NMFS Report

SWFSC Activities

Highly Migratory Species

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Agenda Item H.3.b
Supplemental SWFSC Presentation 1
September 2018
Presentation Outline

- HMS Biological Sampling
  - Foraging ecology
  - Reproductive biology
- Tagging
  - Genetic
  - Conventional
- Deep Scattering Layer
- Stock Assessments
- Conservation Information
- Workshops/Outreach
Bluefin Biological Sampling

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Provides data to support:

• Foraging Ecology
• Reproductive Biology
Pacific Bluefin Foraging Ecology

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- **Northern Anchovy**: Light blue
- **Fish**: Orange
- **Jack Mackerel**: Black
- **Myctophidae**: Purple
- **Pacific Mackerel**: Dark blue
- **Pacific Saury**: Green
- **Sebastes spp**: Light gray
- **Sardine**: Dark gray
- **Cephalopods**: Blue
- **Crustaceans**: Yellow
- **Pelagic Red Crab**: Red

NOAA Fisheries
PBF Reproductive Biology: Are larger fish in the EPO Spawning?

- Samples sent out for histology
  - Females: N=11
  - Males: N=3
  - Length range: 134 to ~180 cm FL (~4-7 years old)
  - Weight range: 120-243 pounds

- Results:
  - Males: mature but inactive
  - Females: immature
Opah Research

Results and ongoing work: 2017-2018

Life history
• Stomachs: Diverse diet in the CA current including epipelagic and mesopelagic forage species
• Gonads: all samples appear immature off CA
• Hard parts: Ageing method needs to be determined
• Data mining - size composition in different fisheries

Speciation
• How many species? – recent genetic research

Future activities 2018-2019: same as 2017-2018
Tagging

PBF Tagging - Close Kin Analysis (genetic tagging)

• Required tissue samples by country/fishery have been collected

• March 2019 - workshop to identify tissue processing protocols; Busan Korea
Tagging

Conventional Tagging

• North Pacific Albacore
  • 2001-2015 (4-150 annually)
  • Summer-fall 2018 (~70 tags)

• Pacific Bluefin Tuna
  • Golden opportunity in 2019

• Opah
  • PAT tagging: 13 tags deployed (2011-2014) and being analyzed

NOAA Fisheries
The Deep Scattering Layer (DSL): It’s what’s for dinner!

The DSL is composed organisms including fish, squid an crustaceans that typically migrate between surface waters at night and deep waters during the day.

• Despite its importance, we know relatively little about the DSL in the California Current (CC) and what conditions are required for foraging (i.e. density and composition).
• Using a combination of acoustic data, environmental data and information on predator distributions scientists at the SWFSC will examine:
  1) patterns in the relative abundance of fish, squid and crustaceans in the CC
  2) how these patterns are linked to 3-D environmental parameters
  3) how patterns are related the abundance and distribution of key predators

The organisms in the DSL are an important food source for a broad range of predators which are both ecologically and commercially important including sharks, swordfish, albacore, bluefin tuna and marine mammals.

(Left: swordfish foraging in the DSL during the day)
HMS Stock Assessments - ISC

2017-2018
• Pacific Bluefin Tuna – Update Assessment – no change in status — series of increased catch projections
• W-CPO Swordfish stock – Benchmark Assessment – not overfished; not experiencing overfishing
• Shortfin Mako Shark – Benchmark Assessment – not overfished; not experiencing overfishing

2018-2019
• North Pacific striped marlin

2019-2020
• Pacific bluefin tuna
• North Pacific albacore tuna
• Pacific blue marlin (?)
Conservation Information

• ISC Tasks:
  • NP Swordfish
    • More tagging & genetic data preferable but $$$$ 
    • U.S. West Coast share of catch unlikely to be a major factor in overall status of the EPO stock
  • Management Strategy Evaluations (MSE)
    • North Pacific albacore tuna MSE Workshop – March 5-7, 2019 – Yokohama Japan
    • Pacific Bluefin Tuna – Spring 2019 Workshop – USA or Japan (preference please)
  • PBF Catch Projections
    • Additional projections requested to determine if the catch of PBF in 2020 may be increased
## Conservation Information

### PBF Catch Projections for Testing (pending approval)

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Workshops-Meetings

• North Pacific Marine Science Organization (PICES) 2018 Annual Meeting – Oct. 25 - Nov. 4, 2018, Yokohama Japan
  • Topic Session 12 - Applying ecosystem considerations in science advice for managing highly migratory species

• Center for the Advancement of Population Assessment Methodology (CAPAM) - 2018 Lasker Award 🏆
  • Spatial Stock Assessment Models – Oct. 1-5, 2018, SWFSC

• Integrating CPS Research – NSF Project, COCOA, Univ. WA
  • Building a Climate Resilient CPS Fishery – Oct. 9, 2018, SWFSC
Outreach

• SWFSC 2017 Billfish Newsletter - *New and Improved* ([https://swfsc.noaa.gov/BillfishTagging/](https://swfsc.noaa.gov/BillfishTagging/))
  • 1963-Present
  • Recent science & tagging results
  • Angler photos

• Tuna Species of the U.S. West Coast – An Identification Guide – *Hot Off the Press*
  • Pacific Ocean management overview
  • Species-specific biology and ecology
Thank You

Questions?