

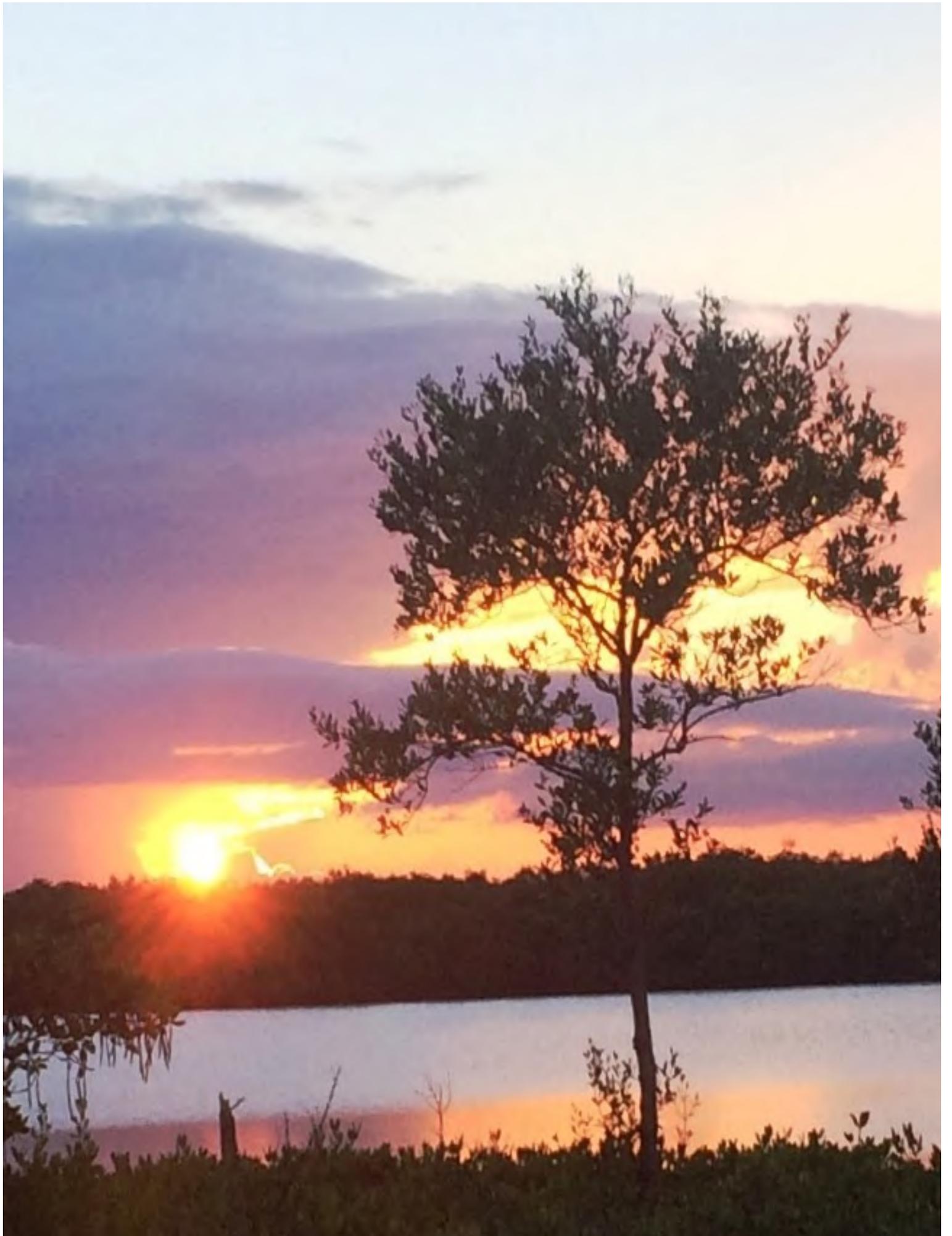
making a difference



annual report | 2015 - 2016

ORCA™

The world's first technology-based aquatic conservation organization®



A Message from Edie

The last two years have been extraordinary for ORCA in so many ways. We received funding from the state of Florida to deploy 25 Kilroys and now for the first time we have been able to gather the critical data needed to determine what needs to be done to help clean up the lagoon. With a lot of determination, we are finally starting to see the substantive results that we predicted from this level of monitoring.



In March, we captured real time data during the unprecedented fish kill in the northern part of the Indian River Lagoon. This wasn't just a few fish, it was hundreds of thousands of different species including brood stock of some of the most valuable game fish like redfish. To our knowledge we are the only organization to have such extensive, real time data during an event of this nature.

