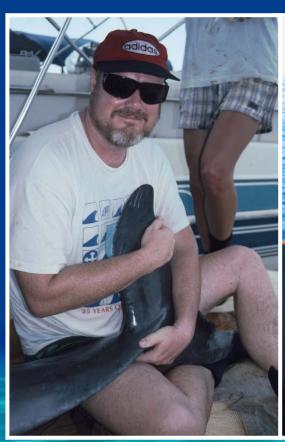
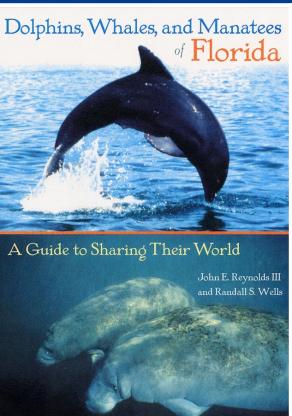
Many thanks to John Reynolds for helping us to better understand conservation of marine mammals – for providing much-needed guidance on sharing their world...







LONG-TERM RESEARCH AND CONSERVATION PROGRAMS – VALUE AND CHALLENGES

Randall Wells, Director,
Sarasota Dolphin Research Program



Senior Conservation Scientist - Conservation, Education & Training Group



Adjunct Professor of Marine Mammal Science, Department of Large Animal Clinical Studies, College of Veterinary Medicine Gretchen Lovewell,
Program Manager,
Stranding Investigations
Program (appearing here as alter-ego, Reina Terror Torres)











Florida's dolphins face a wide variety of concurrent and cumulative natural and anthropogenic threats – conservation efforts are needed



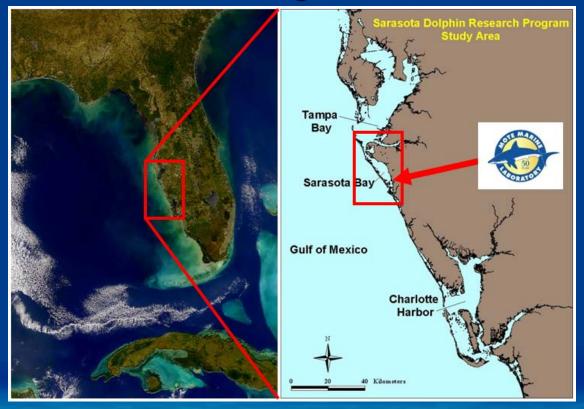
Conservation is often an ongoing, iterative process, combining research and action:

- 1. Identify and characterize the issue.
- 2. Develop and implement conservation measures.
- 3. Evaluate the effectiveness of the conservation measures.
- 4. Refine/revise conservation actions to better address the issue.
- 5. Repeat steps 3 and 4 as necessary...



Conservation of long-lived species can require and/or benefit from long-term research.

Along the central west coast of Florida, a collaborative effort between the Chicago Zoological Society and Mote Marine Laboratory works to study bottlenose dolphins from "cradle to grave" and tries to mitigate conservation issues



Sarasota
Dolphin Research
Program:
initiated in 1970





Stranding Investigations Program: initiated in 1985

Sarasota Dolphin Research Program: Primary Activities

- 1. Photographic identification surveys: monitoring and surveillance
- 2. Capture-release: health assessment, life history
- 3. Biopsy dart sampling: population structure
- 4. Behavioral observations, acoustics
- 5. Telemetry development and application
- 6. Rescues and interventions
- 7. Post-intervention follow-up monitoring
- 8. Ecological perspective: fish surveys, shark tracking, red tide monitoring
- 9. Training of students and professionals
- 10. Outreach and education
- 11. Conservation service: panels, working groups, consultations









