



# 2010 ANNUAL REPORT



MIAMI

R.J. DUNLAP  
MARINE  
CONSERVATION  
PROGRAM

This document is a report summarizing the achievements and progress of the R.J. Dunlap Marine Conservation Program at the University of Miami in 2010.

The document describes the Program's objectives, activities and results that were generated with your support. We hope to continue your support in 2011.



The mission of the R.J. Dunlap Marine Conservation Program is to advance ocean conservation and scientific literacy by combining cutting-edge research and outreach activities. High school, undergraduate and graduate students will have the opportunity to participate in exciting hands-on field and virtual learning experiences.

Additionally, field and virtual expeditions will expose students and teachers from across the globe to the importance of oceans in their daily lives. They will learn about the threats facing our waters

and adjacent coasts, and explore the solutions for conservation. Educational opportunities will especially be made for those in land-locked communities as well as those in traditionally underserved populations.

Students may earn course credits by conducting independent, interdisciplinary projects under the supervision of specialists and scientists who are leaders in their respective fields. These projects will be directly applied to foster ocean and coastal conservation.

# OVERVIEW

1. Advance marine conservation through cutting-edge science and education projects
2. Provide students with opportunities for career development in a variety of disciplines through practical hands-on field experience
3. Advance public understanding of ocean and coastal conservation issues through innovative outreach opportunities

# OBJECTIVES





# P O L I C Y S C I E N C E

## INTERSECTING

The R.J. Dunlap Marine Conservation Program is a joint program of the Rosenstiel School of Marine & Atmospheric Science and the Leonard and Jayne Abess Center for Ecosystem Science and Policy at the University of Miami. The Rosenstiel School offers one of the largest, most comprehensive marine and atmospheric programs in the nation. Robust academics and in-depth scientific investigation are hallmarks of the School's programs. The Abess Center creates innovative interdisciplinary initiatives that bridge the gap between hard science and environmental policy. The Abess Center is the nexus for flexible undergraduate and graduate programs, which gives students the opportunity to learn in a problem-solving context and gain substantial field experience.

This program provides interactions among high school, undergraduate and graduate students, teachers and scientists within a research and mentoring setting. It aims to foster environmental stewardship, student and public awareness of the marine sciences. Information from the program is disseminated to both the scientific community and the general public through peer-reviewed journals, scientific conferences, primary school presentations, presentations to civic organizations, the media and the Internet.



## SHARKS

- Advanced satellite tagging used to determine migratory patterns, feeding aggregations, mating and parturition sites in order to prioritize areas for creation of Marine Protected Areas.
- Determine the relative abundance, growth rates, and sex ratios of coastal shark species.
- Study the presence and concentrations of trace metals and other toxins present in sharks and identify habitats where sharks are vulnerable to bioaccumulation of these toxins.

## MANGROVE FISHES

- Examine the distribution, abundance and behavioral patterns of mangrove fishes in Biscayne & Florida Bay for downstream effects of the multibillion dollar Everglades Restoration Project currently underway.
- Field surveys and laboratory experiments to explore relationships among species, salinity, temperature and other habitat.



## ECOLOGICAL IMPACTS OF DESTRUCTIVE FISHING

- Monthly surveys of marine communities in the Florida Keys to understand the ecosystem role of marine predators and the subsequent cascading effects of their declines by over-fishing on their communities.
- Predict how both predators and prey are likely to respond to destructive fishing practices for developing effective conservation and management strategies.

## HUMAN NEURO-TOXIC DISEASES

- BMAA is a naturally occurring amino acid linked to neurological diseases such as Parkinson's Disease, Alzheimer's Disease and ALS (Lou Gehrig's Disease).
- Detecting and quantifying BMMA in South Florida marine and coastal ecosystems using state-of-the-art analytical methods.

- Field experiments to determine lionfish predators in the subtropical Atlantic.
- Examine size-specific anti-predatory lionfish behavior.



## BARRACUDA

- Surveys to determine seasonal abundance, growth and reproductive patterns of great barracuda.
- Examining the presence and concentration of toxins in barracuda to provide insights into ecosystem health.

## PHYSIOLOGICAL STRESS

- Measure changes in blood-chemistry, behavioral reflexes, and swimming activity of sharks caught during fishing to determine the health, magnitude of stress, as well as any associated immediate and delayed mortality.
- Data will be used to inform and manage catch and release fishing activities.

