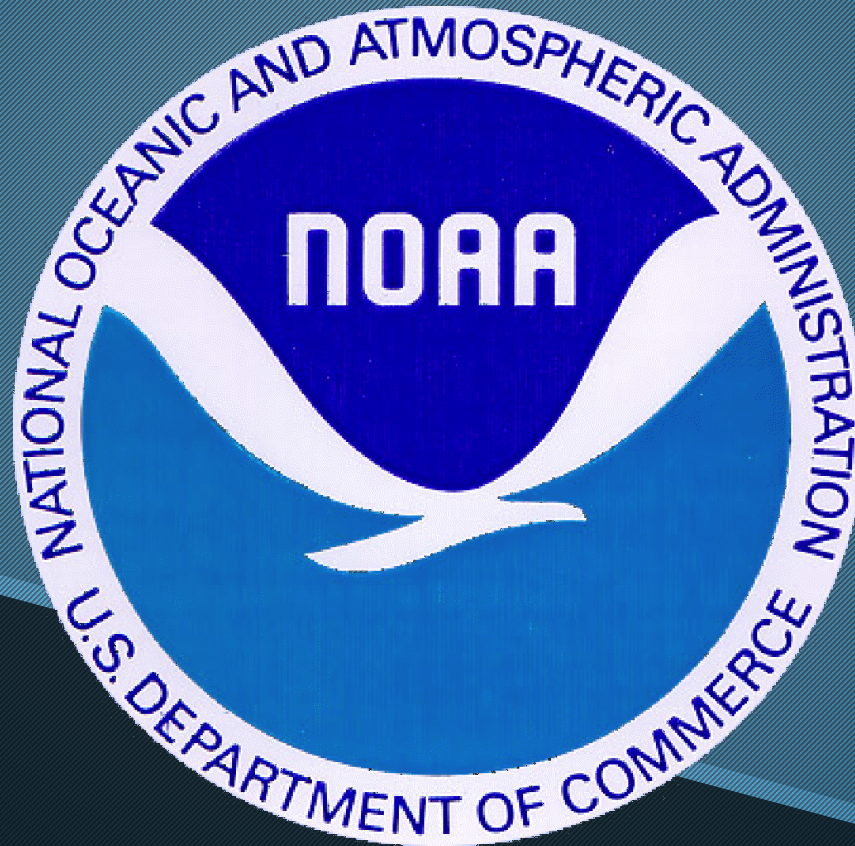


NOAA

Owyn Snodgrass



Biological Sampling and Foraging Ecology of North Pacific Albacore



Owyn Snodgrass

NOAA Southwest Fisheries Science Center, La Jolla, CA 92037 USA

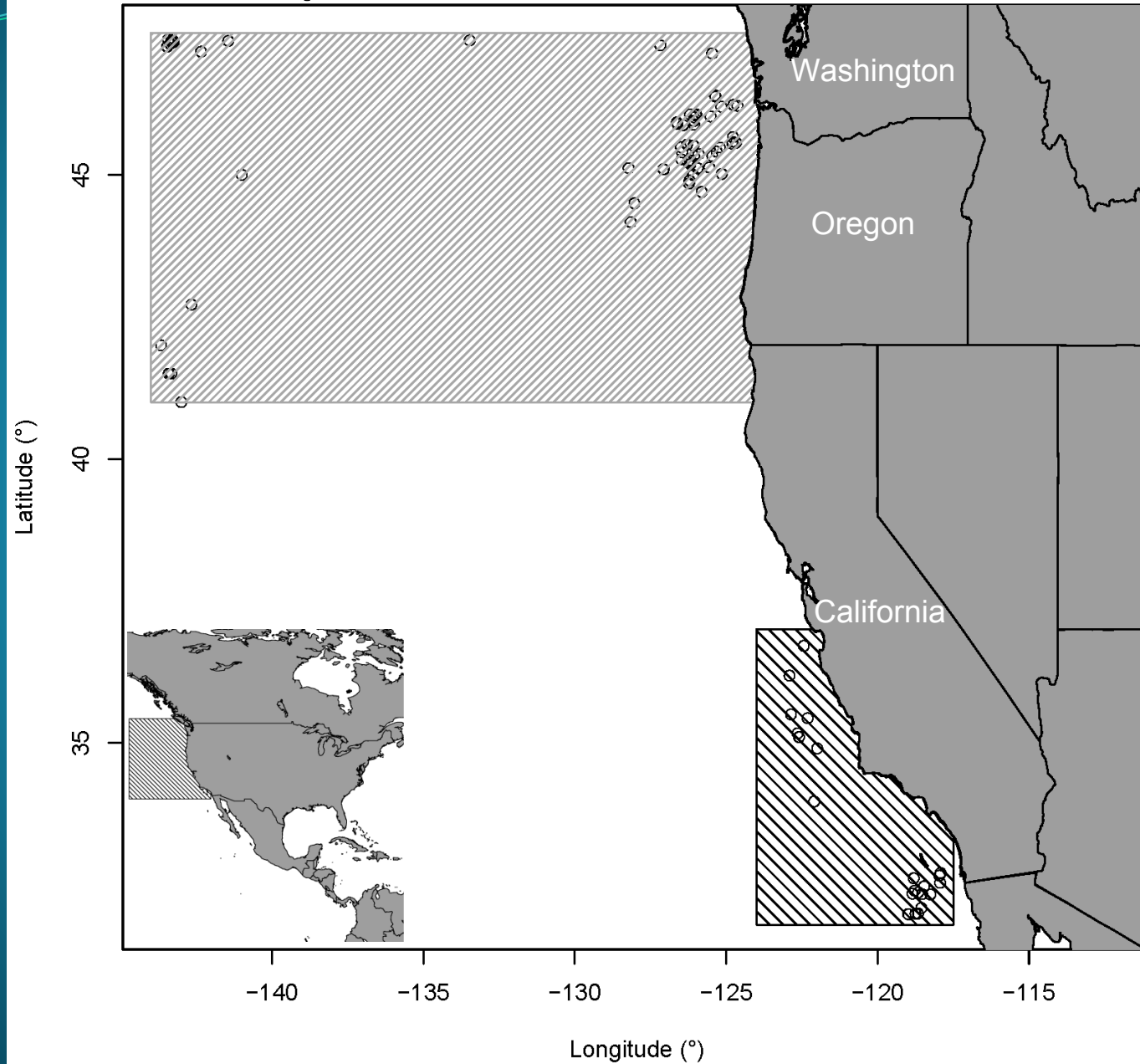
Current and Future Research

- Foraging ecology- stomachs and tissues
 - Paper in prep
- Stock structure- otoliths and tissues
 - Paper *in press*
- Genetic identification of males and females- fin clips
 - Project under design

Total Albacore Collected

Location	2007	2008	2009	2010	2011	2012	2013	2014
Washington / Oregon	-	-	42	191	49	60	60	39
Central California	-	-	-	-	27	31	43	0
Southern California	116	35	93	118	7	62	3	1

Sample Locations



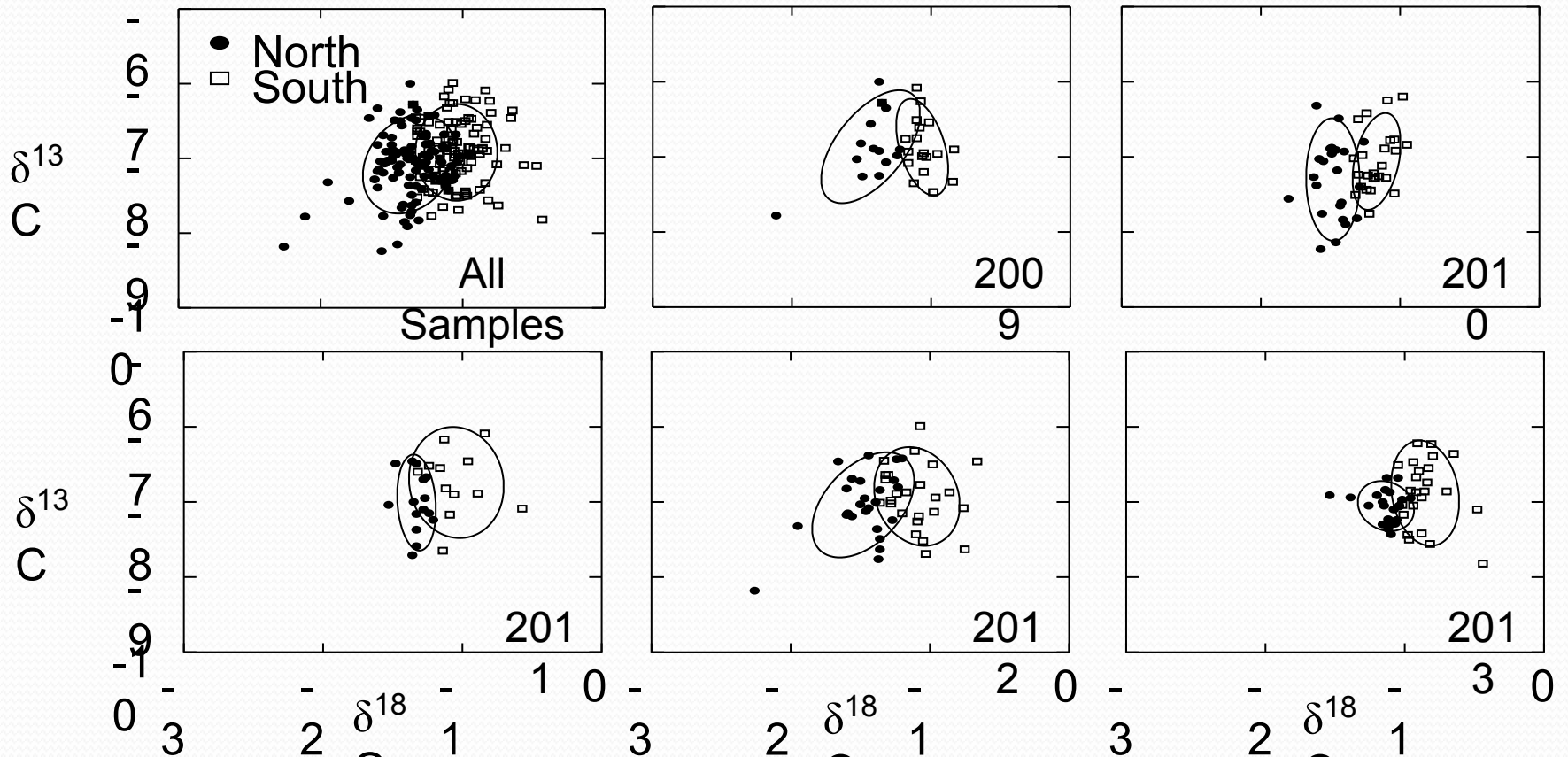
2014 Albacore Collections

- AAFA (WA/OR)- 39
- NOAA Survey (Central CA)- 0
- Sport Caught (Southern CA)- 1
- Fork Length 50.9 - 88 CM
- July 15th - October 5th

Natural tracers reveal population structure of albacore (*Thunnus alalunga*) in the eastern North Pacific Ocean

