Science, Service, Stewardship

SEFSC Research Activities

2011 Spring Species Working Groups Meeting
of the Advisory Committee to the U.S. Section to ICCAT
March 8 - 9, 2011, Silver Spring, MD

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Pelagic Observer Program
2011 Gulf of Mexico Enhanced Observer Coverage

2011 Project Objectives:

- Use available funding to achieve a 50% observer coverage level. This will produce an expected CV for BFT discard estimates of approximately <= 0.2 (***see NOAA Technical Memorandum NMFS-SEFSC-588***)

- Continue collecting data regarding spatial and temporal patterns of BFT bycatch

- Continue collecting biological samples from landed fish or dead discards

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Pelagic Observer Program

- 50% coverage will fully accommodate research objectives of POP ***AND*** additional funding will allow expanded research programs for BFT, including:
  - Continue required training and equipment purchases to build capacity for production ageing at the SEFSC
  - Augment existing sampling programs to obtain BFT tissues (e.g. otoliths, tissue) for production ageing, natal origin, movement and other purposes
  - Conduct ongoing survival studies using electronic tagging and appropriate release techniques (PLL)
  - Continue research on bycatch mitigation

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Pelagic Observer Program

- ***This additional research is of enormous value to stock assessment and will enable marked improvements in stock assessment data and methodologies.***

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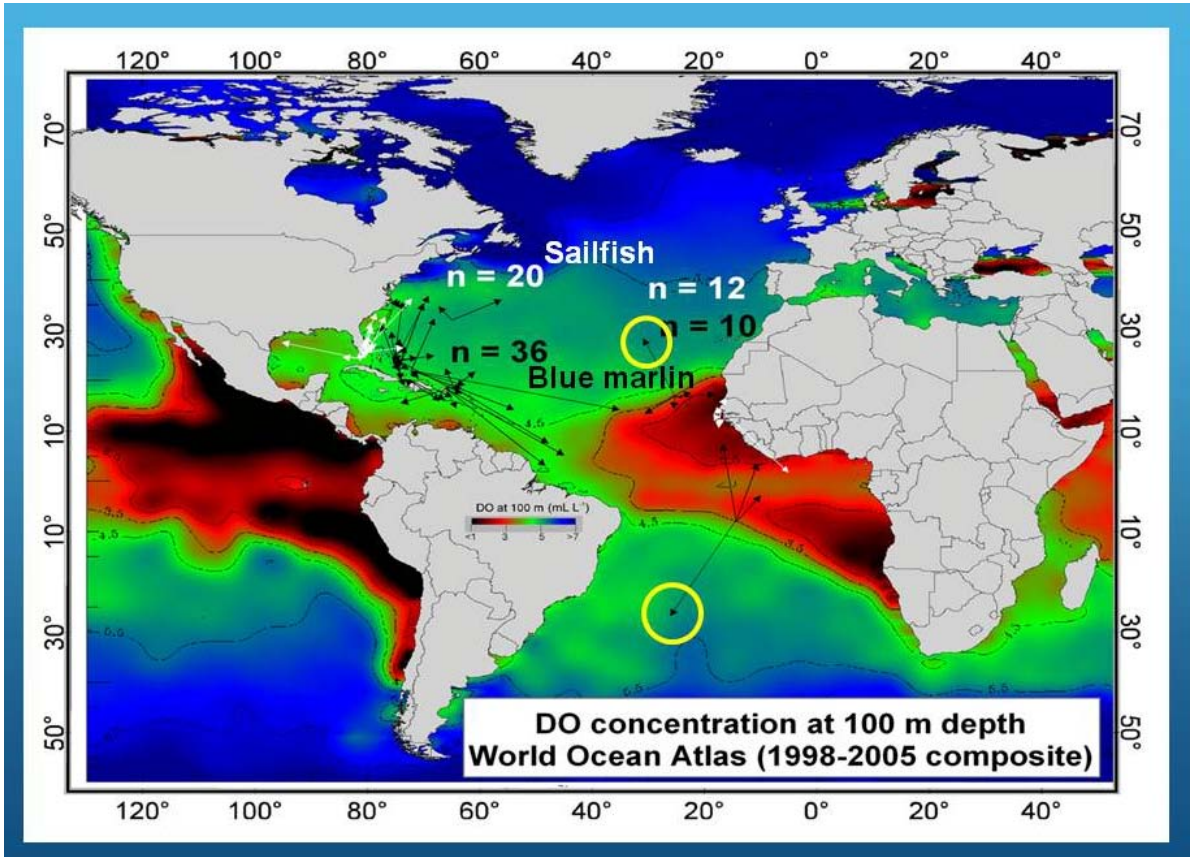
Habitat Utilization

Prince et al. 2010. Ocean Scale Hypoxia-Based Habitat Compression of Atlantic Istiophorid Billfishes. Fisheries Oceanography.



