Olney’s team confirmed that females grow both faster and bigger than their male counterparts. They found that females attained

a maximum length of 160 cm and weight of 37 kg, while males reached a maximum length of 130 cm and weight of 20 kg (see graph). Males from their sample did not reach trophy size, which was, at the time, 45 lbs. for a citation issued by the Virginia Saltwater Fishing Tournament. Also, females outnumbered males by a ratio of 2:1 during the sampling period.

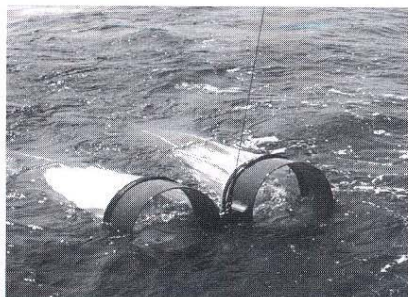
Reproductive status

Another strand of the project involved examining the gonads of mature cobia to gain an understanding of their reproductive status while in the Chesapeake Bay. Through histological analysis of oocytes (developing female repro-



ductive cells), Olney and others learned that females are reproductively active while in the bay and spawn here during several events – as many as six to eight.

Concurrent with this work, the research team was involved in delineating spawning grounds at the bay's entrance, where a plume created by fast-moving currents appears to be a favored spot for ripe females to feed. Using two research vessels to conduct ichthyoplankton surveys during the summers of 1996 and 1997,



A bongo frame holding two nets is pulled behind the research vessel to capture cobia eggs.

Denny collected cobia eggs in the lower bay and offshore. The procedure uses a “bongo frame” holding two extremely fine Nitex nets, dragged behind a vessel moving at very slow speed. At prescribed intervals, the net is pulled up, washed down, and the contents are removed to a sieve for subsequent preservation and study. The nets move throughout the water column, capturing eggs at varying depths.

Cobia eggs were in fact caught in plankton nets throughout the entire study period (mid-June through mid-August) at both inshore and offshore stations and

characterized as large, at 1.1-1.5 mm in diameter. Note the large, dark oil globule in each egg yolk in the micrograph shown below. It is this oil globule that renders the eggs buoyant in the water column. Several larvae were also captured, but only at offshore stations.

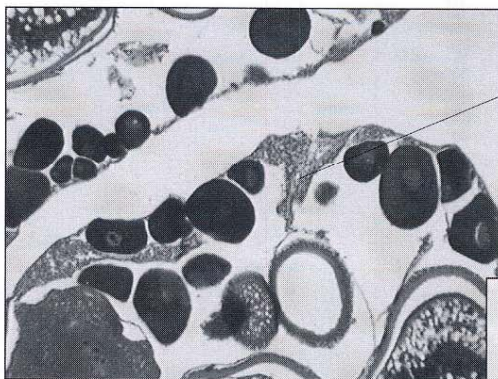
Management implications

At this point in time, the rate at which anglers remove reproductively-active cobia from the population is not known. Young females (3-5 years) that have spawned remain in the Chesapeake during the summer months and have the capacity to reach 37 inches (the current minimum size limit for taking) by September, when they begin to move out of the region – some to southern locations and others, to deeper waters off the coast. At about this same time, an unknown percentage of even younger females (<3 years) has reached sexual maturity but not yet gone through a spawn-

ing phase. These fish are of sufficient size to be taken, however, and therein lies the rub. It is hypothesized that these large, highly fecund females are targeted by recreational fishers in the lower bay as the fish begin to migrate off the Virginia coast. But other than citation records, little data exist on the recreational aspect of Virginia's cobia fishery.

Estimating fishing effort

In order to get at that information, Olney's team devised a clever plan to estimate recreational pressure on cobia stocks. They conducted a series of fly-overs in the lower bay and, through low-level flight, were able to identify the trademarks of cobia fishers in known “hotspots.” Signs such as chumming, anchoring, using bait slicks and heavy-weight rods, for example, indicate cobia fishing onboard. Working in tandem with the fly-over is a research vessel performing “ground-truthing.” Researchers on the vessel move

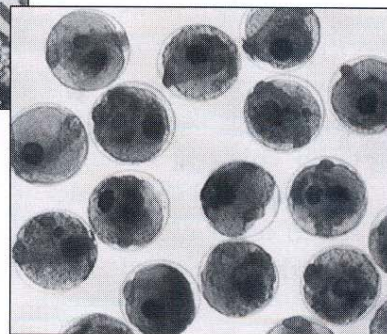


Micrograph Above: This photograph of a microscopic slide depicts oocytes in a gonad, obtained through histological preparation of a thin section of ovary.

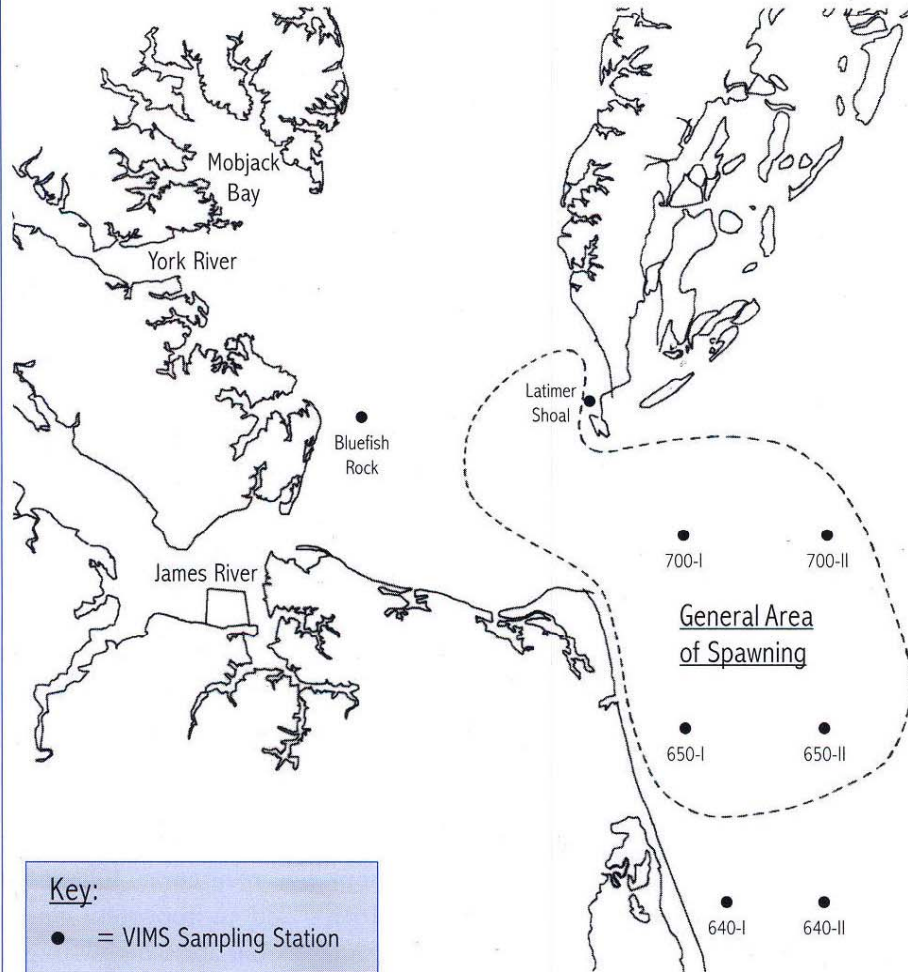
Micrographs courtesy of the Department of Fisheries Science.

