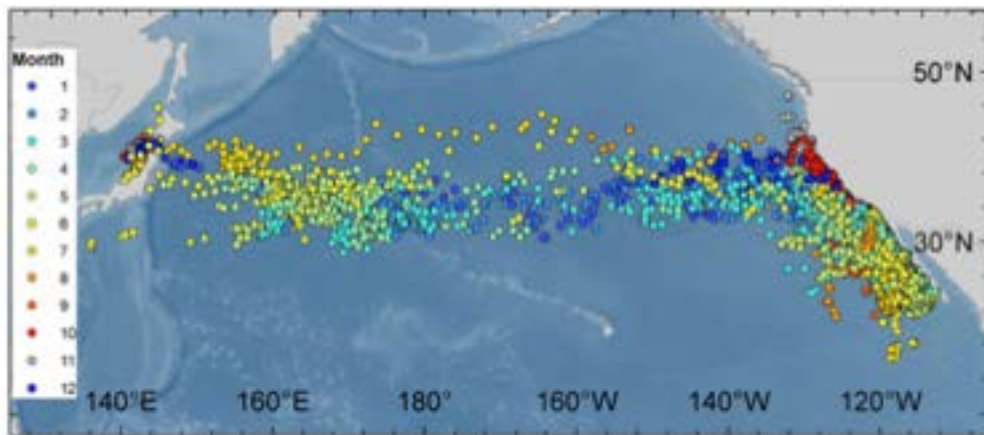


**NOAA
FISHERIES**

- Southwest
Fisheries
Science
Center

NMFS Report SWFSC HMS Activities

Gerard DiNardo



NOAA FISHERIES

Outline

- Completed 2016-2017 Meetings/Workshops
- Research - Pacific Bluefin Tuna
- Other Research and Activities
- Stock Assessments
- Future Meetings-Workshops



Completed 2016-2017 Meetings/Workshops

- **Data-Preparation Workshops** - ISC SHARKWG (NOV. 2016), ISC ALBWG (Nov. 2016), ISC STATSWG (Jan. 2017)
- **RFMO Meetings** – WCPFC-NC, WCPFC-NC/IATTC Joint Meeting (Sept. 2016), WCPFC Commission (Dec. 2016)
 - Tasking ISC to conduct ADDITIONAL Pacific bluefin tuna harvest scenarios (N~35);
 - What level of Pacific bluefin tuna recruitment constitutes an “emergency” in the proposed recruitment emergency rule.
- **Harvest Scenario Testing** – ISC PBFWG completed requested harvest scenarios (Feb. 2017)
- **Research Collaborations** – NRIFS/SWFSC (Feb. 2017)

Research – Pacific Bluefin Tuna

SWFSC Participants: Heidi Dewar, Suzanne Kohin, James Wraith, Mike Kinney, Nicole Nasby-Lucas, Owyn Snodgrass, John Hyde, Russ Vetter, Matt Craig
External Partners: Texas A&M, SAC, NRIFS Japan, Monterey Bay Aquarium, Harvard University

- 2007-present
 - Size sampling/ Biological Sampling
 - Reproductive Biology
 - Foraging ecology
 - Stomach contents
 - Migrations patterns using chemical tracers
 - Trace elements in otoliths
 - Stable isotope analysis
 - Radionucleotides
 - Close kin genetics



