Evaluation of Greenstick and Swordfish Bouy Gears in the Gulf of Mexico: Alternative Gear Pilot Program Preliminary Results

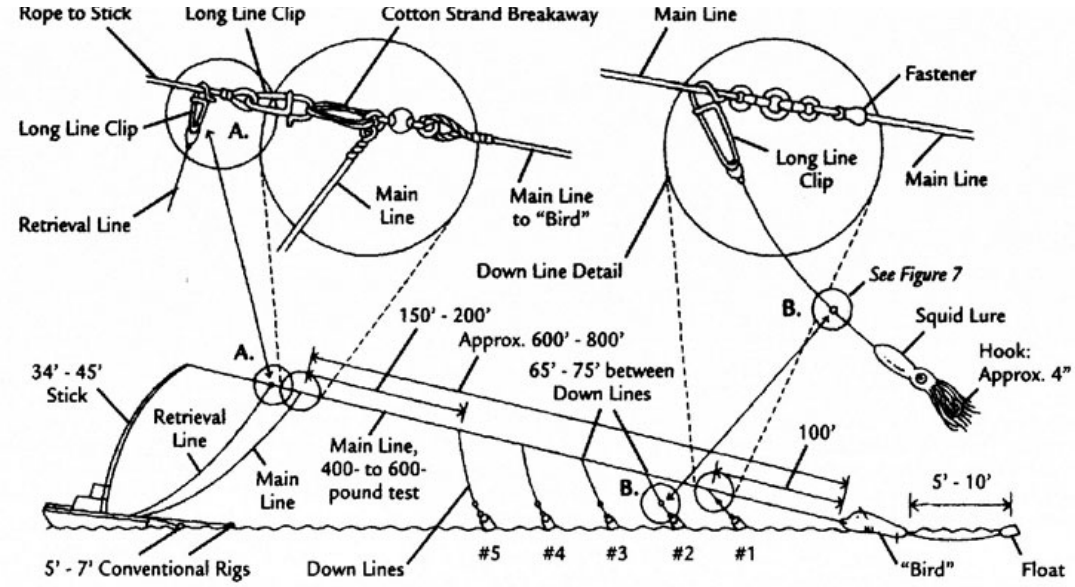
David Kerstetter and Max Appelman
Nova Southeastern University Oceanographic Center
8000 North Ocean Drive
Dania Beach, FL 33004 USA
kerstett@nova.edu

Introduction: Background

- Medium-scale (15-20 vessels, some seasonal) pelagic longline (PLL) fishery in the Gulf of Mexico, mostly based in Dulac, LA
- Continuing problem of bluefin tuna interactions, especially during spawning season, as well as sea turtle bycatch
- Vessels are large (85-100 ft LOA) and old (>15 yrs), primarily steel-hulled

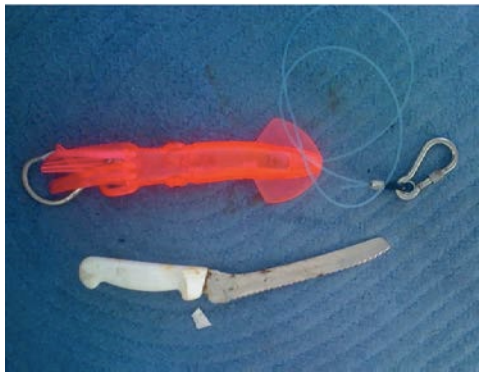
Introduction: GSG Background

- Developed in Japan, taken to Hawai'i → North Carolina PLL fishers on vacation saw gear, took it home with them in late 1970s
- Slow to develop on U.S. East Coast, but now on both commercial and charter vessels – primarily in North Carolina, some effort elsewhere
- Although gear can actually be modified to target bluefin, relatively low rates of bycatch mortality in general for yellowfin-targeting configurations

