
underwater
naturalist
Vol. 25, No. 1

AMERICAN LITTORAL SOCIETY

AMERICAN LITTORAL SOCIETY'S ANNUAL SYMPOSIUMS

PLEASE JOIN ALS MEMBERS AND GUESTS FOR AN EVENING FULL OF GREAT TOPICS, INTERESTING SPEAKERS, AND PLENTY OF TIME FOR QUESTIONS AND ANSWERS. WE LOOK FORWARD TO SEEING YOU AT ONE OR BOTH OF THE FOLLOWING:

New York Symposium
Wednesday, March 29
Ames Auditorium, Lighthouse Inc
111 East 59th St, Manhattan

Coastal Storms
A forensic hurricanologist and professor at Queens College, Nicolas Koch, will discuss coastal storms and the impacts they could have on our area.

Underwater Photography from Indonesia
Can't get to Indonesia? Explore this exotic locale through the underwater photographs and tales of Patricia Jordan.

New Jersey Symposium
Friday, April 14
Monmouth Beach Boro Hall
22 Beach Rd, Monmouth Beach

Secrets of South Jersey
Angela Andersen will guide us on our journey with talk, slides, and devilish surprises, as we learn of the natural wonders in the southern reaches of our state.

Underwater Photography from the Jersey Shore
Gain a new perspective on your local coast with pictures taken from another angle by diver-photographer, Herb Segars.

Individual notices, with details and ticket info, will be mailed soon.

AMERICAN LITTORAL SOCIETY REGIONAL OFFICES

The Society maintains regional offices where members may keep up with local issues and events. Call the chapters for newsletters and local field trip information.

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Highlands, NJ 07732
732-291-0055

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P.O. Box 1306
Tuckerton, NJ 08087
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FL 34241
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Delaware Riverkeeper
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215-369-1188

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www.americanlittoralsoc.org

Bulletin of the American Littoral Society

Volume 25, Number 1

Cover Photography
by Daniel Tardona
Surfclams on a winter beach; round hole near hinge indicates moonsnail predation.

Underwater Naturalist is the bulletin of the American Littoral Society, Sandy Hook, Highlands, NJ, 07732, and is mailed to members only as part of their dues. $15 for students, $25 for individuals, and $30 for clubs.
Note: Past volumes of Underwater Naturalist and individual articles are available on microfiche from UMI, Ann Arbor, MI 48106.

To the editor

Monsters Not Mermaids,

Ms. Dybas' tales of mermaids has an error referring to the Sirens in the same context as the much-storied, romantically linked mermaids. Truly, as the illustration from Ellis' book *Monsters of the Sea* implies (but incorrectly states) the Sirens were monsters.

Homer relates what Odysseus was told by Circe:

First you will raise the island of the Sirens, those creatures who spellbind any man alive...Whoever comes to close, off guard, and catches the Sirens' voices in the air–no sailing home for him...The high thrilling song of the Sirens will transfix him, lolling there in their meadow, round them heaps of corpses rotting away, rags of skin shriveling on their bones.

The illustration's caption wrongly implies that all of Odysseus' crew, including their captain, plugged their ears with wax. Not so. This was Circe's advice:

Soften some beeswax and stop your shipmates' ears so none can hear, none of the crew, but if you are bent on hearing, have them tie you hand and foot...lashed by ropes to the mast so you can hear the Sirens' song to your heart's content. But if you plead...then they must lash you faster, rope on rope.

And in fact, it was only Odysseus who heard the song of the Sirens and lived to tell the tale.

Oscar W. Ruiz, Oakland Gardens, NY

Norfolk Pines,

I read with great interest Mr. Jim Duggan's article, "The Natural Wonders of Norfolk Island" (*Underwater Naturalist* Vol 24, No 3). I always enjoy reading and learning about places which, very likely, I will never have the opportunity to visit.

Something that particularly caught my interest was the latin name of the Norfolk Island pine: *Araucaria heteropyhlla*. There is another *Araucaria*, the *Araucaria araucana*, which grows on the east and west slopes of the Andes at the extreme south of South America. Similarly, there is another family of trees that grow in this region of South America that has representatives in Australia. I am referring to the *Notofagus* family, which has about eight species in South America and three or four in Australia. Yet, these two regions are separated by thousands of miles of open ocean.

One possible explanation for the presence of species from the same family in disparate sites of the planet is continental drift. Although still a theory, facts like this lend further support to this fascinating concept.

Nano Mardones, Freehold, NJ

Back To School,

In the February, 1999, edition of the *Underwater Naturalist*, Cyrus A. Adler writes "...eels should be classified as kosher since they have fins and scales. But few rabbis are ichthyologists, which is lucky for eels, and too bad for the gormet orthodox."

There are a variety of types of scales, the small scales on an eel, the scales on a sturgeon that are outgrown by the time it reaches adulthood, and the persistent scales of a carp. Whether or not ichthyologists have names for these different types of scales, the rabbis did know how to distinguish between the three types. Only the persistent ones are kosher.

Mr. Adler was wrong to second guess and derogate rabbis and their knowledge. He should consider far more study before attempting to decide issues of Halachah (Jewish law).

Sam Saal, Highland Park, NJ

Pfiesteria and Its Kin: Phantoms of the Estuary

by DAVE BULLOCH

The trouble began in the early nineteen eighties in the shallow waters of the Albemarle-Pamlico estuary system that lies enclosed behind the dunes of North Carolina's outer banks. Fish kills were on the increase. Die-offs of millions of menhaden during summer months grew steadily more frequent. Officials attributed these kills to low dissolved oxygen (DO), a water quality problem commonly caused by eutrophication, a process whereby nutrient-laden water, overloaded with nitrogen and phosphorus compounds, under the summer sun, stimulates runaway growth of algae which soon dies and decays. Bacteria active in the decay process exhaust all the oxygen in the water. Fish trapped in this water suffocate, die, and decompose, exacerbating the low oxygen problem.

By 1990, state teams responding to these kills were seeing a new phenomenon. In low DO water fish grow sluggish, barely moving when touched. But in these unusual kills, fish swam rapidly, at odd angles to the surface and often leaped out of the water. Crabs scrambled up anything they could find that rose above the water. And when it was all over and the waters were littered with dead fish, the fish had odd lesions and chunks of flesh missing from their flanks.

Earlier, in 1986, at the North Carolina State College of Veterinary Medicine, aquarium experiments using local fish as well as imported species such as tilapia, were disrupted when an unknown organism invaded the tanks, killing all the fish in them. The cloudy water was full of microorganisms. Curiously, when the dead fish were removed, the water quickly cleared. If new fish were added to the clear water, they quickly showed signs of distress and lack of coordination by swimming slowly at odd angles, followed by death. Again, the water turned cloudy,

Dave Bulloch, a frequent contributor to this journal, is director of the Society's Southeast Regional Office.

filled with the unknown organism. When the dead fish were removed, again the water cleared. Fish placed in this aquarium water after it had been filtered through 0.2 micrometer pore sized paper, which will remove anything down to the bacterial level, suffered over 50 percent mortality and the water remained clear. This suggested the unknown organism had released a toxin.

The toxin proved harmful to humans. In two laboratories, vapors from aerators in the aquaria aerosoled the toxin into the air. In one lab a poorly operating ventilating system failed to adequately change the air in the lab and dumped contaminated air into an adjacent office. This airborne contact caused severe neurological symptoms in several scientists before the problem was discovered and remedied. Work on the organism had to be halted until a safe facility could be built that assured it could be handled with neither airborne nor skin exposure to lab workers.

In May 1991, the organism was found swarming in the waters of a fish kill, positively linking the lab troubles with the fish kills in the surrounding estuary.

By 1993, the organism had been directly implicated as the causative agent in 18 of 35 fish kills in the Pamlico River (mainly menhaden and some flounder), the Neuse River (menhaden and blue crabs), Taylor's Creek (flounder, eel, mullet, and others), the Newport River, and open ocean near Wrightsville and Topsail beaches, apparently carried along by migrating menhaden. Fish kills extended as far as six kilometers offshore.

The remarkable life cycle and the nature of the organism had been partially worked out by Dr. Joann Burkholder and her associates. In June 1992, the as-yet-unnamed organism was announced to the world in the prestigious journal *Nature* under the provocative title "New 'Phantom' Dinoflagellate is the Causative Agent of Major Estuarine Fish Kills."

And what a phantom it has proved to be. In the terse, scientific prose of the journal article that named it *Pfiesteria piscicida* in 1996, it is described as "a polymorphic and multiphasic species with flagellated, amoeboid and cyst stages." Twenty-four distinct forms have been recognized, all of which can transform into one or more other forms depending on environmental conditions.

This newly discovered organism is one of a group of dinoflagellates (single celled with two flagella) that possess a chemosensory driven "ambush-predator" response to prey, in this instance, the excreta of fish. They also seem to react to the presence of certain shellfish. Blue crab and scallops have been attacked, but it's not clear whether this is caused by a direct response or as an indirect result of the presence of fish.

Resting on the bottom as a dormant cyst, the chemical stimulus of fish excreta rapidly causes the cyst to transform into a swimming form, a toxic zoospore (TZ). These swarm upwards toward the fish, exuding a toxin that initially creates erratic swimming but quickly stuns them and eventually causes death. The toxin also causes skin hemorrhaging which sloughs off tissue on which the TZs feed. The abundance of food for the TZs triggers a sexual cycle in which the TZs form gametes (swimming male and female cells) which recombine to form planozygotes (PZs). The PZs also feed on sloughed flesh. Some transform into TZs at a ratio of four TZs for every PZ.

As the dying fish expire, the chemical stimulus ceases. TZs and PZs either transform into amoeboid forms that feed TZ directly on fish flesh (those fish that sink to the bottom are stripped clean to the skeleton), transform into resting cysts that sink to the bottom, or transform into non-toxic zoospores (NTZs) depending on environ-

mental conditions.

Without fish present, remaining gametes transform into NTZs. Toxin production ceases and toxin remaining in the water column degrades. Sexual reproduction stops. Some NTZs encyst, forming thick-walled cysts that settle out and tend to resist re-transformation easily.

And that's not the end of it. If the water is clean, NTZs and gametes are scarce, but if the water is nutrient enriched with excess nitrogen and phosphorus, such as near a sewage outfall, NTZs will be abundant. The enriched water produces prey for the NTZs, algae such as *Cryptomonas* and other very small species. Not only are these eaten by the NTZs but the NTZs ingest the photosynthetic mechanisms of the algae, the chloroplasts, intact and use them to further produce food for themselves.

A strong mammalian excretion stimulant, as occurred when a dike holding raw swine effluent broke and flooded into a tributary leading into an estuary, can also trigger a cycle of toxic dinoflagellate growth. The TZs will also feed on algae and use their chloroplasts in a manner similar to NTZs.

The forms *Pfiesteria piscicida* take depend on the environmental setting. Toxic outbreaks are more likely to occur in warm water (12C to 33C) and at salinities about 15 parts per 1000. In cooler water (10C-14C), without fish present, 90% of the active *Pfiesteria* exist on the bottom in the form of a large lobose toxic amoeba. These amoeboid forms are also found in lesions on dead flounder and in infested scallops. If fish appear, this amoeba will "swim" upward changing into a "star" amoeba which is also toxic and can transform into a planozygote (PZ).

The full range of forms and transformations were induced in the lab as well as observed in the field. This proved to be a daunting task. TZs, PZs, and NTZs are extremely sensitive to pressure and turbulence. Simply transferring them with a pipette or swirling the liquid containing them can induce encystment. In nature, rough water, wind, or rain will induce encystment and quickly diminish their numbers in the water column. Thus, fish are most vulnerable in quiet, shallow water where the excreta from schooling fish can quickly reach bottom and provide the chemical stimulus to start the emergence of TZs.

Identifying all these forms also presented problems. TZs, PZs, and NTZs are small, some in the five micron range, and to examine them in detail requires the use of a scanning electron microscope (SEM). To view them, the specimens have to be mounted and their surface made conductive. The SEM sees only the surface of objects. Initially, because this organism is surrounded by a thin outer coat, its inner plate structure, typical of the armored dinoflagellates and a diagnostic feature, wasn't obvious. A change in preparative technique that removed the outer coat allowed the plates (theca) to be seen. The structure and placement of those plates allowed Dr. Karen Steidinger of the Florida Marine Research Institute, reknowned expert on the taxonomy of dinoflagellates, to classify it. The genus *Pfiesteria* honors Dr. Lois Pfiester, who in 1979 working with a fresh-water dinoflagellate species, hypothesized that multiple forms existed. The species *piscicida*, freely translated, means "fish killer."

In the summer of 1995, massive fish kills in the North Carolina estuaries and accounts of individuals suffering neurological and dermatological problems rapidly drew the attention of state and federal authorities.

It also drew the attention of the press. Some of the symptoms bore a superficial resemblance to Ebola virus, a mysterious and terminal ailment in Africa that is a par-

ticularly nasty way to die. No one had died from *Pfiesteria* nor did hospitals see its victims; but the hype took hold. The organism was soon labeled the "cell from hell" and locally it was known as the "Loch Neuse monster."

By summer 1996, William Broad, of the *New York Times* declared "the microscopic animal moves through coastal waters to kill fish and shellfish by the millions and to poison anglers and others, producing pain, narcosis, disorientation, nausea, fatigue, vomiting, memory loss, immune failure, and personality changes. Its toxins are so deadly that people who merely inhale its vapors can be badly hurt."

In what is an otherwise useful account of the human side of science, how serendipity intervenes and the trail of events that a long term investigation takes, the publishers of Rodney Barker's book (1997) *And The Waters Turned To Blood* embellished the dust jacket with "In the rivers and coastal waters of America an ancient and deadly organism, re-awakened by man-made pollution, may become the ultimate biological threat."

In 1996 few major fish kills were attributed to *Pfiesteria* even though millions of menhaden died in the Cape Fear estuary after a hurricane. Those deaths were attributed to anoxia. Two following hurricanes kept salinities low in the middle and upper reaches of the North Carolina estuaries and menhaden stayed in the lower sounds and estuaries thus avoiding areas most prone to toxic kills.

How toxic is *P. piscicida* to humans? This is still being studied. Much of the evidence is as yet anecdotal and, in one instance seems to be confounded with the day-to-day ills of the crabbing trade which we will get to shortly. In part, however, it depends on the mode of exposure.

Eating fish or shellfish taken from waters close to fish kill areas has not led to reports of illness. Very little toxin will distress or kill a fish so it may be that not enough toxin can accumulate in a fish to harm a human who eats it. In laboratory experiments extremely small quantities of toxin show biological activity, but, in looking for toxin in menhaden, spot, croaker, mullet, and Spanish mackeral taken from fish kill areas, only a few menhaden had accumulated enough to be detected. Lab tests suggest two toxins, one of which is extremely potent.

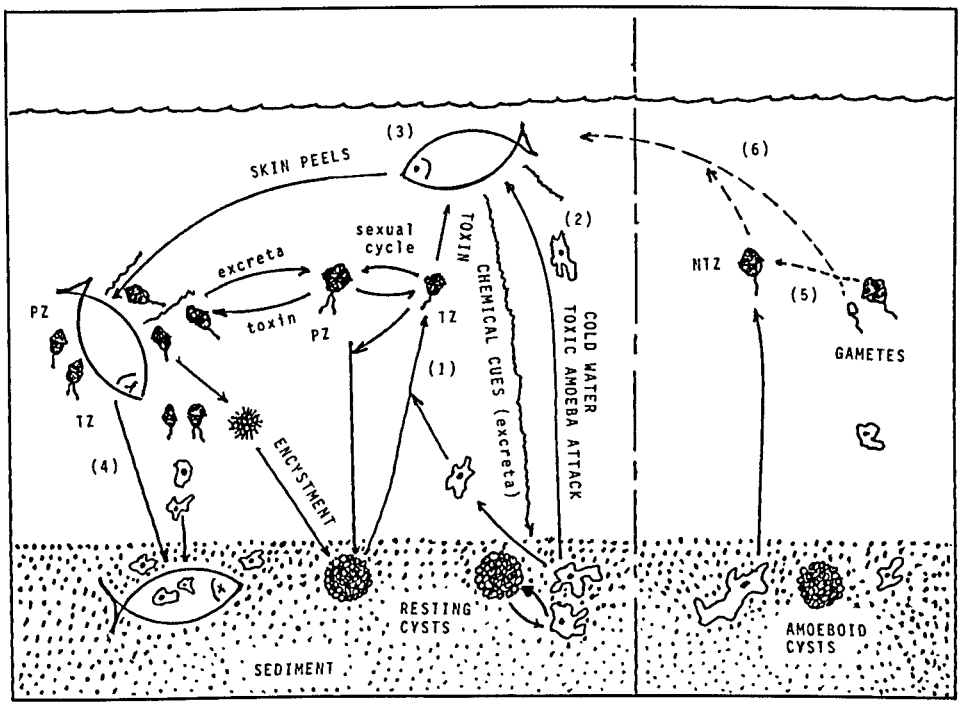
Breathing the airborne toxin on a daily basis for week upon week has debilitating consequences. Two scientists who cultured this organism in improperly ventilated quarters suffered a wide range of serious neurological symptoms, the most persistent of which was mood change, depression, bouts of sudden anger, and memory loss. Anecdotal evidence in North Carolina suggests people working on fish kill waters suffered symptoms. Medical groups from Johns Hopkins and the University of Maryland found a pattern of symptoms in people who worked or swam in *Pfiesteria* infested waters that included headaches, tingling of extremities, confusion, disorientation, and skin lesions.

The third mode of exposure is absorption through the skin. In fish the toxin is thought to stun the fish and allow carniverous forms of *P. piscicida* to get to and attack the skin of the fish both chemically and mechanically. This results in anything from a lesion to a massive removal of flesh. Menhaden are often seen with sizeable chunks missing from the posterior lateral region as though a v-shaped bite had been taken. Divers have said that bottom sediments in fish kill areas are littered with whole skeletons.

Skin lesions on crabbers, whose arms and legs are daily exposed to wetting, were investigated by David Griffith and others of East Carolina University. Because crabbers spend long hours on the water, interviews with a group who set their pots in

Albemarle and Currituck sounds were compared with another group who set in the Neuse and Pamlico rivers, sites of numerous kills. A third group of non-fishing community residents was used as controls. All were queried about their health. Crabbers were asked where they set their pots. All crabbers were aware of fish kill areas whether caused by low dissolved oxygen or *Pfiesteria* and avoided "dead water." All crabbers and the controls had similar levels of a variety of symptoms that have also been ascribed to people exposed to kill areas. The only exception was skin problems which appear to be prevalent in all crabbers irrespective of whether they worked in affected areas or not. Crabbers are more prone to skin cancer and infections from puncture wounds and bites, suggesting lesions are an occupational hazard.

The summer of 1997 saw outbreaks of *Pfiesteria* related fish kills in Chesapeake Bay and, again, in the Albemarle-Pamlico



after Burkholder and Glasgow (1997)

SIMPLIFIED DIAGRAM OF FEEDING BEHAVIOR AND TRANSFORMATIONS OF Pfiesteria piscicida *(Transformations of major forms when fish are present (left of vertical dashed line) and not present (right of dashed line) but in enriched water). With fish present in warm water excreta from fish elicit a rapid transformation from (1) resting cysts and amoeba to toxic zoospores(TZ) which rapidly rise in water column releasing toxin. In cold water amoeba rise releasing toxin (2). The toxin immobilizes the fish and sloughs off its tissues (3). Toxic zoospores (TZ) feed on sloughed tissue as do planozygotes (PZ) formed by rapid sexual division of TZs. As fish die and settle to the sediment, TZs and PZs follow, either transforming to amoeba (4) that feed directly on fish flesh or they encyst forming resting cysts. Amoeboid forms either persist in the sediment or encyst. In colder water cysts may transform into large, lobose amoeba which can release toxin and attack fish directly (2). Without fish present, in phosphate-rich water, non-toxic zoospores (NTZs) and gametes multiply (5). It's thought that either can transform (6) into toxic zoospores (TZs) if fish appear. Some amoeba remain in the water column as well.*

estuaries. No one has yet to estimate the value of the fish lost, but the kills triggered a psychological fear that had severe effects on local economies in Maryland and North Carolina. Fishermen saw a substantial drop in demand for their catches. Dockside prices for striped bass fell 50 cents a pound and the wholesale price of oysters declined four dollars a bushel. In Maryland alone, this translated into a direct $1.5 million loss to commercial fishing. The charter boat industry was also hit hard. Cancelled trips and the number of passengers per open boat dropped by forty percent costing boat operators an estimated $1.3 million.

These easily measurable costs were but a fraction of the total losses related to that summer's outbreak. Seaside tourism dropped, as did beach attendance and the use of private recreational boats. Maryland closed the Pokomoke, Manokin, and Chicamacomico rivers to all recreational activity. Operations at the marinas in those areas as well as those nearby other fish kills were brought to a standstill. The total bill for that summer for Maryland and North Carolina has yet to be summed up. The Agricultural Secretary for Maryland estimated commercial fishing losses at $20 million. Maryland's losses in recreational boating and sportfishing aren't known but in an average year in the 1990s their yearly cumulative value pushes $900 million. The state of North Carolina has not made public any estimates of this kind but it, too, must be substantial.