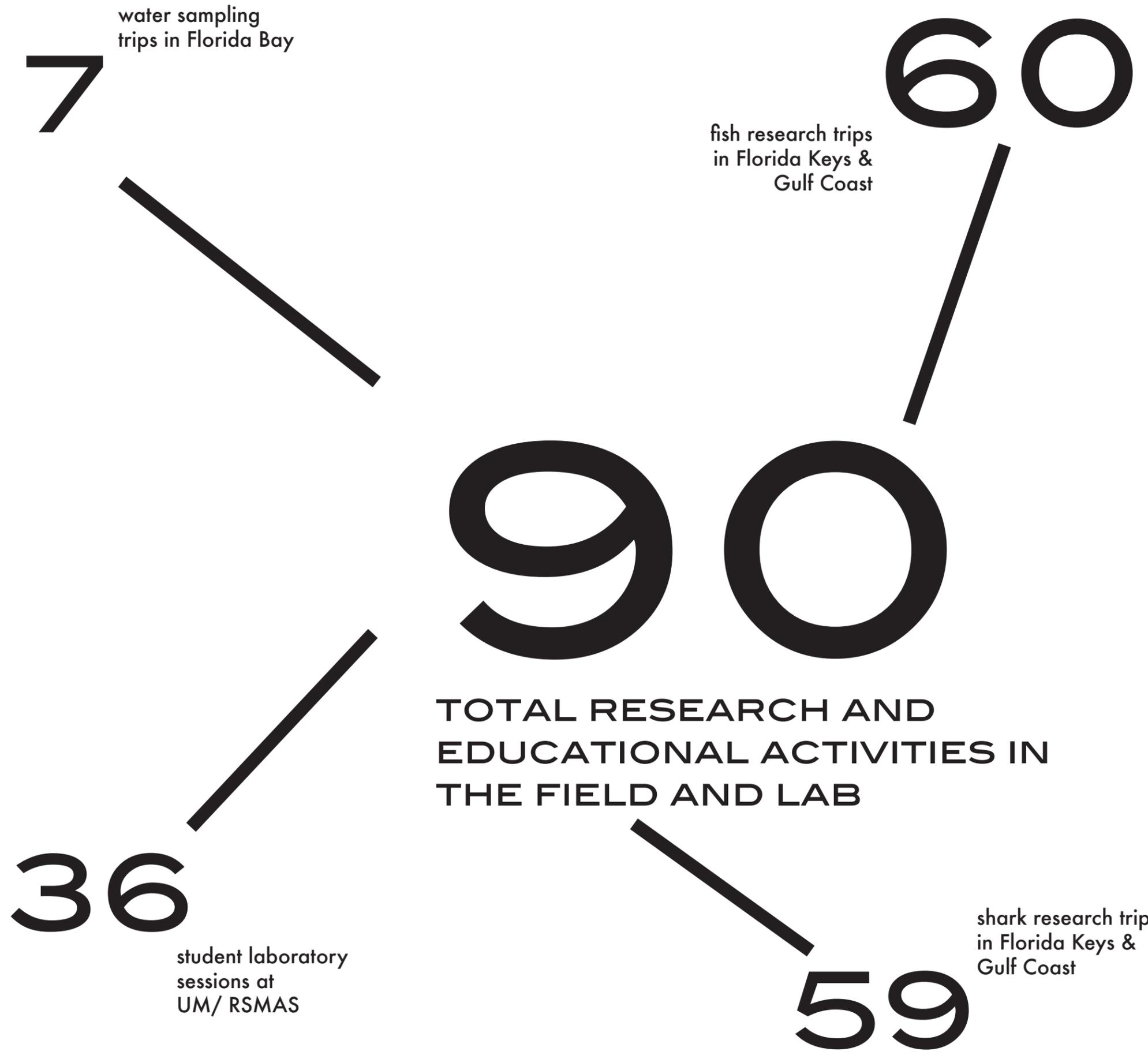
## LIONFISH



# RESEARCH



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# TV

CNN  
PBS  
History Channel  
Animal Planet

# ONLINE

CNN.com  
Sharkwisperer.com  
Planetgreen.com  
Waterwideweb.com  
Outdoorlife.com  
News-Press.com  
VX50.com  
Puggal.com  
Twirlit.com  
UM E-Veritas.com  
Dorsalfin.com  
Innovations-report.com

