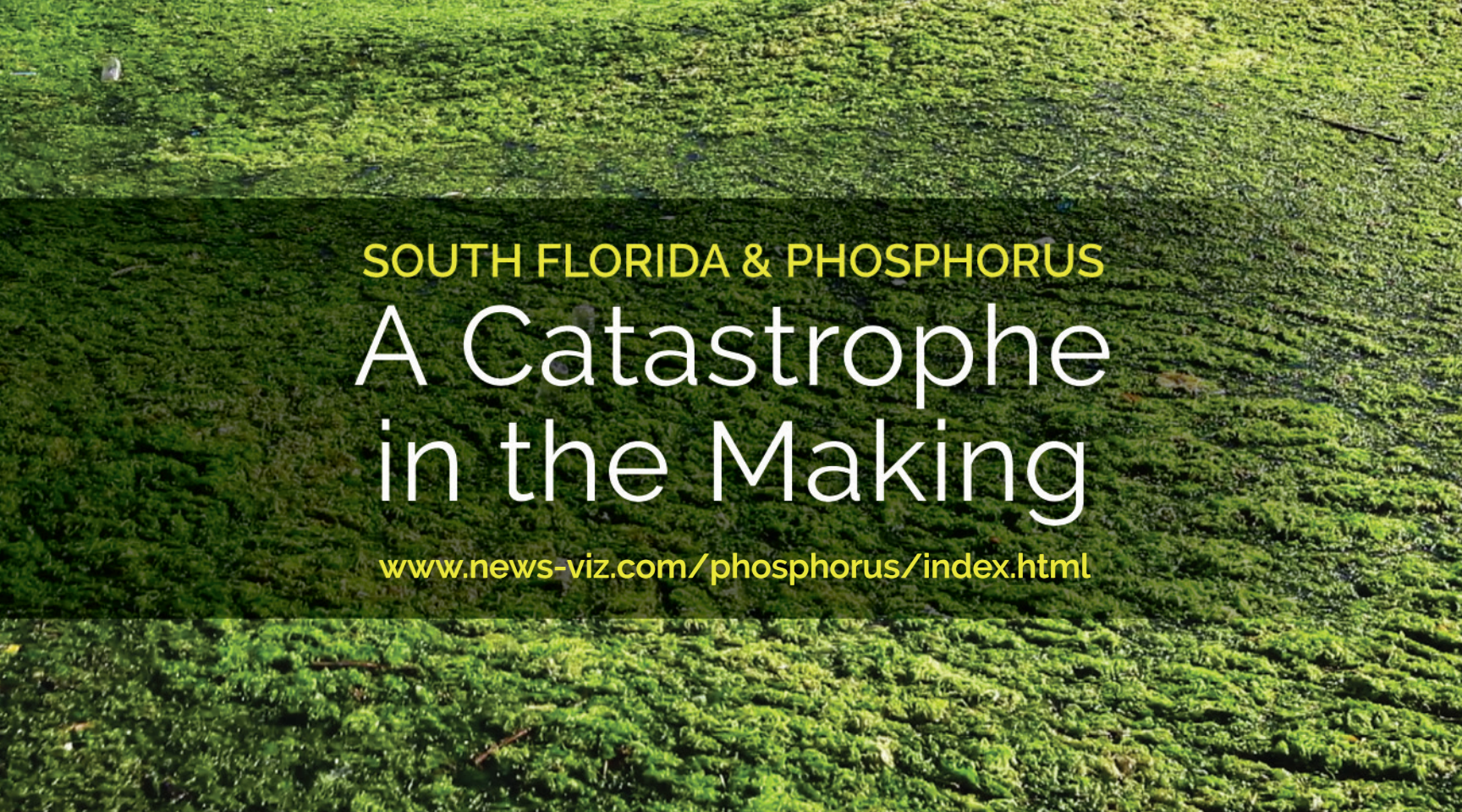
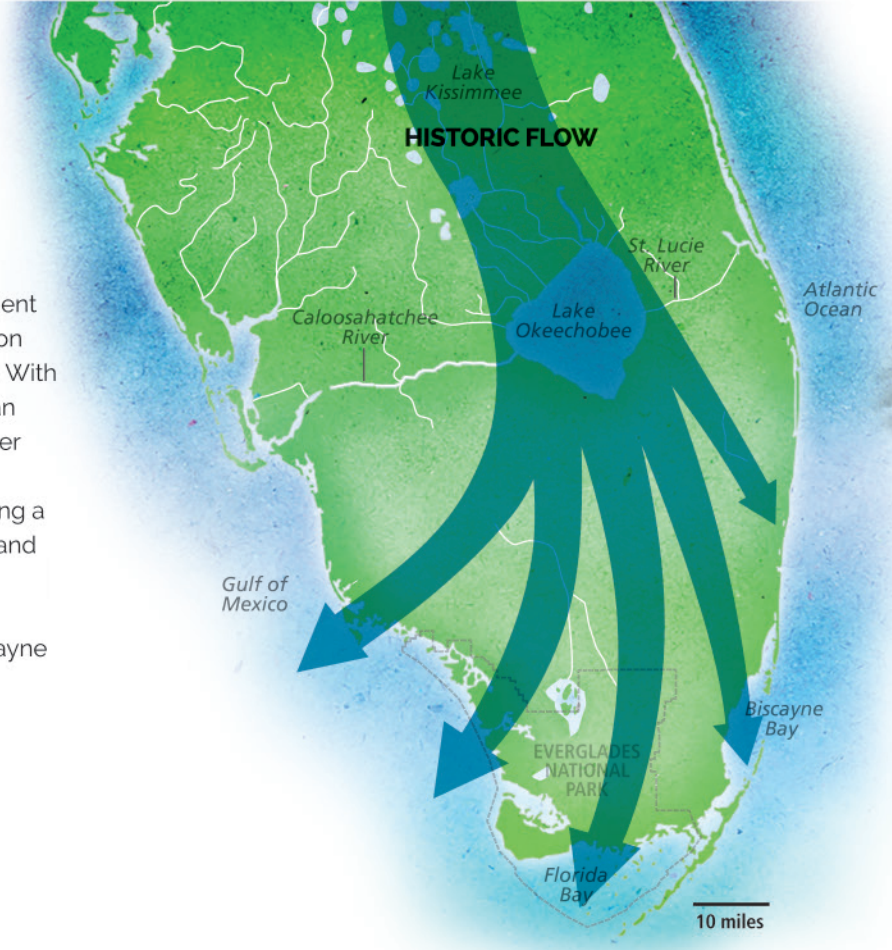