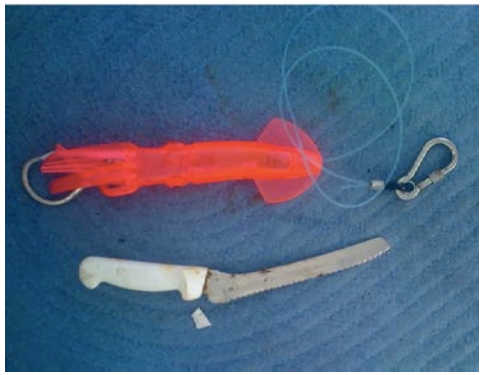


Introduction: GSG Background

Introduction: GSG Background

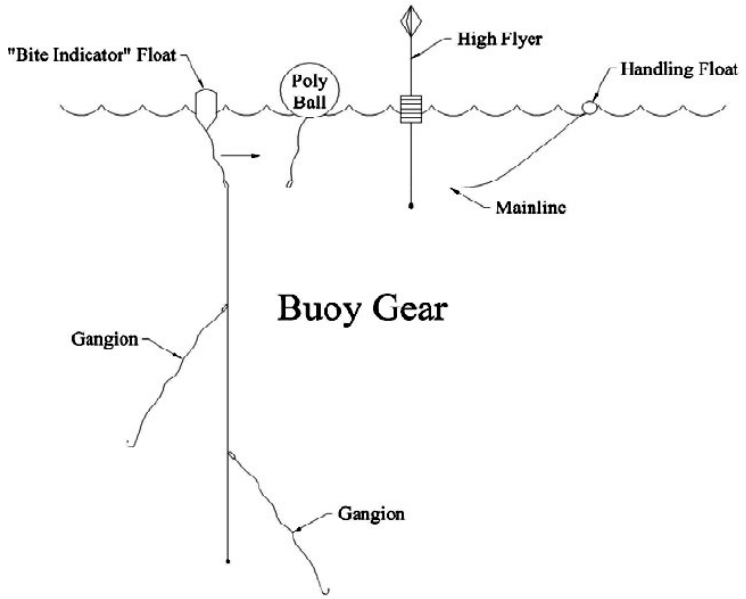


Introduction: GSG Background



Introduction: SBG Background

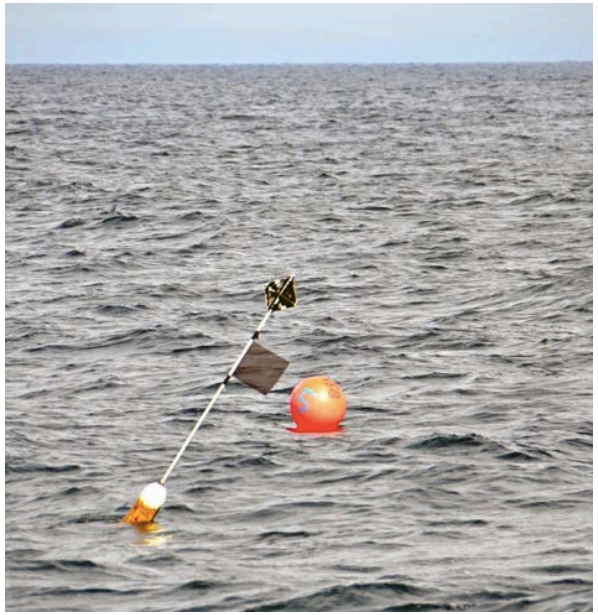
- Developed in the Florida Straits in the early 2000s
- "Allowed" swordfish gear type within various PLL time-area closures
- Low level of bycatch and bycatch mortality documented from at-sea observations from 2007-2009 (Kerstetter and Bayse, 2009)
- Being tested in several regions, including the Mediterranean Sea, for bycatch reduction efforts