Given the public health issues, bad press, and economic losses, both states and the federal government announced a series of initiatives that range from simpler ways to detect *Pfiesteria*, developing a response to the threat, new research facilities and funding, and a marketing campaign to get fish back on the menu and people back into the water. These costs are estimated between $14 and $26 million.

Pfiesteria has been linked to eutrophication. Excess nitrogen and phosphorus lead to blooms of cyanobacteria (blue-green algae), cryptomonads, and other micron-sized algae that are both food for *Pfiesteria* zoospores and major factors in oxygen-depriving events that lead to low DO in water and fish kills by anoxia.

New sources of pollution have appeared in several states over the past 10 to 15 years: chicken manure from factory-like poultry farms in Delaware and Maryland spread in substantial quantities on farmland and similarly, hog manure in North Carolina. Governors of states bordering Chesapeake Bay and the Environmental Protection Agency are intensifying efforts to enhance water quality by averting the runoff effects of these wastes.

In Delaware this has translated into some runoff control using retention ponds, buffer areas alongside streams, better manure control and better soil erosion prevention practices. In Maryland, the state is paying farmers to plant a winter cover crop to slow down nitrogen runoff. In North Carolina hog farms operating on a huge scale continue to proliferate. The waste of some farms equals that of a small city, yet waste treatment is rudimentary. Much of the sludge has wound up on farm fields in quantities far in excess of what is actually needed for crop fertilization, and runoff into the shallow estuaries of the Pamlico system remains severe.

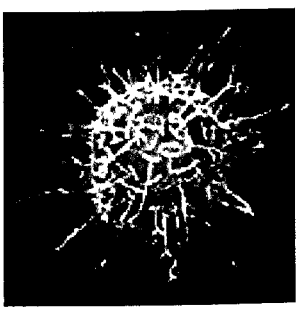
The total costs for summer 1997 alone, including the burst in new research, losses in commercial fisheries, tourism, and the recreation and seafood industry, have been conservatively estimated at $60 million.

Recent studies point to more than one new *Pfiesteria*-like organism. As research on *Pfiesteria* has progressed and more and more samples have been obtained from fish kill areas and prepared for examination with SEM, new forms have turned up.

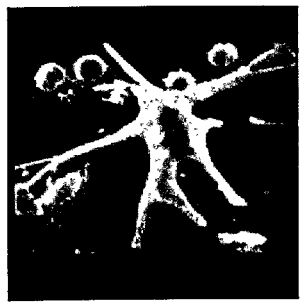
New look-alike species, previously undescribed, have appeared in samples from as far afield as Alabama and Florida. Like *Pfiesteria*, these also have an outer coating and cannot be distinguished from *P. piscicida* with a light microscope. Taxonomic studies remain to be done on at least five or six new forms. All this requires SEM work done by a specialist. Even when completed, differences among new genera and species may not be at all easy on a routine basis and will require skilled people in labs full of sophisticated equipment.

inference, for they have all been found in proximity to fish kills. Whether they all behave in the same manner, have similar life-styles, and use the same toxic agents as *P. piscicida* remains to be determined.

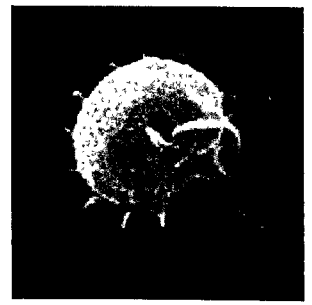
The question of why these creatures have appeared now and where have these species been these many years probably cannot be scientifically answered. Scientists speculate they have always been there but in much smaller numbers. Human induced changes in our estuarine ecosystems, mainly through eutrophication, have allowed them to proliferate. Any reductions in their vast numbers will not occur until we take steps to stop fertilizer and animal waste runoff. Even so, once a species gets a firm foothold in an ecosystem, it may persist long after whatever initiated it has ceased.



Cyst Stage



Amoeboid Stage



Zooapore Stage

How many look-alikes are there? As of 1997 there were at least three whose distinguishing characteristics had been partially elucidated. One from the St. Johns River in northern Florida shows thecal counts identical to *P. piscicida* but is different enough in form that a taxonomist would put in a new species. A sample from Maryland has thecal counts close to *Pfiesteria* but not a match and has other morphological differences suggesting a new genus. In other samples from Maryland, North Carolina, and Florida a distinctly different and previously unknown dinoflagellate, bearing a close resemblance to the genus *Peridiniopsis*, has turned up. It doesn't end there. Still other samples show dinos that are different from the ones mentioned above, but these have not as yet been fully examined.

Are all these look-alikes toxic? Yes, by

For more information see "*Pfiesteria piscicida* and other *Pfiesteria*-like Dinoflagellates: Behavior, Impacts, and Environmental Controls" *Limnology and Oceanography* 42 (part 2), 1997, 1052-1075. □

Some of the photos used in this article were taken from the web page of the North Carolina State University Center for Applied Aquatic Ecology. To learn more about* Pfiesteria *visit their web site at www.pfiesteria.org.

Ben Franklin's Dolphins and Flyingfish

by GEORGE REIGER

In the brief history of marine science published in Volume 24, Number 4 of *Underwater Naturalist*, an important name was left out. This was probably because Benjamin Franklin is so much better known for his contributions to our understanding of electricity, development of wood stoves, and the American Revolution than for his observations of sea life.

Yet, during a voyage made from London to Philadelphia from July 22 to October 11, 1726, young Franklin -- he was only 20 years old -- kept a detailed journal of everything he observed. He was especially intrigued by flyingfish, and the fact that the crew of the *Berkshire* made an ingenuous lure of a candle with two feathers stuck in either side to imitate flyingfish, "which are the common prey of the dolphins" (September 9th).

When the catch was hauled aboard, Franklin saw "that cutting off pieces of a just-caught living dolphin for baits, those pieces did not lose their lustre and fine colors when the dolphin died, but retained them perfectly" (September 2nd). Some 250 years later, I repeated this operation on a just-caught dolphin off the Virginia coast and found Franklin's observations to be accurate. Severed from the central nervous system, the skin retains its gold, green, and blue-flecked appearance even when the rest of the fish dies and turns gun-metal gray.

Incidentally, Franklin and his contemporaries -- living in an apparently less sensitive, but more sensible age -- had no trouble accepting the word dolphin for both a fish and a marine mammal.

Meanwhile, aboard the *Berkshire*, Franklin was busy cutting open dolphinfish to see what they ate, including, in one, "a small dolphin, half-digested" (September 9th); observing an eclipse of the sun -- "at least ten parts out of twelve of him were hid from our eyes" (September 14th); and birding: "Calm all this day. This morning we saw a tropic bird, which flew round our vessel several times. It is a white fowl, with short wings; but one feather appears in his tail, and he does not fly very fast. We reckon ourselves about half our voyage; latitude 38 and odd minutes. These birds are said never to be seen further north than the latitude of 40" (September 16th). And more birding:. "We see tropic birds every day, sometimes five or six together; they are about as big as pigeons" (September 19th).

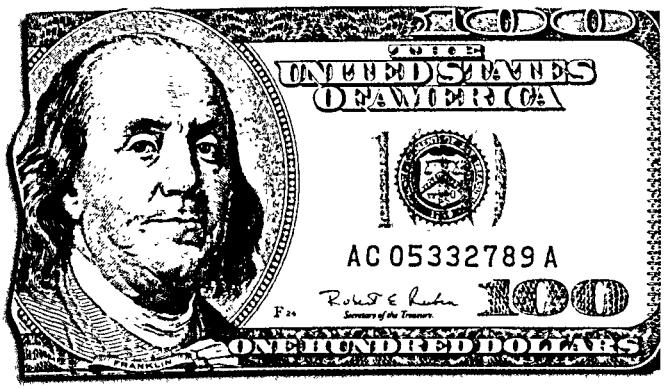
Franklin also made notes on sharks. One that prevented him from swimming for bathing and exercise "seemed to be about five feet long, moves around the ship at some distance, in a slow, majestic manner, attended by near a dozen of those they call pilot-fish, of different sizes; the largest of them is not so big as a small mackerel, and the smallest not bigger than my little finger. Two of these diminutive pilots keep just before his nose, and he seems to govern himself in his motions by their direction; while the rest surround him on every side indifferently. A shark is never seen without a retinue of these, who are his purveyors, discovering and distinguishing

George Reiger - a 30-year member of the American Littoral Society - has written a natural history guide to the Atlantic coast, Wanderer on My Native Shore, *which was a finalist for the Pulitzer Prize in General Non-Fiction in 1980. Earlier, he wrote a tribute to great fish and great fishermen called* Profiles in Saltwater Angling.

his prey for him; while he in return gratefully protects them from the ravenous, hungry dolphin" (September 21st).

Today, we know that pilotfish do not actually lead sharks, but rather ride the "nose-wave" made as sharks move through the sea. Still, we're grateful for Franklin's early description of a behavior witnessed by many before him, but rarely recorded.

On September 28th, Franklin "took up several branches of gulf-weed (with which the sea is spread all over, from the Western Isles to the coast of America); but one of these branches had something peculiar in it. In common with the rest, it had a leaf about three quarters of an inch long, indented like a saw, and a small yellow berry, filled with nothing but wind; besides which it bore a fruit of the animal kind, very surprising to see. It was a small shellfish like a heart, the stalk by which it proceeded from the branch being partly of a grisly kind. Upon this one branch of the weed, there were near forty of these vegetable animals; the smallest of them, near the end, contained a substance somewhat like an oyster, but the larger were visibly animated, opening their shells every moment, and thrusting out a set of unformed claws, not unlike those of a crab; but the inner part was still a kind of soft jelly. Observing the weed more narrowly, I spied a very small crab crawling among it, about as big as the head of a ten-penny nail, and of a yellowish color, like the weed itself. This gave me some reason to think, that he was a native of the branch; that he had not long since been in the same condition with the rest of the embryos that appeared in their shells, this being the method of their generation; and that consequently, all the rest of this odd kind of fruit might be crabs in due time. To strengthen my conjecture, I have resolved to keep the weed in salt water, renewing it every day till we come on shore, by this experiment to see whether any more crabs will be produced or not in this manner."



On September 29th, "upon shifting the water in which I had put the weed yesterday, I found another crab, much smaller than the former, who seemed to have newly left his habitation. But the weed begins to wither, and the rest of the embryos are dead. The newcomer fully convinces me, that at least this sort of crabs are generated in this manner."

Today, we know Franklin's "jelly-like embryo" was not the source of the small crabs, but an entirely unrelated species. (I'm hoping a reader will identify it.) Franklin's determination to link the "embryo" and the crab caused him to see in a previously overlooked crab proof of his conjecture. While not good science, it's still unfortunately common for experimenters to see and conclude what they need to, especially for the benefit of agencies or industries funding the research.

However, Franklin did correctly surmise that the "yellowish color" of both the

crab and the Sargassum weed on which it was found meant that the former was a "native" of the latter.

On the last day of September, Franklin wrote that he'd "sat up last night to observe an eclipse of the moon, which the calendar, calculated for London, informed us would happen at five o'clock in the morning, September 30th. It began with us about eleven last night, and continued till near two this morning, darkening her body about six digits, or one half; the middle of it being about half an hour after twelve, by which we may discover that we are in a meridian of about four hours and half from London, or 67½ degrees of longitude, and consequently have not much above one hundred leagues to run."

On the morning of October 4th, "we found a flying-fish dead under the windlass. He is about the bigness of a small mackerel, a sharp head, a small mouth, and a tail forked somewhat like a dolphin, but the lowest branch much larger and longer than the other, and tinged with yellow. His back and sides of a darkish blue, his belly white, and his skin very thick. His wings are of a finny substance, about a span long, reaching, when close to his body, from an inch below his gills to an inch above his tail. When they fly it is straight forward, (for they cannot readily turn), a yard or two above the water; and perhaps fifty yards is the furthest before they dip into the water again, for they cannot support themselves in the air any longer than while their wings continue wet. These flying-fish are the common prey of the dolphin, who is their mortal enemy. When he pursues them, they rise and fly; and he keeps close under them till they drop, and then snaps them up immediately. They generally fly in flocks, four or five, or perhaps a dozen together, and a dolphin is seldom caught without one or more in his belly."

Except for the use of the pronoun "he" for "it" - since Franklin didn't actually know the sex of the fish he examined - and a phrase like "mortal enemy," Franklin has written as up-to-date a description of the flyingfish as could be found in a modern scientific monograph. Particularly interesting is his observation that the fish "cannot support themselves in the air any longer than while their wings continue wet."

On the evening of October 4th, "a little tired bird, something like a lark, came on board us, who certainly is an American 'tis likely was ashore this day." The next morning, Franklin found further evidence of his ship's proximity to land in the form of "a long-legged, long-necked" heron, "who had lodged aboard last night."

On October 8th, "we saw an Irish lord [?], and a bird which flying, looked like a yellow duck[?]. These, they say, are not seen far from the coast." They also met a ship that "left Sandy Hook yesterday about noon, from which they reckon themselves forty-five leagues distant."

Finally, on October 9th, Franklin spied "LAND! LAND!" and on October 10th "a pilot-boat came off to us from Cape Henlopen." The pilot "brought on board about a peck of apples with him; they seemed the most delicious I ever tasted in my life; the salt provisions we had been used to gave them a relish."

Ever deductive, Franklin believes the apples are not just intrinsically delicious, but delicious for a reason -- a reason he must analyze and record.

It's unfortunate Ben Franklin had such limited exposure to the sea, for had he had more, he would undoubtedly rank high among our marine science pioneers. But then, sea science's loss was our democracy's gain. □

Fisheries: The Uses of Ecological Principles

by LIONEL A. WALFORD

Second in a series of pieces from earlier works on marine science. Dr. Walford was a graduate of Stanford University and received his Ph.D. from Harvard University. This chapter is an excerpt from Living Resources of the Sea *which he wrote in 1958 when he was chief of the Branch of Fishery Biology, U.S. Fish and Wildlife Service; he went on to establish the National Marine Fisheries Service laboratory at Sandy Hook, NJ, in 1961. In this chapter he tackles the prickly subject of fisheries research and how it can be used to manage fisheries. Now, 40 years later, fisheries are still mismanaged, and Dr. Walford's thesis holds. This article was edited by David Bulloch.*

The composition of every environmental system exists naturally in a state of constant flux, whether man is part of the system or not. Individual populations flow and ebb as shifts in the environment favor or do not favor their specific requirements. Any action disturbing one part of the system necessitates some reaction, however slight, in all the other parts. Thus readjustment toward a steady state goes on constantly.

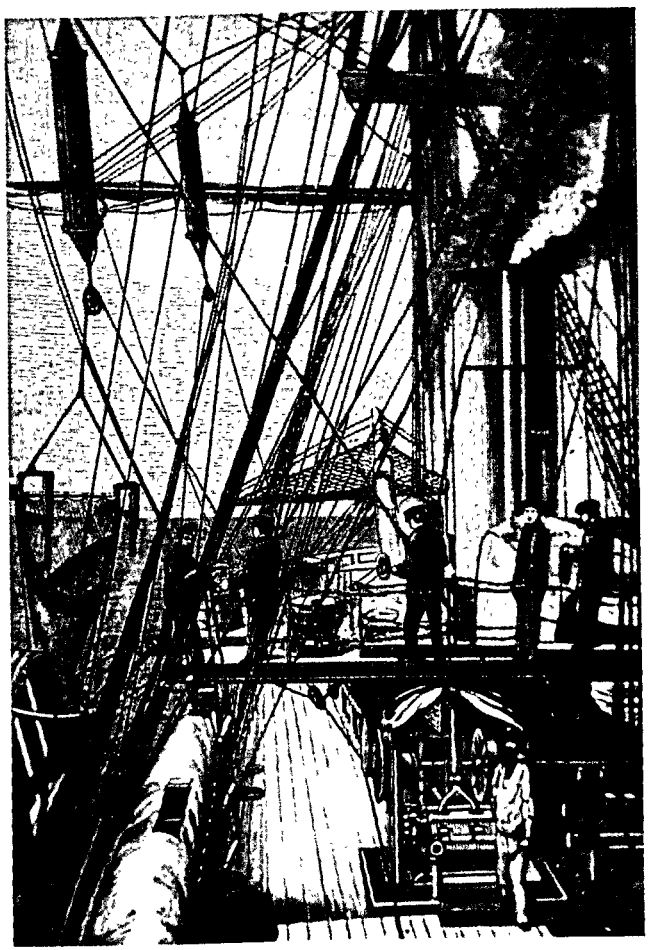
Nevertheless, ecological systems seem never to reach a steady state condition because the environment changes continually, within limits, just as do elements in large-scale geophysical systems such as the weather. The assemblage of species responds variously to these environmental changes as well as to each other's response to them, and there are time lags in these adjustments. Thus at best the species of a system are in a state of continual oscillation. The alternating waves of abundance of predator and prey species is one example. The lag between failure of one fishery and development of a new one is another.

As soon as fishermen begin exploiting a virgin stock of a species, they introduce a new factor into the system of which it is a member, disturbing thereby the pattern of oscillations in which they found it. Gradually thereafter, while the fishery grows, they reduce the stock to lower levels until a new pattern becomes established in the system, which now includes man among the predators. From then on it is difficult to study "the environment" or "ecology" without-taking human affairs into account. Mans' weight in the equilibrium is determined by such things as the number of fishermen, the efficiency of their gear, the wages that a fisherman is willing to work for, the price the public is willing to pay for the fish, and so forth.

People of fishery industries are often passive to these biological and economic mechanisms and tend to strike a let-nature-take-its-course attitude about its action. Environmental systems have mechanisms which operate according to principles, and these principles must be understood before a system can be manipulated scientifically. Textbooks of ecology often attempt to state principles controlling the relations of environments to their resident populations. It is hard to be precise about such statements. Hardly are they set down on paper before it becomes necessary to add a weakening, qualifying word; and hardly is that added before exceptions come to mind. Still there are a few statements of principles which seem approximately true and pertinent to our subject. It is probably true that:

- The populations of organisms inhabiting a common habitat are in constant flux and react upon each other dynamically.

- For each species there is a unique combination of environmental conditions which is optimal for its well-being.
- A population tends to fill all the space in its system that meets its peculiar physiological and behavioral requirements, up to limits set by the abundance of food, predators, and competitors and by diseases and physical barriers.



- With changes in the combination of environmental conditions in an ecological system, such as a fluctuation in climate, a shift in ocean currents, invasion by a new predator or the sudden infestation of the dominant species by a disease, the species composition of the system changes.
- The members of a population compete with each other for food and space.
- The bulk of living organic matter is greatest in the plants which synthesize organic food, least in the supreme carnivorous animals which live off other carnivores. Among species between these extremes it decreases rapidly as dependence on animal food increases. Consequently, the farther away from the bottom of the food "pyramid" a fishery operates, the smaller is the maximum possible harvest.
- The supply of food varies from time to time and place to place.

Generalizations more or less like these are taught in college courses in ecology. They are widely accepted as truth, or at least as rough approximations of truth, for there is a good deal of reason and some evidence to support them. These generalizations have been reached from studies on land and in fresh water rather than in the sea. If such principles do hold true in the sea as well, they ought to influence people's attitudes toward the exploitation of sea environments. As it is, they have rather little influence, for there are in existence some quite commonly held opposing ideas which have evolved by deduction from reasonable-sounding premises, and which are kept alive by tradition and sentiment. These principles are not often expressed; nevertheless they are clearly implied in many

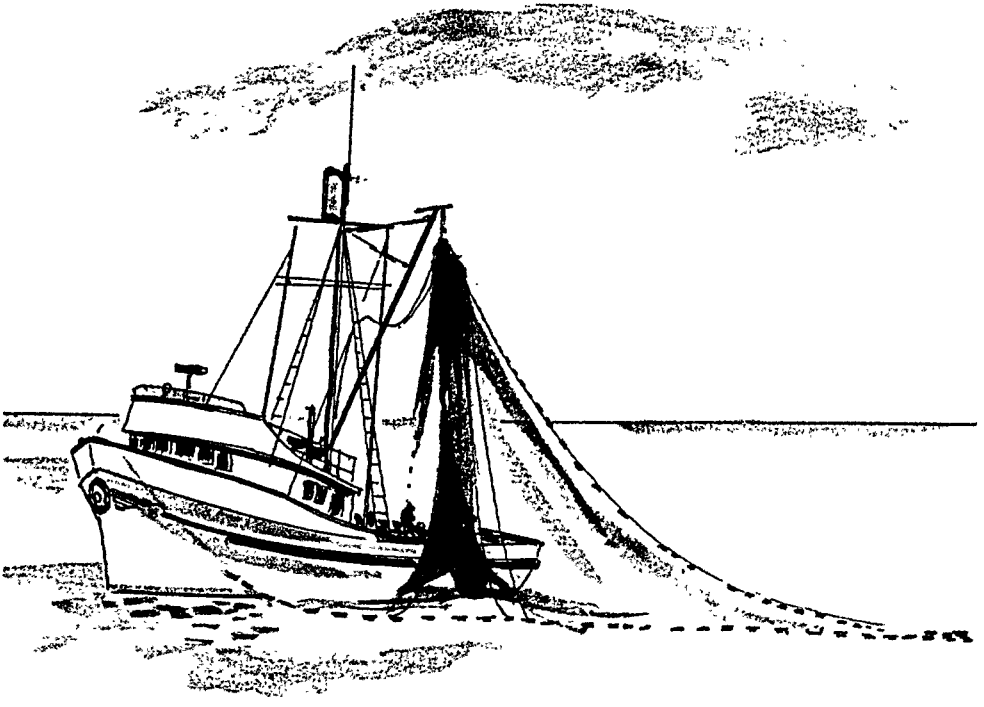
proposals of laws advanced for conservation purposes. They go about like this:

The number of offspring fish surviving to useful size is closely related to the number of spawners.