This collapsed follicle indicates recent spawning; specimen was collected in early summer.

The fertilized eggs shown below were captured in a plankton net. Large oil globules (dark spots) in the eggs render them buoyant in the water column.



COBIA SPAWNING GROUNDS in the Lower Chesapeake Bay



throughout a designated area and interview fishers about what they are catching, the number of cobia on board, how many hours they've been at it, and other data that can be used to construct a clearer picture of fishing effort.

Fishing effort is further documented by information collected from a video-camera placed at Wallace's Bait & Tackle that cap-

tures footage of cobia activity at the dock, and by follow-up phone calls with anglers participating in the survey.

The cumulative knowledge gained from these studies and surveys provides a qualified basis upon which to estimate fishing effort and think about appropriate management responses. Building on these data, Drs. John Olney,

Sr. and John Hoenig developed models relating cobia growth and egg production to fishing mortality (based upon fishing effort) at two different size restrictions. The model shown on page 10 is complex, and best explained by Dr. Olney:

“Egg production per recruit is a declining function of fishing mortality. The trade-off between egg production and yield can be visualized by plotting egg production per recruit against yield per recruit. Going from left to right, each point on the curve represents a level of fishing mortality (F). Each curve pertains to a particular size regulation. In the absence of fishing (when yield per recruit is zero), egg production per recruit is maximal. Thus, each curve in the example has the same origin.

“If we compare two types of fishing with different size regulations, we can conclude that one is uniformly superior to another if, for any level of yield, the one provides greater egg production than the other; likewise, for any level of egg production, that one provides higher yield than the other.

“In the case of cobia,” Dr. Olney notes, “our modeling re-

veals that when fishing mortality is low, a smaller minimum size provides a higher egg production for a given level of harvest per recruit. However, when fishing mortality is high, the situation reverses. When F is high, the larger minimum size is beneficial because it conserves egg production and produces a greater yield (see points Y & Z). In other words, at high fishing mortality, the larger minimum size provides a higher egg production and a higher yield for a given level of fishing effort.

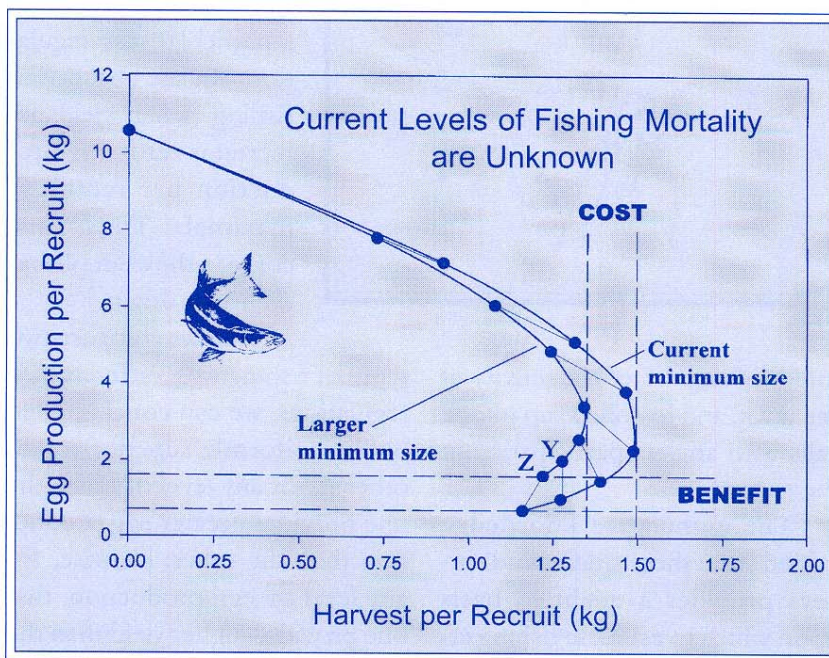
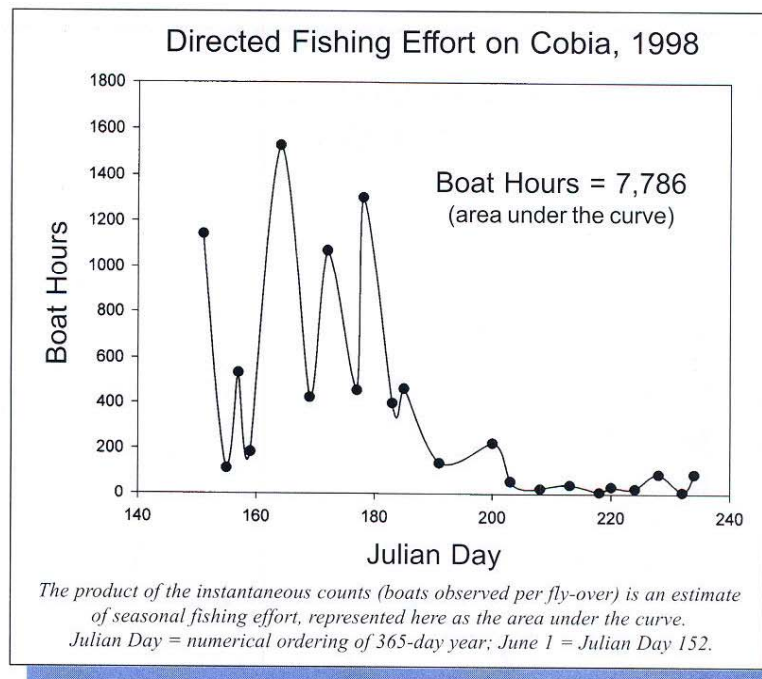
“We conclude that if we can be certain that fishing mortality on cobia will be kept low, then the smaller minimum size, currently 37 inches, will provide a higher yield than the 44-inch minimum size, while maintaining a reasonable high level of egg production

per recruit. However, if one believes that the fishing mortality may be or become large, then the higher minimum size is safer.”

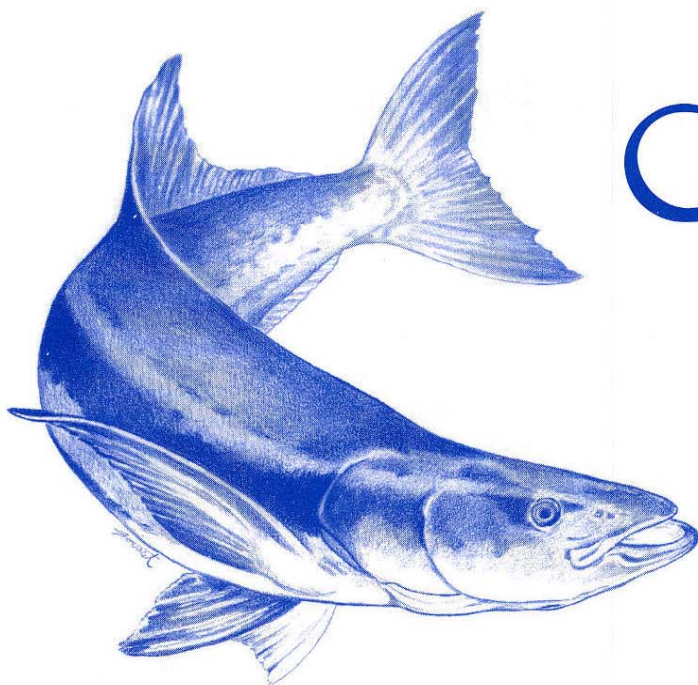
Since there are no ongoing

efforts to monitor the cobia fishery in Chesapeake Bay, there are no current estimates of fishing mortality. We do not know what F is for cobia stocks. Thus, a passive management strategy, such as raising the minimum size, could protect our stocks if F is high.

