

Mapping Pollution and Finding Solutions



ORCATM

OCEAN RESEARCH & CONSERVATION ASSOCIATION

Campaign for a clean Indian River Lagoon



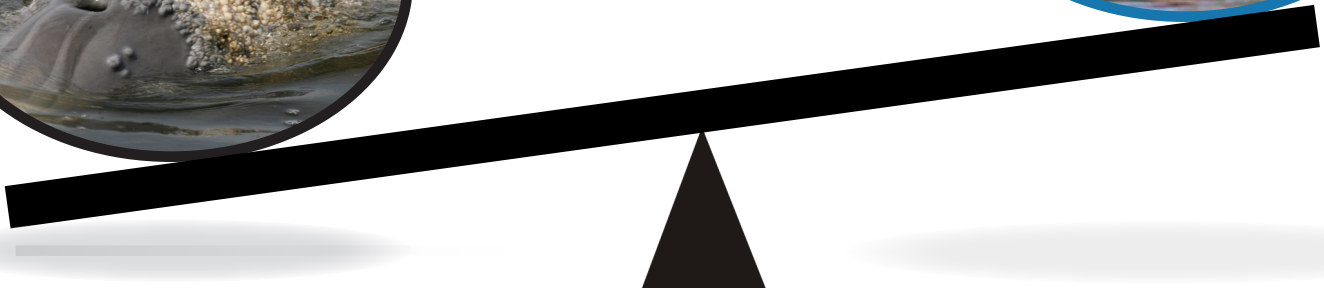
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We have arrived at the tipping point for the Indian River Lagoon. Pushed any further, it will collapse into an algae-dominated, pollution laden system that is unhealthy for fish, dolphins and humans alike.

It's not too late though.

With your help
we can tip the
balance back
toward clean
water, filled
with healthy
and abundant
wildlife.

Your
Help





A Special Place

Because of its unique geographical location, bordering the temperate and sub-tropical zones, the Indian River Lagoon is the most bio-diverse estuary in North America and home to over 2100 species of plants and over 2200 species of animals. It provides habitat for the most diverse bird population anywhere in America and nearly one third of the nation's manatee population live or migrates through the lagoon annually. It also serves as the spawning grounds for over 700 species of ocean, lagoon and shellfish populations. Species of fish that spawn in the Indian River Lagoon range as far north as the Chesapeake Bay. The beaches adjacent to the lagoon are the densest sea turtle nesting areas found in the Western Hemisphere. Besides its importance as a natural preserve, the waters of the lagoon also represent an extraordinary economic benefit to the area. A 2008 economic study estimated that the Indian River Lagoon provides an annual benefit of **\$3.7 billion** to residents and visitors (primarily related to recreational use) and over **\$47 billion** to property values.



In the absence of significant industry, the documented decline in the health of the Indian River Lagoon can be traced primarily to non point source pollution. Storm water runoff, sewage spills and leaky septic tanks are just a few of the suspected sources of pollution. Present day efforts to locate sources of pollution rely on hand sampling or cost prohibitive electronic spot monitoring that only provides a snapshot of the area sampled. Further, the reports generated from these efforts are presented in scientific terms that laymen may or may not understand.



ORCA's mission to protect and restore aquatic ecosystems and the species they sustain through the development of innovative technologies and science based conservation action has resulted in products with the potential to become disruptive solutions to the problem of declining water quality.

Campaign for a clean Indian River Lagoon

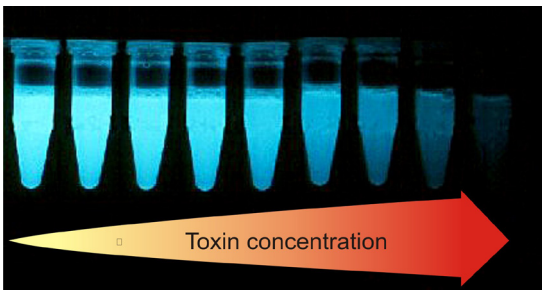


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Fundraising Goal

ORCA seeks to raise \$6 million for the "Campaign for a clean Indian River Lagoon" with the promise to bring real, measurable change to our waterways.

Our scientific focus ensures unbiased feedback to stakeholders, the public and policy makers that management goals are being met and donor dollars effectively spent.



ORCA's Fast Assessment of Sediment Toxicity (FAST) uses light-producing bacteria as a broad spectrum bioassay to test the relative toxicity of different sediment samples. The higher the toxicity, the less light the bacteria emit.

Science-based solutions

ORCA, the world's first technology-based marine conservation organization, has developed innovative tools to provide a constant stream of data as well as easily understood graphical overlays on aerial maps.