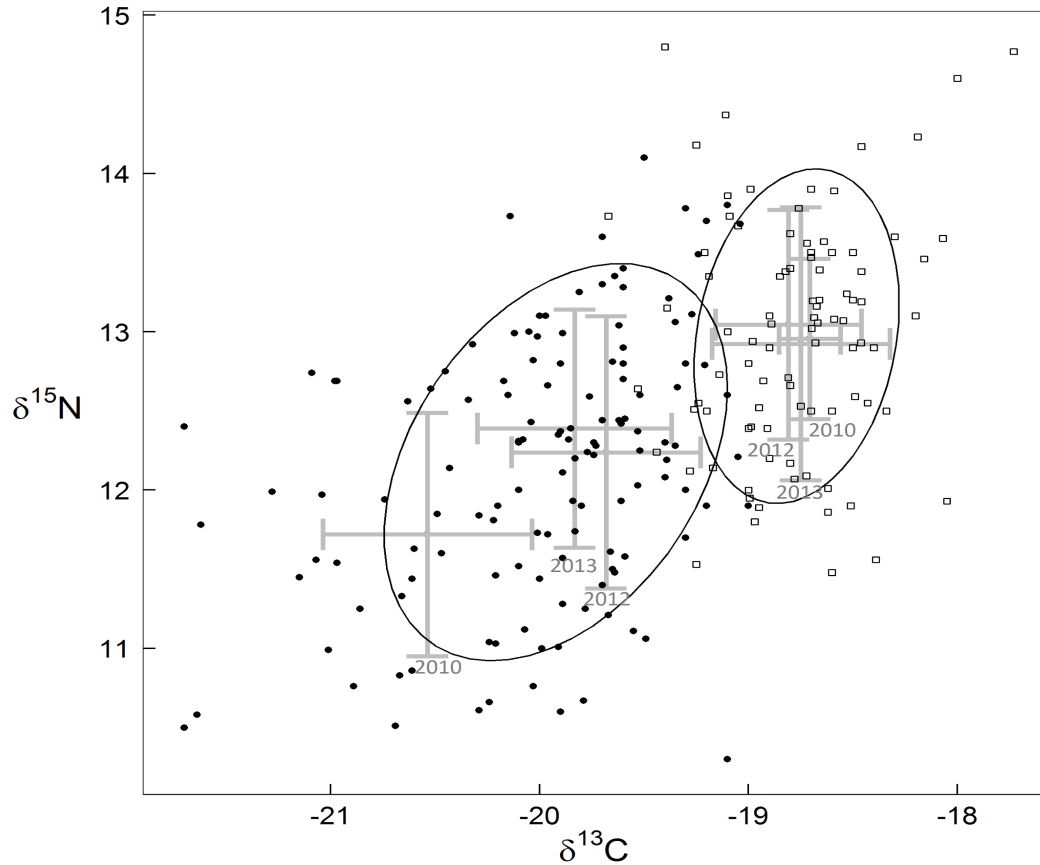
- Paper in *press*: **ICES Journal of Marine Science**
 - Characterize population structure and stock mixing
 - Differences in size distributions ?
 - Differences in migration patterns ?
- Otolith and muscle tissues
 - Northern VS Southern (WA/OR VS CA)

Otoliths



Carbon and Oxygen stable isotopes and trace elements of whole otoliths (90-100 % discrimination accuracy)

Tissues



Carbon and Nitrogen stable isotopes of muscle tissue
(91% Discrimination accuracy)

Conclusions

- Differences in muscle and otoliths support north-south separation
- Movements between north-south limited
- Not yet known whether
 - 2 separate stocks or
 - same stock that recruits to different foraging grounds
- Efforts ongoing to resolve stock

Sample Collection 2015

- Goal: 60 mixed fish
 - 20 small fish: 5-15 lbs
 - 20 medium fish: 15-25 lbs
 - 20 large fish: 25+ lbs
- Completed data sheets sent directly to NOAA (mail or email)

Sample Collection 2015

- Catch location (offshore VS near shore)
- Date/ time (season variation)
- Gear type/ bait species and size
- Observations

Notes

Fish Sample Number	D (MM/YY)
191	09/28
192	09/28
193	09/28
194	09/29
195	09/30
196	09/30
197	09/30
198	10/01
199	10/01
200	10/01

Boat Name

Fish Tick

Total fish

NA46 Caught on jig 12 fathoms from stern. Heavy feed in area Hake?, small humbolt, and other squid.

NA47 Caught on jig 20 fathoms from stern No feed in area. Not many fish around in area.

NA48 Caught on jig 6 fathoms from stern No feed on meter Not many fish in area.

NA49 Caught on chain-line 3 fathoms from Boat No feed on meter 63° water calm no fish in area.

NA50 Caught on long line 17 m from Boat Lots of small school fish (11-13)⁰⁰ in area good feed as well in bait

NA51 Caught around smaller school fish (1-13)⁰⁰ fish are ~~starting~~ starting to school up and jump on the surface.

NA52 Lots of small school fish, fin bait, and large mackerel schools in area.

NA53 Caught with several other large fish on a bait ball. No surface sign.

NA54 Very rough weather some surface bait Not sure what it is - found large mackerel in mouth.

NA55 mixed group of fish in area small surface bait and larger needle fish picked up.

NA56 Scattered fish No large schools appears to be large fin bait in area - and small squid.

NA57 Four fish breaking surface. still mostly scattered. almost full Boat... last trip tagging 2 days to meet quota.

NA58 Full of kill Caught around much larger fish.

NA59 Also full of kill and some small fin bait mixed in with larger 25+ pound fish.

NA60 Not many fish left in area Heavy feed of some kind on meter down to 20 fathoms. caught on cold side of 2 degree break.

- Filets Donated
- Samples Collected
- Carcasses Donated



Thank You

- American Albacore Fishing Association

Brent Bixler (FV ROYAL DAWN)

Carl Nish (FV LYDOREIN)

Eric Hopper (FV KJIRSTIN NICOLE)

Ryan Vantress (FV SEA WIND)

Joshlyn Hardwick

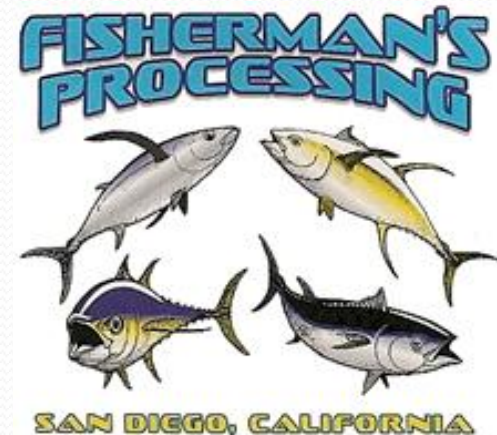
Natalie Webster

- Sean and Rosie @ Fisherman's Processing

- Michael Cornman @ Westport Seafoods

- Bill Olivera @ Trident Seafoods

- Sportfishing Association of California



Assuring Access to a Sustainable Ocean.

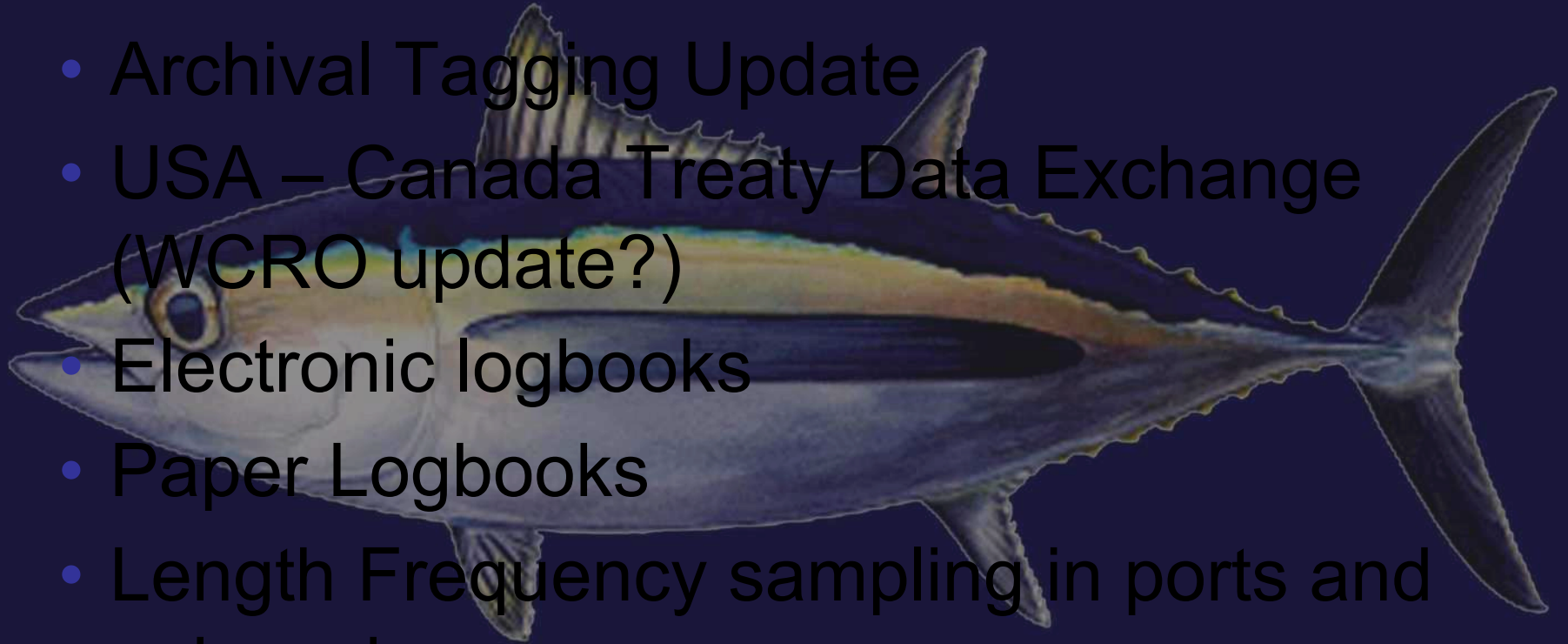
NOAA

John Childers & Craig D'Angelo



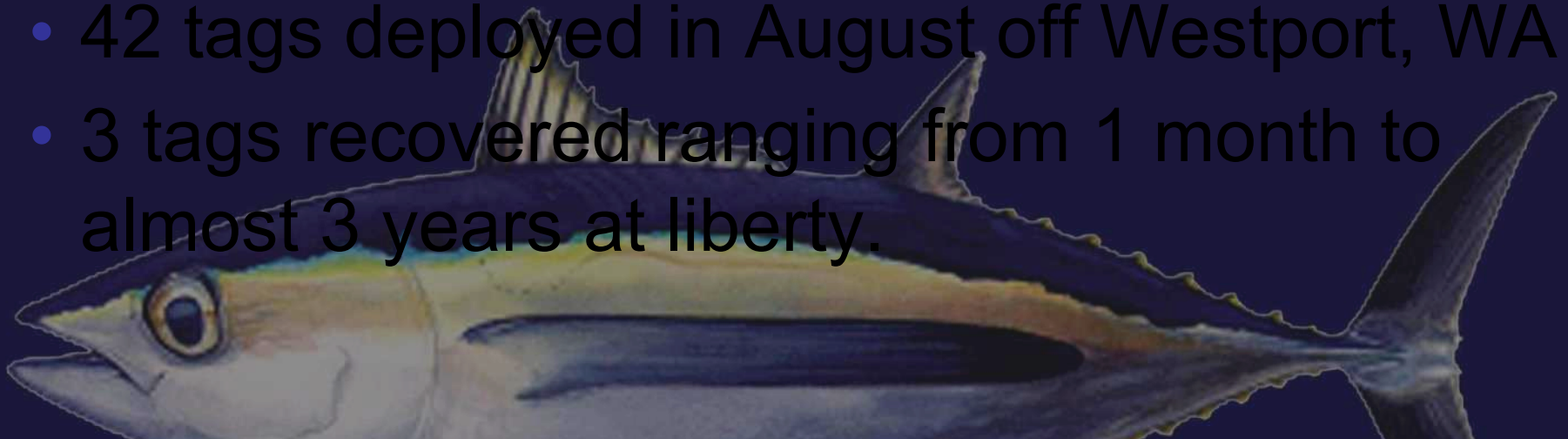
Collaborative Albacore Research Efforts in 2014

- Archival Tagging Update
- USA – Canada Treaty Data Exchange (WCRO update?)
- Electronic logbooks
- Paper Logbooks
- Length Frequency sampling in ports and onboard.
- Gillnet-marked Fish



2014 Tagging

- 42 tags deployed in August off Westport, WA
- 3 tags recovered ranging from 1 month to almost 3 years at liberty.