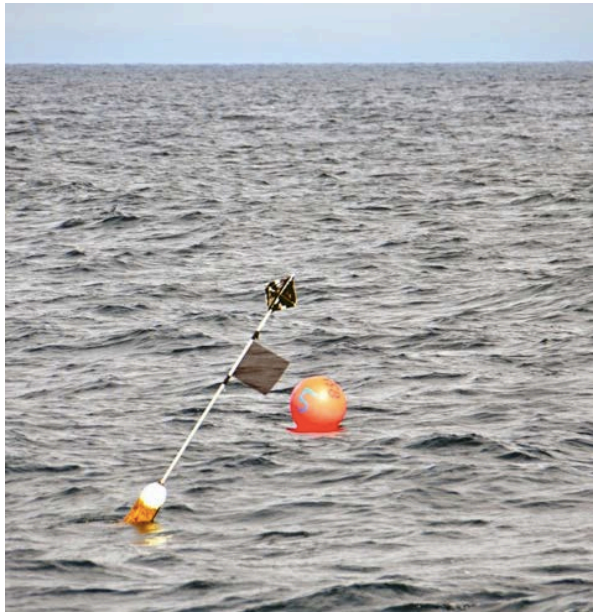
"Standard" NOAA SBG diagram, but now outdated for current fishery:

- Only one hook per "piece"
- Only two "floats" per piece (at most)
- Increasing development of alternate bite and movement monitoring technologies

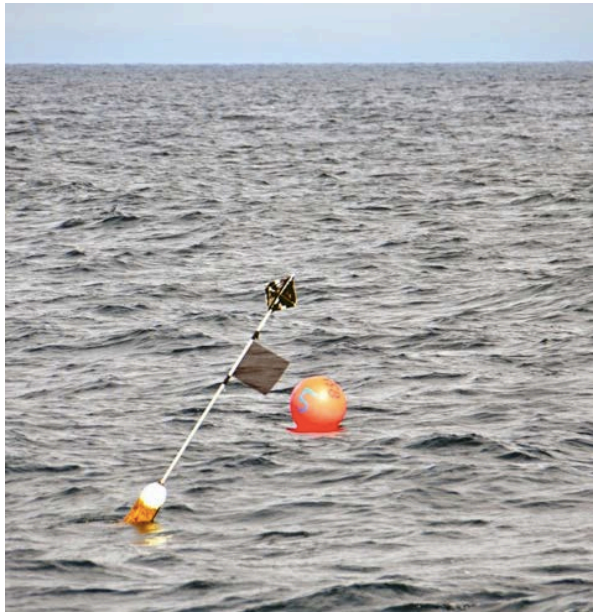
Introduction: SBG Background



Introduction: SBG Background



Introduction: SBG Background



Introduction: Project Goal

Using commercial fishing vessels active in the north-central Gulf of Mexico, evaluate the performance of greenstick gear (GSG) and swordfish buoy gear (SBG) through:

- Catch/Bycatch rates and mortality rates
- Potential gear modifications
- Economic data

Methods:

- Project provided:
  - Gear and expendables (fuel, food, bait)
  - Installation of GSG

