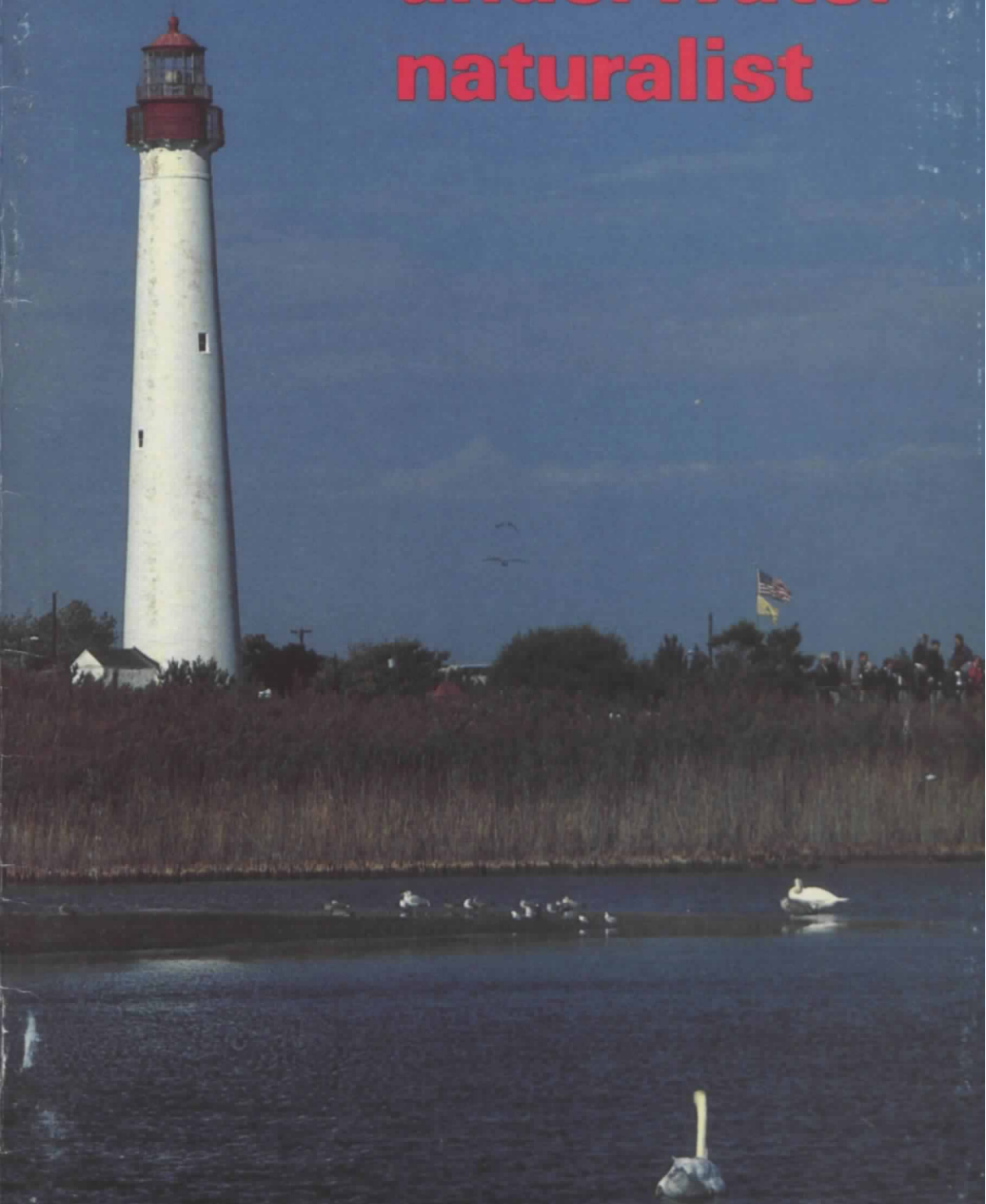


# underwater naturalist



Vol. 23, No. 1

## AMERICAN LITTORAL SOCIETY FIELD TRIP SCHEDULE

This listing of trips was selected from the 1995 Field Trip Schedule and is designed to tempt you into the littoral out-of-doors where you can explore with fellow Littoral Society members under the leadership of experienced naturalists. Call the office at (908) 291-0055 for trip availability, and then send in your deposit to assure your spot. For a complete listing, consult your Field Trip Schedule. Call or write the office if you would like to have one sent.

### **September 21-24 ANNUAL MEETING, GLOUCESTER, MASSACHUSETTS**

Our 34th Annual Meeting will take place over an extended weekend in Gloucester, Massachusetts. Spend your days whale-watching, visiting an uninhabited island, walking the beaches, and hauling in lobster traps. Keep an eye out for more details in the next Coastal Reporter which will be mailed to all members toward the end of this summer.

### **September 29-October 1 CAPE MAY HAWK WATCH NEW JERSEY**

The southern tip of New Jersey is one of the greatest coastal birding spots in the nation and this trip is scheduled to coincide with the shorebird and raptor migration. Visit the hawk-watch platform at Cape May Point, see a banding demonstration, explore nearby wetlands and beaches for shorebirds, waders and plants.

COST: \$185 covers two nights lodging on the beachfront at Cape May, box lunch on Saturday, Saturday supper of spaghetti and white clam sauce, slide shows, and cherrystone clams.

### **October 13-15 CHINCOTEAGUE/ASSATEAGUE ECOLOGY VIRGINIA**

We will have a weekend of good weather and abundant wildlife activity while exploring the ecology of these barrier islands. Two days of seining, mudflat mucking, plankton exploration, sorting out sandpipers, and learning about special refuge practices.

COST: \$140 covers motel lodging, guides and ground transportation.

### **October 21-17 JAMAICA ECOLOGY WEEK**

A week on the tropical island of Jamaica. Explore coral reefs and rain forests. Daily snorkel trips to reefs, seagrass beds and mangroves. Field trips to rocky shores, tide pools, a rain forest, and bat caves. Ecology, history and culture talks given at the Hofstra University Marine Lab.

COST: \$795 covers six nights at the Marine Lab, meals, guides, lectures, ground transportation, field trips. Travel to and from Jamaica is not included.

### **November 8-12 SUWANNEE RIVER CANOE/CAMPFLORIDA**

Four days of easy paddling and three nights of riverside camping along this fabled southern river with crystal clear springs, towering cypress trees, alligators, hawks, owls, and armadillo.

COST: \$210 per person covers one night's motel lodging, canoes, food, guides, and ground transportation to the drop off. You must provide your own camping equipment and get to and from Branford, Florida.

### **November 9-12 ASSATEAGUE FALL WEEKEND VIRGINIA**

The perfect time to escape to one of the nation's great natural seashores. This usually turns out to be a cool, but not cold, sunny fall weekend filled with coastal wildlife. Explore the beaches and wetlands of this Virginia barrier island and see snow geese, teal, wigeon, ruddy ducks, late shorebirds,

*Continued on inside back cover*

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## To the editor

### More About Beaches

...I enjoyed and learned from the Pilkey/Dixon article on beaches in the last magazine. It was a clear, concise prescription for the ills of shorefront development. Could you suggest a short reading list for me — I'd like to dig deeper.

Anthony Durkin  
Salisbury, MD

*(Orrin Pilkey suggests the following: "The Beaches Are Moving," Kaufman and Pilkey, 1983, Duke University Press; "Waves and Beaches," Willard Bascom, 1964, Anchor [Doubleday]; "Barrier Island Handbook," Steve Leatherman; "At the Sea's Edge," William T. Fox, 1983, Prentice Hall, NY; and the series "Living With the (Name of State) Shore," various editors, Duke University Press. "The Beaches Are Moving" is also available on video, a 60-minute 1/2 inch VHS videocassette. Write Environmental Media, Box 1016, Chapel Hill, NC 27514, or phone (919) 933-3003.)*

### Shore Erosion Projects

...It should be noted that right around the time your articles on beaches were printed, the federal government signaled that it was going to be less likely to fund shore erosion projects. Right now, the feds pay from 65-75% of the costs of beach replenishment. This year's Administration budget suggests that the federal share drop to 25% for shore projects of only local significance, which, it seems to me, means all shore projects.

Your readers should be encouraged to write their representatives in Washington and ask them to cut federal appropriations for shore protection. Let the locals pay...then we'd see how fast the money for these projects dries up. As long as it is "someone else's" money, large chunks of federal pork will continue to float in with the tide.

Ken Smith  
Endicott, NY

### It's the Habitat, Stupid

...Let me be one to congratulate the Littoral Society on its efforts to stress the importance of habitat protection along the coast. Too much time is being spent worrying about

allocation of marine resources — who gets what. More effort should be concentrated on keeping marine habitat healthy and diverse. If that's taken care of, many of the problems will be solved.

Lisa Nowak  
Miami, FL

### Mean and Childish

...Your LAST PAGE in Vol. 22, No. 4 was excellent and one of the better treatments of this subject that I have read. I'm only sorry that you couldn't restrain yourself from becoming mean and childish in the final paragraph. When you begin to sound self-righteous and vindictive your otherwise excellent case is weakened.

Warren H. Simmons, Jr.  
Naples, FL

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# GRAND MANAN: Queen of the Fundy Isles

by DAVE GRANT

*"They that go down to the sea in ships,  
that do business in great waters, these see  
the works of the Lord and wonders of the  
deep." —PSALM 107*

Grand Manan is the largest of more than a score of islands spread across Passamaquoddy Bay and the Bay of Fundy where they form the meandering maritime border between the United States and Canada. Dubbed the "Queen of the Fundy Isles" in tourist publications, it is far enough off the beaten path that it is less visited than its smaller and better-known sister islands, Campobello and Deer, which lie closer to the mainland. Less than seven miles east of West Quoddy Head—the easternmost point in the continental U.S., its only access, unless one has a very sturdy boat, is a two-hour ferry ride from Black's Harbour, Canada, one of several mixed blessings here that limit the tourist trade.

Dark, gloomy and foreboding as one approaches its lofty western shore on a sea that routinely produces fog "as thick as chowder," one can see why, during a storm in 1606, Champlain noted in his journal that Grand Manan was a "miserable place." The island flattens out on the eastern shore to reveal a much more appealing shoreline peppered with quaint fishing villages. Grand Manan is about 60 square miles in size, more than 15 miles in length and less than half that at its widest point. There are 19 other smaller islands that make up the archipelago in the shallow waters to the east. Half a dozen of these were once occupied, but now only the largest, White Head, has year-round residents.

*GRANT, the Society's chief naturalist, is a year-round beachcomber and directs Brookdale Community College's Ocean Institute at Sandy Hook, NJ.*

Tiny Ross Island was chosen by the first settlers and "officially" occupied in 1784. Native Americans paddled the treacherous waters of Grand Manan Channel long before these colonists, visiting the islands to collect pipestone for fashioning pipes and pots, and to gather ceremonial sweet grass from its marshes. They also harvested porpoises from the surrounding sea, and these waters still have the largest concentration of harbor porpoise in the world. The name Manan is apparently of Indian origin (via "Menano" from French Jesuits in the early 1600's) meaning "Island Place"; and yes, there is a Petite Manan farther south off the coast of Maine.

The total population of Grand Manan is less than 3000, although that number grows significantly in the summer. Most people live, for good reasons, around five small fishing villages on the eastern side of the island. This is the only part of the island that is low, and it has numerous coves with fine harbors which support the mainstays of the islanders; fishing and "dulsing and winking" (collecting dulce seaweed and periwinkles).

The western side of Grand Manan has few breaks in the 300-400 foot ramparts that one early visitor described in epic terms as "a bold front of overhanging cliffs and lofty mural precipices of majestic grandeur and beauty." If the international boundary continued East from here, rather than veering in a politically expedient dogleg to the southeast, this magnificent coast would undoubtedly be better known to more of us since these precipices are notably higher than any other ocean cliffs in Maine or the rest of the Eastern United States.

Lacking a boat to thoroughly explore this beautiful island, I set out from the island's ferry landing down the road to



*Grand Manan.*

the less populated parts of Grand Manan. Like the early Native Americans, I was interested in the geological and botanical features of the place.

Whale Cove faces north and is one of the few scenic features that is accessible along the side of the island. Fishermen moor larger boats here as well as launch double-ended skiffs off the cobble-covered pocket beach inside the cove. There is enough water here for the deepest draft vessels on the island, and plastic skids nailed to the boat bottoms allow skiffs to be dragged across the polished stones to the launch sites. From here the fishermen tend weirs (“wears” in these parts) that are set primarily for herring — or “herrin.”

Arriving at Whale Cove to explore two of the better-known geological features of the island, Hole In The Wall and Seven Day’s Work, I approached a group of fishermen to ask directions. There always seem to be plenty of experts along any shoreline and fishermen are no exception. In fact, you can usually assume that a fisherman knows everything there

is to know; just ask him. Although I had good reason to think none of them had ever had any inclination to scramble along this rugged shore “to look at a bunch of rocks,” they were, as it turns out, full of information about what was there (“Beautiful stones!”), how to get there and how long it would take (“To walk that beach you’ll need more daylight than you’ve got left in *this* day.”), and tales other geologists and tourists had told them about the place (“People come from all over the world to see it.”).

Eavesdropping on their “fish talk” (which was interspersed with concern over baseball and how it just didn’t seem right for a World Series to be held in Canada...) I realized that they were preparing to get out on the water and I sensed an opportunity to join them in their work. Now I’ll take fishing over pounding rocks anytime, and I’ve discovered over the years that even the most reticent fisherman will open up if you ask the “right” questions about fishing, and “bragging up” your labors is an integral

part of that line of work. So with little effort, other than helping to launch some skiffs down the steep cobble berm, I was off on a fishing adventure with those who ply these cold and fertile waters that lie midway between the equator and the North Pole.

Their objectives were to seine the weirs beneath the two rock forms I had originally come prepared to explore, and after seeing this impressive stretch of coast from the relative comfort of an open boat, it was obvious I never would have reached both objectives that day; yet here we were enjoying an unprecedented view from the water.

"Hole In The Wall" is an enormous sea arch in the rocky cliff that has been cut by waves smashing against the eastern side of the cove. "Seven Day's Work" is a frightful 300 foot escarpment of nearly horizontal layers of amorphous trap rock and amygdaloidal basalt that represent repeated flows of lava during the Triassic Period.

"Trap" is a general term for igneous rocks like basalt that form columnar or step-like structures as they harden. The Palisades along the Hudson River and Watchung Mountains of New Jersey are similar material that formed about the same time as Seven Days Work and under similar conditions. In the Northeast they are a source of trap rock for construction. The word comes from a Swedish word, "trappa," which means stair, a convenient and graphic description of such rock forms. Amygdaloid is a geological term that comes from the Greek word for almond, and it is used for rock that contains almond-shaped mineral nodules. Rockhounds visit Grand Manan to hunt for crystals of semi-opal and zeolite in the amygdaloid that falls to the beach below the cliffs.

Zeolite is more than a novelty for rock collectors. The word translates into "seething or boiling stone" and if a piece is heated to remove the water trapped within it, the crystal — which now has extensive internal surface area to adsorb

water — can then be used in chemical processes for purification and water removal. Some of the 25 or so types of the pale, soft minerals that are known have been used for such things as catalysts in oil refineries, water softeners, and in refrigeration units to adsorb water that contaminates the freon.

The thick layers of rock on the massive, wave battered cliff are an impressive and disconcerting sight from a boat, even on a calm day. As we approached the weirs off the cliff, we were met by two more boats and transferred to the larger of them, a 40-foot tender. Establishing and fishing these nets is no small task.

Our main objective was the Jubilee weir. Each one is named and maintained from year to year by a particular family or group, and it is obvious that even though they cannot be fished much after September — "Not because the fish aren't here, but because of the weather." — particular sites are jealously guarded by families from here and nearby Deer Island. Weirs that are too far outside the cove are damaged by winter waves; those that are too close to shore risk ice damage, but more importantly get a worse shot at the fish that move along the coast. Such traps acquire designations like "Hard Luck" and "Try Again."