Our goal is to revolutionize how scientists and engineers work with communities to protect and improve their water quality.

Our tools produce water pollution gradient maps. These maps are derived from combining data from two ORCA innovations:

- 1.) our broad spectrum bioassay (Fast Assessment of Sediment Toxicity - FAST) that allows us to map the collection of toxic deposits in the sediments of lakes, rivers, estuaries and coastal oceans and
- 2.) our wireless array of low-cost sensors (Kilroys) that supply real-time data via cellular communications and provide the means to map water movement and track pollution to its source.

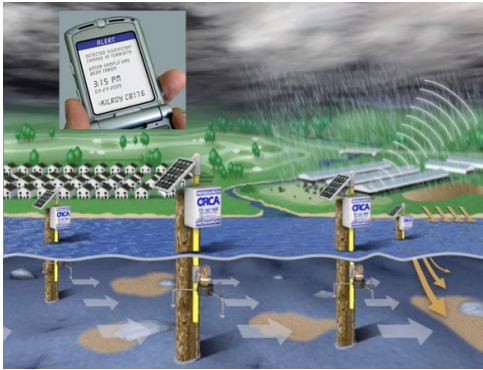
A simple 3 step plan

- 1) Find water pollution sinks, i.e. where pollution has accumulated in sediments.
- 2) Track pollution to its source by mapping water flow patterns around these sinks.
- 3) Stop pollution at its source through education, outreach and land use management programs.

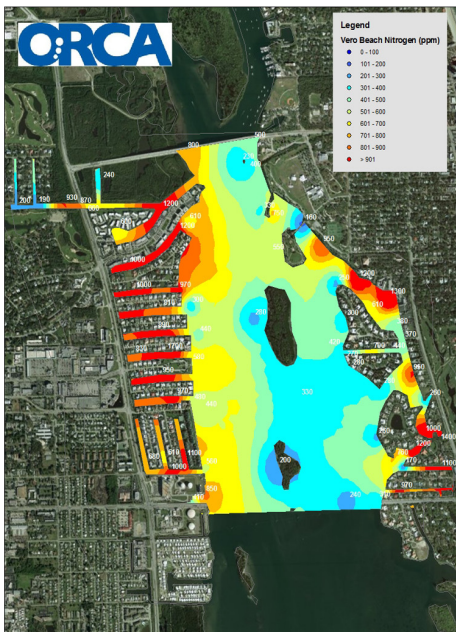
There are real solutions



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ORCA's Kilroys™ can control water samplers that are event-triggered as, for example, in response to a rain storm or a turbidity front. When the sample is taken, Kilroy™ notifies the user by calling their cell phone.



Pollution gradient map of Central Vero Beach showing total nitrogen with red indicating most and blue indicating least concentrated. High nitrogen can lead to algae blooms, reduced transparency and diminished fish populations.

Making a Difference

True solutions flow from effective actions based on good research. Unfortunately, there is too often a disconnect between science and action. Gathering and publishing sound scientific data is a meticulous and time consuming process, while policy decisions are made under deadlines and amid controversy. According to the latest theories of how to initiate change, knowledge is useful and used when it is jointly produced by the participants in the decision making process and the experts with technical and scientific knowledge¹. By having community stakeholders working with ORCA scientists and engineers to jointly produce the data needed, we can not only solve the immediate problem, but ensure continued effective policy decisions by developing an informed constituency dedicated to improved outcomes.

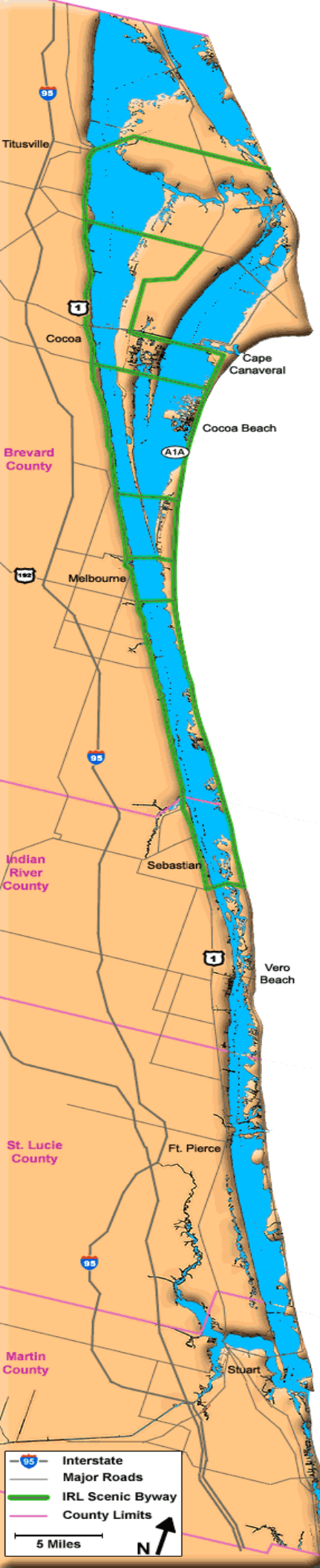
¹David & Lucille Packard Foundation Science Strategy: Linking Knowledge with Action