This idea seems so logical that the man in the street usually assumes it to be true without even questioning it. Yet no study of a marine fish has yet demonstrated a clear, consistent correlation.

Under primeval conditions, with no fishing by man, a stock of fish produces an enormously excessive quantity of eggs. A high proportion of the hatch dies from natural causes such as predation, disease, climatic and hydrologic disasters, and starvation. When man joins the constellation of influences by starting a fishery, he enters into competition with the other -- the "natural" -- causes of mortality, and the course of his fishery is determined in large measure by the success of this competition.

A young, growing fishery gradually, or often rather quickly, reduces the accumulated stock, and therefore the number of spawners and the production of eggs. But this does not necessarily result in any diminution of the number of young surviving to fishable size. It may even have a beneficial effect analogous to that which results from thinning, relieving the severity of competition both among the young and the adults. Thus a higher proportion survives the infant stages under a moderate fishery than under primeval conditions.



It is more destructive to catch fish during the spawning season than at any other time of year.

This conclusion grows out of the belief that as long as the sex products are ripe

they should be utilized. But the quantity of sex products is so vast that the proportion destroyed by taking spawning fish is negligible. Moreover, a fish caught in December instead of in the following June is thereby prevented from spawning in June and the effect is the same. Under some circumstances, however, the proposition may be true. If all the adults of a stock collect in one place to spawn, they will be particularly vulnerable to a fishery that converges on them all at that time.

A species has but little effect on others that share the same environment. If one species declines, the space which it occupied remains vacant until the abundance is restored to its former level.

This is an assumption which is often implied in policies of those concerned with commercial fisheries. Yet it is contrary to principles of ecology. If a valuable species declines, its space may be occupied by a species quite worthless from the commercial point of view, but it does become occupied. When a food species fills this space, fishermen should be encouraged to change their operations accordingly.

The only important cause of diminution or disappearance of a stock of fish is man. All other causes are, on the average, constant and relatively inconsequential. Being natural causes, "they have always been that way" and should not be altered. Indeed, they cannot be altered. Therefore there is little practical value in studying them.

This idea is becoming less prevalent among people interested in fishery problems than it was a few years ago. Its persistence in some quarters adds to the difficulty of gaining support for ecological research.

An unregulated intense fishery will always exterminate a stock eventually.

This is one extreme view and probably is unsound. It can reduce the volume and value of the annual yield, but it is not likely to extinguish the stock.

Direction (i.e. regulation) of a fishery is useless for various reasons, for example, because natural factors alone control abundance or because economic factors alone control fishing rates.

This is another extreme view, and probably also unsound.

If there is not enough knowledge about a stock to provide a basis of scientific regulation, it is better to regulate by judgment or common sense than not to regulate at all.

This is a dangerous idea because it seems right and is hard to refute. Actually such a regulation might be of no benefit to the stock and harmful to the fishery. Where an unsupported regulation is absolutely necessary, it should be carried out as an experiment, its biological effects closely measured.

For the most part these statements are inconsistent with principles where facts are available to support principles, and they are inimical to the most profitable management of the resources. How backward agriculture would be if it were conducted with such a restricted viewpoint! An educated cattle rancher seeks to run his business in accordance not only with sound economics but also with principles of scientific land use and of animal husbandry. He recognizes that the two sides of the job, one having to do with human affairs and the other with the ecology of his property, are inseparable. Fishery entrepreneurs on the other hand, though attentive to business, are often passive to husbandry, leaving the job of fishery management wholly to government. Since they expect this management to take the form of restriction to prevent overfishing, they often oppose it automatically. Government interest in this kind of management usually does not begin until a fishery gets into a distressing situation.

This is a pattern which has been repeated in various localities to solve special problems during the whole history of our biological fishery research. There develops an anomalous condition (often diminution of fish stocks which people remember as having once been much greater). An interested special group of people requests that the condition be investigated, and after due legislative procedure, scientists are assigned to the problem. To understand the cause of the undesirable condition, the scientists first try to establish facts about the time when the condition was satisfactory (i.e., the normal pattern), but because records are nearly always fragmentary or lacking, this effort usually proves useless. Then, because they are expected to devise a remedy for the condition in a reasonable time, they make deductions and recommendations from the data they can assemble. Such an investigation may not be conducive to learning much about the normal, being bound by too many limitations, for the anomalous condition is usually sharply delimited in scope. It is limited in time to the memory of the current generation, often even to such a short period as a season or two. It is limited ecologically to the affected species which are of economic value.

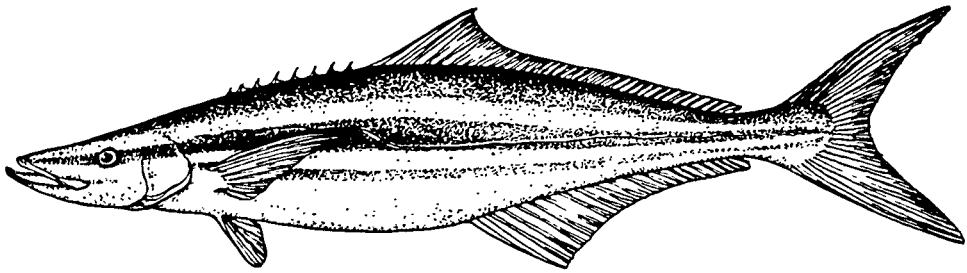
The net effect of our preoccupation with problems of this kind is that we neither cover enough ground in our research nor make fast enough progress toward an ideal goal of full utilization of marine environments....we must try by every means to get better support for the systematic, less spectacular studies of normal conditions, which in the long run will provide us more systematically with what we need to know about the anomalous situations.

Very little systematic marine biological research has been devoted to the dynamics of ecological systems. There is a plentitude of descriptions of communities and catalogues of animals and plants collected in surveys. Although these have reference value to zoogeographers, taxonomists, and others interested in what is often called natural history, they tell very little about the history of nature. A list of species resulting from a survey, even one made with proper statistical technique, shows only what composed a community at one moment in its history. It is like a single frame of a motion picture in its relation to the continuity of a drama. A second survey made of the community ten years after reveals that the flora and fauna have changed. Nothing more. What caused the change? Did an intensive fishery remove an important predator, permitting species lower in the food pyramid to accumulate? Or did it remove a key fodder fish, causing predators to starve to death or leave for richer grounds? Had a change in climate resulted in a rearrangement of distribution? Had epidemics destroyed some of the populations? Had cycles, resulting from the numerical relations of predator and prey, arrived at a different part of their periods? It is not possible to understand causes of changes in the composition of an ecological system without watching them happen, and that requires the drudgery of systematic, long-continued observations of the system in its natural setting.

The greatest danger of environmental research is that it will fail to track. Each of the people engaged in it can easily find some detail of environment overwhelmingly diverting, and pursue it "for the sake of science." Of course an environmental laboratory needs such people. It also needs others who have the patience to conduct the necessary systematic observations year after year. And above all it needs scientists who are devoted to integrating all sorts of information in order to find such principles as it may disclose.□

Kobi: A Fish Tail

by DAVE GRANT



You strange astonished-looking, angle-faced,
Dreary-mouthed, gaping wretches of the sea,
Gulping salt-water everlastingly,
Cold-blooded, though with red your blood be graced,
And mute, though dwellers in the roaring waste...
Leigh Hunt - The Man to the Fish

Each summer brings a new mystery to the bay, courtesy of the currents and the drift of larval fishes. Even in the dullest of summers, like this one, with persistent south winds and cool, upwelled coastal water, exotic fishes appear in the net. This summer (1994) the "Fish of the Year" was a gypsy from the south. Although cold weather also brings arrivals from the north—the odd-looking lumpfish being the latest addition to the Hudson River's list of fishes—most of the variety is of southern origins. Also, obviously, fewer of us are out there getting wet after the weather turns cold, so there are fewer opportunities to find an eccentric northern fish in the winter.

As part of our summer ritual, we do a lot of seining. One day in early August, I knew we were onto something when students dragging a seine became excited over something "hugging" the net. Fortunately we secured the specimen, a dark and beautiful eel-like fish.

This was a new one to me and nothing is more exciting than finding a new fish in the bay...and nothing charges up students quicker than something that stumps the teacher. I had to think fast (to keep the fish alive and to keep one step ahead of the students). Into the bucket it went for the race back to the aquarium and the reference books.

Viewed from the side, it immediately struck me as a remora (shark sucker). Its shape fit that general profile and it swam in a leisurely, serpentine motion, hugging the sides of the tank, behaving as I suspected a remora would in a tank. It had some color as all fish seem to have, if you look close enough (a brassy or greenish sheen), but most striking were longitudinal white stripes and an oddly rounded tail. "Do young remoras have sucker disks?" (Dope's shrug from the crowd.) We tried to get a close look at the dark head, which was remarkably flat, like a remora's. Not wanting to injure our newly-found prize, we didn't dare lift it out of the water. It did not appear to have suckers on the head. We were making progress.

When not visiting Cape Cod, Dave Grant is the Society's Chief Naturalist and Director of Brookdale Community College's Ocean Institute at Sandy Hook, NJ.

While the students were busy dusting off the fish identification books, I tried to visualize images from various sources. I recalled a mounted fish I'd seen on the wall of someone I had done work for when I was in college. He was an avid fisherman; a self-described "good ol' boy from the Chesapeake" who ran some big Fortune 500 company in the city, evidently to support his fishing addiction. Now this guy had more money than God, but his proudest possession was a 50-pound cobia on the wall, the first I'd ever seen. "A real 'Rottweiller' when it comes to fish." In those days, before the big-dog craze, I'd never seen a Rottweiller either. He was amused that I was not familiar with this "bull-dog" of a fish that is so prized down South.

"What about a cobia?" I offered. More blank stares from the students. Kind of like cows when you go "Mooo" at them.

The modern field guides were not giving us the answer -- and for good reason since they typically give only a thumb-nail sketch of an adult. Our specimen was only the size of my index finger, so it was time to call in the big guns.

I contacted Dr. Don Dorfman, our resident ichthyologist in the summer. Now, fishermen know everything there is to know -- just ask one. The only people who know more are ichthyologists. After my description, his response was simple and to the point, "Sounds like a 'tropical' to me. Pickle it (put it in a jar of formaldehyde) and I'll take a look at it sometime." Well, that wasn't going to happen to a beauty like this.

Back to the books. This was quickly becoming a Rorschach Test for fish identification, especially since there seemed to be no reference in the books to the rounded tail. Young fish are always a tough call, which is why we try and keep them a while to grow them out a bit. Young snappers from Florida are the worst. We always get a few of them each summer and wait for them to triple in size before we're sure of what they are.

The consensus was that it must be a cobia, and I like to go with my first guess (I'm correct about half the time), so we began to lean toward that. The students soon dubbed it "Kobi" - their variation of the German name kobia.

More sources, ichthyologists, and aquarists were consulted. Those who had worked down south had no problem with it. Was I the only person on this planet that had never seen a young cobia? "Have a look at the scales," it was suggested. According to his biographer, in contemplating his investigations on fishes, Dr. Samuel Mitchill (1764-1831) once remarked, "Show me a scale and I will point out the fish." Now we were on the right track (or so I thought); all we needed to solve the mystery was to check out the scales.

As luck would have it, the cobia has unique scales, and you guessed it, they are similar to one other fish, the remora. Not yet a dead end for us; and even though it wasn't eating, Kobi seemed to be adjusting well. We weren't about to "pickle" the class pet just yet to find out the answer. We could wait.

Fortuitously, we had a guest speaker that week -- Tony Pacheco from the NOAA Lab -- and the answer walked in the door with him. Always willing to volunteer his time to share his wealth of knowledge, he was a frequent visitor.

I was floored when he eyeballed our aquarium from across the room and said (grinning), "Oh, I see you got yourself a cobia." We were impressed.

Tony did his graduate work farther south, so the cobia was no stranger to him. As usual, the floodgates opened and he proceeded to share with us various regional names, range, reproduction, and tales of how he used to fish for them off of Indian

River Inlet (Delaware) by casting crabs around channel buoys. And that they were a wily fish, not easy to get when you needed one, and (more grins) that they were delicious to eat. (For reasons that should be apparent, I used to introduce Tony to the classes as "Mr. Fish.")

This solved a number of problems, besides identification. Now we had a clue of what to feed it.

We dived into some old references he recommended, including Goode's classic, *American Fishes*. Here was the real scoop on the cobia:

Cobia, like bluefish, are cosmopolitan and reported from Massachusetts to Brazil and out to Bermuda, where they have been called "chubby-yew." They are also reported from warm waters in Asia and "Southeastern Hindostan" - as Goode called that part of the world. Dr. Mitchill seems to be the first to label it "crab-eater," and Linnaeus, who described the species from a South Carolina specimen, may have been told its name was "sergeant-fish" because of its stripes. It has also been called "ling" and "snook" in the South, and in the Chesapeake, "black bonito" and "coalfish" because of its rich, dark coloration. Ichthyologists prefer *Rathycentron canadum* to avoid any confusion in the matter.

The literature informs us that our specimen was by no means the first one found in the bay. In 1815, Dr. Mitchill dissected one caught in "New York Bay" and found it full of "spotted crabs and young flounders," which were presumably calico crabs, which sometimes swim near the surface, and winter flounder, which do not. Goode adds that all the way up in Boston Harbor, a cobia placed in a fish car for market, quickly cleaned out the rest of the catch, reportedly sculpins and porgies. (Which is itself interesting since I can't imagine what sculpin were being used for in those cod-rich days, besides lobster bait; and since every time I mention porgies to anyone north of Cape Cod, they correct me and say, "You mean pogies" -- what the rest of us to the south of them call menhaden.)

For a fish that lays 6-7 million eggs at a time, the cobia is relatively scarce, and even though it turns up on the hook, in gill nets, pound nets, and seines, its "availability seldom exceeds the demand" in the market.

To catch adult cobia, Tony had already advised us that we should look farther south in Delaware Bay, and not surprisingly, the NJ record fish, an 83-pounder, was taken off Cape May. Large cobia are said to travel alone or in small pods and hang out with a pretty tough crowd, sometimes accompanying bluefish and sharks, for which they are occasionally mistaken while in the water. This may account for another interesting nickname, the "prodigal son." So, even if you don't hook a cobia, you are probably in for some excitement when fishing for one.

My fishing friends will enjoy W. C. Prime's encounter with a cobia (From: *I Go a Fishing*): "...his behavior on a fly-rod is that of a wild horse...The tremendous rush was not unfamiliar, but when the fierce fellow took to the top of the water and went along lashing with it with his tail, swift as a bullet, then descended, and with a short, sharp, electric shock left the line to come home free, I was for an instant confounded."

Finally, Tony, as always, had advice on eating what has also been called the lemonfish. Keep it simple: Baked and dipped in butter and lemon.

Now that we knew a bit more about the life history of our wanderer from the south, it was easy to maintain it -- as long as we provided enough small crabs and shrimp. Ignoring most other food, the cobia would snatch crabs and shake them like a dog with a bone, all the while slith-

ering, eel-like, backward. It was quite a sight, and by September it had doubled in size. It also became obvious that the fish was not content in its aquarium.

It would not have been sportsmanlike to eat it even if the fish were large enough, and being too small to tag and too beautiful to put in a jar of alcohol, we elected to release it.

So, before the waters cooled, practically in the shadow of Dr. Mitchill's "mountain" (Mt. Mitchell Park -- the highest point of land south of the Maine coast) which was named in honor of him for the first circumnavigation of Long Island, I released our wanderer with the hopes that "Kobi" would find its way to warm enough waters to survive the winter. After all, as they say: "Gypsies don't come to stay...they come to leave."

What is't you do? what life lead? eh, dull goggles?

How do ye vary your dull days and nights?

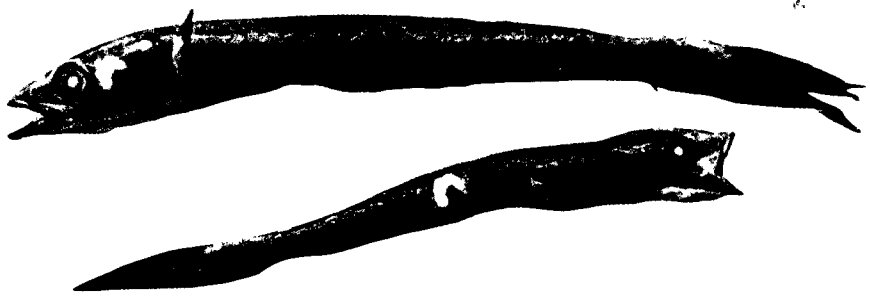
How pass your Sundays? Are ye still but joggles,

In ceaseless wash? Still nought, but gapes and bites,

And drinks and stares, diversified with boggles. □

And Another Fish Tail...

by DON DORFMAN
Monmouth University, West Long Branch, NJ



Young cobia, *Rachycentron canadum*, from the Hudson River.

During trawl hauls at Port Liberte, in the Hudson River, on August 17, 1999, two cobia were collected. The fish, one 87 mm total length and 1.4029 grams, the second 68 mm and 0.5252 grams, were black with a prominent yellow stripe extending from the opercula to the origin of the tail. The yellow stripe apparently does not persist as the fish ages. The lower jaw protrudes. The tail at this stage is single pointed (somewhat leaflike). In the adult stage the tail is forked. Lateral lines originate above the opercula then curve down and run along each side of the fish and onto the tail. These fish can easily be confused with remoras (sharksuckers) because of the flattened head. However, careful examination of the dorsal area anterior to the soft dorsal fin will reveal eight short spines if the fish is cobia. □

Don Dorfman is a natural science professor and a frequent UN contributor.

Field Note

Half a Million Fish Later...

by JOSEPH DUTTON

In New York Harbor, the Friday after Thanksgiving broke drizzly, foggy, and unseasonably warm. At 10:00 a.m., a group of anglers boarded the *Pastime Princess* at Pier 11 on the East River shore of southern Manhattan, hoping to show once again that New York Harbor is full of fish.

ALS member Tom Lake with fish number 500,000, a 24-inch striped bass tagged and released on November 26, 1999, in New York Harbor.

Young menhaden, called "peanut bunker" by local anglers, have choked local waters this summer and fall. That, in turn, has led to an enormous feeding body of striped bass in the Harbor and its tributaries, most of them fat, silvery 20-inch, three-year-old fish. For eight years now, the Friends of Fishes, a Manhattan-based supporter of all fishes and their habitats, has run this post-turkey fishing trip into the Harbor.

The goal? Catch, tag, and release stripers to help learn where they go and how fast they grow. And, as important, we wanted to put ALS tag number 500,000 in a striper in the Hudson estuary, partly because this is where the program began back in the mid 1960s. At the same time, we wanted Tom Lake to do the honors because of his long association with both the Society and the Hudson.

So, at South Street Seaport, while ferries dropped off their suited commuters and stores started opening their doors to holiday shoppers, 34 anglers in a motley assortment of rain gear got on the boat, grabbed coffee, and picked their spots along the rail. Over the day, 25 of the group would catch fish, and 65 striped bass would be tagged and released.

The boat headed downstream and across the harbor to drift across the usual-

Joseph Dutton, retired school teacher who now lives in Scranton, PA, has written for this journal in the past concerning the Delaware River.

ly fruitful fishing grounds near the Statue of Liberty. The rain increased and there were no fish for those bouncing seaworms on the bottom or casting and retrieving bucktails. John Waldman of the Hudson River Foundation soothed the crowd: "This is usually a better spot when the tide runs; we may not catch anything here, but somewhere, sometime it turns on."

The boat moved around the Harbor looking for fish, the World Trade Center loomed above the fog, and the Statue was sometimes invisible, other times in bright sunlight. The Gray Line was busy, but fish were missing.

Another spot south of the Statue was no better. Kids were drinking hot chocolate and munching bagels. The rain turned to drizzle. A big yellow Staten Island Ferry passed. Captain George Richford, who docks the *Princess* in Sheepshead Bay, headed south along the Bayonne shoreline to a series of shoals called the Jersey Flats. Still no fish. But, a little farther on, near the Robbins Reef lighthouse, the captain either found the fish or they simply turned on. At any rate over the next two hours, 52 striped bass came over the rail and into a live well, ready to be tagged. Double-crested cormorants watched from perches on the railing around the lighthouse, trying to dry their wings in the mist. The fishing was steady.

Tom Lake, of the NY Harbor Estuary Program and editor of the *Hudson River Almanac*, got busy. He pulled each bass out of the well and onto a table, measured it and inserted a numbered yellow plastic tag behind the dorsal fin. Phyllis Lake did the record keeping and the fishes, one by one, went over the rail and back into the Harbor.

Onboard, some moved into the cabin to dry off. A child fell and ran calling for her father. New food: cold asparagus, shrimp, sweet sausage, champagne. Talk about other fishing trips, past and future: are the stripers still thick in Raritan Bay?; the Hudson River shad run was late and brief; a winter ice fishing trip to Westchester County was planned.