Fishing the heart-shaped weirs is a labor-intensive operation, drawing manpower from three generations of fishermen. First the weir is surveyed for fish with a taut lead line. Even though these rich waters are surprisingly clear, it is 40 feet deep here and too dark to see what's down inside the trap. Fishes darting about bump into the lead line and fishermen claim they can tell from the vibrations not only how full the net is, but what type of fishes are there. This seems too incredible to be true and I was a bit skeptical until I saw the net come in.

Bringing up the net required a dozen people spread among three boats, plus a scuba diver in the water. First, the escape route from the half-acre weir was closed



*Smoke sheds  
at Seal Cove.*

*Drawing by  
Dave Grant.*

off with a curtain net. Next, from inside the weir the catch boat crew spread a seine along its inner perimeter. Simultaneously, the diver secured the seine along the bottom and the fishermen began to “sweep” the weir. Once the fishes were surrounded, the seine was pursed — pulled together at its bottom like an old fashioned lady’s purse — and the catch was brought up to the surface for our first look.

There is an unavoidable sadness that accompanies that atavistic thrill I get hauling in a net full of fishes. After the initial excitement of watching them rise to the surface, recognizing the various species, and admiring their beauty and schooling precision, I quickly lose my sense of wonder as the outcome of the endeavor becomes clear to me and the fishes. Someone reminded me of our goal with a line from Genesis that seems inauspicious today in an ocean filled with thousands of miles of drift nets and fish traps...

“And the fear of you and the dread of you shall be upon every beast of the earth...and upon all of the fishes of the sea; into your hands they are delivered.”

As the fishes panic and lose their gracefulness, the calm waters become a

glistening caldron of fins and tails. This point, however, is the moment the fishermen enjoy the most since it is their livelihood that is thrashing around in the net (“Money in the bank!”).

The catch, as predicted by the wizard with the lead line, was mostly herring; perhaps a fifth were mackerel. A few minutes were allowed for a youngster on board to remove the small incidental catch; a few dipnets full of “Harbor” pollock and “Black-back” winter flounders that promptly went into “the bucket for mom.” Also, some menhaden (I was immediately corrected, “‘pogies’ up here.”), a large sculpin — (“cat food”), and even a few squid — (“great for food or fishin’”).

The remaining catch was removed from the net with a Rube Goldberg-type pumping apparatus that sucked them out of the water through a pipe alongside our port side and up into a sorting box on top of the wheelhouse. There, two things happened simultaneously; the fishes slid down a chute into the hold of a transfer boat that had come along our starboard side and the pumped water cascaded down onto our deck. The herring were headed for processing in Russian factory





*Minke whale in net.*

ships operating east of us in Fundy Bay; the water was strained through netting on our deck.

A shared characteristic of the various species of herring is that they easily shed their scales when they are handled, and as the fishes passed over our heads through the pumping system, their dislodged scales were diverted by a baffle and collected on our deck in a mattress-sized fine mesh bag — “Headin’ for Eastport (Maine); they’re the glitter for paint... Herrin’ are like pigs; we use everything but the squeal.”

Our next objective was a weir across the cove, beneath Hole In The Wall, where a big surprise awaited us. The night before, a 12 foot minke whale had blundered into the trap and was coursing back and forth across the weir like a convict in a prison yard. It is startling how quickly the behavior of wild animals changes in captivity. Minkes are sometimes curious about boats, but are quick and elusive in the open sea. They’re sleek, and have been called “the sports car model” of the great whales. This one, in its first year and less than half-grown, seemed to ignore our presence and con-

tinuously swam the same exact pattern down the length of the weir, much like a neurotic captive animal pacing in a cage at the zoo. She would take a breath at the far end of the weir and again surface at our end, belly-up as she dove a second time in front of us, visually searching the sides and bottom for an escape route under our boat. She maintained this pattern at a steady pace for the hour or so it took the fishermen to get prepared to seine her out, if that became necessary.

There are a number of creatures that inadvertently get caught in these fish traps each season. This was the sixth whale that year; one of them was a Humpback, the rest Minkes. Some fishermen feel that most marine mammals are smart enough to avoid the nets after such an encounter. Another adult Minke, something of a local legend and I guess the Willie Sutton of Fundy whales, is said to have learned how to safely slip in and out of weirs for free meals. This one is an exception though; most animals that enter a weir stay there until rescued or harvested.

Weirs are an efficient, non-selective fishing technology that have been proven

around the world for centuries, and basking sharks, large makos, and porpoises are also caught here occasionally. Giant tuna also make their way this far north and get into the weirs, but since a permit is needed to catch this threatened species, they are released, unless, I was told (*sotto voce*), "You have a *real* trustworthy crew..."

For the fishermen and their unwanted catch, physically removing the whale is the least preferred method for several reasons. It is dangerous work, and even a small whale can do plenty of damage to nets and boats, as well as to itself and the fishermen. It is also against the law to injure whales now, and an animal that 20 years ago might have been dispatched with a rifle, today is treated more carefully, although not always enthusiastically, by the fishermen. "She picked the right day to get caught," announced the patriarch of the group, referring to the calm and windless conditions that we were lucky to have for this task, as well as the upbeat mood of the successful crew.

After an hour of banging on boat bottoms and yelling was unsuccessful in diverting the whale from her circuit, it was necessary to begin hauling the seine to try and force the minke toward the entrance. This did not work either and only forced her into a narrower area, risking entanglement between the nets. Her behavior hardly changed and she continued to swim the same pattern until it was so confining she was bumping the seine at each turn.

Not surprisingly, all the players in this drama began to lose some of their patience. The crew, who don't get paid by the hour for this, began using language that could peel

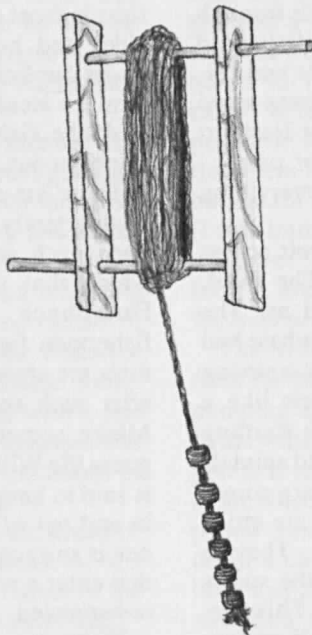
paint off the wheelhouse. The whale, probably issuing her own maledictions beneath the surface, was for the first time struggling against the net and moving erratically.

Rather than surfacing at a leisurely pace every 30 seconds to breathe, she began to prepare for deep diving. Unlike humans, diving whales store little oxygen in their lungs, relying instead on what is dissolved in blood and tissues. This adaptation seems to protect them from some of the physiological problems scuba divers encounter.

Twice she headed for the bottom to ram the net, vigorously emptying her lungs of air and creating great bubbles at the surface. Both times she remained under for 10 very disconcerting minutes. On her final plunge, an agonizing quarter of an hour for those of us on the surface, all movement below the boats stopped. In one final, exhausting effort, the rest of the net was rapidly hauled to the surface, revealing her bruised and motionless body.

As the impact of the disaster became apparent to us, seemingly everything in the cove fell silent for an eery moment. Then as the crew's instincts took control and they began to unwrap the whale and reclaim their net, all Hell broke loose. There was a startling rush of air and water and: "Thar she blows!"...the minke burst halfway out of the water.

The cussing at this point was some of the liveliest I've ever heard in any language as the whale bounded across the water like a skipped pebble. Pausing for a moment to get bearings, she then headed out to sea through a gauntlet of other weirs.



Fish finder. Sketch by Dave Grant.



*Castalia Marsh.*

We sat for a moment, stunned but relieved. Across the calm, mirrored surface of Whale Cove, we could hear her labored breathing echo against the cliff for a great distance, and monitor her retreat to the safety of open water. As she left the cove, the sounds of fishermen working and gulls mewing began to replace the silence. The wind and seas began to rise, and the boats headed for home.

She had picked the right day to get caught...

The eastern shore of Grand Manan is carved into several large coves, and diminished wave action and the accumulation of sediments allow the formation of tidal marshes in the more protected areas. As one travels north along Eastern North America, tidal marshes are smaller in size because of steeper relief of the shoreline, but have more of a variety of plantlife than southern marshes. Phragmites, the bane of southern marshes, is conspicuous in its absence from the perimeter of Castalia Marsh, but other familiar plants from the south, like seaside goldenrod and plantain, orach,

St. Johnswort, and salt-spray rose, are common. Where the freshwater creeks enter the marsh, rush, cat-tail and poke weed predominate.

Castalia Marsh is easily accessible from a sand and gravel pocket beach, dominated by American beachgrass, that separates the wetland from the sea. It is a popular picnic ground for the residents and a great observation site for visiting birdwatchers. The long line of naturalists who have contributed to Grand Manan's list of 338 species of birdlife includes none other than Audubon himself, who visited the island in 1833 to collect breeding birds for his watercolor plate, *The Herring Gull*.

The marsh is best known for shorebirds though, and at low tide its firm sandy bottom allows one to hike out across much of the 200 acre wetland to listen for the plaintive "toor-oo-wee" of incoming black-bellied plovers and to sit among migrating Arctic-bred shorebirds that stream in to probe the shallows for invertebrates.

The Bay of Fundy is noted for its great tide ranges and the ebbing waters expose

a great number of creatures to feed hungry birds and satisfy curious naturalists. Fishes are few in the marsh because the water is so shallow at low tide, but the little gunnel and even a squid or two sometimes become isolated, joining the killifishes in the deeper creeks. The gunnel is one of the five blennies that are found in the region and is a slender and attractive denizen that matches the olive and reddish seaweeds it hides among. Local names for it include: "rock gunnel" - because they like firm bottoms, "rock eel" - because they swim with eel-like undulations; and "butterfish" because they are so quick, slippery and difficult to catch by hand. Herons and gulls call them "breakfast, lunch and dinner."

Most of the action though is at or below the surface of the sand and mud. Nereid, nemertean, amphitrite and bamboo worms wiggle paths or build mud volcanoes in the softest sediments. Crustaceans, like scuds, marine pill-bugs, and hermit crabs cruise the shallow pools or crawl against the current in the creeks. Snails leave their trails among the shells of dog whelks, limpets, astartes, and soft-shell and *Macoma* clams.

Larger animals, which tend to be nocturnal, leave their mark too and the tracks of racoons, river otter and endemic subspecies of vole and deer mouse may be found along the perimeter of the marsh or creeks that empty into it.

Because of its remoteness, land mammals have been slow to repopulate Grand Manan after the last glaciers retreated about 10,000 years ago. Some animals, like deer — which are bold enough to cross the marsh during the day, and snowshoe hares, beaver, raccoons, rats, and house mice, have had to rely on human help to get here from the mainland. Except for bats, which have little problem crossing water and are probably the first land mammal to repopulate these islands, few animals have the swimming stamina or luck to make it here and establish populations. The number of species

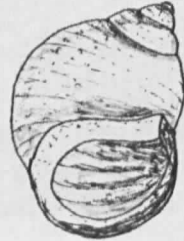
*Dogwinkle*



*Tortoiseshell Limpet*



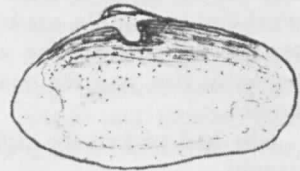
*Periwinkle*



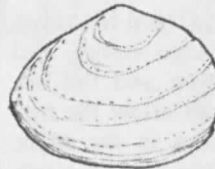
*Dog Whelk*



*Soft Clam*



*Maroma Clam*



*Astart*



*Drawings by Dave Grant.*

on the island is but a fraction of the 50 or so found nearby on Mount Desert Island; which is twice the size of Grand Manan, closer to the mainland, and provides more habitat.

The marsh itself is dominated by cordgrass and pickleweed, but the growth is a bit sparse by southern standards. This may be because run-off from the upland areas carries sediments downstream that spread out and smother the marsh, or perhaps the great tidal flow that flushes the sediments so thoroughly prevents a build up of needed nutrients. A century-old photograph that the Historical Society displays shows the marsh as an even more barren place, so it's possible the site is in transition and has still not developed fully. Like all wetlands, it is fascinating to explore nonetheless, and locked into its sediments are clues to the past environments here too.

One of the most interesting features of the marsh is the presence of a sunken forest of buried trees that is exposed at the mid-beach level. Peat and clay layers are also exposed, documenting much different ancient environments than exist here today. Since the last ice sheets retreated, great changes have occurred in the level of the sea and the location of the shoreline. At times this spot apparently supported a freshwater bog community with tamarack (larch) trees. Sea level continues to rise and will some day retreat, and geological history will repeat itself.

More examples of recent and ancient geological changes can be found farther south at a scenic spot called Red Head, Red Point or Red Rocks Beach, depending on which islander is giving you the directions. Here one can see evidence of the most recent geological events that have shaped the island etched into the rocks that form it.

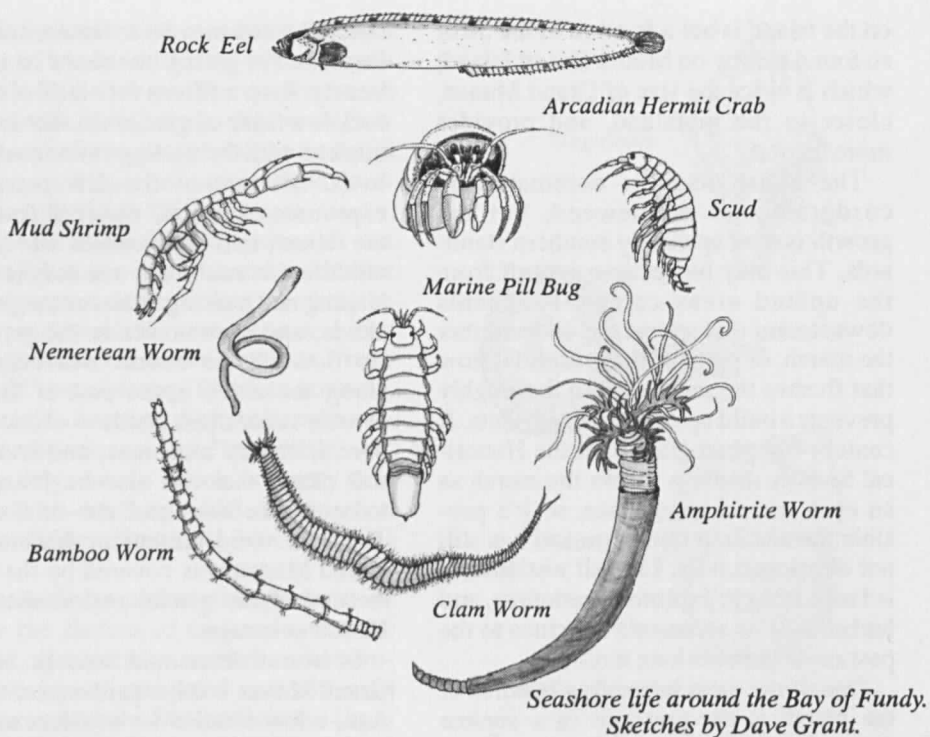
Humans seem to find the most beauty in the places where the forces of nature clash, oppose and destroy each other, and Grand Manan is such a spot. This part of the island faces south, is open to the great unbroken fetch of the Atlantic and is un-

dercut by storm waves; features that are important in giving the shore its rugged beauty. Atop a fifteen foot cliff of eroded rock is a layer of glacial till that is pock-marked with the nesting cavities of swallows. It's one of the few prominent exposures of glacial material found on the island, and an excellent site to spot wildlife. On a calm day one may see seals leaping and hunting fishes among eiders, alcids, and cormorants in the powerful rip tide off the beach. Beachcombing along the sandy upper part of the cliff reveals relict clam shells —arctic rock-borers, chalky macomas, and truncated soft clams that can also be found live today in the tidal and sub-tidal zones. They are vivid reminders that more of Grand Manan was covered by the sea at the end of the glacial period about 10-12,000 years ago.

