What can you do to fight nutrient pollution?

Each individual can do something to protect our waterways from nutrient pollution. Here are some examples:

Follow manufacturers' instructions when using lawn fertilizers and avoid applying fertilizers before heavy rains. This will keep the fertilizer on your yard and not in the stormwater runoff that enters water bodies.

Preserve shoreline and submerged vegetation along your waterfront property. Do not clear or rake vegetation. Natural vegetation provides buffers to absorb nutrients and provides habitat for vital aquatic organisms. Maintain proper dock heights to allow light to shine under the dock, which allows beneficial aquatic vegetation to grow.

Use reclaimed (reuse) water, where available, for your outdoor home or business use. Ask your reuse water supplier to determine the water's nitrogen content. It's possible that the reuse water contains enough nutrients to supply a large portion of a landscape's fertilizer requirement.

Devise ways in your yard or business drainage plan to temporarily retain rainwater to allow nitrogen to be taken up by land plants. A surprisingly large amount of nitrogen enters surface waters when nitrate-rich rainfall flows directly to drainage works.

For more information, you may contact:
St. Johns River Water Management District
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(386) 329-4540 • (800) 451-7106
On the Internet: *www.sjrwmd.com*

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A green blanket on the water
ALGAE
How too many nutrients stress a water body

The lower basin of the St. Johns River — that section of the river between Welaka in Putnam County and Mayport in Duval County — is rich in history, provides many economic opportunities and is enjoyed for its aesthetic and recreational aspects.

Drawn to the river's beauty, millions of people now live and work along the riverbanks. Along with the growth in population have come growing problems for the river, including algal blooms.

Many of the issues impacting the river's health in this area of Florida are not unique to the lower basin. In fact, one problem — algae — is common throughout the state, the nation and the world.

Macro-algal bloom over submerged aquatic vegetation

What are algal blooms and what causes them?

Algae — microscopic, free-floating plants found in all surface waters — are the vital base of the aquatic food chain. In natural water bodies not impacted by pollution, the amount of algae, and likewise the inherent productivity of an aquatic ecosystem, is held in balance by the competition for the low amounts of essential nutrients, primarily nitrogen and phosphorus. As the supply of nitrogen and phosphorus increases, the productivity of a water body increases. While "productive" usually has a positive connotation, it is anything but, in this case.

In surface waters, productive means too many nutrients spurring the growth of too many algae. When algal plants crowd together, the resulting "blooms" block sunlight from reaching underwater plants. Sunlight is vital for the growth of submerged vegetation, which provides food and a place to live and grow for fish and animals.

In addition, the algae lowers levels of dissolved oxygen in the water, which sometimes results in fish kills. This is especially true when the algae move into salty water or when overcast skies cause a reduction in the amount of oxygen algae produce (through the process of photosynthesis). When this happens, the plants draw oxygen from the water.

If lowering oxygen levels weren't serious enough, some types of algae produce toxins that can harm fish, wildlife and, potentially, humans, if ingested.

Where do nutrients come from?

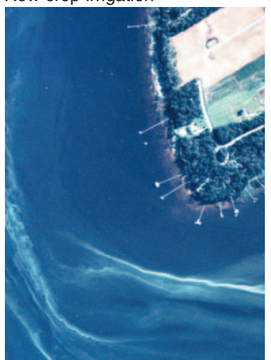
Many human activities inadvertently add nitrogen and phosphorus to surface waters.

For example, large amounts of phosphorus pollution come from wastewater treatment plant discharges, known as point source pollution, and from agricultural runoff, particularly from dairy and livestock production facilities, known as nonpoint source pollution.

Nitrogen pollution comes from many sources. In addition to the point and nonpoint sources responsible for adding phosphorus, nitrogen (in the form of nitrate) originates from fertilizers used in row crop agriculture and landscaping, septic tank seepage, and even rainfall which has become enriched with nitrate through fossil fuel burning. This nitrate-rich water makes its way to surface waters as direct runoff during rain events, or it may drain slowly from the soil over time. Some of this nitrate seeps, or "percolates," into deep groundwater.

Nitrogen pollution of deep groundwater threatens a number of Florida's springs and their unique flora and ultimately adds nitrogen to downstream surface waters.