We fished around the reef till action slowed, but did score one windowpane flounder, a delicate flatfish with both eyes on the lefthand side. Then the boat moved due east across the main ship channel to Bay Ridge Flats, where we picked away at another dozen bass. For the day, 65 bass were tagged and three released without tags (too small). The biggest fish of the day measured 24 inches, landed by Carl Marchese, Brooklyn, NY, on the staff of the Hudson River Foundation. It carried away American Littoral Society tag number 500,000, held back specially for this trip.

Numbers: over the eight years, 394 stripers tagged, 21 recaptured, as far north as Agawam, Massachusetts, and south to Barnegat Light, New Jersey; one tagged bass swam for 1066 days before it was recaptured. Each recaptured fish tells biologists a little more about the fish that was suffering 10 years ago and now appears to be making a sustained comeback.

Back to Pier 11 with no rain. Meanwhile our 65 tagged bass will resume their usual lives: swim and eat and spawn in the Hudson River next spring and carry on the species. □

Want to Tag Fish?

To participate in the American Littoral Society's Tag-and-Release program, you must be a member of the Society ($25 annual membership fee). Tag kits are $6 each (10 tags per kit). To order, make your check payable to:

American Littoral Society
Highlands, NJ 07732

An Old-Fashioned Revival: Coastwatch

Approximately 25 years ago, the Underwater Naturalist ran a section that kept track of coastal happenings. We figure an excellent way to start the new year is to take up the watch again; we plan to keep an eye on as much of the coast as possible. Contributions from our readers are critical to the life of this section; we encourage you to watch your region and if something comes up, drop us a line. Coastwatch is an opportunity to share knowledge about your coastal area and to increase understanding of challenges and issues being addressed there. We look forward to hearing from all the Coastwatchers out there.

Tampa BayWatch

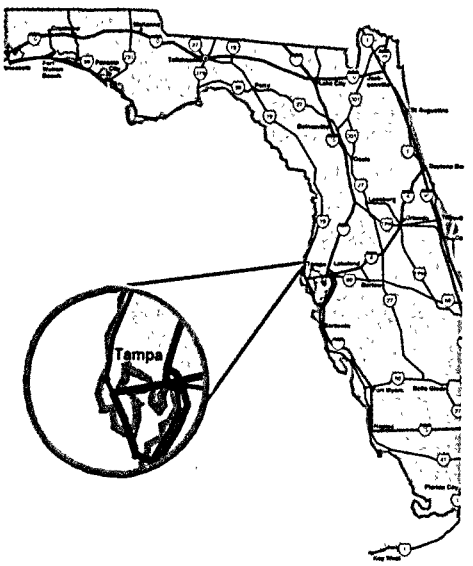
by PETER COOK and SARI SCHLOSSBERG

Located on Florida's central Gulf Coast, the Tampa Bay estuary is Florida's largest, encompassing 400 square miles of open water and 2,300 square miles of highly urban, industrially and agriculturally developed watershed. The estuary supports the cities of St. Petersburg, Clearwater, Tampa, Sarasota, and Bradenton, which have a diverse population of 2.4 million people. This human population in the immediate tri-county area of the bay (Hillsborough, Pinellas, and Manatee counties) is expected to experience a 20% increase by the year 2010.

Tampa Bay is the economic powerhouse of the Gulf Coast of Florida. It contributes more than $8.2 billion every year to the economy through its ports, industry, commercial and recreational fisheries, as well as with the more than 2.5 million tourists who visit the region each year. Tampa Bay also supports a major shipping industry with three major sea ports, including the Port of Tampa, which is ranked as the fourth largest port in the nation for transfer of petroleum products and the seventh largest port in the nation for overall shipping activity. While the Tampa Bay region is highly developed, the area is not entirely urban; there is still agricultural land in the region, and there are several aquatic preserves located throughout the estuary. Barrier islands lie between Tampa Bay and the Gulf of Mexico.

While Tampa Bay has experienced tremendous pressure from development, the natural wonders this area holds are still apparent. Estuaries such as Tampa Bay are among the most diverse and productive ecosystems in the world. The bay's blend of environments, ranging from underwater meadows of seagrass to surrounding marshes and uplands, provides shelter and food for a multitude of diverse wildlife types. Tampa Bay's islands support major bird breeding colonies where more than 40,000 breeding pairs belonging to some 25 bird species come to rear their young. The Tampa Bay system also serves as an important wintering ground or stop-over for many migratory bird species traveling

Peter Clark is the founder and executive director of Tampa BayWatch. Sari Schlossberg is the Environmental Specialist and is responsible for running the High School Wetland Nursery Program.



throughout South, Central, and North America. There are approximately 60 bird species in the estuary year-round and 220 spend the winter in the Tampa Bay area. It is common to see brown pelicans, ibis, and herons, and roseate spoonbills and reddish egrets are making a comeback. The endangered Florida manatee makes its home here and scallops and oysters are making tentative comebacks after disappearing in the 1960s due to heavily polluted water. Common fishes to the area are sea trout, redfish, black drum, jacks, and grunts. There are also mullet and other forage species.

THE PROBLEM

Today, after a century of intensive urban and industrial shoreline development, the character and ecology of Tampa Bay and its tributaries are significantly altered. Coastal wetland losses have exacerbated shoreline erosion and contributed to reductions in water quality within the Tampa Bay ecosystem. The estuary has suffered extensive damage to its once-pristine coastal salt marsh and mangrove habitats. Nearly half of all the mangrove forests and salt marshes that once existed in the Tampa Bay estuary have been destroyed. The loss of these coastal wetlands has resulted in major declines in fisheries and wildlife that depend on these habitats during a portion of their life cycles. Populations of economically important fish, shellfish, bait and food shrimp have dwindled to near-depletion. Scallop and oyster fisheries in the bay have collapsed.

TAMPA BAYWATCH'S HIGH SCHOOL WETLAND NURSERY PROGRAM

The Tampa Bay community has responded to this tremendous loss of habitat and decline in estuarine conditions by undertaking numerous management, permitting, and restoration programs to facilitate the recovery of the bay. One way Tampa BayWatch supports the efforts to protect and restore coastal communities in the Tampa Bay estuary is through the establishment of salt marsh nurseries within the bay region's high school ecology or science clubs. These student-constructed and -maintained nurseries produce salt marsh grass, which is then available for transplanting into habitat restoration projects throughout Tampa Bay.

The first high school wetland nursery was established in 1996 through a grant from the Tampa Bay Estuary Program. Currently, we have 11 established school nurseries that are capable of supporting between one and two rooting cycles per year, for a potential program total of 55,000 to 110,000 plants, provided free of charge to local and state environmental agencies conducting habitat restoration projects. Ideally, these plants will result in enough salt marsh grasses to restore 11 - 16 new acres of tidal ponds per year. This is a significant contribution to the long-term health and recovery of our community's greatest natural resource -- the Tampa Bay estuary.

Kids working with grasses to be planted in Tampa Bay as part of the Tampa BayWatch High School Wetland Nursery Program.

PROJECT OBJECTIVE

The goals of the Tampa BayWatch High School Wetland Nursery Program are to conduct environmental educational outreach that involves students in hands-on habitat restoration and protection activities. The High School Wetland Nursery Program provides the following positive contributions to the long term health of the estuary:

- The consistent and inexpensive source of high-quality salt marsh grasses provided by the High School Wetland Nursery Program for installation on publicly funded restoration projects assists government agencies in accomplishing habitat restoration goals in a cost-effective manner.
- The nursery program not only continues to provide a sustainable source of plants, but also provides a continuous source of volunteers necessary to plant the salt marsh grasses into local, ongoing restoration projects. Student volunteers plant their school grown marsh plants throughout the year as restoration projects become available.
- The program instills in students an understanding and appreciation of the Tampa Bay estuary, the watershed that feeds it, and the wildlife that depend on it; creates a heightened awareness of problems affecting the bay; and provides an intellectual incentive to students to change certain behaviors that impact the bay. A student who has worked to restore bay habitat systems is likely to become a more enlightened bay user, as well as an outspoken advocate for the bay.
- Our High School Wetland Nursery Program's community effort directly results in a measurable improvement in habitat communities and water quality and increases fishing stocks, bird populations and recreational opportunities for people to enjoy the productive beauty and bounty of the bay.

ACCOMPLISHMENTS

Tampa BayWatch's High School Wetland Nursery Program has been a very successful community project since its

inception in 1993. Since the program's start:

- Nurseries have been established at 11 schools, with other schools interested in joining the program.
- Schools have participated in nine habitat restoration transplanting events since the program's inception.
- There are currently 18,500 planting units being actively cultivated for bay restoration projects.
- Each school year, approximately 1000 students will help with the nursery program.
- A High School Wetland Nursery Program Operations Manual was developed in 1997 to facilitate program expansion. Tampa BayWatch distributed this manual to school systems, environmental agencies and other non-profits around the nation, serving as a model for hands-on bay restoration efforts nationwide.

The High School Wetland Nursery Program has won several awards, such as:

- The 1995 Tampa Bay Association of Environmental Professionals "Innovative Educational Programs" award.
- The 1996 Society for Ecological Restoration "Project Facilitation Award."
- In 1997 Governor Lawton Chiles and the Governor's Council for Sustainable Florida recognized the outstanding Environmental Education contribution of Tampa BayWatch's High School Wetland Nursery Program.
- The Tampa Bay Regional Planning Council's Future of the Region Environmental Award in 1998.

For more information on Tampa BayWatch and their Coastal Wetland Nursery Program check out their website at www.tampabaywatch.org. BayWatch is located at 8401 Ninth St. North, Suite 230-B, St. Petersburg, FL, 33702; phone 727-896-5320; fax 727-896-5325. □

Cordova, Alaska

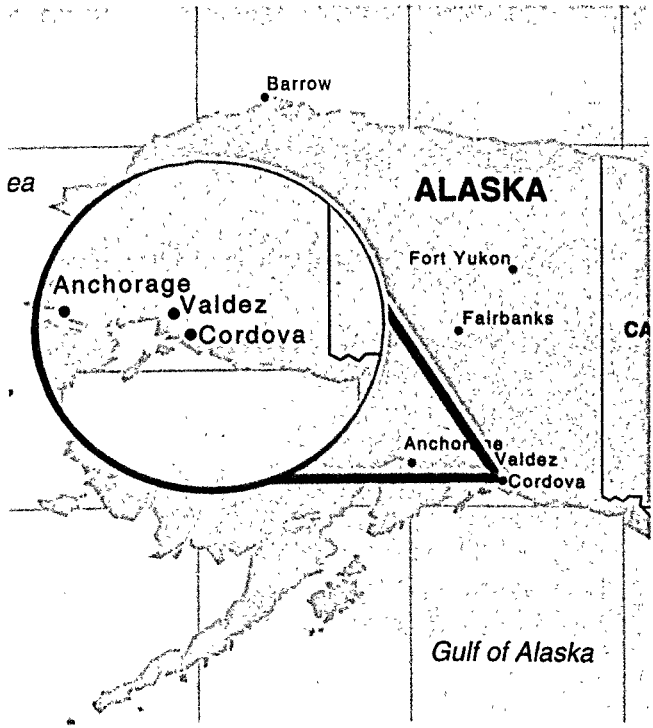
by KEN ADAMS

I'm grateful for the opportunity to write this article about the part of Alaska we live in, along the shore of Prince William Sound (PWS), in the south central part of the state. Here in Cordova, formerly described in postcards as a sleepy little fishing village, the winter population may only be about 1600 people but life is often steeped in issue and controversy. It gives me pleasure to present my perspectives on this life and to try to describe some features of this magnificent area and its people.

Ken Adams, longtime ALS member, lives in Cordova, Alaska. He is a commercial fisherman, primarily gillnetting for pink salmon in Prince William Sound.

To me, Alaska stands in contrast to most of the states in the lower 48 and I think this carries through to citizen involvement and response to controversy. Here, it seems that an individual's efforts are commonly recognized and his or her good works are not lost in the sheer crush of population as can happen elsewhere. Voluntary effort is so extensive it is practically legendary. So why is it this way? For me, two important factors loom: the immensity of the state itself and the miniscule size of its human population. There is little anonymity.

Often the individual must respond or the job just doesn't get done. When this spirit of involvement is shared by others, a cadre of concerned people is formed that can effectively bring about change. I'll give a few examples a little further into this article about what local citizens have accomplished within the past 10 years, but for now I'd like to return to some other contrasts between Alaska and the contiguous states.

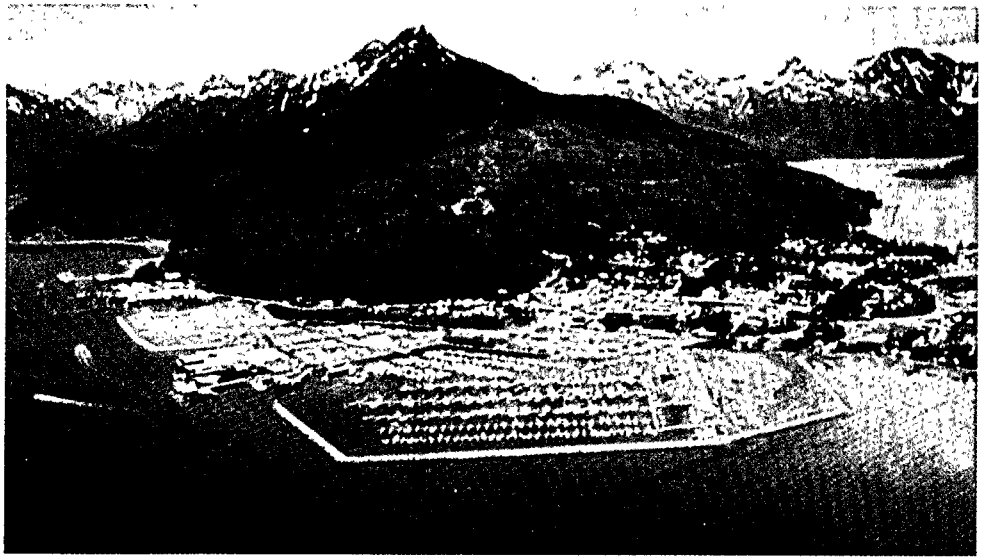


Unlike both Atlantic and Pacific seaboards, we in the PWS area are surrounded by wilderness. The Chugach National Forest, second in size only to the Tongass National Forest in southeast Alaska, forms the perimeter of PWS. To the east of Cordova, the Chugach also encompasses the vast, productive wetlands known as the Copper River Delta. This is prime salmon habitat and the basis for the area's rich and sustaining fisheries. In fact, if we look at the state as a whole, commercial fishing is the largest employer, second only to the oil industry in terms of revenue generation. Habitat remains virtually untouched, waters unpolluted, and the fisheries very closely managed by the State's Department of Fish and Game to achieve sustainability of the resource. The Delta is also the site of a huge concentration of migratory shorebirds each spring.

It is against this background of pristine habitat and clean waters that an ongoing drama of controversy is played. It is a drama which has called into action the best volunteer responses of local citizens who care for their ways of life and the environment they are a part of and the need to coexist with the state's mammoth oil industry. For us in PWS this means coping with the activities of the Alyeska Oil Terminal in Valdez (about 70 miles northwest of Cordova by water) and the shipment of crude oil by tanker through the Sound to market.

Since the Exxon Valdez Oil Spill (EVOS) so clearly demonstrated just how unprepared the oil industry, government regulators, and the population at large were to respond to and control an oil spill of major proportion, it is at the very least informative to see what has been accomplished in our area since that dreadful event occured 10 years ago. Truly, good has been accomplished in the aftermath of the spill and some might even view these comments as a call for them to step forward to help safeguard their environments from the threat of oil spills.

Probably the best place to begin would be by referring to the Oil Pollution Act of 1990. The reader may recall this legislation was mired in Congress for years



The harbor at Cordova, Alaska, can dock more than 700 commercial seiners, gill netters, and trollers, along with a handful of recreational boats.

because of unresolved conflicts dealing with state/federal oil spill liability limits. EVOS gave the momentum needed for passage and included Alaskan provisions for safer transportation of oil. Among these, I think one of the most notable provisions concerned the formation of a citizen's council to oversee the operation of the Alyeska Oil Terminal and the associated tanker fleet. This was truly an amazing accomplishment and one of the best examples I know that demonstrates positive results from grassroots citizen involvement.

In the midst of EVOS the concept of a citizen's oversight council for oil terminal operations and shipping was introduced to the Cordova community. Several dedicated locals travelled to the the Shetland Islands off the coast of Scotland to view first hand British Petroleum's North Sea oil terminal at Sullom Voe. At that facility, foresight on the part of the local Shetlanders insured that there would indeed be citizen involvement in the way the business of oil transportation was to be conducted. Although details of the Shetlander's council differ from what was eventually established in Alaska, the spirit remains basically the same. Residents of the area in which oil operations are conducted have every right to make their concerns known and have the right to investigate the actual practices of industry.

In Alaska two citizen's councils were established under the Oil Pollution Act: one in Cook Inlet, the other in PWS. The latter council is known as the PWS Regional Citizen's Advisory Council, or simply RCAC, and has been involved in scrutinizing and monitoring many practices of the Alyeska Oil Terminal and its fleet of tankers. From the operation of the vapor recovery facility, involved with collection of noxious gases emitted during the loading of crude oil into tankers, to the condition of the effluent from the tanker ballast water treatment facility, to the review of oil spill contingency plans, to the introduction of foreign waterborn species as part of tanker ballast water operations...and a whole host of other issues, RCAC has been the vehicle that insures that citizen's concerns will be given atten-

tion. Although its recommendations have no force of law, they are nonetheless heeded by industry, the U.S. Coast Guard, and the state of Alaska. This council is basically a success story and stands as a positive legacy of the EVOS event. It also stands as a model for what concerned citizens can do in any part of the country where industry is big, regulation is lax or ineffective, and the possibility for environmental catastophe lurks.

I recognize this article is getting a bit too long, but it is only fair that the local citizen effort involved in crafting the major ecosystem research program known as the Sound Ecosystem Assessment (SEA) also be mentioned.

The state of Alaska and the federal government made an out-of-court settlement with Exxon for natural resources damaged during the spill and established the EVOS Trustee Council to administer the $900 million sum that was agreed upon. In 1992 and 1993 the populations of both Pacific herring and pink salmon crashed in PWS. Fishermen were indignant that these important species which had been damaged by the spill were not being given adequate research attention by the Trustee Council. In the summer of 1993, 50 to 60 fishing vessels blockaded Valdez Narrows which lies along the tanker route to the Alyeska terminal and turned back three tankers trying to enter the port of Valdez before the blockade was called off. Secretary of the Interior Bruce Babbitt, who happened to be in Valdez at the time, met with fishermen, heard their concerns, and was instrumental in causing the Trustee Council to release funds to begin a major research effort to help explain what was happening in the Sound.

Through the indefatigable efforts of individuals in Cordova, a major ecosystem investigation was crafted that incorporated the talents of researchers from the Alaska Department of Fish and Game, the University of Alaska, the PWS Science Center, and others. That plan came to be known as the Sound Ecosystem Assessment. It was extensively peer reviewed, funded for five years for $22 million, and in the words of its chief scientist, was declared the "Flagship" of the Trustee Council's research effort. It would receive international acclaim while in progress and it is only now that final reports are being submitted to the Council. We are anticipating the arrival of predictive models for survival of both herring and pink salmon as a result of this research as well as a general circulation model for PWS that will be an invaluable tool for understanding the movement of water and possible transport of contaminants should we be so unfortunate in the future as to experience another major oil spill.

All in all, PWS is emerging, post oil spill, as one of the most intensively studied bodies of water on earth, and Cordova has been propelled into the future, no longer as a sleepy little town but as a center of citizen involvement and participation.

The above discussion gives credit to only some of the activities in our region during the last 10 years. Numerous other issues could be mentioned but I think the above are probably the most significant and attest to the spirit of the concerned citizens. I sincerely hope, as I'm sure others would who have been involved in these issues, that our gains could indeed be passed on to listening ears to help prevent assaults to your environment as EVOS did to ours.

For those wishing further information, the following web sites are offered:

Prince William Sound Regional Citizens Advisory Council: www.pwsrcac.org

Exxon Valdez Oil Spill Trustee Council: www.oilspill.state.ak.us

Prince William Sound Science Center: www.pwssc.gen.ak.us □

San Ignacio Lagoon: World Class Nature Refuge

by MICHELLE KINZEL

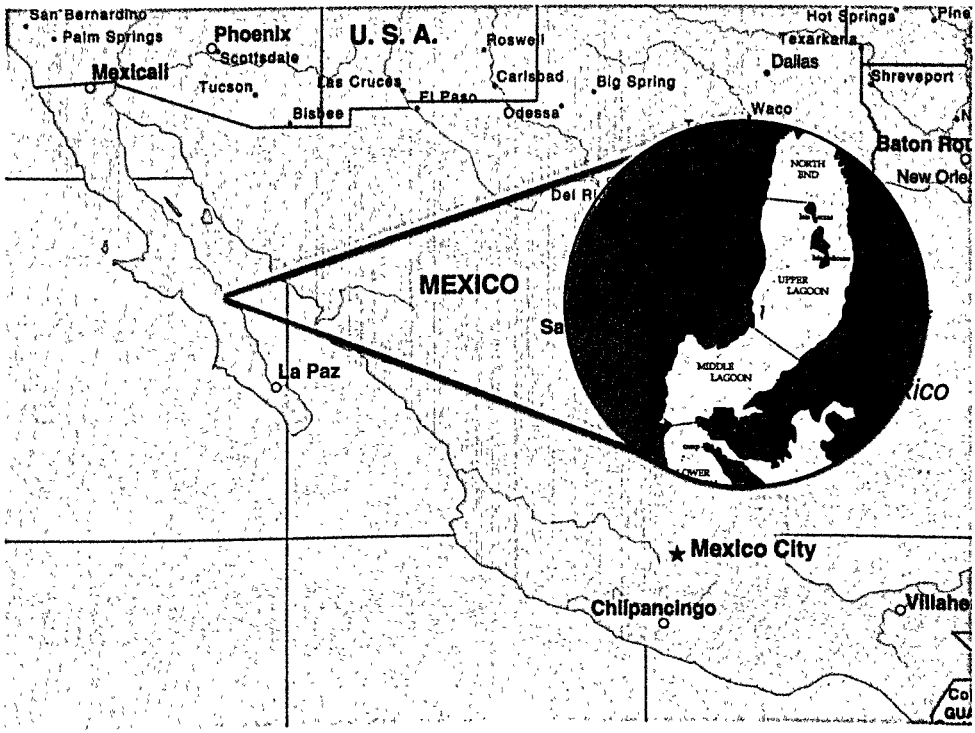
A gray whale spy hopping in San Ignacio Lagoon.