Scattered here and widely around Grand Manan is other evidence of the Ice Age, a few erratics — boulders alien to the island and brought from the mainland by the glaciers. The best known of these is the "Flock of Sheep," named by fishermen because of their huddled appearance from the perspective of the sea; but they can be seen to the south of here from the main road, too.

However, the really exciting geological history at Red Rocks Beach is much older than the Pleistocene glaciers and takes us back to the formation of the Atlantic Ocean. Two bedrocks of different periods are found in contact here, dividing the island along a line from Red Head to Whale Cove. The exposures are quite evident at Red Rock Beach where one can stand, literally, with one foot on Triassic rocks and the other foot on far older material that may date from the Precambrian Period.

The "younger" Triassic basalt making up the western part of Grand Manan was deposited as the continents began to tear apart during the early stages of the formation of the Atlantic, around 200 million years ago. If we could look back in time we would see an environment on our East



Coast similar to the Great Rift Valley, where today similar tectonic forces are tearing Africa apart.

The rocks of the eastern side of the island are thought to be at least twice the age of the basalt and seem to be part of a mysterious piece of land called Avalonia. Geologists speculate that when a primordial ocean closed during the collision of continental blocks and the assembly of the supercontinent, one of those blocks, or "terrane" as geologists now call them, was welded to North America; becoming the eastern portion of Newfoundland, coastal Maine, and extending south to Rhode Island.

Rain is one commodity that is not scarce on this island and runoff is captured in several ponds and bogs on Grand Manan, Long Pond, the most picturesque of them, is adjacent to the provincial campground and is quite accessible. It fits snugly between the spruce forest that covers much of the upland areas and the best developed dune fringe on the island. In fact, it appears

the pond formed as a result of the pocket beach developing between the forest and the sea. A short hike takes you from upland forest, through freshwater wetlands, across dunes and finally to a beautiful crescent beach.

The pond is shallow and has the expected complement of small fishes, aquatic insects and plantlife. Noticeably absent are water lilies, which are on the mainland, but are another species that does not seem to have made it to the island yet. Unlike the ocean, the pond water is warm enough for swimming but is usually loaded with noisy gulls that are preening, splashing around and drinking the fresh water. As a result there is a windrow of gull feathers on the shoreline. Deer venture out of the forest and wade across the pond too, especially at dusk.

The back beach area near the pond is relatively stable and supports an interesting variety of plants, like primrose, Canadian thistle, cinquefoil, sneeze-weed, oxeye daisy, dock, angelica (a



# SHEARWATERS AND PENGUINS OF BRUNY ISLAND

by JAMES DUGGAN



Many of us may have thought of Tasmania as a fictitious place home to the "Tasmanian Devil," of children's cartoon shows. In reality, the island of Tasmania is the smallest state of Australia, with an area of approximately 67,8000 square kilometers or roughly the size of New Hampshire, Vermont and Massachusetts combined (70,389 square kilometers). It is situated off the southeastern part of mainland Australia, separated by Bass Strait. The island is located at the same latitude south (40-44 degrees) as the area from New Jersey to Massachusetts is in the north.

Around this beautiful "Holiday Isle" are several smaller islands, including King, Flinders and Bruny Islands. Flinders Island and King Island lie in Bass Strait while Bruny Island is adjacent to the south eastern coast of Tasmania. All of these islands host sub-

*DUGGAN, a member of both the Australian and American Littoral Societies, lives in Hobart, Tasmania and is a regular reporter on "down-under".*

stantial populations of seabirds. For instance, Flinders Island, named after English explorer Matthew Flinders, has two prevalent species of birds, the Cape Barren Goose, *Cereopsis novaehollandiae*, (second rarest goose in the world) and the short tailed shearwater, *Puffinus tenuirostris*. On Bruny Island and King Island, the fairy penguin, *Eudyptula minor*, has well-established rookeries. Of all these, Bruny Island is the only one accessible by car (via ferry), as it is only 37 kilometers from Hobart, the state capital and gives one the opportunity to see both shearwaters and fairy penguins during their respective breeding seasons.

Bruny Island is not only rich in flora and fauna but also in history. In the early 1790's, French Admiral, Bruny D'Entrecasteaux, named the island; however it was originally discovered in 1642 by the Dutch explorer, Abel Tasman. Captain James Cook visited Adventure Bay on the island in 1777 and made his only friendly contact with the Aborigines there. Captain William Bligh also visited



Bruny Island three times and on his first departure headed for Tahiti, during which the infamous mutiny had occurred. Incidentally, Captain Bligh planted the first apple trees, grapevines, and vegetables in Australia at East Cove.

During the whaling era, Bruny Island was an important whaling station with American ships entering East Cove. The island also boasts the oldest manned lighthouse in Australia, built by convicts in 1836.



Muttonbird in Tasmania. Photo by Dr. William Wakefield.

The island is separated into North Bruny and South Bruny Island, even though a very thin isthmus of sand and dune vegetation links them. There are locations on both North Bruny and South Bruny where shearwaters and penguins breed, including on the isthmus.

The short-tailed shearwater, or muttonbird, belongs to the family Procellariidae (other members include fulmars and petrels).

These shearwaters were first described in 1835 by a Dutch ornithologist, Jacob Temmick, although they were recorded much earlier during Captain Cook's Third Expedition in 1778. The term "muttonbird" was coined by early settlers on Norfolk Island who each year would harvest Providence petrels, *Pterodroma solandri*, for food. These petrels were larger than the short-tailed shearwaters and the Royal Marines called them "Flying Sheep." The Providence Petrels were harvested to extinction on Norfolk Island (171,000 birds in one year!) and now only exist on Lord Howe Island in the South Pacific. The name "muttonbird" has since been applied to the short-tailed shearwaters.

This group of birds can be distin-

guished by their tube-like nostrils on top of their upper beak. Mature short-tailed shearwaters have a wing span of one meter and weigh about 500 grams. They are primarily oceanic, arriving at coastal islands and shores only to breed and nest.

The chicks produce large amounts of oil in their stomach, high in energy content to sustain them while the adults are away. At present, the chicks of these muttonbirds are harvested for food every year on the Bass Strait Islands between March 27th and April 30th. The fat nestlings, weighing about one kilogram each, are killed. Their feathers and down are removed and the bodies gutted to extract the stomach oil which is purified for pharmaceutical use. The cleaned bodies are then sold fresh or are soaked in brine prior to distribution.

There are about 250 colonies, containing 23 million birds in Southeast Australia, breeding from September through April. In September and October, male birds meet with their mates and clean out old burrows or dig new ones. Their burrows are about one meter long and are a hazard to anyone walking around these areas. In early November they leave the colony to feed and return to

lay a single white egg between November 20th and December 2nd, with a peak of activity between November 24th and 26th. The chicks hatch in January and the adults remain until April at which time they begin their migration to the North Pacific. They appear to return to Australia via the Central Pacific in September, covering a distance of more than 30,000 kilometers annually.

Shearwaters, having a life span of between 15 to 19 years, spend much of their time feeding on krill, squid and fish. Their breeding grounds are under constant and increasing pressure due to soil erosion, domestic animals, and human influence. The gill net fisheries in the North Pacific catch up to 500,000 shearwaters annually, all of which drown in their nets. Approximately 250,000 chicks each year are harvested on the Bass Strait Islands by commercial operators; however harvesting limits are imposed so as not to seriously deplete the bird population. In addition, an international treaty has been signed between Japan and Australia (The Japan-Australia Migratory Bird Treaty)

to ensure that each country monitors the shearwater population while the birds are in their respective areas.

The little or fairy penguin, which is not under pressure from commercial harvesting on islands and coastal areas in southern and southeast Australia, is the only resident penguin to breed in Australia. This penguin is also the only penguin that waits until dark before coming ashore to roost.

This smallest of all penguins (40 centimeters in height), is about one kilogram in weight and has a life span of only six years. They are streamlined, affording them great efficiency in swimming and diving for food. They make relatively shallow dives (10-30 meters), catching small fish, squid and krill. Some fairy penguins return routinely to the same burrow year round, but most stay at sea during the Autumn/Winter period (March-September). Their nests are about two meters apart and consist of a 60-80 centimeter tunnel with a nest at the far end. During late winter, male penguins return to their nests to renovate or dig new burrows. The birds breed annually with a clutch of

*Fairy penguin in nesting burrow. Photo by Dr. William Wakefield.*



about two eggs. The adults alternate in incubating the eggs every one or two days and the eggs usually hatch within 33-37 days. After about eight weeks, the chicks are ready to go to sea where they will then mature.

Similar to muttonbirds, these penguins have their own survival problems. Some drown in gill nets, others are contaminated by oil and petroleum products which adhere to their feathers, damaging their buoyancy and insulation capabilities. On land, dogs and cats easily destroy their limited breeding habitats, and human construction of roads and housing developments near their nesting sites impact their numbers.

There are still locations where one can see the penguins, but fewer and fewer come ashore these days. In fact, only five percent of 110,000-190,000 breeding pairs breed on the Tasmanian mainland. Increased pressure by man will probably result in their ultimate extinction on Tasmania.

Fortunately, islands like Bruny, still offer the opportunity to witness the fairy

penguin under strict supervision by the Tasmanian Parks and Wildlife Department.

The historical Island of Bruny offers everyone the opportunity to see for themselves Australia's own little penguin, as well as the infamous muttonbird. Here, they are totally protected.

Guidelines for viewing the penguins include arriving just before dark in dark clothes with the supervision and assistance of the Parks and Wildlife Officer. One should remain at least three meters from the penguin's burrow so as not to frighten them. Camera flashes are allowed; however no flashlights or lamps are permitted, for as soon as the birds feel threatened, they will return to the sea.

Bruny Island is less than one hour car ride from Hobart and is truly a unique and beautiful island. Most of the island has a rich history, beautiful scenery with rainforests, mountains and a rugged southern coastline and an abundance of flora and fauna. I highly recommend a trip if ever visiting the "Apple Isle" we call Tasmania.

### GUIDELINES FOR SUBMISSIONS

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.

**ARTWORK:** 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. It would help, if you have access to a computer, to receive your manuscript saved as ASCII on a 3 1/2" double-sided, high-density disk. 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.

# Snapping Shrimp and Their Behavior

by DANIEL R. TARDONA

As I approach the salt marsh I hear a snap, snap, then another snap without any apparent regularity. It is a sound more associated with some morning meals or popcorn and not with my approach to an oyster bed at low tide. I often hear this noise in between the pleasant sounds of wading birds and other creatures of the marsh. Even those peaceful moments of dead silence that the salt marsh provides are suddenly broken by "snap" "snap" "snap." It is not an unpleasant intrusion, but rather an occurrence that simply causes a curious restlessness as to what is its seeming undiscoverable source. Only recently have I learned the true origin of the unusual sonance. I have suspected that the sound had something to do with the tightly clumped oysters that reminded me of extraterrestrial crafts that had landed on the earth centuries before, or of huge calcareous flower heads popping up from the brackish marsh muds. For a time I thought the snapping was made by the American oysters, *Crassostrea virginica*, tightly shutting their shells to keep from drying out, as the tide moved out exposing them to the sun and marsh breezes. I did not expect the culprit to be one of a variety of other life forms that exist among and within the variously shaped oyster shells.

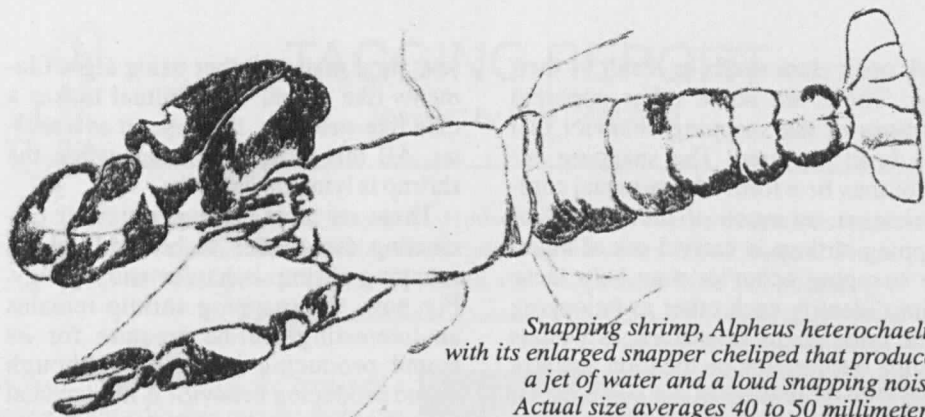
Among the many organisms such as goby fish, worms and a variety of small organisms adapted to the estuarine environment are some rather tiny members of the crustacean family. To my astonishment, the source of the mysterious snaps is a tiny shrimp measuring only one to two inches long. The Big-Clawed Snapping Shrimp, *Alpheus heterochelis*, is one of many species of snapping

TARDONA is a naturalist with the National Park Service at the Great Smoky Mountains National Park. He has researched fossils and marine mammals.

shrimp. What are these crustaceans doing inside oysters and why do they snap?

Crustaceans (those animals with crust-like external skeletons or exoskeletons) are a large group of organisms that come in a variety of shapes and sizes. One of the most recognizable forms is the shrimp. The majority of shrimp, including snapping shrimp, bury themselves in the sediment for at least part of each day or hide in underwater burrows, crevices, tubes, and in the case of some snapping shrimp, inside oyster shells. Shrimp feed on partially decayed plant and animal material, detritus, and some prey on other organisms including smaller shrimp. Most of us are familiar with shrimp in the family Penaeidae, the shrimp we generally eat. The snapping shrimp in the family Apheidae, unlike the others, have the unusual capacity to produce a snapping noise.

There are many species of snapping shrimp that live in various marine habitats along the Atlantic and the Pacific coastlines. Like its relatives, the Big-Clawed Snapping Shrimp that I often hear in the marshes of northeast Florida has one large claw and a smaller pincer claw. Shrimp are decapods; therefore they have five pairs of legs, or chelate. When the first pair of legs is modified to include a large snapping claw and pincer claw, as in the snapping shrimp, they are referred to as cheliped. The large claw on the snapping shrimp has a structure like a hammer and when it closes with a great deal of force into a matching socket, a jet expulsion of water is produced along with the snapping sound. The smaller pincer claw does not have the hammer and socket structures and is designed for other behaviors. The pincer is used for probing the substrate, burrowing in the mud, and foraging for food. The pincer is also used in grooming. Grooming is a behavior important in keeping the snap-



*Snapping shrimp, Alpheus heterochaelis, with its enlarged snapper cheliped that produces a jet of water and a loud snapping noise. Actual size averages 40 to 50 millimeters. Drawing by Jane Tardona.*

ping shrimp clean of parasites and fouling material that can affect the shrimp's ability to move about and sense its environment.

Like other crustaceans, the snapping shrimp is capable of limb autotomy; that is, if a claw is injured or grasped by a predator, the shrimp reflexively responds by disconnecting its limb and regenerating a new one at subsequent molts. But in this animal, if only the snapping claw is lost, the intact pincer claw transforms into a snapping claw while the new claw will regenerate into a pincer. When just the pincer is lost, only a new pincer claw will be regenerated. When both claws are lost simultaneously, the new pincer and snapping claw will regenerate on the same side as the originals which is the typical process of crustacean limb regeneration. This would suggest that the snapping claw has some important function because its presence seems to be a biological priority. The question still remains as to why the snapping shrimp snaps.

There appear to be a few possible reasons for the snapping and associated behavior. Many scientists believe that these shrimp snap as a signal to turn away intruders. Imagine someone approaching you, looking rather menacing with an overly enlarged arm waving and producing a loud snapping sound. As with many defensive behaviors in the animal world, often the behavior is meant as intimidation more than actual harm (even though the behavior, if followed through, would

inflict some damage). Various kinds of fish prey upon snapping shrimp. It is unclear if the snapping or the powerful jet of water produced is successful in killing such predators but it does appear that the snapping behavior is sometimes successful in frightening off potential predators. Perhaps the behavior is more useful against other shrimp species and members of its own species. It does appear that without a functioning snapping claw some species of snapping shrimp do not compete successfully with other shrimp in securing a shelter.