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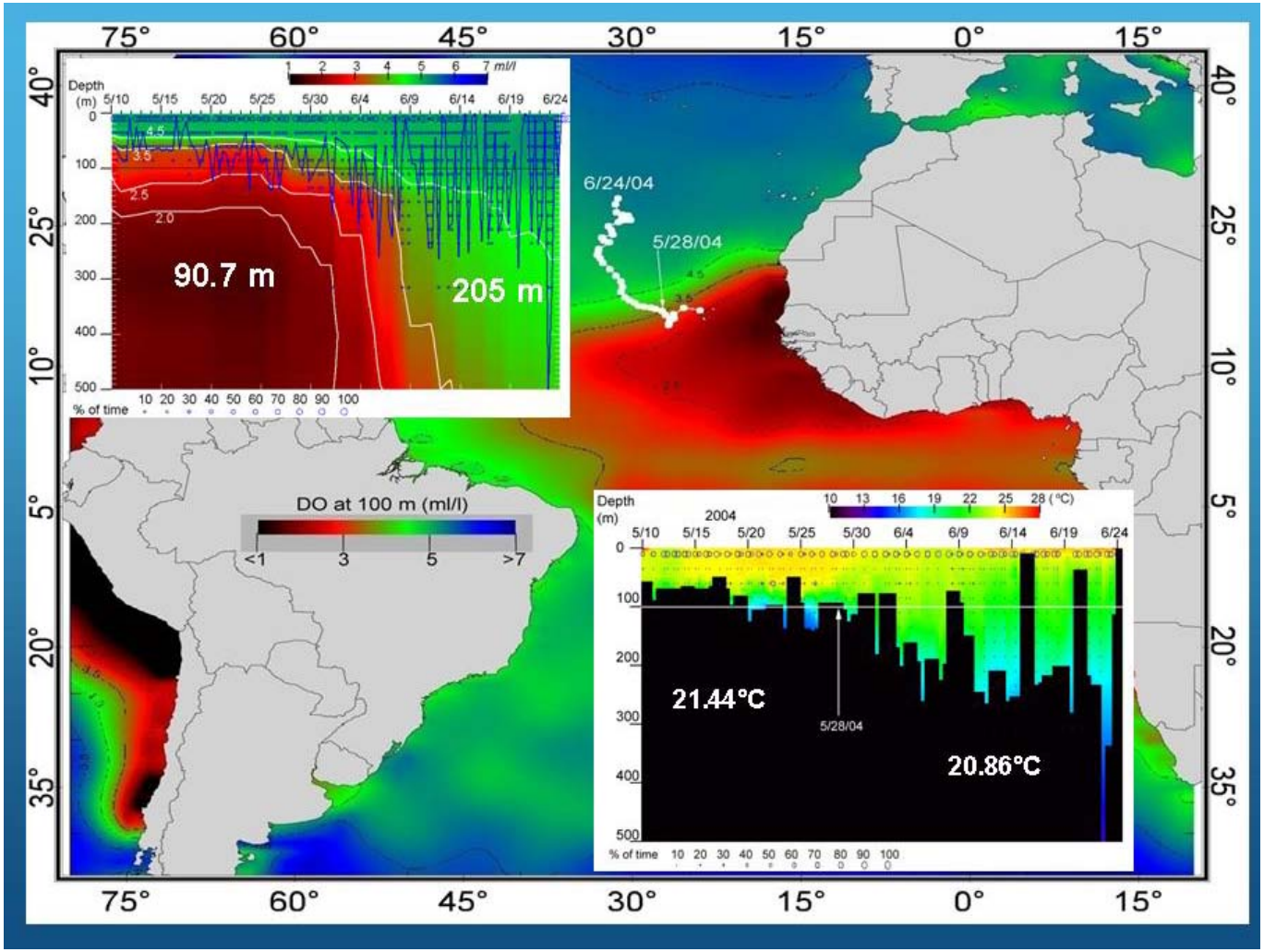
Habitat Utilization

- A tagged BUM was released off the Cape Verde Islands. It was monitored for ~43 days.
- Cross-sections of vertical habitat usage are shown.



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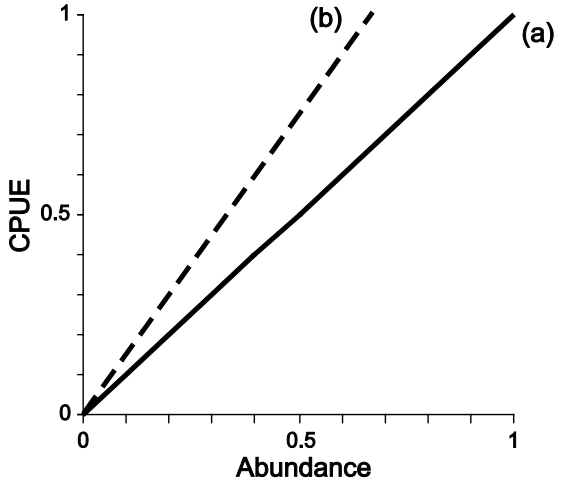
Habitat Utilization

2010 Research:

- At the 2010 BUM data preparatory meeting, SEFSC and SCRS Secretariat staff examined the variability of catchability within and outside the OMZ. A CPUE standardization model was developed to account for this.

- If there is expansion of the OMZ with time, and q varies across the OMZ, it will be necessary to revise CPUE standardization methodologies.