SOUTH FLORIDA & PHOSPHORUS
A Catastrophe in the Making
www.news-viz.com/phosphorus/index.html

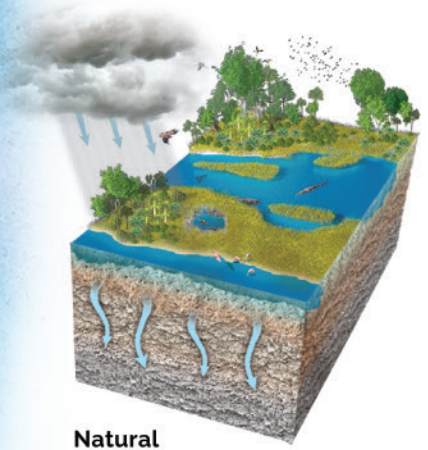
Algae is an important, natural part of South Florida's ecosystem. But high levels of nutrients such as phosphorus from surrounding urban and farm areas have led to widespread increases in harmful Blue-green algae blooms in canals, rivers and streams.

Few areas of the Everglades have been untouched by man. This scene from the protected Everglades National Park is a reminder of what most of Florida once was.

Florida, in 1900

Before Florida's development boom, the state's population was roughly over 500,000. With the absence of man's urban and agricultural areas, water flowed freely through the middle of the state following a gradual downward slope, and passed what is today's Everglades National Park before emptying into Biscayne Bay, Florida Bay and the southern Gulf of Mexico.