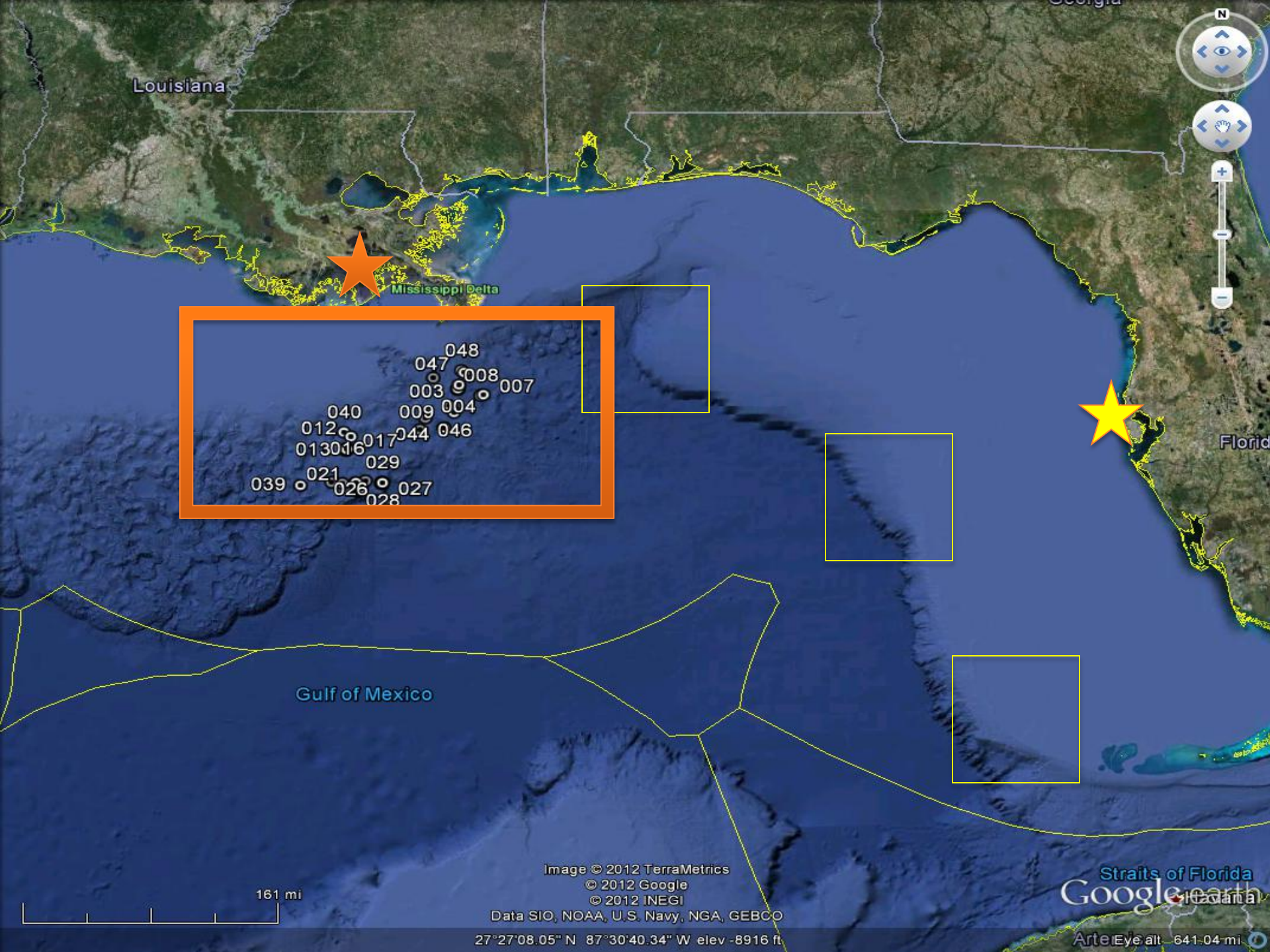
- All sets observed by NSU graduate students using custom datasheets modified from NOAA POP forms:
  - Animal logs
  - Gear/Set logs
  - Economic data

Pre-experiment coordination with NOAA-LDFW BREP project to ensure data compatibility.

Methods:

- As of end of August 2013, working/worked with four commercial fishing vessels currently active in the Gulf of Mexico fisheries:
  - F/V *Sun Dancer* and F/V *Miss Rita* from Madeira Beach, FL (demersal longline for snapper/grouper)
  - F/V *Queensland* and F/V *Blue Sea I* from Dulac, LA (pelagic longline for yellowfin tuna)

- An economic characterization also part of the project to compare profitability of multiple HMS fisheries:
  - Florida Straits SBG vs. experimental Gulf SBG
  - Gulf PLL vs. U.S. South Atlantic Bight PLL
  - North Carolina GSG vs. experimental Gulf GSG


Louisiana
Mississippi Delta
048
047
008
007
003
004
009
040
012
044
046
017
013
016
029
021
039
026
027
028
Gulf of Mexico
Florid
Straits of Florida
Cuba
Image © 2012 TerraMetrics
© 2012 Google
© 2012 INEGI
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
161 mi
27°27'08.05" N 87°30'40.34" W elev -8916 ft
Eye alt 641.04 mi

