

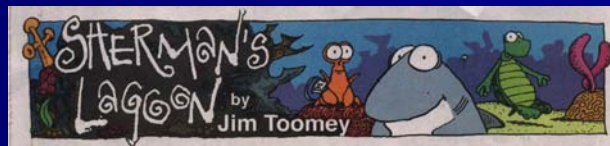
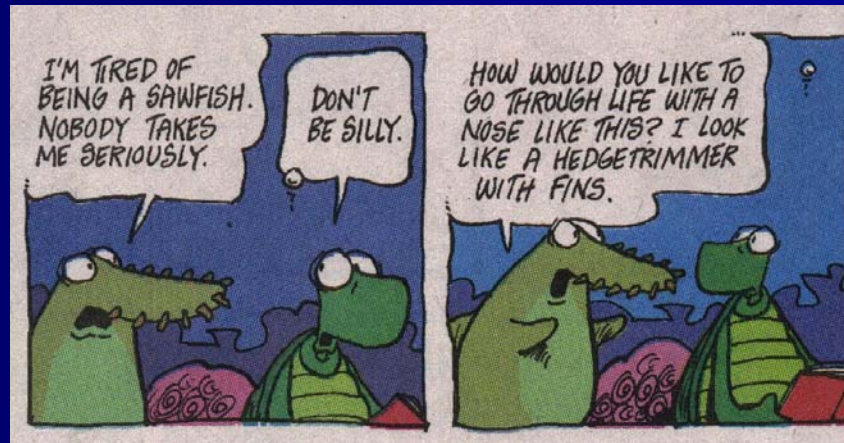
Mote Marine Laboratory smalltooth sawfish research

Colin Simpfendorfer



Research Purpose

To provide science-based information to assist in the develop of conservation plans for smalltooth sawfish.



Research topics

- Distribution and abundance
- Fishery interactions
- Life history and demographics
- Movement, migration and habitat use
- Conservation genetics
- Population and habitat modelling



Research methods

- Public sightings database
- Field surveys
- Acoustic tracking and monitoring
- Archival tagging
- Satellite telemetry
- mtDNA sequencing
- Demographic modelling
- Population viability analysis



Public sightings database - methods

- Florida-wide distribution of posters, articles, press releases, interviews and website.
- Reporters asked a standard set of questions to yield information on location, identification, size, habitat, etc.
- Data verified.
- Data stored in Access.



SAWFISH

Report sawfish encounter

Smalltooth sawfish (*Pristis pectinata*) were once common inhabitants of Florida coastal waters. Scientists at Mote Marine Laboratory in Sarasota are studying sawfish to better understand the species and assist in conservation. Information from the public on their encounters with sawfish, is providing valuable data in helping to save this species from extinction.

To report a sawfish encounter:
Phone: 1-800-691-MOTE (6683)
Email: sawfish@mote.org
Web site: www.mote.org/~colins/

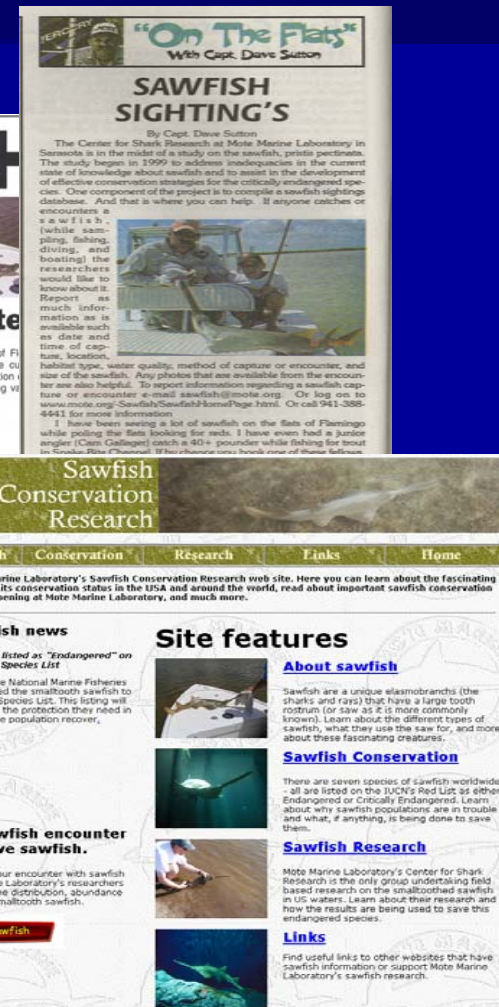
Information requested:

- Your name, phone number and email address
- Date, time and location of your encounter with the sawfish
- Number, size and behavior of the sawfish during encounter
- Your activity at time of the encounter
- Information on any tags, scars or distinguishing marks

Sawfish are federally protected and illegal to harm them in any way.

MOTE MARINE LABORATORY

SAWFISH RESEARCH
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"On The Flats"
With Capt. Dave Sutton

SAWFISH SIGHTING'S

By Capt. Dave Sutton

The Center for Shark Research at Mote Marine Laboratory in Sarasota is in the midst of a study on the sawfish, *pristis pectinata*. The study began in 1999 to address inadequacies in the current state of knowledge about sawfish and to assist in the development of effective conservation strategies for the critically endangered species. One component of the project is to compile a sawfish sightings database. And that is where you can help. If anyone catches or encounters a sawfish (while sampling, fishing, diving, and boating), the researchers would like to know about it. Report as much information as is available such as date and time of capture, location, habitat type, water quality, method of capture or encounter, and size of the sawfish. Any photos that are available from the encounter are also helpful. To report information regarding a sawfish capture or encounter e-mail sawfish@mote.org. Or log on to www.mote.org/Sawfish/SawfishHomePage.html. Or call 941-388-4441 for more information.

I have been seeing a lot of sawfish on the flats of Ft. Myers while poling the flats looking for reds. I have even had a junior angler (Clem Gallagher) catch a 40+ pounder while fishing for trout in Gretna Bay Channel. If you have seen a sawfish, please let me know.

Sawfish Conservation Research

About sawfish | Conservation | Research | Links | Home

Welcome to Mote Marine Laboratory's Sawfish Conservation Research web site. Here you can learn about the fascinating sawfish, investigate its conservation status in the USA and around the world, read about important sawfish conservation research that is happening at Mote Marine Laboratory, and much more.

Latest sawfish news

Smalltooth sawfish listed as "Endangered" on the US Endangered Species List

On April 1st 2003, the National Marine Fisheries Service officially added the smalltooth sawfish to the US Endangered Species List. This listing will provide sawfish with the protection they need in US waters to help the population recover.

Report a sawfish encounter and help save sawfish.

Information about your encounter with sawfish can help Mote Marine Laboratory's researchers better understand the distribution, abundance and habitat use of smalltooth sawfish.

Site features

About sawfish

Sawfish are a unique elasmobranchs (the sharks and rays) that have a large toothed rostrum (or saw as it is more commonly known). Learn about the different types of sawfish, what they use the saw for, and more about these fascinating creatures.

Sawfish Conservation

There are seven species of sawfish worldwide all are listed on the IUCN's Red List as either Endangered or Critically Endangered. Learn about why sawfish populations are in trouble and what, if anything, is being done to save them.