ARCHIVAL TAG	RELEASE VESSEL	Release Date	Release Location	Recovery Date	Recovery Location	DAYS OUT	DISTANCE (km)	Recovery Gear	Recovery Nation
1390076	HER GRACE	8/22/2014	45° 29'N 124° 55'W	9/15/2014	45° 5'N 125° 33'W	25	67	TROLL	USA
1057 (failed)	ROYAL DAWN	11/4/2012	35° 32'N 122° 57'W	11/21/2014	33° 27'N 171° 30'E	748	5903	LONGLINE	JPN
1190241	ROYAL DAWN	10/8/2011	46° 30'N 124° 59'W	8/7/2014	3° 5'N 169° 43'E	1035	7898	LONGLINE	JPN

Archival Tagging

920 Deployments to Date

29 Recoveries to Date

Recovery Rate: 3.2%

Oregon / Washington/ Northern & Central CA

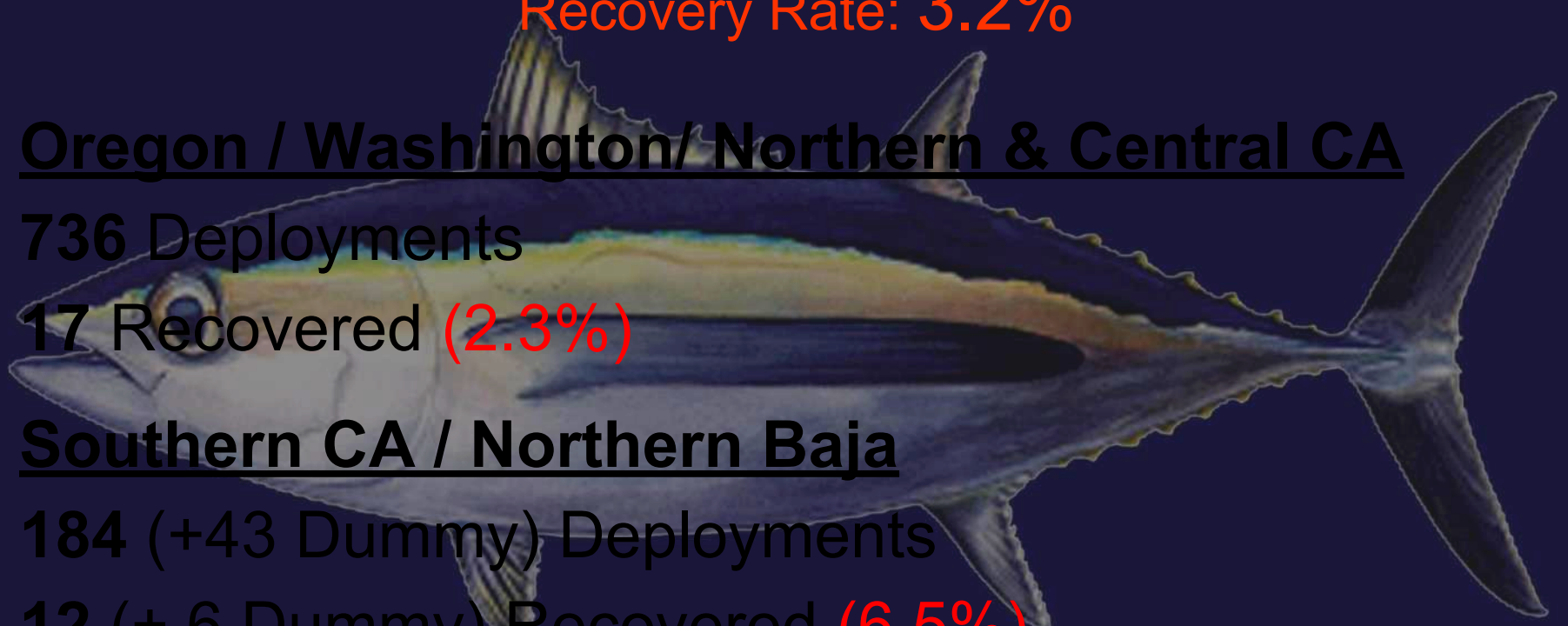
736 Deployments

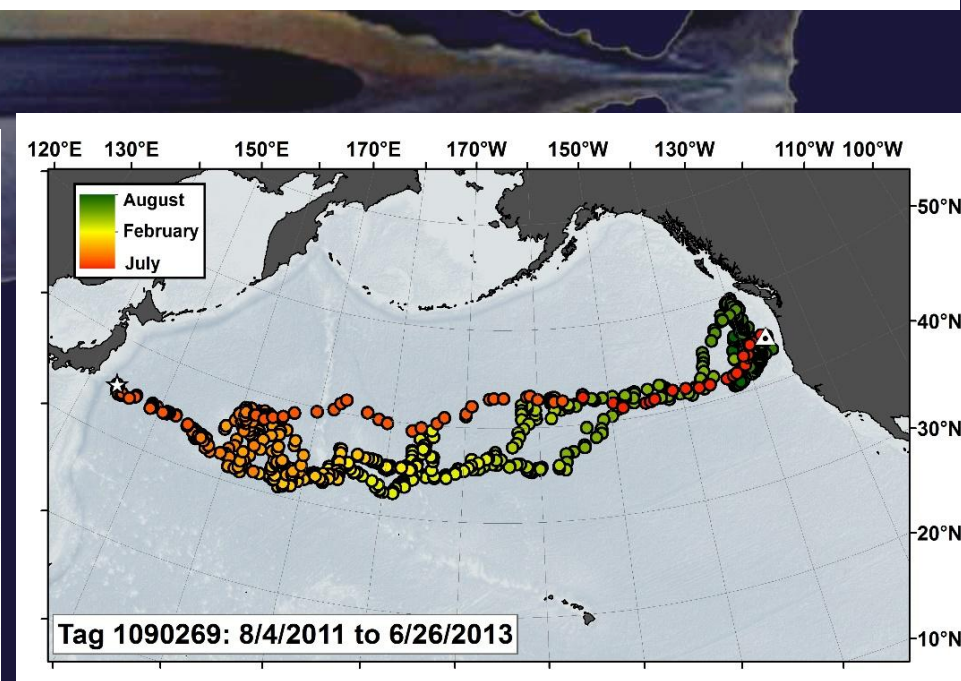
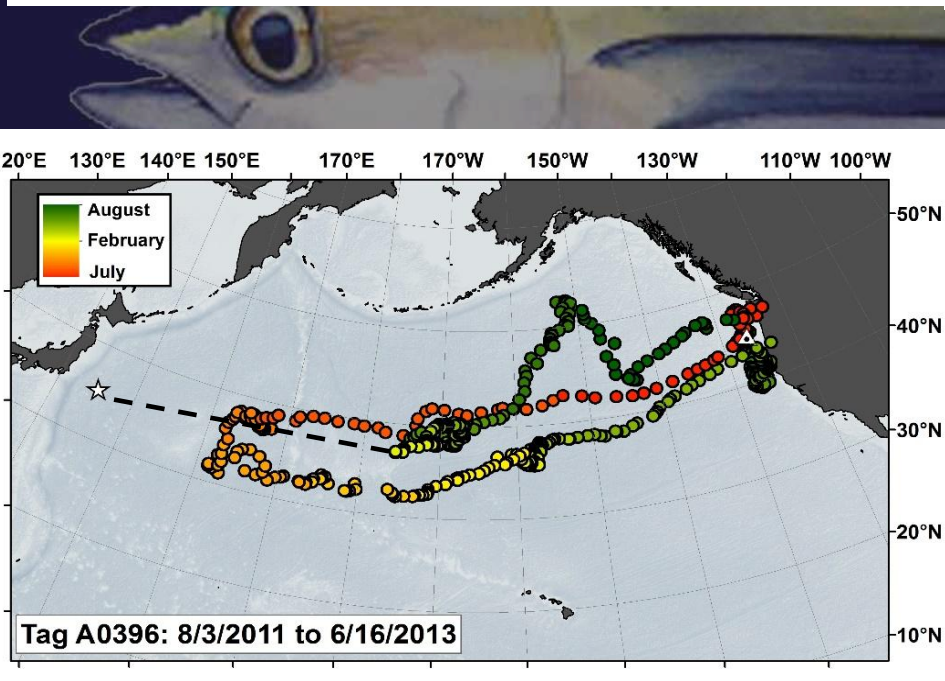
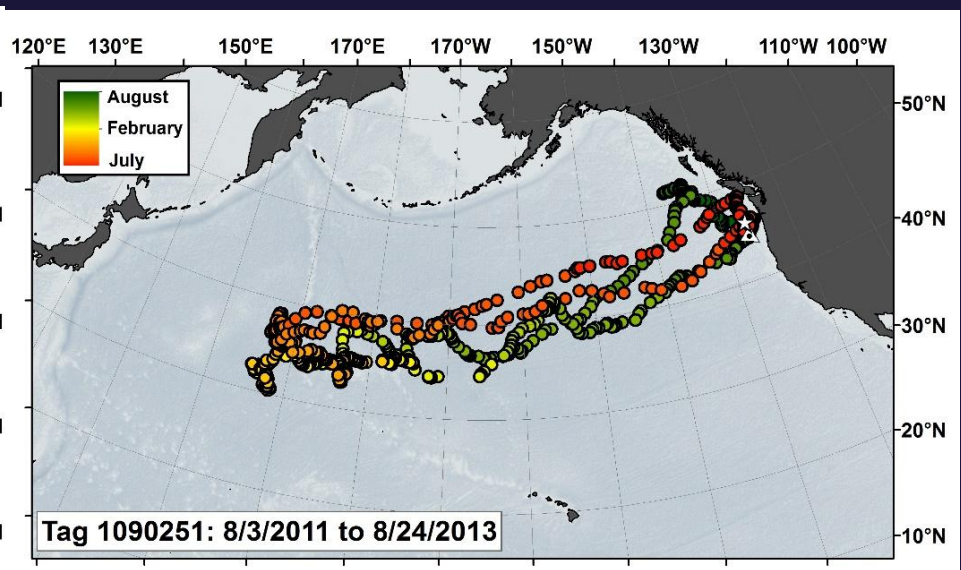
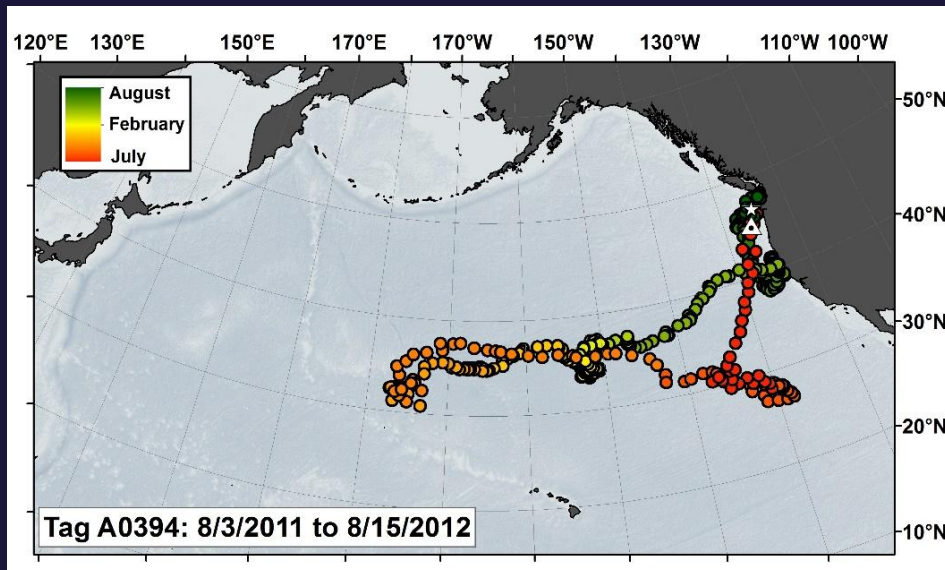
17 Recovered (2.3%)

