

Healthy estuary faces crippling assaults

By Kevin Lollar

klollar@news-press.com

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ESTUARY FACTS

Estuary - the word itself might be a little vague to some, a word that's somewhat familiar, possibly learned in a high school ecology class, but whose meaning is not quite clear. Simply put, an estuary is a semienclosed body of water where salt water from the sea mixes with fresh water from the land. But nothing is simple about the many functions of an estuary - they are among the most productive habitats on Earth. Among the functions of Southwest Florida's estuaries.

* Fish and shellfish:

Some 95 percent of the Gulf of Mexico's commercial and recreational fish and shellfish spend part or all of their lives in estuaries. Red mangrove prop roots and seagrasses serve as nursery grounds for many fish and crustaceans that move offshore as adults. Spotted sea trout, Florida's most popular inshore game fish, spend their entire lives in estuaries. Mote Marine Laboratory has documented that 11 shark species use Charlotte Harbor as a nursery ground.

* Birds:

Area estuaries provide feeding, breeding and roosting grounds for many species, including wood storks, roseate spoonbills, ospreys, white ibis, great blue, little blue and tricolored herons, snowy egrets, American oyster catchers and bald eagles. Migratory birds use estuaries as stopover or wintering sites.

* Neither fish nor fowl:

Bottlenose dolphins, threatened and endangered sea turtles, endangered manatees and endangered American crocodiles live or spend time in area estuaries.

* Water quality:

Filter feeders such as oysters, mussels, barnacles and sea squirts remove organic matter from the water before it moves into the Gulf with the tide.

* Protection. Coastal mangroves protect developed areas from hurricane storm surge:

Filipino scientist J.H. Primavera of the Southeast Asian Fisheries Development Center published a paper in which he credits the extensive mangrove forests of the Indonesian island of Pulau Seumpelu with saving thousands of lives during the Dec. 26, 2004, Indian Ocean tsunami. Only about 100 of the island's 60,000 residents died in the tsunami, while islands where mangroves have been replaced by development suffered horrendous loss of life. Mangroves also stabilize the shoreline and prevent erosion.

* Seafood:

Although the commercial inshore fishery is not nearly as robust as it was before Florida's net limitation went into effect July 1, 1995, legal net fishermen still target finfish in local estuaries. Inshore shrimpers, crabbers and clam farmers also add to the Southwest Florida seafood smorgasbord.

* Recreation.

Local estuaries are a magnet for boaters, fishermen, sunbathers, sightseers, picnickers, bird watchers and windsurfers.

TROUBLED ESTUARIES

In June 2003, the 18-member Pew Ocean Commission, made up of scientists, commercial fishermen, politicians, philanthropists and educators, released a report on the health of the world's oceans.

Concerning estuaries, the report states:

"Coastal development and associated sprawl destroy and endanger coastal wetlands and estuaries that serve as nurseries for many valuable fishery species. More than 20,000 acres of these sensitive habitats disappear each year. Paved surfaces have created expressways for oil, grease, and toxic pollutants into coastal waters. Every eight months, nearly 11 million gallons of oil run off our streets and driveways into our waters – the equivalent of the Exxon Valdez oil spill. "Two-thirds of our estuaries and bays are either moderately or severely degraded by eutrophication (extremely high levels of nutrients). "The amount of nitrogen released into coastal waters along the Atlantic seaboard and the Gulf of Mexico from anthropogenic (caused by humans) sources has increased about fivefold since the preindustrial era and may increase another 30 percent by 2030 if current practices continue."

Etymology: "Estuary" comes from the Latin aestus, meaning "the tide"; aestus originally meant "a boiling" or "heat." Aestus is related to the Latin aestas, meaning "summer." In the first documented use in the English language, John Leland's "The Itinerary" (1538) describes "A greate sande with a shorte estuary into the lande."

First documented use of "estuary" as an adjective by a newspaper, the London Daily News, Oct. 7, 1884: "While the estuary fishermen have reaped a remunerative harvest, the rod men have had little or no fishing."

Dawn painted the horizon and the clear water of upper Pine Island Sound the hue of a medium-rare tuna steak.

The estuary was waking up.

Ibis, egrets and herons rose from healthy and hurricane-damaged mangroves; an osprey passed overhead with the day's first catch; mullet jumped and splashed; a redfish tail reflected the early morning light.

In the distance, an outboard motor whined as its propeller chopped through the bay's rich seagrass beds at low tide.

By popular opinion, and according to a recent Conservancy of Southwest Florida study, Pine Island Sound is the healthiest estuary in Lee County and the second-healthiest of 10 area estuaries.

But local estuaries, including Pine Island Sound, are under constant assault from nature and man - hurricanes, drought, flooding, red tide, pollution and habitat loss.