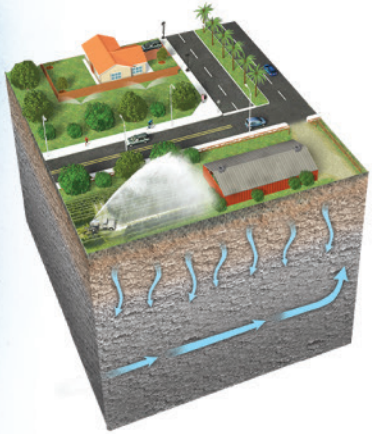


Natural hydrological system of rainfall, water flow, and aquifer storage

South Florida's population has been steadily increasing since the 1920s, and now stands at over 7.5 million people. With that large population comes a great need for clean drinking water.

Urban Sprawl, Farming

Since 1900, much of the Everglades has been channeled for agriculture and urban development. Economic prosperity in the early 20th century stimulated tourism to Florida, leading to development of hotels and resort communities. The Florida land boom of the 1920s brought a brief period of intense land development, altering the landscape with the construction of man-made canals and removal of many natural waterways.



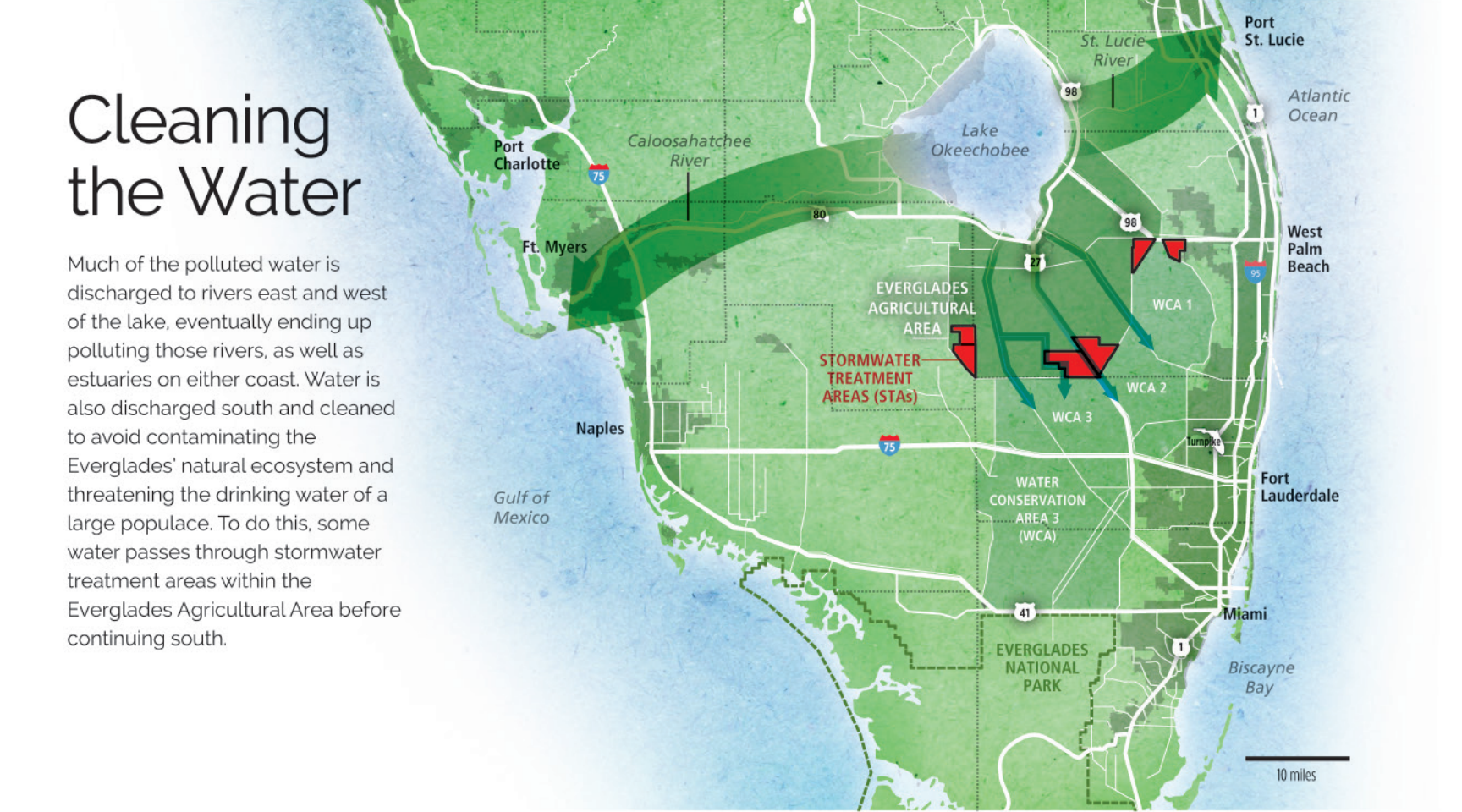
Development of urban and farming areas slow movement of water as well as decrease aquifer replenishment