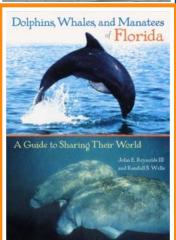






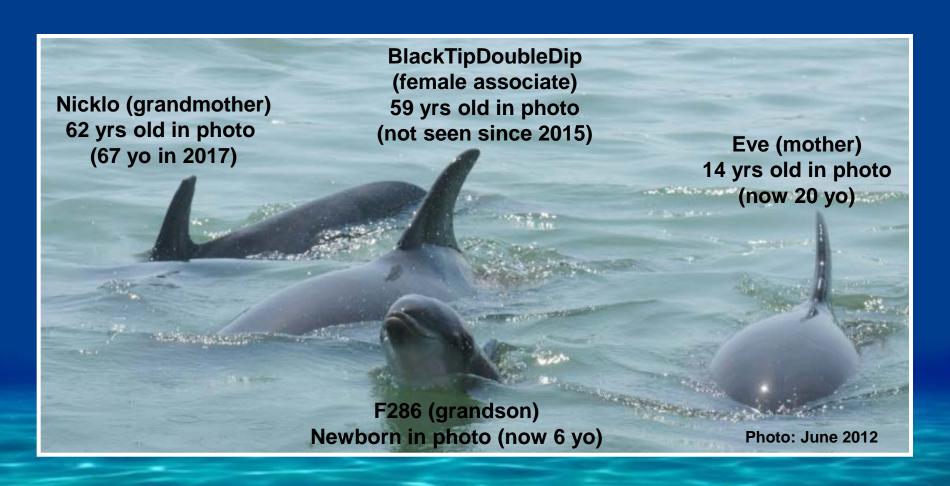






Multi-decadal, multi-generational, year-round resident community of bottlenose dolphins in Sarasota Bay

Spans up to 5 concurrent generations, with individuals up to 67 yrs old



Mote Marine Laboratory's Stranding Investigations Program

Graphic is through 2016 – 19 more cetaceans in 2017

THE STRANDING INVESTIGATIONS PROGRAM (SIP) & THE DOLPHIN, WHALE & SEA TURTLE HOSPITALS

1985

SIP PROGRAM ESTABLISHED

975 SEA TURTLES
RESPONDED TO OR RECOVERED
IN TEN YEARS ALONE





2006 - 2016

2017

667 DOLPHIN & WHALE STRANDINGS RESPONDED TO

560+ SEA TURTLES
TREATED SINCE 1995



100+ TURTLES WITH PAPILLOMA TUMORS

70+ DOLPHINS TREATED SINCE 1992

learn more at MOTE.ORG

Stranding data help to identify conservation issues Carcass recovery, examination, sampling, UME detection, diet





MARINE MAMMAL SCIENCE, 24(4): 774–794 (October 2008) © 2008 by the Society for Marine Mammalogy DOI: 10.1111/j.1748-7692.2008.00212.x



Consequences of injuries on survival and reproduction of common bottlenose dolphins (*Tursiops truncatus*) along the west coast of Florida

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Marine Mammal Science





Notes

MARINE MAMMAL SCIENCE, 31(1): 355–368 (January 2015) © 2014 Society for Marine Mammalogy DOI: 10.1111/mms.12142

> Carcass-recovery rates for resident bottlenose dolphins in Sarasota Bay, Florida

RAMOALL S. WELLS¹ and JASON B. ALLIN, Samonto Dolphin Research Program, Chicago Zoological Society, % Mote Marine Labonatory, 1600 Ken Thompson Parkway, Samoto, Florida 34236, U.S.A.; GARTCHISN LOVEWELL, Stranding Investigations Program, Mote Marine Labonatory, 1600 Ken Thompson Parkway, Samoson, Florida 34236, U.S.A.; JAY GORZELANY, Stranding Investigations Program, Mote Marine Labonatory, 1600 Ken Thompson Parkway, Samoson, Florida 34236, U.S.A. and Sea-to-Shore Alliance, 4411 Bee Ridge Road 4490, Samoson, Florida 34235, U.S.A.; RUTHE E DELYNN and DEBORAH A. FAUQUELE, SERRING Investigations Program, Mote Marine Labonatory, 1600 Ken Thompson Parkway, Samoson, Florida 34236, U.S.A.; NELDO B. BARDOS, Samosota Dolphin Research Program, Chicago Zoological Society, % Moter Marine Labonatory, 1600 Ken Thompson Parkway, Samosot, Florida 34236, U.S.A. and Stranding Investigations Program, Mote Marine Labonatory, 1600 Ken Thompson Parkway, Samosot, Florida 34236, U.S.A. and Stranding Investigations Program, Mote Marine Laboratory, 1600 Ken Thompson Parkway, Samosot, Plorida 34236, U.S.A.

Wildlife managent staked with understanding mortality patterns and survivoship for populations of concern can glean much information from carcasses. Determination of cause of death and how mortalities are distributed across populations and life history classes can play a crucial role in directing conservation action (Byrd et al. 2008). The ability to detect and recover carcasses, and the condition of the carcass upon recovery, depend greatly on the animals' body composition, habits and habitat (Williams et al. 2011, Pelicite et al. 2012). Carcasses obtained from fisheries monitored by dedicated observers provide clear indications of sources of mortalities (e.g., Pallac and Rossman 2001). Data from carcasses of stranded ceaceans have become increasingly important in recent years, particularly since fishery observer coverage is declining or nonexisten? (Borth et al. 2008).

