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Study ties decline of coral reefs to sewage pipes, coastal runoff

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FORT LAUDERDALE, Fla. – Prozac, estrogen fertilizer, pesticides, antibacterial soap and countless other chemicals pour into the ocean off southeast Florida, shot through sewer pipes and washed off lawns, golf courses, roads and farms.

Environmentalists have long suspected this chemical brew of playing a role in the decline of coral reefs. Now a study by academic and government scientists has tentatively linked sewage pipes and coastal runoff to coral damage off southeast Florida.

The study found that corals near sewage pipes and inlets – where urban and agricultural runoff flows into the ocean – showed harmful changes in levels of molecules associated with the ability to heal wounds. When scientists cut holes in corals, they found the ones near sewage pipes and inlets took longer to heal. At samples tested next to one sewer pipe, wounds expanded rather than healed.

“Those are indications of environmental stress, for the most part from land-based sources,” said Phillip Dustan, professor of biology at the College of Charleston, one of the authors of the study, which was funded by state and federal environmental agencies.

“This is something we should have done 30 years ago, when we saw the reef was degrading. People have said you can't prove this is happening. Well, we're beginning to prove this is happening.”

This summer, the researchers will begin a more extensive study intended to tie the damage to specific chemicals, such as particular fertilizers, nutrients or pharmaceuticals. Once that study is completed, it could lead to tighter sewage treatment requirements, as well as campaigns to encourage people to avoid fertilizers and other chemicals that ultimately could reach the reefs.

Six sewage pipes in three counties, including Miami-Dade, discharge about 300 million gallons a day into the ocean. While the sewage undergoes treatment, no one claims the water is perfectly clean.

Rich in nutrients such as nitrogen, phosphorus and ammonia, the treated sewage is suspected of fueling the growth of algae that smother reefs. Charter captains and other savvy anglers have learned to head to the discharge areas for king mackerel and other species that feed on smaller, algae-eating fish.

The reef research is being coordinated by the Southeast Florida Coral Reef Initiative, a state-sponsored group of scientists and government officials trying to come up with ways to protect the reefs against ship groundings, coastal development and other threats.

“The ultimate goal of the project is going to be to identify how land-based sources of pollution might be affecting southeast Florida's coral reef ecosystem,” said Chantal Collier, a reef specialist for the Florida Department of Environmental Protection, who is program manager for the Southeast Florida Coral Reef Initiative. “And to try to identify specific linkages between pollutants and coral reef degradation.”

If the follow-up study succeeds in linking coral degradation to sewage, there are ways to limit the damage, officials said. The Florida Department of Environmental Protection could require additional treatment before discharge. Or plants could inject more of the sewage into deep underground disposal wells, although that practice has caused treated sewage to migrate upward into potential sources of drinking water.

Tim Powell, a permitting supervisor, said the best solution would be to recycle treated sewage to irrigate lawns, golf courses and other places that need water. In addition to reducing ocean discharges, it would ease the demand on the region's supply of fresh water.

Broward and Miami-Dade counties reuse only 5 percent to 6 percent of their sewage, the lowest percentages in the state, he said. Plant officials say it's

difficult for urbanized areas to install the pipes and other systems that newly developing counties are putting in.

“The utilities are under tremendous pressure to reuse wastewater,” said Tony Hui, utility director for Broward County Water and Wastewater Services, whose plant discharges about 40 million gallons a day into the ocean off Pompano Beach. “It's a difficult issue. We don't have the irrigation option – to tear up all the streets and install pipelines.”

Reducing the pesticides, fertilizers, oils and other chemicals washing into the ocean from cities and farms may be more difficult to solve than sewage pollution. To a person spreading fertilizer on a lawn in West Boca, it's not obvious they could be harming a coral reef 10 miles away.

“We have a lot of green lawns, and people want to keep them green,” Collier said. “A lot of chemicals are used in that process, and some of that finds its way into the ocean.”