Most recently, lower Pine Island Sound has been in the news because heavy releases of nutrient-laden fresh water down the Caloosahatchee River from Lake Okeechobee has created a host of environmental problems.

If local estuaries die, much of what makes Southwest Florida desirable dies with them, as estuaries are the hydrological and biological linchpins of this and every coastal environment.

Casual observers might look at our estuaries and think they're doing fine, but natives who grew up before the onslaught of development say they've seen a steady degradation.

"Everything's gone to hell compared to when I was a boy," said Ralph Woodring, 69, who was born on Sanibel and runs a bait and tackle shop on Tarpon Bay. "When we were growing up, we ate every damn thing on the land and in the water. We ate rabbits, gophers (gopher tortoises), birds. Same with fish, any kind of fish you wanted: You could throw a cast net and catch all the fish you wanted. Now you see none or very few fish.

"There are too damn many people bringing pollution of every description, boats, fertilizer, septic tanks. The water situation has gone to hell."

Capt. Harvey Hamilton, 66, was born on Cayo Costa and watched the decay of local estuaries as a commercial fisherman and fishing guide.

"Thirty years ago, there were fish everywhere, redfish, snook, trout – it was astronomical," he said. "Now it's just beat down too bad. People are catching them too much.

"The boat traffic is out of this world. It's getting out of hand. It's hard to find a fishing spot anymore. And the seagrass is all chewed up with wheel tracks (boat propeller scars)."

Estuary strains

No habitat exists in isolation. Each, whether upland, wetland or estuary, is connected to other habitats, and what happens on one affects others. Much of what's wrong with local estuaries, and estuaries everywhere, starts on land.

"We live in watershed areas that drain into individual estuaries," said Jennifer Hecker, natural resource policy manager for the Conservancy of Southwest Florida. "The runoff from our yards goes into a swale, then to a canal or creek, and ends up in the estuary."

During the past 40 years, development in Southwest Florida has exploded.

From 1960 to 2000, Lee County's population jumped from 54,539 to 440,888.

Development has destroyed about 50 percent of Florida's wetlands – 30 percent in the Charlotte Harbor watershed, which includes Lee County.

Wetlands store water, and when those areas turn into homes and roads, that water has no place to go except the estuaries.

"In the natural system, because you have storage on the landscape, the water filters down to the estuary over time," said Greg Tolley, professor of marine science at Florida Gulf Coast University. "As you get more impervious surfaces, water runs to the estuary in bursts, which stresses marine animals and plants. That water also flushes nutrients into the estuary, which gives potential for algal blooms."

Water quality

No estuary can be productive without good water quality: the right range of salt levels, the right amount of nutrients, low bacteria and heavy metal levels.

Massive freshwater releases from Lake Okeechobee after Hurricane Wilma have been the biggest water-quality issue in years.

Nutrient-rich water from the lake caused huge macro- and micro-algal blooms, disrupted the fresh- and saltwater balance of the bay and changed the dynamics of estuarine life.

Probably, the most obvious effect is a dense mat of filamentous algae that covered hundreds of acres of seagrass in lower Pine Island Sound.

Lee County and the city of Sanibel threatened to sue the South Florida Water Management District and U.S. Army Corps of Engineers to get those agencies to stop the releases.

"It's been devastating," said Woodring, Tarpon Bay tackle shop owner. "There were no birds around here, no fish. The grass is definitely in bad shape. I'm talking right here in Tarpon Bay because it hits us right in the kisser."

Water quality in lower Pine Island has improved since massive releases from Lake Okeechobee were stopped. Water managers are working to get water levels low enough that massive releases won't be necessary during the next hurricane season.

Another water-quality controversy has been red tide.

Some environmentalists and scientists insist that nutrients from land cause blooms of the red tide organism. They also say red tides are occurring more often and lasting longer because more nutrients are pouring into local estuaries.

Other scientists, including Karen Steidinger, for whom the red tide organism (*Karenia brevis*) is named, say nutrients from the land do not cause red tide, that it forms well offshore, beyond any nutrient runoff.

Nutrient runoff might fuel red tide once it reaches an estuary, they say, but that scientific connection has not been made.

Nor is there evidence of more and longer outbreaks of red tide, some scientists say, but rather an "observer effect." That means increasing public awareness, monitoring and research might make red tides appear to be increasing.

Turbidity also can be a land-based problem: Rivers and creeks running into estuaries carry sediments that cloud the water and block sunlight, thus affecting the growth of sea grass.

Estero Bay is murky much of the time; turbidity in lower Pine Island Sound comes and goes with outflow from the Caloosahatchee River; upper Pine Island Sound is clear most of the time, depending more on winds than the effects of runoff.

"You get a south wind, and it gets muddy," said Hamilton, a commercial fisherman and fishing guide. "You get a north wind, it's clear."

A major issue for area estuaries is fecal bacteria, mostly from septic systems, said Hecker, with the Conservancy of Southwest Florida.