The marine environment presents particular challenges for detecting and examining cetacean carcasses when they are not obtained directly from fisheries. While some

Corresponding author (e-mail: rwells@mote.org)

³Personal communication from Laura Engleby, National Marine Fisheries Service, Southeast Regional Office, 263 13th Avenue South, St. Petersburg, Fl. 33701, November 2013.

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Conservation Challenge/Solution: One of the biggest challenges to successful conservation of Florida's dolphins:

\$\$\$ - predictable support is required to maintain consistent and continuous operations to conduct the long-term work necessary to develop, implement, assess, and adapt conservation programs for long-lived animals.

Our solution: We have had to be creative and persistent to find support for nearly five decades of work...we are grateful for the support of these entities, among others:



















foundation



CHARLES & MARGERY





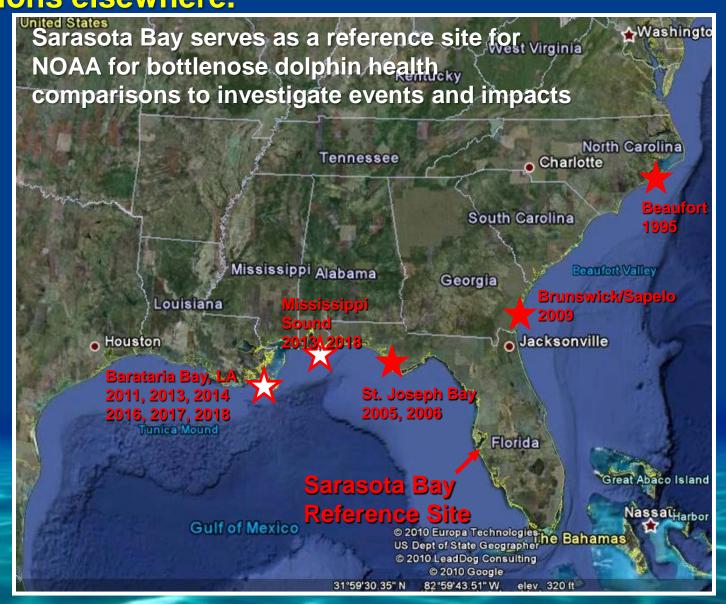






With this support, the combined efforts of the CZS Sarasota Dolphin Research Program and the MML Stranding Investigations Program have the goal of enhancing protection of dolphin populations, and involve:

Conservation Activity #1: The establishment of a reference population for comparative investigations of at-risk populations elsewhere.



Conservation Activity #2: Development of reference health parameter values.

Long-term health monitoring, large sample sizes, repeated sampling, availability of stranders, facilitate developing reference ranges.

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Vol. 18: 63-68, 2013 doi: 10.3354/ab00491 AQUATIC BIOLOGY Aguat Biol

Published online March 5

Reference ranges for body condition in wild bottlenose dolphins *Tursiops truncatus*

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²Chicago Zoological Society, Cyc Mod Marine Laboratory, 1600 Kem Thompson Parkway, Sarsaots, Horida 34236, USA

ABSTRACT: Marine mammal body condition, as evaluated by a combination of mass, length, and/or girth measurements, is considered an indicator of nutritional status. We used measurements of total mass, total length, and maximum girth from long-term bufflenose dolphin Tursions truncatus capture-release research conducted in Sarasota Bay, Florida, USA, [1987 to 2009] to develop 95th percentile reference ranges for 2 body condition models (1) total mass versus total

length and (2) maximum girt' ods were used to estimate the to examine body condition an upon commonly acquired me data on mass or age. Ultimat body condition of individual health of coastal populations

KEY WORDS: Marine man Mass - Girth - Length - Quant

INTRODUCTIO

Body size and growth in matrix been assessed using a variety of m claiming direct measurements of le mass [Lockyre & Morris 1907, Read mill et al. 1905, Triles & Pauly 197 2011), body volume and mass base azullary girth (finnes et al. 1981, Ca 1903), weight-lo-cheight raiso (Ridywo Maeiller et al. 2011), blubbor mass (I been mass and skin thickness relative and girth (Pitcher et al. 2000), and unement from early ploblographe (I seepth, mass, and girth contribute to of body size, however, body size as fused with estimates of body conditicondition, which is often evaluated un-