Southern CA / Northern Baja

184 (+43 Dummy) Deployments

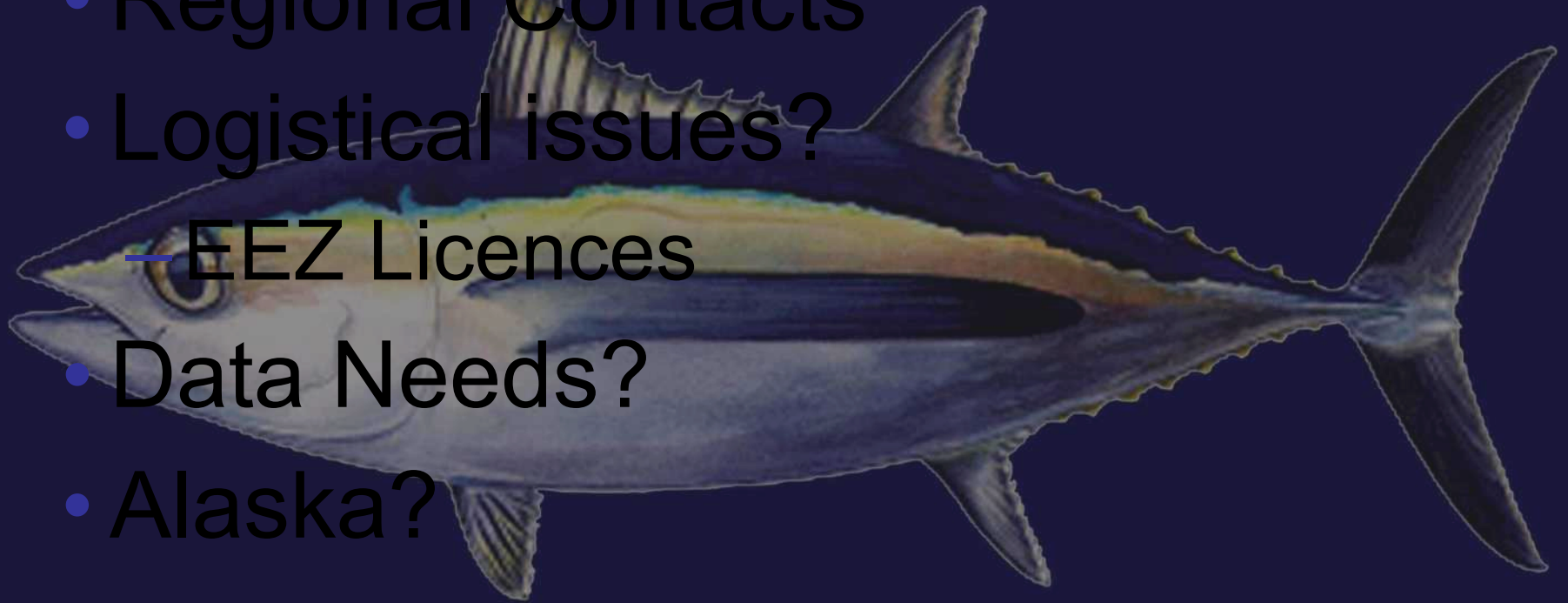
12 (+ 6 Dummy) Recovered (6.5%)





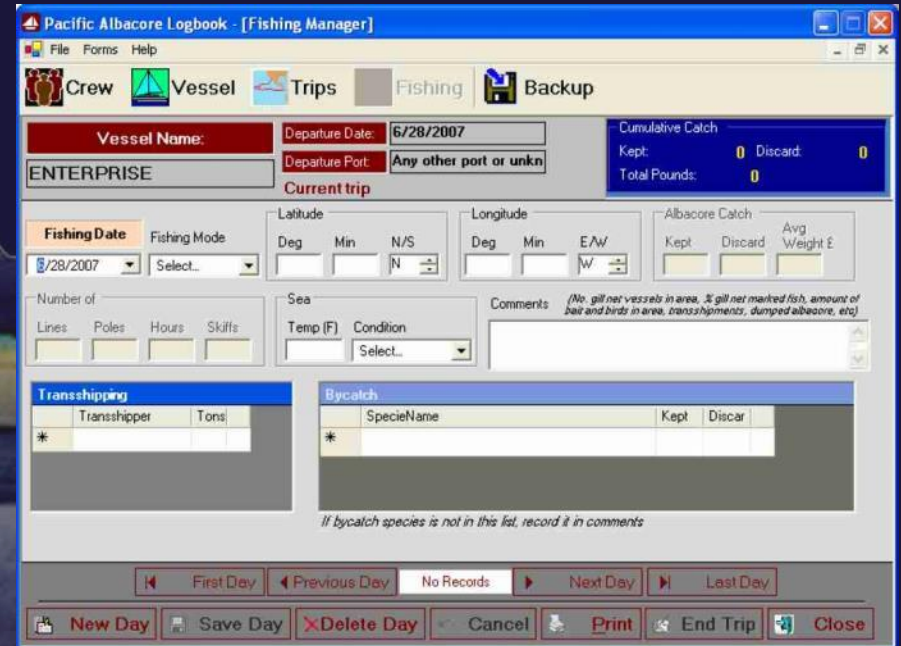
USA – Canada Treaty Data

- Regional Contacts
- Logistical issues?
 - EEZ Licences
- Data Needs?
- Alaska?



Electronic Logbooks

- From 2006 to 2014, 383 trips were submitted using e-log program.
- The program is antiquated and we have not been able to update or replace it.
- Current efforts include trying to create a fillable PDF form that can be emailed or submitted via the internet



The screenshot shows the 'Pacific Albacore Logbook - [Fishing Manager]' window. The interface includes a menu bar (File, Forms, Help) and a toolbar with icons for Crew, Vessel, Trips, Fishing, and Backup. The main form contains the following sections:

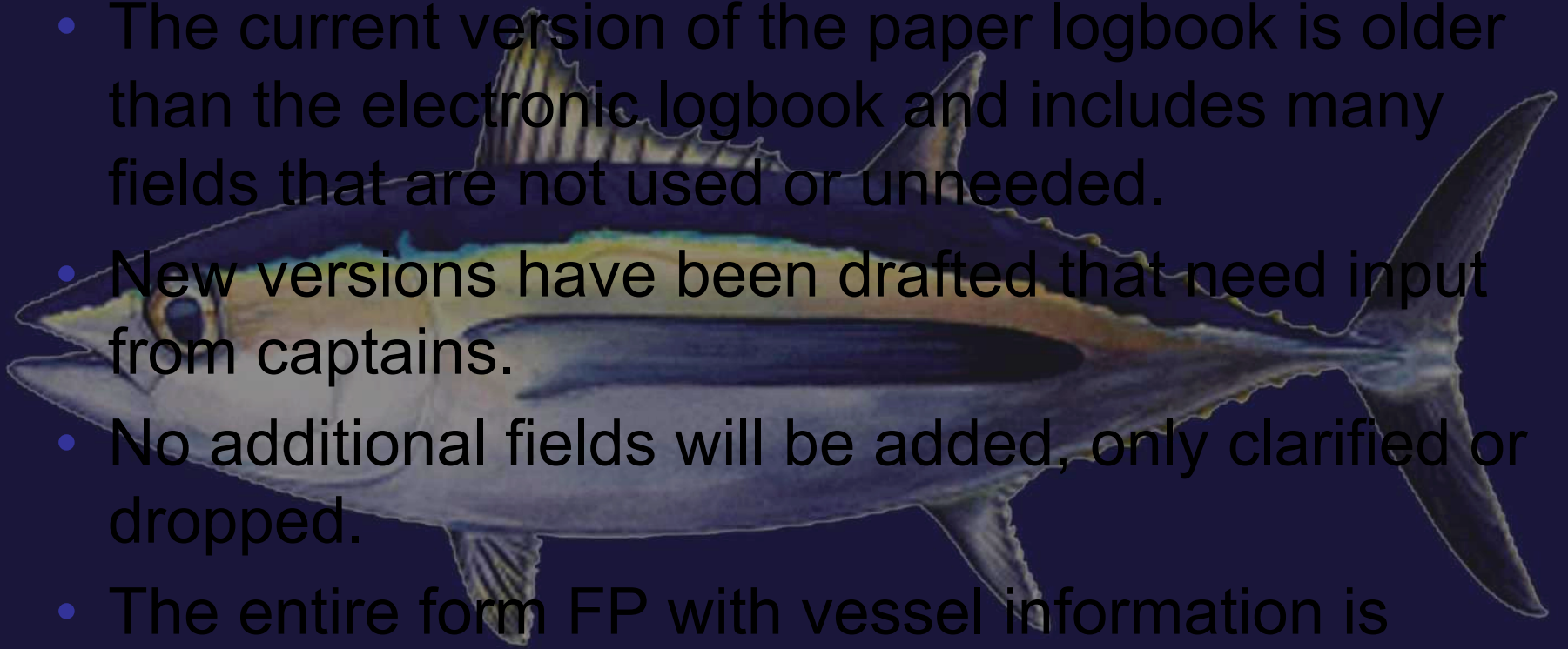
- Vessel Name:** ENTERPRISE
- Departure Date:** 6/28/2007
- Departure Port:** Any other port or unkn
- Current trip** (highlighted)
- Cumulative Catch:** Kept: 0, Discard: 0, Total Pounds: 0
- Fishing Date:** 6/28/2007
- Fishing Mode:** Select...
- Latitude:** Deg, Min, N/S
- Longitude:** Deg, Min, E/W
- Albacore Catch:** Kept, Discard, Avg Weight E
- Number of:** Lines, Poles, Hours, Skiffs
- Sea:** Temp (F), Condition
- Comments:** (No gill net vessels in area, it gill net marked fish, amount of bait and birds in area, transshipments, dumped albacore, etc)
- Transshipping:** Table with columns: Transhipper, Tons
- Bycatch:** Table with columns: SpecieName, Kept, Discar

At the bottom, there are navigation buttons: First Day, Previous Day, No Records, Next Day, Last Day, New Day, Save Day, Delete Day, Cancel, Print, End Trip, and Close.

contact John Childers (john.childers@noaa.gov) to participate in the electronic logbook program

Paper Logbooks

- The current version of the paper logbook is older than the electronic logbook and includes many fields that are not used or unneeded.
- New versions have been drafted that need input from captains.
- No additional fields will be added, only clarified or dropped.
- The entire form FP with vessel information is proposed to be eliminated.



Current Proposed Changes

U.S. PACIFIC HMS TROLL AND POLE-AND-LINE FISHING INFORMATION

COAST GUARD DOCUMENT NO. _____
OR
STATE MARINE BOARD NO. _____
(e.g. WN1234AB)

LANDING RECEIPT NUMBER FOR THIS TRIP	

DEPARTURE DATE _____ ARRIVAL PORT _____ PORT(S) LANDED _____
DEPARTURE DATE / / ARRIVAL DATE / / TOTAL POUNDS LANDED _____
(MM/DD/YYYY) (MM/DD/YYYY) FOR THIS TRIP TOTAL POUNDS SOLD DOCKSIDE _____

DATE MM/DD/YYYY	LATITUDE			LONGITUDE			TARGET CATCH				No. JIGLINES	No. BAIT POLES	HRS. FISHED	BYCATCH			COMMENTS (No. & amount of bait and _____)	
	DEG.	MIN.	N/S	DEG.	MIN.	EW	SPECIES NAME	No. KEPT	No. DISCARD	AVGWT (lbs)				SPECIES	No. KEPT	No. DISCARD		
							A) ALBACORE B) YELLOWFIN C) BLUEFIN D) _____											
							A) ALBACORE B) YELLOWFIN C) BLUEFIN D) _____											
							A) ALBACORE B) YELLOWFIN C) BLUEFIN D) _____											
							A) ALBACORE B) YELLOWFIN C) BLUEFIN D) _____											
							A) ALBACORE B) YELLOWFIN C) BLUEFIN D) _____											
							A) ALBACORE B) YELLOWFIN C) BLUEFIN D) _____											
							A) ALBACORE B) YELLOWFIN C) BLUEFIN D) _____											