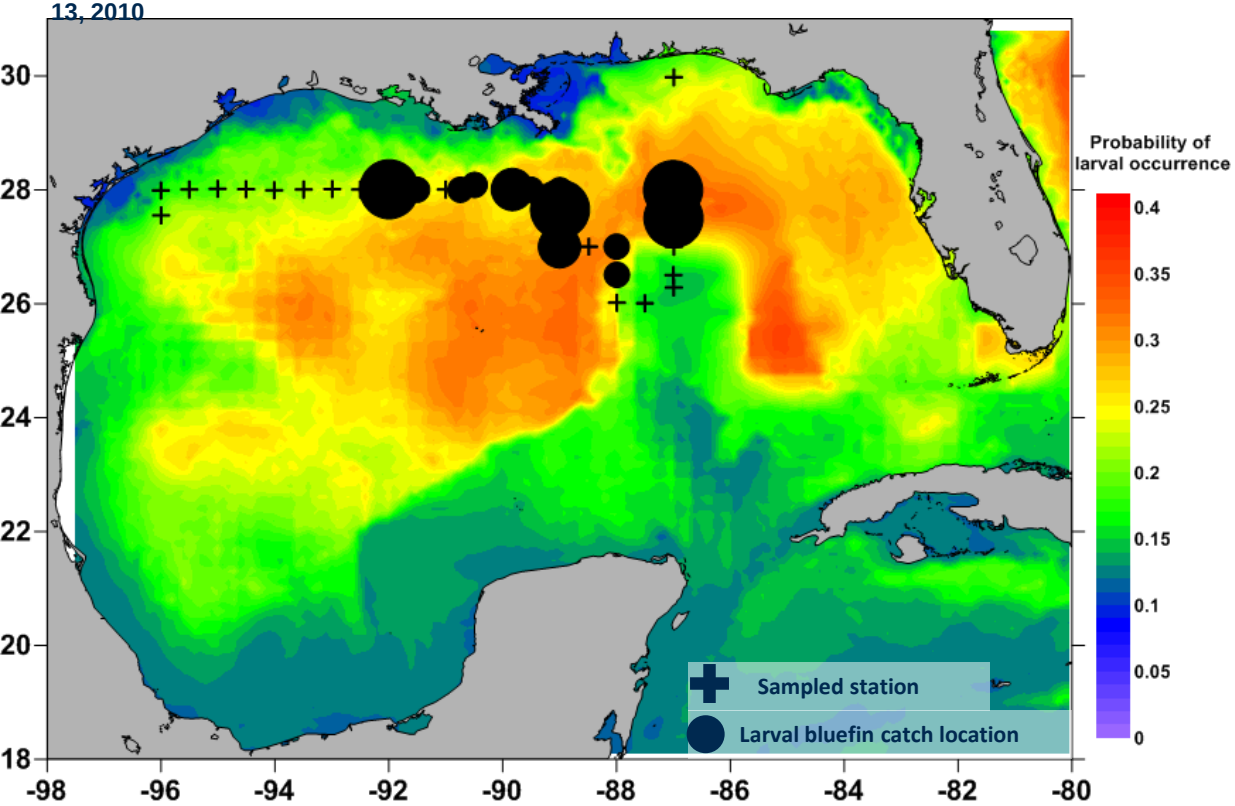


The relationship between CPUE and abundance for tropical pelagic billfish and tuna in uncompressed (a) and (b) compressed environments.

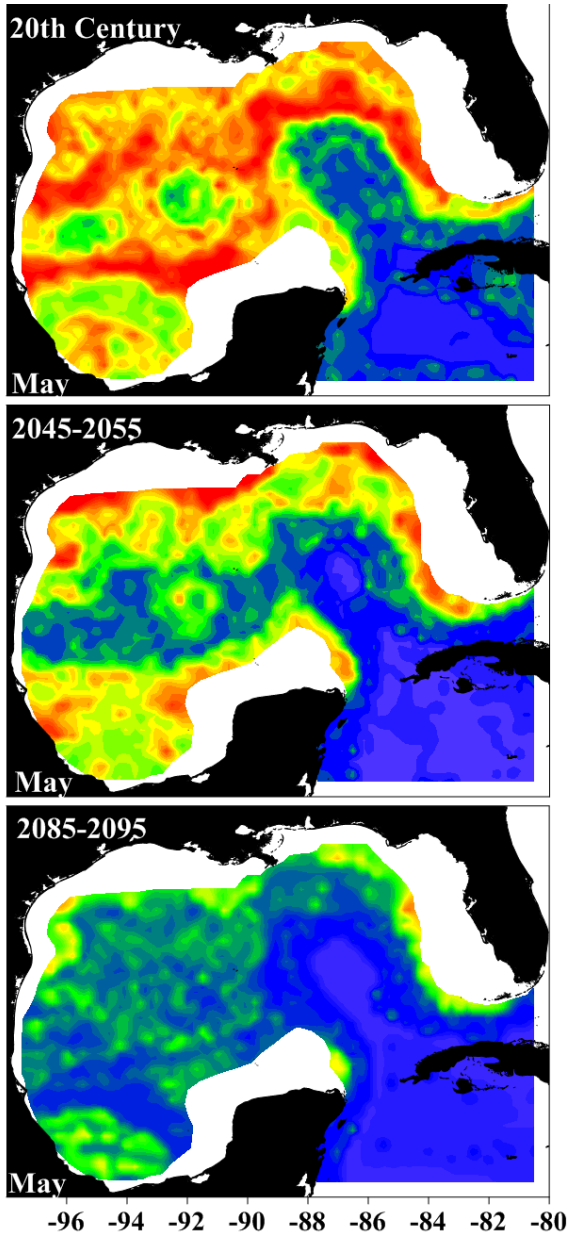
Larval bluefin tuna habitat modeling

- Larval bluefin tuna catch times and locations from surveys completed between 1977 and 2008 have been combined with environmental data to formulate predictive models of occurrence
- These models can run using *in-situ* environmental data from CTD casts, or remotely sensed data from various satellites
- We are working towards incorporating this information into the current larval index
- In addition, we are investigating the potential impacts of climate change on spawning habitat, by using water temperature predictions from climate models