Row crop irrigation

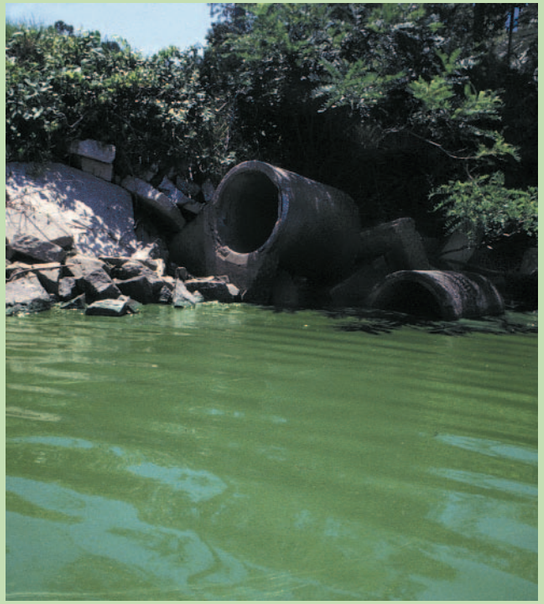


Shoreline development and agricultural fields

Scientists have understood the pollutant threat from phosphorus in bodies of freshwater for some time and so have developed treatment and control measures. Nitrogen, and how to control it, is less well understood. Part of this lack of understanding stems from the complexity of the nitrogen cycle. Nitrogen can be found in nature as a gas, dissolved in water or as small particles of organic matter.

The numerous ways in which nitrogen is available are of particular concern, as algal blooms of the lower St. Johns River grow more in response to nitrogen pollution. Nitrogen control has been stressed as a priority for upgrading sewage treatment plants that discharge to the river.

In the past, nutrient pollution increased as population increased, to a point where the amounts of nutrients exceeded the river's ability to absorb the pollution and still remain healthy. Careful planning and forethought can break this association between population growth and nutrient pollution.



Decaying blue-green algae causes low oxygen levels for fish.

A fish kill caused by decay of blue-green algal bloom and low dissolved oxygen.

Fish with sores and lesions in the St. Johns River are often associated with poor water quality.

Twenty-six major facilities discharge approximately 96 million gallons of effluent each day along this area. It has the highest density of point sources in the entire St. Johns River. Within this area, the river receives about 30 percent of its total amount of nitrate and ammonia nitrogen and 33 percent of its phosphate.

Freshwater and salt water begin to mix in this stretch of the river, making the water cloudy and reducing light penetrating the water. Freshwater algae formed upstream decline and decompose and are replaced by salt-tolerant algae. The decomposition reduces dissolved oxygen, leading to fish kills.

Water quality is best between Palmo Cove and Black Creek due to upstream pollutants being diluted and by the relative natural state of the shoreline in this area. Rapid development poses a threat to continued good water quality here.

As the lower St. Johns River widens downstream of Palatka, the speed of water flow decreases, making the river lake-like and making conditions favorable for algal growth.

Large, prolonged high tides can cause water to reverse its flow in the river as far upstream as Lake George. This delays the dispersal of pollutants. Because ocean water is clearer than river water, spring season low water flow generally results in an increase in water transparency and salinity at the downstream end.

The roughly 30,000 acres of row crop agriculture in this area of the river basin supplies 40 percent of the spring season inorganic nutrients that enter the river between Palatka and Green Cove Springs. Algae typically peak in this area.

The lower St. Johns River forms where the Ocklawaha and middle St. Johns rivers meet. These two rivers, along with Dunns Creek, supply 21, 61 and 18 percent, respectively, of the river's flow at Palatka. Water clarity improves during the spring dry season when dark-colored runoff decreases and upstream flows from artesian springs increase in proportion to total flow. This improvement in water clarity allows light to penetrate the water, which is important for submerged vegetation, but also promotes algal growth if nutrients are available.

How can you learn more?

Staff at the St. Johns River Water Management District developed a five-year restoration plan for the Lower St. Johns River Basin. The District is working closely with others who also care about the river, such as the city of Jacksonville, the U.S. Environmental Protection Agency, the Florida Department of Environmental Protection, the Stewards of the St. Johns, the Duval County Health Department, JEA and individuals and lawmakers. The District is also involved in other areas of its 18-county jurisdiction in northeast and east-central Florida to address water quality issues.

Blue-green algae surface scum covering more than 40 miles on the St. Johns River.