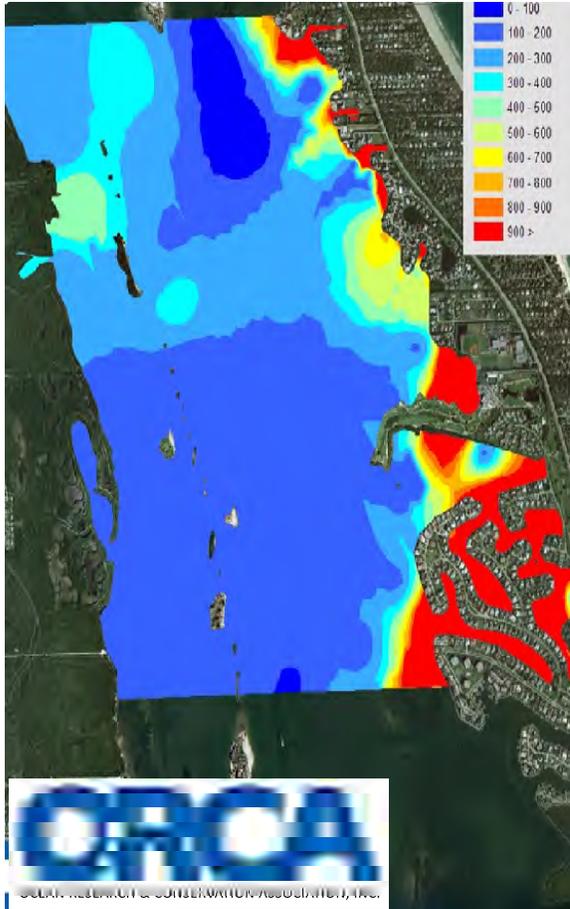
In June and July, the southern end of the Indian River Lagoon experienced a similarly devastating environmental disaster in the form of a toxic algae bloom. This event had damaging consequences on the local economy and has raised serious concerns about potential human health impacts. During this, ORCA was gathering and tracking algae blooms in real time.

As we look to the coming years, I hope you will stay engaged and continue to follow the news and reports on the lagoon and our progress. Please remember, the only way we can achieve our goal of a clean Indian River Lagoon, filled with abundant and healthy wildlife, is with your continued support.

A handwritten signature in black ink that reads "Edith Widder".

Edith Widder, PhD.
CEO and Senior Scientist

Mapping in Indian River County



Total nitrogen map of the study area. This gradient map shows the total nitrogen (mg/kg) of sediment samples collected in Indian River County.

With support from the Indian River Community Foundation, ORCA was able to extend pollution mapping in the county in 2016. The goal of this project was to identify the most serious and urgent issues facing the Indian River Lagoon (IRL) in Indian River County.

Sixty sites located between Oslo Park and the Moorings and one linear mile north were selected for testing. Pollution maps were created to show several possible sources of pollution in the lagoon including toxicity, nitrogen, phosphorus, and sulfur. The map to the left shows total nitrogen.

Breaking the study area into geographical categories such as natural shoreline, intracostal waterway, and developed shorelines have helped us examine the impacts in these areas more closely. It came as no surprise that the living or natural shoreline along the western boundary of the IRL had low nutrients compared to other sites. That's because we consistently see that natural shorelines,

lined with vegetation, such as mangroves and grasses, act as a buffer to trap excess nutrients and runoff from the land.

Interestingly, the samples collected around the Moorings Golf Course had the lowest relative toxicity and nutrients compared to all other samples along the eastern boundary. This may be due in part to the fact that the course has been a certified member of The Audubon Cooperative Sanctuary Program (ACSP) for Golf Courses since February 2014 and the shoreline is comprised of mangroves instead of the bulkheads that are common to so much of that shoreline. An ACSP designation for Golf Courses is an environmental education and certification program that helps golf courses protect the environment.

The objective going forward is to share the information generated through this study with others so that solutions can be implemented and monitored in the most affected areas.

A Real Solution

For many years ORCA has been looking for ways to identify pollution as well as cost effective ways to help remediate its effects. From several studies, including the most recent one in Indian River County, we have determined that living shorelines have an important role to play in terms of providing answers to our pollution problems.

The Indian River Lagoon's waters are some of the most productive and valuable natural habitats in the world. Diminishing water quality has serious, long-term implications for all those that live in or near these waters.

Many developed shorelines, including those on residential properties, have their native plants, grasses and trees replaced with wooden bulkheads or concrete walls. This process is ostensibly done to prevent erosion, but erosion can still occur behind the walls. The bulkheads destroy the natural habitat, but more importantly, hardened shorelines cannot filter rainwater runoff, so pollutants and sediments can easily enter the waterway and harm aquatic life.