Researchers of this behavior generally agree that it is actually the swift stream of water expelled rather than the snapping sound that wards off intruders. The snapping claw may be used occasionally as a weapon to stun potential prey such as other small shrimp. It has been reported that some snapping shrimp are able to

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crack open clam shells as result of their snap. There are some other apparent functions of the snapping behavior that have been explored. The snapping behavior may be a form of non-visual communication, as much of the activity of snapping shrimp is carried out at night. The snapping behavior may help these shrimp identify each other as belonging to the same genus or species, as well as provide information on location and size of another individual as the audibility of the snap appears to be correlated with size. The behavior associated with the snapping claw and the snapping behavior itself also plays a role in mate selection. Female snapping shrimp generally are larger than male snapping shrimp; however, male snapping shrimp generally have a larger snapping claw. As you might expect, it is important that a snapping shrimp searching for a mate would want to size up its potential partner.

It is interesting to note that the various species of snapping shrimp behave similarly and the mechanisms for producing the behavior are identical. For example, a species of snapping shrimp along the California coast, *Alpheus californiensis*, has one enlarged claw for snapping, but the structure of the claw and the way the snapping sound is produced is different from *A. heterochelis* that is commonly found along the southeast coast. It is quite possible that a number of mechanisms for snapping have been developed among the great variety of snapping shrimp. Perhaps the snapping and associated behaviors have different meanings or functions depending upon the environmental conditions in which they live.

Snapping shrimp use their other "legs" for movement along the substrate and for swimming. At least one species of snapping shrimp, *Alpheus pachychirus*, uses its flexible second pair of legs to construct shelter by literally stitching together algal mats. This species of snapping shrimp has been observed using one of its second pair of legs like a needle to

sew algal mats together using algal filaments like thread. The animal makes a tube like structure, then uses it as a shelter. All this is accomplished while the shrimp is lying on its back.

There are most likely many other fascinating discoveries to be made about snapping shrimp behavior and biology. For now, the snapping shrimp remains an interesting marine creature for its sound producing behavior. Although sound producing behavior is not unusual among crustaceans—lobsters produce grating sounds and mantis shrimp produce sounds—much of this behavior is not very well understood. The behavior of marine invertebrates is a fascinating field study and much is yet to be learned.

My visits to the salt marsh are always exciting and full of new discoveries. The oyster reefs exposed at low tide now provide an even richer experience and provide me with an opportunity to learn more. With each visit I realize more and more the significance of the salt marsh in the web of life and the importance of its continued survival. If we are not careful with this valuable life giving natural resource, we could lose it as quick as the snap of the last snapping shrimp.

Since 1967 this journal has been printed by The Riverview Press in Red Bank, NJ, and Bill Howitt, owner and sole proprietor did the designing, selecting and sometimes setting type, layout, tasteful editing, cheerleading, and worrying. Shop visits were a joy, paper, negatives, and glue on the light table, presses humming, clattering, and jamming in the back room, all seasoned with the smell of ink. We talked color separations, type sizes, and politics.

BILL HOWITT died June 28, but The Riverview Press is still there, two of his sons out front and the crew in the back. We will miss Bill's advice and friendship, but the UNDERWATER NATURALIST is in good hands.



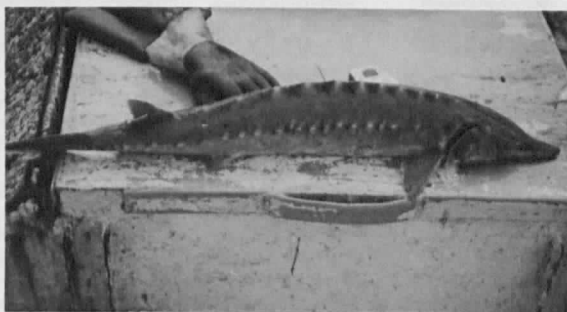
# TAGGING REPORT

compiled by PAM CARLSEN

The shad bush blooms in May in the Hudson Valley. Its blossoms mark the peak shad run and herald the Atlantic sturgeon, a fish of myth and legend. These great fish can grow to ten feet in length and weigh more than 300 pounds.

*from the Hudson River Almanac by Tom Lake (ALS tagger since 1972),  
Frances Dunwell and Bethia Waterman.*

In November of 1992, we received a letter along with this picture from our member, commercial fisherman, Paul Westcott, Point Judith, RI. He tagged and released this fish, five miles west of Gay Head, Martha's Vineyard, MA. He wrote, "Two sturgeons were caught on 9/16/92 in the same tow, one had a long narrow nose (Atlantic) and the other a wider short nose (Shortnose)." The one pictured is the more common Atlantic sturgeon.



On June 18, 1994, another Atlantic sturgeon was caught and tagged by Sergio Radossi accompanied by Kevin Morgan and Pete Orenza. All are members of the NJ Hudson River Fishermen's Association. This 47" fish was tagged at Romer Shoal off Sandy Hook, NJ.



On August 5, 1994, Joe Kane wrote from Maine, "Big News! Caught an Atlantic sturgeon in the Kennebec River right behind my house. It was 40" and around 14 to 15 pounds. I put a tag in it and took a picture of it."

Atlantic sturgeon are armored with rows of large bony plates. Its snout is slender and slightly upturned and on the underside of the head is a small and toothless mouth. In front of the mouth are 4 pointed barbels which act as sense organs when searching for food. According to Bigelow and Schroeder in *FISHES OF THE GULF OF MAINE*,

"The sturgeon is a bottom feeder, rooting in the sand or mud with its snout like a pig, as it noses up the worms and mollusks on which it feeds and which it sucks into its toothless mouth with considerable amounts of mud." Although most of its life is spent at sea, the sturgeon enters fresh water to spawn and then returns to the sea.

## TAGGING RETURNS

| Species           | Lgth | Tagger           | Place Tagged         | Date     | Recapturer      | Location                 | Lgth | Date     |
|-------------------|------|------------------|----------------------|----------|-----------------|--------------------------|------|----------|
| <b>Black Drum</b> |      |                  |                      |          |                 |                          |      |          |
|                   | 10   | J Wright         | Venice, FL           | 06/24/94 | S Zisman        | Venice, FL               | 11   | 06/29/94 |
| <b>Bluefish</b>   |      |                  |                      |          |                 |                          |      |          |
|                   | 14   | P Lent           | Shinnecock Bay, NY   | 08/13/88 | E Hasbrouck     | Shinnecock Inlet, NY     | 14   | 10/15/88 |
|                   | 26   | M Barrett        | Annadale, NY         | 05/29/94 | R Giordano      | Montauk Pt., NY          | 29   | 07/04/94 |
|                   | 30   | M Dunnaway       | VA Beach, VA         | 06/18/93 | R Berger        | Stratford, CT            | 34   | 07/06/94 |
|                   | 18   | M Barrett        | Great Kills, NY      | 06/04/94 | C DeCrescenzo   | Tin Can Grounds, NY      |      | 07/11/94 |
|                   | 24   | M Barrett        | Great Kills, NY      | 06/05/94 | D Davis         | Mdwbrk Pkwy. Bldg., NY   |      | 07/16/94 |
|                   | 22   | M Barrett        | Annadale, NY         | 05/29/94 | J Busacca       | Hoffman Is., NY          |      | 07/28/94 |
| <b>Fluke</b>      |      |                  |                      |          |                 |                          |      |          |
|                   | 14   | T Witek          | Fire Island, NY      | 08/26/90 | E Hasbrouck     | unknown/fish market      |      | 10/15/90 |
|                   | 12   | F Spall          | Old Orchard Lt., NY  | 07/14/92 | L.D. Amory Co.  | Offshore trawl           |      | 01/23/93 |
|                   | 15   | T Surgent        | Shark R., NJ         | 08/28/93 | B Epstein       | Shark R., NJ             | 18   | 08/07/93 |
|                   | 12   | M Gallagher      | Jamaica Bay, NY      | 08/15/93 | W Pope          | The Rockaways, NY        | 14   | 09/03/93 |
|                   | 11   | C Fiorillo       | Avon, NJ             | 07/13/93 | I Almeida       | Elizabeth, NJ            | 15   | 09/13/93 |
|                   | 12   | J Calamia        | Democrat Pt., NY     | 08/02/92 | F/V Deborah Ann | E. of Pt. Judith, RI     |      | 09/19/93 |
|                   | 14   | K Donley         | Orient Pt., NY       | 08/25/93 | F/V Glacier Bay | 20Mi. S Block Is., RI    | 15   | 11/20/93 |
|                   | 13   | R Haug           | Moriches Inlet, NY   | 07/29/93 | F/V Shelby Ann  | 9 Mi. S Block Is., RI    |      | 12/05/93 |
|                   | 12   | R Anderson Jr.   | Fire Is. Inlet, NY   | 05/22/94 | Y Jung          | Johnson Beach, NY        |      | 05/30/94 |
|                   | 12   | S Wisniewski     | Harvey Cedars, NJ    | 08/09/93 | M Ogden         | Docked-Morehead City, NC | 15   | 06/01/94 |
|                   | 12   | W Filce          | Ambrose Chan., NJ    | 09/05/93 | B Horne         | Provincetown, MA         |      | 06/01/94 |
|                   | 19   | D Dixon          | York R., VA          | 06/06/94 | D Brown         | York R., VA              | 20   | 06/03/94 |
|                   | 12   | J Brittin        | Delaware Bay, NJ     | 06/04/94 | K Johnson       | Delaware Bay, NJ         | 12   | 06/11/94 |
|                   | 13   | N Fiorillo Jr.   | Spring Lake, NJ      | 07/10/93 | M Gelman        | Brighton Beach, NY       |      | 06/11/94 |
|                   | 12   | S Carlsen        | Shark R., NJ         | 07/26/93 | A Fuentes Jr.   | Sandy Hook Bay, NJ       | 14   | 06/16/94 |
|                   | 12   | L Ruch Jr.       | Asbury Park, NJ      | 06/11/94 | P Ferlita       | Monmouth Beach, NJ       | 12   | 06/26/94 |
|                   | 13   | F Waltzinger III | Asbury Park, NJ      | 06/13/94 | B Stromko       | Elberon, NJ              | 13   | 06/26/94 |
|                   | 11   | F Waltzinger III | Avon, NJ             | 09/23/93 | R Swerida       | Asbury Park, NJ          | 13   | 06/26/94 |
|                   | 14   | M Daniewicz      | Sandy Hook, NJ       | 05/18/94 | J Lowe          | Earle Pier, NJ           |      | 06/30/94 |
|                   | 12   | B Shillingford   | Corsons Inlet, NJ    | 07/07/93 | R Davis         | Long Branch, NJ          | 16   | 07/02/94 |
|                   | 12   | M Daniewicz      | Flynn's Knoll, NJ    | 06/01/94 | F Matulonis     | Leonardo, NJ             | 12   | 07/02/94 |
|                   | 14   | M Daniewicz      | Sea Bright, NJ       | 06/05/94 | R Butewicz      | Earle Pier, NJ           | 14   | 07/02/94 |
|                   | 12   | S Carlsen        | Shark River, NJ      | 05/31/93 | D Spillane      | 69th St. Pier, Bklyn, NY | 16   | 07/02/94 |
|                   | 13   | J Dotsey         | Lido Beach, NY       | 05/29/94 | I Guchi         | Reynold's Chan., NY      | 13   | 07/03/94 |
|                   | 10   | B Stromko        | Manasquan, NJ        | 05/29/94 | F McCann        | Allenhurst, NJ           | 11   | 07/03/94 |
|                   | 14   | M Greatsinger    | Fire Is. Inlet, NY   | 06/25/94 | G Leary         | Captree St. Pk., NY      |      | 07/03/94 |
|                   | 12   | S Fekete         | Spring Lake, NJ      | 07/14/93 | B Bradley       | Deal, NJ                 | 15   | 07/04/94 |
|                   | 12   | R Meyer          | Earle Pier, NJ       | 08/08/93 | A Willner       | Earle Pier, NJ           | 14   | 07/04/94 |
|                   | 11   | F Waltzinger III | Ocean Gröve, NJ      | 06/13/94 | V Gawron        | Sandy Hook Bay, NJ       | 13   | 07/06/94 |
|                   | 11   | M Zielen         | Sandy Hook, NJ       | 06/04/94 | J Markowitz     | Sandy Hook, NJ           | 11   | 07/06/94 |
|                   | 15   | K Donley         | Orient Pt., NY       | 08/09/93 | B Asanto        | Gardiners Is., NY        | 23   | 07/06/94 |
|                   | 12   | K Miles          | Spring Lake, NJ      | 07/02/94 | L Stickle       | Avon, NJ                 | 13   | 07/07/94 |
|                   | 13   | W Filce          | Spring Lake, NJ      | 06/22/94 | R Reingle       | Shark R., NJ             | 13   | 07/07/94 |
|                   | 16   | K Leopold        | Great South Bay, NY  | 05/21/94 | R Busch         | Fire Is. Inlet, NY       |      | 07/07/94 |
|                   | 14   | K Miles          | Spring Lake, NJ      | 06/19/94 | R Marion        | Long Branch, NJ          | 14   | 07/07/94 |
|                   | 13   | W Gano           | Moriches Bay, NY     | 06/10/94 | D Davis         | Moriches Bay, NY         | 13   | 07/08/94 |
|                   | 10   | V Galgano        | Spring Lake, NJ      | 07/05/93 | F Tenore        | Sandy Hook, NJ           | 11   | 07/08/94 |
|                   | 14   | W Filce          | Spring Lake, NJ      | 06/22/94 | J Murray Jr.    | Spring Lake, NJ          | 16   | 07/08/94 |
|                   | 12   | R Halsey         | Manasquan R., NJ     | 08/18/93 | K Conroy        | Pt. Lookout, NY          | 14   | 07/09/94 |
|                   | 13   | C Fiorillo       | Avon, NJ             | 07/13/93 | D Britton       | Barneget Lt., NJ         | 15   | 07/09/94 |
|                   | 12   | S Wisniewski     | Provincetown, MA     | 06/19/94 | P Croteau       | Provincetown, MA         | 13   | 07/09/94 |
|                   | 13   | W Gano           | Moriches Bay, NY     | 06/13/94 | F Vallone       | Moriches Inlet, NY       | 14   | 07/09/94 |
|                   | 13   | B Shillingford   | Ludlam Bay, NJ       | 07/04/94 | A Cole          | Sea Isle City, NJ        | 13   | 07/09/94 |
|                   | 13   | M Zielen         | Sandy Hook, NJ       | 06/18/94 | T Buban         | Sandy Hook Bay, NJ       |      | 07/10/94 |
|                   | 12   | R Johnson        | Sandy Hook Bay, NJ   | 07/01/94 | T Buban         | Sandy Hook Bay, NJ       |      | 07/10/94 |
|                   | 13   | S Knapik         | Jones Inlet, NY      | 06/13/93 | T Buban         | Kismet, NY               | 17   | 07/10/94 |
|                   | 13   | S Wisniewski     | Provincetown, MA     | 06/23/94 | T Perry         | Provincetown, MA         | 14   | 07/10/94 |
|                   | 13   | R Anderson Jr.   | Snake Hill Chan., NY | 07/11/93 | D Kavity        | Montauk, NY              | 15   | 07/10/94 |
|                   | 13   | W Filce          | Manasquan, NJ        | 06/19/94 | D Ciszkeski     | Spring Lake, NJ          |      | 07/10/94 |
|                   | 13   | A Kahlau         | Rockaway Inlet, NY   | 06/14/94 | J Pintauro      | Rockaway Inlet, NY       | 14   | 07/10/94 |
|                   | 13   | S Knapik         | Pt. Lookout, NY      | 05/30/94 | T Rupp          | Lido Beach, NY           | 14   | 07/11/94 |