In considering a higher minimum size restriction, Olney and Hoenig add an important caveat: “Since cobia are a highly migratory species that travel along the entire southeastern coast and throughout the Gulf of Mexico, any attempts to impose size restrictions in Virginia must be accompanied by equal restrictions in other coastal states along their migration path in order to be effective.”



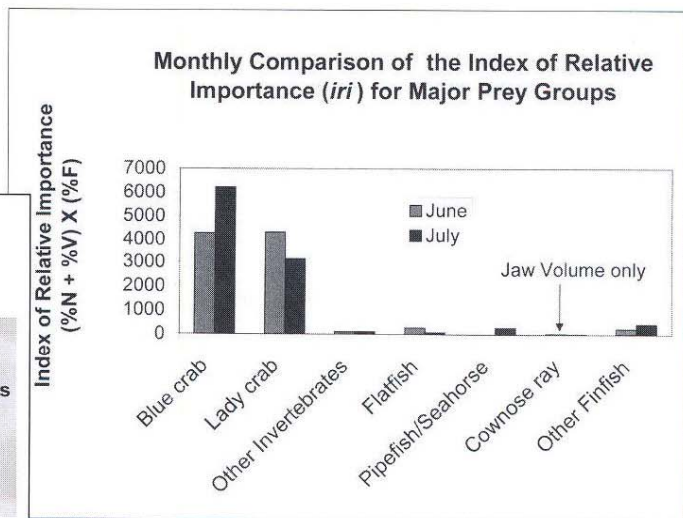
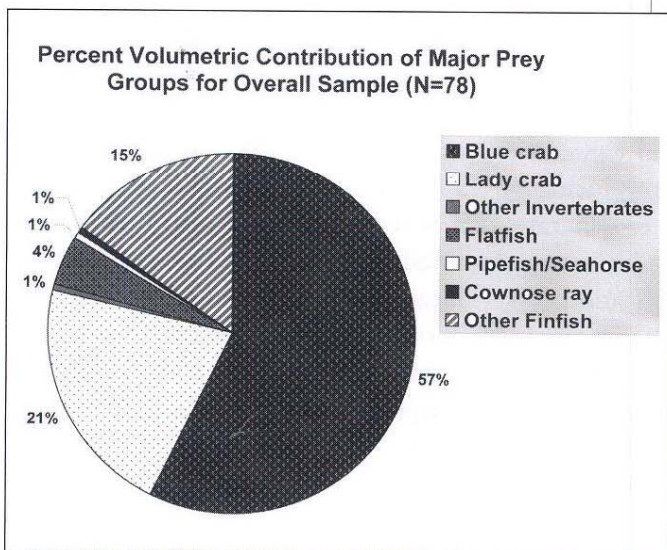
In graphing egg production against yield, or harvest, per recruit, a model of fishing mortality can be established. Based on this model, when fishing mortality becomes high, the higher minimum size is safer.



Cobia Diet

In an analysis of stomach contents of cobia captured in the lower Chesapeake Bay in 1997, graduate student Mike Arendt uncovered some interesting data that underscores the variability of results observed thus far on the species. Arendt examined the stomach contents of 114 cobia collected at weigh stations and tournaments. Of the total collected, 78 stomachs contained identifiable, non-bait prey items. In contrast to results from prior studies that examined the cobia's diet, Arendt found the following:

- ◆ As many as 28 different species were consumed by the cobia examined, but swimming crabs dominated the diet;
- ◆ Swimming crabs dominated the diet of all sized cobia in the sample, by both number and volume (vs. an earlier study that found finfish to be the dominant prey item in the largest size class examined, which was 115-153 cm FL);
- ◆ Pipefish and seahorses appeared important only in the diet of smaller cobia (vs. their importance to all sizes examined in a study conducted in North Carolina waters); and
- ◆ Cownose rays, previously unseen in the cobia diet, were observed in sampled cobia greater than 100 cm FL.



FISH TAGGING REPORT		Complete Tagging Report and return card immediately. Tag information must be reported promptly to be useful.	
TAG NUMBER	SPECIES	DATE	
LOCATION CAUGHT / LOCATION RELEASED		WEIGHT (LB)	
LENGTH (INCH)	LENGTH (TOW)	TELEPHONE	
TAGGER (NAME)	ADDRESS		FISH CONDITION
BAY TYPE		REMARKS	
<input type="checkbox"/> LIVE <input type="checkbox"/> DINE <input type="checkbox"/> APPROX <input type="checkbox"/> OTHER			
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Tagging Efforts Provide Insight

By Sally Mills & Jon Lucy

Inherent to any fisheries management plan is a basic understanding about species growth and reproduction, diet, habitat needs, and migration. In the case of cobia, very little was known about such behaviors or habitat needs; yet a growing number of citations were being awarded for large fish taken during the Virginia Saltwater Fishing Tournament.

In fact, little time had been invested in studying cobia since the early research performed by C. E. Richards at VIMS in the late '60s. Richards tagged 16 cobia in the Chesapeake Bay during 1967 and 1968, with six returns. Three returns were recorded between one and five years after tagging, within 32 nautical miles from the release site. Cobia that returned during the same year of tagging were recovered between 12 and 36 nautical miles from the release site. The information suggests that a distinct, repetitive, summer habitation occurs and that the cobia in the Chesapeake Bay may be a distinct group or sub-population.

The question lingers. Faced with no contemporary information about cobia movement in the Chesapeake, a tagging study was initiated in 1995 through the Virginia Game Fish Tagging Program, with support from the Virginia Recreational Fishing Devel-

opment Fund, administered by the Virginia Marine Resources Commission. The study set out to identify migratory habits of cobia along the East Coast, through a well-publicized tagging effort by trained recreational fishers.

Tagging of cobia has occurred every year since, and has received strong support from the Marine Advisory Services Department at VIMS and the Virginia Sea Grant College Program. Money from the fund has been used primarily to purchase tagging equipment, conduct training workshops for volunteer fishers, and compile study results. Claude Bain with the Virginia Saltwater Fishing Tournament and Jon Lucy with Marine Advisory Services at VIMS co-direct the project and act as principal investigators, while graduate student Michael Arendt assists with special tagging studies, data validation, and report writing.

Results to date are presented in the adjacent chart. Since 1995, 362 cobia have been tagged off the Virginia coast, producing 48 recaptures (a 13% return rate). The recapture rate indicates good tag retention in fish and, most importantly, suggests that tagging (and the hook and release that accompanies it) does not interfere with fish behavior or health.

A few anecdotal observations

will illuminate the data shown here. Of the fish recaptured one time (single recaptures), two general trends were seen:

- ◆ Larger fish caught initially in the lower Chesapeake Bay near the Bay Bridge-Tunnel in early to mid-summer were most often recaptured within the lower bay at or near the same tagging site the following year. One fish returned two consecutive years. Same season recaptures inside the bay indicate cobia both staying at release sites and moving significant distances.

- ◆ Small (<14") fish caught in the Elizabeth River in the "hot ditch" area near the Virginia Power plant and close to the Intracoastal Waterway tended to stay in the area for significant time periods. Recaptured in the same vicinity from between 8 to 37 days later, these fish probably over-wintered here (from November to perhaps as late as April) before moving farther north into the bay.