1) Predicted probability of larval bluefin tuna occurrence and larval catch locations, May 13, 2010



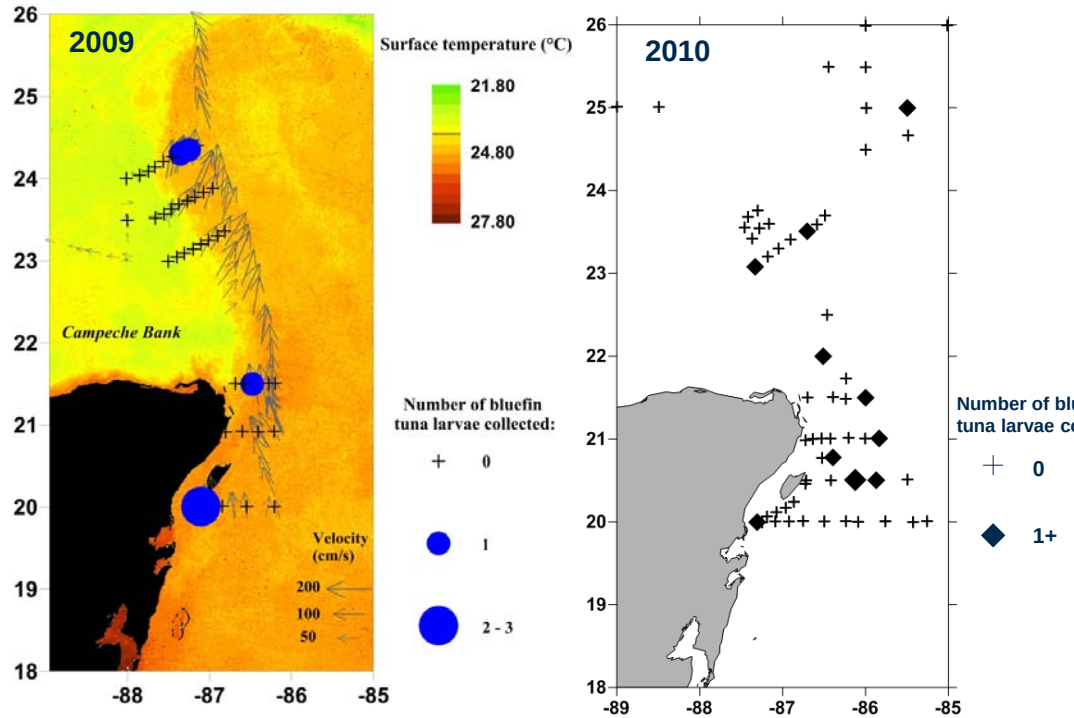
2) Predicted probability of larval bluefin tuna occurrence in May for the late 20th century, 2045-2055, and 2085-2095



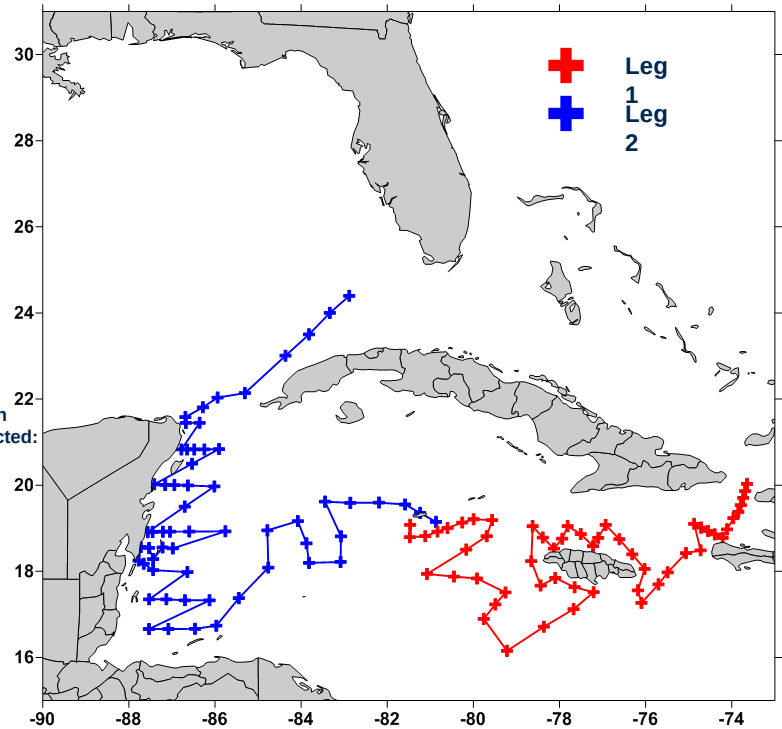
Bluefin tuna spawning outside the Gulf of Mexico

- In 2009 and 2010, low numbers of small bluefin tuna were collected east of the Yucatan Peninsula, and northwest of Campeche Bank
- Given that larvae were collected in strong northwards flow, they were likely to have been spawned outside of the Gulf Of Mexico
- In spring 2011, additional sampling in the western Caribbean, between Windward Passage and the Yucatan Peninsula will be completed, to further investigate the extent of spawning activity outside the Gulf of Mexico