"Coastal waters are one of the nation's greatest assets, yet they are being bombarded with pollutants from a variety of sources. Our failure to properly manage the human activities that affect the nation's oceans, coasts, and Great Lakes is compromising their ecological integrity, diminishing our ability to fully realize their potential, costing us jobs and revenue, threatening human health, and putting our future at risk."



ORCA's Kilroy is the sentinel we need to identify and respond to pollution in the water. The ecosystem based approaches to ORCA's programs are the solutions needed to address water quality issues at the local, regional and national scale."

- Admiral James D. Watkins (Retired), Co-Chair Joint Commission on Ocean Policy -



As state and federal governments put fewer and fewer dollars into environmental protections, the protection of the most biologically diverse estuary in the United States, the Indian River Lagoon, is falling to local stakeholders.

Map a mile and make a difference.

With \$27,000 we can map one square mile of the Indian River Lagoon.

With donations from Impact 100 and an anonymous donor, ORCA mapped pollution between the bridges in Vero Beach and then presented the results to the Vero Beach City Council. Based on that presentation the council passed a fertilizer ordinance and a local landscaping company started the ball rolling by pledging to stop dumping grass clippings into the lagoon, thus helping to eliminate a major source of chemical pollution. Small changes such as these can make a big difference for our lagoon. Now, with a larger grant from Impact 100 and your help, we seek to expand the map to cover the entire Indian River Lagoon. We will use this map and data from our water quality monitoring network (Kilroys) to determine where the pollution is coming from and then work together with everyone involved to stop it at its source. A novel aspect of this project is that we seek to involve waterfront communities, citizen scientists, youth groups, schools and volunteers in collecting and analyzing the data.

Our future on this planet depends on protecting our life support systems. The greatest legacy we can leave to future generations is a healthy environment. Therefore we ask you to join with us in protecting this very special place.

"The environmental problems that our generation has left to those that will follow are beyond imagining. That our choices and behaviors are actually changing the balance of life in our vast blue ocean boggles the mind. Paradoxically, in the face of such gloom and doom, the most valuable tool we need to be passing on to our children is optimism. It is only the optimists that will see the solutions and recognize that if it was our choices and behaviors that brought us to this environmental precipice then their choices and behaviors can pull us back from the brink. That is why a critical aspect of ORCA's Campaign for a Clean Indian River Lagoon is involving youth in such a way that they learn that they can make a difference."



- Edith A. Widder, President and Senior Scientist, ORCA -

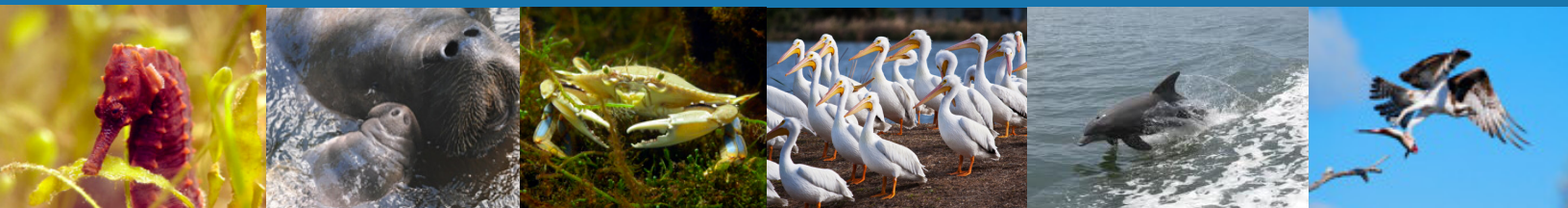
A Vision for tomorrow



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Mapping pollution in the Indian River Lagoon is the first step towards a cleaner Florida. With your help, we can demonstrate that this approach will work and then expand this project to Florida's waterways, estuaries and coastal ocean, ensuring Florida's waters are clean and filled with healthy and abundant wildlife.



What a way to be remembered:
You kept the Indian River Lagoon alive.



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