*Email: leslie.burdett@noaa.gov



DESEADONADOCEE

Adrenal Hormones in Common Bottlenose Dolphins (*Tursiops truncatus*): Influential Factors and Reference Intervals

Lestie B. Hart¹*, Randall S. Wells², Nick Kellar³, Brian C. Balmer^{1,2}, Aleta A. Hohn⁴, Stephen V. Lamb⁵, Teri Rowles⁶, Eric S. Zolman¹, Lori H. Schwacke¹

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Otation: Hart LB, Wels RS, Kellar N, (liatner IIC), Hohn AA, Lamb SV, et al. (2015) Adrenal Hormones in Common Bottlendes Delphins (Tisratep truncate) influential Fladors and Reference Intervals. PLoS ONE: 10(5): eVIZP4.32. doi:10.1371/journal.

Academic Editor: Daniel E Crocker, Sonoma Stat

Bereivet Ottober 30, 2014

Accepted: April 15, 2015 Published: May 18, 2015

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Data Availability Statement: All relevant data are within the paper and its Supporting information file. Funding: Funding was received from the Office of Naval Research's Marine Mammals & Bology

Competing Interests: The authors have declared

Abstract

Inshore common bottlenose dolphins (Tursiops truncatus) are exposed to a broad spectrun of natural and anthropogenic stressors. In response to these stressors, the mammalian adrenal gland releases hormones such as cortisol and aldosterone to maintain physiological and biochemical homeostasis. Consequently, adrenal gland dysfunction results in disruption of hormone secretion and an inappropriate stress response. Our objective herein was with the stress response (i.e., cortisol, aldosterone) that account for the influence of intrinsic (e.g., age, sex) and extrinsic (e.g., time) factors. Ultimately, these reference intervals will be used to gauge an individual's response to chase-capture stress and could indicate adrenal abnormalities. Linear mixed models (LMMs) were used to evaluate demographic and sampling factors contributing to differences in serum cortisol and aldosterone concentrations among bottlenose dolphins sampled in Sarasota Bay, Florida, USA (2000-2012), Serum cortisol concentrations were significantly associated with elapsed time from initial stimulation to sample collection (p<0.05), and RIs were constructed using nonparametric methods based on elapsed sampling time for dolphins sampled in less than 30 minutes following net deployment (95% Rt 0.91-4.21 µg/dL) and following biological sampling aboard a research vessel (95% Rt: 2.32-6.68 µg/dL). To examine the applicability of the pre-sampling cortisol RI across multiple estuarine stocks, data from three additional southeast U.S. sites were compared, revealing that all of the dolphins sampled from the other sites (N = 34) had corticoncentrations of aldosterone and variables reported in previous studies (i.e., age, elapsed sampling time) were not observed in the current project (p<0.05). Also, approximately 16%

Since 1988:

- 274 individuals examined, sampled in Sarasota.
- Up to 17 re-captures (over decades).
- 841 sets of samples for blood chemistry and hematology, urinalysis, serology, biotoxins, microbiology, inorganic/organic contaminants.
- 838 sets of measurements of weight, blubber depth, and/or morphometrics.
- >100 peer-reviewed scientific publications on health, physiology, contaminants.





Conservation Activity #3: Surveillance, facilitating discovery of disease, condition changes and injuries, as well as timely detection of situations (e.g., entanglements) that would benefit from interventions.









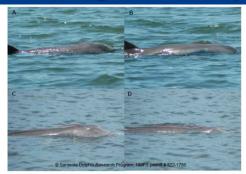
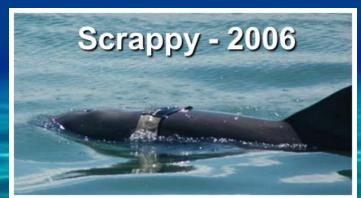


Figure 4-8. Method #1 applied to photos of the female MML0904 with different postures. A) and B) Photos taken 10 days before MML0904's necropsy. C) and D) Photos taken 8 days before MML0904's necropsy. Regardless of posture, Method #1 identified a PDI in each photo; however, the space between the line and dorsal surface is more noticeable when the animal is in a flat position (B and D) compared to an angled position (A and C).









Conservation Activity #4: Compilation of long-term datasets on dolphins, prey, predators, and environmental variables for trend detection.

Opportunistic observations, systematic observations, stomach contents, prey sampling, shark tracking, red tide monitoring



Conservation Activity #5: Archiving of biological samples for subsequent analyses including retrospective studies as new concerns emerge and new assays are developed.



