

Studies of Bluefin Tuna (*Thunnus thynnus*) Larvae from the Gulf of Mexico



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ATLANTIC BLUEFIN TUNA

Thunnus thynnus



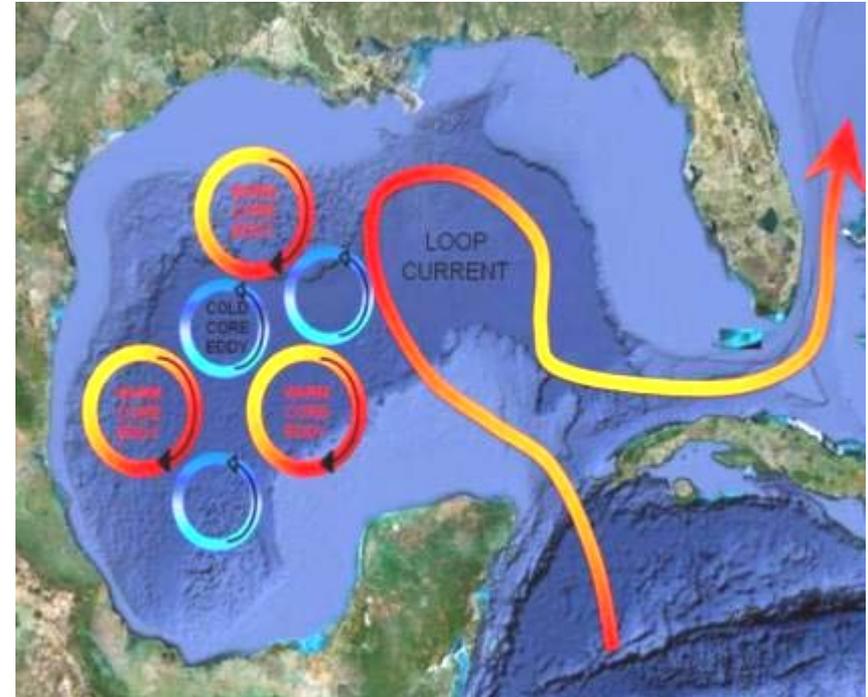
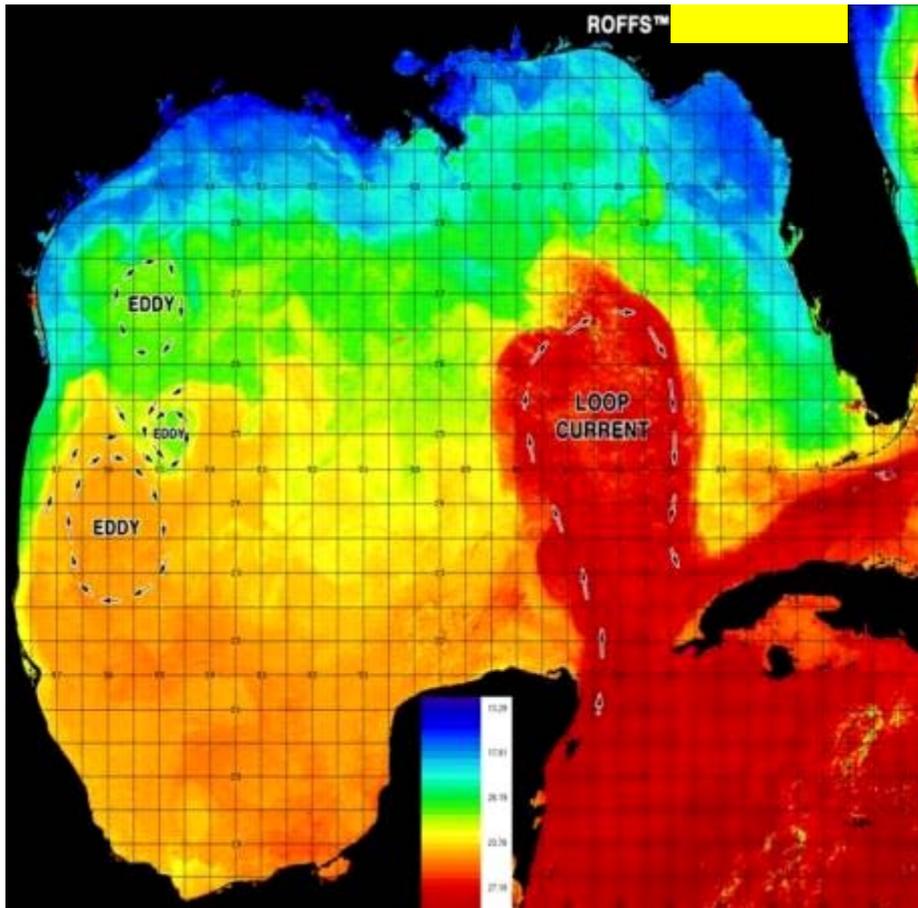
- ❑ Managed as two stocks (Western & Eastern Atlantic)
 - NOAA Fisheries-HMS; ICCAT
- ❑ Severely depleted stocks ... 20% of 1975 SSB
- ❑ Western stock spawns in GOM March – May (April peak)
- ❑ No directed fishery in GOM; incidental catch (bycatch) in GOM commercial yellowfin tuna & swordfish pelagic longline fisheries; recreational limit, 1 giant per vessel/yr
 - NMFS observers 2007-08: 511 adult ABT boatside (55% dead discards, 23% live release; 15% retained); 7% lost