**Species**

| Lgth | Tagger         | Place Tagged           | Date     | Recapturer         | Location                 | Lgth | Date     |
|------|----------------|------------------------|----------|--------------------|--------------------------|------|----------|
| 14   | M Zielen       | Sandy Hook, NJ         | 06/26/94 | R Leadenham        | Leonardo, NJ             | 14   | 07/12/94 |
| 14   | S Wisnewski    | Provincetown, MA       | 06/23/94 | S Jonas            | Provincetown, MA         | 15   | 07/12/94 |
| 13   | A Kahlau       | Rockaway Inlet, NY     | 07/01/94 | P Russo            | Marine Pkwy Brdg., NY    |      | 07/12/94 |
| 14   | K Leopold      | Great South Bay, NY    | 07/02/94 | W Ciesluk Sr.      | Fire Is. Inlet, NY       | 14   | 07/13/94 |
| 09   | S Carlsen      | Atlantic Highlands, NJ | 06/17/93 | F Fraioli Jr.      | Narragansett, RI         | 14   | 07/14/94 |
| 13   | E Feret        | Freeport, NY           | 06/04/94 | F Kasema           | Freeport, NY             | 14   | 07/14/94 |
| 13   | K Bannick      | Mackeral Cove, RI      | 07/02/94 | R Rose             | Mackeral Cove, RI        |      | 07/14/94 |
| 14   | L Ruch Jr.     | Asbury Park, NJ        | 06/11/94 | T Finneran         | Earle Pier, NJ           | 14   | 07/15/94 |
| 13   | J Tirpak       | Monmouth Beach, NJ     | 07/10/94 | T Kelly            | Monmouth Beach, NJ       | 14   | 07/15/94 |
| 13   | B Goodman      | Reynolds Chan., NY     | 06/26/94 | B Helms            | Reynolds Chan., NY       | 13   | 07/15/94 |
| 13   | A D'Amato      | Cape May, NJ           | 08/01/93 | P Connon           | Woods Hole, MA           | 16   | 07/15/94 |
| 15   | W Gano         | Moriches Bay, NY       | 06/23/94 | E Trovitch         | Moriches Bay, NY         | 15   | 07/16/94 |
| 13   | W Gano         | Moriches Bay, NY       | 07/14/90 | E Trovitch         | Moriches Bay, NY         | 26   | 07/16/94 |
| 12   | F Rupp         | Raritan Bay, NJ        | 07/08/94 | S Posten           | Sandy Hook Bay, NJ       |      | 07/16/94 |
| 12   | M Zielen       | Sandy Hook, NJ         | 07/05/92 | L Gotthold         | Sandy Hook, NJ           | 19   | 07/16/94 |
| 11   | R Anderson Jr. | Captree, NY            | 05/21/94 | M Lazzaro          | Babylon, NY              | 11   | 07/16/94 |
| 14   | S Carlsen      | Shark R., NJ           | 07/07/94 | C Correia          | Avon, NJ                 | 14   | 07/17/94 |
| 11   | S Knapik       | Pt. Lookout, NY        | 07/09/94 | B D'Attore         | Jones Inlet, NY          |      | 07/18/94 |
| 14   | J Dotsey       | Lido Beach, NY         | 05/02/94 | F DeMarco          | Long Beach, NY           | 17   | 07/18/94 |
| 14   | K Miles        | Manasquan, NJ          | 05/15/94 | R Beard            | Sandy Hook, NJ           | 14   | 07/19/94 |
| 13   | W Filce        | Manasquan R., NJ       | 07/30/93 | S Galetta          | Stonington, CT           | 14   | 07/19/94 |
| 11   | D Mann         | Flax Pond, NY          | 06/26/94 | G Kilmer           | Crane's Neck, NY         |      | 07/19/94 |
| 12   | M Greatsinger  | Snake Hill Chan., NY   | 06/18/94 | R Green            | Fire Is. Inlet, NY       | 13   | 07/20/94 |
| 14   | K Leopold      | Great South Bay, NY    | 07/03/94 | R Lyme             | Captree, NY              |      | 07/21/94 |
| 17   | G Ottavio      | Cape May Pt., NJ       | 07/11/94 | H Weber            | Cape May Pt., NJ         |      | 07/21/94 |
| 11   | D Mann         | Mt. Misery, NY         | 07/11/92 | D Stevenson        | Eatons Neck, NY          | 21   | 07/21/94 |
| 12   | P Donnelly     | Spring Lake, NJ        | 05/15/94 | P Alfano           | Keansburg, NJ            | 15   | 07/23/94 |
| 13   | R Joyce        | Pt. Judith, RI         | 06/15/94 | G Messick          | Pt. Judith, RI           | 13   | 07/23/94 |
| 14   | R Anderson Jr. | Fire Is. Inlet, NY     | 07/24/94 | A Schnell          | Fire Is. Inlet, NY       |      | 07/24/94 |
| 13   | R Anderson Jr. | Fire Is. Inlet, NY     | 07/16/94 | A Schnell          | Fire Is. Inlet, NY       |      | 07/24/94 |
| 14   | W Filce        | Sandy Hook, NJ         | 07/03/94 | S Burney           | Sandy Hook Bay, NJ       | 14   | 07/24/94 |
| 13   | A D'Amato      | Cape May, NJ           | 09/22/93 | Cr. Bay Fish Stat. | Jamaica Bay, NY          |      | 07/24/94 |
| 11   | R Anderson Jr. | Fire Is. Inlet, NY     | 07/19/94 | A Schnell          | Fire Is. Inlet, NY       |      | 07/24/94 |
| 12   | M Greatsinger  | Snake Hill Chan., NY   | 06/17/94 | A Schnell          | Fire Is. Inlet, NY       |      | 07/24/94 |
| 11   | R Anderson Jr. | Fire Is. Inlet, NY     | 07/16/94 | J Lauro            | Great South Bay, NY      |      | 07/24/94 |
| 13   | S Knapik       | Pt. Lookout, NY        | 08/26/93 | L Molnar           | Shinnecock Bay, NY       | 15   | 07/24/94 |
| 10   | M Russo        | Smith Pt., NY          | 06/07/93 | R Buggy            | Shinnecock Bay, NY       | 12   | 07/24/94 |
| 14   | K Leopold      | Great South Bay, NY    | 07/08/94 | M Pellegrino       | Fire Is. Inlet, NY       |      | 07/25/94 |
| 11   | S Carlsen      | Atlantic Highlands, NJ | 06/27/94 | B Bazydlo          | Atlantic Highlands, NJ   | 13   | 07/25/94 |
| 13   | M Greatsinger  | Fire Is. Inlet, NY     | 06/03/94 | B Koehler          | Fire Is. Inlet, NY       | 13   | 07/26/94 |
| 15   | G Ottavio      | Cape May, NJ           | 07/16/94 | D Knaebel          | Cape May Pt., NJ         | 16   | 07/26/94 |
| 12   | K Miles        | Manasquan R., NJ       | 07/25/94 | R Prendeville      | Manasquan R., NJ         |      | 07/26/94 |
| 14   | S Wisnewski    | Provincetown, MA       | 06/23/94 | J Burnett          | Provincetown, MA         | 14   | 07/26/94 |
| 13   | S Fries        | Rockaway Inlet, NY     | 09/05/93 | A Melnick          | Chatham, MA              |      | 07/27/94 |
| 14   | W Gano         | Moriches Bay, NY       | 07/13/94 | P Cuthbert         | Moriches Bay, NY         |      | 07/27/94 |
| 13   | R Johnson      | Long Branch, NJ        | 07/17/93 | J LaMonica         | Tin Can Grounds, NY      | 14   | 07/27/94 |
| 14   | P Schrader     | Moriches Bay, NY       | 06/23/94 | W Gano             | Moriches Bay, NY         | 15   | 07/27/94 |
| 12   | S Knapik       | Pt. Lookout, NY        | 07/09/94 | S Kmiotek          | Pt. Lookout, NY          | 12   | 07/28/94 |
| 14   | K Leopold      | Great South Bay, NY    | 07/02/94 | C Gregory          | Robert Moses St. Pk., NY | 15   | 07/29/94 |
| 12   | K Leopold      | Great South Bay, NY    | 07/16/94 | K Imm              | Democrat Pt., NY         |      | 07/30/94 |
| 15   | R Anderson Jr. | Fire Is. Inlet, NY     | 07/19/94 | J Gortakowski      | Fire Is. Lt., NY         | 15   | 07/31/94 |
| 11   | R Anderson Jr. | Fire Is. Inlet, NY     | 07/19/94 | B Casselli         | Robert Moses Brdg., NY   |      | 07/31/94 |
| 13   | M Fritz        | Delaware Bay, NJ       | 07/02/94 | R Fulginiti        | Delaware Bay, NJ         | 14   | 07/31/94 |
| 13   | J Irwin        | Delaware Bay, NJ       | 07/25/93 | C Cooper           | Delaware Bay, NJ         | 14   | 07/31/94 |

**Sheepshead**

|    |          |            |          |          |            |    |          |
|----|----------|------------|----------|----------|------------|----|----------|
| 14 | J Wright | Venice, FL | 06/24/94 | M Wright | Venice, FL | 14 | 06/25/94 |
| 11 | J Wright | Venice, FL | 06/28/94 | M Wright | Venice, FL | 11 | 07/31/94 |

**Snook**

|    |         |               |          |         |               |    |          |
|----|---------|---------------|----------|---------|---------------|----|----------|
| 26 | E Lelie | Marco Is., FL | 07/17/94 | E Lelie | Marco Is., FL | 26 | 07/20/94 |
|----|---------|---------------|----------|---------|---------------|----|----------|

## Species

| Lgth                | Tagger         | Place Tagged          | Date     | Recapturer     | Location                 | Lgth | Date     |
|---------------------|----------------|-----------------------|----------|----------------|--------------------------|------|----------|
| <b>Striped Bass</b> |                |                       |          |                |                          |      |          |
| 22                  | T Rinaldi      | Baiting Hollow, NY    | 11/08/93 | K Foy          | Riis Park, Rockaway, NY  |      |          |
| 27                  | R Lewis        | Seaside Hts., NJ      | 11/05/89 | M Napolitano   | Staten Island, NY        |      | 11/15/92 |
| 25                  | S Kellner      | Hortons Point, NY     | 09/08/91 | H June         | Crabmeadow Beach, NY     |      | 04/15/93 |
| 20                  | R Leja         | Bridgeport, CT        | 10/05/93 | H June         | Sunken Meadow, NY        |      | 11/15/93 |
| 30                  | R Canfield     | Westport, CT          | 07/23/93 | W Bulla        | Great Kills, NY          | 34   | 11/21/93 |
| 19                  | S Penta        | Boston, MA            | 10/09/92 | W Kobel Jr.    | Northport, NY            | 23   | 03/08/94 |
| 26                  | D Kelly        | Orient Pt., NY        | 07/26/93 | D Feague       | Delaware Bay, DE         |      | 03/15/94 |
| 20                  | G Epple        | Charlestown, RI       | 09/30/91 | S Feague       | Delaware Bay, DE         |      | 03/15/94 |
| 20                  | A Lo Cascio    | Manhasset Bay, NY     | 05/07/93 | D Wilson       | Dover, DE                |      | 04/04/94 |
| 20                  | I Fuchs        | Ellis Is., NY         | 11/18/92 | L Gonzalez     | City Is., NY             |      | 04/08/94 |
| 19                  | R Nystrom      | Bridgeport, CT        | 03/28/94 | T Mikrut       | Bridgeport, CT           |      | 04/14/94 |
| 21                  | S Kellner      | Riverhead, NY         | 11/15/93 | G Westfal      | Tivoli, NY               | 24   | 04/30/94 |
| 22                  | T Marburger    | Northport, NY         | 05/05/91 | C Jones        | Beach Haven, NJ          | 28   | 05/01/94 |
| 27                  | GS Gray        | Charlestown, RI       | 09/23/92 | R Johndrow     | Cape Cod Canal, MA       |      | 05/08/94 |
| 17                  | D Kelly        | Sag Harbor, NY        | 06/24/92 | T Allen        | Long Beach Is., NJ       |      | 05/15/94 |
| 22                  | JC Wright      | Ches. By Bg. Tun., VA | 03/31/94 | M Ernest       | Chesapeake Bay, MD       |      | 05/15/94 |
| 22                  | K Black        | Merrimack R., MA      | 08/06/92 | Point Trap Co. | Little Compton, RI       |      | 05/15/94 |
| 23                  | R Irrgang      | Delaware River, PA    | 09/30/91 | R Samples      | Bowers Beach, DE         |      | 05/15/94 |
| 17                  | D Hawkins      | Wading River, NY      | 10/12/91 | J Skinner      | Wading River, NY         | 22   | 05/18/94 |
| 17                  | J Gregal       | Penns Grove, NJ       | 05/09/92 | R Harbina      | Monmouth Beach, NJ       | 23   | 05/19/94 |
| 19                  | J Gibbons      | Sea Bright, NJ        | 07/27/92 | J Murphy       | Shrewsbury R., NJ        | 24   | 05/20/94 |
| 20                  | T Rinaldi      | Mattituck, NY         | 11/10/92 | N Navikas      | Cornwall, NY             |      | 05/23/94 |
| 22                  | A Fette        | Narragansett, RI      | 09/26/92 | R Galipeau     | Charlestown, RI          | 28   | 05/28/94 |
| 17                  | I Gordon       | Jamaica Bay, NY       | 10/06/93 | R Singleton    | Coney Is., NY            | 21   | 05/28/94 |
| 29                  | G Ottavio      | Cape May, NJ          | 11/28/92 | A Ciaramella   | Bayonne, NJ              | 33   | 05/29/94 |
| 16                  | J Timmermann   | Hempstead, NY         | 11/14/93 | D Bennett      | New Haven, CT            |      | 05/30/94 |
| 18                  | R Fink         | Northport, NY         | 03/22/94 | W Johnson      | Charlestown, RI          |      | 05/30/94 |
| 21                  | J Gibbons      | Sandy Hook, NJ        | 10/08/93 | J Tamuleuich   | Marshfield, MA           |      | 05/31/94 |
| 20                  | J Karolides    | Danvers, MA           | 07/20/92 | J Lockhart     | Ches. Bay Brdg. Tun., VA | 26   | 06/05/94 |
| 35                  | L Molnar       | Shinnecock Inlet, NY  | 06/18/92 | D Baldwin      | Moriches Inlet, NY       | 36   | 06/10/94 |
| 17                  | B Billerman    | Newburyport, MA       | 05/25/91 | B Cumings      | Mt. Sinai, L.I., NY      | 22   | 06/10/94 |
| 27                  | A Anderson     | Block Is., RI         | 10/30/93 | J Jones        | Charlestown, RI          |      | 06/11/94 |
| 35                  | P Grippo       | Tobay Beach, NY       | 10/15/93 | J Rezendes     | Fishers Is., NY          | 37   | 06/12/94 |
| 34                  | F Stunkel      | Darien, CT            | 10/18/93 | F Ryan         | Darien, CT               | 35   | 06/14/94 |
| 21                  | J Goodman      | Charlestown, RI       | 09/27/92 | D Perry        | Barrington, RI           | 30   | 06/14/94 |
| 34                  | G Innes        | Moriches Inlet, NY    | 10/22/93 | A Beauvais     | Cape Cod Canal, MA       | 34   | 06/15/94 |
| 20                  | F Stunkel      | Stamford, CT          | 10/05/93 | F Martinez     | Cove Is. Park, CT        |      | 06/15/94 |
| 25                  | K Sprankle     | Outer Banks, NC       | 02/04/92 | J Lassahn      | Kent Is., MD             |      | 06/15/94 |
| 30                  | F Coronato     | Governor's Is., NY    | 10/27/93 | J Stavola      | Statue of Liberty, NY    | 34   | 06/15/94 |
| 22                  | F Hinehline    | Cape May, NJ          | 11/11/92 | M Pena         | Raritan R., NJ           |      | 06/18/94 |
| 29                  | K Sprankle     | Outer Banks, NC       | 02/04/92 | A Minuto Jr.   | S side Montauk Lt., NY   | 30   | 06/19/94 |
| 39                  | D Baldwin      | Moriches Inlet, NY    | 06/16/94 | G DuBois       | Moriches Inlet, NY       |      | 06/20/94 |
| 16                  | J Karolides    | Beverly, MA           | 06/03/94 | J Lynch        | Danvers, MA              | 17   | 06/20/94 |
| 26                  | R Nystrom      | Bridgeport, CT        | 08/03/93 | R Jones        | Newington, NH            |      | 06/20/94 |
| 29                  | J Della Porta  | Winthrop, MA          | 09/05/93 | R Stearns      | Boston, MA               |      | 06/21/94 |
| 13                  | R Kyker        | Norwalk, CT           | 05/13/94 | R Deschenes    | Pawtucket, RI            | 17   | 06/23/94 |
| 18                  | C Tomkins      | Millford, CT          | 06/22/91 | D Koskey       | Norwalk, CT              |      | 06/23/94 |
| 34                  | R Lux          | Rockaway Pt., NY      | 08/29/92 | G Benevento    | Breezy Pt., NY           | 34   | 06/25/94 |
| 34                  | E Fanz         | Great Bay, NJ         | 10/23/92 | R Lambert      | Merrimack R., MA         | 35   | 06/25/94 |
| 31                  | A Anderson     | Block Is., RI         | 06/14/94 | K Coombs       | New London, CT           |      | 06/25/94 |
| 19                  | L Richards     | Atlantic Beach, NY    | 07/18/93 | P Bianchin     | Plum Is., MA             | 21   | 06/25/94 |
| 36                  | D Baldwin      | Moriches Inlet, NY    | 06/20/94 | D Thompson     | Moriches Inlet, NY       | 37   | 06/25/94 |
| 29                  | W Perlman      | Atlantic Beach, NY    | 06/09/94 | M Berger       | Atlantic Beach, NY       | 27   | 06/26/94 |
| 26                  | A Lo Cascio    | Execution Lt., NY     | 06/17/94 | E Liss         | Manhasset Bay, NY        | 27   | 06/26/94 |
| 31                  | J McAfee Jr.   | Quick's Hole, MA      | 06/11/94 | D Conroy       | Quick's Hole, MA         | 31   | 06/26/94 |
| 28                  | B Roesch       | Bridgeport, CT        | 06/09/94 | E Wargo        | Bridgeport, CT           | 28   | 06/26/94 |
| 34                  | E Wargo        | Bridgeport, CT        | 06/30/93 | E Wargo        | Bridgeport, CT           | 35   | 06/26/94 |
| 20                  | B Shillingford | Corson's Inlet, NJ    | 10/07/92 | D Young Jr.    | Tuckahoe R., NJ          | 22   | 06/26/94 |
| 33                  | G Keenan       | Shinnecock Bay, NY    | 05/25/94 | P Cilento      | Moriches Inlet, NY       | 33   | 06/26/94 |
| 28                  | C Flaherty     | Boston, MA            | 06/12/93 | F Flaherty     | Boston, MA               | 30   | 06/27/94 |
| 31                  | F Strmiska     | Fishers Is., NY       | 06/20/93 | J Chase        | Watch Hill, RI           | 32   | 06/27/94 |
| 22                  | K Morgan       | Norwalk, CT           | 11/26/89 | J DiScipio     | Albany, NY               | 33   | 06/27/94 |