MARINE MAMMAL SCIENCE, 12(4):499-515 (October 1996) © 1996 by the Society for Marine Mammalogy

MORBILLIVIRUS INFECTION IN BOTTLENOSE DOLPHINS: EVIDENCE FOR RECURRENT EPIZOOTICS IN THE WESTERN ATLANTIC AND GULF OF MEXICO

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ABSTRACT

Morbillivirus infection is widespread among odontocetes of the western Atlantic and Gulf of Mexico. Serologic evidence of infection in bottlenose dolphins. Tursiph truntatus, was first detected during an epizootic along the

Conservation Activity #6: Opportunities to test or refine new approaches, tools, and techniques.

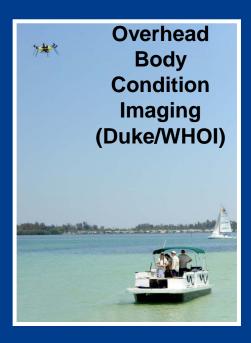


Metabolic Rates















Conservation Activity #7: Maintaining rescue readiness with a trained team and equipment.

Able to engage in interventions upon request/approval by NOAA







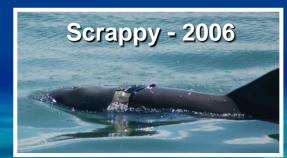


















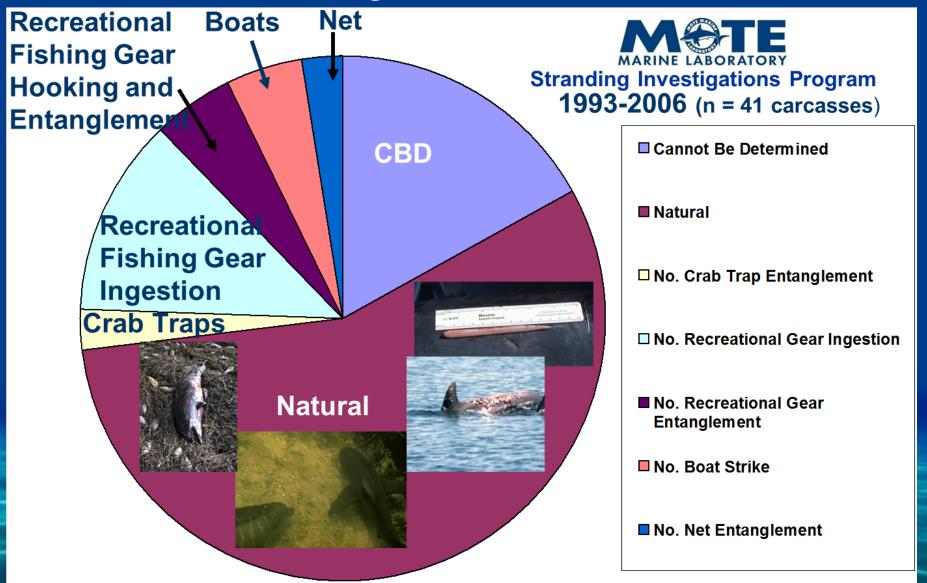


Conservation Activity #8: Training personnel to build conservation capacity in other regions/countries.



Conservation Activity #9: Identifying relative contributions of different sources of mortality and serious injury.

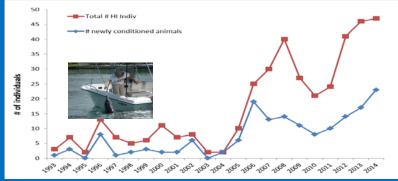
From observations/strandings: 33% of losses recovered as carcasses



Conservation Challenge: Human Interactions are a large and increasing threat to dolphins in Sarasota.

Exacerbated by illegal provisioning, and interactions with bait/catch





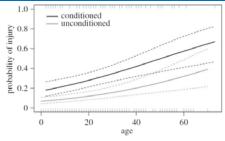
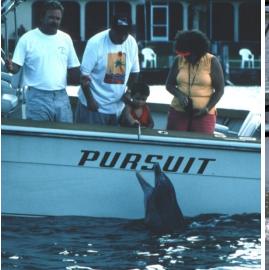


Figure 6. Probability of injury as a function of age for conditioned (black solid line) and unconditioned (grey solid line) bottlenose dolphins. The solid lines represent the fitted values of the generalized linear model. The dashed lines represent 95% Cls. The distribution of age values for conditioned and unconditioned dolphins are shown by the top and bottom rug plots, respectively. n = 404.