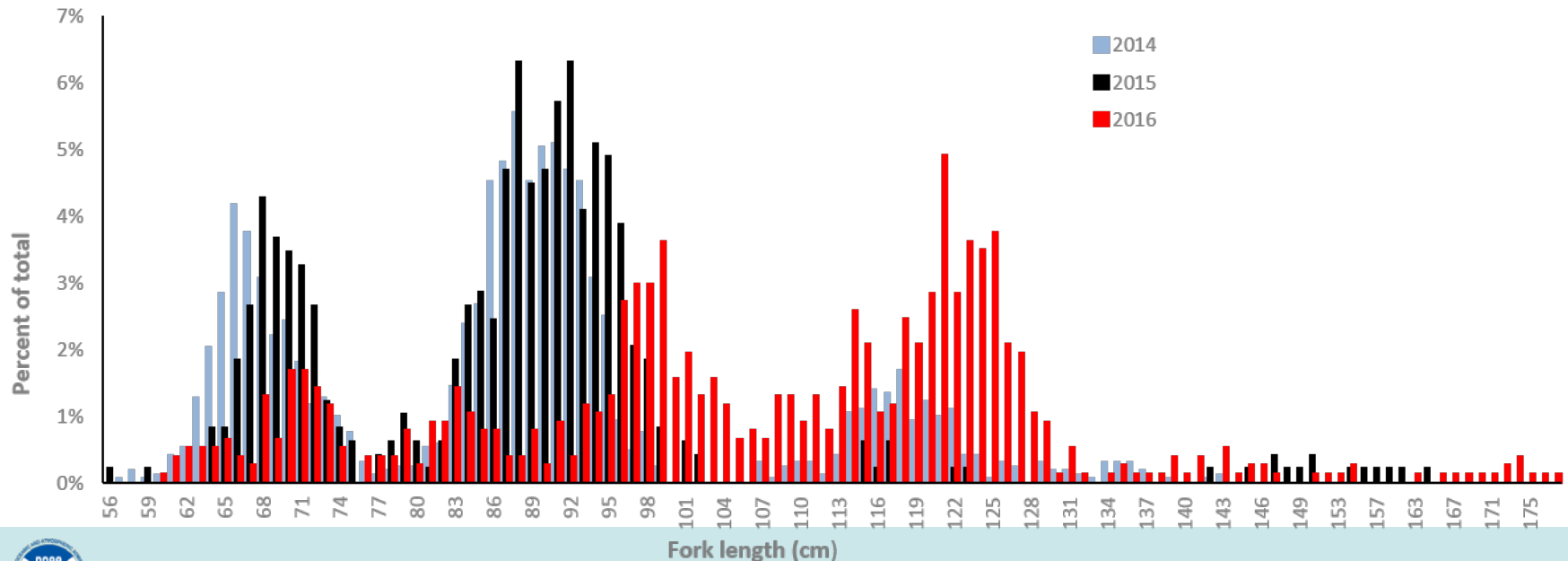
Bluefin Recreational Catch Size Sampling

- NOAA started in 2014, previously done by IATTC



	2014 (July-Sep.)	2015 * (June-Sep.)	2016 (May-current)
Sample size	1,732	492	132 (to date)
Length range (cm FL)	58- 143	56- 165	73- 175
Avg. length (cm FL)	88	87	103
Age classes	1-4	1-6	1-7

*Mexican PBF closure in place for all 2015 and U.S. bag limit reduced from 10 to 2 fish/day



Bluefin Biological Sampling – Core data

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
PBT	0	75	78	54	189	294	171	156	120	276	1413

Provides data to support:

- Reproductive Biology
- Foraging ecology
 - Stomach contents
- Migrations patterns using chemical tracers
 - Trace elements in otoliths
 - Stable isotope analysis
 - Radionuclotides
- Close kin genetics

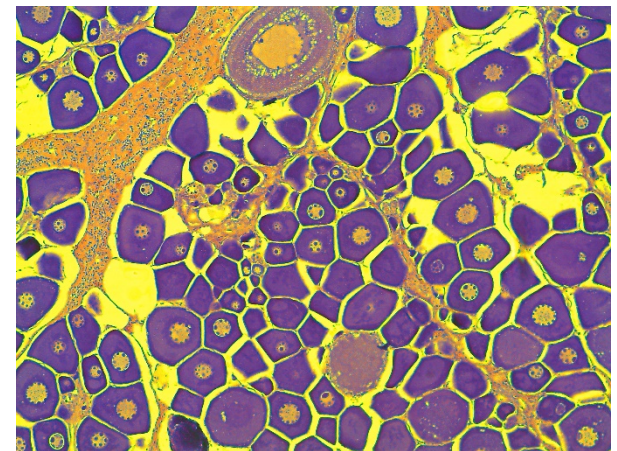


Reproductive maturity: Are larger fish in the EPO Spawning?