Each fall, gray whales end their summer feeding season and begin an incredible journey. The whales leave the rich and productive feeding grounds located in the Arctic Ocean and migrate south to Baja California, Mexico. Most of the population will swim 5000 miles to the breeding and calving lagoons located along the Pacific side of Baja California. Here the whales congregate in breeding groups or give birth to the calves conceived the previous winter. This annual trek is the longest known migration of any mammal.

Michelle Kinzel is a field biologist who studies whales, dolphins, and sea turles. She lives in Southern California when she is not working in the field.

The pregnant females are the first to arrive in the warm, protected waters of Mexico. The sexually mature adults are close behind, completing a breeding cycle that has enabled this species to recover from near decimation twice in the last century. Although the gray whale was officially removed from the U.S. Endangered Species List in 1994, it remains listed in Annex I of CITES, the Convention for International Trade of Endangered Species. Thus, the gray whale is still classified as an endangered species worldwide. Yet this species is once again facing imminent danger from proposed land development along the shores of one of the breeding and calving sanctuaries.

Currently, the last pristine and undevel-



oped calving lagoon, Laguna San Ignacio, is targeted for an industrial development with potentially staggering consequences. The Mitsubishi Corporation and the Mexican Government have joined efforts in a corporation known as Exportadora de Sal, S.A. (ESSA) in an effort to build the largest saltworks plant in the world. The plant would be built in the middle of Laguna San Ignacio, a primary breeding and calving lagoon for wintering gray whales. The gray whale population occupies three principal breeding grounds each spring, Magdalena Bay, Laguna San Ignacio, and Laguna Ojo de Liebre. Laguna San Ignacio stands alone as the final remaining pristine haven for these whales. There is a saltworks plant in operation in Guerrero Negro, and a 5000-acre tourist resort slated for development in Magdalena Bay.

The combination of low rainfall, high evaporation rates, sparse vegetation and impermeable soils make the site a highly desirable location for a saltworks plant. While San Ignacio Lagoon has the environmental and geological characteristics ideal for the production of industrial salt, the harvesting of this salt would destroy an ecological preserve. Laguna San Ignacio supports a wide array of plant and animal species that would be threatened by industrial development. The lagoon and surrounding mangroves provide a wintering ground for hundreds of birds and provides habitat for numerous marine and terrestrial plant and animal species, many threatened or endangered. The upper portion of the lagoon also provides a birthing environment for gray whales free from human disturbance. In fact, the lagoon is located within the Vizcaíno Biosphere Preserve, the largest of Latin America's reserves. This reserve includes Laguna San Ignacio, Ojo de Liebre, and Guerrero Negro. These three lagoons

make up the Whale Sanctuary of El Vizcaíno. The entire Vizcaíno Preserve has been designated a UNESCO World Heritage Site in recognition of its status as a nature reserve.

The initial saltworks operation proposal was rejected by the Mexican environmental authorities as being incompatible with the status of a biosphere preserve. The current proposal has been modified and is currently undergoing environmental impact assessment. However, we should not celebrate the "friendliness" of the new proposal or the prospect of a safe saltworks operation. The current proposed project, even after being redesigned to address the concerns raised by Mexican and international environmental groups, still promises to have several major impacts on the area and its resident plant and animal species.

If approved, the construction of the saltworks plant would destroy approximately 250,000 acres of land by altering the entire watershed's drainage through increased erosion and influx of freshwater into the lagoon. The area surrounding the plant would be dramatically impacted by noise, urban development, physical disturbances, and indirect economic development. Seventeen loud diesel engines would pump 6000 gallons of saltwater per second out of the lagoon, 24 hours a day, 365 days a year. This water would be directed into 116 square miles of evaporating ponds, obviously displacing any plant or animal life currently inhabiting the area. The company intends to cut down the mangrove swamp in Bahia de Ballenas to make room for a pier. The loss of any ecosystem or wetland is devastating, but mangroves especially so, as they provide a habitat, feeding grounds, and a nursery for thousands of bird, fish and invertebrate species. The mangroves in Laguna San Ignacio mark the northernmost limit of mangroves in the western hemisphere. Additionally, this 1.25-mile long pier would be built in a key abalone and lobster fisheries area. This conduit for transporting the salt to the ocean-going ships would also be located in the whales' migration path. More than three million gallons of diesel fuel and toxic concentrated salt brine would be the accumulated waste products after one year of operation. This staggering conglomeration of toxins and biohazards would be separated from the lagoon itself only by manmade earthen dikes, creating a potential hazard from leakage or spillage. Changes in the eel grass beds would affect the 10,000 brant geese that winter in the lagoon. The large katarina scallop fishery would suffer consequences from the changes as well. Among the staggering list of species at risk are the peregrine falcon, golden eagle, osprey, northern pintail, blue-winged teal, American wigeon, lesser scaup, white pelican, green sea turtle, gray whale, and numerous fish and invertebrate species.

These potential dangers are neither contrived nor inconceivable. Saltworks operations have wreaked havoc in similar marine environments. The small community of Las Lisas, located on a small sand strip between the Chiquimuililla canal and the Pacific Ocean in Guatemala has experienced negative effects from the advent of salt production. Twenty salt and shrimp factories have consumed thousands of acres in that area over the past fifteen years. This expansion has destroyed 97% of the local mangrove forest. The forest strip is a mere 30-120 ft. wide at the present, and the canal has become much shallower and wider. This change in habitat has pushed iguanas, pelicans, and fish to the brink of extinction in that area. The local fishermen can now only harvest a small fraction of these resources on which they depend for subsistence. Guatemalan laws prohibiting the cutting of mangroves were not strong enough to withstand the

pressure and enticement of the bribes from salt and shrimp businesses to the responsible officials.

By its own actions and refusal of initial proposals, the Mexican Government recognizes the danger and threat that the saltworks plant poses to Laguna San Ignacio. A Mexican Federal Government report dated July 1998 documented two spills of toxic brine waste into Laguna Ojo de Liebre. These spills have been implicated in the death of 94 endangered black sea turtles and countless species of fish. It is also of note that following the construction of the saltworks operation at Guerrero Negro, the gray whale population abandoned the lagoon for over a decade. Their disappearance has been directly linked to the dredging of the lagoon mouth for the purpose of accommodating salt barge traffic. The whales did not return to the lagoon until the barge operations had been moved to another location.

The prospect of building a saltworks operation in a pristine biosphere reserve is disturbing. The proposed salt facility makes a mockery of the concept of a World Heritage Site. The project would destroy crucial core and buffer zones of Mexico's largest protected area. Numerous species would be displaced, habitat loss would be astronomical, and impacts as yet unpredictable would undoubtedly occur. For the whales, the threats of boat collisions, loss of protected nursery areas and the inevitable bioaccumulation of toxins would be introduced if the construction of the saltworks operation were allowed. The gray whale has been excluded from the endangered species list for only five years. We would be rolling the dice a bit too soon for this still recovering species by allowing crucial habitat to be destroyed and introducing yet more threats caused by man.

Ghost crabs populate beaches.

What can you do?

Call or write the president of Mitsubishi and tell him that you are outraged by their plan to endanger some of our continent's most spectacular wildlife. Tell him that as a consumer you support companies that work to create a more sustainable future and if the salt works plan moves forward you will feel obliged to reconsider purchasing Mitsubishi products.

Mr. Motohiko Numaguchi
President, CEO
Mitsubishi International Corporation
520 Madison Avenue
New York, NY 10022
Phone: 212-605-2000

Write to the President of Mexico and remind him to live up to Mexico's promises of whale protection and enforcement of Mexican environmental laws under NAFTA. Remind him that the world is watching his country's commitment to protection of precious wildlife.

President Ernesto Zedillo
c/o The Embassy of Mexico
1911 Pennsylvania Avenue, N.W.
Washington, DC 20006
Phone: 202-728-1600

□

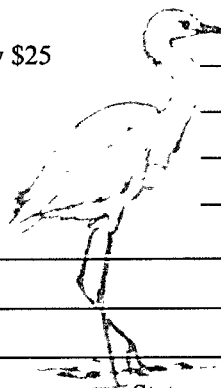
ALS and the Internet

The American Littoral Society is now on-line. Check out our website at **www.americanlittoralsoc.org**. Learn more about the Society while you scope out a field trip, upcoming activities, or events. Read up on our hot issues and link to our chapter sites.

_____ Yes, I want to be a member of the American Littoral Society.

_____ I am currently a member and here are my renewal dues.

Enclosed is my check for $_____. With these annual membership dues I will receive the *Coastal Reporter* newsletter, the *Underwater Naturalist* journal, field trip and event information, tagging privileges, and any local chapter newsletters and information.



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Return coupon to: American Littoral Society
Sandy Hook, Bldg 18
Highlands, NJ 07732

TAGGING REPORT

compiled by PAM CARLSEN

On Dec. 5-8, 1999, in Virginia Beach, I represented the ALS tagging program at a national symposium, "Catch and Release in Marine Recreational Fisheries," sponsored by VA Sea Grant of the VA Institute of Marine Sciences. After three and a half days of presentations and panel discussions the message of the conference was clear:

1. The public needs to be educated about how to release fish properly so the fish survive.

2. Fish that survive go on with their normal life cycles. Thus, careful anglers mean better fisheries resources.

3. There should be recognition of catch and release angling as an important part of the fishing experience.

Two statistical presentations on mortality were given using ALS data. One by the scientist at Woods Hole who manages our data, Gary Shepherd, and another by Christine Lipsky of the University of RI. We should all be proud to see our data contributing to these scientific papers.

The most graphic presentation was by Allen Grover of the California Dept. of Fish and Game, who studied the effects of shank hooks vs. circle hooks in the ocean sport fishery for chinook salmon. Fish gut hooked with shank hooks suffered ripped stomach, liver, and interior linings. All gut hooked salmon died. Circle hooks rarely gut hooked salmon and when they did there were no interior tears. Overall, shank hooks caused a 57% mortality, but when the fishermen switched to circle hooks a 25% mortality was reported. I returned from the conference with material on both Eagle Claw and Daiichi circle hooks. If you would like to know more, contact the office.

I also got to go night fishing under the Chesapeake Bay Bridge Tunnel for rockfish (while in VA, speak like a native). We underhand cast 1 oz. jig heads with 8" Mr. Twister white curly tails, into the bridge pilings. Many fish were caught (the biggest was 25 ½") and all were released, NO TAGS...How did I know I'd get to go fishing?

On Apr. 11, 1999, a 24" striped bass (when in NJ, talk like a native) was tagged by Charlie Kennedy, at Prissywick Shoal, off Cape May. On June 30, it was recaptured in Kennebunkport, ME, by former President George Bush. On July 16, return letters were sent out to Charlie and President Bush. On July 28, we received a note from Charlie, "I was very surprised to hear that President Bush caught my fish. That fish was really swimming to make it to Maine in two and one half months." And again on Aug. 31, "I wrote to President Bush and he wrote back to me. He is a fly fisherman and loves to catch stripers (when in ME, talk like a native). He seems like a real nice person and a regular guy. Please send me 12 packs of tags, no needles."

Cape May, also, had a nice fluke return. On July 2, 1998, Al D'Amato tagged a 13" fish in Lower Delaware Bay. On Aug. 19, 1999, this fish was recaptured south of Coney Island, NY, at 17". Mr. Weir wrote, "I used spearing and pork rind for bait, but the fish spit up shrimp. I had a ham and cheese sandwich." Who eats better, fish or fishermen?

Circle Hook *Shank Hook*

TAGGING RETURNS

Species Length	Tagger	Place Tagged	Date	Recapturer	Location	Length	Date
Bluefish							
22	A Anderson	Block Is , RI	08/22/97	S Switalsk	Howard Beach, NY	24	05/08/98
21	B Finke	Montauk, NY	10/11/97	B Suralik	Great Bay, NJ	23	05/16/98
23	A Anderson	Block Is , RI	11/05/97	J Warshaw	SE Moriches Inlet, NY	23	05/18/98
24	A Anderson	Block Is., RI	05/15/98	J Simes	Gardiners Bay, NY		05/19/98
30	M O'Connell	NY Harbor	10/14/97	O Ballweg	NY Harbor		05/20/98
18	C Kennedy	Cape May Inlet, NJ	05/29/98	B Patterson	Forked River Bay, NJ	18	06/07/98
23	A Schweithelm	Montauk, NY	10/09/97	F/V Terri-Sue	Montauk, NY	28	06/09/98
30	R Kyker	Stamford, CT	06/27/97	T Massey	Sandy Hook, NJ		06/19/98
Fluke							
15	A D'Amato	Delaware Bay, NJ	06/18/98	E Hall	Offshr , Chincoteague, VA	22	02/22/98
10	S Giaccone	Shinnecock Canal, NY	04/26/98	M Russo	Shinnecock Inlet, NY		04/27/98
13	S Giaccone	Shinnecock Canal, NY	05/24/96	E Warner	Shinnecock Bay, NY		04/28/98
14	C Kennedy	I.C.W #457, NJ	07/19/97	T Beers	Sea Isle City, NJ	16	05/19/98
10	D Crann	Great Bay, NJ	06/21/97	P Catuzzi	Little Egg Hrbr., NJ	11	05/24/98
14	B Shillingford	Ludlam Bay, NJ	07/07/97	M Kellner	Breezy Pt., NY	15	05/25/98
12	R Anderson Jr.	Fire Is. Inlet, NY	05/31/97	R Bertha	Jamaica Bay, NY	14	05/26/98
13	R Rinaldi	Wildwood, NJ	06/27/97	G Smith	Manasquan Inlet, NJ	16	05/27/98
13	L Gonnello	Sandy Hook, NJ	05/24/98	S Sanrides	Sandy Hook, NJ	13	05/27/98
14	L Gordon Jr	Lynnhaven R., VA	07/26/97	A Harris	Lynnhaven R , VA	18	05/28/98
16	A D'Amato	Cape May, NJ	09/18/97	W Ingling	Sea Isle City, NJ	17	05/30/98
13	S Carlsen	Deal, NJ	09/12/97	L Faulmino	Staten Is , NY	16	05/30/98
13	K Carson	Ambrose Chan., NY	06/28/97	J Magosin Jr	Ocean City, NJ	16	05/31/98
13	R Crawford Jr	Jones Inlet, NY	05/16/98	G Beasley	Captree, NY		06/01/98
16	T Ritchie	Grassy Sound, NJ	05/20/98	D DeBrakeleer	Cape May Lt , NJ	17	06/02/98
21	G Dickerson	Manasquan R , NJ	05/25/96	B Collard	Manasquan R., NJ	25	06/03/98
12	B Shillingford	Ocean City, NJ	07/05/97	R Bond	Jamaica Bay, NY	14	06/06/98
14	O Ruiz	Fire Is. Inlet, NY	05/11/97	T Fetherston	Pt Judith, RI	17	06/06/98
14	W Filce	Manasquan, NJ	05/31/98	V Sabia	Manasquan R , NJ	14	06/07/98
13	A Gano	Fire Is Inlet, NY	08/07/97	G Benz	Fire Is Inlet, NY	15	06/07/98
17	J Gibbons	Atlantic Beach, NY	05/16/98	F Latini	Bayville, NY	17	06/07/98
14	J Gibbons	Atlantic Beach, NY	06/01/98	T Delerario	Island Park, NY	15	06/08/98
14	J White	Fire Island Inlet, NY	08/30/97	M Laettezza	Robert Moses Brdg., NY	20	06/10/98
	R Rinaldi	Longport, NJ	07/27/96	P Lenard	Little Egg Inlet, NJ	15	06/11/98
15	B Goodman	Jones Inlet, NY	05/23/98	G Hartenfels	Oceanside, NY	15	06/14/98
13	D Crann	Beach Haven, NJ	09/02/97	R Verity	Fire Is. Inlet, NY	14	06/14/98
15	G Bachert	Scotland Buoy, NJ	04/21/98	G Nigro	Shrewsbury R., NJ	15	06/14/98
14	W Filce	Manasquan, NJ	05/03/98	I Krugolets	Bensonhurst, NY	14	06/16/98
16	J Gibbons	Island Pk., NY	05/24/98	A Berman	Atlantic Beach, NY		06/18/98
10	F Waltzinger III	Deal, NJ	09/15/97	T Buban	Sandy Hook, NJ	15	06/18/98
15	J Gibbons	Atlantic Beach, NY	05/17/98	T Guzowski	Atlantic Beach, NY	16	06/19/98
14	W Filce	Lavalette, NJ	08/15/97	J DiGuglielmo	Manasquan, NJ	17	06/19/98
15	J Gibbons	Atlantic Beach, NY	05/23/98	J Mannone	Atlantic Beach Brdg., NY	15	06/19/98
13	M Barrett	Great Kills, NY	07/28/97	P Holmes	Fire Is. Inlet, NY	15	06/19/98
13	G Covello	Navesink R., NJ	06/29/97	P Weiss	Great Bay, NJ	17	06/21/98
12	P Hession	E Rockaway Inlet, NY	07/22/97	F Ulschmid	Baldwin, NJ		06/24/98
14	B Goodman	S of Jones Inlet, NY	10/05/97	E Driscoll	Merrick, NY	16	06/25/98
12	J White	Robert Moses Brdg., NY	06/02/98	S Carley	Fire Is. Inlet, NY	12	06/25/98
13	R Romanow	Jones Inlet, NY	06/10/98	M Baglio	Jones Inlet, NY	13	06/25/98
14	J Gibbons	Atlantic Beach, NY	06/21/98	A Berman	Reynold's Chan., NY	14	06/25/98
14	A Malheiros	Sandy Hook, NJ	04/17/98	R Jones	Sandy Hook, NJ	14	06/25/98
Grouper							
13	F Waltzinger III	Bahia Honda Key, FL	02/19/98	C McMichael	Bahia Honda Key, FL		06/07/98
Sheepshead							
8	D Sherman	Offshr , Savannah, GA	12/19/97	J Cavuoto	Offshr., Savannah, GA	09	05/17/98
8	D Sherman	Offshr., Savannah Reef, GA	05/02/98	K Kitchen	Offshr., Savannah Reef, GA	08	05/22/98
10	D Sherman	Offshr , Savannah, GA	05/02/98	J Cavuoto	Offshr , Savannah, GA	10	05/25/98