Our solution: Education and outreach activities...but how do we reach appropriate audiences and get them to care enough to make a difference?

Audiences/venues/materials:

- 1. Stakeholder meetings/town halls.
- 2. Elementary school curriculum.
- 3. High school field and lab activities.
- 4. College internship opportunities.
- 5. Grad student and professional opportunities.
- 6. Videos, social media presence.
- 7. Printed materials: books, brochures, cards.
- 8. Scientific publications.

To report feeding or hazament of wild dolphins, cull the NOAR Atheries Southers Enforcement Division at: 1-800-853-1964.

To report an injured or entangled dolphin, or other wildlife, call the Florida Feh and Wildlife Conservation Commission at: 1-888-404-PMCC (3922). For more information on fishing line recycling and bin locations, please visit: www.fishinglinerecycling.org

For more information on dolphins and interactions with angles, please visit:











Dolphins Need Your Help, Serious and even falal dolphin injuries from interactions with recreational fishing gear and boats are on the rive. You can prevent injuries to dolphins and other sea life – and have a better day on the water – by following a few tips designed to protect marine animals. Hose "Best Practices" were developed by marine scientists and wildlift manages working with boaters, angles, and fishing guides:

1) Never feed wild dolphins

- it's harmful and illegal
 Feeding teaches dolphins to beg for
- recoing teaches doipnins to beg for food and draws them dangerously close to fishing gear and boat propellers.
- Feeding is illegal under the federal Marine Mammal Protection Act.

2) Reuse or share leftover bait

- Freeze leftover bait for later or give it
- to your fishing neighbor.

 Dumping leftover bait may attract dolphins to fishing areas to beg or steal bait and eatch.
- Reel in your line if dolphins appear
 Reel in and wait for dolphins to pass
- to avoid losing your bait or eatch and prevent potential harm to dolphins.

 Never cast toward dolphins.

Change locations if dolphins show interest in hait or catch

- Move away from dolphins to avoid unintentionally hooking one and prevent damage to gear or catch.
- Release catch quietly away from dolphins when and where it is possible to do so without violating any state or federal fishing regulations
- Feeding or attempting to feed a marine mammal in the wild is prohibited.

6) Check gear and terminal tackle

 Inspect your gear often to avoid unwanted line breaks – even small amounts of gear in the water can be harmful to wildlife if entangled or ingested.

7) Use circle and corrodible hooks

- Grele hooks may reduce injuries to fish,
 - dolphins, and sea turtles.

 Corrodible hooks (any hook other than stainless steel) eventually dissolve.

8) Stay at least 50 yards away

- Stay at least 60 yards away
 Stay a safe distance from wild dolphin
- to avoid causing potential harm.

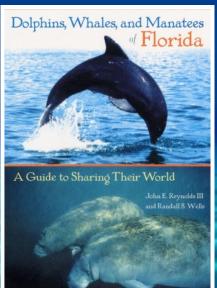
 Maintaining a safe distance helps keep

Prevent wildlife entanglements recycle fishing line

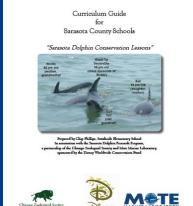
- Place all broken or used fishing line in a Monofilament Fishing Line Recycling Bin.
- If no recycling bins are available, place broken or used fishing line that has been cut into pieces in a lidded truth one.

10) Stash your trash

- Littering is illegal and can be harmful to wildlife.
- Collect any trash you've left behind and place it in a lidded trash can.









Our solution: Education and outreach activities...but how do we reach appropriate audiences and get them to care enough to make a difference?

- 1. Gordon Bauer suggested that facts are not enough, and we need to influence behaviors more than attitudes.
- 2. Heidi Harley suggested using empathy and rapport to influence behavior change the in-group concept.
- 3. We have been using a combination of these ideas to promote conservation of Sarasota dolphins, based on long-term research, using the strength of our past efforts to look to the future:
 - Helping people to relate to the dolphins as individuals, as neighbors, with local histories and dramas that we have documented over the course of their lives;
 - When possible, we give voice to issues through our staff and students - who better to interpret and speak passionately about our findings?

Risky unnatural feeding behaviors are spread through dolphin social learning – we try to mitigate through human education.

And if we need more, we can play the "cuteness card" to get people to care about issues faced by these animals.

After Megan's talk on Wednesday, there may be stiff competition for "King of Cute" among Florida's aquatic mammals...



VS.



You be the judge....