



Water Quality Answers for the Florida Keys



The coral reef ecosystem, with its teeming fish populations, thrives in clean water that is relatively low in nutrients.

Photo: Larry Benvenuti

1. What is meant by the term “water quality”?

The term “water quality” is used to describe the condition of the water. It can be used to describe the chemical, physical, and biological characteristics of water, usually with respect to its suitability for a particular purpose (i.e., drinking, swimming, or fishing). Water quality can also indicate the concentrations of substances in quantities above their natural background levels that could negatively affect plant and animal life (pollution) and the presence of substances like pesticides that are not usually found in water (contamination).

2. What factors or parameters are used to describe water quality in the Florida Keys?

The following factors are often used to provide a measure of water quality: the concentration of dissolved oxygen (DO); the level of fecal coliform bacteria from human and animal wastes; the concentrations of plant nutrients nitrogen and phosphorus; the amount of particulate matter suspended in the water (turbidity); the concentration of salt (salinity); and the amount of chlorophyll pigment filtered from microscopic algae living in the water column. Pesticides, herbicides, heavy metals and other chemicals may also be measured to characterize the water quality.

3. Why is good nearshore water quality important to people?

Untreated or poorly treated stormwater and sewage can pose a health risk for humans and, at times, have resulted in beach closures. When present in high enough levels, fecal coliform bacteria, which are found in human intestines and are easily measured in the environment, are an indicator of untreated or minimally-treated sewage. These bacteria are not usually harmful, but can indicate the presence of other disease-causing organisms carried in the human intestine, such as cholera, diphtheria, and *Escherichia coli* and streptococcal

diseases. Because fecal coliform bacteria do not survive long in marine waters, their presence in marine systems is considered an indicator of *recent* fecal contamination.

4. Why is good water quality important to marine life?

Good water quality is essential to a healthy coral reef ecosystem in the Florida Keys. Tropical marine hard bottom, seagrass, and coral reef communities thrive in clean water that is relatively low in nutrients (nitrogen and phosphorus). Wastewater or stormwater high in nitrogen and phosphorus favors those plants and animals that thrive in nutrient-rich conditions, and over time this can change the nature of the coral reef or seagrass meadow. A coral reef that is exposed to too much nitrogen is usually covered with algal growth that competes with the living corals for space and sunlight. This visible change in ecosystems due to excessive nutrients is called eutrophication, which means “too much food.”

5. Why do our actions have such an immediate and direct impact on water quality?

In the Keys, the groundwater and nearshore surface waters are closely connected. Wastewater from septic systems and cesspits seeps into the surrounding porous limestone rock and pollutes the groundwater. The polluted groundwater seeps into nearshore marine waters where it introduces excessive nutrients and even harmful bacteria. The ebb and flow of the daily tidal cycle creates the force that drives this fairly rapid (hours to days) exchange between ground and surface waters.

Stormwater is a major source of pollutants in the Keys. Stormwater is washed from the land into nearshore waters, where it introduces organic debris, silt, nutrients, metals and oils, and sometimes pesticides, herbicides and fertilizers. Impervious surfaces like



roads, bridges and most parking lots contribute to stormwater runoff; but significant runoff also occurs from yards and other landscaped areas.

Dead-end or poorly-flushed canals also contribute to poor nearshore water quality in the Keys. Stormwater runoff and wastewater from septic tanks find their way into canals. Tidal currents cause canal waters to flow into nearshore marine waters.

6. What activities/practices are negatively impacting water quality in the Florida Keys?

High nitrogen concentrations from untreated or poorly treated wastewater are entering canals and nearshore surface waters and causing eutrophication of seagrass meadows and coral reefs in some areas. At times, poorly treated sewage is introducing potentially harmful bacteria into Keys canals and beaches. Stormwater from land is washing pollutants and contaminants into nearshore waters where they may affect corals, seagrass and other biological communities.



Nutrients in marine waters promote the excessive growth of macroalgae that can compete with the corals for living space.

