



**KENT DENVER SCHOOL**  
**GOLIATH**  
**GROUPE**  
**RESEARCH PROJECT**

“If a small group of ninth graders in Colorado can make a difference in a marine ecosystem over two thousand miles away, then we can only imagine what the scientific community at large can accomplish.”

“This project is different than anything I've ever done before, and it could make a big impact by encouraging other schools to become involved in ecosystem health nationwide.”

—Kent Denver 9th Graders

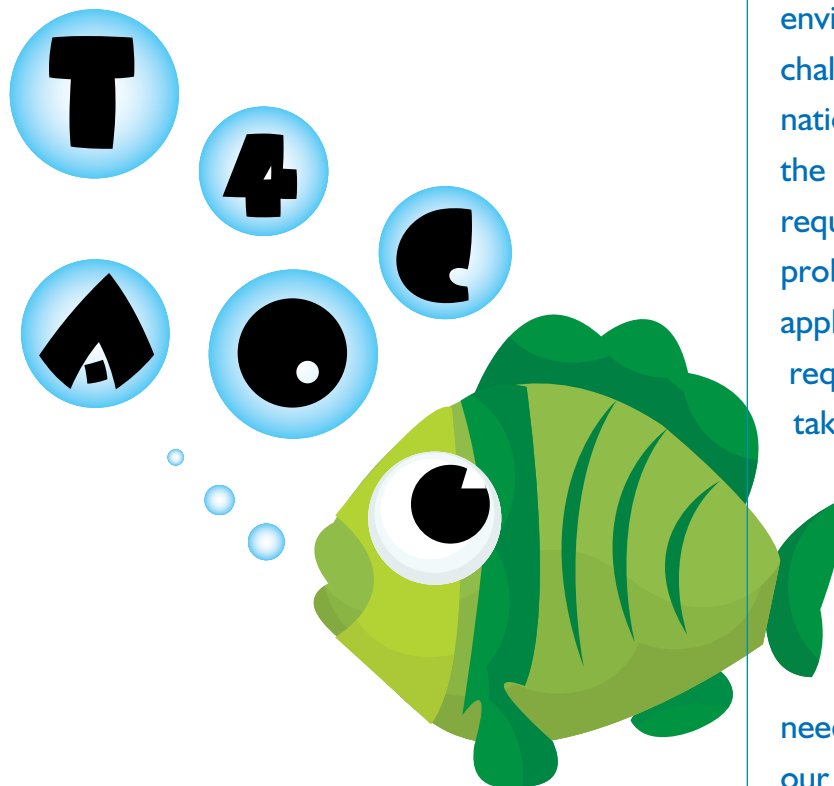


Kent Denver School

in collaboration with



BUILDING AMERICA'S OCEAN TRUST



**BAHIA HONDA STATE PARK,**  
**FLORIDA KEYS**



**W**e confront an ethical, environmental, and economic challenge that urgently requires our nation to realign its posture toward the sea. Changing our course requires understanding the problems, setting the objectives, applying the focused energy required to overcome inertia, and taking appropriate action in time to stem the impending disaster. Only a well-coordinated and innovative public effort will accomplish the work of educating people about the need to redress the imbalance in our oceans.”

—Pew Oceans Commission

**GOLIATH GROUPE**

**S**tudents at Kent Denver School have designed, and plan to install a remote underwater research station on pylon #65 of the Bahia Honda Bridge in the Florida Keys in August of 2008. The purpose of the installation is to study a species of fish called the Goliath Grouper, in addition to the many other



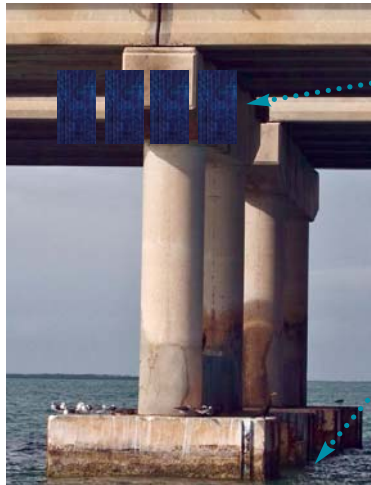
forms of magnificent underwater life that inhabits the study site.