Sawfish Research

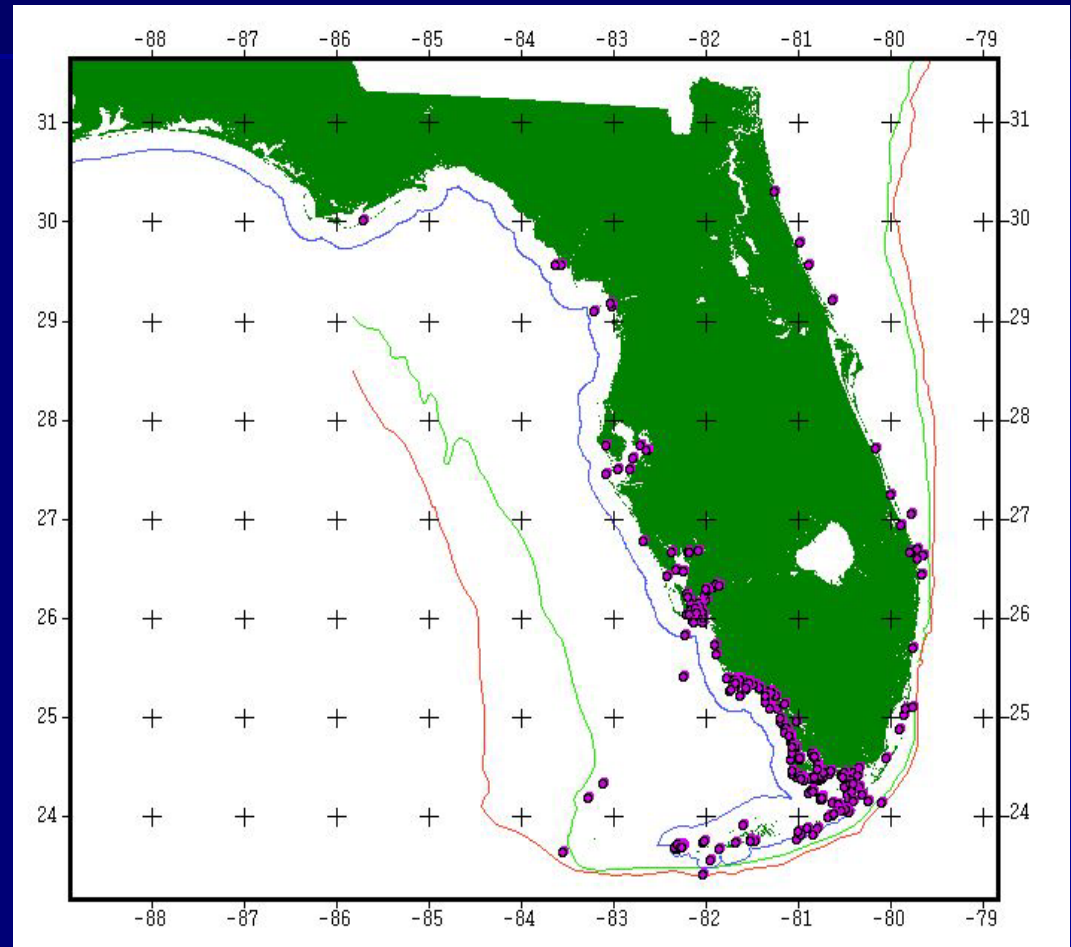
Mote Marine Laboratory's Center for Shark Research is the only group undertaking field based research on the smalltoothed sawfish in US waters. Learn about their research and how the results are being used to save this endangered species.

Links

Find useful links to other websites that have sawfish information or support Mote Marine Laboratory's sawfish research.

Sightings data - overview

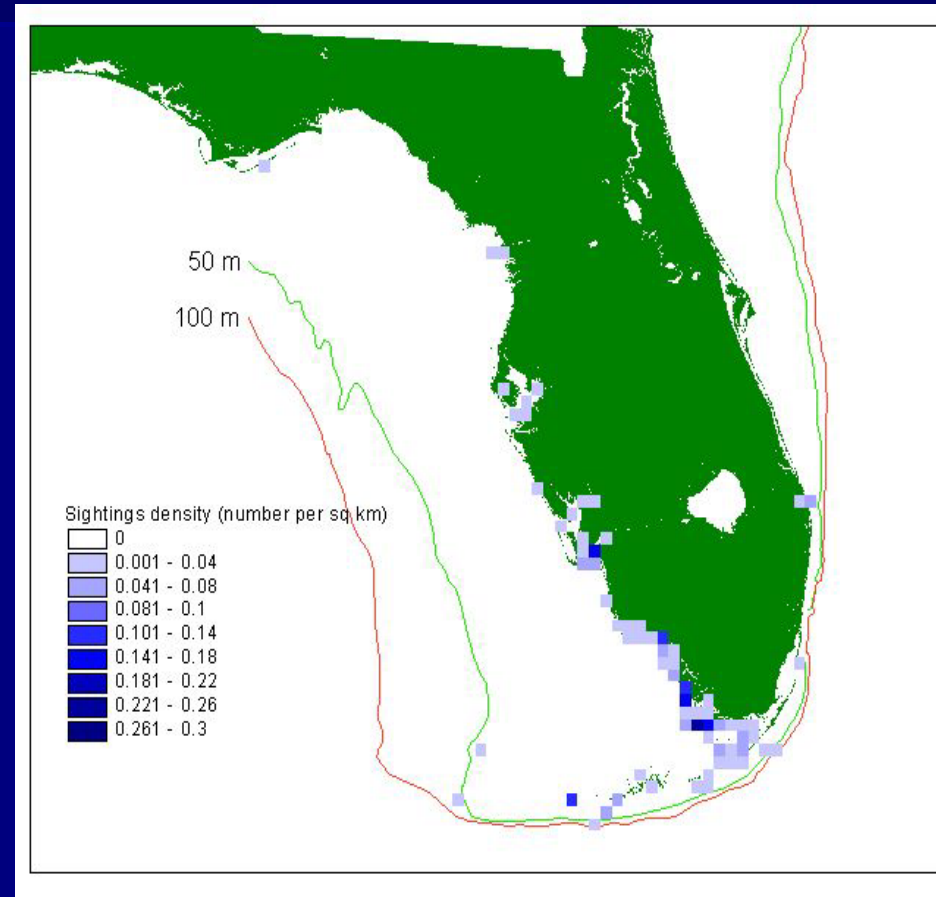
- 394 verified records covering approximately 650 individuals.
- Data collection ongoing.



Distribution of all Florida sawfish records in Mote Marine Laboratory sawfish sightings database.