7. What can my family and I do to help protect and improve water quality?

You can support and participate in advanced wastewater treatment programs that remove unwanted nutrients and harmful bacteria. You can also use “pump-out” stations for your vessel’s sewage and always observe the “No-Discharge” Zone. Landscape your lawn or business to include native plants and reduce or eliminate the use of fertilizers. You can also slope or construct berms on your property to reduce the runoff of fertilizers or yard wastes into nearshore waters. Never dispose of fish carcasses or other organic waste into canals. Use as many “green” products as possible, such as phosphate-free soaps and detergents, and dispose of your household chemicals and hazardous wastes according to label instructions.

Find out more by reading EPA’s fact sheet *Coral Reefs and Coastal Watersheds* at:
<http://www.epa.gov/owow/oceans/factsheets/fact4.html>.

Learn about green products by visiting: www.epa.gov/epp/pubs/about/about.htm.

8. What is the Water Quality Protection Program (WQPP), and what is its relationship to the Florida Keys National Marine Sanctuary (FKNMS)?

In the Act that created the Florida Keys National Marine Sanctuary, Congress directed the U.S. Environmental Protection Agency (EPA) and the State of Florida’s Department of Environmental Protection (FDEP) to develop a Water Quality Protection Program (WQPP) for the sanctuary. The purpose of the WQPP is to recommend corrective actions that restore and maintain the water quality conditions needed to maintain healthy native plant and animal populations in sanctuary waters.

9. What are some of the major accomplishments of the WQPP?

In 2002, state waters of the FKNMS were declared a “No-Discharge” zone for vessels. Since then, the new vessel pump-out facilities have processed thousands of gallons of wastewater that would have otherwise gone untreated into nearshore waters. Thousands of pounds of nitrogen and phosphorus are also being kept out of Key West waters each year now that Key West is using advanced wastewater treatment. However, many Keys residents and businesses still need to upgrade their wastewater treatment systems in order to meet the treatment standards set by the State of Florida by the 2010 deadline.



10 What are some of the ongoing monitoring and special studies projects supported by the WQPP?

Water quality, seagrass communities, and coral reefs have been monitored in the sanctuary for the past eleven years. Data from this long-term monitoring program have been useful in understanding the complex water quality and ecological balance of the marine ecosystems in the Keys. Monitoring is also required to detect any changes in the sanctuary from Everglades restoration projects or other upstream influences. Special studies have helped scientists and managers to better understand groundwater seepage, the effects of mosquito control measures on non-target animals, human pathogens in canals, the effects of pharmaceutical drugs on marine life and a host of other related topics. For more information about the WQPP, please visit: <http://floridakeys.noaa.gov/>.

11. What are the ecological trends shown in the different WQPP monitoring projects?

Water Quality: Results from the Water Quality Monitoring Program (1996-2005) indicate that Middle and Lower Keys inshore waters had higher nitrate (a form of nitrogen) concentrations than waters from the reef tract. In the inshore waters of the less populated Upper Keys and the Tortugas, nitrate levels were low and similar to those found on the reef tract. This difference suggests that shoreline development may be the source of nitrate in the Middle and Lower Keys. Temporal trends in water quality observed inside the FKNMS are influenced by regional conditions outside sanctuary boundaries.



The Coral Reef Evaluation and Monitoring Program (CREMP) surveys the coral reefs of the Keys using a video-transect approach.

Coral: From 1996 to 2004, the Coral Reef Evaluation and Monitoring Program documented an overall decline in stony coral cover from 11.9% to 6.6% throughout the sanctuary. Significant losses took place between 1997 and 1999, when mass coral bleaching, outbreaks of coral diseases and strong storms occurred. There has been no significant change in stony coral cover since 1999.

Seagrass: From 1995 to 2003, seagrasses remained relatively healthy. However, there were a few locations that showed trends consistent with eutrophication (increased nutrients) and hurricanes resulted in loss (burial or erosion) of three of 30 permanent stations.

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