1) Catch locations of larval bluefin tuna in April 2009 (left) and April 2010 (right)



2) Planned cruise track for April 2011



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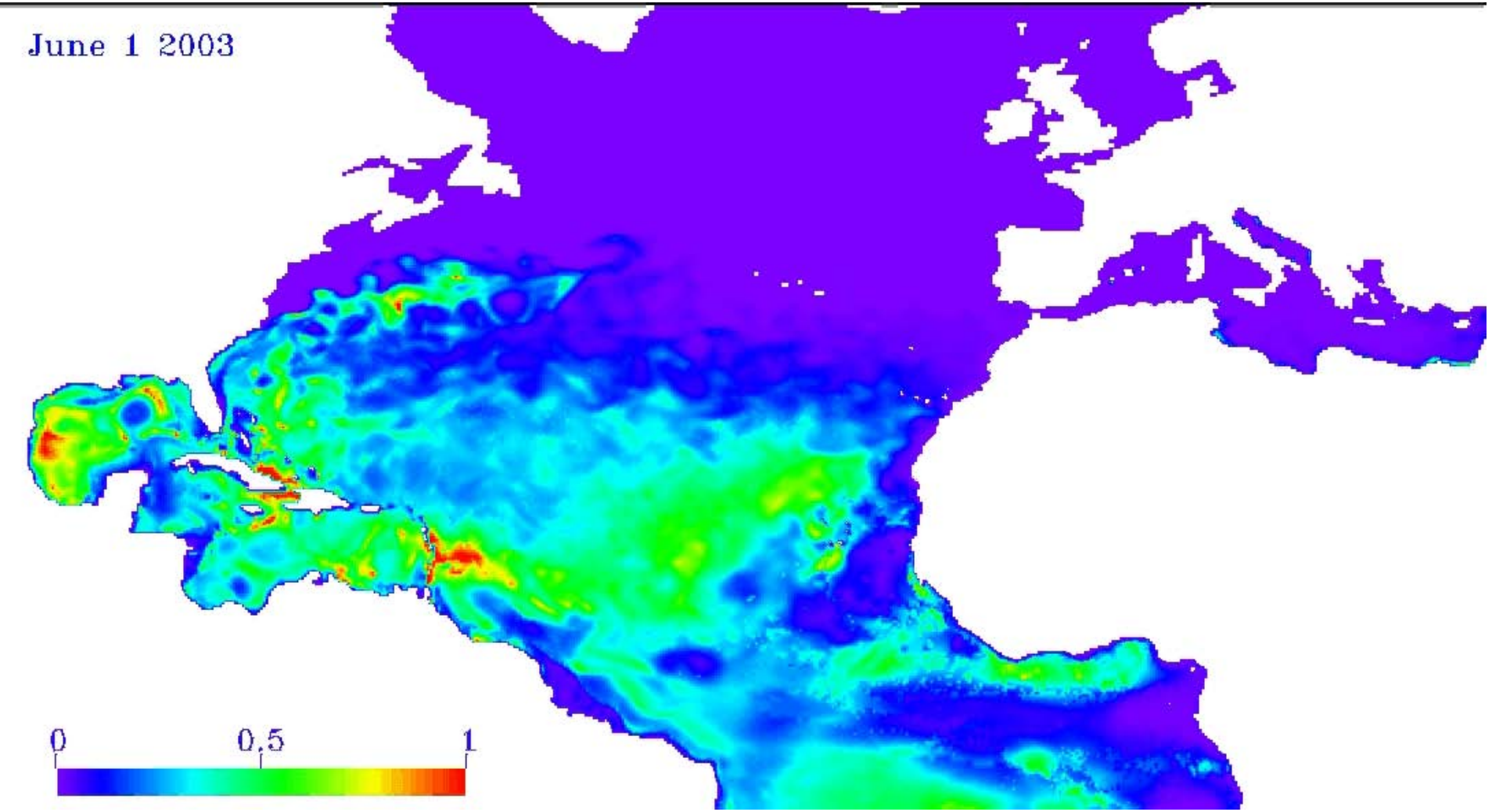
Habitat Assessment Improvement Plan

- ***Primary Investigators:*** Michael J. Schirripa (SEFSC), Patrick Lehodey (CLS, France), Eric Prince (SEFSC) and Jiangang Luo (UM-RSMAS)

- ***Objectives:*** Model the habitat of Atlantic blue marlin using an approach developed for a Spatial Ecosystem And Populations Dynamics Model (SEAPODYM). The model is calibrated and evaluated using fishing data and electronic tagging data. The results will be useful for CPUE standardization.


June 1 2003
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0.5
1

NOAA Sponsored BFT Research 2010

Direct contribution to GBYP: $175,000

External funding

- **Virginia Tech University Call: $600,000**
- **Southeast Regional Office Call (2011): $510,000 ?**

Internal funding (Southeast Fisheries Science Center)

- **Expanded observer coverage (GOM bluefin spawning season)**
- **Weak-hook study**
- **GOM LL release mortality study (on going)**
- **Pilot biological sampling program (first of its kind)**
- **Adaptive larval sampling**

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Experiments in the Gulf of Mexico to Evaluate Bluefin Tuna Bycatch Mitigation Measures in the Yellowfin Tuna Fishery

Dan Foster, Charles Bergmann and others….