## Species

| Lgth                         | Tagger         | Place Tagged          | Date     | Recapturer    | Location                 | Lgth | Date     |
|------------------------------|----------------|-----------------------|----------|---------------|--------------------------|------|----------|
| <b>Striped Bass (cont'd)</b> |                |                       |          |               |                          |      |          |
| 16                           | D Mann         | Port Jefferson, NY    | 11/19/93 | E Caron III   | Niantic, CT              | 20   | 06/28/94 |
| 28                           | AD'Amato       | Delaware Bay, NJ      | 12/02/93 | T Marburger   | Shinnecock Inlet, NY     | 28   | 06/28/94 |
| 28                           | R Chmiel       | Westerly, RI          | 06/05/94 | P Dauk        | Watch Hill, RI           | 28   | 06/28/94 |
| 24                           | G Ministeri    | Cape Cod Bay, MA      | 07/28/93 | P Burton      | Wellfleet, MA            |      | 06/28/94 |
| 27                           | M Berger       | Debs Inlet, NY        | 07/31/93 | J Cintio      | Atlantic Beach Brdg., NY | 32   | 06/28/94 |
| 25                           | J Posh         | Stratford, CT         | 08/29/93 | M Rivera      | New Haven, CT            | 35   | 06/28/94 |
| 29                           | M Berger       | Debs Inlet, NY        | 05/20/93 | K Santos      | Niantic Bay, CT          |      | 06/29/94 |
| 25                           | R Leeds        | Ocean City, NJ        | 05/24/94 | J Amato       | Ocean City, NJ           | 29   | 06/29/94 |
| 20                           | W Perlman      | Rockaways, NY         | 11/21/93 | D Marcotte    | Beverly, MA              | 23   | 06/29/94 |
| 25                           | R Canfield     | Norwalk, CT           | 08/07/93 | R Canfield    | Norwalk, CT              | 26   | 06/30/94 |
| 16                           | M Christiansen | Somers Pt., NJ        | 06/21/93 | C Ingersoll   | Great Egg Harbor R., NJ  | 20   | 06/30/94 |
| 17                           | B Edwards      | Stratford, CT         | 06/16/94 | B Edwards     | Stratford, CT            | 17   | 06/30/94 |
| 29                           | S Penta        | Boston, MA            | 09/08/92 | R Stearns     | Boston, MA               | 30   | 06/30/94 |
| 35                           | D Sowerby      | York Beach, ME        | 06/24/94 | K Gagnon      | York, ME                 |      | 07/01/94 |
| 25                           | F Urban        | Flynn's Knoll, NJ     | 06/23/94 | M Napalitano  | Statue of Liberty, NY    | 28   | 07/01/94 |
| 19                           | A LoCascio     | Manhasset Bay, NY     | 11/17/93 | T Figureid    | Warren, RI               |      | 07/01/94 |
| 30                           | B Billerman    | Newburyport, MA       | 07/03/91 | D Auger       | Newburyport, MA          | 35   | 07/02/94 |
| 23                           | W Hraska       | Throgs Neck Brdg. NY  | 07/09/90 | K Roster      | Throgs Neck Brdg., NY    | 26   | 07/02/94 |
| 36                           | R Fink         | Rockaway, NY          | 05/29/94 | J Conant      | Martha's Vineyard, MA    | 38   | 07/02/94 |
| 36                           | A LoCascio     | Manhasset Bay, NY     | 09/13/93 | J Caputo      | Barker's Pt., NY         | 37   | 07/02/94 |
| 33                           | G Kerghan      | Sandy Hook, NJ        | 07/22/92 | B Raffel      | Sea Bright, NJ           | 36   | 07/02/94 |
| 35                           | J Tucker       | Nauset Beach, MA      | 08/22/92 | G Rooke       | Nauset Beach, MA         | 37   | 07/02/94 |
| 26                           | D Kelly        | Orient Pt., NY        | 07/03/93 | E Andresen    | SW Montauk Pt., NY       | 26   | 07/02/94 |
| 21                           | F Pecikonis    | Absecon Inlet, NJ     | 10/28/93 | P Tuttle      | Narragansett, RI         | 26   | 07/03/94 |
| 26                           | J Caputo       | Hart Is., NY          | 06/11/94 | W Romeyko     | Hewlett's Pt., NY        | 27   | 07/03/94 |
| 22                           | A LoCascio     | Manhasset Bay, NY     | 08/05/93 | D Ghosio      | Northport, NY            | 24   | 07/03/94 |
| 27                           | M Berger       | Atlantic Bch Brg., NY | 06/26/94 | L Richards    | Atlantic Beach, NY       | 27   | 07/03/94 |
| 21                           | J Della Porta  | Boston, MA            | 05/20/94 | W Dumas       | Saco, ME                 | 22   | 07/03/94 |
| 20                           | A LoCascio     | Manhasset Bay, NY     | 09/15/91 | R Sotansky    | Kings Pt., NY            | 20   | 07/03/94 |
| 40                           | J Della Porta  | Swampscott, MA        | 07/07/93 | B Ripley      | Boston Harbor, MA        | 41   | 07/03/94 |
| 32                           | J Slocum       | Groton, CT            | 06/13/93 | R Sheridan    | Fishers Is. Sound        | 34   | 07/03/94 |
| 32                           | T Schlichter   | Moriches Inlet, NY    | 06/30/93 | D Baldwin     | Moriches Inlet, NY       | 37   | 07/03/94 |
| 27                           | J Foti         | Ft. Wadsworth, NY     | 06/26/93 | G Gifford     | Ft. Wadsworth, NY        | 30   | 07/03/94 |
| 27                           | R Leja         | Bridgeport, CT        | 05/22/94 | S Miller      | Phippsburg, ME           | 31   | 07/04/94 |
| 32                           | J Capuano      | Shinnecock Inlet, NY  | 06/20/89 | S Witthuhn    | Montauk Pt., NY          | 38   | 07/04/94 |
| 35                           | R Szellan      | West Bank Lt., NY     | 11/15/93 | S Rymyszewicz | Cuttyhunk, MA            | 35   | 07/04/94 |
| 29                           | D Mann         | Sow & Pigs, MA        | 08/22/93 | C Nitsche     | Sow & Pigs, MA           |      | 07/04/94 |
| 31                           | F DeMenezes    | Buzzards Bay, MA      | 07/04/93 | D Wood        | Cuttyhunk, MA            |      | 07/04/94 |
| 31                           | D Mann         | Quick's Hole, MA      | 06/18/94 | B Rogers      | Quick's Hole, MA         |      | 07/04/94 |
| 23                           | T Nowell       | Newburyport, MA       | 09/12/93 | W Hadley      | Merrimack R., MA         | 24   | 07/05/94 |
| 32                           | F Tenore Jr.   | Sandy Hook, NJ        | 07/07/94 | A Ciaramella  | Sandy Hook, NJ           | 32   | 07/05/94 |
| 32                           | J Sullivan Jr. | Newburyport, MA       | 08/24/93 | D Auger       | Newburyport, MA          | 34   | 07/05/94 |
| 24                           | J Della Porta  | Nahant, MA            | 06/19/93 | V Steriti     | Nahant, MA               | 24   | 07/05/94 |
| 17                           | M Romano       | Kill Van Kull, NJ     | 09/25/93 | M Armstrong   | Kill Van Kull, NJ        |      | 07/05/94 |
| 34                           | F Heal         | Staten Is., NY        | 11/05/93 | J Vigorito    | Verrazano Brdg., NY      |      | 07/05/94 |
| 24                           | A Poreda       | Throgs Nk Bridge, NY  | 10/31/92 | R Singleton   | Coney Is., NY            | 24   | 07/06/94 |
| 34                           | G Keenan       | Shinnecock, NY        | 05/28/93 | D Anzalone    | Shinnecock Inlet, NY     | 36   | 07/06/94 |
| 37                           | E Wargo        | Westport, CT          | 10/06/92 | C Leighton    | Westbrook, CT            | 37   | 07/06/94 |
| 34                           | F Heal         | Staten Is., NY        | 11/16/93 | J Hendley     | Old Saybrook, CT         | 35   | 07/07/94 |
| 31                           | H Blazer       | Cape May, NJ          | 10/28/92 | A Verrancio   | Westport, MA             | 32   | 07/07/94 |
| 30                           | F Coronato     | West Bank Lt., NY     | 06/27/94 | J Mester      | West Bank Lt., NY        | 32   | 07/07/94 |
| 30                           | D Sowerby      | York Harbor, ME       | 06/28/94 | D Beetz       | York, ME                 |      | 07/07/94 |
| 28                           | W Perlman      | Atlantic Beach, NY    | 05/30/93 | B Longstreet  | Atlantic Beach, NY       | 28   | 07/07/94 |
| 20                           | R Litke        | Zachs Bay, NY         | 10/26/92 | J Segelken    | Wantagh, NY              | 24   | 07/07/94 |
| 26                           | L Richards     | Atlantic Beach, NY    | 07/14/93 | M Berger      | Atlantic Beach Brdg., NY | 28   | 07/07/94 |
| 21                           | R Wellman      | Shelter Is., NY       | 11/06/93 | M Dezzani     | Charlestown, RI          | 22   | 07/08/94 |
| 32                           | S Kellner      | Duck Pond Pt., NY     | 06/03/94 | J Herniciar   | Plum Is., NY             |      | 07/08/94 |
| 32                           | J Posh         | Watch Hill, RI        | 06/22/94 | L Rascoe      | Fishers Is., NY          | 32   | 07/08/94 |
| 36                           | J Della Porta  | Swampscott, MA        | 06/30/93 | G Sofronas    | Swampscott, MA           | 38   | 07/08/94 |
| 30                           | B Shillingford | Cape May, NJ          | 11/16/93 | R Lentz       | Newington, NH            | 33   | 07/08/94 |
| 35                           | C Ambrogio     | Stratford, CT         | 06/28/93 | D Battiparano | Stratford, CT            | 36   | 07/08/94 |