- 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
- Preliminary results:
 - Males: mature but inactive
 - Females: immature (either unyolked or early yolking stages)



Ovaries from a 189 lb female caught in July 2015



Eggs either unyolked or in early stages of yolking

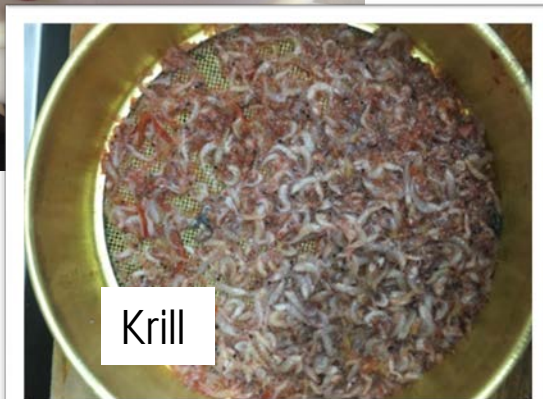
Bluefin foraging ecology : Diverse prey



Pelagic red crabs



Anchovies

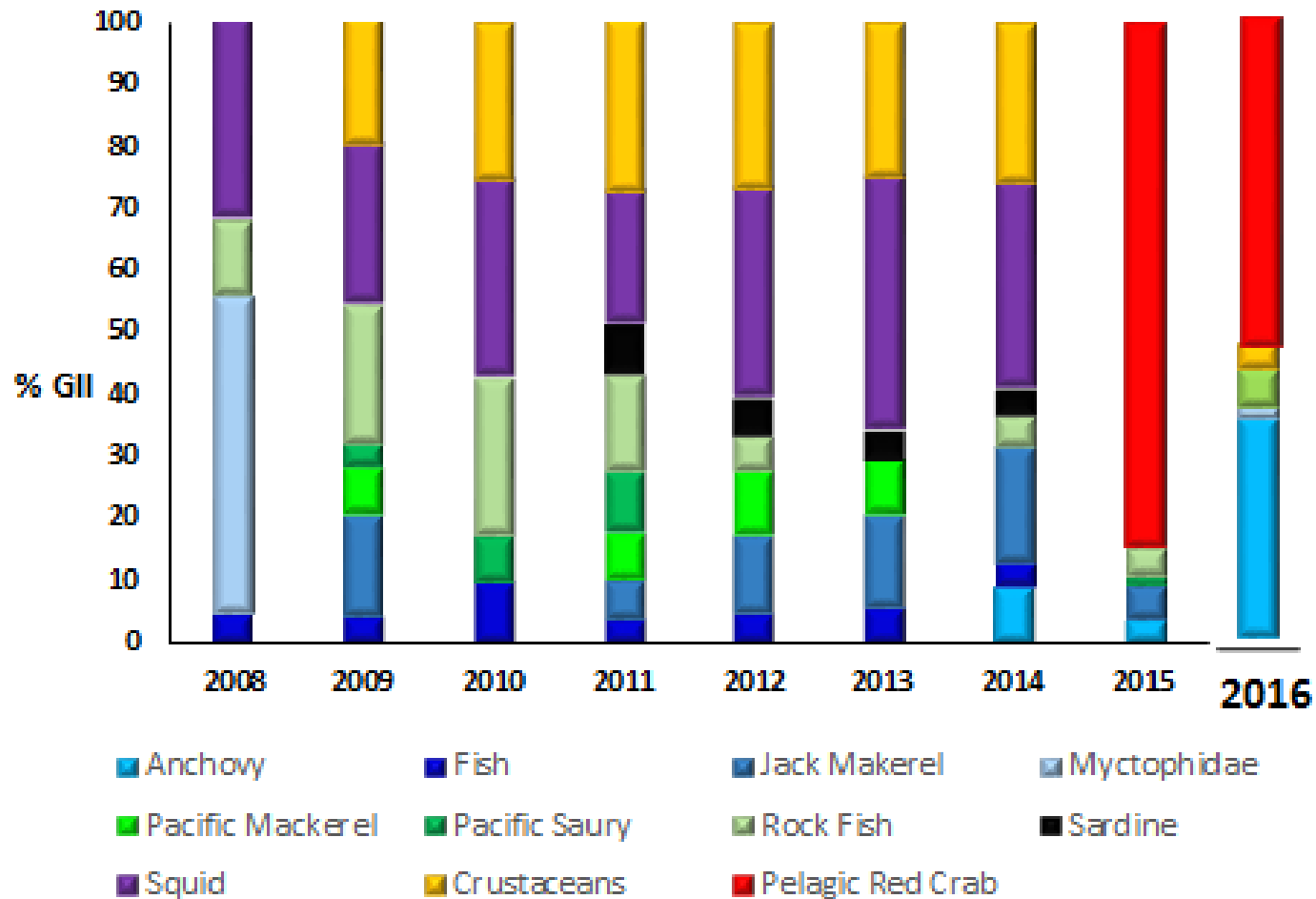


Krill



Flatfish