Sightings data - density

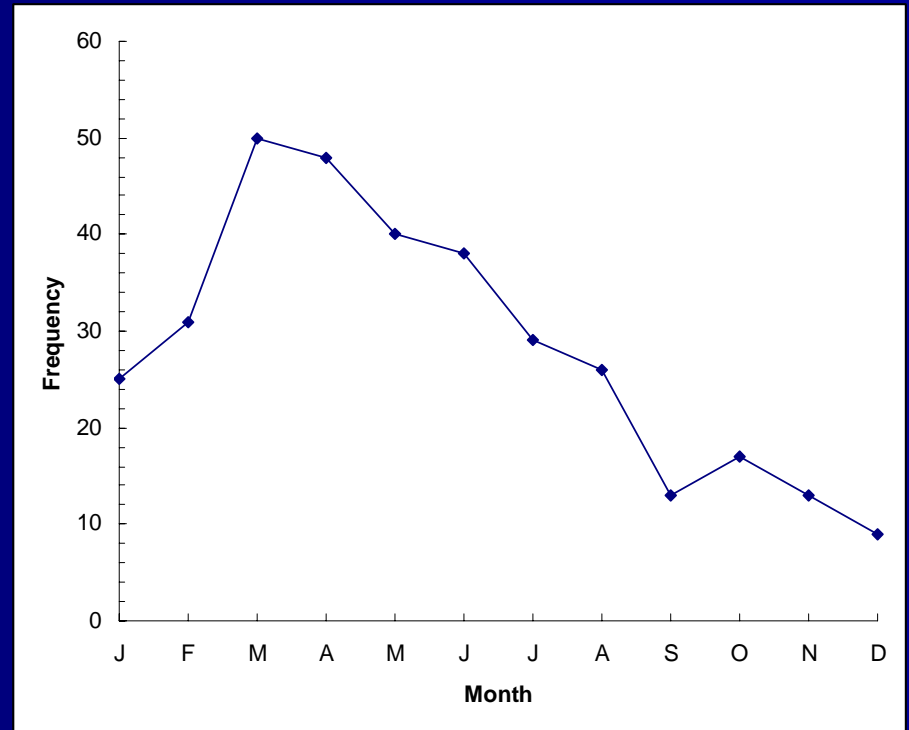
- Individual sighting reports converted to density using ArcView Spatial Analyst.
- Identifies reporting hotspots.
 - Concentration of sightings effort? Or concentration of sawfish?
 - Focus for research surveys?



Sightings density 1998-2003

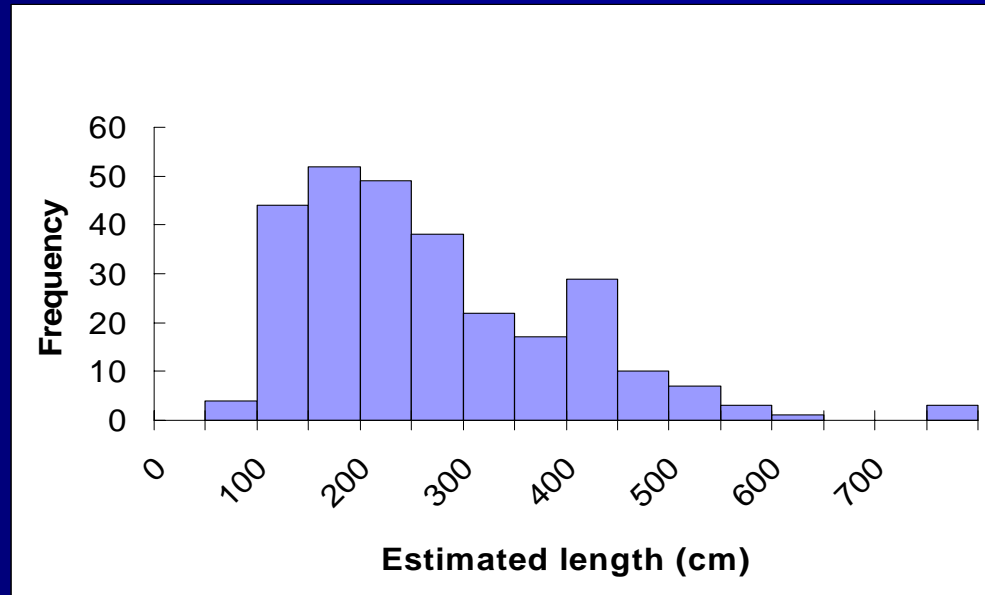
Sightings data - seasonality

- Strong seasonal relationship, with peak sightings March to June.
 - Vulnerability of sawfish?
 - Recreational fishing effort?

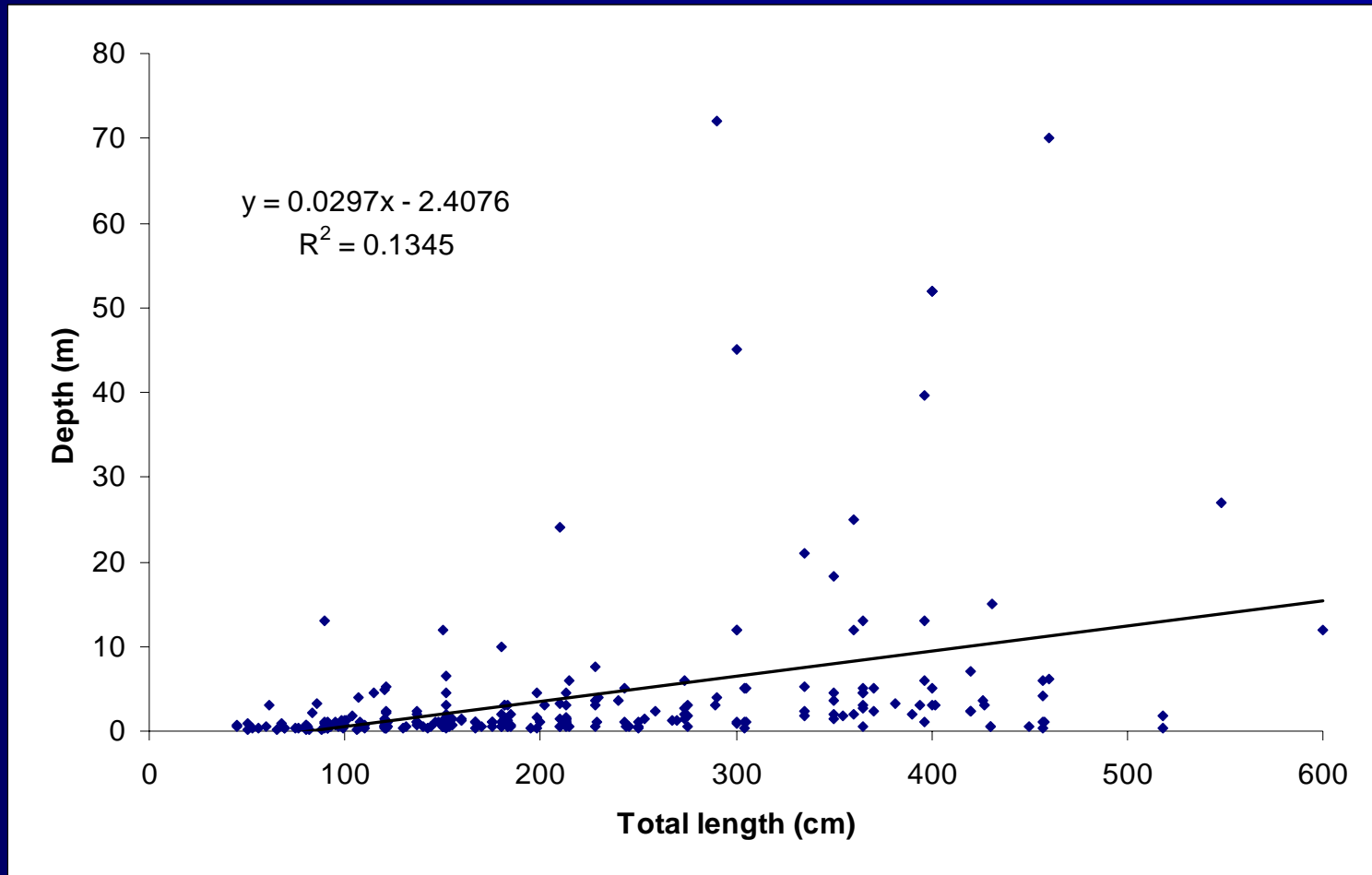


Sightings data – size

- Full size range of animals reported, with most from 100 to 300 cm (i.e. juvenile).
- No apparent “holes” in the population.
- Reported sizes are only estimates and probably contain a high degree of error.