Species Length	Tagger	Place Tagged	Date	Recapturer	Location	Length	Date
Striped Bass							
22	A LoCascio	Manhasset Bay, NY	10/02/95	K Derby	2 mi E Cape Henry, VA	26	12/26/97
18	R Pearson Jr.	Croton Bay, NY	03/25/96	VA Inst Mar Sci.	James R , VA		03/17/98
15	R Pearson Jr	Croton Bay, NY	04/04/98	J Barry	Marlboro, NY		04/25/98
21	R Ries	Cold Spring Hrbr , NY	09/29/97	B Varricchio	Island Beach St Pk., NJ	22	04/25/98
24	A Anderson	Pt Judith, RI	10/30/97	K Oltan	Norwich, CT		04/25/98
24	J Lutz	Cape May, NJ	11/30/97	A Wakeford	Barnegat Inlet, NJ		04/25/98
16	K Carson	Hudson River, NY	12/23/97	C Gargiulo	New Rochelle, NY	17	04/25/98
14	A Anderson	Thames R., CT	11/29/97	A Pena	Montville, CT		04/25/98
14	H Sweet	Warren, RI	08/01/97	M Behl	Jerusalem, RI	16	04/25/98
24	M Klause	Mays Landing, NJ	05/10/96	J Fortunato Jr.	Mays Landing, NJ	30	04/25/98
18	GR Gray	Charlestown, RI	06/14/96	S Fontanella	Lavallette, NJ	25	04/25/98
23	P Grippo	Wantagh Brdg , NY	06/07/97	J Balicki	Cliffwood Beach, NJ	25	04/25/98
22	W Meyer	Sandy Hook, NJ	10/30/97	F Casillo	Raritan Bay, NJ	22	04/25/98
22	A Anderson	Thames R , CT	12/26/97	D Channer	Norwich, CT		04/25/98
17	T Marburger	Northport, NY	04/08/97	V Melendez	E. Harlem R., NY	19	04/25/98
23	W Perlman	Long Beach, NY	11/05/97	T Marburger	Northport, NY	23	04/26/98
14	G Clusman	Sandy Hook, NJ	04/23/98	J Kim	Sandy Hook, NJ		04/26/98
16	GS Gray	Charlestown, RI	05/12/97	I Astacio	Throgs Neck Brdg., NY	16	04/26/98
21	A Wilkenson	Milford, CT	06/25/96	J Mylod	Poughkeepsie, NY	22	04/26/98
17	R Grobarz	Bay Head, NJ	07/17/97	W King	Little Egg Inlet, NJ		04/26/98
18	P Grippo	3rd Wantagh Brdg., NY	06/30/97	C Andreski	Massapequa, NY	21	04/26/98
20	A Anderson	Montauk Pt., NY	11/06/97	H Seybold	Brant Beach, NJ	21	04/26/98
16	A Schweithelm	Ft Salonga, NY	06/14/96	J Dickinson	Susquehanna Flats, MD	21	04/27/98
18	P Grippo	Jones Beach, NY	08/03/97	J Dotsey	Rockaway, NY	20	04/27/98
19	J Calamia	East R., NY	12/03/97	J Rose	Warren R , RI		04/27/98
36	S Fries	Montauk, NY	10/13/97	R Nutwell Jr.	Chesapeake Beach, MD	37	04/28/98
19	W Perlman	Atlantic Beach, NY	06/21/97	A Colin	Ship Bottom, NJ	20	04/28/98
35	R Conklin	Moriches Inlet, NY	10/03/96	F/V Second Wind	Offshr , Ocean City, MD	37	04/28/98
22	F Casey	Boston Harbor, MA	10/04/97	F Behrle	Norwich, CT		04/28/98
18	A LoCascio	Little Neck Bay, NY	02/28/98	R Cedar	Eatons Neck, NY	20	04/28/98
33	JC Wright	Ches. Bay Brdg. Tun., VA	11/14/96	W Perry	Ches Bay Brdg. Tun., VA		04/28/98
24	G Ciriello	Coney Is. Flats, NY	07/05/97	P Sciortino Jr	Romer Shoals, NJ	28	04/29/98
19	R Conklin	Moriches Inlet, NY	07/21/97	B Ferro	Seaford, NY	21	05/01/98
23	C Harrison	Warren River, RI	07/30/97	F Bynum	125th St., Hudson R., NY	24	05/02/98
20	A Moore	Newburgh, NY	05/08/97	A Canino	Whitestone Brdg., NY		05/02/98
41	D Sowerby	York Harbor, ME	09/11/97	T Gibson	Solomons, MD	43	05/02/98
26	P Malamed	Moriches Inlet, NY	06/25/95	R Woolley	Verplanck, NY	29	05/03/98
11	R Kyker	Norwalk, CT	05/21/96	A Anderson	Old Lyme, CT	14	05/03/98
20	R Leja	Bridgeport, CT	10/23/97	W Bernd Sr	Island Beach St. Pk., NJ	21	05/03/98
19	J Karolides	Danvers, MA	07/20/97	A Mota	Yonkers, NY	20	05/03/98
23	R Nystrom	Fairfield, CT	08/10/97	M Strouse	Lambertville, NJ	28	05/04/98
17	H June	Nissequogue R., NY	10/29/97	J Dotsey	Atlantic Beach Brdg., NY		05/04/98
22	M Berger	Atlantic Beach, NY	11/12/97	M Healy	Bass R , MA	25	05/04/98
22	M Mercer	Barrington R., RI	06/01/97	K Miner	Warren R , RI	24	05/05/98
24	S Knapik	Montauk, NY	10/07/96	C Lohafer	Ches. Bay Brdg Tun , VA	29	05/05/98
15	A Schweithelm	Asharoken, NY	05/26/97	R Taylor	Bayonne, NJ		05/06/98
18	D Hoxsie	Charlestown, RI	06/19/97	B Millar	Montville, CT	21	05/06/98
28	J Gibbons	Sandy Hook, NJ	09/22/97	D Gladysiewicz	Perth Amboy, NJ	28	05/06/98
26	R Leeds	Ocean City, NJ	03/28/97	D Sendecki	Island Beach St Pk., NJ	28	05/06/98
20	D Kelly	Sag Harbor, NY	07/01/97	D Chambers	Seaside Hts , NJ	22	05/07/98
18	R Kyker	Norwalk, CT	06/29/97	W Kenney	Island Beach St Pk , NJ	18	05/07/98
14	D Hoxsie	Charlestown, RI	08/18/97	F Novotney	Northport, NY	16	05/07/98
25	R Manera	Millville, NJ	04/27/97	J Werner	Millville, NJ	25	05/07/98
15	A Anderson	Thames R , CT	12/14/97	M Bartolotta	CT River		05/07/98
22	G Nigro	Sandy Hook, NJ	11/25/97	J Dymant	Jones Inlet, NY	25	05/08/98
16	J Karolides	Beverly, MA	07/16/97	D Shauger	Island Beach St Pk , NJ	19	05/08/98
18	A Schweithelm	Asharoken, NY	07/12/97	T Ruvolo	Centerport, NY		05/09/98
25	A Anderson	Block Is., RI	06/26/96	D Dean	Cold Spring Hbr., NY		05/09/98
14	R Kyker	Norwalk, CT	05/02/97	D Zambrotta	Newport, RI	16	05/10/98
23	T Marburger	Northport, NY	05/01/97	J Moomjian	Keyport, NJ	25	05/10/98
32	J Foti	Montauk, NY	09/06/96	J Fournier	E Falmouth, MA	37	05/10/98
22	M Simmons	Barnegat Light, NJ	11/26/97	J Szczoczarz	Westport, MA	24	05/10/98
21	E Petronio Jr.	Pt. Judith, RI	10/31/97	C Karbownik	Island Beach St Pk., NJ	21	05/10/98
30	H Schauer	Martha's Vineyard, MA	10/06/97	P Collett	Cape Cod Canal, MA	33	05/10/98

Species Length	Tagger	Place Tagged	Date	Recapturer	Location	Length	Date
Striped Bass (cont.)							
22	T Marburger	Northport, NY	03/09/97	A Bessinger	Devon, CT	22	05/11/98
15	A Schweithelm	Ft. Salonga, NY	04/18/98	N Schwab	Roslyn, NY	16	05/11/98
20	P Grippo	Seaford Harbor, NY	05/15/97	M McNeil	W. Harwich, MA	25	05/12/98
23	H Sweet	Warren, RI	09/11/97	S Casto	Barrington, RI		05/12/98
24	J Brittin	Cape May, NJ	11/15/96	S Downs	S. Hartford, CT		05/12/98
16	T Marburger	Northport, NY	03/16/97	D Emmons	Stamford, CT		05/13/98
24	E Petronio Jr	Pt. Judith, RI	06/25/96	D Mulvey	Clinton, CT	26	05/13/98
20	R Allen	Cape Henry, VA	12/26/97	T Schwieger	Ridge, MD		05/13/98
	J Mulkerin	Union Beach, NJ	10/29/97	R Taylor	Bayonne, NJ	11	05/13/98
23	J Lutz	Cape May, NJ	11/28/97	P Valliere	Pt. Judith, RI	24	05/13/98
30	F Casey	Boston, MA	05/07/98	A Lehmann	Boston, MA	30	05/13/98
22	E Adams	Long Branch, NJ	06/21/96	T Lake	Chelsea, NY	27	05/14/98
17	R Stroz	Normandy Beach, NJ	11/28/97	W Heller	Gilgo Beach, NY	18	05/14/98
30	A Pedersen	Staatsburg, NY	04/24/98	P DeBlasio	Kingston, NY		05/14/98
19	H Sweet	Warwick, RI	08/25/97	J Dotsey	Atlantic Beach, NY	19	05/14/98
15	H Sweet	Warren, RI	08/03/95	P Casto Sr	Bristol, RI	26	05/14/98
17	S Keiper	Indian R. Inlet, DE	11/03/96	D Givens	New Castle, DE	24	05/14/98
39	A Anderson	Montauk, NY	06/07/97	F Lamonica	Staatsburg, NY	40	05/15/98
20	A Anderson	Pt. Judith, RI	10/31/97	K Hollins	Island Beach St. Pk , NJ	20	05/15/98
23	M Mercer	Barrington River, RI	06/06/97	D Roulston	Warren R., RI	26	05/15/98
18	B Shillingford	Corson's Sound, NJ	09/26/97	T Clark	Old Saybrook, CT	18	05/15/98
28	B Shillingford	Cape May, NJ	04/28/95	T Hodun	Stratford, CT		05/15/98
16	J O'Keeffe	Stratford, CT	05/05/97	R Roa	Atlantic City, NJ	18	05/15/98
21	A LoCascio	Throgs Neck Brdg., NY	10/29/94	J Renzo	Hudson, NY	29	05/15/98
27	M Collura	Arthur Kill, NJ	09/15/97	B Ferratto	Germantown, NY	33	05/15/98
31	D Spring	Ches. Bay Brdg. Tun , VA	11/11/95	C Westphal	Indian R., DE	37	05/15/98
13	G Blank	Jersey City, NJ	11/30/97	P Medler	Gardiners Bay, NY		05/15/98
24	B Radice	Monmouth Beach, NJ	11/25/95	R Delaprida	Sea Bright, NJ	28	05/15/98
18	H Sweet	Warren, RI	08/08/97	P Medler	Gardiners Bay, NY		05/15/98
17	H Sweet	Warren, RI	09/05/96	P Medler	Gardiners Bay, NY		05/15/98
20	A Young	Mattituck, NY	09/09/97	S Kellner	Mattituck, NY	22	05/16/98
22	W Perlman	Atlantic Beach, NY	06/05/97	R Leporin	J F.K. Airport, NY	26	05/16/98
21	B Garfield	Portland, ME	08/15/97	J Dotsey	Far Rockaway, NY	22	05/16/98
24	B Shillingford	Cape May, NJ	04/29/96	B Girouard	Cape Cod Canal, MA	27	05/16/98
24	L Hickey	Cape May, NJ	11/16/96	L Richards	Atlantic Beach Brdg , NY		05/16/98
27	T Lake	Liberty Isl., NY	11/29/96	S Switalski	Howard Beach, NY	29	05/16/98
22	D Mann	Pt. Jefferson, NY	10/22/96	J Dotsey	Far Rockaway, NY	22	05/16/98
22	T Rinaldi	Riverhead, NY	11/06/92	W King	Little Egg Inlet, NJ	29	05/16/98
38	A Anderson	Montauk Pt., NY	10/03/97	J Kusmanick	Cape May, NJ	40	05/16/98
16	T Marburger	Northport, NY	03/15/97	L Maxwell	Mouth of CT River, CT	16	05/16/98
32	D Dibblee	Esopus, NY	05/05/98	R Cole	Saugerties, NY	33	05/16/98
20	M Russo	Stony Brook, NY	05/11/98	M Crego	Cold Spring Harbor, NY		05/16/98
27	J McAfee	Quick's Hole, MA	07/23/96	B Schneider	Watch Hill, RI	28	05/17/98
28	J Lind	Sandy Hook, NJ	10/12/97	C Johnson	Spring Lake, NJ		05/17/98
19	T Marburger	Northport, NY	01/23/96	J Dotsey	Long Beach, NY	22	05/17/98
36	A LoCascio	Execution Lt., NY	06/23/97	W Roth	Cornwall, NY		05/17/98
20	GR Gray	Charlestown, RI	09/13/97	S Neary	Fire Is. Inlet, NY	21	05/17/98
22	P Grippo	Haunts Cr., NY	06/12/97	V Ragusin	Haunts Cr , NY	26	05/17/98
22	F Tenore	Sandy Hook, NJ	05/08/98	G Stephens	Montauk, NY		05/17/98
36	P Grippo	Tobay Beach, NY	10/29/92	T Kollbeck	Hudson R., NY	37	05/17/98
22	J Karolides	Beverly, MA	10/08/97	J Yescalis	Beverly, MA	26	05/17/98
25	J McAfee	Quick's Hole, MA	06/04/97	D McLane	Shinnecock Inlet, NY	26	05/17/98
31	D Kelly	Sag Harbor, NY	06/05/97	F Fowler	Sag Harbor, NY	34	05/17/98
20	G Ciriello	Coney Island, NY	11/29/97	M McGovern	Jamaica Bay, NY	21	05/17/98
33	A Anderson	Montauk Pt., NY	06/25/97	R Shaffer	Staatsburg, NY	33	05/17/98
21	J Brittin	Cape May, NJ	11/15/96	C Compton	Longport, NJ	21	05/17/98
21	T Lynch	Stamford, CT	07/24/93	P Emmerich	Hempstead Harbor, NY	35	05/18/98
32	B Shillingford	Brown Shoal, DE Bay, NJ	11/05/97	A Shaw	Barrytown, NY		05/18/98
20	J Della Porta	Boston, MA	07/30/97	F Casey	Boston, MA	23	05/18/98
22	G Blank	Verrazano Brdg., NY	06/14/97	A Shaw	Barrytown, NY		05/18/98
17	A Drew Jr.	Charlestown, RI	05/23/97	K Golding Jr.	Little Compton, RI	19	05/18/98
17	T Shaheen	Rumson, NJ	05/16/95	B Biedinger	Highlands Brdg., NJ	19	05/18/98
19	G Blank	Edgewater, NJ	02/10/98	G York	Housatonic R., CT	21	05/19/98

Species Length	Tagger	Place Tagged	Date	Recapturer	Location	Length	Date
Striped Bass (cont.)							
18	M Strucich	Flynn's Knoll, NJ	12/18/97	M Figioli	Sandwich, MA	19	05/19/98
18	J O'Keefe	Stratford, CT	05/01/98	K Goldring Jr	Little Compton, RI	19	05/19/98
28	A LoCascio	Manhasset Bay, NY	05/31/96	W Van Tassell	New Rochelle, NY	32	05/19/98
28	F Casey	Boston Harbor, MA	06/16/97	N Gonzalez	Far Rockaway, NY	30	05/19/98
19	G White	Piscataqua R., NH	09/06/97	P Gillmer III	Long Branch, NJ	21	05/19/98
24	W Perlman	Atlantic Beach, NY	07/13/97	H Killen	1 mi off Leipsic R., DE		05/20/98
25	A Anderson	Charlestown, RI	10/22/97	H Killen	1 mi. off Leipsic R , DE		05/20/98
23	J Cosgrove	Highlands Brdg., NJ	07/15/97	T LaRose	Highlands Brdg , NJ		05/20/98
21	JC Wright	Linkhorn Bay, VA	10/23/97	Unkn Fisherman	Ches. Bay Brdg. Tun., VA		05/20/98
25	C Wilcox III	Moriches Inlet, NY	05/06/98	C Ford	Moriches Bay, NY	26	05/20/98
19	A Anderson	Pt Judith, RI	10/30/97	S Jones	Norwich, CT	22	05/20/98
15	R Kyker	Norwalk, CT	04/19/96	P Fazio	Kismet, NY	21	05/21/98
29	S Jakubowski	Sandy Hook, NJ	11/13/97	L Gobel	Moriches Inlet, NY	29	05/21/98
27	F Jessup II	Moriches Inlet, NY	11/11/97	S Hurley	Boston, MA	29	05/21/98
12	A Anderson	Thames R , Ct	12/14/97	B Fontaine	Norwich, CT	14	05/21/98
17	K Hollins	Island Beach St Pk , NJ	11/06/97	R Alworth	Spring Lake, NJ	18	05/21/98
24	R Grobarz	Bay Head, NJ	07/17/97	F Simms	Bay Head, NJ	28	05/21/98
18	P Blanchard	Merrimac R , MA	07/08/97	D Rogers	Newburyport, MA	24	05/22/98
19	J O'Keeffe	Stratford, CT	05/06/98	C Elser	Stratford, CT		05/22/98
38	N Eckert	Old Orchard Lt , NY	05/02/98	V Bilodeau	Moriches Inlet, Ny	38	05/22/98
21	M McCredie	Lambertville, NJ	09/18/97	H Killen	1 mi off Leipsic R., DE		05/22/98
32	W Williams	Bay Head, NJ	09/26/94	G Seiler	Sea Bright, NJ		05/22/98
21	P Johnson	Cape Cod Canal, MA	10/05/97	J Maxwell	Salisbury, MA	22	05/22/98
21	R Nystrom	Bridgeport, CT	06/14/97	D Coulombe	Hartford, CT	23	05/23/98
24	P Hierholzer	Wildwood, NJ	12/05/96	B Wazek	The Race, L.I Sound	27	05/23/98
18	P Grippo	3rd Wantagh Brdg., NY	07/22/97	E Zack	Massepequa, NY		05/23/98
24	W Kuchinsky	Montauk, NY	10/15/94	G Ciaravino	Jamaica Bay, NY	34	05/23/98
22	G Clusman Jr	Brick Beach, NJ	11/05/97	S McDermott	Seabrook, NH	28	05/23/98
27	G Horvath	Trenton, NJ	04/21/98	M Santorsiero	Trenton, NJ	27	05/23/98
21	M Simmons	Barnegat Lt , NJ	11/06/96	R White	Canarsie, NY	26	05/23/98
20	R Kyker	Norwalk, CT	08/03/96	F Hubner	Montauk Pt., NY		05/23/98
24	F Stunkel	Norwalk, CT	11/05/97	J Santiago Jr	N. Andover, MA		05/23/98
32	T Marburger	Shinnecock Inlet, NY	06/20/95	C Billings	Newburgh, NY	36	05/23/98
27	A Schweithelm	Montauk, NY	06/06/97	M Wagner	Montauk Pt., NY	29	05/24/98
25	R Kalenka	Shinnecock Bay, NY	05/23/97	E Nichols	Shinnecock Bay, NY	28	05/24/98
	S Kellner	Riverhead, NY	11/08/93	B Waters	Bayville, NY	27	05/24/98
28	F Casey	Boston Harbor, MA	07/31/97	J Toth	Barnegat Inlet, NJ	29	05/24/98
30	D Haines	Nantucket, MA	09/13/97	N King	Woods Hole, MA	30	05/24/98
18	D Brodeur	Milford, CT	06/08/97	G Faucher	Orient Pt , NY		05/24/98
22	F Stunkel	Stamford, CT	10/20/97	K Bova	Stamford, CT	24	05/24/98
22	S Kellner	Duck Pond Pt , NY	08/09/96	E Weyer	Moriches Inlet, NY	37	05/24/98
24	D Wright	Ches Bay Brdg. Tun., VA	07/28/97	C Guin	Ches. Bay Brdg. Tun., VA	27	05/24/98
22	G Nigro	Sandy Hook, NJ	11/26/97	K Miner	Warren R., RI	25	05/24/98
19	T Marburger	Northport, NY	04/19/98	J Beausoleil	Plum Is , MA		05/25/98
18	L Tikuisis	Bay Head, NJ	12/05/97	M Fluet	Salisbury, MA	21	05/25/98
16	P Fallon	Georgetown, ME	08/14/96	P Michetti	Nantucket, MA	22	05/25/98
25	D Kelly	Orient Pt , NY	11/17/95	R Couch	Newburyport, MA	31	05/25/98
17	J Della Porta	Boston, MA	07/29/97	E Flanagan	Boston, MA	20	05/25/98
19	R Kyker	Northport, NY	03/31/96	R Fry	Moriches Bay, NY	22	05/26/98
24	L Gonnello	Romer Shoals, NJ	10/26/96	L Szeliga	Leonardo, NJ	25	05/26/98
19	B Perlman	Atlantic Beach, NY	05/08/97	E Buccigross	Buzzard's Bay, MA	24	05/26/98
26	J Lutz	Cape May, NJ	11/28/97	M DeMari	Atlantic City, NJ		05/26/98
21	G Horvath	Barnegat Inlet, NJ	10/03/97	R McGee	Strathmere, NJ	23	05/26/98
16	P Grippo	Jones Inlet, NY	11/25/95	R Kress	Sandy Hook, NJ	23	05/27/98
22	N Fiorillo Jr.	Flynn's Knoll, NJ	11/22/97	C Maxon	Boston, MA	23	05/27/98
17	A Anderson	Thames R., CT	12/21/97	M Hillyer	Groton, CT	18	05/27/98
22	S Kellner	Orient Point, NY	11/17/91	E Wykert	Sands Pt., L.I , NY	27	05/27/98
22	J Della Porta	Marblehead, MA	09/22/96	D Martin	Salisbury, MA	25	05/27/98
33	B Shillingford	Brown Shoal, DE Bay, NJ	11/04/97	N Spagna	Montauk Pt., NY	36	05/27/98
26	R Locke	Provincetown, MA	06/07/97	D Waldo	Eastham, MA	26	05/27/98
14	T Tavares	Amelia Earhart Dam, MA	04/27/98	J Borsetti	Beverly, MA	14	05/27/98
14	A Anderson	Old Saybrook, CT	04/26/98	N Kittredge	Westport, MA		05/27/98
19	H Sweet	Warwick, RI	08/02/97	B Renauld	E Greenwich Bay, RI	21	05/27/98