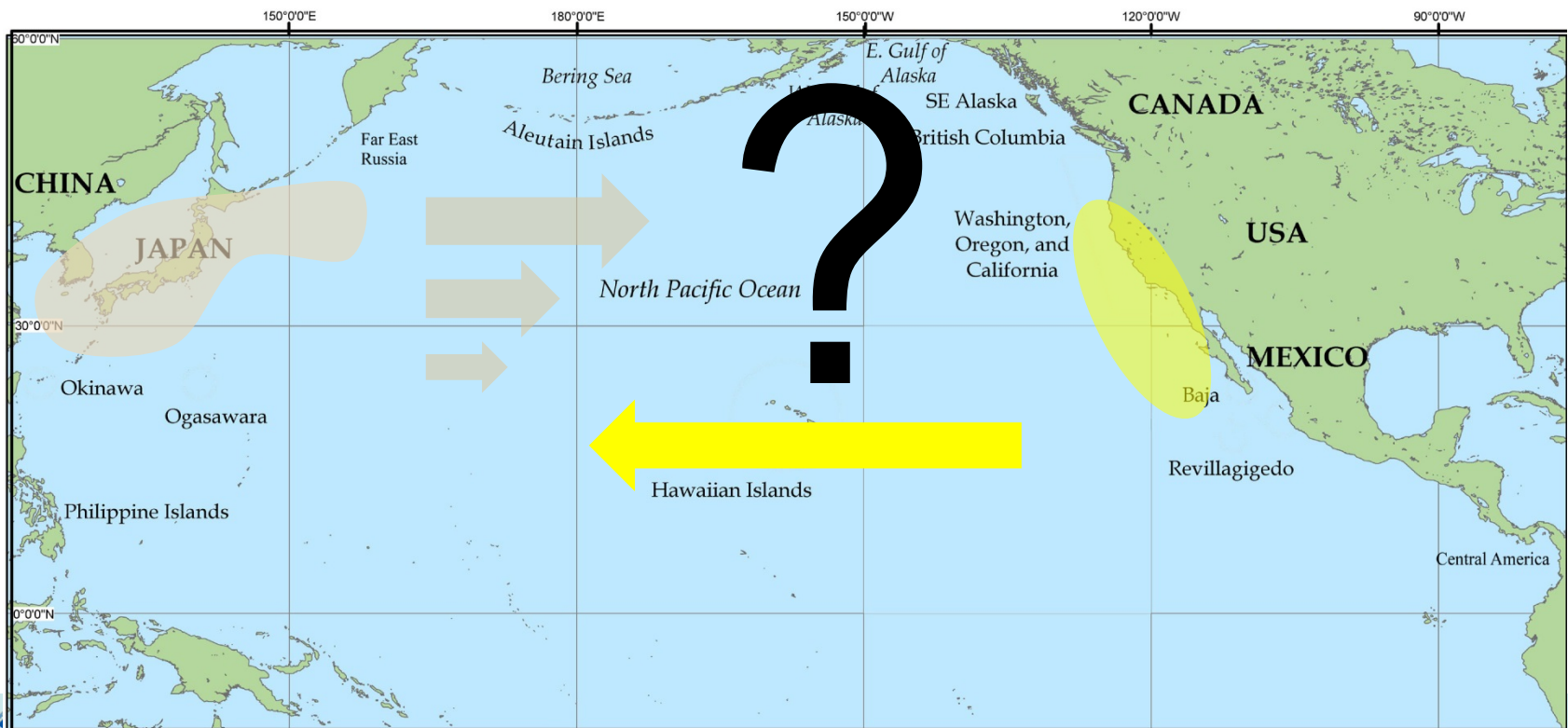
Bluefin foraging ecology



Chemical Tracers: Otoliths and Tissue

Data Gaps

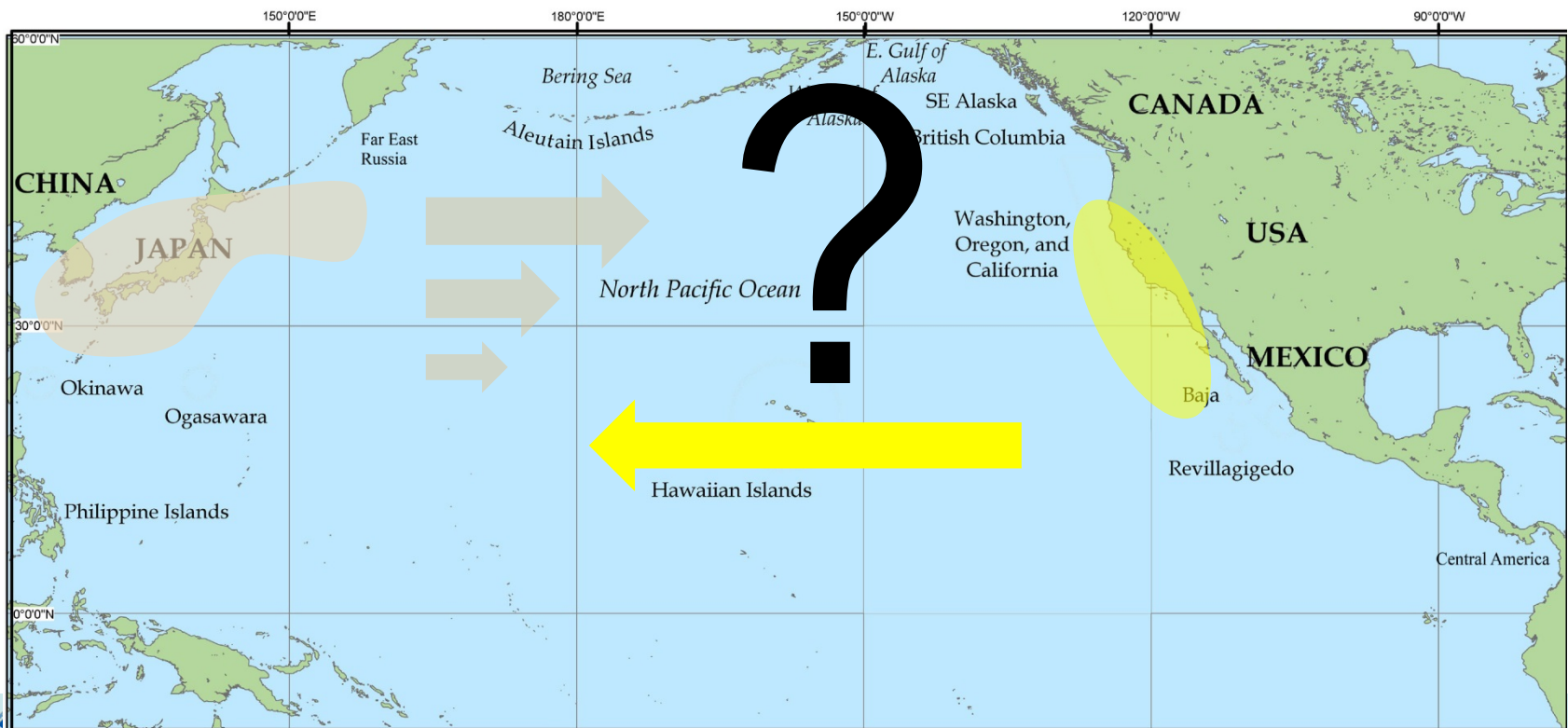
1. What is the natal origin of fish in the EPO?
2. How and why does rate of movement to EPO change across years?
3. How are movements west linked to spawning grounds?
4. What is the relative contribution of eastern fish to spawning stock biomass?



Chemical Tracers: Otoliths and Tissue

Methods:

1. Tissue isotopes
2. Radionucleotides
3. **Otolith Microchemistry**



Chemical Tracers: Preliminary Results of Otolith Microchemistry

- Model results indicate correct classification success ranged from 80-90% each year, thus providing a proof of concept of the approach.

-In addition to trace elements, stable isotope analysis ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) is underway on the same otoliths.

-Next step is to examine core of age-classed matched tuna from the EPO.