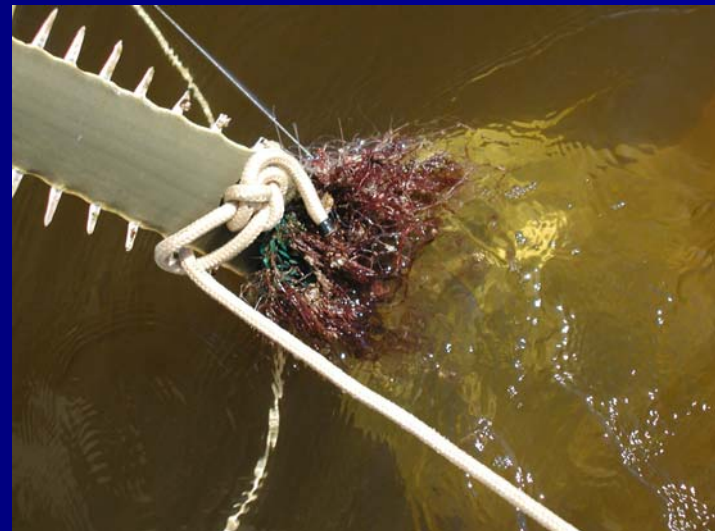


Sightings data – size & depth.



Fishery interactions - overview

- Identify potential fisheries with which smalltooth sawfish interact.
- Determine:
 - Size classes
 - Locations
 - Mortality level



Field surveys - gear



Gillnet and seine



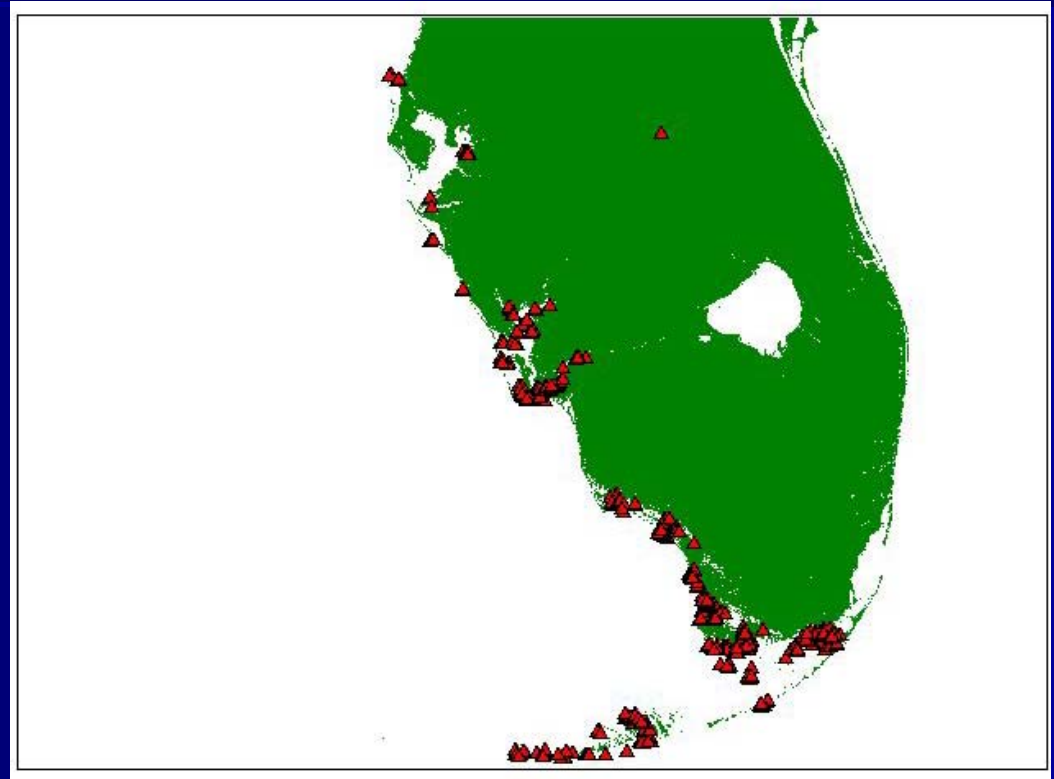
Rod and reel



Longline

Field surveys - locations

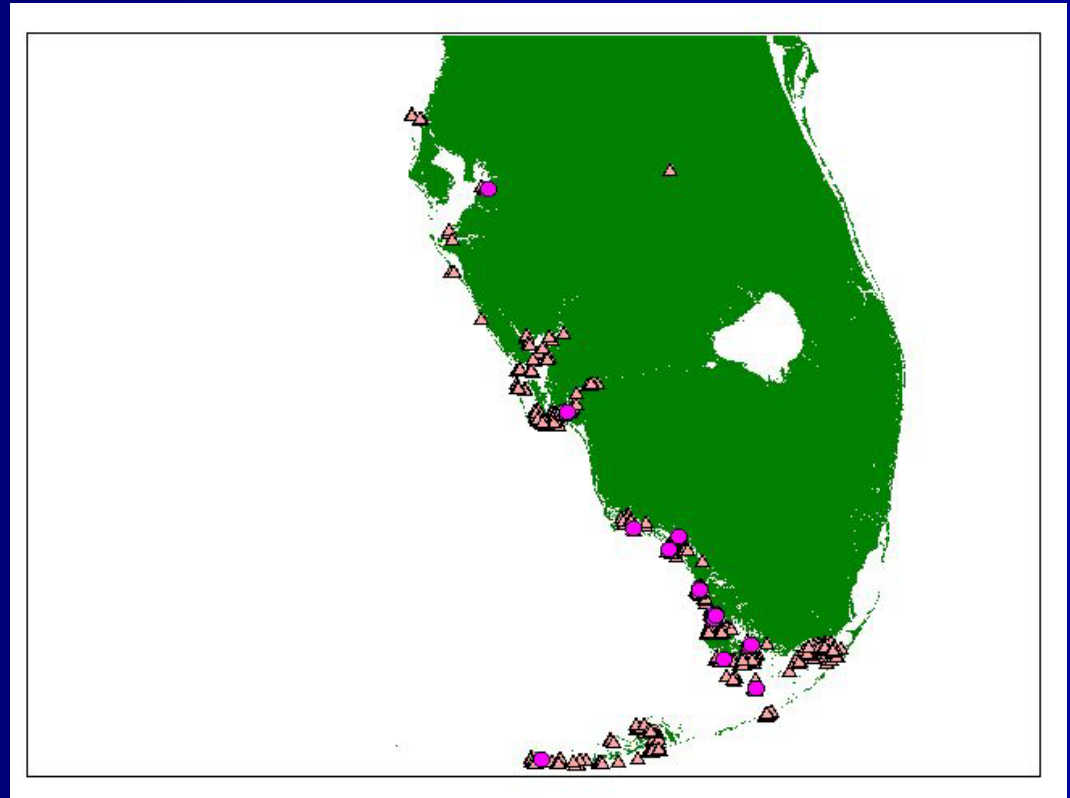
- 776 sets
 - 630 longline
 - 62 rod and reel
 - 32 gillnet
 - 27 visual
 - 16 set line
 - 9 seine
- Tampa Bay to outer Keys



Red triangles indicate sampling locations

Field surveys - sawfish

- 34 sawfish captured
 - 13 longline
 - 10 rod and reel
 - 6 gillnet
 - 5 seine
- Size range 80 to 450 cm.