Of fish caught on more than one occasion (multiple recaptures), a few theories can be offered:

- ◆ Several individuals were recaptured in or very near to the same location year after year. These occurrences suggest the importance of certain areas in the bay for congregating fish – either for eating or spawning reasons.

- ◆ Data demonstrate that spawn-

ing-sized females are returning annually to the lower Chesapeake Bay, and that the same fish is capable of returning again and again.

◆ Data also demonstrate that the catch and release process does not harm the fish; multiple recaptures and recaptures of deeply hooked fish clearly substantiate this fact.



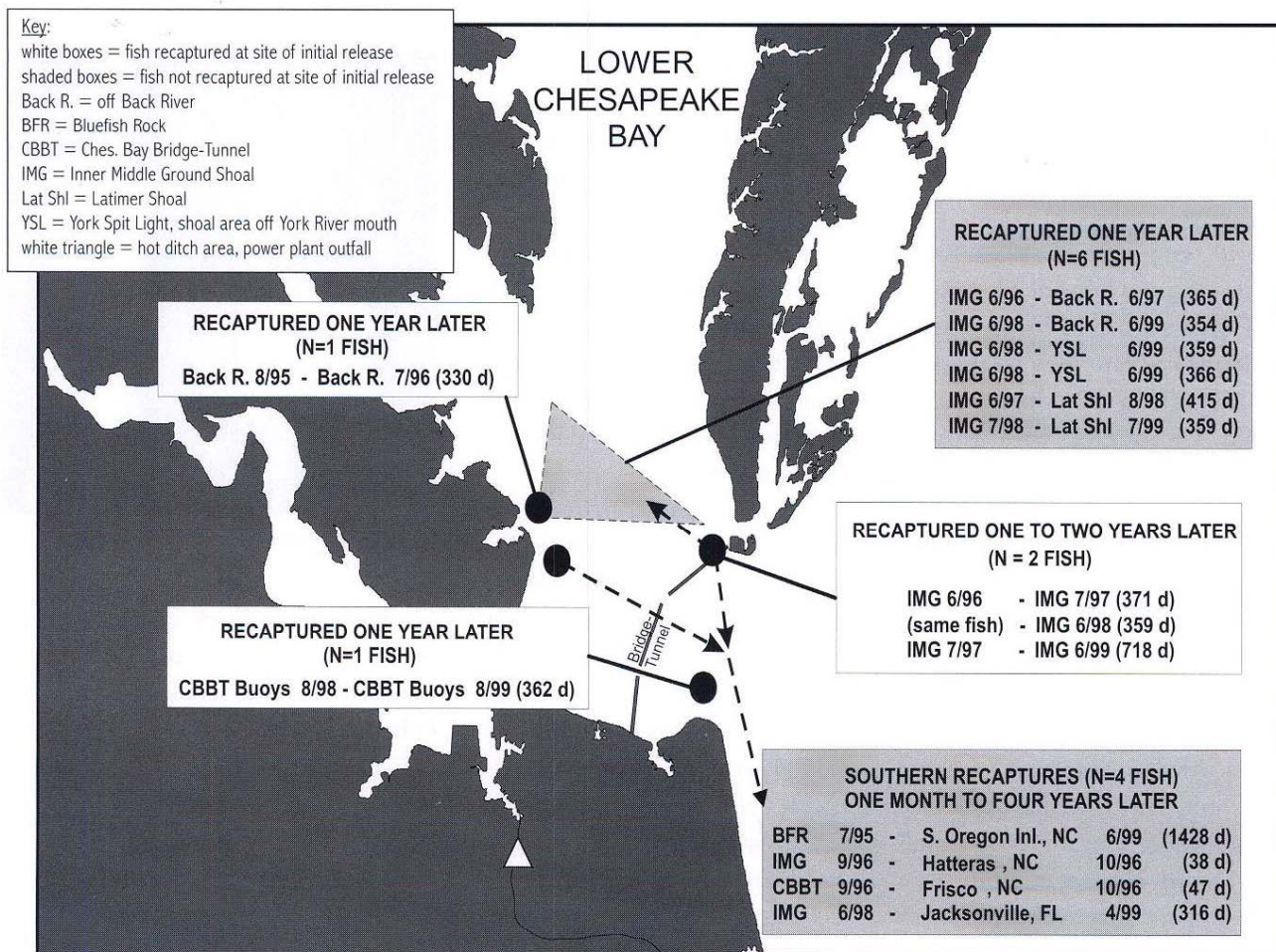
The cobia tagging program is beneficial for many reasons. First and foremost, it provides much needed information about a poorly understood marine species. When multiple recaptures are made, we get unique information about fish movement over time.

That information is key to identifying essential fish habitat – information that gets incorporated into management plans. Jon Lucy adds, “Fishers can help us by writing down the tag number, estimating the size of the fish, and then *releasing* it. Tag numbers can be called in to (757) 491-5160.”

A secondary benefit that, until now, has been somewhat overlooked is the opportunity realized by having a trained cadre of fishers equipped with tagging devices along Virginia’s coastline. Once this group has mastered proper handling and tagging procedures, those skills can be readily trans-

ferred to many other marine species that might warrant a need for study – often at moment’s notice. Such has been the case on several occasions with large, unpredicted puppy drum migrations in the bay.

As Claude Bain is quick to point out, it is this team of volunteers, approximately 140-strong in Virginia, who deserves great credit for the success of the program. “The sportfishermen do this on their own. They donate their time on the water, their fuel, and attend workshops regularly to stay up on the latest tag retention studies. We could not do this work without them,” he emphasized.



Source: Data compiled and analyzed by Michael D. Arendt.

Cobia in the Bay: A Moving Target?

By John Olney, Jr.

As one of the two largest gamefish entering the Chesapeake Bay, the cobia predictably draws a great deal of interest from local sportfishers. Often growing to a length of 50 inches and weighing anywhere from 10 to 100 pounds, the cobia by all reasonable estimates is one of, if not *the*, premier sportfish in the Chesapeake Bay. Available in sizable numbers for only a few months in the summer, it's reputed as a bullish fighter, and at times can be an awfully elusive creature. It's a fish that people brag about when they catch one, and it's a fish that people tend to tell exaggerated stories about when they lose one.

Cobia season in Virginia usually begins in late May as the fish are migrating into the bay to spawn. Chumming with ground bunker (menhaden) is the favorite local method in the early months of the season, accompanied by live eel or spot as preferred bait.

"You wouldn't think it, but usually the best cobia fishing starts on the western shore of the bay first, not the eastern shore — places off the beach at Buckroe, York Spit, and Bluefish Rock are usually where they show up first," says David Hogge, a long-time recreational cobia fisherman from Gloucester.

"The cobia are caught in good numbers to the Bay Bridge-Tunnel and the eastern shore later in the summer, though they tend to be a smaller class of fish." David goes on to say that in his experience it's best to always have your tackle thoroughly prepared, and to grind your own chum, so you know exactly what you are fishing with.