May 2009

Research Needs / Questions – Gulf of Mexico

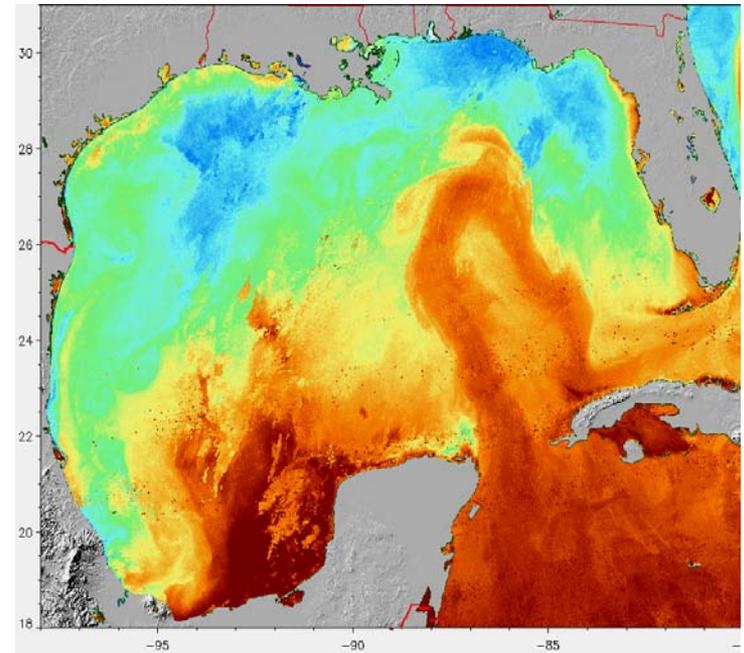
- ❑ Life history (larval stage), biology, habitats
- ❑ Effects of DWH oil spill on life stages (Lethal & sub-lethal exposures)
 - Behavior of spawning adults; successful spawns
 - Larval growth & survival
 - Prey (adults, juveniles and larvae)
 - Recruitment



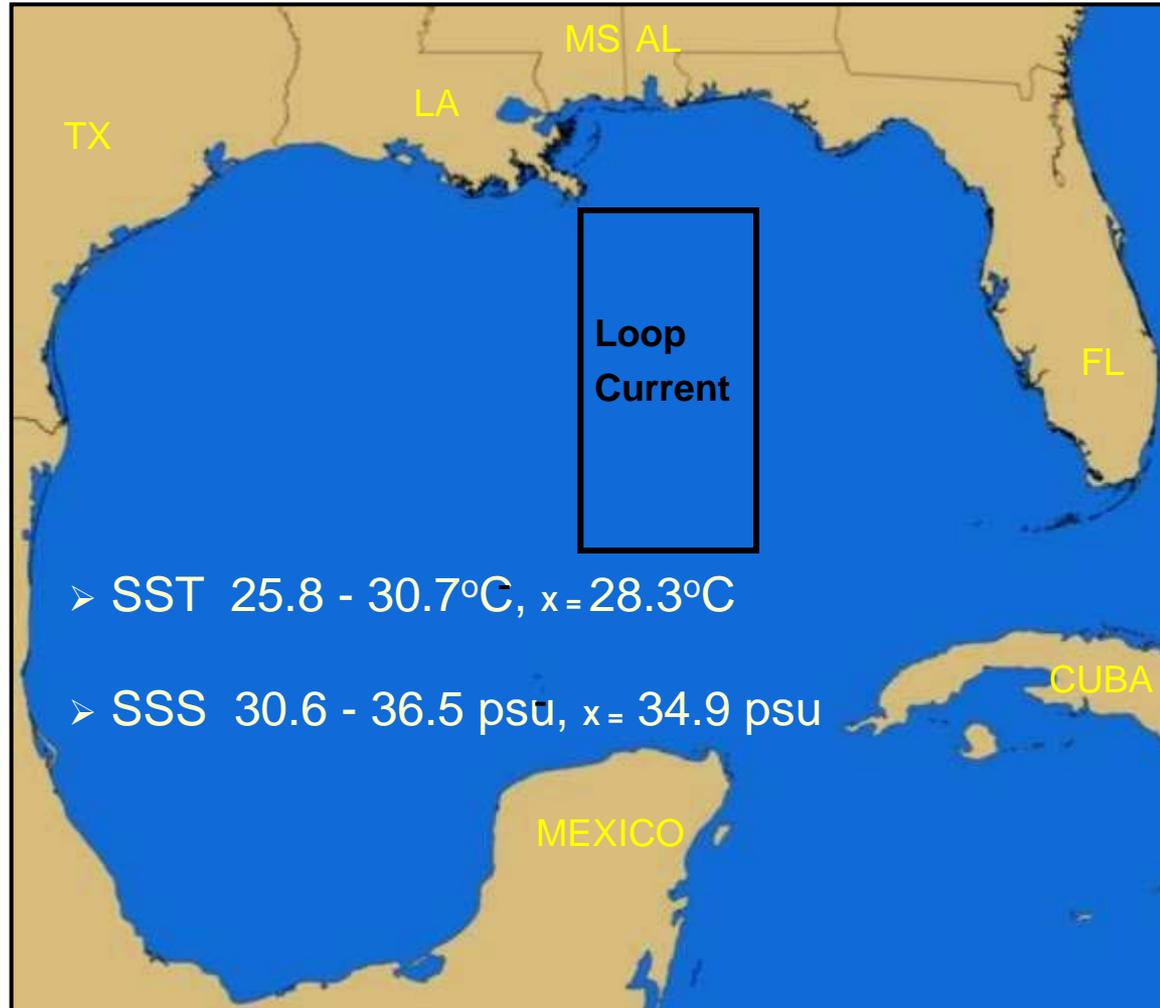
**Oceanographic features
(Loop Current, eddies, fronts)**