Magenta dots indicate locations of sawfish captures

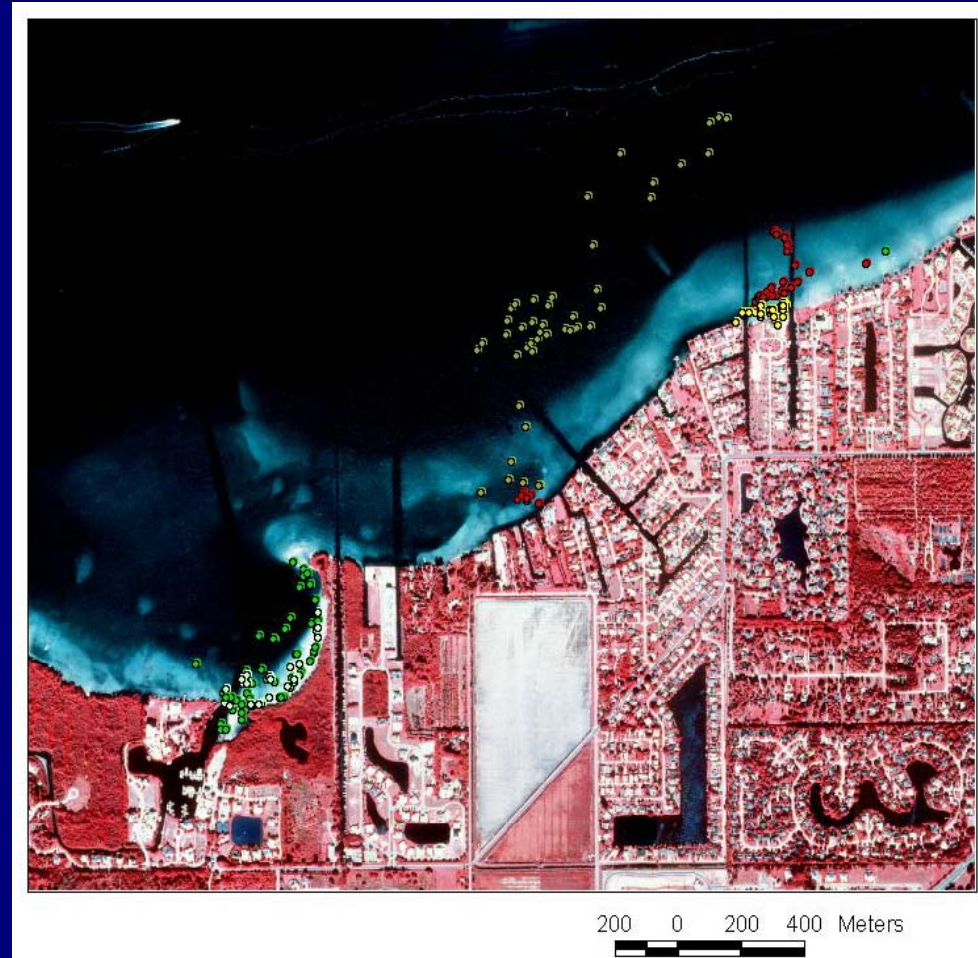
Acoustic tracking - methods

- Vemco V8 or V16 acoustic tags.
- Mounted on fin using rototag.
- Animals followed using a directional hydrophone.
- Analyzed for home range, site fidelity, etc.
- 10 juveniles tracked.



Acoustic tracking - results

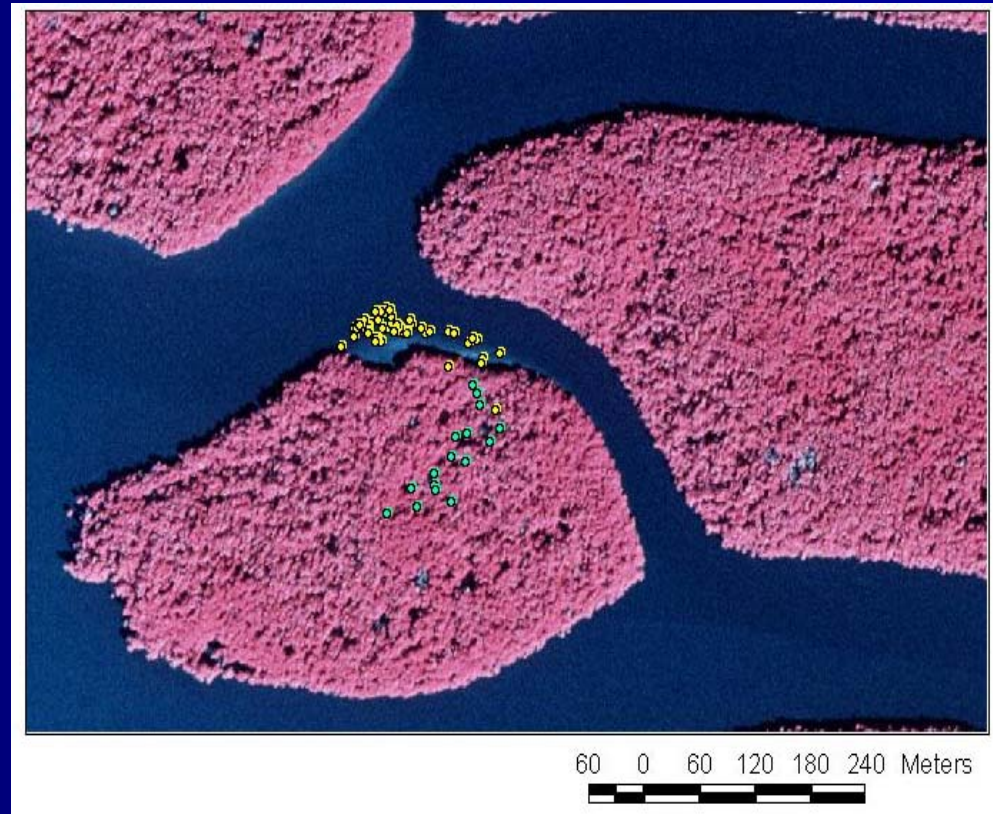
- 153 cm STL.
- Captured July 17, 2002.
- Tracked on several different days over 3 months.
- Home range overall 1.2 km^2 , $0.036 - 0.35 \text{ km}^2$ each day.



Caloosahatchee River

Acoustic tracking - results

- 82 cm STL.
- Captured November 11, 2002.
- Tracked over 3 consecutive days.
- Strong tidal pattern, using a narrow mangrove drainage at high tide.