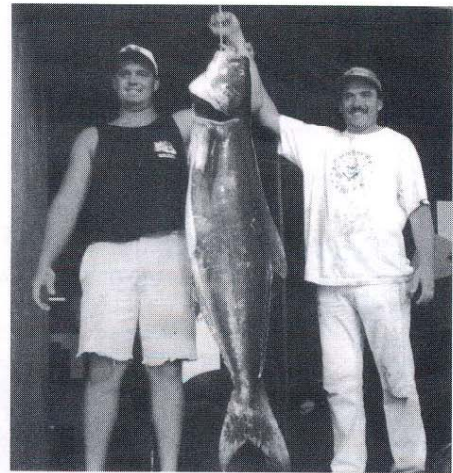
"Man, most people just don't know how much work it is to keep everything up to date. The fishing is one thing, but all the work to get to the fishing stage is something else altogether," he adds.

It may be a lot of work, but whatever David does seems to be effective. In 1995, he and his fishing parties caught 106 cobia (in a season that usually doesn't last 100 days), and in 1996, he and his buddies caught 92.

Later in the season, in July and August, "running the buoys" is a popular fishing method in which fishers cruise from inlet buoy to inlet buoy (hoping to spot a cobia hanging underneath a surface structure) and toss a live bait, or a bucktail to entice it. Cobia, as a general rule, are often closely associated with a structure, whether it is a floating buoy or a wreck on the bottom; this is especially apparent after spawning season.

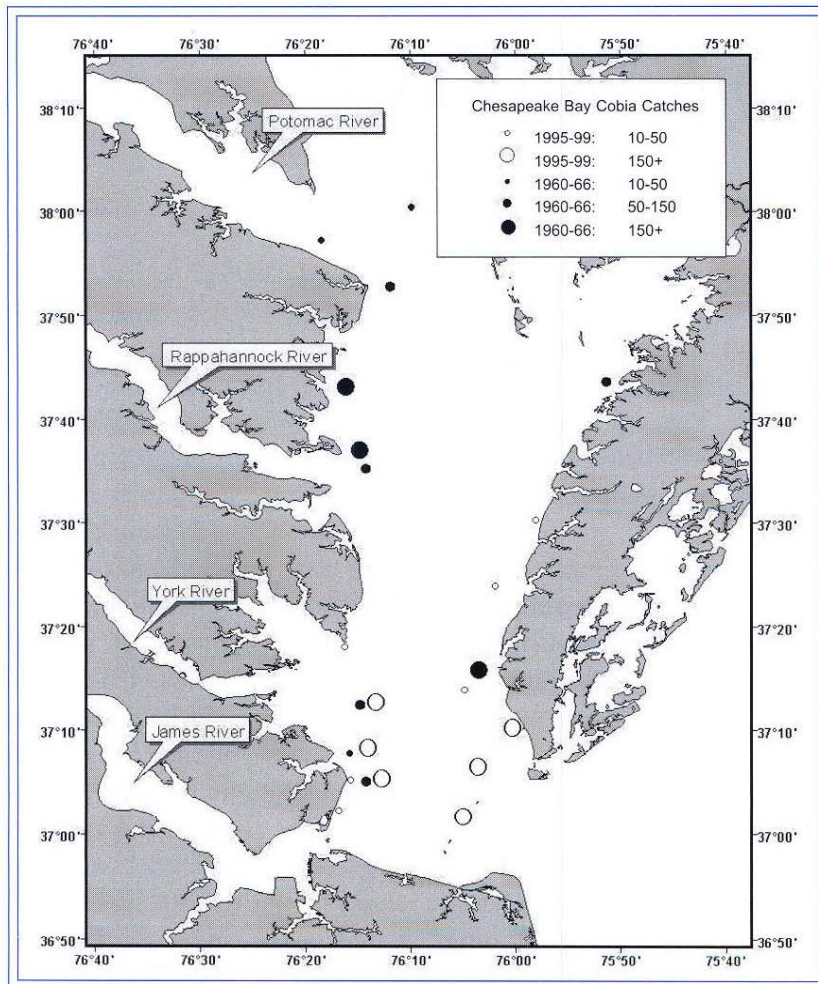
Cobia hotspots

The most popular fishing locations for cobia in the early summer months are York Spit, the Bluefish Rock and Poquoson Flats area, and off of Hampton Roads. Later, much of the fishing pressure is diverted toward the eastern shore and the Bridge-Tunnel fishing areas, but these haven't always been the preferred spots.



Cobia anglers David Hogge (R) and Timmy Brown proudly display their catch.

If you could step back in time and ask a bay fisherman of the 1960s where the best location for cobia in the Chesapeake Bay was, you may be surprised by his answer. Of course it wasn't the Bay Bridge-Tunnel (construction wasn't even finished until 1964), but it also wasn't the normally productive places like Latimer Shoals,



off Back River, or the Inner Middle Ground Area. These three areas, popular and often overcrowded now, only produced a total of 36 citations over the seven-year period from 1960 through 1966. Contrary to this, during the period 1995-1999, over 800 citation cobia were reportedly captured in these same locations. If you throw in the Bridge-Tunnel reporting data, the difference grows from 36 citations during 1960 to 1966, to over 1,100 citations during the period 1995-1999.

So, you might ask, where were all the fish? Surprisingly enough, over 900 of the approximately

1,300 total Virginia citations that were awarded during those years were taken north of the Rappahannock River. The largest catch area extended from Windmill Point to Point Lookout on the western side of the bay, and from Tangier over to Onancock on the eastern side. This heightened activity, of course, was the major reason behind Onancock's once cherished nickname as the "Cobia Capital of the World." Fishers went after cobia with trolling spoons, which seems very different from the chumming style that is most popular today.

Today's cobia numbers are

quite different for this area of the bay. From 1995-1999, only three citation-sized cobia were reported here, and the question is, why don't the fish go north anymore? Surely, the fishers in Hampton and Poquoson don't seem to mind the shift in cobia traffic, but finding an answer to the question is not easy. Ideas floating among the recreational angling community include: an unexplained change in fish behavior, changes in available habitat, or even changes in angler behavior. But with little to no data to support the change, it's currently anyone's guess.

◆ QUICK FACTS ◆

- ◆ The current harvest limit for cobia is 2 per day, no smaller than 37" fork length.
- ◆ Once a familiar spot for cobia, Point Lookout is nearly 60 miles from the Chesapeake Bay Bridge-Tunnel.
- ◆ Cobia are often segregated by gender. Males are commonly caught on the eastern shore in late June, July, and August while females are most often caught on the western side of the bay in June and July.
- ◆ Though not a definitive fact, a 37" cobia (the minimum size limit in Virginia) is probably five years old.
- ◆ Virtually all citation-sized cobia are mature females. Males do not generally reach 50 lbs.
- ◆ The IGFA all-tackle record cobia is 135 lbs., 9 oz. The fish was taken by Peter Goulding of Shark Bay, Australia.
- ◆ The Virginia state record cobia of 103 lbs., 8 oz. was caught by Edward Brown in Mobjack Bay in 1980.

