



Kerstetter Fisheries Research Laboratory

Nova Southeastern University, Oceanographic Center

The Fisheries Research Laboratory, founded by David W. Kerstetter, Ph.D. in 2007, conducts research on fish biology and applied fisheries science to address pressing issues in marine fisheries management. Many of its projects involve collaborative scientific research with the recreational and commercial fishery sectors on a local, national, and international levels. The Laboratory primarily focuses on the pelagic fishes, including swordfish, tuna, wahoo, king mackerel, and dolphinfish.

Current Graduate Student Research Projects:

- ◆ **Travis A. Moore:** Trophic Dynamics & Ecosystem Changes within the Southeast Florida Coastal Pelagic Fish Community.
- ◆ **Jenny Fenton:** Post-Release Survival and Habitat Utilization of Juvenile Swordfish in the Florida Straits Recreational Fishery.
- ◆ **Kerri Bolow:** Age and Growth of Four Large Mesopelagic Fish Species in the U.S. Western North Atlantic.
- ◆ **Tiffany Weidner:** Combined Gut Content-Stable Isotope Trophic Analysis and Satellite Tagging of the Pelagic Stingray (*Pteroplatytrygon violacea*) from the Western North Atlantic Ocean.
- ◆ **Twyla Herrington:** Socioeconomic Characteristics of Fishing Tournaments in South Florida Coastal Pelagic Fishes.
- ◆ **Elaine Brewer:** A Historical and Analytical Description of the South Florida Recreational Tournament Fishery for Swordfish, *Xiphias gladius*.
- ◆ **Amanda Karch:** Use of Simulation Analyses to Investigate Yellowfin Tuna (*Thunnus albacares*) Growth Models in the Atlantic Ocean Incorporating Gear Selectivity.
- ◆ **Heidi Da Silva Keller:** Trophic Study of Escolar, Snake Mackerel, Oilfish, and Lancetfish in the Western North Atlantic Ocean using Stomach Content Analysis and Carbon and Nitrogen Stable Isotope Analysis.
- ❖ **David Kerstetter**, Ph.D. graduated from the Virginia Institute of Marine Science at the College of William & Mary. He has been conducting research in collaboration with recreational and commercial marine fisheries for over 15 years. Along with the current projects in the Florida Straits, he and his graduate students have worked with fisheries in Hawaii, Brazil, the Cayman Islands, and Turkey. In addition to directed research and graduate-level education in fisheries science at the Center, he serves on several federal advisory groups, including the Highly Migratory Species Advisory Panel and the U.S. Advisory Committee for the International Commission for the Conservation of Atlantic Tunas (ICCAT).
 - ◆ For information or assistance regarding a research project, please see the contact information.

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The Nova Southeastern University, Oceanographic Center is situated at Port Everglades, close to the cities of Fort Lauderdale and Dania Beach. Its Mission is to carry out innovative, basic and applied research and to provide high-quality graduate and undergraduate education in a broad range of marine science and related disciplines. The Center also serves as a community resource for information, research, and education on oceanographic and environmental issues.

2010 YCMBT Coastal Pelagic Research Results



- ◆ At the 2010 Yamaha Contender Miami Billfish tournament (YCMBT), the fisheries lab set up a booth during the 3-day weigh-in to conduct fisheries research as part of Travis Moore's thesis research project. Graduate researchers took measurements and collected biological samples (stomach, gonads, muscle tissue, and liver tissue) from fish species in the "funfish" category, which includes: king mackerel (*Scomberomorus cavalla*), blackfin tuna (*Thunnus atlanticus*), wahoo (*Acanthocybium solandri*), and dolphinfish (*Coryphaena hippurus*).
- ◆ Once the angler/team had weighed-in the fish, they had the option to donate samples by dropping off their fish for approximately 10-15 minutes at the lab booth and have the graduate researchers take measurements and collect samples. The standard, fork, and total lengths were recorded for each fish, and the stomachs, gonads, and muscle tissue were collected for further analysis in the lab. After all the measurements and samples were collected, the fish was returned to the angler/team, all the while being kept on ice.