GCRL Bluefin Tuna Larval Sampling: Loop Current

- Plankton sampling along transects that intersected the Loop Current western & northern frontal boundary area
 - May (2003–04, 2008–10)
 - U.S. F&WS, MDNR, NOAA Fisheries – SEAMAP
 - 500+ collections (95% ETOH)
 - 800+ BFT larvae (DNA confirm)
 - Primary gear: neuston net
 - 1x2x3m; mesh 333 μ m, 505 μ m
 - Hydrographic data
- Larval BFT habitat; NMFS larval index of spawning biomass



Larval Bluefin Collections



Thunnus thynnus
3.0 – 9.9 mm BL



May 16 – 18, 2008

Loop Current

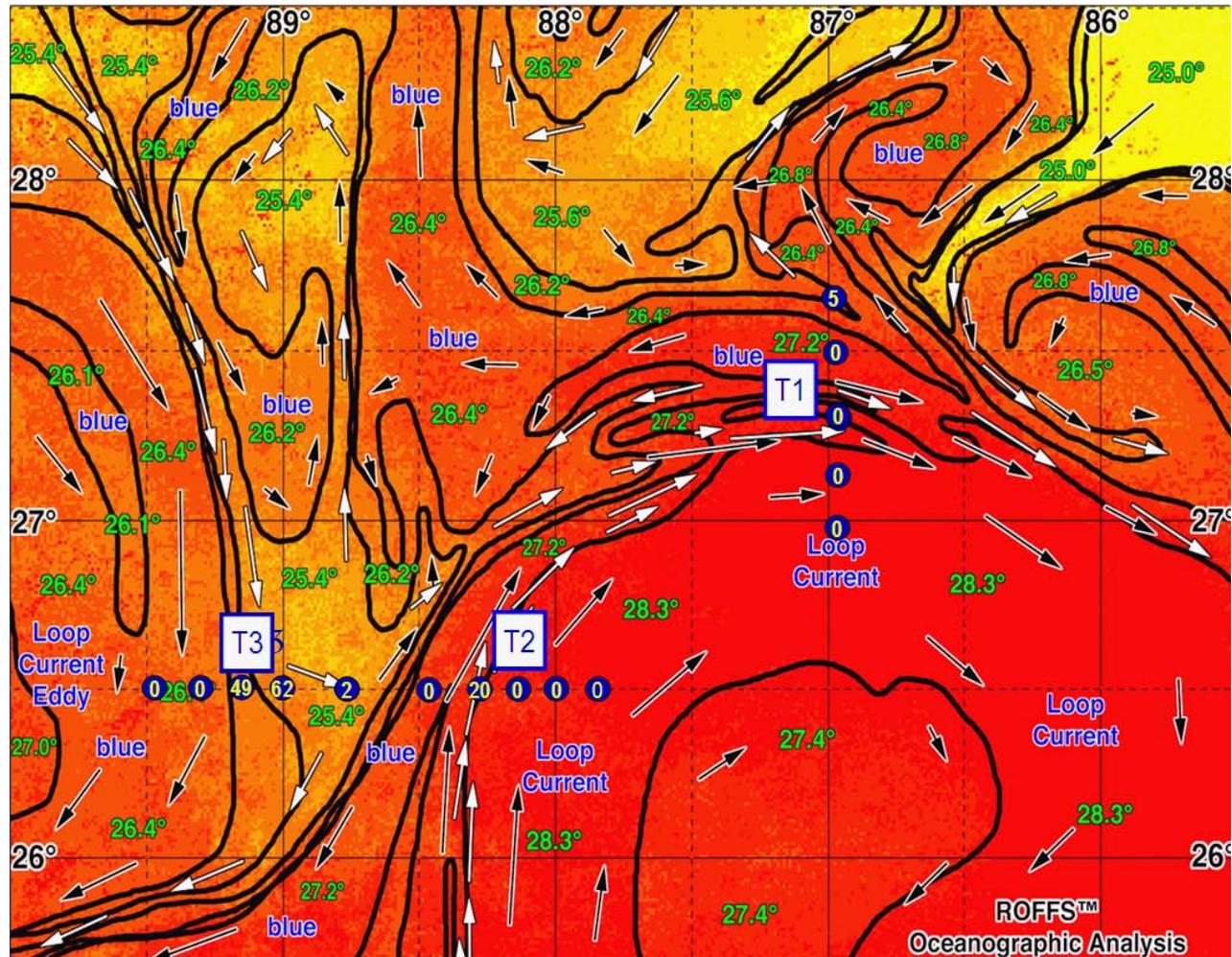
Larval bluefin transects

138 larvae

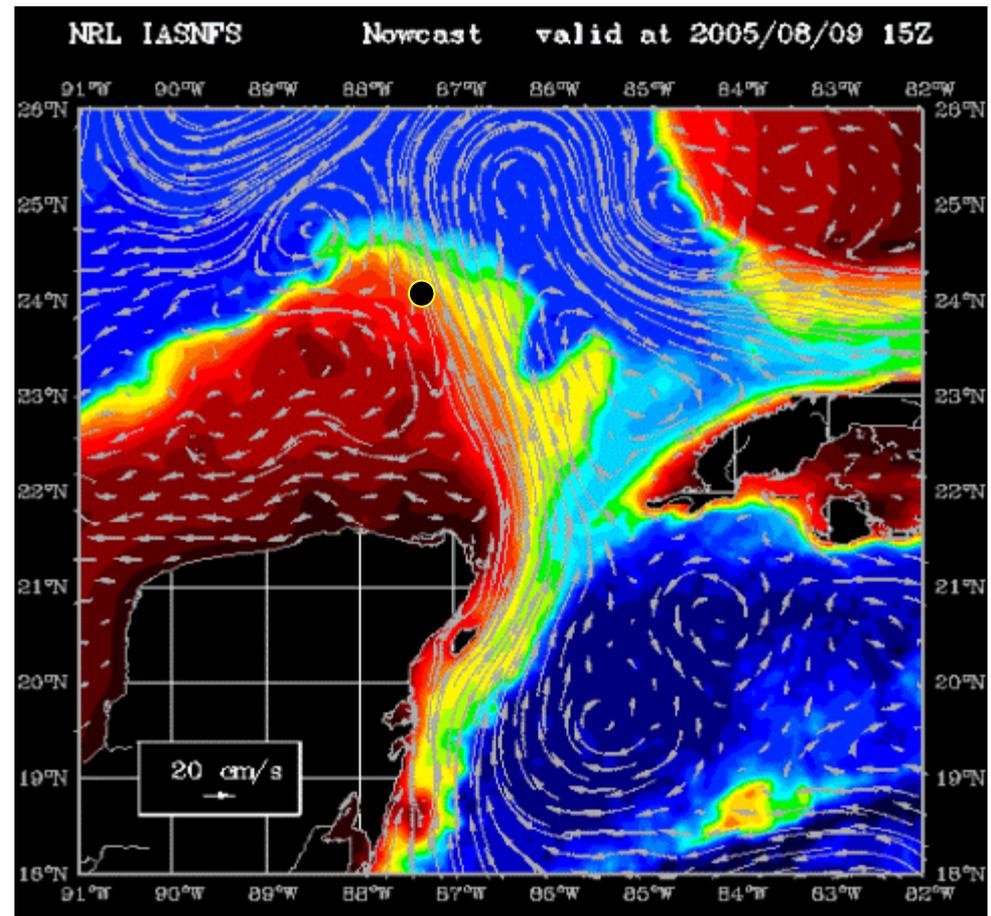
T1 (16 May)
5 larvae
5 stations

T2 (17 May)
20 larvae
5 stations