Department of Commerce
NOAA Fisheries – Southeast Fisheries Science Center
Engineering and
Harvesting Branch

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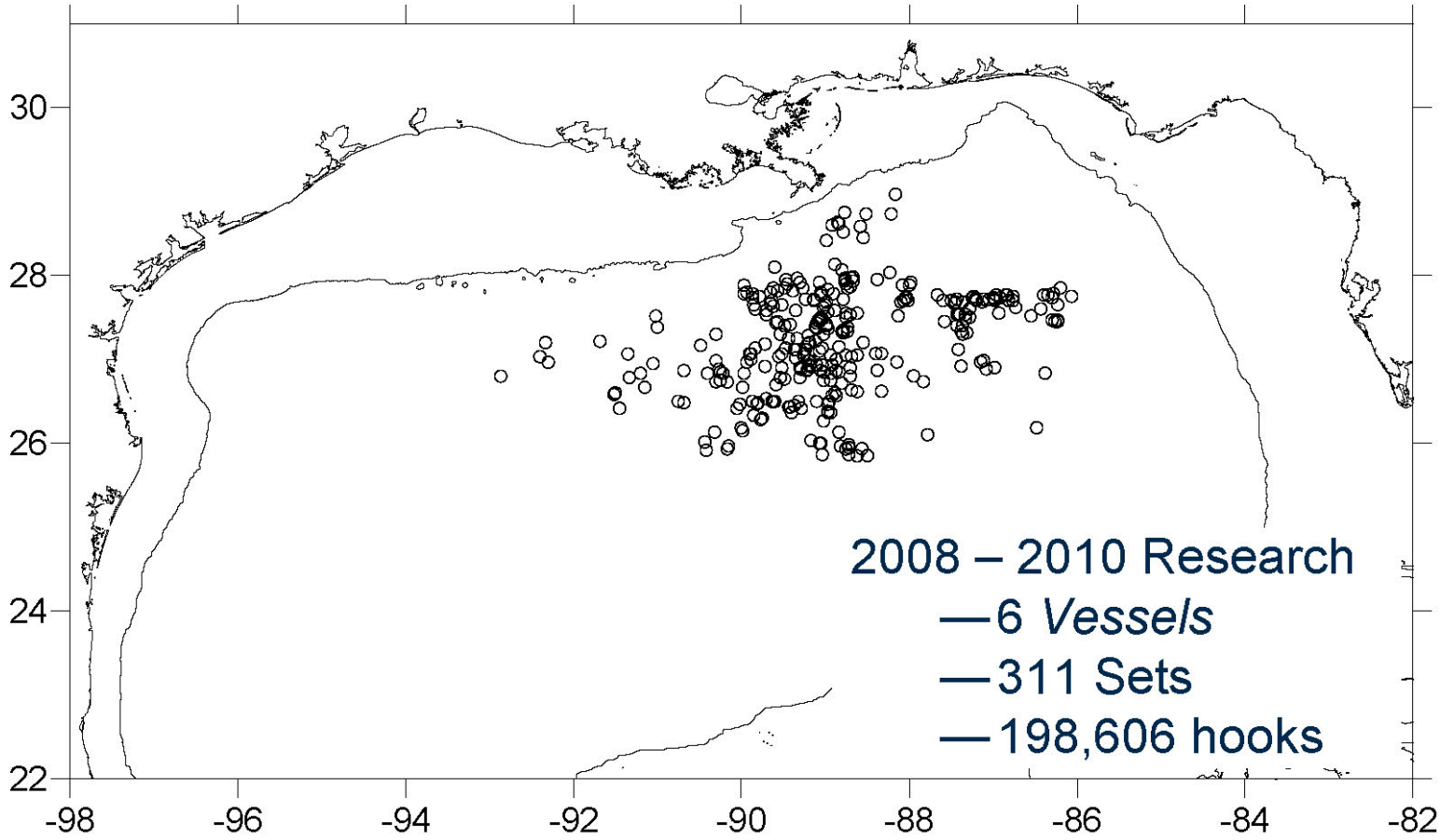
2008-2010 Effort Distribution



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2008 – 2010 Results

		CPUE (x1000)		311 sets	
	n	Control	Exp.	% Reduction	*P-value*
Bluefin Tuna	33	0.266	0.116	56.5	0.0351
Yellowfin Total Count	2065	10.564	10.231	3.1	0.479
Yellowfin Kept	1637	8.540	7.945	7.0	0.1427
Swordfish Total Count	234	1.208	1.148	5	0.7437
Swordfish kept	54	0.342	0.201	41.2	0.0759
Dolphin Fish	812	4.250	3.93	7.6	0.2757
Wahoo	255	1.480	1.09	26.5	0.0171