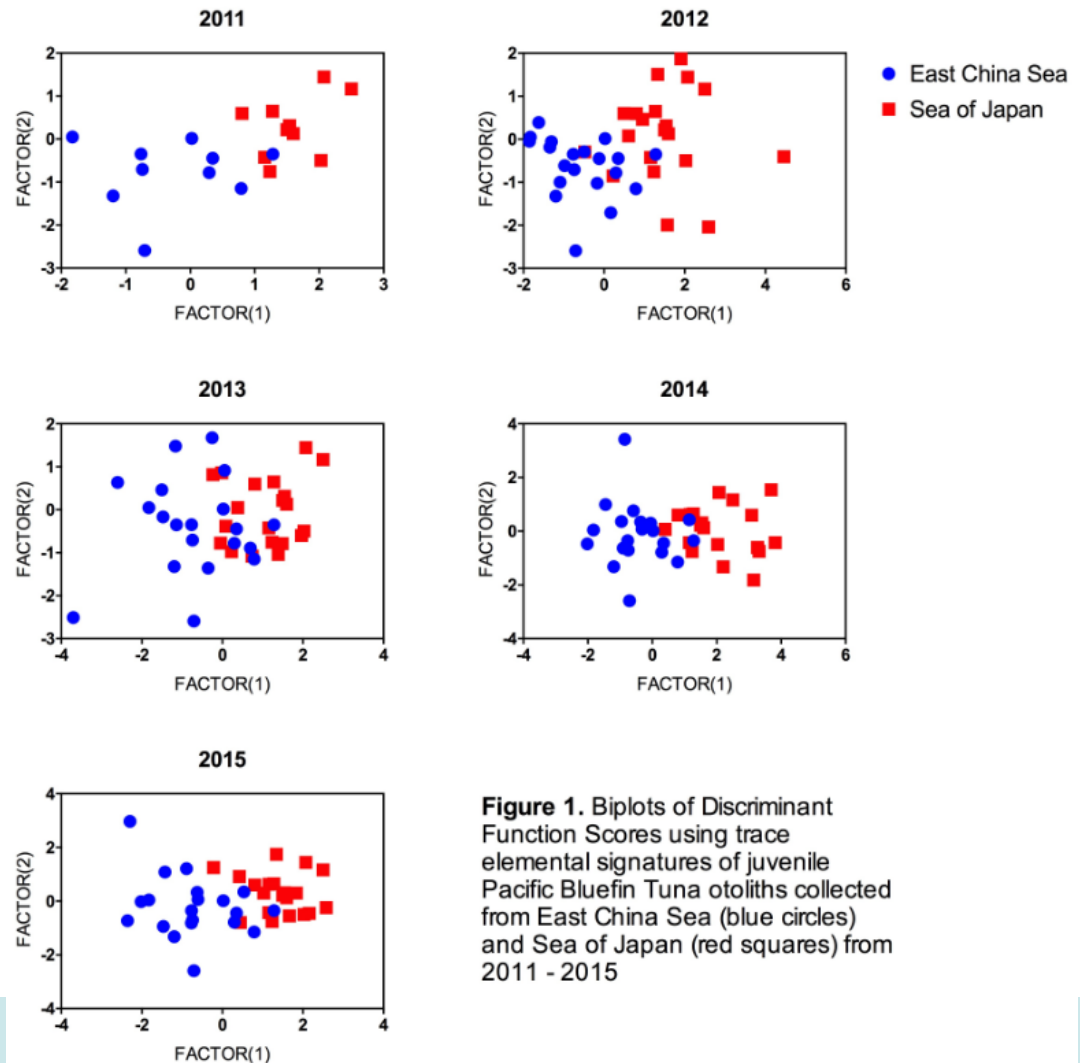


Figure 1. Biplots of Discriminant Function Scores using trace elemental signatures of juvenile Pacific Bluefin Tuna otoliths collected from East China Sea (blue circles) and Sea of Japan (red squares) from 2011 - 2015

