Water quality is monitored to assess environmental conditions

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All living things on Earth need water to survive. Our bodies are made up of more than 60% water, and we need clean water to drink, grow crops, swim, surf, fish, and sail. Water quality measurements provide an indicator of the nature and health of an ecosystem. Monitoring water quality characteristics allow scientists and managers to keep their "finger on the pulse" of the ecosystem and are determined by measuring a variety of water quality parameters. Measurements allow ecosystem managers to take action prior to ecosystem collapse.

Why we measure water quality

- Establish baseline conditions;
- Detect long-term trends;
- Determine suitability for uses;
- Check compliance with standards; and
- Ensure public health safety.

Most people recognize degraded water quality by characteristics such as discolored water, algal scums, and odors. But degraded water quality may not be easily recognized. For example, contamination by pathogenic bacteria and viruses may make water dangerous for swimming, but the risk is not recognizable without laboratory testing.

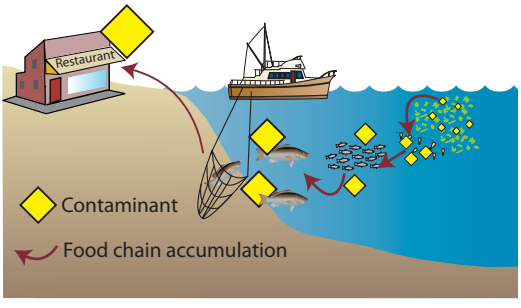
Water quality is also a measurement of the ability of the aquatic system to support beneficial uses. Because many systems differ greatly in their use, what constitutes good water quality is site specific, and water quality is judged by the particular purpose for which the system is being used. In fact, the United States Environmental Protection Agency identifies designated uses (e.g., fishable, drinkable, swimmable) when setting targeted levels for individual water quality parameters. If the water is to be used for drinking, a specific set of chemical parameters are well defined. Waters used by fishing or shellfishing industries are characterized by parameters required to maintain healthy fisheries. For recreational purposes, such as boating, good water quality enhances the aesthetic experience.

Commonly measured water quality parameters

- Temperature
- Salinity
- pH
- Turbidity
- Light attenuation
- Dissolved oxygen
- Chlorophyll *a*
- Total organic carbon
- Total organic nitrogen
- Total nitrogen
- Total phosphorus
- Nitrate
- Nitrite
- Ammonium
- Silicate
- Fecal coliform bacteria

Factors that contribute to degraded water quality can be related to both natural processes and influences of human activities. Many lakes naturally go through a life cycle in which the lakes slowly fill in over geological time. However, that process may be accelerated by human activities, such as those that result in the delivery of increased nutrients to the lake.

In coastal marine systems, human activities, such as population growth and development, often have a detrimental impact on coastal water quality. Increased or changing nutrient delivery can result in algal blooms that discolor the water and decrease light penetration, in turn affecting benthic communities, including seagrasses.



Water quality monitoring can detect contaminants, such as mercury, that can become biomagnified through food webs and is toxic to consumers.

Poor water quality conditions can affect humans in many ways. For example, bathing in waters containing harmful bacteria or consumption of seafood from areas with poor water quality can cause sickness and disease. Contaminants such as heavy metals can be concentrated in seafood through a process called biomagnification.

Different ecosystems have different characteristic water quality regimes. In south Florida, the coastal marine ecosystem is primarily oligotrophic, with low nutrient and chlorophyll concentrations. As such, this ecosystem responds rapidly and significantly to nutrient loads that would be considered small in many other regions. Water quality in the south Florida marine ecosystem is directly influenced by runoff from natural areas, such as creeks and streams, the nearby Everglades ecosystem, and from surrounding urban areas (land-based sources). A comprehensive water quality monitoring program is required to identify and track, and ultimately control, sources of nutrients and other contaminants that enter these waters.

Water quality in south Florida is generally good compared with other areas of the Atlantic coast, even with the major landscape changes that have occurred in south Florida. Recently, seagrass die-off and algal blooms have resulted in degraded water quality in Florida Bay. Given the landscape changes to the watershed, returning Florida Bay to nondegraded conditions is a major challenge of the Comprehensive Everglades Restoration Plan. Completion of the plan is likely to alter the south Florida marine ecosystem. The United States Commission on Ocean Policy concluded that long-term water quality monitoring is the best measure to provide accountability for management actions. Water quality monitoring in the south Florida marine ecosystem must be used to adaptively manage the restoration process to ensure that the most beneficial outcomes are achieved.

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Poor water quality conditions can result in fish kills.

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Good water quality is required to meet the standards of fishable, drinkable, and swimmable waters.