Shark River

Acoustic tracking - results



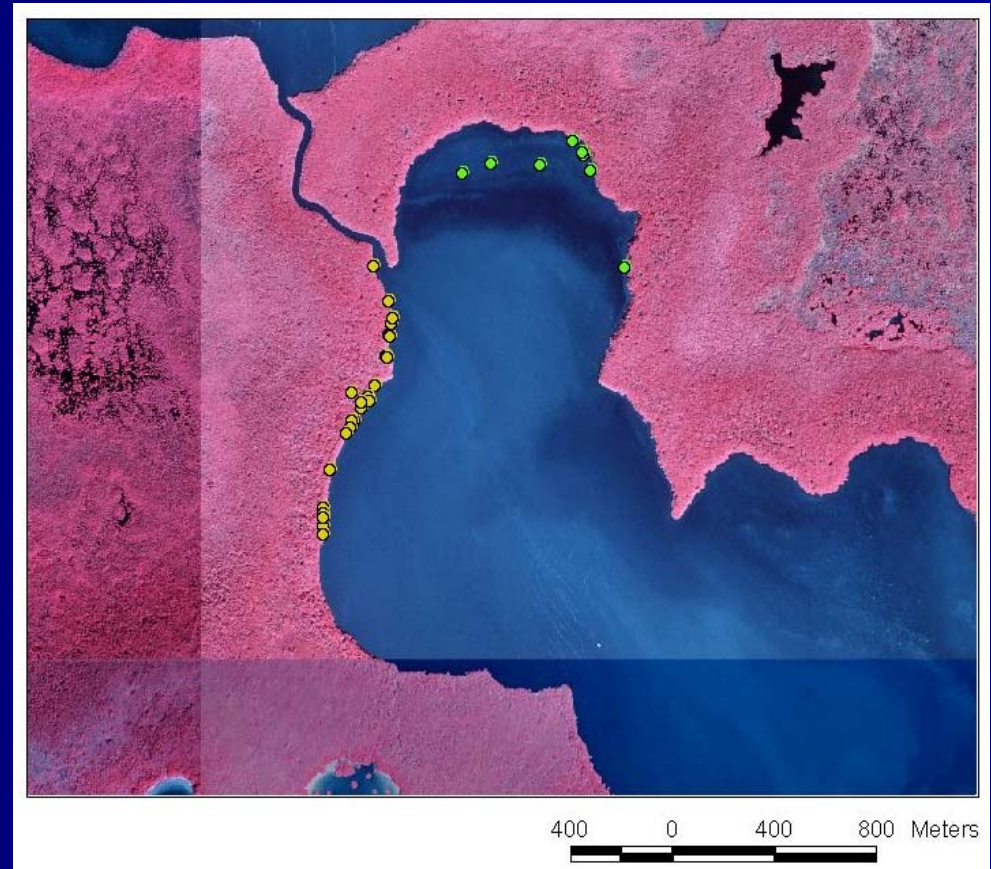
Low tide habitat



High tide habitat

Acoustic tracking - results

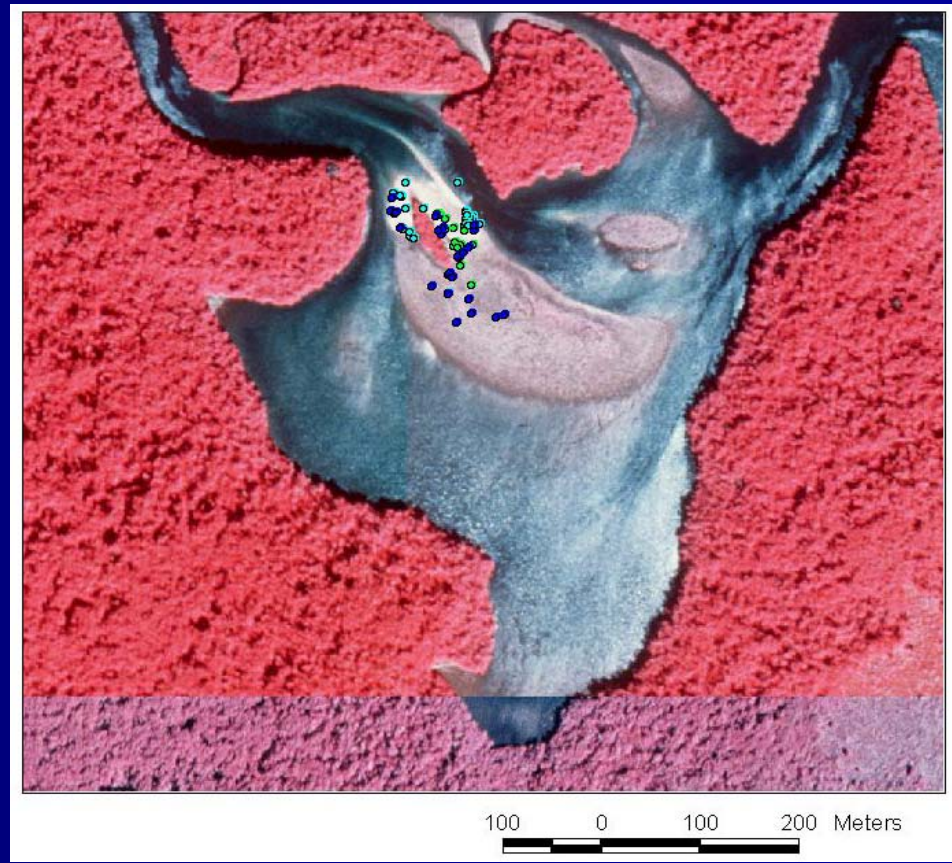
- 150 cm STL.
- Captured February 17, 2003.
- Tracked over 3 consecutive days.
- Always associated with mangrove roots along edge of bay.
- Home range 0.08 km².



Coot Bay

Acoustic tracking - results

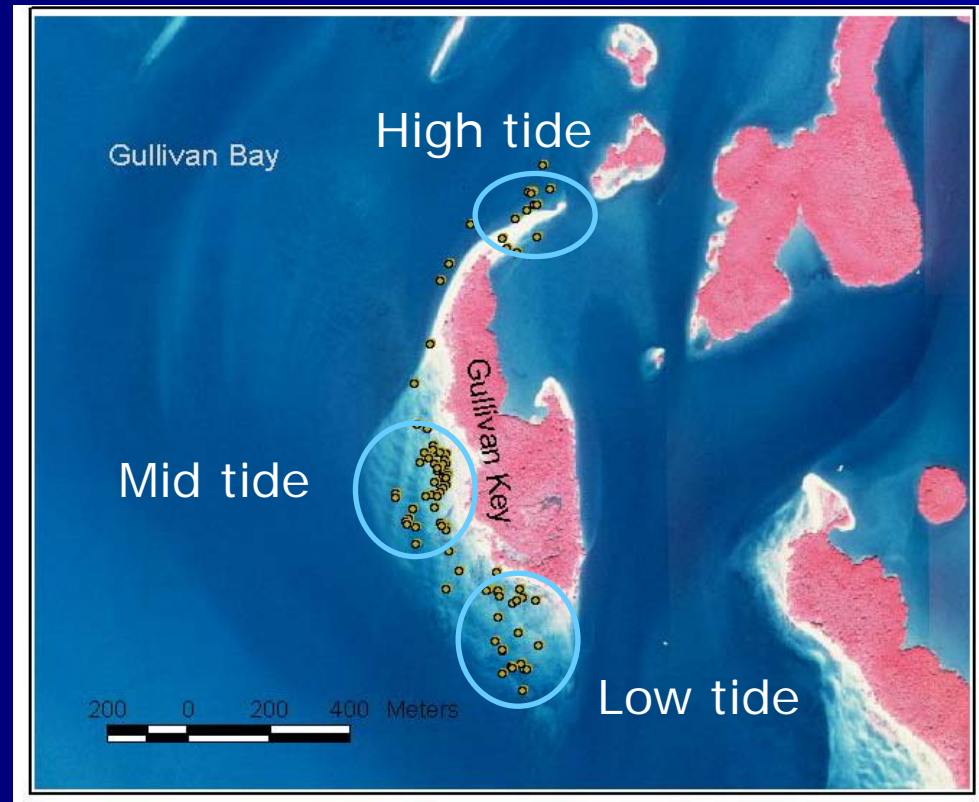
- 89 cm STL.
- Captured April 15, 2003.
- Tracked on 3 consecutive days.
- Home range 0.01 km².
- Repeated use of shallow mud bank



Hurdles Creek

Acoustic tracking - results

- 200 cm STL.
- Captured September 3, 2003.
- Tracked on 2 consecutive days.
- Strong tidally driven pattern.