Added year

Dropped Radio call sign

Added space for multiple fish tickets

Dropped Gear Code and Fishing code

Options for target species

Removed weather info and skills

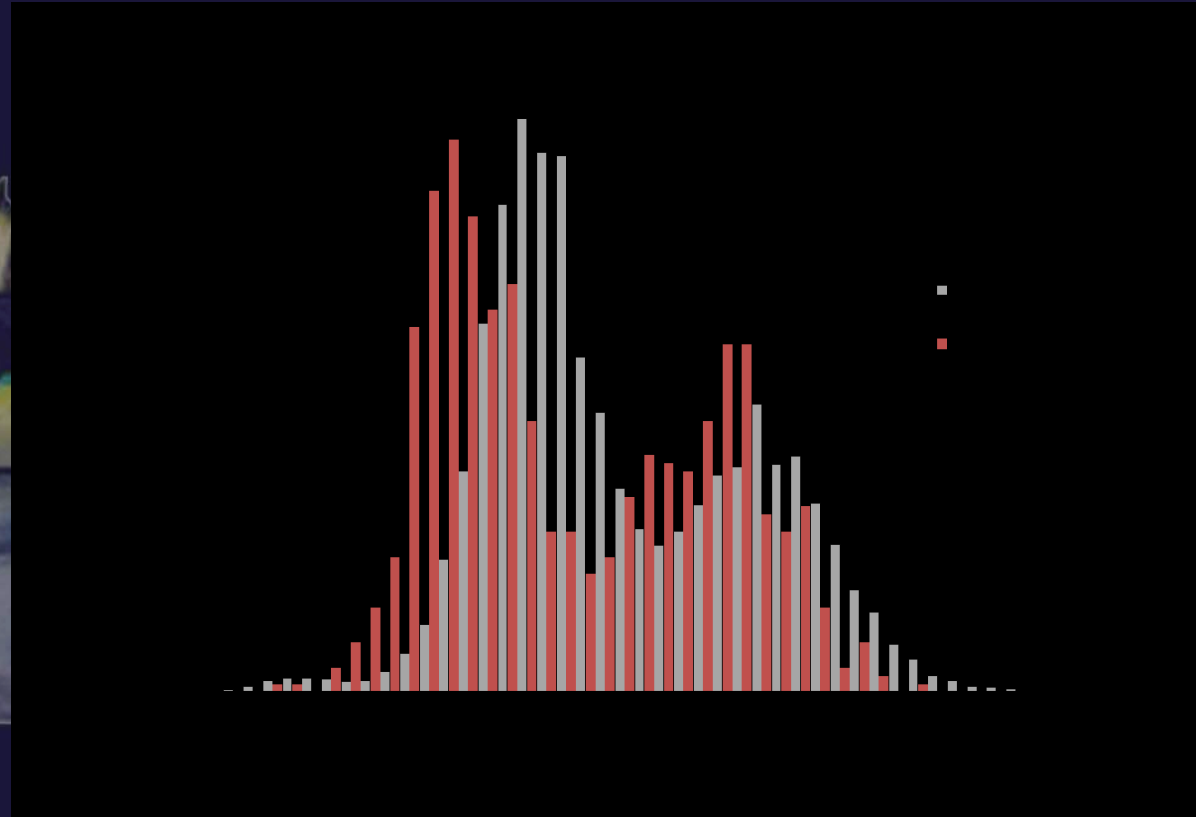
Replace transshipment info with dockside sales

I certify that the above information is complete and accurate to the best of my knowledge Signature: _____ Date: _____

INSERT FOLDED BACK COVER UNDER YELLOW COPY

Onboard Length Sampling

YEAR	VESSEL	NUMBER MEASURED
2010	CAPRICCIO	150
2010	HANS HALVOR	306
2010	LYDOREIN	23
2010	NEDIAN	290
2010	ROGGY	240
2011	HANS HALVOR	1769
2011	ROGGY	170
2012	HANS HALVOR	1222
2012	ROGGY	200
2013	HANS HALVOR	687
2013	SAN PABLO	39
2014	HANS HALVOR	547
2014	SAN PABLO	208



- Measurements are especially needed **early** and **late** in the season, and near the **outskirts** of the fishery

Gillnet Marked Fish

- What marks are caused by gillnets and what marks aren't
- Document it, then what?



