

# Trolling for data

By Rich Eldred

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Not all the boats on Cape Cod Bay last summer were trolling for fish. Captain Marc Costa, of The Good Fortune, and his wife, Amy, trolled for data on behalf of the Provincetown Center for Coastal Studies.

"We never looked at nutrients before," said Amy Costa during a lecture Saturday afternoon at Snow Library in Orleans. "We've got temperature and salinity data going back 30 years."

Costa's talk was part of a series the library and center presented last month. She is originally from Georgia and started working at the Center for Coastal Studies in 2000. She remained associated with the center while studying for her Ph.D. at the University of Rhode Island. Now Costa is back full time.

Her co-investigator and husband Marc is an Orleans native and sometime Rock Harbor-based fisherman. His family owns Capt'n Elmer's Seafood Restaurant in Orleans.

The population of Barnstable County has jumped from 50,000 in 1940 to more than 220,000. That's led to an increase in nutrients, primarily nitrogen, flowing into Cape Cod Bay from septic systems, fertilizers, groundwater runoff and other sources.

Algae blooms are the result of increased nutrients, especially in smaller bays and harbors; this can result in the replacement of healthy, clean sand bottoms, covered with eelgrass by a shapeless ooze of decaying algal matter. Scallops, clams, crabs and bottom dwelling fish all become far less abundant.

"It's underwater and a lot of it you don't see until it's too late," Costa noted.

Provincetown Center for Coastal Studies launched the Cape Cod Bay Ocean Sanctuary and Monitoring Program to take the pulse of the bay and identify possible key sources of pollution.

"This will provide baseline data about nutrients inshore and offshore," Costa said.

In addition to sampling nitrogen and phosphorus levels, they recorded water temperature, salinity, clarity and the amount of dissolved oxygen. Next year they'll look at the level of chlorophyll (plant material).

"Every site was sampled twice a month – over two to three days a week," Costa explained. "We had two boats and we took over 1,500 water samples. The volunteers do it once a week."

Cape Cod Bay is large, at 615 square miles, but never deeper than 80 feet. The Costas sprinkled 40 stations around the bay including eight offshore sites and a string of inshore locations. Where the boats couldn't go, volunteers collected data from the shore.

The nine most western sample sites are in Duxbury Bay, at the mouth of Jones River, and in Plymouth Harbor. Cape Cod Canal, Sandwich Harbor, Scorton Creek, Barnstable Harbor, Sesuit Harbor and Quivett and Paines creeks cover the Mid-Cape area. Several sites are clustered around Namskaket Marsh and Rock Harbor in Orleans and First Encounter Beach in Eastham. There are four sites in Wellfleet Harbor, one at the mouth of the Pamet River and six more near Provincetown.

Samples at each site were done at flood and ebb tide to catch the water coming in and the water going out. Nutrient levels were higher when the land was a greater source of water (at ebb tide).

Water samples were taken from April till October. Precipitation levels were obtained from Hyannis.

"That (rain) does affect salinity," Costa noted. "The salinity in the spring was lower than the rest of the summer due to precipitation. The dissolved oxygen levels were really good in the spring but there was a pretty substantial drop during the summer months. The dissolved oxygen level is also related to the water temperature. The warmer the water, the less oxygen."

Nutrient levels climbed with the population in the summer but overall levels didn't appear to be bad. The highest readings were near the Jones River in Kingston, Scorton Creek in Sandwich, in Wellfleet Harbor and at the mouth of the Pamet River in Truro.

"They're not bad. It's not the Hudson River yet," Costa said. "But high nitrogen levels, declining water clarity and lower dissolved oxygen are all things that could damage our bay."

She is looking to get a lot more data in order to get a better handle on things.

"Some of the nutrient concentrations were a little higher than I thought they'd be but it was so ephemeral. It was high one week. The next week it would be back to OK," noted Costa.

More volunteers would help, but she's very grateful for the ones she has.

"They did a wonderful job," Costa said. "They took measurements of temperature and salinity and used a Secchi disk for water quality. Then they collect a sample of water at depth and freeze it and when I see them, I collect it."

What's on tap for summer two of the project?

"Expand the capability for nutrient monitoring, hopefully expand the volunteers and expand the eelgrass (monitoring) program," answered Costa.

She's seeking volunteers from Plymouth to Provincetown.

"We'll take them anywhere," Costa declared. "It's all from the shore. It probably takes 20 minutes once you're at the site. It's just the temperature, salinity, dissolved oxygen and clarity, they do ph as well. I give them all a test kit and they take a water sample and freeze it."

For more information, contact Costa at 508-487-3623, ext. 122 or [Acosta@coastalstudies.org](mailto:Acosta@coastalstudies.org).