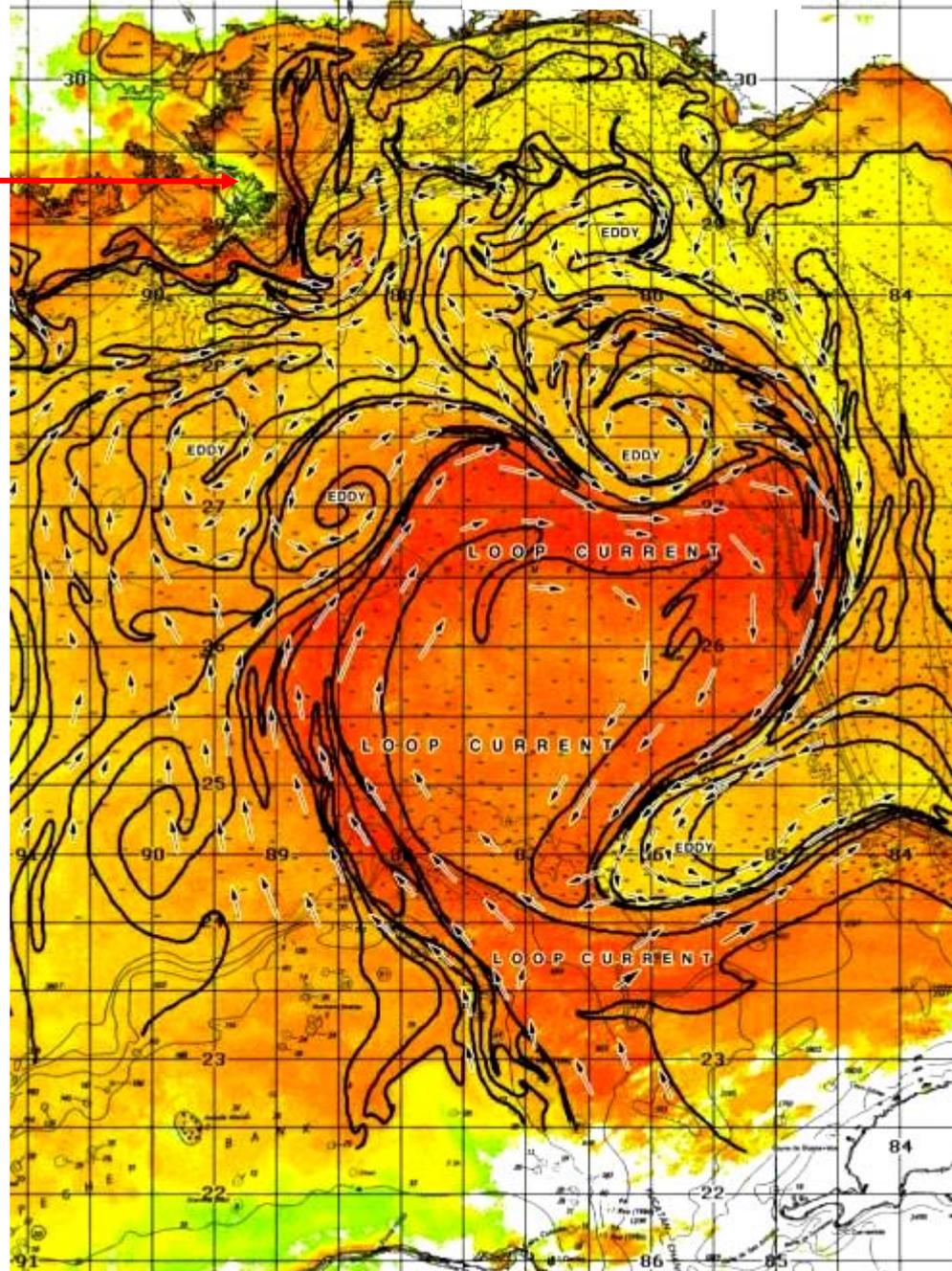
T3 (18 May)
113 larvae
5 stations



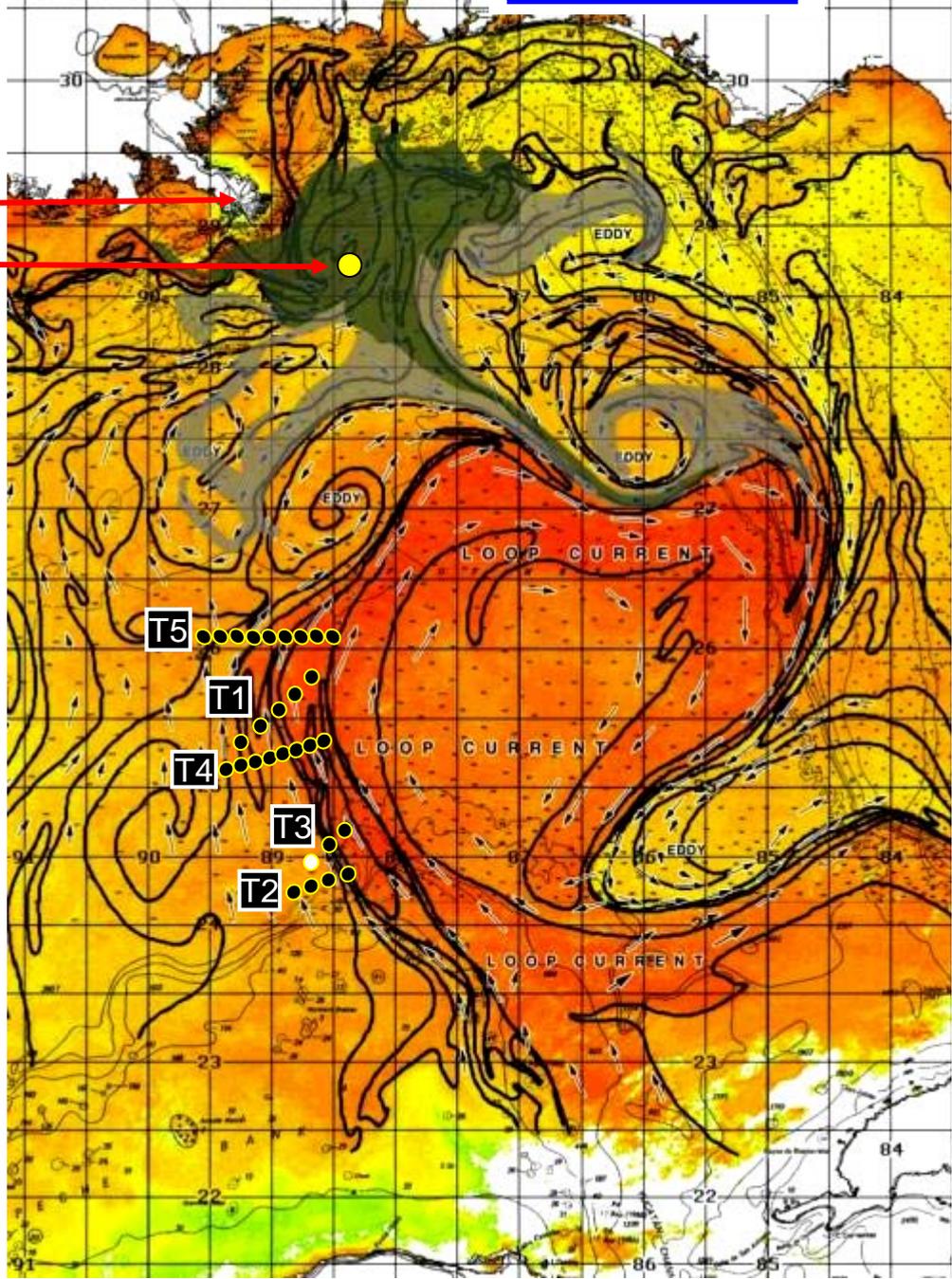
Retrospectively ID discrete bluefin tuna spawning locations using modeled current data coupled with larval age and collection locations