LA Times  
Coastal Angler  
Sun Sentinel  
Outdoor life magazine  
Miami Hurricane  
News-Press (Fort Myers &  
Southwest Florida)  
Miami Herald  
Spiegel Magazine

# PRINT

Florida Association of Science Teachers  
Annual Conference  
AcuFest Wellness Fair at the  
Biltmore Hotel  
BioBlitz  
American Elasmobranch Society  
South Florida Urban Ministries  
Shark Fest at Florida Keys Community  
College  
Lower Metacumbe Fishing Club  
Springer Publishing  
EarthFest

# PRESENTATIONS



IN THE  
MEDIA



# GPS

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(FOR SHARKS)



We are using advanced satellite technology that allow real-time tracking of tagged sharks, particularly hammerhead, tiger, and bull sharks, which are included on the IUCN Red List of Threatened Species due to their alarming population declines.

The goal of this work is to understand the migratory routes and residency patterns of these species to help implement policy that will improve protection for these species (i.e. marine reserve design) while simultaneously providing knowledge that will increase safety for recreational ocean users.

Satellite data from tagged sharks have been provided to and named after students and schools throughout southern Florida as well as online for free download by schools anywhere in the world. Students can follow the animals' real-time movements and create independent projects based on the data. Data on the movements of migrating sharks will educate students about the life history of sharks, while at the same time teaching students the scientific method and training them in the techniques needed to analyze scientific data.

Marian Dunlap  
Batchelor Foundation, Inc.  
The Rosenstiel School of Marine & Atmospheric Science  
The Leonard and Jayne Abess Center for  
Ecosystem Science and Policy

Wells Fargo  
SeaStar Foundation  
Felix Leander  
Hank Luria  
Mary O'Malley & Lupo Dion

## SPONSORS



The RJ Dunlap Marine Conservation Program at the University of Miami is indebted to the support of its partners and sponsors. Established through a founding donation from Marian Dunlap in honor of her husband, the late Richard J. Dunlap who was an avid fisherman and environmentalist, the program is providing exciting opportunities for students to advance ocean conservation through hands on projects.

Herbert W. Hoover Foundation  
Save The Blue  
Key Biscayne Rotary Club  
NOAA Living Marine Resources Cooperative Science Center  
Jim Abernethy's Scbua Adventures

The Stiltsville Trust  
Antoinette and Gail Baldwin  
Stan Spielman  
Tim & Joan Delaney  
Liataud Family

## PARTNERS

# SPONSORS

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Sophi Bromenshenkel  
Curt-a-Sea Fishing Charters  
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Oceana, Inc.

The BioDiversity Research Institute  
Cooperative Unit for Fisheries Education and Research, RSMAS  
Mote Marine Laboratory  
Biscayne National Park  
Capt. Chris Johnson, SeaSquared Charters

Our work is supported by a variety of exceptional organizations, companies and private donors. We truly appreciate the generosity and foresight of all our sponsors and partners and look forward to exploring future endeavors together.



# PARTNERS

YSI, Inc.  
Global Village Concerns  
DragonFly Expeditions  
Shark Foundation  
Deering Estate at Cutler

CLS America, Inc.  
West Coast Inland Navigation District  
Everglades National Park  
Florida Gulf Coast University



## REAL-TIME SHARK TRACKING



Students can study the satellite tracks of more than two dozen sharks in real-time via *GoogleEarth* on our website. Profiles for each shark give a complete picture of their stories. The tracking data is providing new insight into the behavior of these elusive oceanic predators.

To increase student learning and public outreach across the globe, we have created the first of a series of virtual interactive learning experiences and expeditions that are freely accessible to students and teachers across the globe. The Virtual Expedition demonstrates the connectivity and importance of marine and terrestrial environments in our daily lives. In addition, it trains students in the scientific method, using real scientific data.