The Kissimmee River and other canals north of Lake Okeechobee contribute large amounts of phosphorus to the lake.

Lake Okeechobee receives most of this polluted water, but because the lake levels have to stay a certain height to avoid flooding nearby communities, large amounts of water needs is discharged elsewhere.

Cleaning the Water

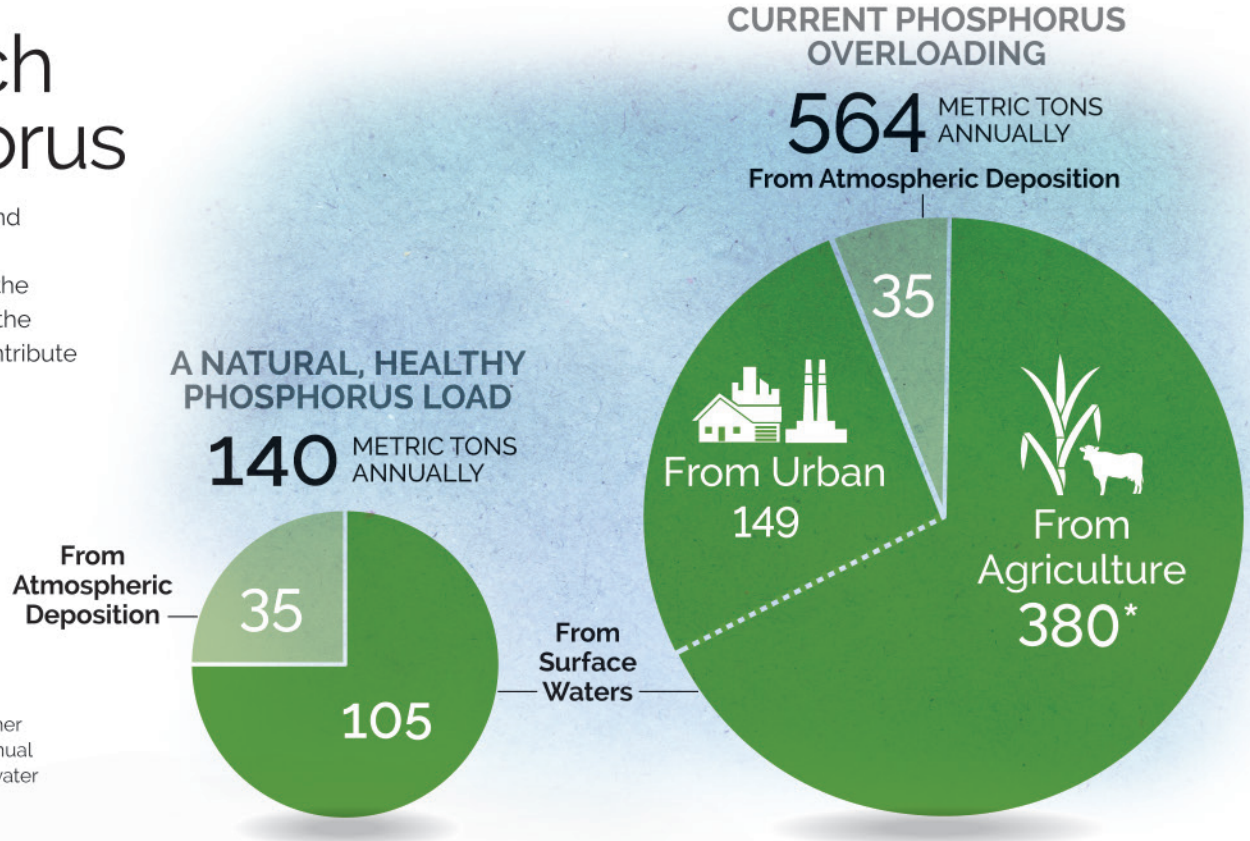
Much of the polluted water is discharged to rivers east and west of the lake, eventually ending up polluting those rivers, as well as estuaries on either coast. Water is also discharged south and cleaned to avoid contaminating the Everglades' natural ecosystem and threatening the drinking water of a large populace. To do this, some water passes through stormwater treatment areas within the Everglades Agricultural Area before continuing south.