Having confirmed the importance of living shorelines in so many of our studies, ORCA will add educating the public on the benefits of living shorelines to our charge. We are also seeking opportunities to partner with other organizations to develop and restore living shorelines along the Indian River Lagoon.



Twenty-Five State Funded Kilroy Study

The decline of our beautiful Indian River Lagoon has put ORCA's efforts front and center in the newspapers and on everyone's mind. It has also resulted in much needed funding to do some of the research necessary to determine what is really happening in the lagoon.

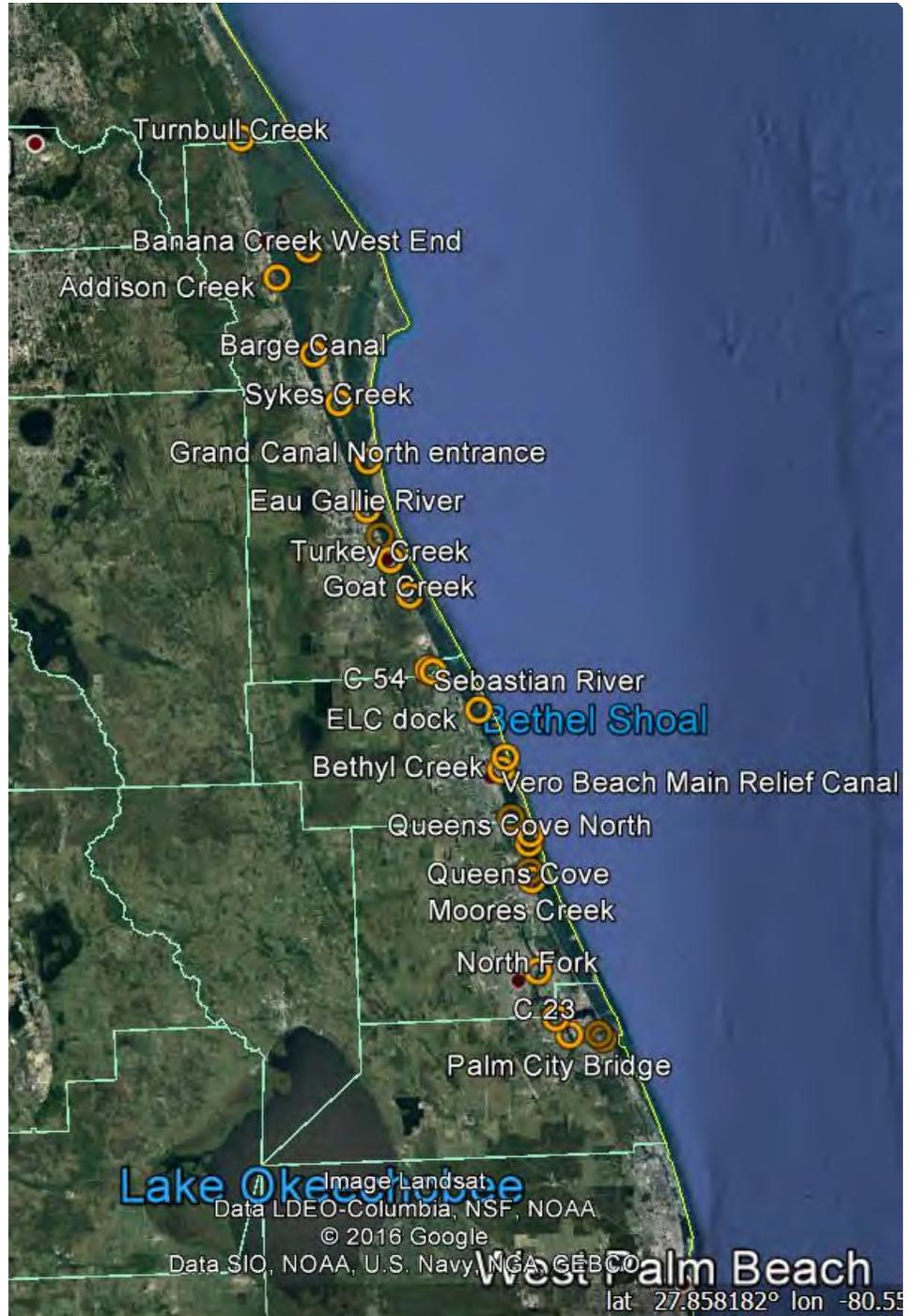
We know most of the pollution affecting our waterways can be traced primarily to non-point source pollution. Storm water runoff, lake discharges, sewage spills, and leaky septic tanks are just a few of the causes, but it is difficult to know the exact source and that's where ORCA's Kilroys come in. Because the Kilroys are very compact, that makes them uniquely suited for deployment in the canals and tributaries that are carrying pollution into the lagoon. ORCA has, for the past two years, received funding from the state of Florida to deploy 25 Kilroys in canals and other inputs that discharge into the Indian River Lagoon

With our goal being to provide the best available science for formulating management decisions, we are now able to identify canal inputs most in need of mitigation. Continued monitoring will help ensure management goals are being met and tax dollars effectively spent.