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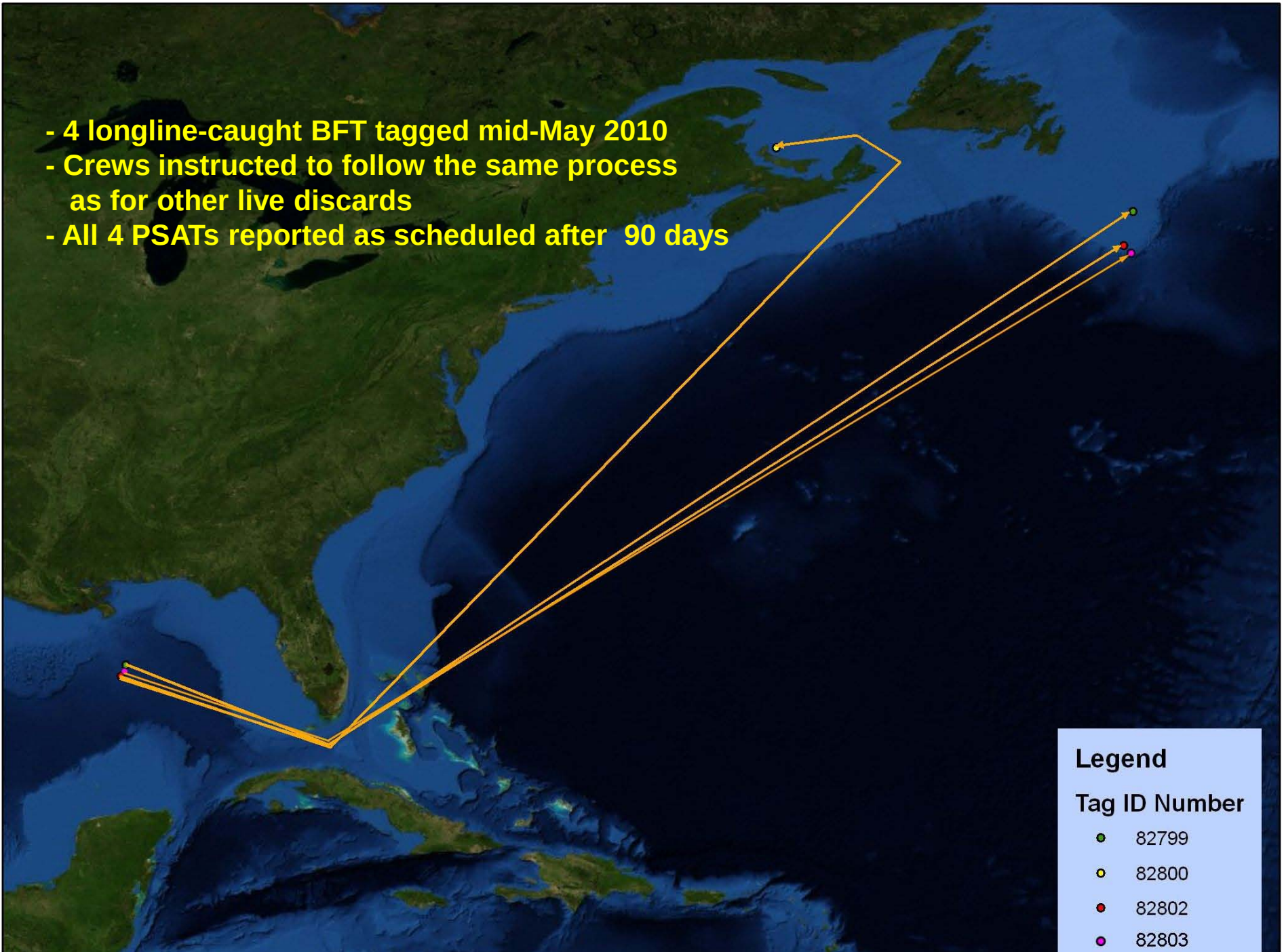
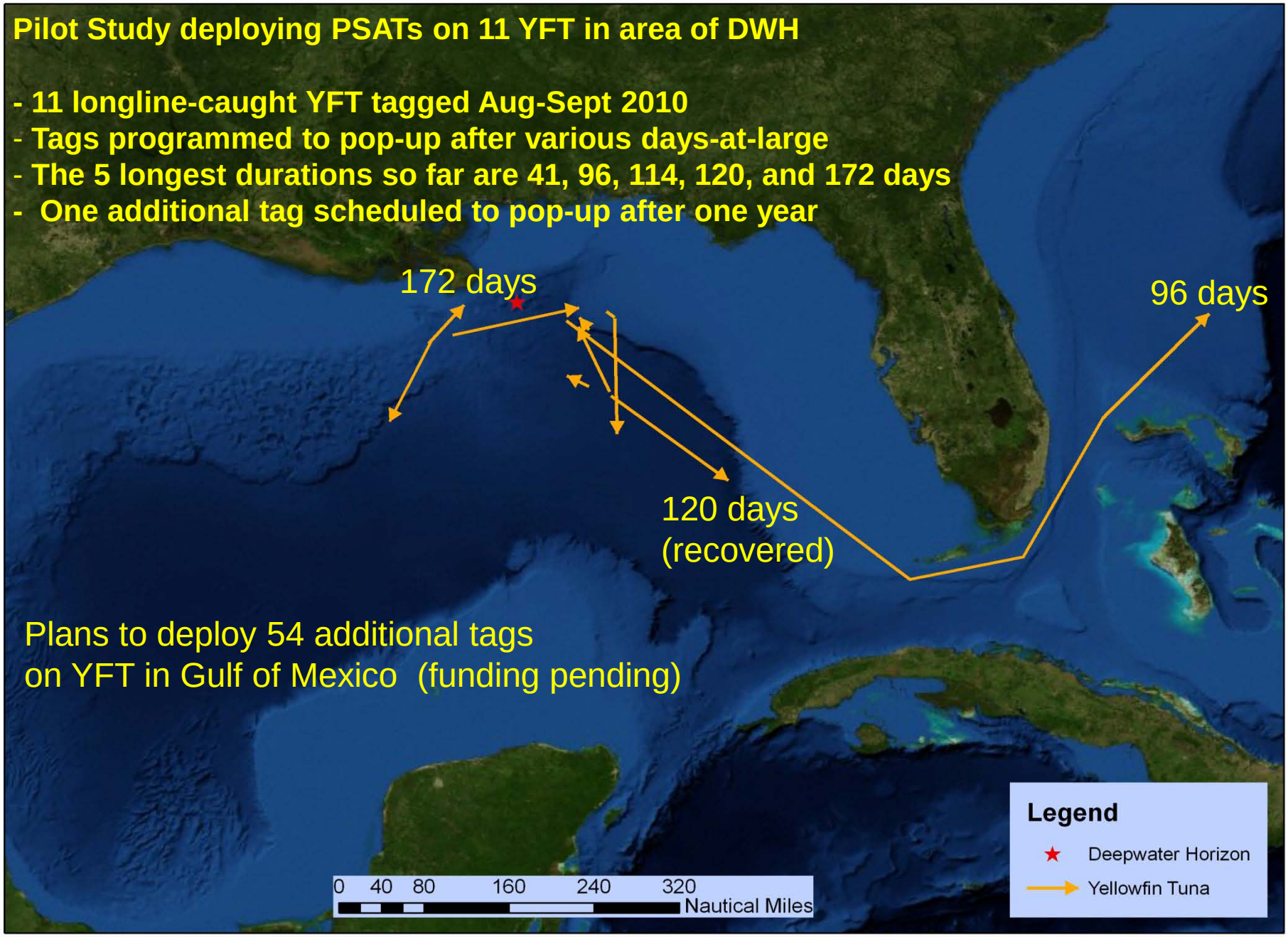
2008 – 2010 Bycatch Results