Species Length	Tagger	Place Tagged	Date	Recapturer	Location	Length	Date
Striped Bass (cont.)							
20	D Hoxsie	Charlestown, RI	08/07/97	E Sudal	Charlestown, RI	20	05/28/98
20	H Sweet	Warren, RI	10/13/97	J Morrison	Barrington, RI	24	05/28/98
25	M Simmons	Barnegat Light, NJ	07/16/97	F Bogue	Barnegat Inlet, NJ	27	05/28/98
30	G Kerkhan	York, ME	09/10/97	B Normandin	Buzzard's Bay, MA	31	05/28/98
36	S Fries	Montauk, NY	10/13/97	R Parker	J.F.K. Airport, NY	37	05/28/98
25	R Vogel	Flynn's Knoll, NJ	07/29/97	C Carroll	Flynn's Knoll, NJ	25	05/28/98
22	S Pisano	Jamaica Bay, NY	04/17/97	H Vanasse	Block Is., RI	30	05/28/98
32	JC Wright	Ches. Bay Brdg. Tun., VA	11/14/96	R Balsamo	Old Orchard Lt., NY	33	05/28/98
16	R Conklin	Moriches Inlet, NY	10/08/97	J Kocinski	Shirley, NY	19	05/28/98
30	S Jakubowski	West Bank Light, NY	10/29/96	P Whitting	2 mi. E Montauk Lt., NY	30	05/28/98
24	G Buono	Old Orchard Lt., NY	09/29/96	H Youngs	Newburgh, NY	27	05/28/98
22	P Lowcher	Sea Bright, NJ	05/03/98	F Decker	Shrewsbury R., NJ	22	05/28/98
20	G Kerkhan	Monmouth Beach, NJ	12/20/97	G de Labry	Groton Pt., CT		05/28/98
25	L Gonnello	Flynn's Knoll, NJ	07/29/97	E Anderson IV	Flynn's Knoll, NJ		05/29/98
19	H Sweet	Warren, RI	08/08/97	A Shorey	Barrington, RI	19	05/29/98
23	P Lowcher	Sea Bright, NJ	04/25/98	P Lowcher	Shrewsbury R , NJ	24	05/29/98
28	B Garfield	Portland, ME	08/16/97	B Ricard	Lawrence, MA	30	05/29/98
20	A Moore	Newburgh, NY	04/15/98	R DeRise	3 mi. N Pt. Judith, RI		05/29/98
23	R Kyker	Norwalk, CT	07/16/96	J Caputo	Great Neck, NY	26	05/29/98
35	C Carroll Jr.	Flynn's Knoll, NJ	05/28/98	E Anderson III	Flynn's Knoll, NJ		05/29/98
34	A D'Amato	Offshr., Cape May, NJ	11/10/96	E DeJesus	Sandy Hook Bay, NJ	37	05/29/98
34	A LoCascio	Manhasset Bay, NY	06/28/97	A Schettino Jr.	Manhasset Bay, NY		05/29/98
37	R Gardrel	Block Is., RI	10/04/97	R Parker	Jamaica Bay, NY	39	05/29/98
29	A Anderson	Montauk Pt., NY	10/15/97	G Sanford	Plum Is., MA	29	05/29/98
19	R Pearson Jr.	Breezy Pt., NY	12/03/93	A LoCascio	Execution Lt., NY	27	05/29/98
21	A LoCascio	City Is., NY	11/09/97	C Wazer	Westerly, RI	21	05/30/98
16	F Ryan	Darien, CT	08/09/97	A Heath	Kennebec R., ME	19	05/30/98
27	T Marburger	Shinnecock Inlet, NY	06/09/96	J Timpanaro	Shinnecock Inlet, NY	37	05/30/98
25	P Chowansky	Island Beach St. Pk., NJ	11/01/97	K Johnston	Brant Beach, NJ	25	05/30/98
16	K Kyker	Norwalk, CT	04/28/94	C Czartarieski	Plum Gut, NY	27	05/30/98
33	R Grobarz	Sandy Hook, NJ	10/08/97	J Calamia	Flynn's Knoll, NJ	36	05/30/98
25	L Gonnello	Flynns Knoll, NJ	06/24/97	C Coughlin	Leonardo, NJ	27	05/30/98
27	R Leja	Fairfield, CT	10/25/91	V Natale	Kings Pt., NY	35	05/30/98
14	A Perednia	East R., NY	11/06/96	R Melendez	Far Rockaway, NY		05/30/98
16	T Marburger	Northport, NY	03/31/98	A Zaron	Brooklyn, NY		05/30/98
20	T Shaheen	Navesink R., NJ	05/15/97	L Sime	Vineyard Sound, MA	24	05/31/98
17	R Ferraro	Narrow R., RI	11/24/96	J Cimino	Strathmere, NJ	21	05/31/98
34	B Glynn	Great Kills, NY	05/17/97	J Asklof	Great Kills, NY	36	05/31/98
18	M Strober	Jersey City, NJ	08/23/97	D Swanson	NY Harbor		05/31/98
32	D Dibblee	Esopus, NY	05/08/98	B Thurman	Moriches Inlet, NY	34	06/01/98
21	J Della Porta	Swampscott, MA	08/08/97	G Kutzelman	Salisbury, MA	24	06/01/98
24	W Perlman	Atlantic Beach, NY	06/15/96	W Perlman	Atlantic Beach Brdg., NY	28	06/01/98
19	S Fries	Rockaway Inlet, NY	11/29/97	W Perlman	Atlantic Beach, NY	19	06/01/98
24	A Anderson	Pt. Judith, RI	10/30/97	VA Inst. Mar. Sci.	York R , VA		06/01/98
27	G Horvath	Barnegat Inlet, NJ	11/12/97	C Carmack	Troy Dam, NY		06/01/98
25	W Matuszak	Montauk Pt., NY	06/21/97	D Kaye	Shinnecock Bay, NY	25	06/01/98
15	M Strober	Robbins Reef, NY	05/16/98	A Matias	Hudson R., NY	16	06/01/98
17	T McCandless	N. Kingstown, RI	10/01/96	VA Inst. Mar. Sci.	York R , VA	21	06/01/98
25	T Marburger	Shinnecock Inlet, NY	06/09/96	B Bossung	Shinnecock Bay, NY	30	06/01/98
21	P Grippo	Jones Inlet, NY	11/22/97	J Donald	Lower Kennebec R., ME	23	06/01/98
27	T Marburger	Shinnecock Inlet, NY	06/16/96	B Devinney	Somers Pt., NJ	30	06/02/98
26	C Bassano	Tuckernuck Is , MA	08/17/97	A Anderson	Block Is., RI	26	06/02/98
15	J Calamia	Astoria Pk., NY	11/24/96	R Hauck	35th Ave. Astoria, NY	15	06/02/98
11	A Perednia	East River, NY	11/06/97	R Campora	Cornwall, NY	12	06/02/98
18	K Carson	U.N. East R , NY	06/29/97	R Sanchez	L.I. City, East R., NY	22	06/02/98
28	A Anderson	Block Is., RI	07/19/97	J Vashalifski	Charlestown, RI	28	06/02/98
22	A Anderson	Block Is., RI	07/16/97	D Zambrotta	Block Is , RI		06/02/98
23	T Shaheen	Raritan Bay, NJ	07/04/96	W Buzin	Flynn's Knoll, NJ	28	06/02/98
30	A Schweithelm	Ft. Salonga, NY	06/17/96	J Morrissey	Moriches Inlet, NY	33	06/03/98
21	D Kelly	Sag Harbor, NY	05/05/98	L Schellinger	East Hampton, NY		06/03/98
26	G Ottavio	Cape May, NJ	11/21/96	P Westcott	Charlestown, RI	28	06/03/98
18	R Grobarz	Long Branch, NJ	06/01/97	M Lewis	Asbury Park, NJ	24	06/03/98
16	G Kerkhan	Mantoloking, NJ	11/28/97	M Cantella	Chatham, MA		06/04/98

Species Length	Tagger	Place Tagged	Date	Recapturer	Location	Length	Date
Striped Bass (cont.)							
22	R Allen	Cape Charles, VA	12/13/97	L Allen	Chesapeake Bay, VA	23	06/04/98
15	A Schweithelm	Northport, NY	11/30/97	R DeRise	3 mi N Pt Judith, RI		06/05/98
17	G Clusman Jr.	Brick, NJ	11/20/96	V Negron	Hartford, CT	25	06/05/98
16	E Petronio Jr.	Pt. Judith, RI	06/29/95	S Pianka	Clinton, CT	24	06/05/98
22	W Kobel Jr	Moriches Inlet, NY	07/15/97	B Ferrandino	Moriches Bay, NY	24	06/05/98
29	A Anderson	Montauk Pt., NY	06/25/97	P Lopez	Wantagh, NY	30	06/05/98
31	A Anderson	Block Is., RI	06/17/97	M Prudhomme	Block Is , RI	33	06/05/98
38	F Dyer	Race Lt., NY	08/29/97	I Cantner II	Old Saybrook, CT	38	06/06/98
21	G Horvath	Barnegat Inlet, NJ	09/22/97	J Goldberg	Barnegat Inlet, NJ	26	06/06/98
21	M Heffernan	Long Beach, NY	11/04/97	J Sabella	Merrick, NY	23	06/06/98
25	A Anderson	Block Island, RI	05/30/97	F Tenore	Sandy Hook, NJ	28	06/06/98
20	R Grobarz	Sea Bright, NJ	05/15/95	R Raymond	Newburyport, MA	26	06/06/98
28	W Matyka Jr.	Fisher Is , NY	06/28/96	C Chancey	Providence, RI	31	06/06/98
17	M McCredie	Lambertville, NJ	08/15/97	B Carlen	Lambertville, NJ		06/06/98
25	J Kelley	Sandy Hook, NJ	05/24/98	M Egloff	Sandy Hook, NJ		06/06/98
18	M Mercer	Barrington R., RI	05/28/97	P Auclair	Mt Hope Bay, RI	22	06/06/98
11	A Perednia	East R., NY	10/06/96	A Perednia	East R , NY		06/06/98
19	H Sweet	Warren, RI	09/25/97	J Peloquin	Warren, RI		06/07/98
26	J Doyle	Trenton, NJ	05/25/95	R Kostrub	Trenton, NJ	28	06/07/98
14	J O'Keefe	Stratford, CT	05/02/98	C Carfora	Stratford, CT	15	06/07/98
17	R Kalenka	Glen Cove, NY	10/08/95	J Gattuso	Cold Spring Hbr , NY	23	06/07/98
20	G White	Piscataqua R , NH	05/25/98	J Oliver	Popham Beach, ME		06/07/98
14	J O'Keefe	Stratford, CT	04/30/98	C Hawley	Buzzard's Bay, MA		06/07/98
19	T Marburger	Northport, NY	03/25/97	G Wetmore	Eatons Neck, NY	23	06/07/98
22	W Brett	Marshfield, MA	07/23/95	J Harris	Flynn's Knoll, NJ	26	06/07/98
17	A Anderson	Thames R , CT	12/21/97	B Jones	Newburyport, MA	17	06/07/98
17	A Anderson	Thames R., CT	12/06/97	W Dreyer III	Martha's Vineyard, MA		06/07/98
18	G Kerkhan	Island Beach St. Pk , NJ	05/17/98	C Pullman	Pt Pleasant Canal, NJ	20	06/07/98
16	T Lake	Hudson R , NY	11/29/96	R Miranda	Huntington, NY	18	06/07/98
21	J Karolides	Beverly, MA	10/08/97	J Yescalis	Beverly, MA	22	06/08/98
23	M Berger	Atlantic Beach, NY	06/12/97	D Eichin	Atlantic Beach, NY	26	06/08/98
21	R Kalenka	Shinnecock Bay, NY	07/05/97	J Karr	Chatham, MA	22	06/08/98
40	A LoCascio	Execution Lt., NY	06/11/97	R Colagiovanni	Watch Hill, RI		06/08/98
10	A Anderson	Thames R., CT	05/06/97	J Brown	Norwich, CT	13	06/08/98
24	W Perlman	Atlantic Beach, NY	07/04/97	E Poindexter	Robert Moses St Pk., NY	28	06/08/98
22	A Anderson	Thames R , CT	12/26/97	J Toabe	Newburyport, MA		06/08/98
19	B Waas	Brewster, MA	10/04/97	J Mauro	Wantagh, NY	20	06/09/98
28	A Moore	Newburgh, NY	05/22/98	R Andrews	Troy Dam, NY		06/09/98
22	J Della Porta	Nahant, MA	08/27/97	D Dahlbeck	Lynn, MA	27	06/09/98
28	K Carson	UN, East R., NY	07/26/97	S Messen	Flynn's Knoll, NJ	29	06/09/98
27	R Kalenka	Shinnecock Bay, NJ	05/23/98	A Visentin	Shinnecock Bay, NY	27	06/09/98
23	W Perlman	Atlantic Beach, NY	05/16/98	P Giacalone	Robert Moses St. Pk , NY	23	06/09/98
21	L Gonnello	Romer Shoals, NJ	10/23/96	V Minafo	Rockaway, NY		06/09/98
25	G Kerkhan	Deal, NJ	05/26/96	R Grobarz	Long Branch, NJ	26	06/09/98
18	R Stroz	Lavallette, NJ	11/17/97	P MacNeil	Essex Dam, Lawrence, MA	19	06/09/98
21	A D'Amato	Cape May, NJ	11/25/96	W Dee	Haddam, CT	22	06/10/98
26	F Coronato	West Bank Lt., NY	08/08/96	V Minafo	Rockaway, NY	28	06/10/98
21	P Chowansky	Island Beach St. Pk., NJ	05/25/98	R Guttadauro	Rockaway Inlet, NY	21	06/10/98
21	J Daly	Deal, NJ	06/08/96	A Arcabascio	West Bank Lt , NY	23	06/10/98
15	T Lake	Bay Ridge, NY	11/28/97	J Benchoff	Ipswich, MA	20	06/10/98
18	R Crawford Jr	Robert Moses Brdg., NY	06/17/97	B Reynolds	Robert Moses Brdg., NY	24	06/10/98
24	H Schauer	Martha's Vineyard, MA	05/03/98	T Morrilly	Plum Is , MA		06/10/98
23	A LoCascio	Throgs Neck Brdg., NY	09/27/97	T Ortiz	Kings Pt., NY	30	06/10/98
34	R Conklin	Moriches Inlet, NY	10/12/97	D DeLaVergne	Moriches Inlet, NY	37	06/11/98
18	G Husta	Mullica R , NJ	04/23/97	G Dellaporte	Mullica R., NJ	20	06/11/98
23	H Goldblum	Sea Bright, NJ	11/15/92	T Viet	Green Island, NY	28	06/11/98
24	F Casey	Boston Harbor, MA	08/18/97	E Walsh	Cape Cod Canal, MA		06/11/98
13	A Anderson	Thames R , CT	04/14/98	R Salzer	Merrimack R., MA	14	06/11/98
19	R Conklin	Moriches Inlet, NY	11/13/97	W Janke	Oak Beach, NY	22	06/11/98
18	R Grobarz	Sandy Hook, NJ	04/23/97	C Scherholz	Mullica R , NJ	20	06/11/98
32	T Marburger	Shinnecock Inlet, NY	06/10/97	D Lesta	Southampton, NY	32	06/11/98
29	R Locke	Provincetown, MA	09/15/97	K Lafreniere	Newburyport, MA	33	06/11/98
28	R Grobarz	Sea Bright, NJ	06/30/96	L Gonnello	Sandy Hook, NJ	30	06/12/98

Species Length	Tagger	Place Tagged	Date	Recapturer	Location	Length	Date
Striped Bass (cont.)							
21	A D'Amato	4 mi. S Cape May, NJ	12/10/97	B Jeffrey	Boston, MA	24	06/12/98
22	P Lowcher	Sea Bright, NJ	04/13/98	J Baltusis	Jones Inlet, NY	23	06/13/98
24	N Kittredge	Narragansett, RI	10/18/97	T Wesp	Cliffwood, NJ	28	06/13/98
17	C Wilcox III	Moriches Inlet, NY	07/27/97	F Califano Jr.	Atlantic Beach, NY	22	06/13/98
18	P Lowcher	Rumson, NJ	06/16/97	T Shaheen	Rumson, NJ	20	06/13/98
22	P Lowcher	Sea Bright, NJ	04/21/98	T Shaheen	Rumson, NJ	22	06/13/98
20	T Shaheen	Navesink R , NJ	04/22/98	T Shaheen	Rumson, NJ	21	06/13/98
16	M Vargas	Stratford, CT	11/12/94	C Andreski	Wantagh, NY	24	06/13/98
25	A Anderson	Montauk Pt., NY	10/03/97	W Dzilenski	Barrington, RI	25	06/14/98
21	P Grippo	Haunt's Creek, NY	08/16/97	L Thomas	Jones Beach, NY	24	06/14/98
22	R Leja	Bridgeport, CT	07/13/97	S Durkee	Stratford, CT	24	06/14/98
24	F Stunkel	Stamford, CT	11/12/97	R Stuver	Quincy Bay, MA	25	06/14/98
25	D Brown	Bay Head, NJ	07/10/97	M Cameron	Brielle, NJ	29	06/14/98
20	T Marburger	Shinnecock Inlet, NY	07/30/96	J Garcia	Raritan Bay, NJ	25	06/14/98
20	J Leonard	Mt. Hope Bay, RI	07/01/97	L Manchester	Bristol, RI	24	06/14/98
20	R Croft	Norwich, CT	04/14/96	B Phelan	CT River, CT		06/14/98
22	F Jakob	Brick, NJ	10/25/97	J Tebaldi	Moriches Bay, NY	24	06/14/98
17	J Maffucci	Silver Pt , L.I., NY	11/02/95	L Winston	Shelter Is , NY	24	06/14/98
25	A LoCascio	City Is., NY	11/09/97	A LoCascio	Throgs Neck Brdg., NY	25	06/14/98
26	D Olsen	1 mi off Absecon Inlet, NJ	11/28/97	L Oldenbutfel	Jamaica Bay, NY	28	06/14/98
15	P Chowansky	Spring Lake, NJ	12/06/97	R Quinlan	Hope Is., RI	16	06/14/98
21	W Perlman	Atlantic Beach, NY	09/13/97	C Bellinzoni	Jones Inlet, NY	22	06/15/98
17	C Carroll Jr.	Deal, NJ	06/05/97	P Lowcher	Sea Bright, NJ	23	06/15/98
17	A LoCascio	Manhasset Bay, NY	10/31/95	L Bassett	Clinton, CT	24	06/15/98
28	F Casey	Boston, MA	07/01/96	MA Div of Fish.	Boston Harbor, MA	30	06/15/98
25	R Grobarz	Sandy Hook, NJ	09/28/97	G Malanga	Spring Lake, NJ	29	06/15/98
24	G Buono	Sandy Hook, NJ	11/16/96	F Heal	Staten Is., NY		06/15/98
22	A LoCascio	Hart Is., NY	10/12/97	G Schechtman	Hart's Is., NY	22	06/15/98
21	F Jakob	Brick Beach, NJ	11/15/97	M Beaulieu	New London, CT	21	06/15/98
21	JC Wright	Ches. Bay Brdg. Tun , VA	10/31/96	R Amburn Jr.	Reedville, VA	22	06/15/98
19	H Sweet	Warwick, RI	08/29/97	S Covitz	Pt Judith, RI		06/15/98
25	F Heal	Staten Island, NY	11/25/96	E McGorty	Rockaway Inlet, NY	39	06/15/98
22	M Berger	Atlantic Bch. Brdg., NY	06/05/97	W Robinson	Watch Hill, RI	27	06/15/98
22	A Anderson	Pt Judith, RI	10/31/97	F Hatch	Chatham, MA	24	06/15/98
27	J Beaver	Sandy Hook, NJ	07/21/98	E McGorty	Robert Moses St. Pk., NY	30	06/15/98
24	G Nigro	Sandy Hook, NJ	11/23/97	C Johansen	Cape Cod Canal, MA	25	06/16/98
8	G Horvath	Trenton, NJ	05/28/98	G Horvath	Trenton, NJ	09	06/16/98
22	M Simmons	Barnegat Light, NJ	11/12/97	A Bailey	Mystic, CT	23	06/16/98
42	C Kennedy	Offshr , Cape May, NJ	05/20/98	F Will	Cuttyhunk Is , MA		06/17/98
27	A Anderson	Montauk Pt , NY	06/08/97	J Denton	Old Saybrook, CT		06/17/98
20	W Zembruski	Quonchontaug, RI	07/31/95	J Mazzola	Napatree Pt., RI	27	06/17/98
20	JC Wright	Ches. Bay Brdg. Tun., VA	10/20/96	M Townsend	L Susquehanna R , MD	23	06/17/98
32	F Casey	Boston Harbor, MA	08/19/97	A Lehmann	Boston, MA	36	06/17/98
32	N Aurili	West Bank Lt., NY	07/15/97	M Vitale	Sandy Hook, NJ	32	06/17/98
26	P Lowcher	Sea Bright, NJ	06/06/98	M Iorio	Sandy Hook, NJ		06/17/98
18	R Grobarz	Sandy Hook, NJ	06/05/95	C Racey	Atlantic Beach Brdg , NY		06/17/98
24	M Bolton	Middletown, RI	07/15/96	J McCormick	Watch Hill, RI	28	06/17/98
21	T Shaheen	Navesink R., NJ	04/20/98	C Nigro	Great Kills, NY	24	06/17/98
22	L Richards	Freeport, NY	07/02/97	G Genes Jr	Wantagh, NY	25	06/17/98
14	G Blank	Edgewater. NJ	02/03/98	J Hanfling	Manhasset Bay, NY	15	06/17/98
8	G Horvath	Trenton, NJ	05/28/98	G Horvath	1 mi. S Trenton, NJ	08	06/17/98
15	M Simmons	Barnegat Lt., NJ	12/10/96	M Greenstein	Clinton, CT	16	06/18/98
34	W Kobel Jr.	Eatons Neck, NY	07/14/97	R Gruebel	Norwalk, CT	36	06/18/98
21	R Leja	Bridgeport, CT	05/03/98	A Smith	Rockport, MA		06/18/98
36	R Conklin	Moriches Inlet, NY	10/01/97	K Davies	Manhasset Bay, NY		06/18/98
9	G Horvath	Trenton, NJ	05/14/98	D Wise Jr.	Philadelphia, PA		06/18/98
33	C Kennedy	Prissywick Shoal, NJ	11/06/96	R Paffenroth	Mamaroneck, NY	33	06/18/98
26	L Gonnello	Flynns Knoll, NJ	07/03/97	E Anderson	Flynn's Knoll, NJ	26	06/18/98
19	P Gaffney	Chatham, MA	05/24/98	J Leonard	Chatham, MA	20	06/19/98
21	B Garfield	Portland, ME	08/15/97	R Fitzgerald	Salisbury St. Pk., MA	23	06/19/98
19	R Conklin	Moriches Inlet, NY	07/08/97	S White	Moriches Inlet, NY		06/19/98
28	T Marburger	Shinnecock Inlet, NY	06/20/95	R Sansarico	Staten Is , NY	30	06/19/98
24	R Grobarz	Sandy Hook, NJ	06/04/97	E Eisemann	Sandy Hook, NJ	26	06/19/98