Preliminary Results: GSG

- 182 observed fishing days with GSG through July 2013
- 28,479 pounds of yellowfin tuna was landed via GSG
- The combined catch rate for GSG aboard the two Madeira Beach vessels is 0.77 retained yellowfin per hour* – detailed analyses currently underway on a per-day basis to examine variance and weather effects

* For comparison, PLL CPUE in the Gulf is 8.52 YFT per 1000 hooks

Preliminary Results: GSG

- Yellowfin tuna caught via GSG received an average grade of two or better. The average weight of yellowfin tuna landed via GSG is 47 lbs dressed weight (dw) with the largest weighing 151 lbs dw and the smallest weighing 10 lbs dw.
- Of the 1852 total fish caught with GSG in the Pilot Program, 92.5% tunas (combined YFT, BLK, SKJ, BON, LTA, and BET) and 36% retained yellowfin tuna

Preliminary Results: GSG*

Fish Caught via GSG in Alternative Gears Pilot Program by Vessel

Vessel	# fish	#tuna	# yft	#yft retained	%TUN	%YFT	%retained yft
BS1	154	136	83	31	88.3	53.9	20.1
QL	252	225	142	83	89.3	56.3	32.9
MR	888	835	574	386	94.0	64.6	43.5
SD	558	518	298	160	92.8	53.4	28.7
TOT	1852	1714	1097	660	92.5	59.2	35.6
AVERAGE	463	429	274	165	91.1	57.1	31.3

Incidental catches of wahoo, mahi, and bigeye tuna contributed over 16% of the program's total GSG landings, adding value to each trip.

VESSEL	Catch/Troll	Catch/Hour	Tcatch/hour
SD	1.40	1.48	0.39
MR	1.38	2.65	1.08
QL	0.92	0.46	0.16
BS1	0.87	0.59	0.14
AVERAGE	1.12	1.28	0.44

Preliminary Results: SBG

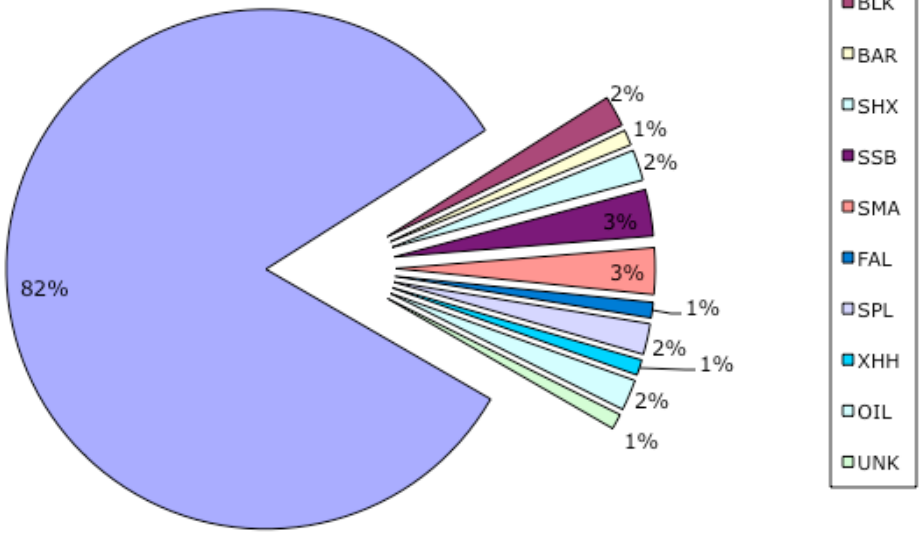
- Only the Madeira Beach vessels have fished SBG, 40 nights total – one more back-to-back trip planned for 14 August
- Over 3,400 pounds of swordfish has been landed via SBG
- Catch rate for SBG is 88.6 retained swordfish per 1000 hooks, which is over an order of magnitude greater than PLL swordfish catch rates*
- The average weight of swordfish landed via SBG is 68 lbs DW, with the largest to date weighing 193 lbs DW