At the heart of the problem is the Everglades Agricultural Area which mainly harvests sugarcane. Irrigation canals like this one are used to water the plants, but also end up collecting phosphorus from the fertilizer runoff.

Too Much Phosphorus

Agricultural areas above and around Lake Okeechobee contribute roughly 67% of the total phosphorus entering the lake, while urban areas contribute 26%, and the atmosphere provides the remainder.



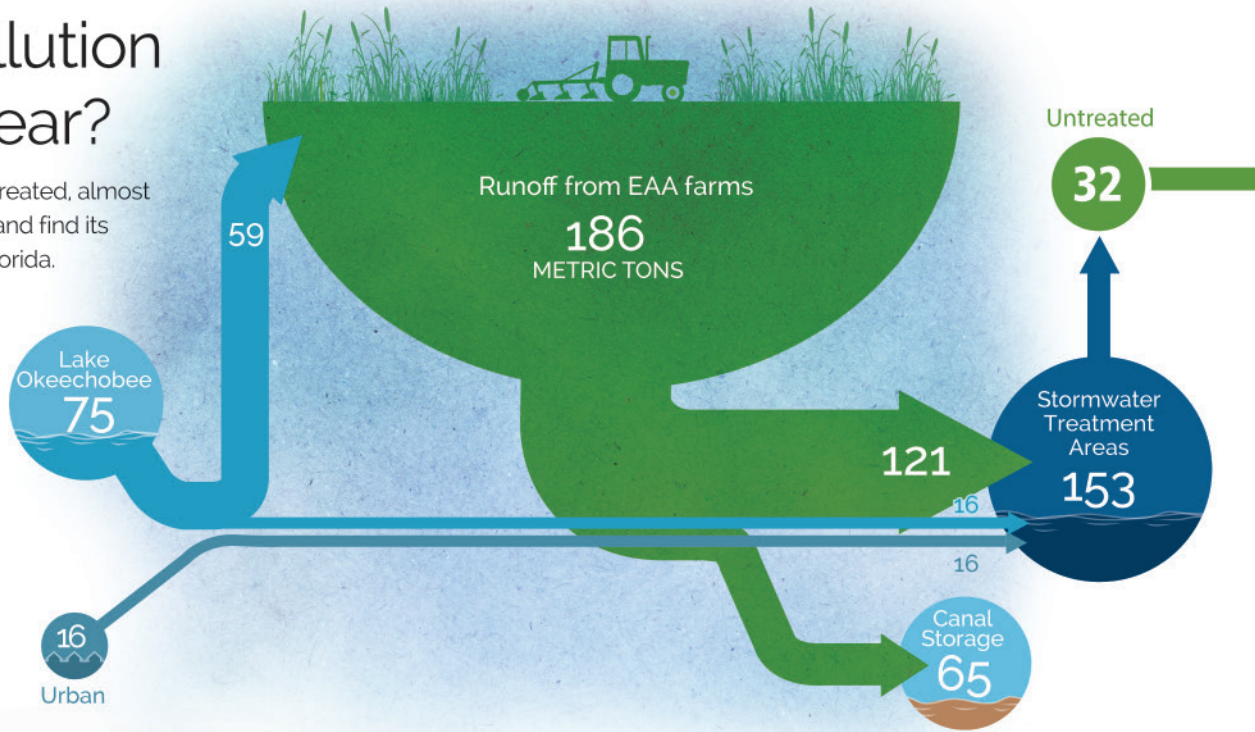
* From Lake Kissimmee and other agricultural areas, average annual total phosphorus loading for water years 2005-2009