Pacific Bluefin Tuna Close-kin Mark Recapture

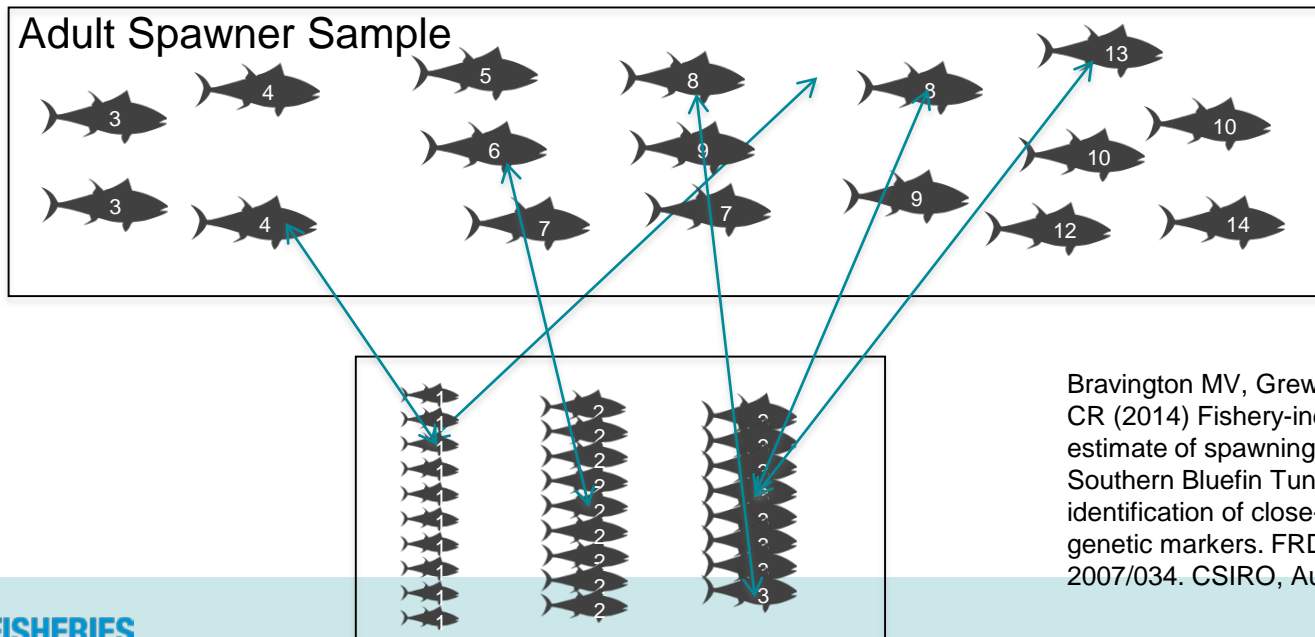
Fisheries independent estimate of spawning stock biomass!

Status:

- U.S. collected ~970 samples in 2016
- Sampling programs ongoing in several countries around the Pacific

Next Steps:

- Additional sample collection across range and age classes
- Funding for sample processing
- Workshop for standardization of genetics methodology



Bravington MV, Grewe PG, Davies CR (2014) Fishery-independent estimate of spawning biomass of Southern Bluefin Tuna through identification of close-kin using genetic markers. FRDC Report 2007/034. CSIRO, Australia.

Other Research and Activities

- Petition to list Pacific bluefin tuna as an endangered species – moving forward
- Prototype e-logbook albacore fishery – under review
- SWFSC Cooperative Research – NP albacore, Opah, Pacific bluefin tuna
- Japan-US MoU – Cooperation on Research Between the NMFS and the Japan Fisheries Research and Education Agency – April 2017

Stock Assessments

- Thresher Shark- CIE Review – completed in 2016
- North Pacific Albacore – Benchmark Assessment (July 2017)
- North Pacific Blue Shark – Benchmark Assessment (July 2017)

Meetings-Workshops- 2017

RFO-RFMO

- ISC SHARKWG Workshop: March 17-24; SWFSC, La Jolla, CA USA
- ISC ALBWG Workshop: April 10-19; SWFSC, LA Jolla, CA USA
- ISC International Stakeholders Meeting: April 25-27; Tokyo, Japan
- ISC BILLWG Workshop: April; Keelung, Taiwan
- IATTC Scientific Advisory Committee Meeting: May 8-12; La Jolla, CA USA
- ISC Plenary Meeting (ISC17): July 12-17; Vancouver, Canada
- IATTC Commission Meeting: July 24-28, Mexico
- WCPFC Scientific Committee (SC13): Aug. 9-17; Cooks Island
- WCPFC Northern Committee (NC13): Aug. 28-Sept. 1, Korea
- ISC 3rd MSE Workshop: October, Canada (?)
- WCPFC Commission Meeting (WCPFC14): Dec. 3-8, Philippines

INDUSTRY

- American Fisherman's Research Foundation: March 28-29; Astoria, OR USA
- American Albacore Fishing Association: May; San Diego, CA USA

Thank You

Questions?



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