Water Quality: Frequently Asked Questions

Florida Keys National Marine Sanctuary

1. What is water quality?

The term *water quality* is used to describe the condition of the water, including its chemical, physical and biological characteristics, usually with respect to its suitability for a particular purpose (i.e., drinking, swimming or fishing). Water quality is also affected by substances like pesticides or fertilizers that can negatively affect marine life when present in certain concentrations.

2. What factors determine water quality in the Florida Keys?

The following factors are often used to provide a measure of water quality: concentration of dissolved oxygen (DO); levels of fecal coliform bacteria from human and animal wastes; concentrations of plant nutrients nitrogen and phosphorus; amount of particulate matter suspended in the water (turbidity); and amount of salt (salinity). In many bodies of water, the concentration of chlorophyll-a, a green pigment found in microscopic algae, is also filtered from water samples to give a measure of the microalgae living in the water column. Quantities of pesticides, herbicides, heavy metals and other contaminants may also be measured to determine water quality.

3. Why is good 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 certain levels, fecal coliform bacteria, which are found in human intestines, are indicators of untreated or minimally treated sewage. Because these bacteria do not survive long in seawater, their presence in marine waters is considered an indicator of recent fecal contamination. Fecal coliform bacteria are not usually harmful, but are easily detected and may indicate the presence of other disease-causing organisms carried in the human intestine such as cholera, diptheria, *E. coli* and streptococcal diseases.

Good water quality is important for marine life.
Photo: Larry Benvenuti

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

Good water quality is essential to a healthy marine ecosystem in the Florida Keys. Tropical marine hardbottom, seagrass and coral reef communities thrive in clean water that is relatively low in nutrients. Wastewater or stormwater containing high nitrogen and phosphorus concentrations promotes the growth of plants and animals that thrive in nutrient-rich conditions, and over time this can have a negative impact on marine life. A coral reef or seagrass meadow exposed to an overabundance of nitrogen may become covered with seaweed and other macroalgae, which can out-compete the living coral and seagrass for space and sunlight. This visible change in ecosystems due to excessive nutrients is called eutrophication, which means “too much food” in Latin.

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

In the Florida Keys, the groundwater and nearshore surface waters are closely connected. Wastewater from septic systems can seep into the surrounding porous limestone and pollute the groundwater, introducing excessive nutrients and even harmful bacteria into nearshore marine waters. This fairly rapid exchange between ground and surface waters is driven by the pumping action created by the ebb and flow of the daily tidal cycle.

http://floridakeys.noaa.gov/

National Marine Sanctuaries

6. What is negatively impacting water quality in the Keys?

Stormwater is a major source of pollutants in the Keys. Washed from the land into nearshore waters, stormwater introduces organic debris, silt, nutrients, metals and oils, and sometimes pesticides, herbicides and fertilizers. Hard, non-porous surfaces like roads, bridges and most parking lots contribute to stormwater runoff, but significant runoff also occurs from yards and other landscaped areas.

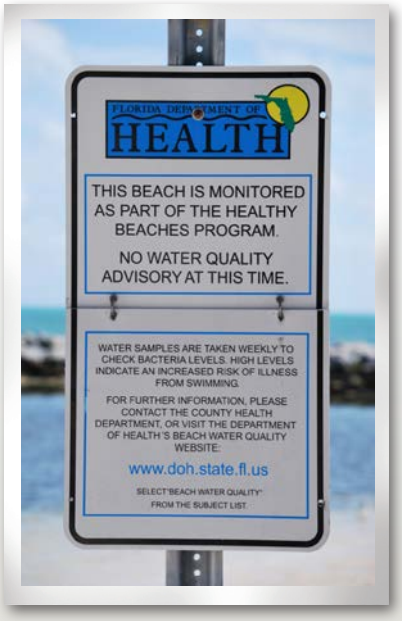
Nutrient enrichment promotes macroalgae growth.
Photo: John Halas, Florida Keys National Marine Sanctuary

In some areas, high nitrogen concentrations from untreated or poorly treated wastewater are entering canals and nearshore surface waters, contributing to eutrophication of seagrass meadows and coral reefs. Wastewater also introduces potentially harmful bacteria into canals and beaches in the Florida Keys.

Dead-end or poorly-flushed canals also contribute to poor nearshore water quality in the Keys. Stormwater runoff and wastewater from septic tanks enters canals and may be carried by tidal currents into nearshore marine waters.

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

There are many things you can do to prevent degradation to sanctuary waters. Support and participate in advanced wastewater treatment programs that remove unwanted nutrients and harmful bacteria. For your vessel's sewage, use "pump-out" stations and always observe the No Discharge Zone in the Keys. Around the home and office, 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. On your property, reduce or eliminate the use of fertilizers, construct vegetation berms to reduce the runoff of fertilizers or yard wastes, and landscape with native plants. When fishing, after cleaning your catch, do not throw fish carcasses or other organic waste into canals where they can reduce water quality and contribute to low oxygen conditions.



High bacteria levels cause beach closures.

8. What is the Water Quality Protection Program?

In the act that created the Florida Keys National Marine Sanctuary, Congress directed the U.S. Environmental Protection Agency and the state of Florida's Department of Environmental Protection to develop a Water Quality Protection Program for the sanctuary. The purpose of the program is to recommend corrective actions that restore and maintain the water quality conditions needed to sustain healthy native plant and animal populations in sanctuary waters.

9. What are some of the major accomplishments of the Water Quality Protection Program?

In 2002, state waters of the sanctuary 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 the city is using advanced wastewater treatment. This trend is expected to continue as Keys communities are in the process of upgrading 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 other research projects supported by the program?

Water quality, seagrass meadows and coral reefs have been monitored in the sanctuary since the mid-1990s. Data from these long-term monitoring programs have been useful in understanding the complex water quality and ecological balance of the marine ecosystem in the Florida Keys. Monitoring is also required to detect any changes in the sanctuary from Everglades restoration projects or other upstream influences. Special studies in the Water Quality Protection Program have helped scientists and managers to better understand a host of topics including groundwater seepage, the effects of mosquito control measures on non-target animals, human pathogens in canals, and the effects of pharmaceutical drugs on marine life. For more information about the Water Quality Protection Program research findings, visit http://ocean.floridamarine.org/fknms_wqpp/.

Written by: Nancy Diersing, Florida Keys National Marine Sanctuary
Published: May 2009