During the fish kill, because ORCA had Kilroy water quality monitors in place, both in kill zone and in the surrounding areas, we were able to collect detailed data on the algae bloom and other events that were responsible for the kill. What we discovered was a massive algae bloom, a series of overcast days, and an increase in water temperature in the days preceding the kill. Those events reduced the oxygen carrying capacity of the water and, along with a decrease in barometric pressure, appear to have caused the conditions that suffocated the fish.

We believe this may be the most comprehensive information ever collected on a fish kill and it will help answer long standing questions about why massive algae blooms lead to fish kills in some situations and not others. With this knowledge, we may be able to stop this kind event from happening again.

ORCA was also involved on several fronts trying to understand the devastating algae bloom that occurred in the southern end of the lagoon in June and July. We were monitoring the water quality with Kilroys and measuring the concentration of the potent toxins in the water and the muck. We are concerned about the possibility of this toxin finding its way into our food and water supply and are working on tracking methods to address these concerns. Evidence that microcystin, one of the toxins which is known to cause liver damage, is in fact making its way into our food web is critical in order to accurately assess the exposure risk to humans and marine life such as manatees and dolphins.



Comprehensive Canal Study

In December of 2016, ORCA finished up a two-year year study called the Comprehensive Canal Study (CCS). The project began in 2014, and was a first-of-its-kind research project. The study was conducted in the C24 canal, which leads into the Indian River Lagoon. The plan was to take an ecosystem-wide approach to understanding the impact of various pollutants on the water quality of the lagoon. The multi-year study provided information to scientists to allow them to see if there were seasonal impacts or other weather and anthropogenic affects on the water quality and conditions of the canal.

A seven person committee was established to serve as oversight because the research being done by ORCA was funded by The Scotts Miracle-Gro Company. The committee provided guidance to ORCA on the design of the project and ensured that the research yielded unbiased insight into the Indian River Lagoon's health. A final review by the committee will be done in January of 2017 and the results of the study are to be presented to the public at ORCA's first Report on the Indian River Lagoon, which will take place on January 25, 2017.

The CCS included Kilroy water quality monitoring systems and FAST sediment testing along with several other components. ORCA's CEO and senior scientist, Dr. Edie Widder, along with Research Scientist, Dr. Beth Falls oversaw all of the aspects of this project. Analysis of the samples was conducted at ORCA's laboratory as well as in collaboration with Smithsonian Marine Station in Fort Pierce, The University of Georgia, Indian River State College and Walsh University in Canton, Ohio.

The Comprehensive Canal Study Research Review Panel Members

Donald Albrey Arrington, Ph.D.

Executive Director Loxahatchee River Environmental Control District

Deborah Drum

Manager, Ecosystem Restoration & Management
Martin County

Boyd E. Gunsalus

Lead Environmental Scientist
South Florida Water Management District

Peter D. O'Bryan

Indian River County Commissioner District 4

Mark Perry

Executive Director Florida Oceanographic Society

H. M. Ridgely

Real Estate Manager
Evans Properties, Inc.

Karen Smith, PWS (has since retired)

Former Director, Environmental Resources
Department / St. Lucie County

Ways to Help the Next Generation



ORCA is a not-for-profit organization. We works with donors, colleagues and friends to protect and conserve aquatic ecosystems and the species they sustain for the benefit of this and future generations. Every dollar you contribute goes directly to support advances in technological research, conservation science and educational programs. You can mail donations to ORCA, 1420 Seaway Drive, Ft. Pierce, FL 34949 or visit us online at teamorca.org.

You may also consider extending your support of ORCA into the future by including ORCA in your estate plans with a legacy gift. Each donor has unique circumstances, which determine the means of giving that is most applicable to their individual situation. When considering a legacy gift to ORCA, we encourage you to discuss these and other specialized giving vehicles with your attorney and/or financial advisor to ensure your legacy giving is appropriate to your estate plans and to determine the tax benefits of the legacy gift to you and your family.