* For comparison, PLL CPUE is 10.71 SWO per 1000 hooks in the Gulf

Preliminary Results: SBG

- For SBG, 103 fish have been caught via SBG, 82% of which were swordfish (44% retained swordfish). 45 fish were released alive (including 34 juvenile swordfish) and only 9 released dead.
- Eleven sharks were caught with SBG; all were released alive. All sharks were hooked in the jaw or corner of the jaw, except one silky shark hooked in roof of the mouth

44% of total catch was retained swordfish



Preliminary Results: Bycatch

- ***There were no observed interactions with Atlantic bluefin tuna, marine mammals, or sea turtles with GSG.*** 9 billfish (WHM and BUM, combined) and 2 sharks (both silky) were caught with GSG, all but 1 BUM and 1 silky released alive.

Preliminary Results: Bycatch

- ***There were no observed interactions with Atlantic bluefin tuna, marine mammals, or sea turtles with GSG.*** 9 billfish (WHM and BUM, combined) and 2 sharks (both silky) were caught with GSG, all but 1 BUM and 1 silky released alive.
- ***There were no observed interactions with Atlantic bluefin tuna, marine mammals, or sea turtles with SBG.*** 11 sharks (various species) were caught with SBG, with all released alive.

Preliminary Results: Gear Modifications

- Changes from NC to GoM:
  - 2-way swivels vs. chafing gear
  - Bigger hooks: Owner 12/0 vs. Mustad 12/0
  - Smaller A-2 polyballs vs. A-1
- Changes within the GoM program:
  - Modified buoy configurations for appropriate drag on mainline
  - Increased strength of breakaways from 200# to 400# (or more) mono
  - General gear operations around oil rigs:
    - Experimentation in distance from oil rigs
    - curved vs. straight passes
    - side of rig fished in relation to current direction
    - time of day (dawn vs. dusk vs. midday)
- Experimentation with squid placement on hook
- General modifications in leader positioning along mainline

Future Plans:

- Further explore methods to increase product quality
- Continue economic characterization… on our own, apparently
- Still plan to participate in a collaborative trip with the joint NOAA-LDWF BREP project in Fall 2013

Discussion: This project…

- Encountered minor grading issues (bias) – addressed through better handling of catch at-sea
- Revenue negative on most trips, but got better over time – both FL boats positive by end of project, both LA boats still negative
- No bluefin tuna, sea turtle, or marine mammal interactions -- fish bycatch almost always released alive (or could have been)
- Catch rates generally increasing for each successive trip for both gear types, but high variance in catch rates, as well as strong seasonal weather effects
- Project now scheduled for a September 2013 fieldwork conclusion, work still going on economic comparisons

Discussion: … and its implications.

- Production volume not at all equal – many more vessels would be needed – but economics may be more favorable (especially for the small vessels) at both vessel and community levels

Thanks to:

- Funding: National Fish and Wildlife Foundation and Walton Family Foundation for field trials of gears, and Gulf Restoration Network/Pew Charitable Trusts for socioeconomic work
- Captains Tim Palmer (Jupiter, FL) and Fred Fox (Wanchese, NC)
- Logistical support: Bobby Nguyen and Will Ward
- NSU fisheries observers: Max Appelman, Sohail Khamesi, Rachel Hickey, Matt Dancho, Jesse Secord, Noah Hansen, and Joe Hornbeck
- Participating vessel owners, captains, and crews: F/V *Sun Dancer*, F/V *Miss Rita*, F/V *Queensland*, and F/V *Blue Sea I*

David Kerstetter, Ph.D.
Fisheries Research Laboratory
Nova Southeastern University Oceanographic Center
Email: kerstett@nova.edu
Phone: 954-262-3664

http://cinemar.unh.edu/photos/tuna_school.jpg