Although the Everglades Agricultural Area (EAA) has been implementing management practices to reduce phosphorus levels, much still makes its way south past the EAA and into South Florida waters.

How much pollution is that in one year?

Even though over 150 metric tons are treated, almost three dozen metric tons go untreated and find its way to waterways throughout South Florida.

ALL NUMBERS IN ANNUAL METRIC TONS



NOTE: Values obtained from the South Florida Water Management District and from the South Florida Environmental Reports for Water Years 2005-2012 (from May 2004 to April 2012).

PHOSPHORUS-
POLLUTED WATER

32
METRIC TONS

South
Florida
Waterways

=

159
METRIC TONS
OF BAGS OF FERTILIZERS
DUMPED INTO THE EVERGLADES

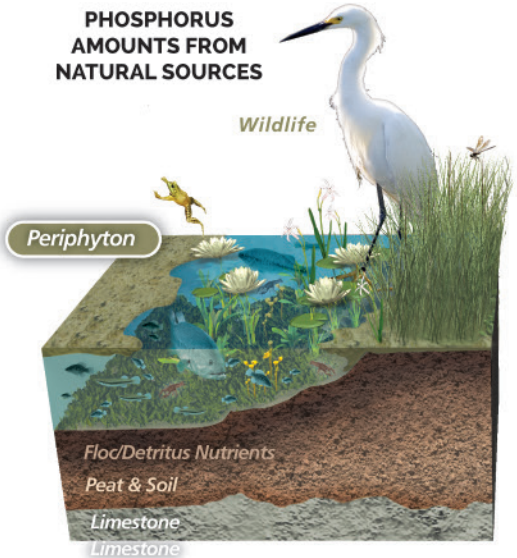
=

16 10-WHEEL DUMP TRUCKS
WITH A 10 METRIC TON CAPACITY

The increased phosphorus brings about excessive cattail growth, and invasive species of plant. In this neighborhood, it has overtaken a large portion of a lake, driving wildlife away and affecting views that are important to real estate values.