## ONLINE HIGH SCHOOL CURRICULUM

In collaboration with Deering Estate at Cutler Bay, the R.J. Dunlap Marine Conservation Program has developed a full curriculum for high school students in Marine Conservation Science & Policy. The curriculum is free to download online from our website and it meets Florida Sunshine State Standards. Modules include: Coastal and Ocean Habitats; Sharks and Rays; Ocean Connections: Marine Issues: Scientific Method; and Management, Conservation, Research and Action.

## INTRODUCTORY R.J.D. PRESENTATION

Available in our Learning Resources Online Library, students can download an introductory presentation on our program and research methodology.

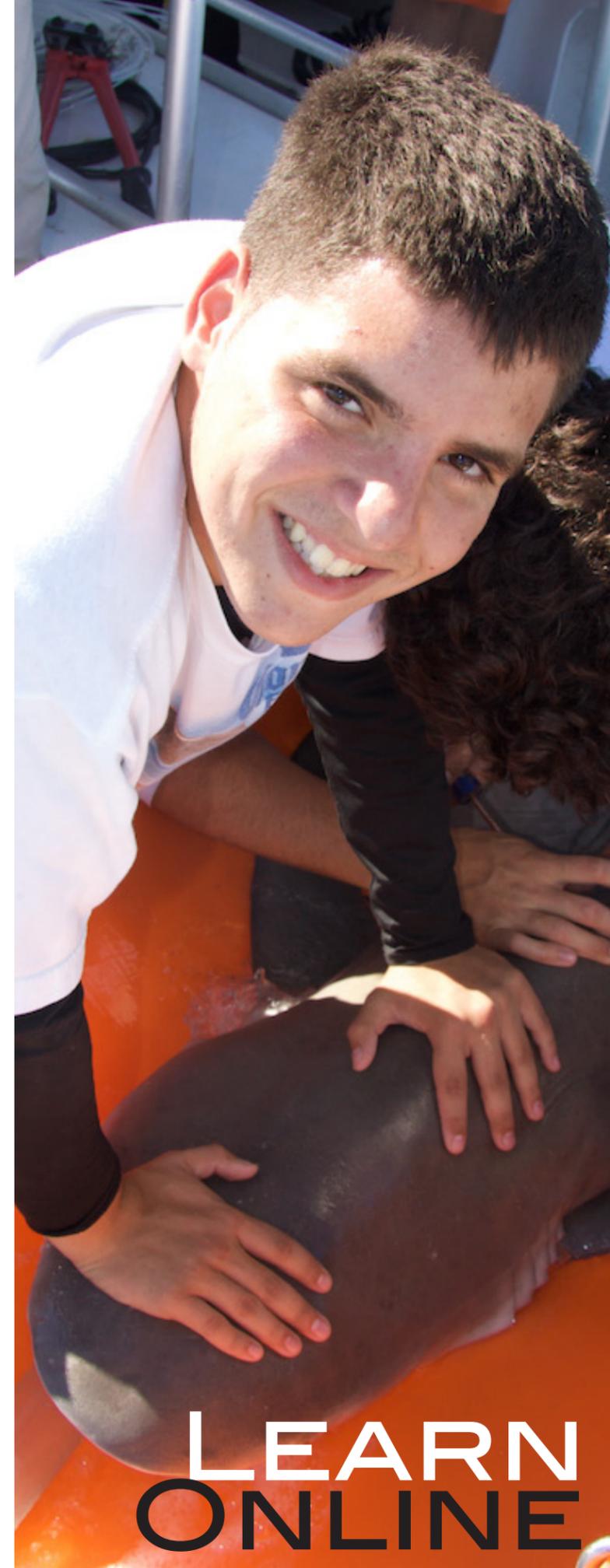
The DAMSL Project is a first of its kind, interactive database, which catalogs marine life in photographs by geographic location while providing encyclopedic content. Employing satellite imagery and photographer Myron Wang's images, DAMSL allows users to see images of indigenous species as they run their mouse over a map of the world. The DAMSL database is available online, free of charge.



## PROFESSIONAL EDUCATION

The RJ Dunlap Marine Conservation Program is excited to collaborate with RSMAS at UM to offer a Professional Masters Degree in Marine Conservation. The goal of the track is to advance conservation efforts, scientific literacy and communication, public outreach and integration, and education within the marine realm. This 12-month program includes two semesters of coursework and a 3-6 month internship at one of a number of a number of local federal agencies, institutions, and NGOs, in which students apply both the theory and practical aspects of their training to real-world projects.