"One-third of the pollution in the United States is from septic systems," she said. "In this region, it's particularly difficult because we use septic with high groundwater and a proximity to coastal waters.

"For the most part, the degradation of our water is not from pollution sources such as industry, but from the byproducts of everyday living." Lee County's estuaries also are plagued by excess nutrients, low dissolved oxygen and pesticides.

Seagrasses

A key component of any estuary is seagrass, which provides food and habitat for a variety of organisms, including fish, shellfish, birds, turtles and manatees.

The most important seagrasses in Southwest Florida are turtle grass, shoal grass, manatee grass and eelgrass, which grows in the less salty water of tidal rivers and tributaries.

Eelgrass in the Caloosahatchee is suffering from a natural event, said Brad Robbins, director of Mote Marine Laboratory's Landscape Ecology Program.

During a drought in 1999 and 2000, salinity in the river was 27 parts per thousand - as much as five times more than eelgrass can stand. Eelgrass in the river was wiped out, Robbins said.

"It's struggling to make a comeback," he said. "It's present in the river, just not as robust as it used to be. (Eelgrass) grows to 4 feet long. We're getting 3 or 4 inches."

Scientists documented a 29 percent loss in Lee County's seagrasses between the 1940s and 1982. Since then, there have been no catastrophic losses, said Catherine Corbett, of the Charlotte Harbor National Estuary Project.

Most of the 29 percent is in southern Pine Island Sound, Matlacha Pass and San Carlos Bay.

"People have theorized that a lot of the loss was from dredging the Intracoastal Waterway and construction of the Sanibel Causeway island," Corbett said. "That not only piled spoil on seagrasses, it also suspended a lot of sediments in the water, which causes problems with light and clarity."

A seagrass mapping project indicates county seagrasses are relatively stable, Corbett said, but she has cause for concern.

With Southwest Florida going through a period of wetter weather and with development creating more impervious surface, increased stormwater runoff could increase turbidity.

Meanwhile, commercial fisherman Hamilton said seagrasses in northern Pine Island Sound are doing as well as they ever have, except for the prop scars, which can take 10 years to heal.

A recent state study for the Charlotte Harbor National Estuary Program documented 30,064 acres of prop scars in the greater Charlotte Harbor region.

Pine Island Sound had the most prop scarring with 11,618 acres, 38 percent of the total.

"Prop scars are a loss of habitat, and, clearly, if seagrass is important habitat, every time a prop goes through seagrass, it significantly alters that," said Steve Bortone, director of the Sanibel-Captiva Conservation Foundation Marine Laboratory. "One could also argue that prop scars almost serve as channels and increase erosion. One prop scar in itself is not a big deal, but when you have hundreds, that's a problem."

Mangroves

Mangroves are an important component of subtropical estuaries. Leaf litter from mangroves form the basis of the estuary's food chain, while red mangrove prop roots provide habitat for fish and filter-feeding mollusks and tunicates that filter algae from estuary water.

Above the water, mangroves are nesting and roosting places for coastal birds.

Lee County still has extensive mangrove forests - only the Ten Thousand Islands has more in Florida - in part because county officials fought to save mangroves in the 1970s, when many South Florida counties were tearing them out for development.

While mangroves can be a hedge against storms, major storms can do a number on them: The effects of Hurricane Charley still can be seen in thousands of acres of shattered and uprooted mangroves in Pine Island Sound.

Estuary

So, how healthy are Lee County's estuaries?

Rather than talk about health, it's better to talk about how well an estuary responds to challenges, said Ernie Estevez, director of Mote's Center for Coastal Ecology and coordinator of the Charlotte Harbor research project, a scientific look at every aspect of the harbor.

Charlotte Harbor, Estevez said, is "authentic." It still has large predators; the habitat is still complex (that is, it has many elements, including mangroves, seagrasses, surrounding wetlands); it hasn't been overloaded by nutrients and only a few areas have contaminant issues.

"Look at what humans do to the environment," Estevez said. "They kill the big predators, simplify the habitat, over-enrich the environment with nutrients, and contaminate the environment.

"To restore the system, you have to work backward: Decontaminate it, reduce nutrients, get the complexity back, and allow large predators to exist."

A relatively unaltered estuary responds to challenges better than one that has been significantly altered, or impaired.

"An impaired estuary doesn't have the toolbox to respond," Estevez said. "But Charlotte Harbor has a deep, robust capacity to respond to challenges."

That robust capacity doesn't mean that Lee County's and other area estuaries are in great shape.

Some area estuaries are doing better than others, but none is what it was 60 years ago.

For people such as Woodring, the degradation has been dramatic. "You get tears in your eyes thinking about it," the Cayo Costa native said. "It breaks your heart. The only way for it to get better is to get up on our hind legs and just raise hell."