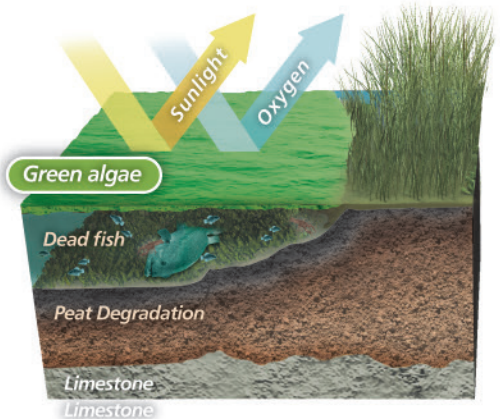
Affecting Water Quality

PHOSPHORUS AMOUNTS FROM NATURAL SOURCES

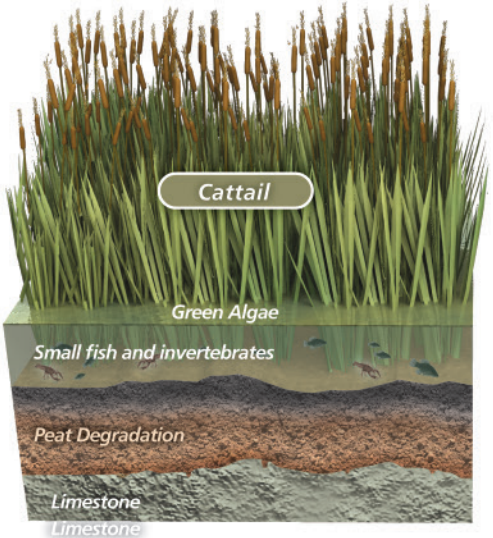


In normal amounts, phosphorus helps grow periphyton, a complex mixture of algae, cyanobacteria, microbes, and detritus that attaches to submerged surfaces in most aquatic ecosystems.

TOO MUCH PHOSPHORUS FROM UNNATURAL SOURCES



With too much phosphorus, green algae covers the water table, blocking important sunlight and oxygen for sustaining life under water.