		CPUE (x1000)		311 Sets	
	n	Control	Exp.	% Reduction	*P-value*
Blue Marlin	113	0.574001	0.563931	1.8	1
White Marlin/ Roundscale Spearfish	96	0.382667	0.584071	-52.6*	0.0519
Sailfish	52	0.271895	0.251755	7.4	0.8899
Large Coastal Sharks	82	0.453159	0.372597	17.8	0.4396
Pelagic Sharks	21	0.140983	0.090632	35.7	0.4048

* Negative value denotes increase


- 4 longline-caught BFT tagged mid-May 2010
- Crews instructed to follow the same process as for other live discards
- All 4 PSATs reported as scheduled after 90 days
Legend
Tag ID Number
82799
82800
82802
82803


Pilot Study deploying PSATs on 11 YFT in area of DWH
- 11 longline-caught YFT tagged Aug-Sept 2010
- Tags programmed to pop-up after various days-at-large
- The 5 longest durations so far are 41, 96, 114, 120, and 172 days
- One additional tag scheduled to pop-up after one year
172 days
96 days
120 days
(recovered)
Plans to deploy 54 additional tags
on YFT in Gulf of Mexico (funding pending)
0 40 80 160 240 320
Nautical Miles
Legend
Deepwater Horizon
Yellowfin Tuna

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Additional Planned Research on Bycatch Mitigation

- Continue gear studies on weak hooks to refine precision estimates for assessment models
- Evaluate time fish struggle before straightening hooks, using hook times and time-depth recorders
- Multi-task experimental sets by deploying PSATs on BFT (and YFT, if project funded)

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Biological Sampling Program: Commercial and Recreational fisheries

- Primary Objective – Collect BFT otoliths representative of the fisheries, to permit assignment of stock origin and direct ageing

- Secondary Objectives –
  - collect additional hard parts (spines, vertebrae) from BFT
  - collect reproductive and muscle tissues from BFT/evaluate reproductive status
  - collect biological samples from other tunas

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Biological Sampling Program: Commercial and Recreational fisheries

- 2010 pilot study faced many difficulties and failed to collect very many otoliths. The problems included:
  - Late start (due to late availability of funds)
  - Delays in training of observers (DWH a factor)
  - Poor coordination of sampling effort with locations of landings
  - Majority of BFT appear to be landed without heads (or heads are quickly discarded)
  - Retention of the most available recreational size category were not permitted for much of the year
- We need to do much better this year.
  - Increased outreach, involvement of dealers/fisherman, collaborations with researchers, etc.

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Additional Research Funding

- Roughly $600K was made available through Virginia Tech to fund extramural research (e.g. genetic studies, tagging etc.)
- The response to the Fiscal Year 2010 opportunity was quite impressive and 13 proposals totaling in excess of $2.6 M were submitted for consideration. While a high proportion of these were highly ranked by the GBYP SSC and independent peer reviewers, the available funds permitted supporting only the top 3 ranked proposals which included:
  - 'Application of otolith stable isotope tracers to assign population of origin in US and Eastern Atlantic bluefin tuna fisheries' - Secor & Rooker
  - 'Use of organochlorine tracer analysis to determine the magnitude and temporal variation of mixing rates of Eastern and Western school sized bluefin tuna' - Graves et al.
  - 'Development of a suite of high-throughput molecular markers for genetic monitoring, genetic tagging, and population genetics in bluefin tuna' - McDowell et al.

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Additional Research Funding

- FY 2011 Funding:
  - Four proposals received
  - The review process in continuing
  - Funding levels for FY11 are not currently known

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QUESTIONS?