Albacore Stock Assessment

Vidar Westestad

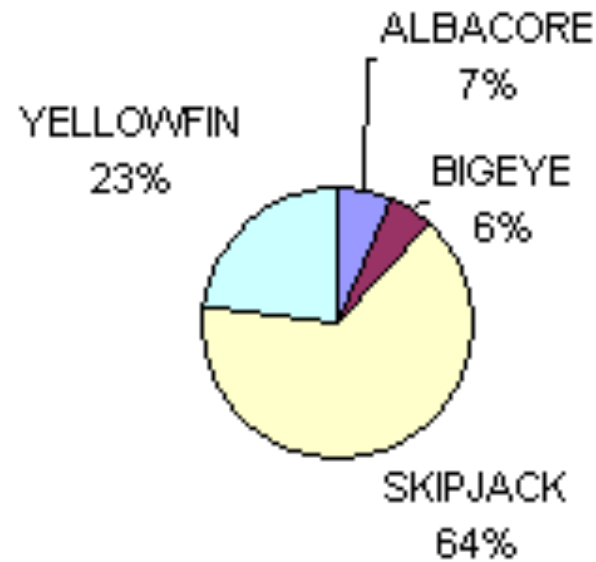


State of Albacore

World Catch

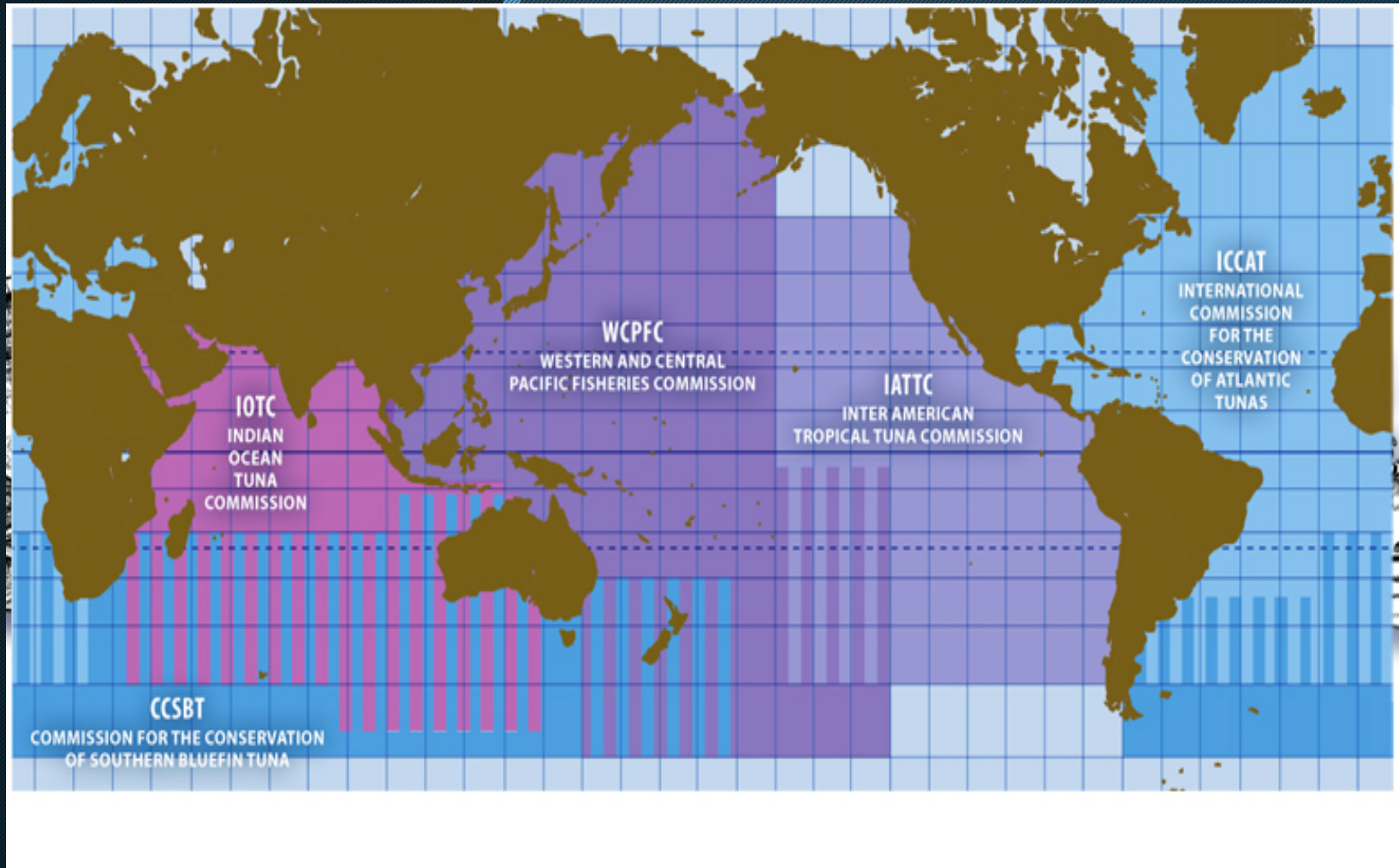
North Pacific

Management Trends

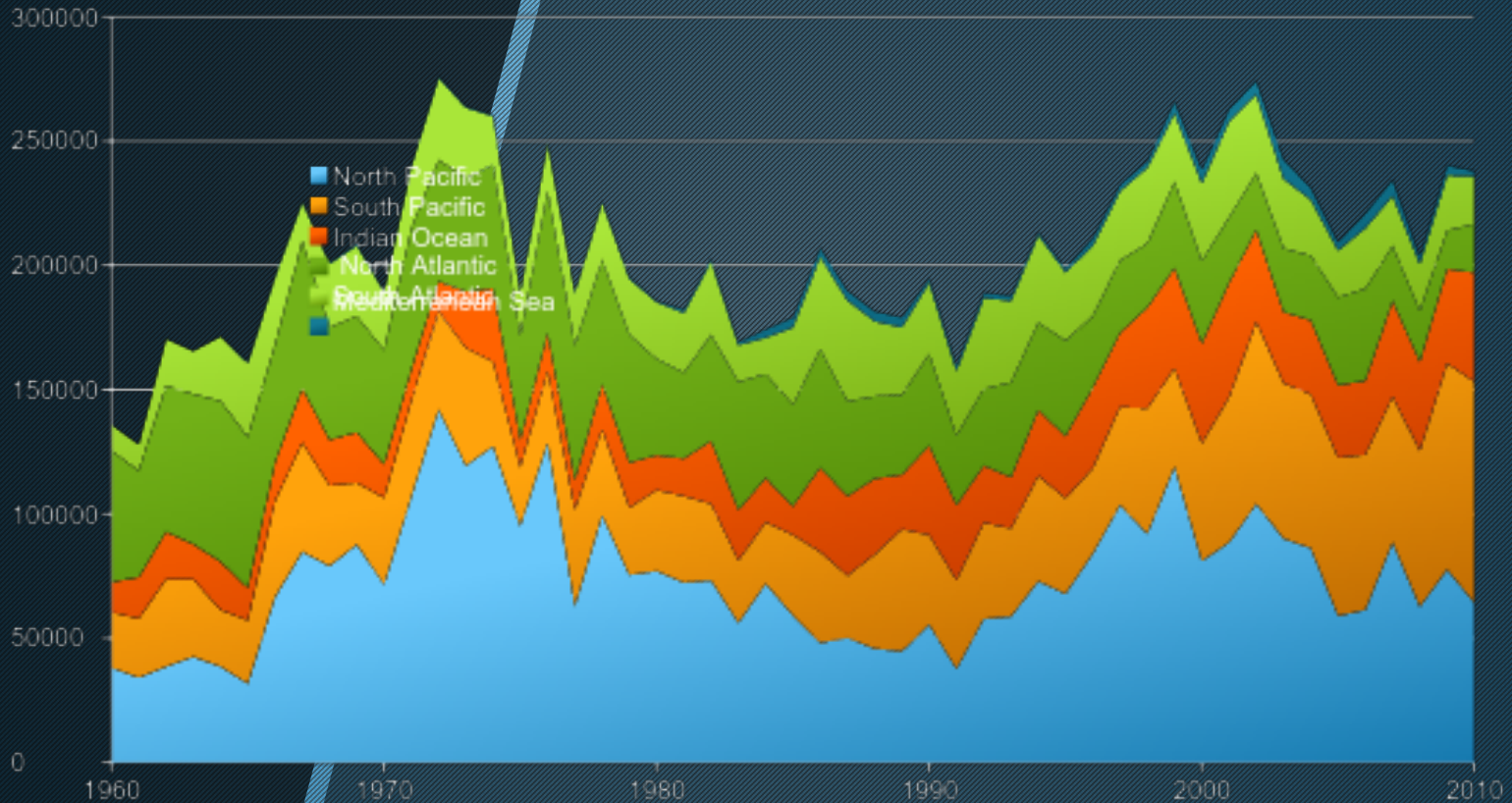


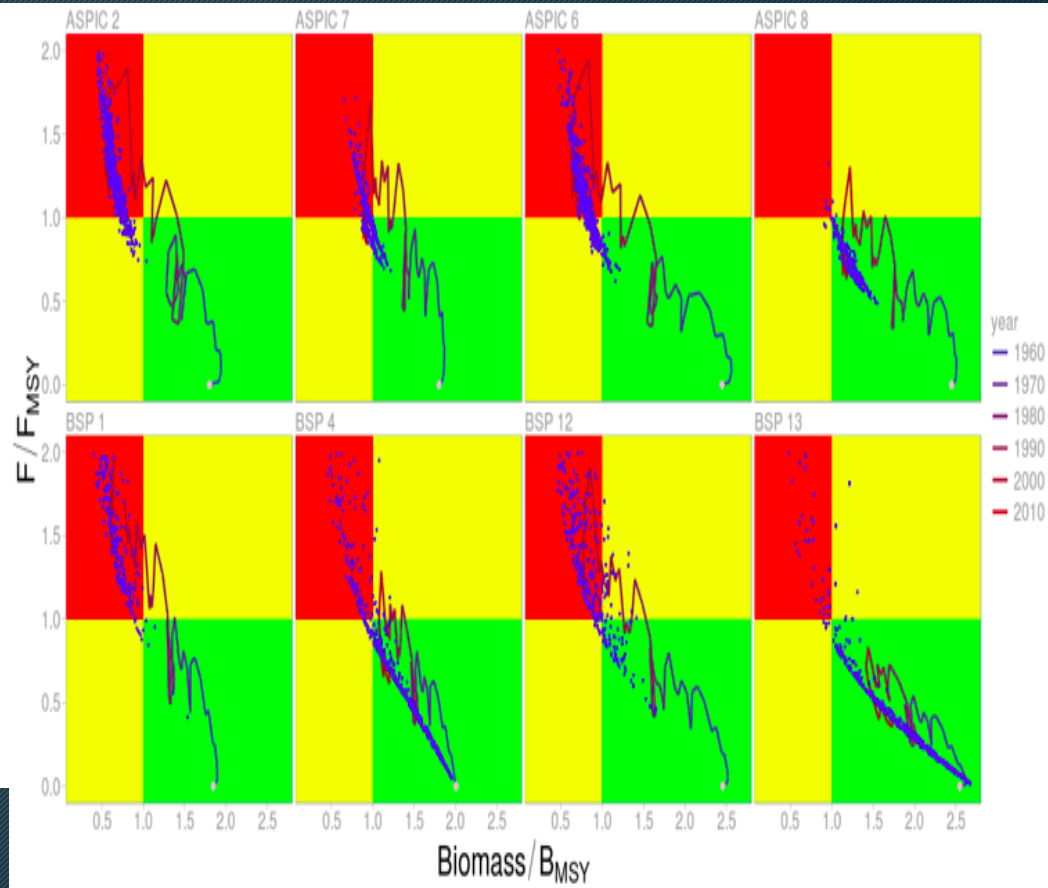
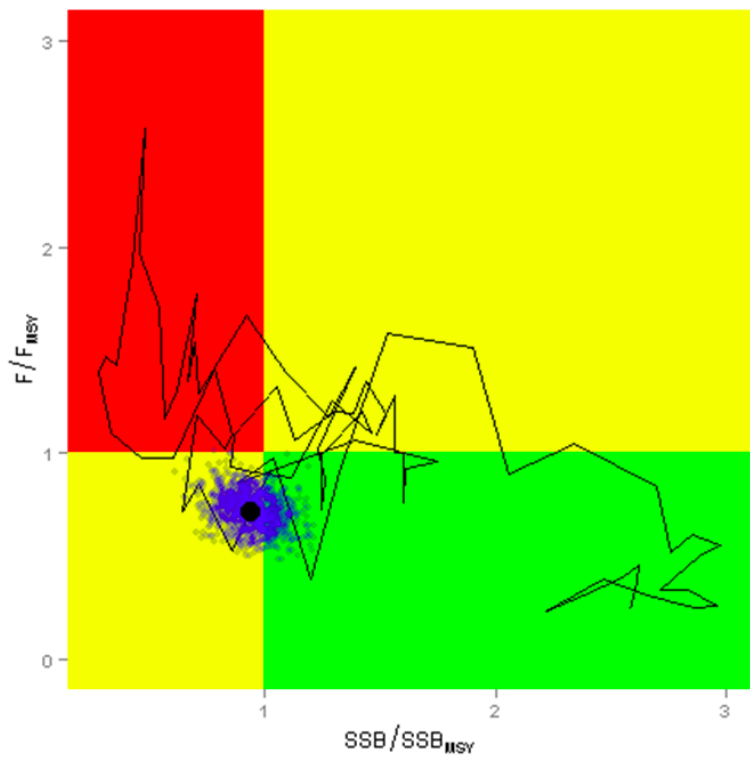
Stocks and Management Bodies