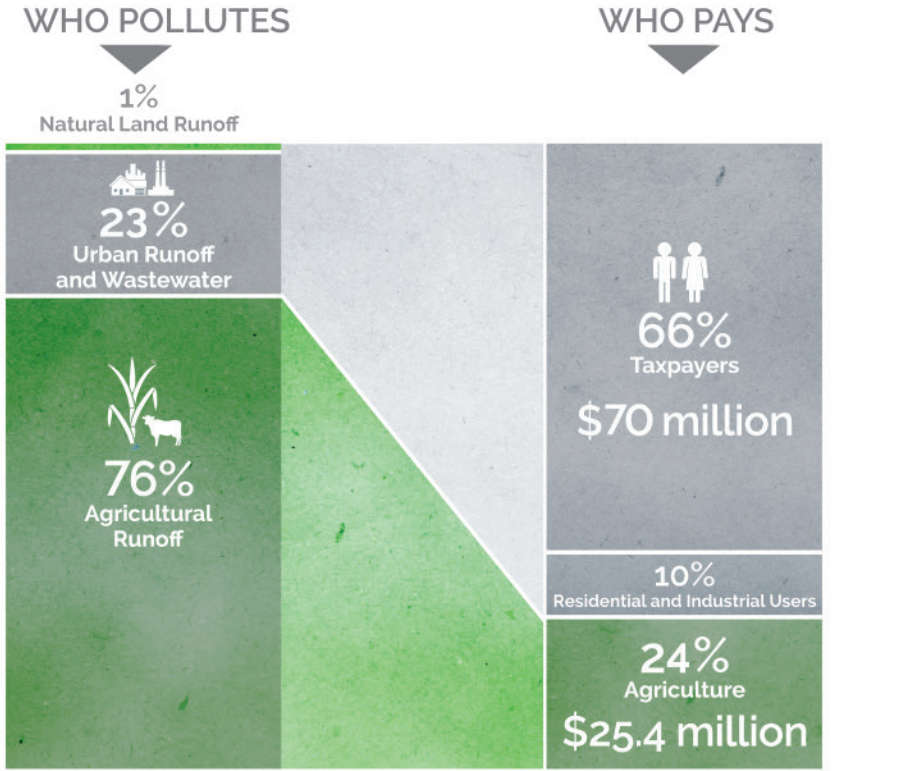


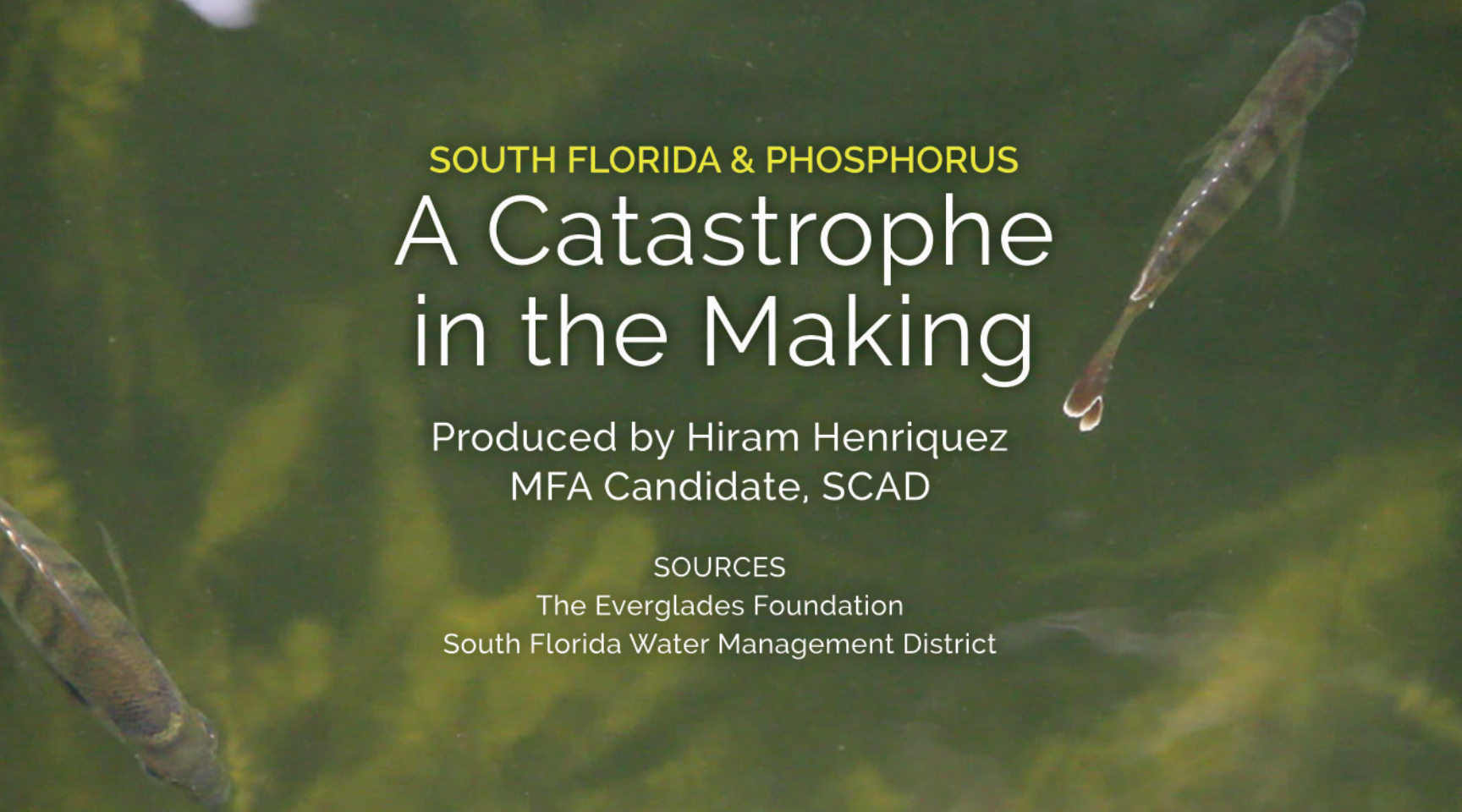
The Everglades food cycle is broken as large fish are unavailable as a food source for the birds that are attracted by them, altering the landscape forever.

Usually massive fish kills are the result of algae blooms caused by phosphorus overloading as fish are left without oxygen and can't find safer waters, like this one here in the St. John's River, just east of Lake Okeechobee.

Who Pollutes and Who Pays

Even though agriculture is responsible for 76% of the pollution threatening the Everglades ecosystem, they only pay 24% of the nutrient removal. The remaining 66% is paid by taxpaying citizens.





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MFA Candidate, SCAD

SOURCES
The Everglades Foundation
South Florida Water Management District