## DAMSL PROJECT



# LEARN ONLINE

# PARTICIPATION

During the reporting period, nearly 1000 students participated in RJ Dunlap field and lab activities. We would like to thank the participating institutions, organizations, and agencies.

## Middle School & High School

Coral Shores High School - Miami, FL

Hebrew Academy - Miami, FL

Palmetto High School - Miami, FL

Saint Andrews High School - Miami, FL

South Broward High School (SBHS) - Hollywood, FL



Lakeview Middle School - Lakeview, NC

MAST Academy High School - Key Biscayne, FL

Palmer Trinity High School (PTS) - Palmetto Bay, FL

St. Thomas Aquinas High School - Fort Lauderdale, FL

Troy Academy - Miami, FL

AMIkids - Miami, FL

## Universities

Boston University - Boston, MA

Dalhousie University - Ontario, Canada

Florida Gulf Coast University (FGCU) - Fort Myers, FL

Florida International University (FIU) - North Miami, FL

Oregon University - Eugene, OR

Northeastern University - Boston, MA

Nova Southeastern University (NSU) - Dania Beach, FL

University of Miami - Miami, FL

University of Southern Maine - Portland, ME

# PARTICIPATION

## Organizations

Branches

City Year

Curt-A-Sea

Florida Seabase

Global Village Concerns (GVC)

Greenworks

Jim Abernathy Scuba  
Adventures (JASA)

Keys Marine Lab

The Miami Museum of Science,  
IMPACT Program

Oceana

## Government Agencies

Department of Environmental  
Resources Management  
(DERM)

Florida Fish and Wildlife  
Conservation Commission  
(FWC)

National Marine Fisheries  
Services (NMFS)

National Ocean and  
Atmospheric Association  
(NOAA)

National Park Service (NPS)

Oceanicallstars

Save the Blue

Shark Safe Network

Summit Series



# DETAILED PARTICIPATION SUMMARY

During the reporting period, nearly 1000 students participated in field trips through the RJ Dunlap Marine Conservation Program. Participating included middle school, high school, undergraduate students, graduate, and post graduate.



**10** students and 2 faculty members of Coral Shores High School located in Tavernier, Florida participated. The school has 0.91% Asian, 2.85% Black, 26.17% Hispanic, 0.26% Indian, 1.17% Multi-Racial, and 68.65% White of an over 700 student total population.

**11** students and 2 faculty members participated from the Hebrew Academy, which is part of the South Florida Jewish community. "Its role is to carry out the Torah's mandate to teach the principles and practices of Judaism to our students and their families with love and sensitivity. We strive to develop an appreciation for and commitment to Judaism as a way of life, affecting both the way we think and the way we act. Our aim is to engender within our students a sense of commitment and caring of one human being for another, as well as to develop within them a sense of responsibility for the environment, and all of creation. We encourage our students to become involved and actively participate in the concerns and activities within their local, national and world communities. They are trained to aspire to and assume leadership roles within their community, through taking an active role in its needs, thereby becoming productive American citizens, recognizing and internalizing their responsibilities of citizenship. Our entire learning environment is suffused with service learning.

**17** students and 2 faculty members participated from the Lakeview Academy, which "is committed to excellence in the personal growth and academic development of the college-bound student through a partnership of school, family, and community."



**68** participated from MAST Academy, including 4 faculty members. MAST Academy was established in September 1991 and accredited by the Southern Association of Colleges and Schools. MAST is the only maritime and science technology magnet high school in the Miami-Dade County Public School system. MAST has over 500 students in grades 9-12. The MAST Academy offers a unique and rigorous marine-theme curriculum and superb facilities with access to the local Biscayne Bay ecosystem. The small size of the school, low student-teacher ratio, and parent, community and corporate involvement contribute to the success of the MAST Academy as an educational institution. MAST Academy is 50% Hispanic, 29% White non-Hispanic, 17% Black, and 4% Asian.