The Old Fish Dock

By Charlie Petrocci

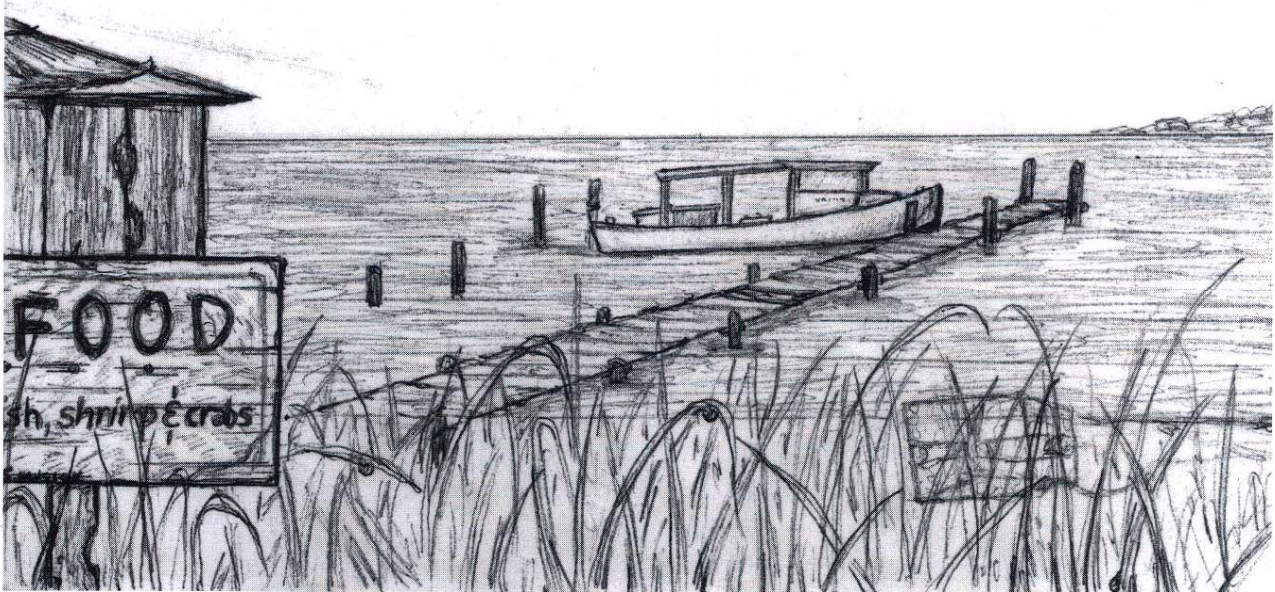
As you walk across the dock, old boards groan under each step. Various sized fish scales of unknown species cling to the boards like barnacles on a jetty. Calico-colored cats sit lazily in your path and make little or no effort to get out of your way. And they seem to peer at you from every nook, fish box, and shelf that lines the bordering, rusting wall. In the background, gulls scream and voices carrying distinct accents of past generations drift through the air. Wooden benches, an old scale, and a couple of cleaning/culling tables line your passage to a small office and retail market. An outdated winch, complete with wooden block and tackle, are the only signs of anything resembling high technology found here. Its

boom sways precariously over the water's edge. Here there are no computers, fax machines, or even conveyor belts to carry fish shoreside. This is a fish dock that has remained timeless in an industry whose time demands constant change.

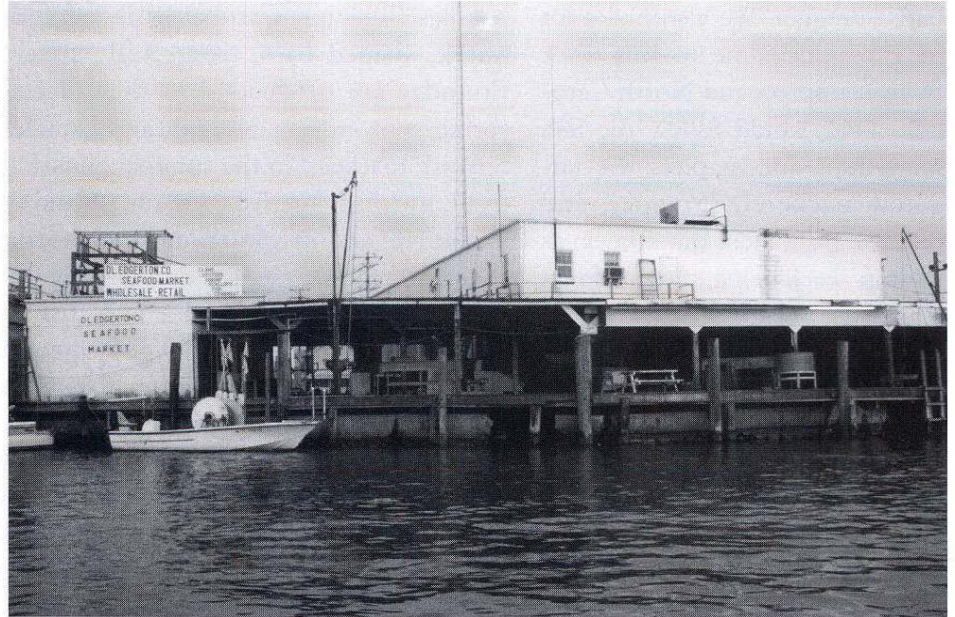
Most docks around Virginia today are used for commercial fishing, for family sport fishing, or simply to tie up a pleasure craft. But if we take a closer look, such docks have served as a critical backdrop to our cultural heritage for centuries. They have played an important role in both creating history and developing international geo-political positioning. For it was from docks that kings stepped ashore to new lands, where diplomats left for long voy-

ages, and where crusaders, pirates, and revolutionaries boarded ships to meet their destinies.

It was from docks that explorers exposed a known world to the expanses of an unknown world. Docks were the launch pads of exploration for 12 centuries. They were also the hotbeds of commerce and crime, and home to the ill-reputed members of society. Docks felt the winds of trade and the despair of war and colonization. It was upon their boards that sailors brought messages from around the world. Here the outcomes of distant battles were read aloud to the waiting masses and the names of ships lost at sea announced. In America, they controlled a new colony's wealth and her destiny.



Across docks lining Virginia's waterfront traveled tobacco, lumber, animal skins, seafood, and the intrepid adventurer seeking a new place to call home. Today, only seafood still travels across their ancient boards. Most of the old docks are gone, but the handful still dotting historic shorelines evoke to the imaginative the sights and sounds of a by-gone era.



The old fish dock, DL Edgerton, has served the historic seafood town of Chincoteague since 1928.

DL Edgerton's

Located on the waterfront of the historic seafood town of Chincoteague Island, Virginia, sits an old-time fish dock, known as DL Edgerton's. Edgerton's fish dock is probably not unlike very many other fish docks found along the Mid-Atlantic. It buys fish, packs and copacks fish, sells ice, and has a small retail market. It closes by 4 o'clock each day. Edgerton's has seen its share of gill-netters, draggers, monitors, bateaus, Jersey skiffs, scows, and deadrises.

The dock has been warmed by thousands of sunrises, felt the tugs of countless tides, and supported the weight of hundreds of watermen and millions of fish. Though its claim to history is not noteworthy, it represents an era of tough men in wooden boats — a cultural centerpiece symbolizing the independent waterman. It continues to attract active watermen as well as those who have now retired, who come daily

to reminisce, to share stories, and to watch for each day's catch. They sit with wrinkled eyelids; the lines on their faces reveal the harshness of years gone by. They do not forget the dock and the safe haven it represented during their glory years as fishermen.

"Donnie Edgerton bought this old dock in 1960," says manager William Lee Moore. He will probably be the last to own it in a long line of previous owners.

"We don't see much of Mr. Edgerton, as he lives across the Chesapeake Bay in Virginia Beach, so he lets me run it as I see fit. I've been working on this dock for 47 years now and I suspect I won't leave until the day I die," says Moore. The fish dock opened in 1928, mostly taking in fish such as mackerel and oysters and selling ice from the adjacent ice plant, stuck on one end of the building.