Gullivan Key

Acoustic tracking – habitat use summary

- Juveniles, especially the very small animals, have a strong preference for very shallow areas (<50 cm).
- In areas where shallows are not available, shelter around mangrove roots.
- Movements driven mostly by tide; keep up with changing water depth.

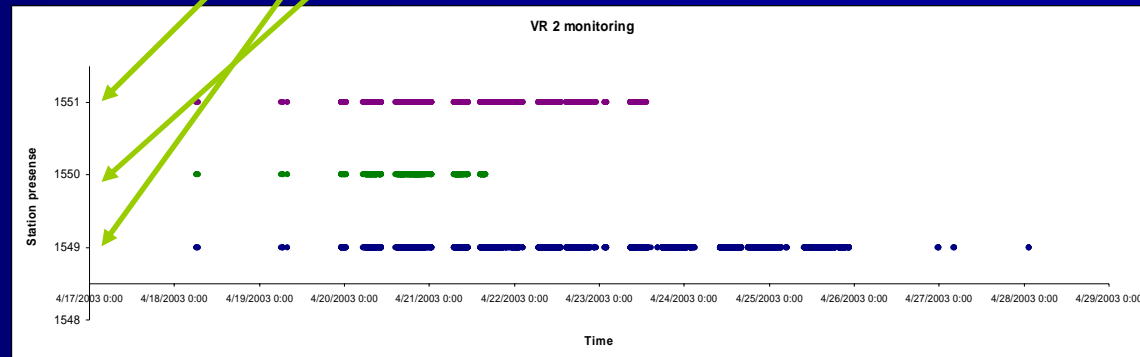
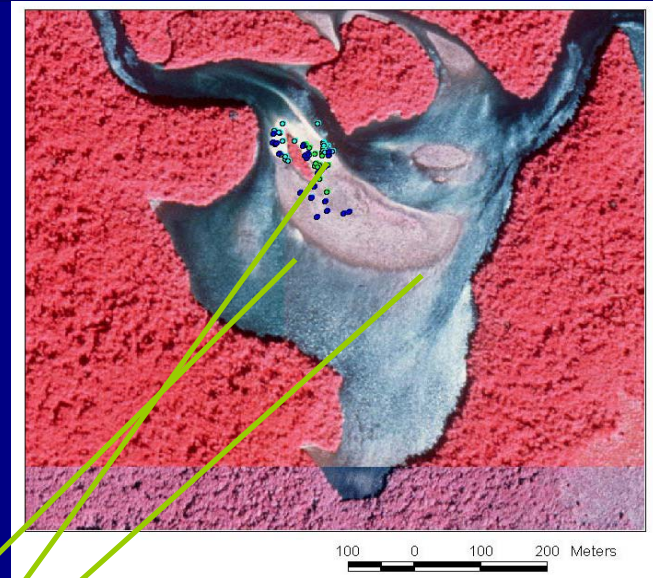
Acoustic monitoring - methods

- Vemco VR2 monitors moored long-term in nursery areas.
- Sawfish fitted with tags that last 12-24 months.
- Assessing site fidelity, residence patterns, effect of environmental changes (temperature, salinity, etc.).



Acoustic monitoring – prelim. results

- Single animal monitored in Hurdles Creek.
- Monitors present April through September.
- Present in range only 6 days.



Acoustic monitoring - the next step

- Monitoring 4 sites in 2004:
 - Caloosahatchee River (20)
 - Faka Union Bay (3)
 - Hurddles Creek (3)
 - Coot Bay (3)
- Results from other users in other areas if heard.



Archival tagging - overview

- Two types of tags:
 - Pop-up satellite tags (Wildlife Computers PAT tags).
 - Recoverable depth, temperature, salinity tags (Star-Odi CTD tags).



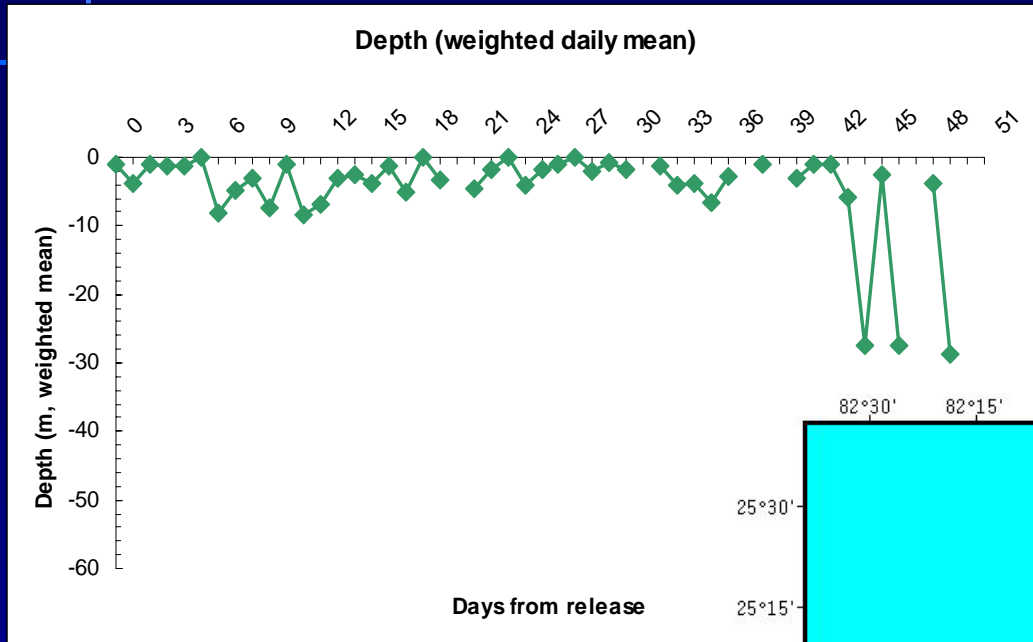
PAT tagging - summary

- PATs deployed on seven sawfish
 - 1 worked perfectly
 - 1 early release
 - 1 heard but no data
 - 4 not heard from
- Disappointing results to date.
- Working to resolve attachment issues.