**53** participated from Palmer Trinity School (PTS), including 1 faculty member and 1 staff member. Palmer School and Trinity Episcopal School merged to become Palmer Trinity School in 1991, with plans and visions that would allow the two institutions to be mutually beneficial. Predictably, there were challenges after the merger, as two different school cultures and communities came together. It took a few years for the green and gold Pirates and the purple and white Titans to feel bonded in being blue and gold Falcons, but it was increasingly clear that this new independent Episcopal school was destined to become a premier educational institution. Today Palmer Trinity's students, over 50% of who are bilingual, come from 37 countries. Students represent Episcopal, other Protestant Christian, Roman Catholic, Jewish, Islamic, and Hindu faiths. As an Episcopal school, Palmer



Trinity welcomes students and families of all faiths, and promotes an affirming, inclusive atmosphere. Palmer Trinity's dedication to excellence spans all facets of school life. Honors and AP courses, the Laptop Program, the Advanced Scholars Program, Curriculum Mapping, and initiatives like Religion and Ecology reflect Palmer Trinity's commitment to strong traditional education alongside creative, innovative education. Along with PTS a student from Palmetto High School and a student from Saint Andrews participated.

**73** participants were from South Broward High School, including 2 faculty members. South Broward High School is a maritime magnet school with a student population approximately 2,300 and is ethnically diverse with over 60% eligible for free/reduced lunch. The socioeconomic backgrounds range from poverty to upper middle class. This school offers an assortment of maritime curricula as well as a full range of athletics, clubs and organizations designed to engage the students. Their high school students are a highly trained resource for the maritime community. They dive on reefs, count sharks and design their own Geographic Information System (GIS) maps back at school as Service Learning projects. They also build Remotely Operated underwater Vehicles (ROV) equipped with cameras and robotic arms. They use them to study the coral reef, explore historic shipwrecks and inspect mega yacht hulls from local marinas. In return for their unique experiences, these ocean ambassadors personally visit elementary school classrooms (or video conference), providing them with hands-on lessons about coral reef ecology and apex predators. Of the total students at South Broward there are 37% White, 31% Hispanic, 28% African-American, 2% Asian, <1% American Indian, and 2% Multi-Racial.



**14** students and 3 faculty members participated from St. Thomas Aquinas, which is "a four-year, college-preparatory, secondary school that educates young men and women in the Catholic tradition of youth formation. Respectful of each person's self-worth, we seek to develop each student's God-given talents in a safe atmosphere of caring, sharing, and challenge through a varied program of educational offerings, religious experiences, athletic programs, social and cultural opportunities, and service. The entire program focuses on the individual student, made in the image and likeness of God, who receives attention, acknowledgement, and challenge."

**11** students and 2 faculty members participated from Troy Academy, which is 87% Black and 13% Hispanic.



An undergraduate student from Boston University participated 4 times and a post graduate student from Dalhousie University participated 5 times. 28 undergraduate students and 3 faculty members participated from Florida Gulf Coast University (FGCU). A PhD student continued to participate this year from Florida International University. A graduate student from Oregon University interned. A Masters student from Northeastern University interned and is now a PhD student at the University of Miami. An alumni of University of Miami, who is now a graduate student at Nova Southeastern University continued to participate. Over 50 students from the University of Miami, including 20 new participated. A student from the University of Southern Maine interned as well.

**11** participated from the AMIkids Miami-Dade, which was formerly known as Dade Marine Institute. It "is a private, not for profit, alternative based program for adjudicated youth referred through the Department of Juvenile Justice. AMIkids finds solutions for juvenile crime issues that face Miami-Dade County through a low-risk, non-punitive marine guided environment for approximately 6-9 months. We traditionally deal with at-risk youth, 14-19 years of age who have been redirected through the courts system to help change their life without slipping further into the legal system. We boast an 87% success rate locally; meaning that nearly 90% of the youth whom successfully complete our program never have a brush with the law again. We work with youth on strict educational, legal and treatment programming in a marine environment. Our staff approach blends the best of structure, discipline, care and nurturing. We know there is a bright future for every kid. In this, we find hope, excitement, discovery, promise and success."





**19** participated from Branches. There are several community-service projects that I will always remember. The Miami District Disaster Response Youth Summer Interns decided to have a youth work day. The program wants the participants to learn to give and participate in a service project each month. They feel that “it is important to teach the value of serving and then to practice it.”