Trophic Dynamics & Ecosystem Changes within the Southeast Florida Coastal Pelagic Fish Community

The objective of this research project is to investigate and achieve a greater understanding of coastal pelagic fishes, with an emphasis on the higher order species that inhabit the mid-range coastal pelagic to true pelagic waters, and the ecological role they play within the community ecology of the pelagic ecosystem. Presently, there is a shortage of available data concerning fishes of the coastal pelagic ecosystem, which are primarily targeted by recreational tournaments. The ability to collect accurate data concerning the community ecology dynamics would greatly enhance the opportunities to successfully manage and develop sustainable fisheries for the future. The selected fish species include all of the ones sampled at the 2010 YCMBT, as well as yellowfin tuna (*Thunnus albacares*), skipjack tuna (*Katsuwonus pelamis*), and the small tunas like little tunny (*Euthunnus alleteratus*).

At local recreational fishing tournaments, biological samples (stomach, gonads, muscle and liver tissue) are collected from the selected fish species. The stomach and muscle tissue is collected in an effort to evaluate the trophic dynamics via stomach content analysis and stable isotope analysis.

King Mackerel (*Scomberomorus cavalla*):

- A total of 26 king mackerel were sampled at the 2010 YCMBT. Gonad examination indicated that the majority of king mackerel sample were female at 77%, with male at 19%, and undetermined at 4%. The average fork length was 108 cm (33.5 in). An average fork length of 100 cm and 115 cm occurred most frequently (Figure 2). The stomach content analysis preliminary results indicate that king mackerel are primarily opportunistic predators, with 42% of the stomachs containing common bait items such as blue runners, scads, flying fish, and shrimp (Figure 1).

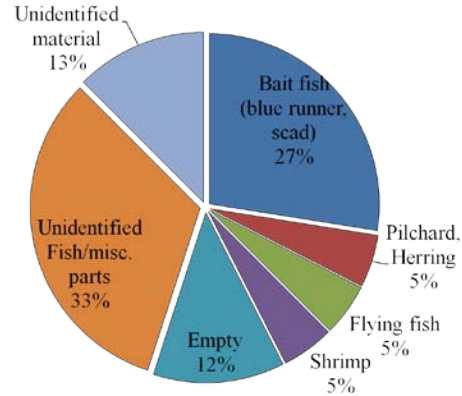


Figure 1: king mackerel stomach content by percentage.

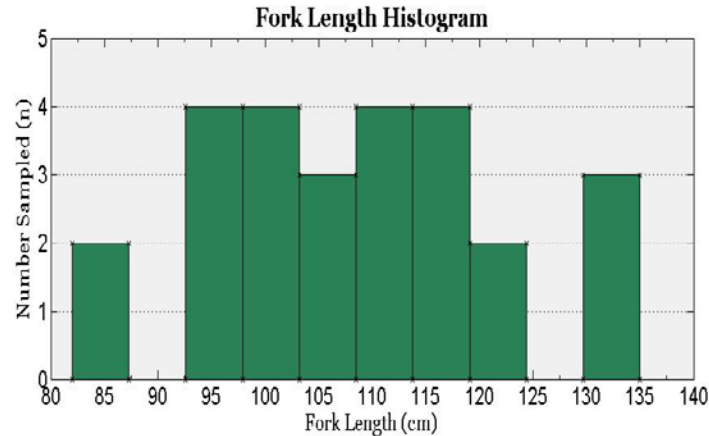


Figure 2: Distribution of king mackerel fork length.

Blackfin Tuna (*Thunnus atlanticus*):

- A total of 7 blackfin tuna were sampled at the 2010 YCMBT. Gonad examination indicated that all the blackfin tuna sampled were male. The average fork length was 85.5 cm (33.6 in). An average fork length of 80 cm (31.5 in) occurred most frequently (Figure 4). The preliminary stomach content analysis results of 74% of the stomachs containing flying fish, 9% common bait fish (blue runners, scads, goggle eye), 5% crab, 4% *Sargassum* and 4% seahorse (Figure 3). Those results indicate that blackfin tuna exhibit a degree of species specific prey selectivity. Blackfin are selectively preying upon flying fish. The presence of crab, seahorse, and *Sargassum* are concluded to be accidental ingestions and are evidence as to the habitat where blackfin are commonly found, a weed line.