Species Length	Tagger	Place Tagged	Date	Recapturer	Location	Length	Date
Striped Bass (cont.)							
27	W Kobel Jr	Eatons Neck, NY	07/14/97	G Nilson	Eatons Neck, NY	28	06/20/98
20	T Marburger	Northport, NY	12/01/96	P Broadhead	Greenwich, CT	28	06/20/98
17	N Raptou	Robert Moses St Pk , NY	11/28/97	T Goldberg	S Kingstown, RI		06/20/98
30	A Anderson	Block Island, RI	11/11/96	J Toomey	Scituate, MA	31	06/20/98
29	A Anderson	Block Is , RI	05/23/98	M Ramm	Rocky Pt , L.I., NY	30	06/20/98
27	T Marburger	Northport, NY	10/31/95	W Kaprielian	Montauk, NY	31	06/20/98
26	J Kelley	Sandy Hook, NJ	05/24/98	N LaSala	Romer Shoal Lt., NJ	26	06/20/98
19	B Greene	Chesapeake Bay, VA	06/12/98	K Hozdic	Ridge, MD		06/20/98
20	J Karolides	Beverly, MA	09/20/96	J Karolides	Beverly, MA	24	06/20/98
32	T Shaheen	Ambrose Chan , NJ	10/22/95	R Tonreiro	Manhasset Bay, NY	34	06/20/98
22	R Kalenka	Shinnecock Bay, NY	06/03/98	R Sullivan	Shinnecock Bay, NY	23	06/21/98
29	M O'Connell	NY Harbor	06/19/98	F Arnero	Bayonne, NJ	29	06/21/98
22	T Shaheen	Navesink R., NJ	06/18/96	F Zwirko	Montauk Pt., NY	28	06/21/98
9	G Horvath	Trenton, NJ	05/28/98	G Horvath	Trenton, NJ	09	06/21/98
20	G Kerkhan	Sea Bright, NJ	05/11/96	B Fallar Jr.	Gilgo Beach, NY	29	06/21/98
24	R Grobarz	Deal, NJ	10/08/95	C Whitt	Deal, NJ	29	06/21/98
21	T Shaheen	Raritan Bay, NJ	07/07/96	T Giorgio	Ambrose Chan., NY	26	06/21/98
23	T Marburger	Northport, NY	04/26/98	A Munafo	Jamestown, RI	23	06/21/98
21	M Berger	Atlantic Beach Brdg., NY	06/25/97	W Perlman	Atlantic Beach, NY	22	06/22/98
9	G Horvath	Trenton, NJ	05/28/98	C Ruediger	Betsy Ross Brdg , NJ		06/22/98
14	A Anderson	Old Lyme, CT	05/03/98	J Almeda	Westport R , MA		06/22/98
20	E Petronio Jr	Pt Judith, RI	06/27/97	P Medler	Gardiners Bay, NY	26	06/22/98
24	L Gonnello	Flynn's Knoll, NJ	07/07/97	P Sciortino	Flynn's Knoll, NJ	26	06/22/98
24	G Ciriello	Sandy Hook, NJ	06/01/96	D Mulvey	Clinton, CT	30	06/22/98
9	G Horvath	Trenton, NJ	06/21/98	G Horvath	Trenton, NJ	09	06/22/98
30	F Auriti	West Bank Lt , NY	07/07/97	P Sciortino	Flynn's Knoll, NJ	30	06/22/98
16	A Anderson	Jerusalem, RI	05/22/97	D Unangst	Green Harbor, MA		06/22/98
29	D Dibblee	Esopus, NY	05/08/97	J Robertson III	Glen Cove, NY	30	06/22/98
24	L Tikuisis	Bay Head, NJ	12/12/97	P Oyola	Lowell, MA		06/23/98
21	JC Wright	VA/NC Border	12/11/97	K Whipp	Chesapeake Bay, MD	22	06/23/98
17	C Kennedy	Cape May Inlet, NJ	06/11/97	B Hanson	Cape May Harbor, NJ	20	06/23/98
18	T Marburger	Northport, NY	01/21/95	J Markey	Pt Jefferson, NY	25	06/23/98
19	R Leeds	Ocean City, NJ	04/04/98	R Leeds	Ocean City, NJ	20	06/23/98
18	J Karolides	Danvers, MA	08/19/96	J Karolides	Beverly, MA	20	06/23/98
8	G Horvath	Trenton, NJ	06/12/98	G Horvath	Trenton, NJ	08	06/23/98
12	M Strober	Robbins Reef, NY	05/16/98	T Boasci	Kill Van Kull, NJ	14	06/23/98
14	J Zaffuto	Cedar Bar, NY	05/17/97	M Einfeldt	E Moriches, NY	16	06/23/98
9	G Horvath	Trenton, NJ	06/22/98	G Horvath	Trenton, NJ	09	06/23/98
22	J Karolides	Beverly, MA	06/23/98	J Karolides	Beverly, MA	22	06/23/98
8	G Horvath	Trenton, NJ	05/28/98	G Horvath	Trenton, NJ	08	06/24/98
9	G Horvath	Trenton, NJ	06/12/98	G Horvath	Trenton, NJ	09	06/24/98
21	M Bolton	Middletown, RI	07/15/96	R Kalenka	Shinnecock Bay, NY	24	06/24/98
18	R Ferraro	Narragansett, RI	05/08/98	P Dupont	Tiverton, RI		06/24/98
21	M Simmons	Barnegat Lt , NJ	10/01/97	B Perretta	Provincetown, MA	22	06/24/98
27	F Stunkel	Stamford, CT	11/03/97	T Blinstrub	Scituate, MA	29	06/24/98
19	P Lowcher	Sea Bright, NJ	09/23/95	R Delaprida	Monmouth Beach, NJ	28	06/24/98
27	J Foti	South Beach, NY	09/14/96	R Robinson	Hoffmann Is., NY		06/24/98
9	G Horvath	Trenton, NJ	06/23/98	G Horvath	Trenton, NJ	09	06/24/98
30	F Casey	Boston Harbor, MA	09/10/97	J Brilliant	Boston Harbor, MA	30	06/24/98
31	A Dangelo	Montauk, NY	10/22/96	G Barron	Bourne, MA	35	06/25/98
Weakfish							
24	A D'Amato	Cape May Inlet, NJ	05/26/98	K McDermott III	Hereford Inlet, NJ	24	05/22/98
20	G Ottavio	Cape May Pt , NJ	05/18/98	C Burkel Sr	Cape May Pt., NJ		05/28/98
21	G Ottavio	Cape May Pt , NJ	05/28/98	C Burkel Sr	Cape May Pt , NJ		05/29/98
23	S Keiper	Longport, NJ	05/16/98	P Galbally	Beasley's Pt , NJ	24	05/30/98
16	S Keiper	Longport, NJ	05/16/98	K Davis	Great Bay, NJ	17	06/16/98
Winter Flounder							
12	B Goodman	Jones Inlet, NY	05/30/98	H Jaeger	Jones Inlet, NY	12	06/05/98
12	J Lutz	Avalon, NJ	05/24/97	C Kochka	Great Bay, NJ	14	06/22/98

Book Reviews

MUDDY WATERS
by Beth A. Millemann
with
"Tales from the Trenches"
by Cynthia A. Zipf
Coast Alliance,
600 Pennsylvania Ave SE,
Washington, DC 20003
152 pp. $25 (paper); Call ALS for the grassroots price.

This handy, big format book will tell you all you need to know about the "toxic wasteland below America's oceans, coasts, rivers and lakes." Millemann covers the chemistry and biology of aquatic life trying to cope with periodic dumped loads of contaminated sediments into their living quarters. And into their tissues. She describes the procedures that dumpers are supposed to follow. She lets the reader in on the labyrinthian roles of the Corps of Engineers who haven't found a shipping channel they don't want to widen and deepen, and describes the Environmental Protection Agency's unwillingness to clean up the dumping act.

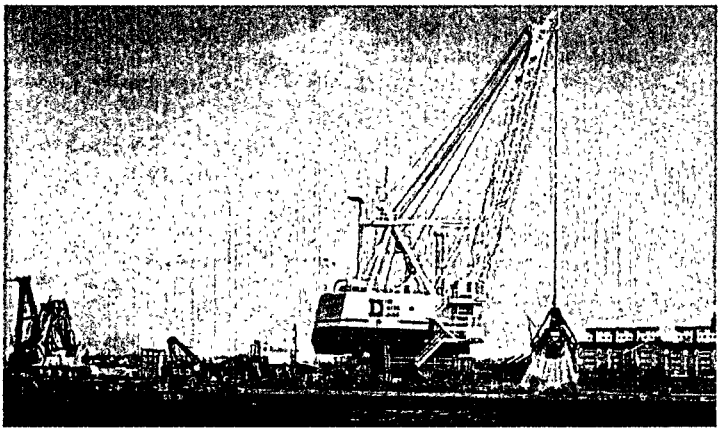
Interspersed are vignettes about how New Jersey groups fought the dumping of dredged muds off its coast. These sections make good reading and will help activists plan strategy for other dumps at other times. The mix of Millemann and Zipf makes for a useful guide book, a how-to, and a case study.

We can only hope that the regulators read the book, too. They may be good at dredging and they certainly can dump in a hurry, but when they dump toxic mud in the open ocean, that does bad things. They need to go back to the drawing board. *Muddy Waters* can be their guide.

SURFCASTER'S QUEST
by Roy Rowan
The Lyons Press
151 pp. $22.95 (cloth)

Another book about surf fishing? Yes, indeed, and a very good one. The author, like many confirmed surf fishermen, caught the bug early and has stayed with it for half a century. Rowan knows his stuff and gets it down on paper well.

His favorite fishing spot is Block Island off the Rhode Island coast, where waters from the Sound meet the Atlantic; the mixing zone is a happy hunting ground for stripers and bluefish, which Rowan pursues day and night during all seasons. He knows that surfcasters are bitten by an almost unexplainable urge to wander beaches, look for likely spots, and then cast funny looking plugs for the ultimate -- a 50-pound striper. "They may be a less pious bunch than fly fisherman, but they are an adventurous, feeling group of



outdoors lovers," he writes. That's another way of saying that surf people tend to be sloppily dressed, often wet and sandy, carrying their gear in a soggy, saggy canvas bag, while fly casters usually carry more that $1500 worth of gear -- flies, fly dope, tweezers, line dressing, magnifying glasses, fly tying kits, all clipped to a too-fancy vest. They wear floppy hats and polaroid sunglasses. Everything is olive drab, tan, putty, taupe, ecru, or beige.

The book is about more than fishing. He is very good at the feel of the places he fishes -- the history and the geography. He also lets us in on what goes through the mind of the angler as he looks around him or wonders what's going on out there beyond the breakers.

It's good to see Rowan quoting that famous outdoor writer and confirmed surf-caster, Owen Hatteras, whose work appears sporadically in this Littoral Society journal. Maybe Rowan and Hatteras will meet on a coastal strand someday and talk about the big ones that got away. It would be a worthwhile conversation.

THE HUNGRY OCEAN

by Linda Greenlaw
Hypernion Press
258 pp. $22.95 (cloth)

In the fall of 1997, Linda Greenlaw sailed from Gloucester, Massachusetts, captain of the *Hannah Boden*, bound for the Grand Banks to longline for swordfish. Unlike the boat and crew of Sebastian Junger's book, *The Perfect Storm*, she survived to tell this tale.

It is a worthy mix of writing about the boat, the crew, the sea and the weather, fishing technique, fatigue, and the danger of the profession. Swordfishing means loading a boat full of bait and gear, steaming more than 1000 miles east to the Banks, rigging up to 40 miles of line with floats, buoys, lights, and baited hooks and then running out the whole string in, on, or near "breaks" in the sea, places where strips of warm water are sandwiched between bodies of cold water. The boat is equipped with almost every piece of electronics you can imagine -- autopilot, loran, GPS, temperature probes, fax machines for weather, radios, radar, phones from bridge to fishing deck. Add to that stove, microwave, washer/dryer, diesel engine, and evaporators for freshwater. It's a floating fortune.

The prey is one of the sea's most vital fishes, a 200-pound fast-swimming billfish that stuns its prey with its broad bill (hence its name, broadbill swordfish, *Xiphias gladius*), a single-species family (*Xiphias*), that can live 500 feet down yet often feeds on the surface (it also suns itself there and can be harpooned). Swordfish grow to 16 feet (almost half of that length is bill) but many of the fish Greenlaw catches are under 100 pounds. The bait is squid. The method is to lay the line, then go back and pick it up, preferably with lots of hooked fish, bring the fish onboard, cut off the sword, gut the fish, and ice it away. The trip takes 30 days, mostly without sleep. Results: $133,000 worth of swordfish (50,000 pounds at $2.61 per pound at the dock, a lousy price); $13,700 for Greenlaw, $5500 for each of the five crew.

The author traps lobsters in Maine now, but she still feels the pull of offshore fishing. Recently, she returned to the Gloucester docks to pick up some of her personal logbooks. She writes: "I stepped out of my car and into a sunny and crisp winter morning. Filling my lungs with a breath of cold salt air, I thought, God, I miss this, and for a moment entertained the thought of running the *Hannah Boden* again."

WANNABE A BILLIONAIRE

Of course you want a billion dollars. We all do. And, as Ed McMahon would say,"You may have already won!" So enter the contest. Pull a chair up to the kitchen table, get out some scrap paper, sharpen your pencil, and tackle this test, prepared exclusively for us by the Environmental Testing Service (ETS). On the multiple choice questions, choose the best answer: mail your answers to someone. Then, stay by your phone for GOOD news. The judge's decision is final.

1. What happens when the tide goes out?
   a. People gather 'round and they all begin to shout.
   b. A real estate developer builds houses there.
   c. The Corps of Engineers dredges a new channel.
   d. The exposed mud smells bad.
2. What kind of noise annoys an oyster?
   a. A noisy noise annoys an oyster (say 10 times fast, earn a bonus).
   b. The flushing sound of a combined sewer overflow.
   c. A Corps of Engineers dredge scraping bottom.
   d. All of the above.
3. What does a Corps of Engineers dredge do on its day off?
   a. Rusts.
   b. Sheds tears of frustration.
   c. Gets overtime pay working for the highway department.
   d. Grabs a pen and approves its own permits.
4. Where do white sharks sleep?
   a. Anywhere they want.
   b. In elasmobeds.
   c. Sharks don't sleep.
   d. Yes they do.
5. What's the difference between a swordfish and a jellyfish?
   a. You can't spread a swordfish on toast.
   b. You can't catch a jellyfish on a longline.
   c. Remind me not to come to your house for dinner.
   d. A jellyfish's reproductive technique is not particularly exciting.
6. What is ecology, and how can it be prevented?
   a. It's a mystery, so just enjoy it.
   b. It's an invention of the Sierra Club; apply chlordane.
   c. It's deep; pretend it isn't there.
   d. It's from the Greek ekko, meaning "say it again"; take two aspirin.
7. How do you smoke eels?
   a. With difficulty.
   b. With friends.
   c. With brandy.
   d. Without inhaling.
8. Why are beaches sandy?
   a. Try making sand castles out of mud.
   b. Sitting on marbles is uncomfortable.
   c. Iron causes rust spots on bathing suits.
   d. An environmental impact statement by Corps of Engineers indicates that sand is the preferred alternative as beach material.
9. Why do Canada geese fly in V's?
   a. It's easier than flying in X's
   b. To get to the other side.
   c. So the leader can locate golf courses.
   d. It's good aerodynamics (and it's pretty).
10. ESSAY QUESTION: Why do flounders fall in love? No more than 500 words. And, please keep it clean. This is a family journal.

That's it. Good luck to all of you. Next issue: presidential candidate (at this writing) Donald Trump lays out his coastal environmental agenda.

D. W. Bennett

GENERAL STORE

Here is a sampling of books and items for sale. More selections are available in our BEACHLOVERS Catalog. Call or write for a copy.

BOOK SHELF

Fields of Sun and Grass by John R. Quinn. In the shadow of Manhattan, largely unnoticed by the millions of motorist zooming by on one of the worlds busiest highways, lies the Meadowlands. Naturalist John Quinn, through his sketches and writing, shows us the beauty, history, and political complexities of this great American urban wildernesses. $16

Life in the Chesapeake Bay by Alice & Robert Lippson. A guide to more than 100 kinds of fishes and species of crabs, clams, jellyfishes, sponges, and other invertebrates commonly found in the Chesapeake Bay and coastal inlets from Cape Hatteras to Cape Cod. Wonderful reading, beautifully illustrated. $14.

OTHER ITEMS

NEW! Golf Style Short Sleeve Knit Shirt: White with ALS logo, 60% combed cotton, 40% polyester. In sizes large and extra large. Was $25, now $20.

ALS Walking Field Guide T Shirts - Color:
Series 1: Fishes of the Atlantic - Pacific Green
Series 2: Shore Birds - Caramel
Series 3: Coastal Ducks - Sandstone
Order by Series number 100% cotton w/art work on the back and American Littoral Society on the front pocket. M. L. XL $15.

AMERICAN LITTORAL SOCIETY BOOKS

Anglers Guide to Sharks by Jack Casey A classic field guide to the sharks that inhabit the waters from Maine to the Chesapeake Bay. $3.

New Jersey Coastwalks by D. W. Bennett. Pack a lunch, put on your walking shoes, get in your car, and drive to Kearny, NJ. At this point take out your copy of NJCW and follow the author's route from Kearny to Cape May and on to the Delaware Bay. Always changing, the coastline of New Jersey offers many surprises. This book will take you on a watery tour that will fascinate and teach you at the same time. $5.

Seaside Reader edited by D. W. Bennett. A coastal anthology mixing nature writing and other casual coastal musings. $20.

The Whale Watcher's Handbook by David Bulloch. If you are just starting to learn about whales, dolphins, and porpoises or are an advanced watcher here is the perfect guide to have with you. $12.

SHIPPING CHARGES
$5.01 to $15.00 - $3.20
$15.01 to $30.00 - $5.10
$30.01 to $50.00 - $6.10
over $50.00 - $9.10

For all items in this notice send a check made out to:
AMERICAN LITTORAL SOCIETY, SANDY HOOK, HIGHLANDS, N.J. 07732

GUIDELINES FOR SUBMISSION

UNDERWATER NATURALIST is the Society's journal. We encourage members to submit articles, pictures, observations, comments, compliments or criticisms. Please follow these guidelines.

SUBJECT MATTER: **Feature articles** run 1,500-3,500 words (4-10 double-spaced, typed pages); please refer to back issues for guidance. For **Field Notes and Coast Issues**, submit no more than three pages of direct observations of interesting natural history found while walking, diving, or fishing in a coastal area. Topics can be of current interest, such as red tide in the Carolinas, whale deaths in New England, or mangrove preservation in the south; you can also submit a number of short observations or notes regarding a particular area. **Letters to the Editor** expressing thoughts on the magazine and its contents or general food for thought are especially appreciated.

ART WORK: For illustrations, black and white prints are preferred, but clear color slides or color prints with good contrast, drawings, maps and charts will also be considered. For Cover Photos, we need clear, sharp 35mm color slides or color prints, either horizontal or vertical, of littoral subjects above or below the water. Horizontals can wrap around from front to back. Action is not necessary. (Note: Unless otherwise requested, we keep all accepted art work until it is published).

HOW TO SUBMIT: Typed, double-spaced manuscripts, please. If possible, please send a disk with your manuscript. Use common, not Latin, species names. We do not carry footnotes; incorporate sources in your article. We edit for clarity using Strunk and White's Elements of Style as our guide and favor clear wording over specialized terminology. Send your work with a stamped, self-addressed envelope; we will acknowledge its receipt.

☐ We do not pay for articles or illustrations, but we do send five authors' copies when published. Thank you for your interest. We look forward to receiving your submission.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