5 major Stocks and 4 RFMOs



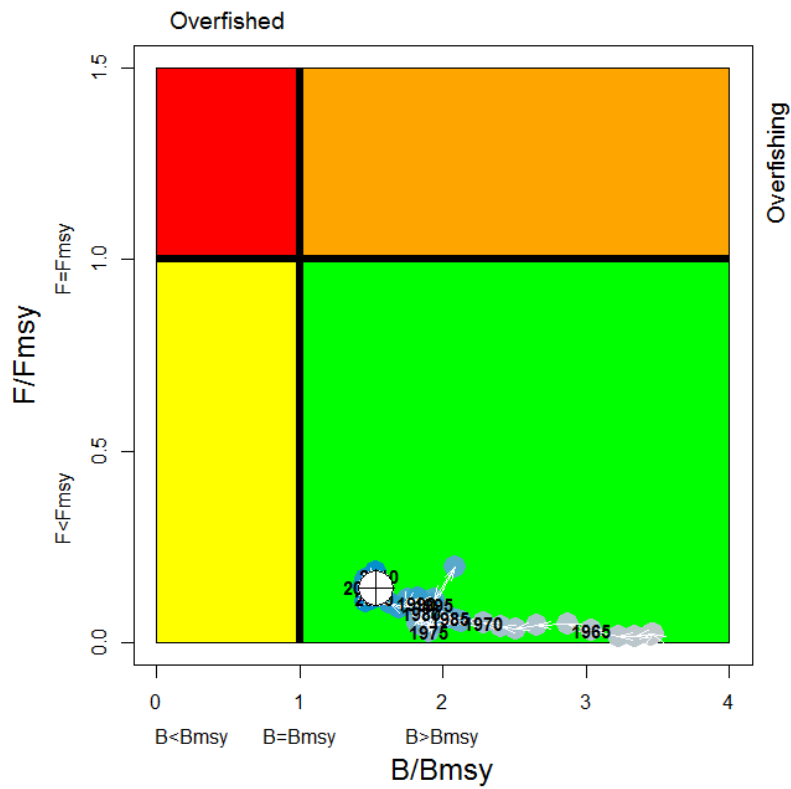
WORLD ALBACORE CATCH 1960 - 2014



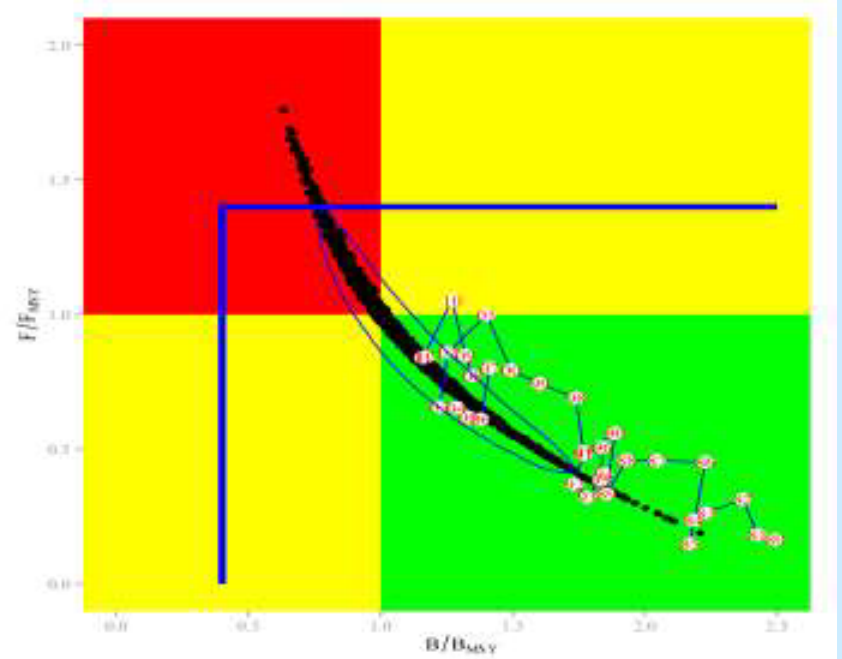


North

South



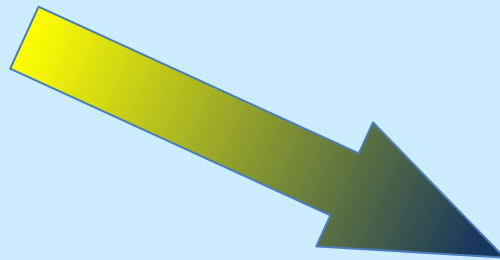
South Pacific



Indian Ocean

Management strategy evaluation

Forces declaration of
strategic goals



Finds tactical,
transparent methods

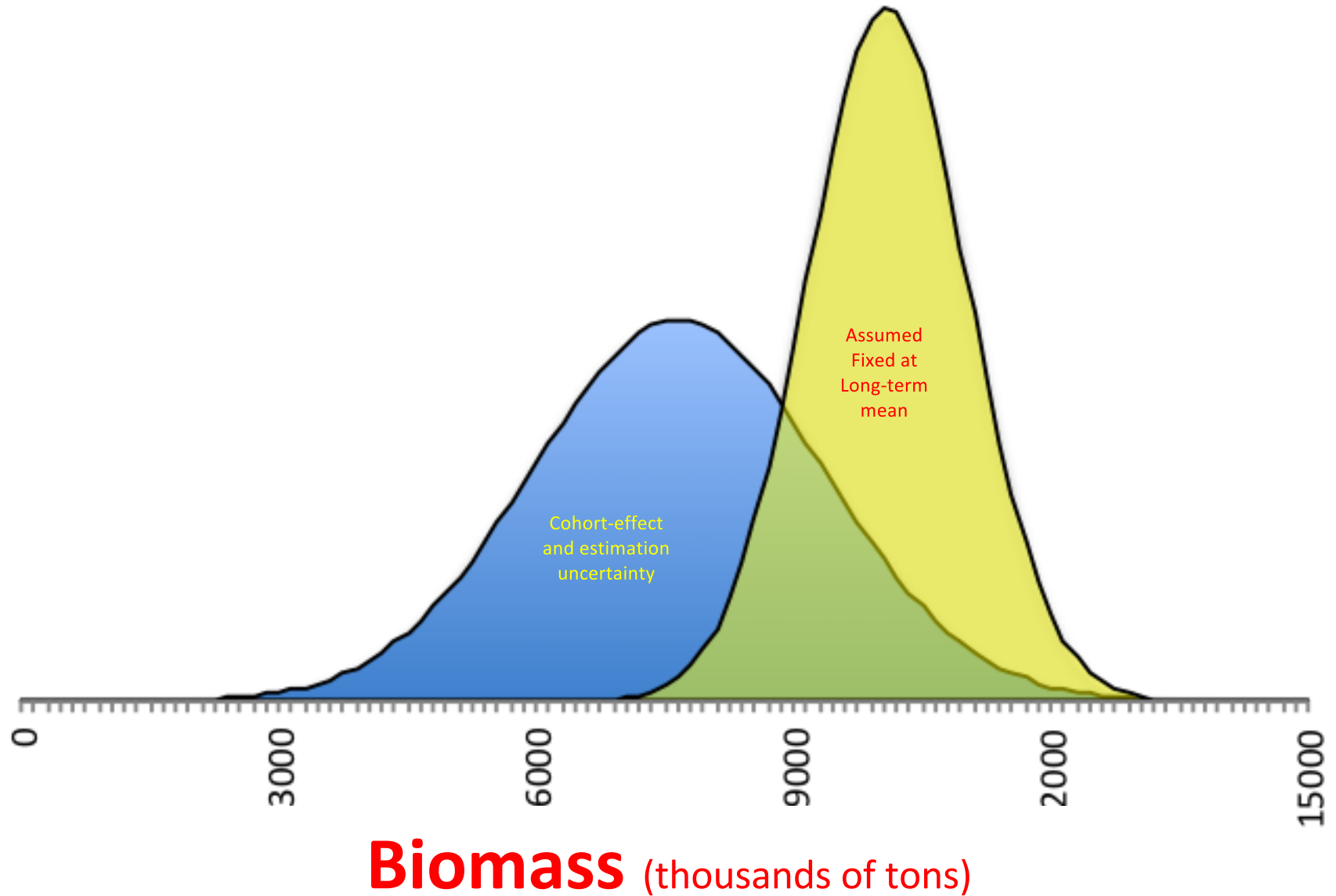
Management implications

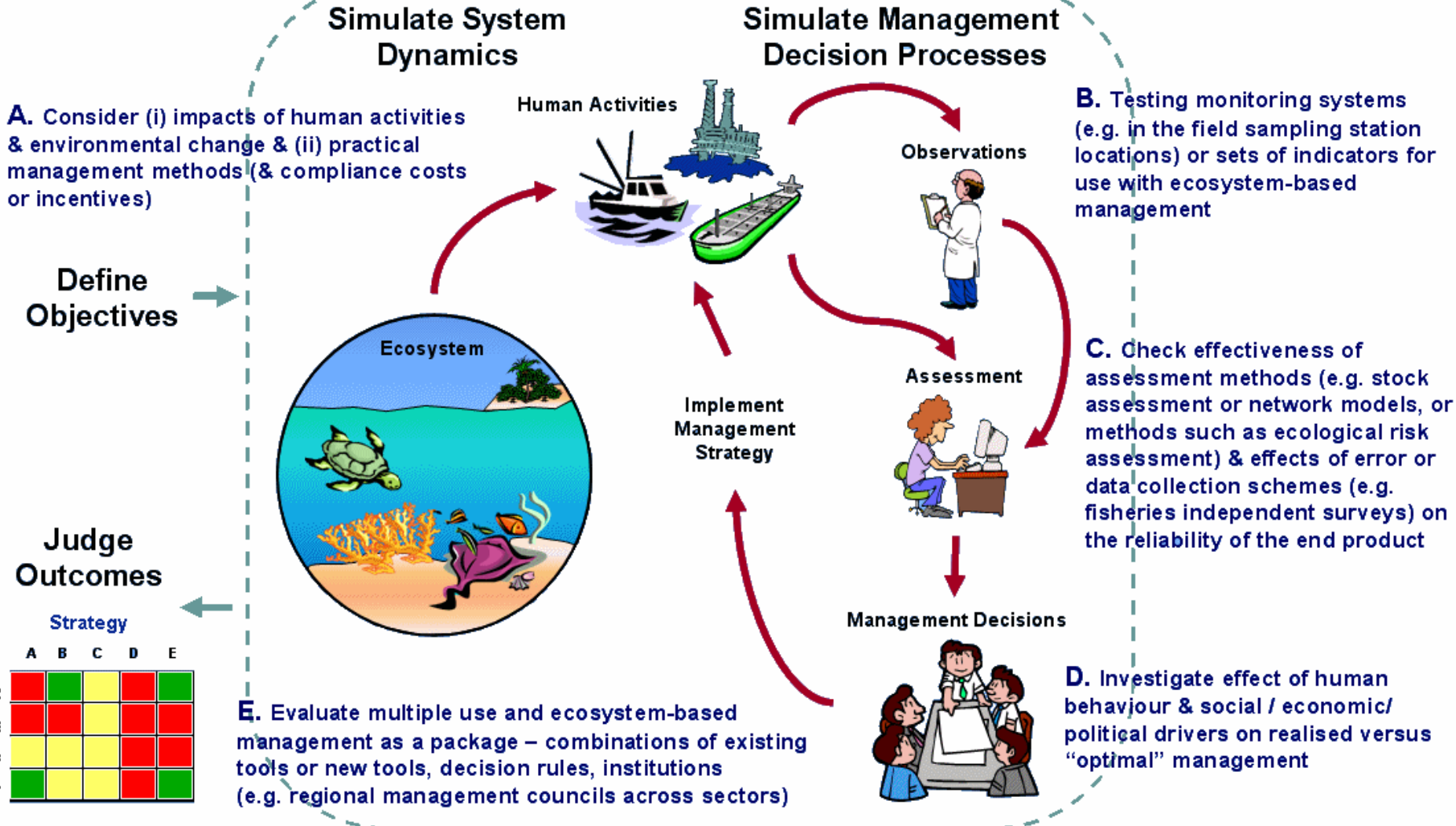
ABC specifications require “reliable” estimates of F_{msy}
and the **uncertainty** of the estimate...

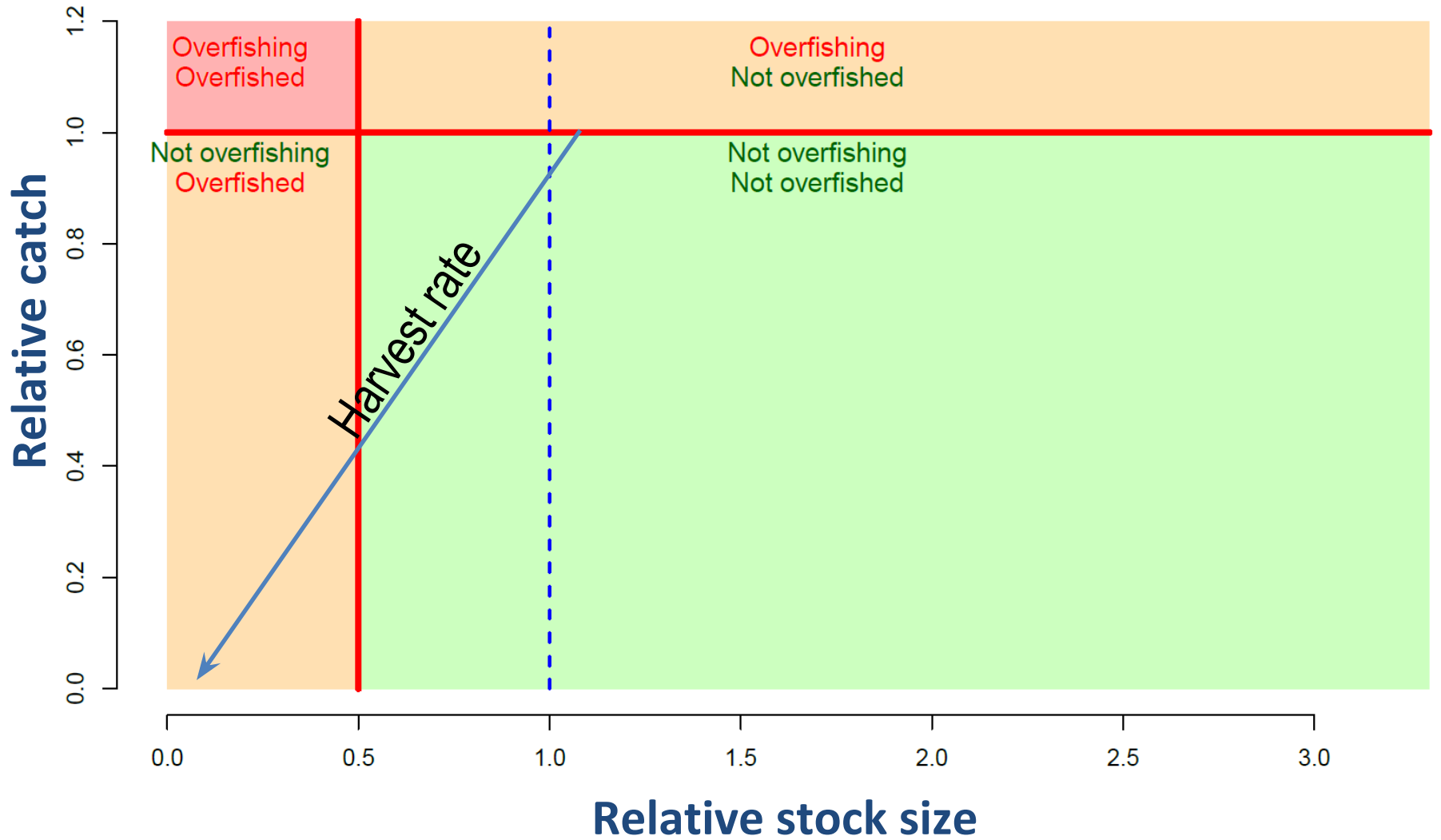
What affects productivity estimates?

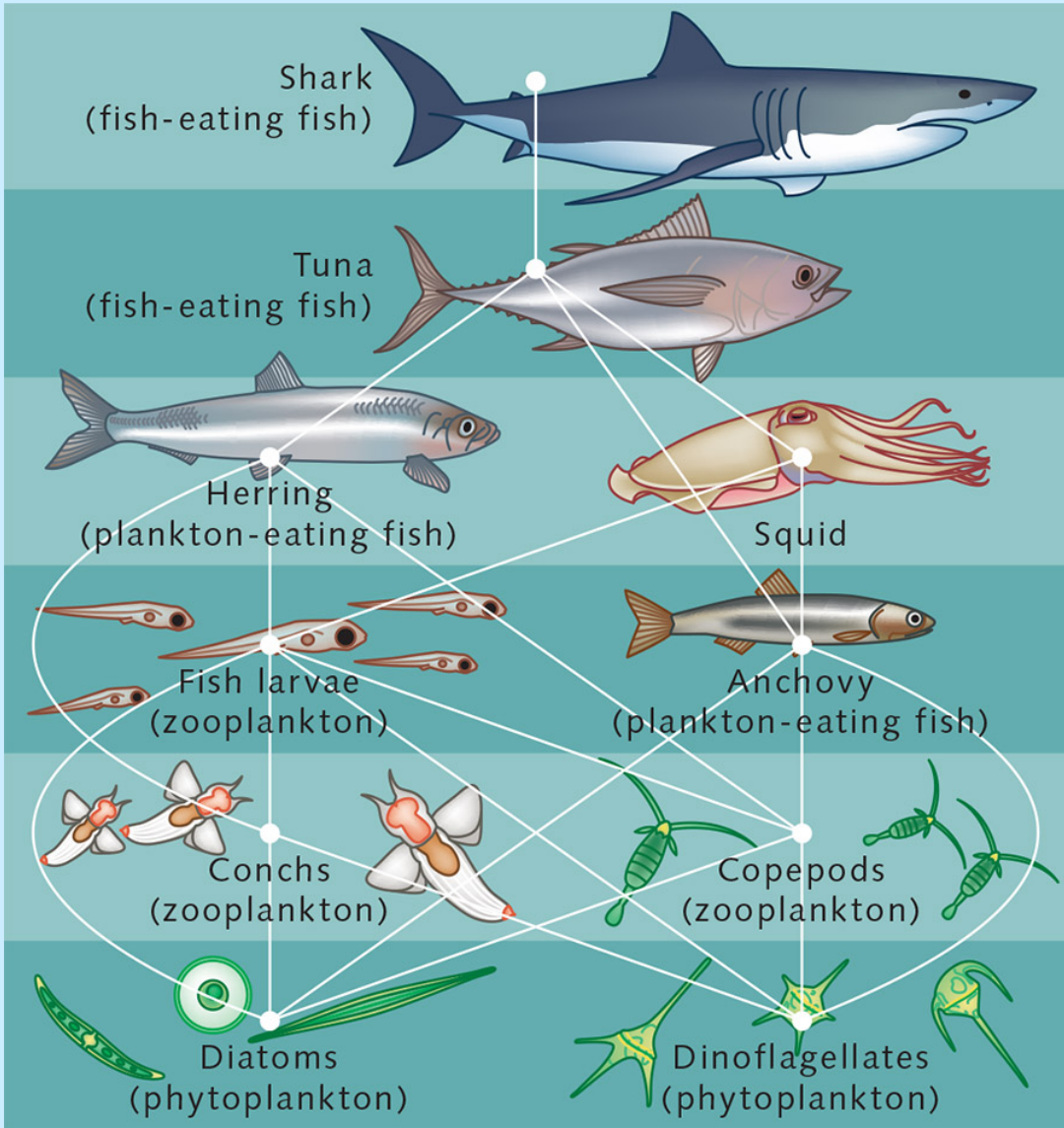
- Stock-recruit relationship
- Fishery selectivity
- Natural mortality
- Body mass-at-age