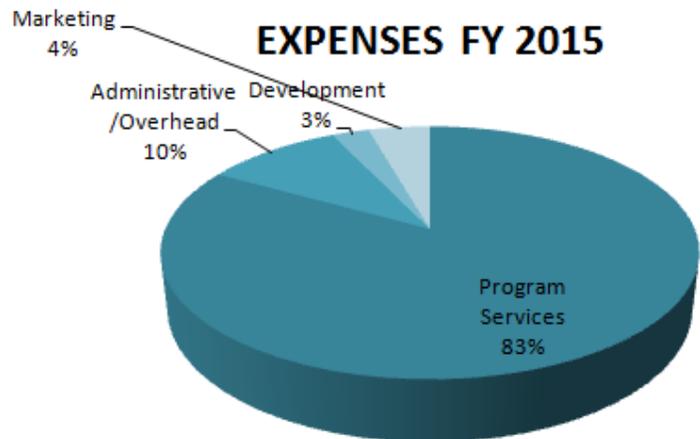
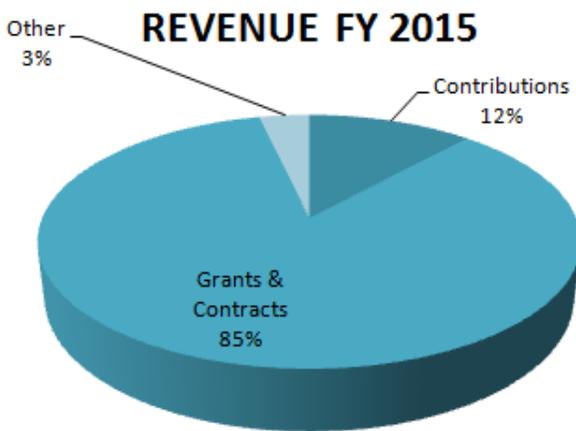
ORCA is a non-profit, non-governmental conservation organization and tax exempt under Section 501(c)(3) IRS. Contributions are tax-deductible.

2015 - 2016 Financial Summary

The information below summarizes ORCA's audited revenues and expenses for the fiscal years 2015 and 2016. For more information or questions, please call (772) 467-1600.

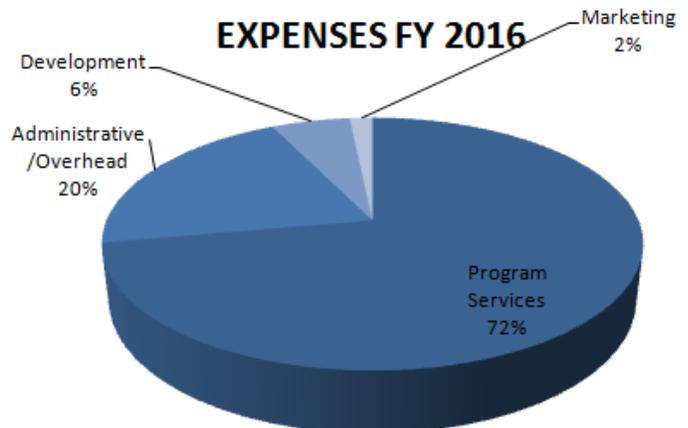
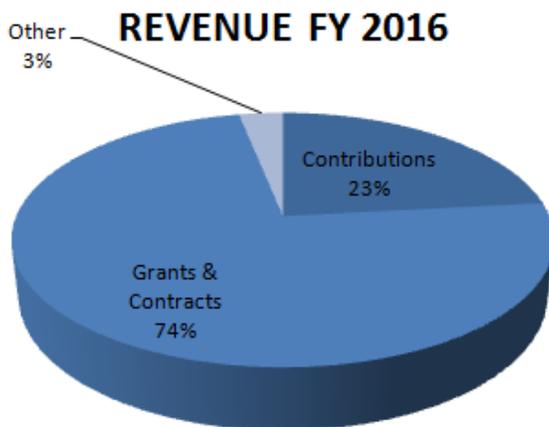
Revenue FY 2015	\$2,447,630
Donations	\$ 287,096
Grants/Contracts	\$ 2,073,255
Other	\$ 87,279

Expenses FY 2015	\$ 2,485,340
Program Services	\$ 2,065,778
Administrative/Overhead	\$ 243,007
Development	\$ 66,606
Marketing	\$ 109,949



Revenue FY 2016	\$ 1,611,315
Contributions	\$ 375,060
Grants & Contracts	\$ 1,185,807
Other	\$ 50,448

Expenses FY 2016	\$ 1,771,965
Program Services	\$ 1,278,949
Administrative/Overhead	\$ 364,233
Development	\$ 99,731
Marketing	\$ 29,052





OCEAN RESEARCH & CONSERVATION ASSOCIATION

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