**1** undergrad from City Year participated. “City Year unites young people of all backgrounds for a year of full-time service, giving them the skills and opportunities to change the world. These diverse young leaders help turn around high-need schools and get students back on track to graduation. At City Year’s 20 locations across the United States, young adults ages 17 – 24 serve full-time for 10 months and apply the power of national service to help close the education achievement gap by working directly with at-risk children throughout the entire school year. Teams of full-time corps members help improve student attendance, behavior and course performance – which research confirms are indicators of a student’s likelihood of graduating from high school. As near-peers who begin their service before the first bell rings and stay until the last child leaves the after-school program, corps members are uniquely able to help students and schools succeed.”

Curt Slonim and 6 associates participated. Curt is the captain and owner for Curt-A-Sea Fishing Charters located on Lower Metacurnbe in beautiful Islamorada, Florida Keys. Curt has fishing and diving the waters of the Florida Keys since early childhood and at the age of 33, he has already had his Captain’s License for 13 years. Curt has earned his fishing pedigree by fishing side by side with some of the most well-known and best captains in the business. He started his own company in 2003, and has developed a great client base.



**21** mates participated from the Florida National High Adventure Sea Base, which is owned and operated by the National Council of the Boy Scouts of America to offer unique educational aquatic programs to our members.

**3** mates participated from the Keys Marine Laboratory, which “is a full-service marine lab situated in the heart of the Florida Keys island chain at mile marker 68.5. The facility offers a unique opportunity for college level education and researchers studying the only tropical marine ecosystems in the continental United States. The laboratory includes flow-through seawater systems, housing, laboratories, classroom/meeting rooms, boat fleet, and diving support facilities.”

Jillian Morris participated from Oceanicallstars, which is an international team of well traveled, highly skilled individuals who through providing video, photo, design and consultancy services; help focus, raise awareness and promote the conservation of sharks and other threatened wildlife. Oceanicallstars strive to raise public awareness of sharks and their vital role in the marine ecosystem.

Participation also included George Hampton from Global Village Concerns (“GVC”), James Jila participated from Greenworks, Claus from Latitude within Denmark, Sylvester King Jr and Scott Brady from Morgan Stanley, Elizabeth Wilson and Jon Warrenchurch from Oceana, Edward and Hillary Smith of Save the Blue, Mary O’Malley of Shark Safe Network, and 11 coordinators of the Summit Series. The Bromenshenkel, Geiger, LeShaw, Liataud, Oleson, and Slonim families participated. Commissioner Ray Sudah as well as officials and representatives from the Department of Environmental Resources Management (DERM), Florida Fish and Wildlife Conservation Commission (FWC), National Marine Fisheries Services (NMFS), National Ocean and Atmospheric Association (NOAA), and National Park Service (NPS) were also present on trips. Video and photographic documentation was also done by 333 Productions, Animal Planet, CNN, FOX News, History Channel, Mark Rackley Productions, Oceanicallstars, as well as a few local media groups.