Impact on biomass estimate

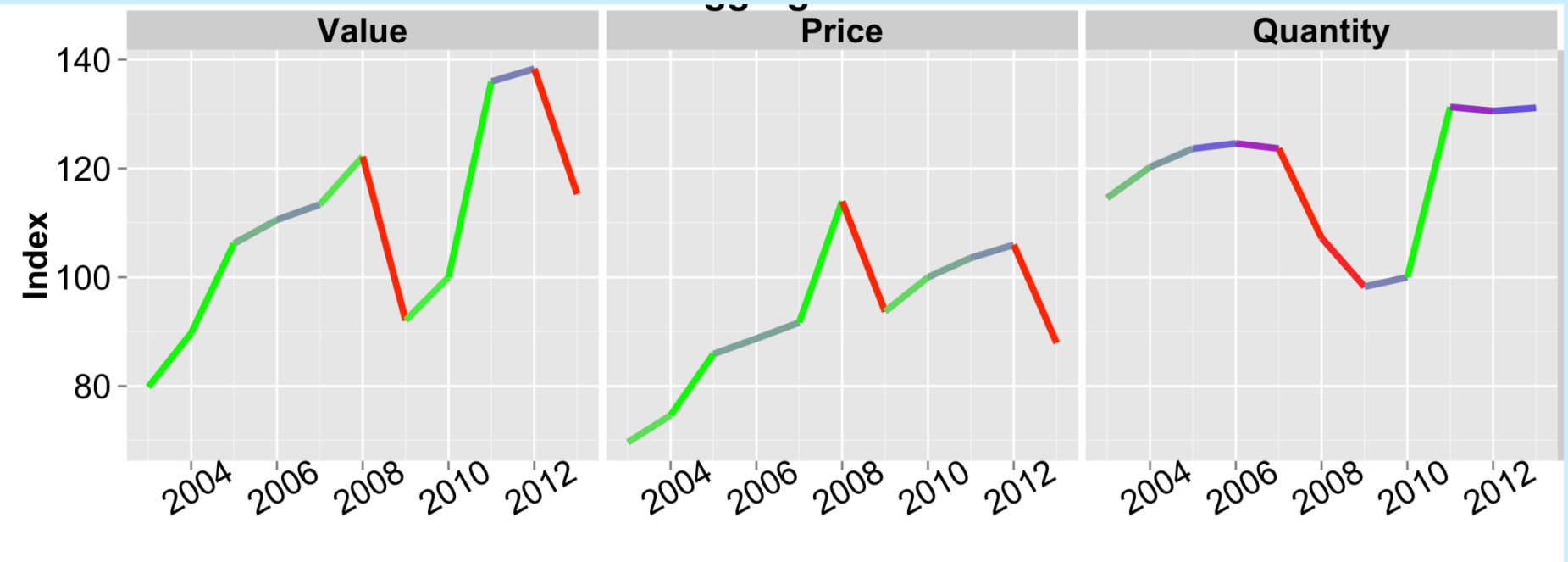




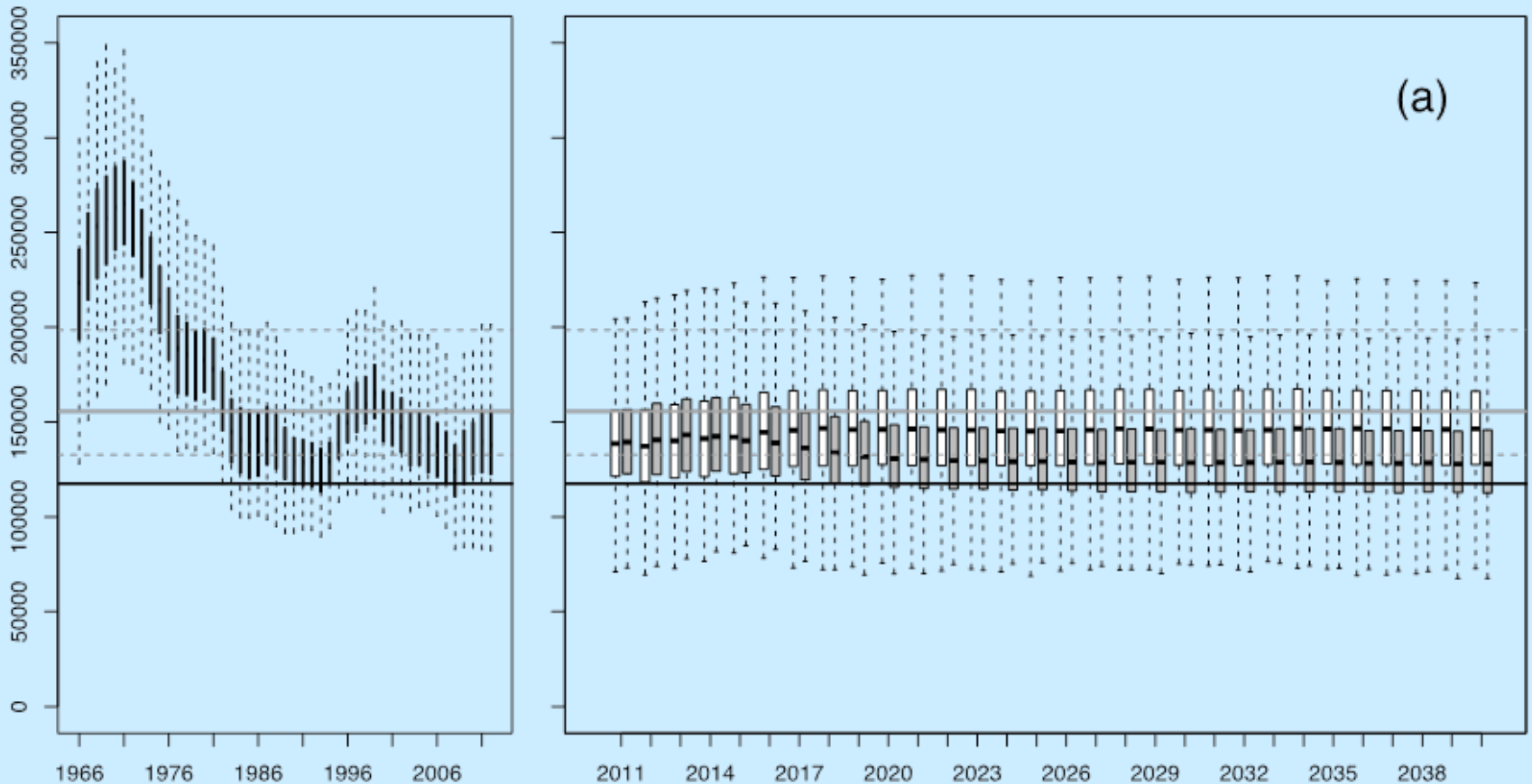




Fishery economic indicators



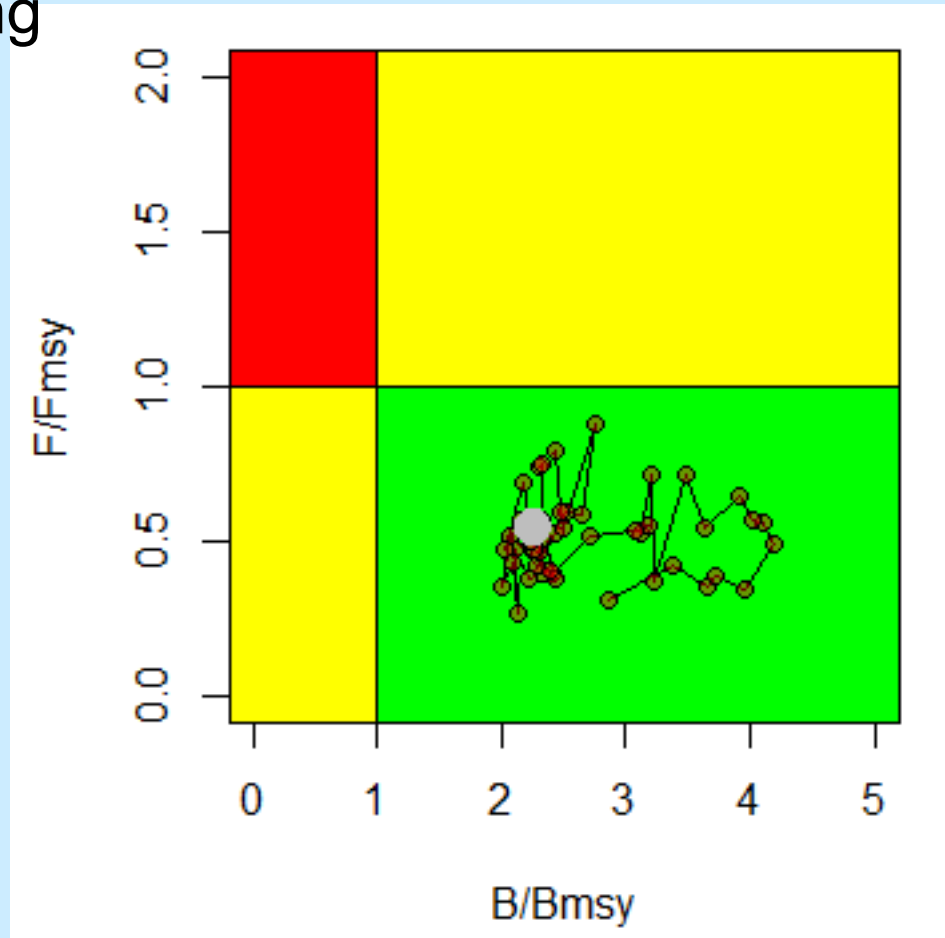
North Pacific Albacore Outlook



Historical and future trajectories of north Pacific albacore female spawning biomass (SSB) based on two constant harvest scenarios (F2002-2004 - gray boxplot; F2010-2012 - white boxplot) with average historical recruitment. The solid gray and red dashed lines represent median, 25% and 75% quartiles of past SSB, respectively. The solid black line is the average of 10 lowest estimated historical female SSB values, i.e., the SSB-ATHL threshold.

Exploitation Solidly in the Green

North Pacific not overfished, nor overfishing occurring



Albacore BRPs

BRP	$F_{2006-2008}/F_{RP}$	SSB (t)	Yield (t)	Description
$F_{SSB-ATHL-25y-50\%}$	0.71	356,382	101,426	F that prevents SSB from declining below ATHL over 25 years with 50% prob.
F_{MSY}	0.14	11,180	185,913	F at MSY. Equivalent to F_{MAX} for F_{MSY} when steepness assumed to be 1
F_{MAX}	0.14	11,180	185,913	F at maximum yield per recruit (YPR)
$F_{0.1}$	0.29	107,130	170,334	F at which slope of YPR is 0.1 of slope at origin
$F_{20\%-SPR}$	0.38	171,427	156,922	F that reduces SPR to 20% of unfished state
F_{MED}	0.99	452,897	94,080	F corresponding to median observed recruit to SSB ratio
F_{LOSS}				F expected to keep SSB at minimum observed

China, Subsidized Fishery Effect

As advertized on www.alibaba.com/

Whole Round Albacore Tuna

28 Metric Tons (Min. Order)
US \$1000-2000 / Metric Ton (FOB Price)
Variety: Tuna Certificate: HACCP, ISO,
Dolphin safe, Catching certificate
Certification: FDA,HACCP,ISO,KOSHER,QS,
HALAL Packaging: Bulk Part: Whole Style:
Frozen
Ningbo King Marine Food Co., Ltd.
China (Mainland) Contact Details
Contact Supplier Chat Now!
Whole Round Albacore Tuna

Whole Round Albacore Tuna

US \$1000-2000 / Metric Ton (FOB Price)
28 Metric Tons (Min. Order)
Variety: Tuna Certificate: HACCP, ISO, Dolphin safe, Catching
certificate Certification: FDA,HACCP,ISO,KOSHER,QS,HALAL Packaging:
BulkPart: Whole Style: Frozen Ningbo King Marine Food Co., Ltd.China
(Mainland)