## Species

| Lgth                         | Tagger         | Place Tagged           | Date     | Recapturer    | Location                 | Lgth | Date     |
|------------------------------|----------------|------------------------|----------|---------------|--------------------------|------|----------|
| <b>Striped Bass (cont's)</b> |                |                        |          |               |                          |      |          |
| 25                           | D Mann         | Sow & Pigs, MA         | 08/06/93 | S Pietruska   | Vineyard Sound, MA       |      | 07/08/94 |
| 28                           | N DelPrato     | Boston, MA             | 07/02/94 | E Tero        | Nauset Beach, MA         |      | 07/09/94 |
| 26                           | S Penta        | Boston, MA             | 08/20/93 | R Conti       | Pt. Judith, RI           | 26   | 07/09/94 |
| 24                           | S Penta        | Boston, MA             | 08/20/93 | J Snow        | Rowley, MA               | 24   | 07/09/94 |
| 30                           | B Shillingford | Barnegat Inlet, NJ     | 06/08/93 | D Bycsek      | Belmar, NJ               | 34   | 07/09/94 |
| 34                           | R Paganini     | Far Rockaway, NY       | 07/21/93 | J Dotsey      | Rockaway, NY             | 35   | 07/09/94 |
| 27                           | G Dulka        | Ches. By Brg. Tun., VA | 11/25/92 | P St. Pierre  | Race Pt., MA             | 32   | 07/09/94 |
| 18                           | S Wisniewski   | Provincetown, MA       | 10/08/91 | J Ploss       | Manchester, MA           | 23   | 07/10/94 |
| 31                           | P Grippo       | Tobay Beach, NY        | 11/03/91 | J Clemenza    | Ellis Is., NY            | 36   | 07/10/94 |
| 39                           | F Norton       | Kennebec R., ME        | 06/24/94 | G White       | Piscataqua R., NH        | 40   | 07/10/94 |
| 19                           | T Hodun        | Bridgeport, CT         | 05/16/92 | H Olsen       | Bridgeport, CT           | 24   | 07/10/94 |
| 21                           | T Rinaldi      | Rocky Pt., NY          | 11/28/93 | A Schweithelm | Fort Salonga, NY         | 20   | 07/10/94 |
| 15                           | G Keenan       | Shinnecock Bay, NY     | 05/16/94 | D Browne      | Shinnecock Bay, NY       | 22   | 07/10/94 |
| 22                           | T Pretakiewicz | Mattituck, NY          | 06/20/91 | C Rhodes      | Old Saybrook, CT         | 27   | 07/10/94 |
| 22                           | S Fontoella    | Normandy Beach, NJ     | 12/12/91 | J Ward        | Montauk Pt., NY          | 22   | 07/10/94 |
| 31                           | F Coronato     | Staten Island, NY      | 06/01/94 | C Burnett     | Shinnecock Inlet, NY     |      | 07/10/94 |
| 34                           | S Maguire      | Newburyport, MA        | 09/02/93 | K Reidl       | Ipswich, MA              | 34   | 07/11/94 |
| 17                           | N Harper       | Mullica River, NJ      | 11/15/91 | W Fitzgerald  | Tin Can Grounds, NY      | 30   | 07/11/94 |
| 29                           | F Ryan         | Stamford, CT           | 07/13/93 | F Stunkel     | Stamford, CT             | 31   | 07/11/94 |
| 26                           | S North        | Coney Is., NY          | 11/21/93 | M McInerney   | Moriches Inlet, NY       | 33   | 07/11/94 |
| 26                           | T Lynch        | Stamford, CT           | 08/03/93 | S Horvath     | Greenwich, CT            | 30   | 07/11/94 |
| 31                           | P Grippo       | Tobay Beach, NY        | 10/23/93 | P Schrader    | Eatons Neck, NY          | 34   | 07/11/94 |
| 34                           | J Mester       | Staten Island, NY      | 11/15/93 | P Minafo Jr.  | Brighton Beach, NY       |      | 07/12/94 |
| 26                           | D Mann         | Quick's Hole, MA       | 08/06/93 | J McAfee      | Quick's Hole, MA         | 29   | 07/12/94 |
| 34                           | B Billerman    | Newburyport, MA        | 07/29/92 | G Kutzelman   | Salisbury, MA            | 38   | 07/12/94 |
| 26                           | J McAfee Jr.   | Quick's Hole, MA       | 06/18/94 | J Baron       | Sow & Pigs Reef, MA      |      | 07/12/94 |
| 25                           | C Payne        | Boston, MA             | 06/19/94 | M Blaisdell   | Wells Harbor, ME         | 26   | 07/13/94 |
| 32                           | F Casey        | Boston, MA             | 07/06/94 | J Lindberg    | Boston, MA               |      | 07/13/94 |
| 35                           | B Shillingford | Cape May, NJ           | 11/16/93 | A Whittet     | Monomoy Rips, MA         |      | 07/13/94 |
| 26                           | D Mann         | Quick's Hole, MA       | 07/24/93 | J Donovan     | Quick's Hole, MA         | 30   | 07/13/94 |
| 28                           | A Schweithelm  | Northport, NY          | 09/15/93 | J Marino      | Greenwich, CT            | 31   | 07/13/94 |
| 30                           | B Finke        | Stamford, CT           | 07/14/93 | L Senecal     | Stamford, CT             | 33   | 07/13/94 |
| 30                           | B Shillingford | Cape May, NJ           | 11/16/93 | D Stuart      | Portsmouth, NH           | 33   | 07/14/94 |
| 39                           | G Keenan       | Shinnecock Inlet, NY   | 06/21/94 | R Zambrzycki  | Hampton Bays, NY         | 39   | 07/14/94 |
| 19                           | J Andia        | Highlands Brdg., NJ    | 05/09/93 | W Fitzgerald  | Sandy Hook, NJ           | 26   | 07/14/94 |
| 33                           | J Della Porta  | Swampscott, MA         | 09/10/90 | R Whitten     | Swampscott, MA           | 41   | 07/15/94 |
| 28                           | A Anderson     | Block Is., RI          | 06/21/94 | P Parent      | The Race, L.I. Sound     | 28   | 07/15/94 |
| 37                           | F Heal         | Staten Island, NY      | 05/06/94 | T Jackson     | Wiscasset, ME            |      | 07/15/94 |
| 22                           | O Van Helmond  | Riverhead, NY          | 11/02/93 | T Ford        | Guilford, CT             | 23   | 07/15/94 |
| 31                           | D Kelly        | Orient Pt., NY         | 07/08/92 | C Carlson     | Orient Pt., NY           | 35   | 07/15/94 |
| 17                           | T Marburger    | Northport, NY          | 03/08/94 | J Court       | Kennebunk, ME            | 18   | 07/15/94 |
| 29                           | F Heal         | Staten Island, NY      | 07/06/93 | D Ambrico     | Statue of Liberty, NY    |      | 07/15/94 |
| 30                           | A Anderson     | Pt. Judith, RI         | 10/25/91 | P Westcott    | Offshr., Charlestown, RI | 30   | 07/15/94 |
| 29                           | D Kelly        | Orient Pt., NY         | 08/01/93 | C Carlson     | Orient Pt., NY           | 33   | 07/15/94 |
| 23                           | S Radossi      | Liberty State Park, NJ | 11/17/91 | D Ambrico     | Statue of Liberty, NY    |      | 07/15/94 |
| 22                           | R Wellman      | Mulford Pt., NY        | 08/14/93 | R Jacobs      | E. Marion, NY            |      | 07/15/94 |
| 33                           | R Fink         | Rockaway, NY           | 06/18/93 | J Taylor      | Jones Inlet, NY          | 35   | 07/16/94 |
| 25                           | J Pemberton    | Sandy Hook, NJ         | 11/16/93 | C King        | Middletown, RI           |      | 07/16/94 |
| 32                           | J McAfee       | Quick's Hole, MA       | 07/04/94 | J Garant      | Pawtucket, RI            |      | 07/16/94 |
| 21                           | C Payne        | Boston, MA             | 08/10/92 | J Hubert      | Boston, MA               | 25   | 07/16/94 |
| 26                           | J Karolides    | Danvers, MA            | 07/26/93 | D Tsoutsouris | Danvers R., MA           | 31   | 07/16/94 |
| 36                           | F Casey        | Boston Harbor, MA      | 06/21/94 | W Plekan      | Nauset Beach, MA         | 38   | 07/16/94 |
| 20                           | D Partusch     | Shrewsbury River, NJ   | 05/02/92 | R Kurau       | Lattingtown, NY          | 25   | 07/16/94 |
| 14                           | G Blank        | Piermont, NY           | 04/24/94 | A Snurkowski  | Niantic, CT              | 18   | 07/16/94 |
| 28                           | J McAfee       | Quick's Hole, MA       | 07/04/94 | J Kenep       | Cultyhunk, MA            | 31   | 07/16/94 |
| 32                           | R Cingolani    | Quick's Hole, MA       | 06/05/94 | D Gill        | Sow & Pigs Reef, MA      | 34   | 07/16/94 |
| 27                           | D Mann         | Sow & Pigs, MA         | 08/22/93 | S Abdow       | Sow & Pigs, MA           | 29   | 07/16/94 |
| 28                           | S Jakubowski   | Verrazano Brdg., NY    | 11/04/92 | J Foti        | Ft. Wadsworth, NY        | 29   | 07/16/94 |
| 27                           | P Sowerby      | York Beach, ME         | 08/08/93 | J Amero       | Gloucester, MA           |      | 07/16/94 |
| 31                           | S Celona Jr.   | Boston, MA             | 05/23/93 | J Brilliant   | Boston, MA               | 35   | 07/16/94 |
| 34                           | H Laufgraben   | Hempstead, NY          | 06/26/94 | E Gallagher   | Huntington, NY           | 35   | 07/17/94 |

**Species**

| Lgth                         | Tagger         | Place Tagged           | Date     | Recapturer      | Location                  | Lgth | Date     |
|------------------------------|----------------|------------------------|----------|-----------------|---------------------------|------|----------|
| <b>Striped Bass (cont'd)</b> |                |                        |          |                 |                           |      |          |
| 26                           | F Strmiska     | Fishers Is., NY        | 07/25/93 | E Hanlon        | Hull, MA                  |      | 07/17/94 |
| 26                           | J Mester       | Staten Island, NY      | 07/08/87 | M Bosley        | Massachusetts waters      | 39   | 07/17/94 |
| 31                           | D Mann         | Sow & Pigs, MA         | 08/22/93 | T O'Leary       | Sow & Pigs, MA            | 32   | 07/17/94 |
| 23                           | W Swartz III   | Cape Cod, MA           | 10/08/92 | D Payne         | Boston, MA                | 24   | 07/17/94 |
| 32                           | F Heal         | Staten Island, NY      | 06/30/93 | M Napalitano    | Hoffman Is., NY           | 32   | 07/17/94 |
| 31                           | F Tenore Jr.   | Sandy Hook, NJ         | 05/28/94 | K Hunt          | Montauk Pt., NY           | 32   | 07/17/94 |
| 30                           | L Molnar       | Shinnecock Inlet, NY   | 06/27/94 | P Governale     | Shinnecock Inlet, NY      |      | 07/17/94 |
| 30                           | A Marsello     | Cape Cod Canal, MA     | 06/26/94 | R Bass          | Cape Cod Canal, MA        | 31   | 07/18/94 |
| 30                           | P Mikoleski    | Eaton's Neck, NY       | 07/08/91 | J Cooper        | Huntington, NY            | 34   | 07/18/94 |
| 30                           | S Cea          | U.N., East R., NY      | 08/30/94 | D Ambrico       | Statue of Liberty, NY     |      | 07/18/94 |
| 17                           | D Hawkins      | Smithtown, NY          | 07/07/93 | D Ghosio        | Stony Brook, NY           | 20   | 07/18/94 |
| 35                           | F Coronato     | West Bank Lt., NY      | 10/30/93 | A Bencivenga    | Flynn's Knoll, NJ         | 35   | 07/18/94 |
| 33                           | F Stunkel      | Stamford, CT           | 06/04/94 | T Biros         | Stratford, CT             | 34   | 07/19/94 |
| 30                           | R Granfield    | Nauset Beach, MA       | 09/10/93 | D Ambrico       | Statue of Liberty, NY     |      | 07/19/94 |
| 26                           | G Ottavio      | Cape May, NJ           | 11/22/92 | M Kieron        | Cuttyhunk Is., MA         | 30   | 07/19/94 |
| 33                           | S Maguire      | Newburyport, MA        | 06/30/93 | M Giusto        | Ipswich, MA               | 36   | 07/20/94 |
| 34                           | D Kelly        | Orient Pt., NY         | 06/15/92 | D Clark         | Plum Gut, NY              |      | 07/20/94 |
| 27                           | S Kellner      | Montauk Pt., NY        | 10/31/90 | J Correia       | Gloucester, MA            | 28   | 07/21/94 |
| 19                           | A Schweithelm  | Northport, NY          | 03/26/94 | J Glowa Sr.     | Kennebec R., ME           |      | 07/21/94 |
| 30                           | A Dangelo      | Charlestown, RI        | 11/19/93 | B Humphrey      | Freeport, ME              | 33   | 07/21/94 |
| 33                           | J Caputo       | Hart Is., NY           | 06/26/94 | B Sloat         | Execution Lt., L.I. Sound | 34   | 07/21/94 |
| 18                           | D Zurheide     | Ellis Is., NY          | 07/03/94 | D Ambrico       | Statue of Liberty, NY     |      | 07/22/94 |
| 34                           | F Coronato     | Old Orohard Lt., NY    | 06/17/94 | N Auriti        | Sandy Hook, NJ            |      | 07/22/94 |
| 27                           | P Bombino      | Verrazano Brdg., NY    | 07/19/94 | D Ambrico       | Statue of Liberty, NY     |      | 07/22/94 |
| 23                           | J Conti        | Boston, MA             | 07/10/94 | J Conti         | Winthrop, MA              | 23   | 07/23/94 |
| 48                           | M Favale       | Provincetown, MA       | 08/21/92 | B Flaherty      | N. Eastham, MA            | 50   | 07/23/94 |
| 24                           | C Matuzek      | Plymouth Bay, MA       | 06/04/94 | B Nelson        | Kingston, MA              | 27   | 07/24/94 |
| 25                           | A Anderson     | Block Is., RI          | 06/11/94 | A Dangelo       | Block Is., RI             | 25   | 07/24/94 |
| 27                           | A Anderson     | Block Is., RI          | 06/20/94 | A Dangelo       | Block Is., RI             | 28   | 07/24/94 |
| 18                           | B Wilkins      | Plum Is., MA           | 10/09/93 | B Caron         | Merrimack R., MA          |      | 07/24/94 |
| 30                           | J Karolides    | Danvers, MA            | 10/09/93 | J Scimemi       | Danvers, MA               | 33   | 07/24/94 |
| 19                           | J Karolides    | Danvers, MA            | 08/13/93 | J Scimemi       | Danvers, MA               |      | 07/24/94 |
| 23                           | K Gleason      | Greenwich, CT          | 11/09/93 | J Payne         | Marblehead, MA            | 25   | 07/24/94 |
| 27                           | K Engstrand    | Cape Cod Canal, MA     | 08/23/93 | R I Hopwood Jr. | Buzzard's Bay, MA         |      | 07/24/94 |
| 34                           | B Shillingford | Cape May, NJ           | 11/15/93 | J Szekely       | Montauk, NY               |      | 07/24/94 |
| 20                           | R Wellman      | Riverhead, NY          | 11/09/93 | R Onderdonk     | Stonington, CT            | 22   | 07/24/94 |
| 29                           | G Kerkhan      | Raritan Bay, NJ        | 11/13/93 | D Ambrico       | Statue of Liberty, NY     |      | 07/24/94 |
| 26                           | M Roberts      | Spring Lake, NJ        | 10/15/90 | D Ambrico       | Statue of Liberty, NY     |      | 07/24/94 |
| 28                           | F Heal         | Staten Island, NY      | 10/06/93 | R Soto          | Hudson R., NJ             | 38   | 07/25/94 |
| 34                           | J Karolides    | Beverly, MA            | 08/21/93 | S Gray          | Beverly, MA               | 37   | 07/25/94 |
| 25                           | J Murphy       | Shrewsbury R., NJ      | 05/11/94 | R Stearns       | Lynn Harbor, MA           | 30   | 07/25/94 |
| 36                           | C Pumphrey     | Great Egg Inlet, NJ    | 10/15/93 | V Richardson    | Monomy Pt., MA            | 38   | 07/26/94 |
| 18                           | K Black        | Merrimack River, MA    | 06/02/91 | D Scott         | Newburyport, MA           | 25   | 07/26/94 |
| 15                           | E Koeniger     | E. Greenwich, RI       | 06/10/94 | J White         | E. Greenwich, CT          | 15   | 07/27/94 |
| 24                           | K Conway       | Hull, MA               | 05/28/94 | J Paquette      | Weir R., MA               | 25   | 07/27/94 |
| 28                           | T Pendyk       | Verrazano Brdg., NY    | 10/20/92 | P Orefice       | Verrazano Brdg., NY       |      | 07/27/94 |
| 29                           | B Billerman    | Newburyport, MA        | 07/29/92 | C Wickers       | Newburyport, MA           | 34   | 07/29/94 |
| 28                           | M Behl         | Pt. Judith, RI         | 06/24/94 | T Fetherston    | Pt. Judith, RI            | 34   | 07/29/94 |
| 34                           | F Strmiska     | Fishers Is., NY        | 07/12/94 | M DiCocco       | Watch Hill, RI            |      | 07/30/94 |
| 17                           | J Karolides    | Beverly, MA            | 06/03/94 | J Karolides     | Beverly, MA               | 17   | 07/30/94 |
| 32                           | D Mann         | Quick's Hole, MA       | 07/24/93 | K Callahan      | Quick's Hole, MA          | 32   | 07/30/94 |
| 27                           | D Mann         | Quick's Hole, MA       | 07/17/94 | J McAfee        | Quick's Hole, MA          | 28   | 07/30/94 |
| 18                           | D Hopkinson    | Barnegat Bay, NJ       | 09/22/93 | C English Jr.   | Barnegat Inlet, NJ        | 24   | 07/30/94 |
| 18                           | R Mahoney      | Cape Cod Canal, MA     | 08/11/90 | B Joyce         | Cape Cod Bay, MA          | 30   | 07/31/94 |
| 27                           | F Strmiska     | Fishers Is., NY        | 07/12/94 | F Dyer          | Watch Hill, RI            | 27   | 07/31/94 |
| 20                           | M Berger       | Atlantic Bch Brdg., NY | 07/30/94 | M Hayden        | Atlantic Beach Brdg., NY  | 21   | 07/31/94 |

**Weakfish**

|    |           |                  |          |           |                  |    |          |
|----|-----------|------------------|----------|-----------|------------------|----|----------|
| 17 | G Ottavio | Cape May Pt., NJ | 07/06/94 | G Ottavio | Cape May Pt., NJ | 17 | 07/18/94 |
|----|-----------|------------------|----------|-----------|------------------|----|----------|



## A TON OF TERRAPINS

by D.W. BENNETT

On May 13, 1995, during a day of bird counting and watching on Sandy Hook, a barrier spit at the northern end of New Jersey, several of us sighted a dense collection of diamondback terrapins (*Malaclemys terrapin*) in the water and pulled out on a sandy beach. We estimated the number at around 400, about 300 of those in the water with just their heads showing.