The Goliath Groupers have been targeted both commercially and recreationally since (at least) the late 1800's. These fish were primarily hunted during their spawning season when they would congregate in large numbers on near shore reefs. They suffered their biggest population decrease in the 1970's and through the 1980's. Thanks to the incredible work of one man, fisherman Don DeMaria, the species was listed as a candidate for the Species of Concern List under the U.S. Endangered Species Act, and since rebounded to historic numbers.

The Goliath Grouper is emblematic of a healthy and potentially sustainable fishery, but must be rigorously studied to ensure that viable populations can be maintained. Kent Denver students will facilitate researchers around the country in their studies of Goliath Grouper behavior, feeding, life history strategies, and migratory patterns.

## WHY IS IT IMPORTANT?

The equipment at the bridge will consist of three state-of-the-art underwater cameras, with acoustic sensing hydrophones to record the sounds that the groupers are known to use during spawning and feeding. Sophisticated lighting systems will allow observation of life at night. Students will have the ability to monitor and study the fish and then report their findings to leading scientists, such as Dr. Chris Koenig and Dr. Felicia Coleman, collaborating on the project.



Solar panels and battery systems to power the system

Cameras, hydrophones, and lights attached to bridge pylon

## RESEARCH GOALS

**W**hat are the Goliath Groupers' feeding habits?

**C**an Goliath Groupers see light? If so, how do groupers react to light?

**H**ow do groupers react when humans are near?

**W**hy do thousands of Tarpon migrate to the Bahia Honda Bridge in the spring?

**W**hat are natural predators of tarpon?

**W**hat are major pollutants in the water and how can we reduce the pollution in the water?

**T**his project will not only facilitate a better understanding of the Goliath Grouper and the ecosystem it lives in, but also serve to develop stewardship for our ocean. The empowerment and knowledge the students have gained while doing this project have been

immeasurable. Furthermore, the students have tangible goals that they individually have met, and worked on diligently throughout the year. This project will give Kent Denver students the opportunity to connect with professional scientists and other students across the country and gain a practical, real-world exposure to the scientific process.

## TIMELINE + COSTS

- Students have been designing and testing the equipment since January 15, 2008.
- Final fabrication and testing will be conducted toward the end of May 2008.
- Emplacement online is scheduled to occur August 12-18, 2008.
- The total cost for constructing and installing the base is \$73,900.00.
- Additionally, an annual maintenance fee of \$1,500 is necessary, as well as a \$5,000 retro-fit after five years.
- This funding will fund a fully functional and self-powering system, and will transmit video and acoustic data directly to Kent Denver School.
- The research base will be available to a worldwide audience, but controlled by the students at Kent Denver School.

## HOW DO THE STUDENTS HELP?

In order to design and install the research equipment, students had/have to:

- Make contact with the necessary scientists to aid in establishing worthwhile research questions about the Goliath Grouper and the ecosystem in which it lives.
- Induce scientific questions and make predictions, deductively derived from the students' hypotheses.
- Research and familiarize each other with equipment, fish tagging, and acoustic technologies.
- Design station and powering system for cameras, lights, and hydrophones.
- Draw Schematics of the Bahia Honda Bridge, Pylon #65.
- Apply for a permit from the Florida Department of Transport.
- Assist Mr. Mendelow in securing funding.
- Purchase, build, and install the equipment.
- Work with Dr. Chris Koenig to determine the nature of the data sets his team needs – e.g. sound recordings, visual observations, dates, times, tidal and meteorological conditions etc.
- Frame scientific hypotheses, and design the experiments to test them.
- Monitor the station, collect and analyze the data, and publish the results
- Work with scientists like Dr. Chris Koenig for joint publication.
- Use station to promote interest and awareness of coastal marine ecosystems.

**T**revor Mendelow and his 9th Grade students have collaborated with Dr. Chris Koenig from Florida State University, and acclaimed filmmaker and marine scientist, Soames

Summerhays. Don DeMaria will assist us with the installation of the equipment, in recruiting schools and fisherman in the Florida Keys, and with the monthly underwater maintenance.



Don DeMaria



Dr. Chris Koenig



Oean Presence Technologies OPT-6 underwater camera