Herman Whealton, a regular,

reminisces, "We had a lot of pound netters fishing around these waters years ago, and they would come in with their catch standing knee-deep in fish inside those open boats. You would also see wood boxes, each holding a hundred pounds of fish, piled high on this dock. And then the old fish mongers who would come to get their share and peddle fish in the streets of the island and in the small towns on the mainland."

"I've seen draggers tied up to this dock six boats deep and three across," says waterman John Moncheitti. Moncheitti proudly tells me he has been landing fish on this dock "...since 1949, when I moved down here from New Jersey to take advantage of the good mackerel fishing in those days. My father was a fisherman, so after the war I followed in his footsteps."

He adds, "In the early days, I

had a dragger. We also had a lot of draggers come to this dock from Hampton and North Carolina. They would follow the fish migrations and markets. We targeted mackerel, flounder, and bluefish back then. But as soon as shrimp were being caught down south the southern boys would disappear. Then we had the fishery to ourselves.”

Today’s boats (mostly small scows and 30- to 40-foot gill-netters) leave at daybreak and return by one or two o’clock. “We have about ten gill-netters working out of here and about ten clambers who work on and off,” says dock foreman, Frank Reed. “We pack out about 60 boxes of fish a day here now, a far cry from the days when this dock moved thousands of pounds of fish a day.”

Like most fish docks, Edgerton’s is open year round and

handles fish on a seasonal basis. Shark, striped bass, trout, and flounder are off-loaded in the spring; spot, croaker, bluefish, and Spanish mackerel in the summer; trout, rockfish, kingfish, and tuna in the fall; and in winter, mostly shellfish such as oysters, although clams are taken year round.

“We shuck about a 1,000 gallons of oysters a year, but we only employ three guys for that,” adds Moore. Recently spot and croaker have been the steady money fish for local watermen. There are also a couple of lobster boats working out of Chincoteague that use the dock to take on ice, off-load, and pack the catch for markets in Washington, D.C., and Jessup, Maryland. These boats are fishing the southern range of the lobster grounds so their catches are moderate compared to those working northern harvest areas.

“At one time this fish dock employed 15 workers,” reports waterman Bill Booth. “There were three men who did nothing all day but make boxes. Now only two full-time men work the dock and one or two seasonal helpers,” he added.

Lloyd “Woose” Reed

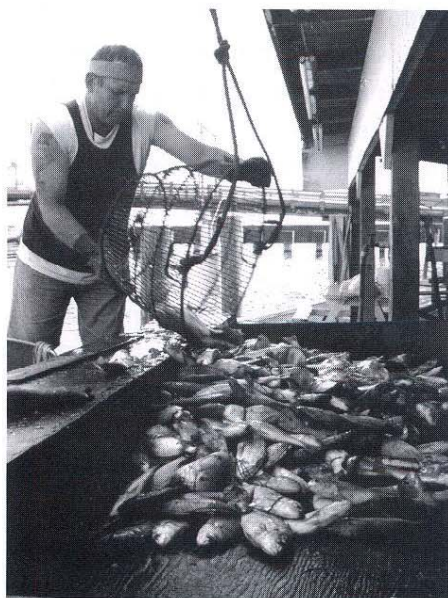
Known to everybody at the dock simply as “Woose,” Lloyd Reed at 92 is the oldest waterman who fishes out of Edgerton’s and possibly the oldest waterman who fishes along the entire mid-Atlantic coast. Though he can’t recall where he got his nickname, he does remember the days gone by at the old fish dock. The son of a

son of a waterman, he recalls the past with a twinkle in his eye. “I started by helping my father sell mullet in the morning out of a fish cart. We’d drive along the street and occasionally stop and blow a horn to let people know we were in the neighborhood with fresh fish. I also remember when sturgeon were heaved upon this dock and roe spilled between the cracks in the boards. Most of the sturgeon went to New York or Philly and we got five dollars a pound for the roe in those days, darn good money. I’ve also seen over a thousand boxes of mackerel on this dock and black drum piled up like cordwood. I fished a 28-ft. Jersey skiff in those days. The work was hard but the experience was worth it.”

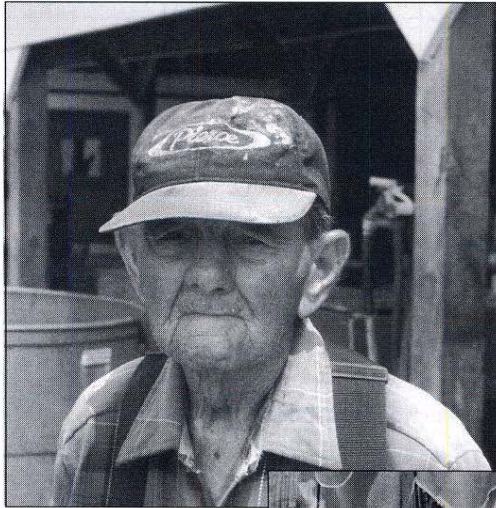
Woose has fished from Massachusetts to Florida and pioneered the original offshore deep-water fishing for red snapper out of Moorhead City, North Carolina, 50 years ago. Today he still wades for clams from his little skiff, using hand-sewn moccasins on his feet to deflect the inevitable nicks and cuts that come with the job. And he still runs occasional wreck-fishing charters on his larger deadrise boat, the *Pine Cove*, for his “old regular customers.” Woose is a colorful character and an important part of the cultural fabric that makes this old dock a local landmark.

Chincoteague

Chincoteague Island has long been synonymous with seafood, especially clams and oysters. As a



Dock foreman Frank Reed unloads a catch from a local gill-netter.



Lloyd "Woose" Reed and his hand-sewn mocassins



matter of fact, its oysters were once considered the "aristocrats" of all

the nation's oysters, second only to the famous Blue Points of New York. Seafood was the main occupation of the island during those years. It has been feeding seafood into northern markets since well before the Civil War. It is because of the lucrative connection with the north, no doubt, that Chincoteague was the only town in Virginia to side with the Union at the outbreak of the Civil War. (Locals may have realized early on that Richmond was not going to consume a lot of clams and oysters).

Straddling the Atlantic Ocean between Ocean City, Maryland, and Virginia Beach, Virginia, Chincoteague Island sits on the Eastern Shore, tucked behind Assateague Island National Seashore Park. Fishermen and farmers who lived in crude log cabins and used sea clamshells as fish oil

lamps first settled it in 1672. Their only communication with the "mainland" was made possible by boat. In 1922 that all changed when a causeway and bridge were built out to the island. Now Chincoteague is a popular tourist destination with over 400,000 visitors each year.

But sacrificed in its zeal to embrace the tourism rush were the old fish docks and oyster shucking houses that once lined the waterfront. Motels, condominiums, and town-houses have

now replaced them. The few fish docks left on the island are barely hanging on.

Edgerton's is one that appears, for now, to be hanging on. In addition to packing out each day's catch, DL Edgerton's also has a modest down-home style retail fish market. Because Chincoteague is a tourist town now, the fish market draws newcomers and seasoned visitors alike. Julie Ohylski of Baltimore tells me, "Whenever we come down here on vacation, we like to stop by the fish market to see what they have available. I get a kick out of walking across these old boards. My husband buys fish bait here and the kids love to see the watermen walk around in their slickers. It's become part of our vacation experience every year here."