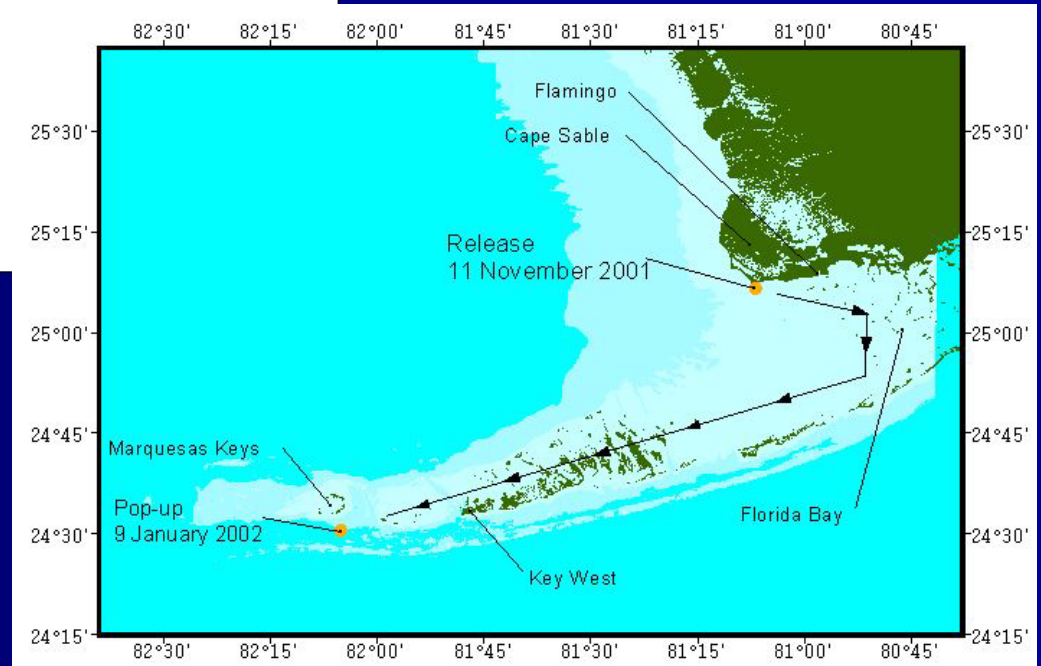


11 foot sawfish with PAT tag

PAT tagging - results



- 450 cm adult female.



CTD tagging - overview

- Aim is to investigate salinity preferences of sawfish and how they react to changes.
- Deployed on sawfish for several weeks, with acoustic tag for relocation.



Satellite telemetry - overview

- Wildlife Computers SPOT2 and SPOT3 tags.
- Provide position estimate when out of water and satellite overhead.
- 2 SPOT2 released
 - One heard from occasionally but never gets position.
 - One recovered
- 6 SPOT3 tags to be released next year.



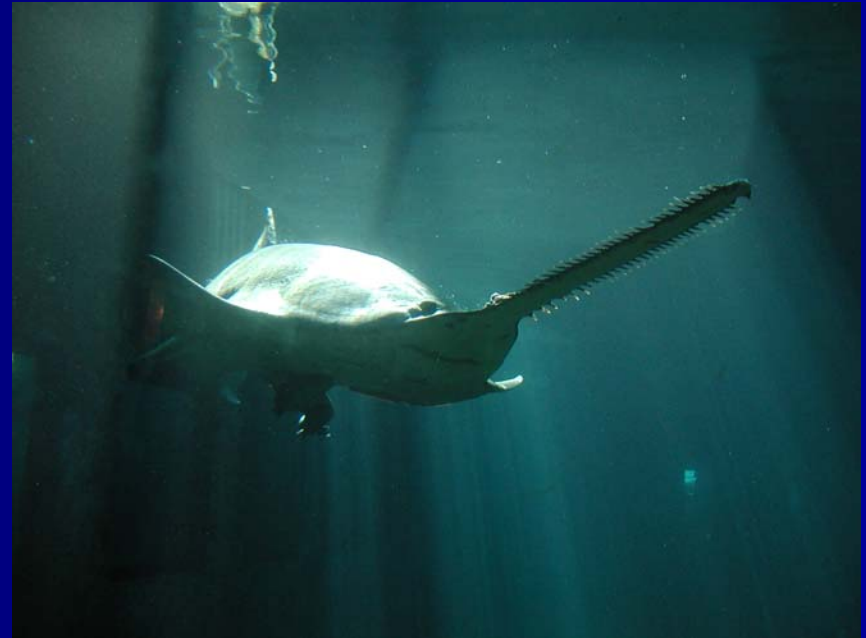
150 cm sawfish released with
a SPOT2 tag

Sawfish genetics - overview

- Collaboration with Gavin Naylor (FSU) and Vicente Faria (Student, ISU/FSU).
- Sequencing mtDNA to investigate:
 - Genetic diversity (current and historic)
 - Relationship between different populations (esp. USA and Bahamas)
 - Relationship to other species of sawfish.

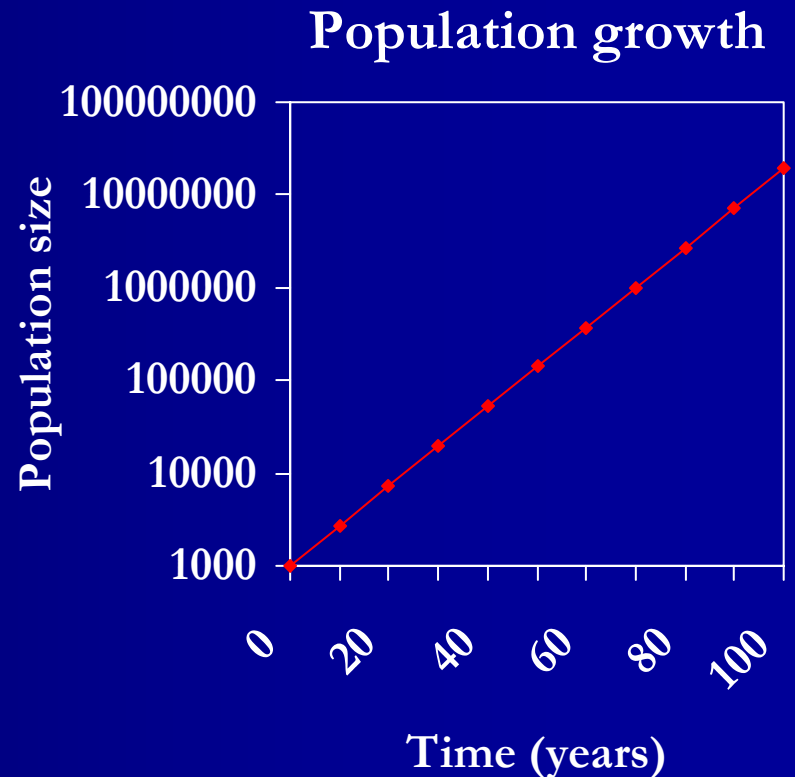
Demographic modelling - overview

- Uses life history data to look at rate of population increase.
 - Litter size 17.5
 - 2 year reprod. cycle
 - Max. age 30/50/70 yrs
 - Age mat. 10/17/24 yrs
 - Nat. mort. 0.059 to 0.139 year⁻¹



Demographic modelling - results

- Intrinsic rate of population increase (r)
 $\sim 0.08 \text{ year}^{-1}$.
- Population doubling time ~ 8 years.
- Assumptions
 - Life history values OK
 - No extra mortality
 - No habitat limitation
 - No genetic effects



Population viability analysis

- Demographic analysis was a preliminary look at population growth rates.
- We are investigating the use of PVA for smalltooth sawfish to provide information relevant to the recovery process.

Long-term research strategy

- National sightings database -> Distribution
- Long-term population monitoring -> Abundance
- Habitat use assessment -> Critical habitat
- Physiological research -> Habitat changes
- Population Viability Analysis (or similar) -> Population status and recovery