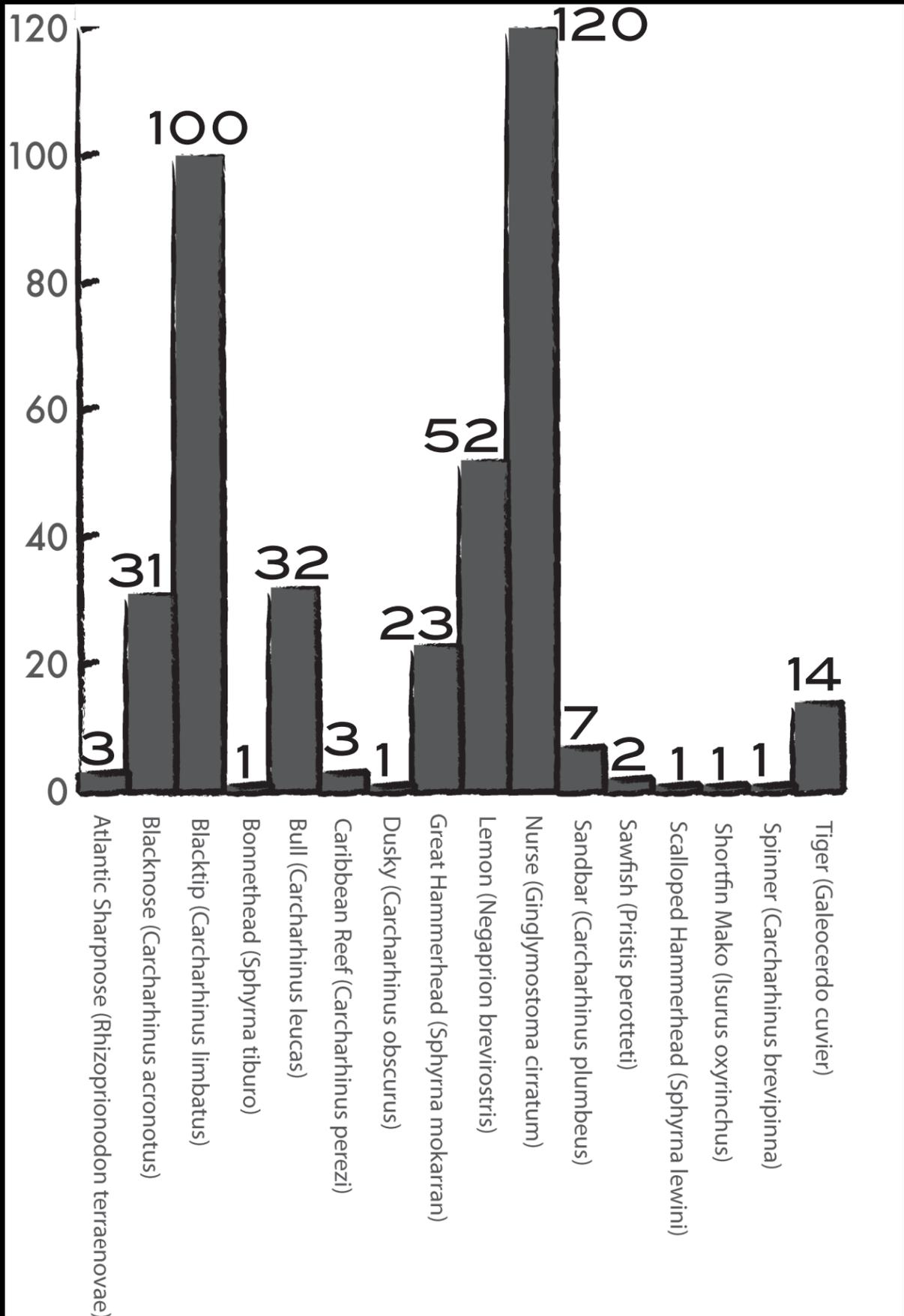


# SHARKS



In less than five years, we have tagged and sampled over 1200 sharks. These results have already revealed differences in species diversity, relative abundances, sex ratios, and average total lengths of the shark populations in Biscayne Bay and Florida Bay. Mark-recapture efforts have yielded clues to adult shark movement within the bays. An analysis of mercury content in muscle tissue has identified coastal sharks that are dangerous for human consumption. Results from these experiments allow us to better understand these predators and their cascading effects on the South Florida ecosystem. This data can hopefully reduce the demand for shark meat and further global conservation efforts. Below please find an overview of some of our latest results.

## SPECIES BREAKDOWN





# SHARKS

SPECIES	SEX RATIO		LENGTH (CM)	
	FEMALE	MALE	MIN	MAX
Atlantic Sharpnose	1	2	90	92
Blacknose	24	3	97	125
Blactip	64	31	67	187
Bull	17	15	150	234
Caribbean Reef	2	1	86	190
Great Hammerhead	14	8	187	345
Lemon	40	12	130	266
Nurse	51	59	185	274
Sandbar	2	5	189	217
Sawfish	1	1	410	420
Tiger	10	4	120	295

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# CREDITS

**Words** Dr. Neil Hammerschlag  
& Leann Winn



**Photo** Dr. Neil Hammerschlag, Christine Shepard  
& Jim Abernathy

**Design** Christine Shepard



## Thanks

When given lemons, these marine enthusiasts sure know how to make 'lemonade.'

This report was prepared with the help of Laura Bracken, Yanira Blanco, Dominique Lazarre, Leann Winn, & Rose Mann.

We would especially like to thank all our partners, sponsors, collaborators and supporters, like 7-year-old Sophie Bromenshenkel who has raised over \$3,000 selling lemonade, hot chocolate, and even bracelets.





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