MS River
Delta

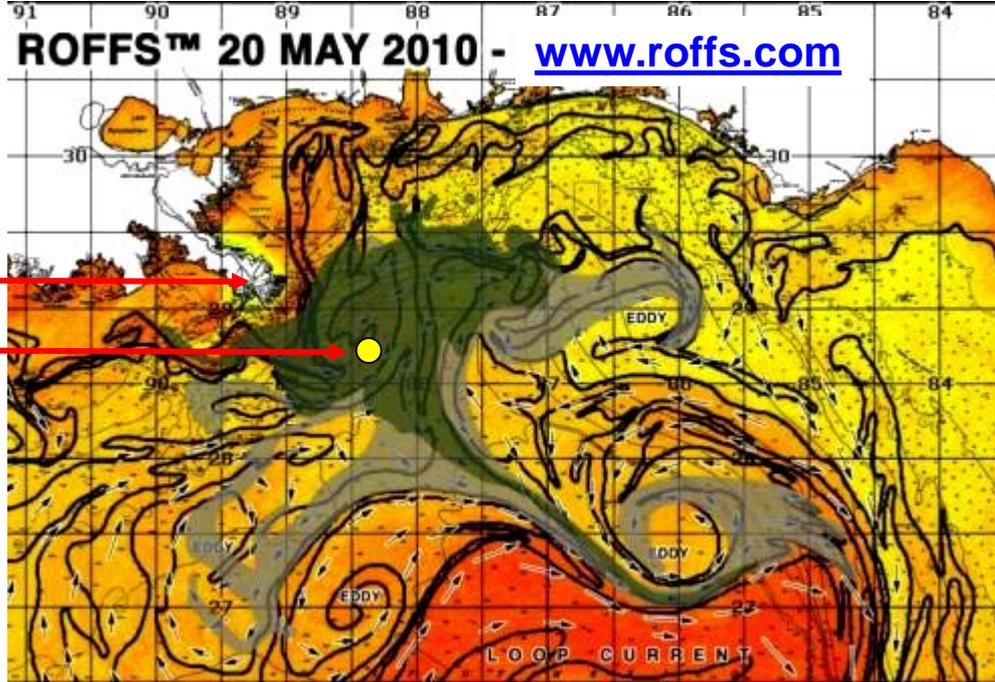


MS River Delta
DWH Site



May 18 – 21

No BFT larvae on
Transects 1 – 5

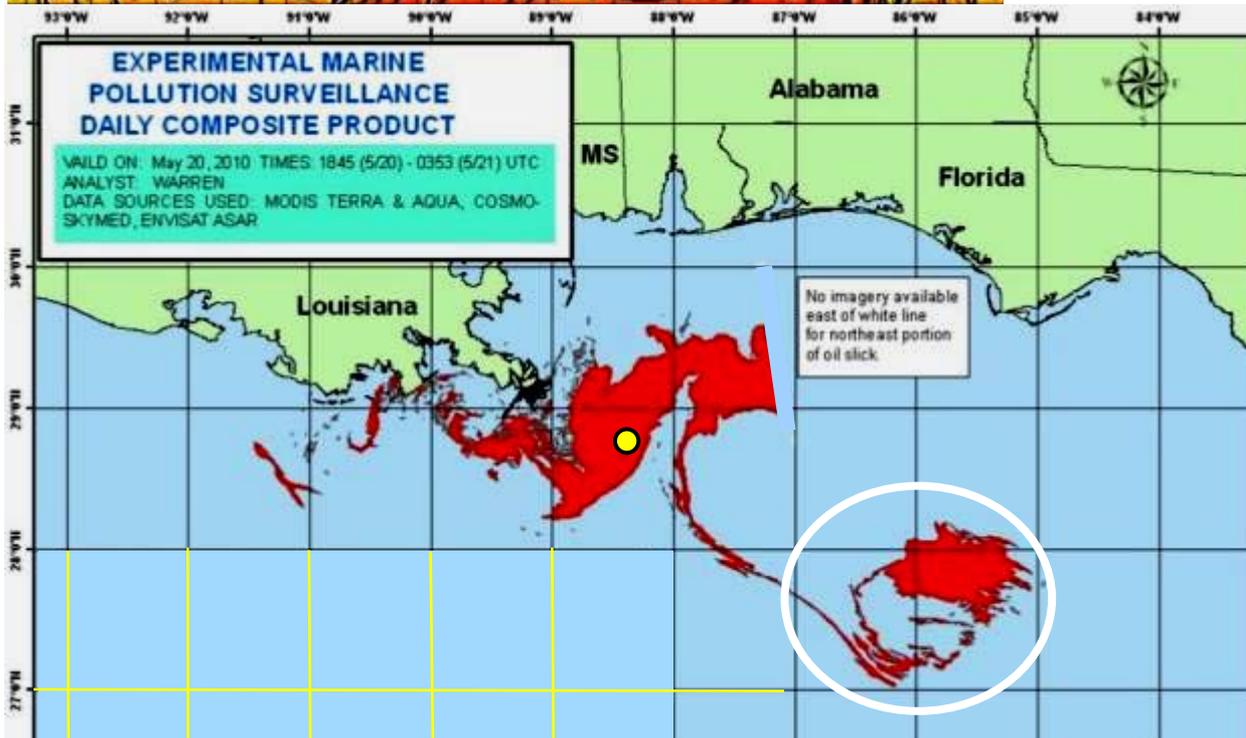


MS River Delta

DWH Site

May 18 – 21

No BFT larvae on
Transects 1 – 5



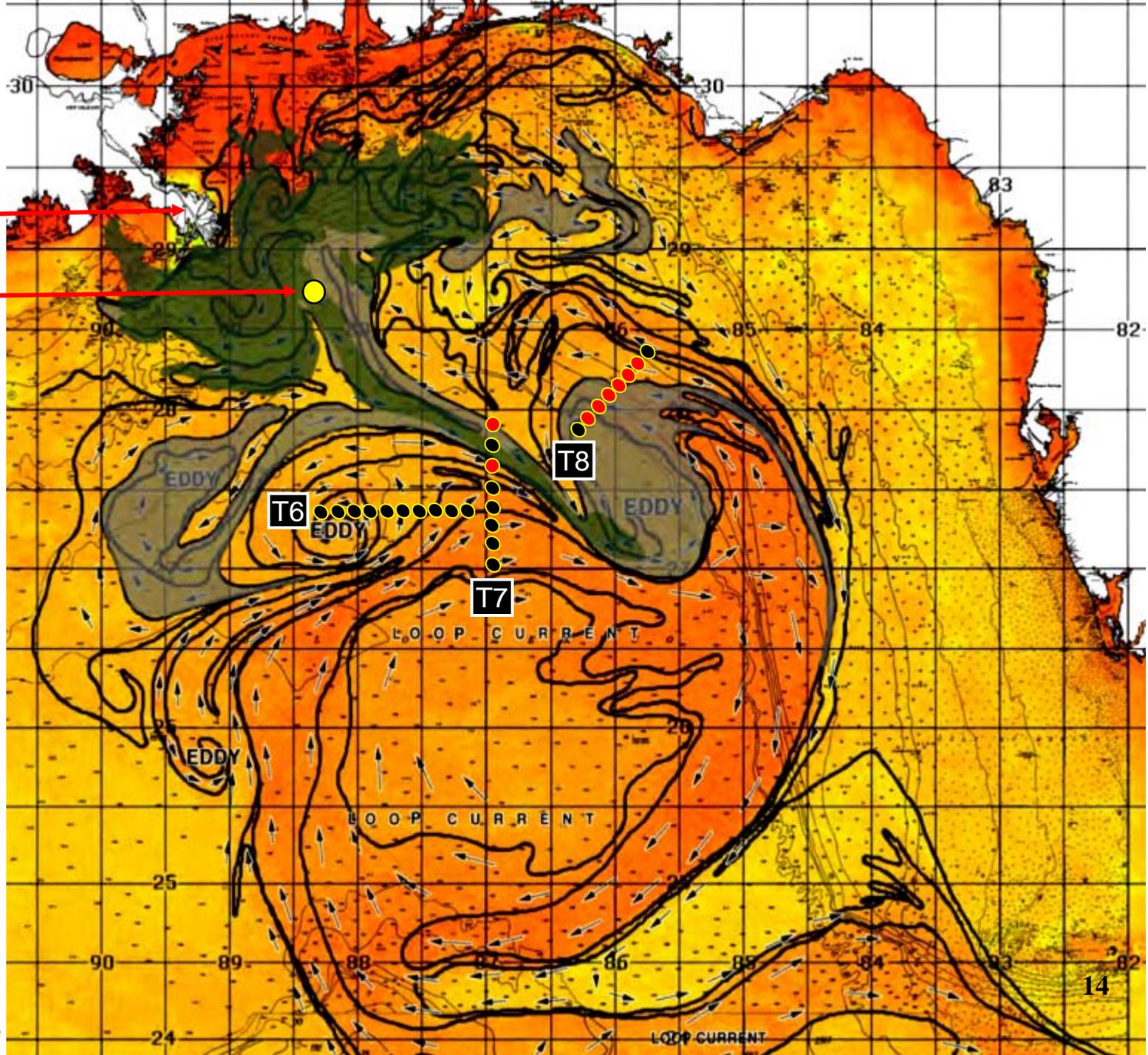
MS River
Delta

DWH Site

May 22 – 24

No BFT
larvae on
Transect 6

ROFFS



Oil Sheens and Pelagic *Sargassum*



Future Work

Archived collections:

- ❑ Increase understanding of temporal and spatial patterns of BFT spawning activity in GOM through larval assessments
 - Backtrack ('hindcast') aged larvae from capture locations to discrete spawning area(s)/habitats
- ❑ Investigate the role of fine-scale oceanographic features in spawning, larval distribution & abundance
- ❑ Examine geographical history of 'known-age' larvae as related to oceanographic habitats encountered along passive transport pathways

Future Work (cont.)

... 2010 collections:

- Estimate residence time for larvae in 'oiled' LC eddy and associated currents
- Larvae fixed in RNA*later* & 95% ETOH:
 - Examine general toxicity & genotoxicity ... Dr. Joe Griffitt
 - Conduct toxicity tests to examine effects of transient exposure to oil/dispersed oil on gene expression patterns
 - DNA studies: epigenetic modifications (heritable changes)

Current GCRL Larval Bluefin Tuna Research Funding Support



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