In the water, the turtles were concentrated in the quiet waters at the north end of Spermaceti Cove, a shallow three-acre cove (average 2-5 feet) hemmed in on the north, east, and south by sandy mudflats, with a sand spit and a sand island on the west. The 100 or so hauled up were on the sand spit; they ducked back into the water as the tide rose.

It was a sunny day, 70°F, almost windless. We estimate the water temperature at about 55°F. It was 4:00 P.M., two hours into flood tide.

Diamondbacks range from Cape Cod south to Texas. They are the only true estuarine turtle of the east coast, usually

*BENNETT is the Executive Director of the American Littoral Society and an avid beach-watcher.*



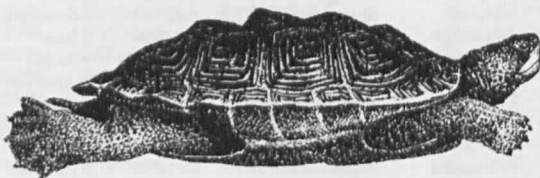
## LANDLUBBER FLUKING

by STEPHEN C. SAUTNER

Surfcasters and shoreline anglers should take note that throughout the summer and early fall, there's an overlooked species prowling Mid-Atlantic estuaries, jetties, and tide-rips that readily grabs bucktails, spoons, and plugs. It's the familiar fluke, or

*SAUTNER, a staff member of Clean Ocean Action, is an ardent fisherman and regular contributor to the UN.*

coming ashore to lay eggs on Sandy Hook late May through June. Eggs can hatch and hatchlings head back to water in the fall, or, if laid late in the season, they can winter over in the nest and dig free and enter the water the following



spring. They feed on green shoots, mollusks, insects, crustaceans, and carrion (and I have caught them on bait while fishing for fluke with squid). They can live 20 years.

Locally, diamondbacks are losing habitat to development, and, particularly in southern New Jersey, are often run over by cars on coastal highways.

We suspect that the diamondbacks we observed had recently come out of the winter mud and were cruising for mates or building up heat from the afternoon sun.

My apologies to Hannah (Words) Johnson, who used to edit these pages. She reported a similar observation several years ago, but was belittled by another field observer (me). She was correct in every respect.

summer flounder, and while drifting sea-robin belly or killies 'n squid will often put more fish in the cooler, shoreline casting with lures makes for more interesting and fun angling.

Remember, fluke are aggressive predators, and will often feed throughout the water column, sometimes even boiling at the surface in pursuit of prey. This means that the right lure in the right place

will often result in a slashing strike from a fired-up flounder.

Look for fluke in the same places you would find striped bass—shoreline rips, drop-offs, or jetties near deeper water. Concentrations of baitfish, especially spearing, sand-eels, bay anchovy (rain-fish), or snappers are a definite plus. Fish around high tide, since that's generally when flounder will feed closest to shore. The perfect spot might be a sandy point where a flowing tide washes baitfish over a steep drop-off.

Other spots which can hold good numbers of fluke include the deep water around marinas where schools of baitfish often congregate. I once watched an angler standing on a dock flipping a bucktail under a tied-up party boat, and pulling in pound-and-a-half fluke on every other cast. The boat was filled with confused-looking fishermen who just paid 25 dollars each to go fluke fishing offshore.

Good fluke lures include small bucktails and lead-head jigs up to an ounce, metal spoons, and diving plugs. The best colors are white or yellow, but chartreuse and even purple have worked for me. My all-time favorite fluke lure was a three-quarter ounce white marabou jig, which I found in a tackle shop a few years ago. There was something in the marabou's breathing and pulsating action that made fluke pounce on the lure repeatedly. After finally losing it to a bluefish, I returned to the shop to stock-up, only to find that the company no longer made that particular lure. I haven't seen them since, but I keep a 20-dollar bill in my wallet at all times just in case I do.

Tackle should be kept as light as possible, since you'll be throwing relatively light lures, and, for the most part, shoreline fluke will run under two pounds. A six or seven foot light spinning or casting rod spooled with eight or ten pound line is just right.

There are two ways to work a shoreline for fluke. The first is to simply cast out, let the lure settle just off the bottom, then retrieve it steadily. This method catches

lots of fluke and is great for beginning anglers.

However, the second technique produces more fish; it's just harder to master. Cast the lure out, but as it falls to the bottom, maintain contact by raising the rod tip. As soon as you feel the lure tap the bottom, reel a few turns, then lift again, following it back down with the rod, and repeating for the whole retrieve. Your lure should take two to four seconds to touch bottom. If it takes less, you're either using too heavy a lure, or aren't lifting enough. If it takes more, the opposite is true.

Unlike most jigging techniques where 90 percent of the fish will hit as the lure drops, most fluke will hit on the lift. The strikes are hard to describe. Sometimes as you lift, the fluke will suddenly just be on the line, while other times you can feel a dull thud as the fish grabs the jig as it rises.

Whichever technique you choose, keep a sharp eye out for fluke following the lure and lashing out just before you lift it from the water. Be ready to loosen your drag, or you'll break the fish off as it tries to run on a short line. If the fish misses, flip the lure out a few feet, and often it will hit on the second cast. One thing you'll find out right away is that given the right tackle, fluke are great fighters, with lots of short, fast runs, and rapid head shakes.

The bonus to this type of fishing is that you'll never know what else you might catch. Expect plenty of hard-fighting sea robins (which are also good to eat), windowpane flounder, and occasional bluefish and striped bass. Two years ago I hooked a large fish while casting a lime-green bucktail from a rocky wall. It ran about twenty yards at medium speed then stopped and shook its head. I pumped it to the surface, and just as I thought I saw a flash of silvery purple, the hook pulled and it was gone. I'm almost convinced it was a weakfish of about eight pounds, but I'll never know for sure. Maybe it was an enormous fluke, purple with rage that I fooled it.

## Book Reviews

### **OCEAN PLANET: WRITINGS AND IMAGES OF THE SEA**

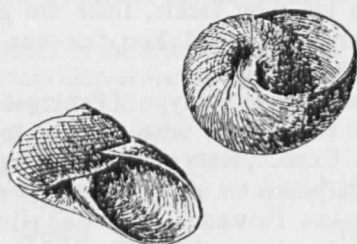
with writing by PETER BENCHLEY  
and editing by JUDITH GRADWOHL

Harry N. Abrams, New York, NY.  
187 p. \$39.95 (hardcover).

This anthology comes out on the 25th anniversary of Earth Day, timed to coincide with Smithsonian's Planet Ocean exhibit which will tour the country. Collected here are select writings from such authors as Rachel Carson, John McPhee, William Beebe, Tom Horton, and Farley Mowat. Benchley introduces each chapter with a short note and there are hundreds of good color photos.

The topics covered are: Visions of the Sea, Seafarers, Discovery, and Oceans in Peril. Each includes well chosen excerpts (Peter Matthiessen's *MEN'S LIVES* is represented in the Seafarer's section) along with good illustrations of commercial fishing and sea voyagers and voyages.

There is a good sea taste here; a worthy collection to whet the ocean appetite.



### **SHELLS OF THE ATLANTIC AND GULF COASTS AND THE WEST INDIES**

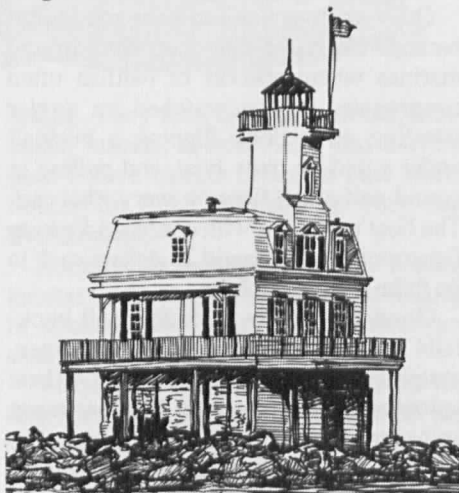
by R. TUCKER ABBOTT  
and PERCY A. MORRIS

Houghton Mifflin, New York, NY.  
307 p. \$16.95 (paper).

Here is the fourth edition of the Peterson Field Guide to shells, up to date, accurate, with new color illustrations,

covering Laborador to Texas. Included is a caution to collectors: don't decimate a species to stock your shelves.

A typically good Peterson guide with a thorough introduction as well as sketches and descriptions to help the shell person to tell one from another. An interesting footnote to the squid section: the book says that both long-finned and short-finned squid are caught commercially off New England for bait. Recently, both species have become prime targets for the dinner table.



### **NEW YORK AND NEW JERSEY: COASTAL ADVENTURES**

by BETSY FRAWLEY HAGGERTY

Country Roads Press, Castine, ME.  
173 p. \$9.95 (paper).

A good, detailed compendium of places to see and things to do along the water's edges of New York and New Jersey. Included are suggestions for kayak trips, sailboat jaunts, overnight and day hikes and stays, mostly on beaches or in and near interesting shore towns. Plenty of names, addresses and phone numbers, good directions, and details about what to expect.

Want a quibble? There's a picture of a stud and his babe on a jetski on page 87. It all depends, one guesses, on the definition of "coastal adventure." So please ignore that page and benefit from all the other good stuff.





## LIGHT IN THE SEA

by DAVID DOUBILET

Thomasson-Grant, Charlottesville, VA.

168 p. \$39.95 (paper).

**LIGHT IN THE SEA**, David Doubilet's long awaited first book, presents the best images of one of the world's foremost underwater photographers. Since 1971, Doubilet has explored oceans for *National Geographic*, photographing scenes stranger than anything above water: the savage courtship dance of reef sharks, the coral encrusted wreck of a sunken B-17, the eight-foot claw span of a 50-year-old crab.

Doubilet's photos are awe-inspiring. Not only does he capture these amazing images on film, but he vividly narrates his experiences at each site. Readers will immediately feel the urge to call their travel agents and book that trip of a lifetime. Highly recommended. AML

## PERSPECTIVE ON FINFISHERIES IN SOUTHERN NEW ENGLAND

by GEORGE C. MATTHIESSEN

The Sounds Conservancy,

Box 266, Essex, CT 06426

44 p. \$10 (paper).

With this monograph, The Sounds Conservancy adds to its string of short, useful publications about the coastal waters of eastern Long Island Sound and the waters off Rhode Island and southern Massachusetts. Covered are some 25

valuable commercial and recreational fishes (and their forage) with information on life histories, habitats, landing data, and population trends.

The stress is on the value of shallow water habitat to fish and fisheries, and the need to manage living resources better. Earlier publications have dealt with sea level rise, storms, shellfish, and intertidal flats. Good works all.

## SHALLOW WATER DICTIONARY: A GROUNDING IN ESTUARY ENGLISH

by JOHN R. STILGOE

Princeton Architectural Press,  
New York, NY.

43 p. \$11.95 (paper).

**SHALLOW WATER DICTIONARY** celebrates the richness of our vernacular language, and at the same time, explores the demise of words which are vital to understanding our estuaries, marshes and shallow water regions.

These lands, once the primary landscape of America, now face both physical and linguistic destruction. Stilgoe's examination of the original meanings of words such as "skiff", "creek" and "chartreuse" provide readers with thought-provoking insights to our language and leave them with the unanswered question: How can we accurately and usefully describe a landscape which lacks modern day vocabulary?

PSB

## *On Green Pond*

We can tell when it's summertime partly because of the number of "green pond" phone calls we get, plaintive calls for help because the local waterbody has suddenly turned green and slimy. Herein, a brief summary of the illness — its causes and cures.

Most green ponds are caused by green lawns; the process is called eutrophication. A natural, healthy pond will go through periods of clear and cloudy water depending on season and rainfall. When nutrients — primarily nitrogen and phosphorous — wash into a pond, they fertilize both the planktonic and attached algae, which bloom and can cause cloudy and weedy water conditions. That's usually not a serious problem. But when the pond gets too much nutrient, the algae can get out of hand. In severe cases, the pond is covered by a green mat of algae and the water stays cloudy. A combination of still water, sun, and nutrients usually means trouble.

The quick, dirty, and unsound cure is a good dose of copper sulfate. This clears the pond of algae but takes most living things with it. Often every fish in the pond turns belly up because the copper sulfate cure deprives the water of its dissolved oxygen.

Since the major source of nutrients is lawn fertilizer, a more sensible approach is to keep these nutrients from getting to the pond. This, however, strikes at the heart of one of Americans' fondest aims — a lush, green lawn. We are prone to pound our lawns with fertilizer and water all summer, mostly, it seems, to out-green our neighbors. Most lawn fertilizer washes off the lawn during watering or rainstorms and heads for the nearest receiving water — a pond or stream. Result: Green Pond.

The best long-term steps to healthy ponds are: (1) convince homeowners that green summer lawns are unnecessary and make no ecological sense, (2) steer stormwater runoff into the ground, not across it to ponds and streams, and (3) replant lawns, especially those that discharge directly to storm drains, with native vegetation that does not demand fertilizer and water.

Or, if you must have a lawn, let it turn brown during the heat and drought of summer. It's not dead, just resting till fall. Another benefit: brown lawns needn't be mowed.

Estuaries react somewhat like ponds, often suffering from nutrient overload. This brings on dense algae blooms, the red, green, or brown tides that disrupt oxygen levels, and, generally, goof up the system. Best advice: wean your pond or estuary away from too many nutrients.

D.W. Bennett

*Continued from inside front cover*

peregrine falcons, Sika deer and wild ponies.  
Lots of walking.

COST: \$210 covers three nights motel lodging, guides, films and lectures, safari bus tour and an "all-you-can-eat" seafood buffet on Saturday night.

**November 11  
OYSTER/FOSSIL DIVE  
CHESAPEAKE BAY, MARYLAND**

A day of fall diving near Calvert Cliffs for fossils and oysters. Interesting diving followed by a beach cookout.

COST: \$20 per person covers guides and refreshments. Diver certification is required.

## ***Sneak Preview...Field Trips 1996***

**February 22 - 28, 1996**

### **SHARKS IN BIMINI**

Escape for five full days to the Bahamas where we will come in close personal contact with some of the most magnificent creatures in the sea - the Requiem sharks. Swim safely with these sharks in their own environment and go on field trips to catch, tag and release large tiger and lemon sharks. World renowned shark biologists Drs. Samuel Gruber and Erich Ritter will debunk the myths about sharks through a series of illustrated lectures and videos. Participants must be able to snorkel.

COST: \$895 covers lodging at the Bimini Biological Field Station, lectures, field and

snorkel trips, meals, and airfare(Ft. Lauderdale - Bimini, roundtrip), taxes and transfers.

### **April 25 - May 2 BELIZE ECOLOGY WEEK**

Join trained guides to explore the second largest barrier coral reef in the world, the rainforest, and Mayan ruins. Explore eight days of intriguing diversity, including five days on Caye Caulker where you'll experience spectacular snorkeling, ecology lectures, and tours by a marine biologist.

COST: \$1200 covers guides, ground and marine transportation, most meals, lodging (double occupancy) and lectures.

## **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.

### **NEW JERSEY**

Highlands, NJ 07732  
908-291-0055

### **NY/NJ HARBOR BAYKEEPER**

Highlands, NJ 07732  
908-291-0176

### **NEW YORK**

28 West 9th Road  
Broad Channel, NY 11693  
718-634-6467

### **DELAWARE RIVERKEEPER**

P.O. Box 753, Lambertville, NJ 08530  
609-397-4410

### **SOUTH ATLANTIC/ GULF COAST**

Box 3828, Sarasota, FL 34230  
813-951-0884

### **SOUTHEASTERN FLORIDA**

7601 S.W. 134 Avenue, Miami, FL 33183  
305-385-6880

### **PROJECT REEFKEEPER**

2809 Bird Ave., Suite 162, Miami, FL 33133  
305-858-4980

### **CAPE FLORIDA PROJECT An Ecological Restoration**

1200 South Crandon Blvd.  
Key Biscayne, FL 33149  
305-667-4166

### **WESTERN REGION**

P.O. Box 6048, Olympia, WA 98502  
206-754-1417

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