Frank Reed adds, "We also get

a number of 'well-to-do' seasonal home owners who call ahead from, say, Washington and put in a big order for various types of cleaned fish. I assume they use it to entertain guests, since some of these people have been doing it for years." Chincoteague also prides itself on a number of seafood restaurants, and the better establishments will also order fresh fish from the dock twice a week. But most of the fish ends up in New York, Maryland, Philadelphia, and D.C.

"We also get a number of guys who are 'hucksters' and sell fish by the side of the road up and down the Eastern Shore," adds dock manager Moore.

The future?

Retired watermen still return to old fish docks to see what the younger guys are catching and to twist old stories that have been re-told for generations. They are part of Virginia's living cultural heritage, as are the deadrise boats, the weathered scows, and the well-worn gill-netters that leave each dawn and return like clockwork. Clammers and netters work alongside the occasional lobster boat, still claiming these docks their home. And visitors get a chance to see a part of the past that is still alive, because these men, this place, and the old fish dock business is an important part of the Eastern Shore—and American—cultural mosaic. Their stories, and the docks that breed them, are pieces of history surely worth holding onto.

Outreach & Announcements

Folks at Virginia Sea Grant spent countless hours culling through the stack of proposals submitted in response to the *Fishery Resource Grant Program (FRGP)* announcement. The idea behind the grant program originated within the fishing industry, and funds were secured through the Virginia legislature. According to marine business specialist Tom Murray, who acts as field manager for the FRGP, "The program solicits ideas that arise from a fisher's actual harvesting experience. Modeled after a similar program in North Carolina, the FRGP is based on the simple approach that experienced fishers come up with ideas to improve their productivity or reduce costs every day. But typically, attempting such an idea or change entails a cash outlay that is too big a risk for an individual fisherman to justify, particularly if any benefits of the idea would also be realized by his competition." The FRGP funds such associated costs, with the belief that what benefits one member will eventually improve productivity throughout the industry.

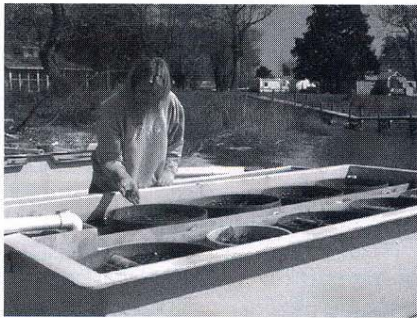
"Getting the program underway has been a great success and Sea Grant is pleased to be involved," stated Bill Rickards, director of the Virginia Sea Grant College Program. "The FRGP is similar to many functions routinely handled by Sea Grant and, as such, we are uniquely positioned to route the funds and get them quickly into the hands of watermen who will use them judiciously."

Among the ideas chosen for funding this year were proposals to:

- Explore the viability of soft clam culture and, in so doing, compare the grow-out success of soft clams in trays deployed in open water versus those placed in a land-based alternative;

- Compare oyster seed growth rates using a floating upweller system to growth rates achieved through a traditional float/bag system; and

- Employ the use of deck mats and trip lines for more efficient culling and unloading of oyster seed from boats.



Linda Vigliotta from Ward Oyster Company at the site of a project designed to compare two methods of soft clam culture.

A new study underway in the Marine Advisory Program is looking at ways to reduce impacts to the horseshoe crab (*Limulus polyphemus*) - a preferred bait in widespread use among conch pot fishers. The objective of the study is to determine if reducing the amount of bait placed in a mesh bag will affect the number of conch caught per trap. It is hypothesized that, if scavenger animals are kept away from the bait through the use of mesh bags, less bait will be needed and the bait used will continue to attract conch during the full time that traps are in the water. Whole crabs have been tested against crab halves, cut and placed in the mesh bags. One whole female or two whole males were used as the control groups for the first experiment.

Preliminary results from the first experiment site, conducted 35 miles off Cape Henry, Virginia, in 24.4 to 30.4 m of water, indicate no significant difference in catch (N=350) between using a whole female or two whole males (which is standard commercial practice) versus a half-female or two halves of male crabs per bag. Results from other resource areas in Virginia are currently being evaluated to explore the potential of reducing the amount of bait used to one-third or one-fourth of a horseshoe crab per pot.



Teachers from 5th grade through high school are invited to apply for a course entitled "Floyd and the Flood," to be held at East Carolina University in Greenville, North Carolina. The course is being coordinated by the Sea Grant programs in North Carolina and Virginia and other partners.

Following the model of the 1999 Mid-Atlantic region Operation Pathfinder /COAST course, participants will take part in field and classroom activities that include current scientific research and technology. Course dates are June 26-29, with a follow-up session on October 7, 2000. Participants will be chosen through a competitive process, and will receive one graduate credit upon completion, from North Carolina State University. Tuition and expenses will be paid for by course sponsors. The application deadline is May 1, 2000. For information, go on-line to <http://www.vims.edu/adv/mamea>.

Naturalist's Corner

Late March in a salt marsh...

Spring appears to have taken a temporary pause in Virginia after a cold snap that snuffed the flowering life out of our daffodils and violets. And so it presented an opportune time to visit a salt marsh and catch an early peak at what's beginning to stir. As anticipated, marshland along the lower Chesapeake is only now beginning to green up. Familiar cordgrasses—big and saltmarsh—are just now breaking ground with new shoots that have reached a mere 3 or 4 inches. No eelgrass is evident in the shallows yet; instead, the charcoal hues of water and muddy shorelines prevail. Immediately beyond the lowest elevations, in the fastlands that soon will be home to thick tangles of saltmeadow hay and saltbush shrubs, are even fewer signs of life today. The stark, brittle branches of groundsel trees hold their form against the chilling winds off the water.

At first blush, nothing appears to be happening here. A closer view of the ground, however, reveals more. Scattered among the new growth at the water's edge in the intertidal zone is a healthy community of marsh periwinkle. No larger than three-quarters of an inch across, the snail shells can be distinguished from similar-looking saltwater molluscs by rows of tiny red dots aligning each ridge of the shell. Inside, a set of antennae withdraws quickly upon my inspection. The periwinkles share this marsh with a large assemblage of Atlantic ribbed mussels, burrowed in the mud and often found in groups of 2 or 3. About half of each elongated, brown shell remains under the surface, and what juts out is tightly closed during this low tide. Each is firmly embedded and not about to give up its hold to gentle prying. Clumps of byssal threads looking like fine strands of grass spill out of its shell and attach to roots in the mud. Filtering more than a gallon of water hourly when submersed, the mussels thrive on organic matter and diatoms washing over them during the incoming tide.

This salt marsh will soon be in full swing. Over the next month or so, adult blue crabs will emerge from their wintering grounds in the deep mud of the bay bottom and use the underwater grasses adjacent to the marsh to molt. Marsh and fiddler crabs will find shelter in the protective cordgrasses here, and scuffle about with their young. Mating horseshoe crabs will make calculated trips with the high, spring tides to the farthest edge of the intertidal zone to lay and fertilize their eggs away from vigilant predators. Great blue and green-backed herons will soon wade in these shallows, feeding on young fish and assorted burrowing invertebrates. The occasional red-winged blackbird will perch upon a wax myrtle for a spell, before moving farther upriver. And with each incoming tide, waves of nutrients will flush over the ground and be taken up by awaiting filter feeders. This generous buffer of vegetation pulsing with coastal life will perform its cleansing and nursery duties for yet another year, without fanfare and at no expense.

Until all these forces take hold, however, the ospreys flying overhead each day with young fish in their talons will serve as reminders that spring has, indeed, arrived.

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