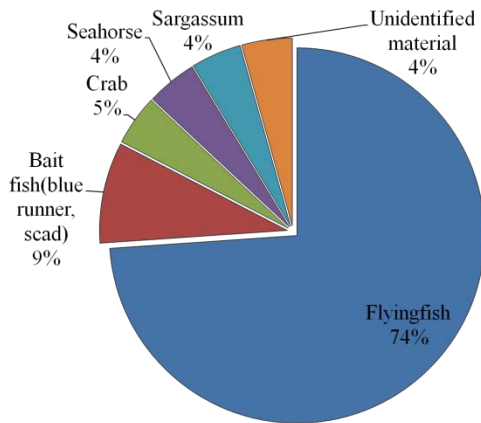


Figure 3: blackfin tuna stomach content by percentage.

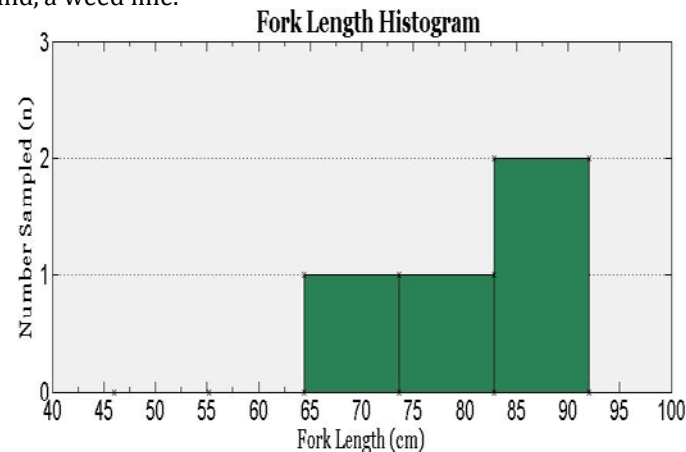


Figure 4: Distribution of blackfin tuna fork length. (*lengths for 3 blackfin were not recorded)

Stable Isotope Analysis:

- The stomach content analysis data will be paired with stable isotope analysis of the fish muscle tissues to provide additional information on the trophic dynamics. A comparison of the $\delta^{13}C$ and $\delta^{15}N$ stable isotopes present in the muscle tissue, blood, and bone will be used to indicate the dietary assimilation of prey items by the predator fish at varying time scales. The stable isotope values will also better describe the trophic level within the food web for each predator/prey species.

The 2010 YCMBT coastal pelagic research conducted by Travis Moore would not have been possible without the active participation of the recreational tournament anglers, the support of his fellow lab mates, and the guidance of Dr. David Kerstetter. The research was funded by the YCMBT.

- **Travis A. Moore**, a current M.S. student at Nova Southeastern University Oceanographic Center, graduated from the University of Alabama with a B.S. focusing on Geography and Marine Science. He has been an avid recreational and tournament angler all his life. As a graduate student, he has been conducting research on collaboration with recreational and commercial fisheries for 1.5 years. Along with his current project in the Florida Straits, he has worked with fisheries in the Cayman Islands, Turkey, and the Gulf of Mexico.

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Monitoring the Coastal Pelagic Fish Complex for Assessing Deep Water Horizon Related Trophic Changes and Contaminant Exposure.

- This research project is a collaboration between the Nova Southeastern University Oceanographic Center and the University of North Florida. The strategy involves collection of coastal pelagic fishes from recreational tournaments and research gillnet sampling in waters off SE Florida. The project is planned to continue for two years and will include stomach content analysis and stable isotope analysis, as well as chemical testing for oil and dispersants related to the Deep Water Horizon oil spill event. Stomach content analysis will be used to determine predator-prey interactions, with additional analyses of nitrogen stable isotope ratios to determine trophic level and carbon stable isotope ratios to trace carbon sources in the diet of these coastal pelagic fishes. The samples will also be used to trace exposure and effects of exposure to polycyclic aromatic hydrocarbons (PAHs). The potential toxicological effects of the DWH event on coastal pelagic fishes in the Florida Straits will be assessed by conducting laboratory-based assays for the cytochrome P4501A1, biliary fluorescent aromatic compounds, and PAH-DNA adduct biomarkers. These combined trophic and ecotoxicity studies will provide important information for assessing policy options for the coastal pelagic fisheries resources of the Florida Straits.
- Research funded by the Florida Institute of Oceanography, through a contribution by BP.

