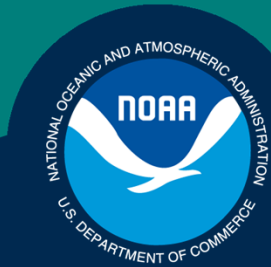


Science, Service, Stewardship



2015 Gulf of Alaska Bottom Trawl Survey

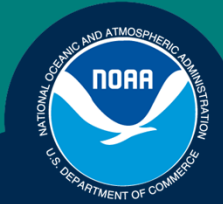
GOA/AI Survey Team

Christina Conrath, Elaina Jorgensen, Ned Laman, Peter Munro Jay Orr, Nate Raring, Chris Rooper, Paul von Szalay, Mark Zimmermann

Wayne Palsson, Team Leader

September 29, 2015

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Survey Purpose

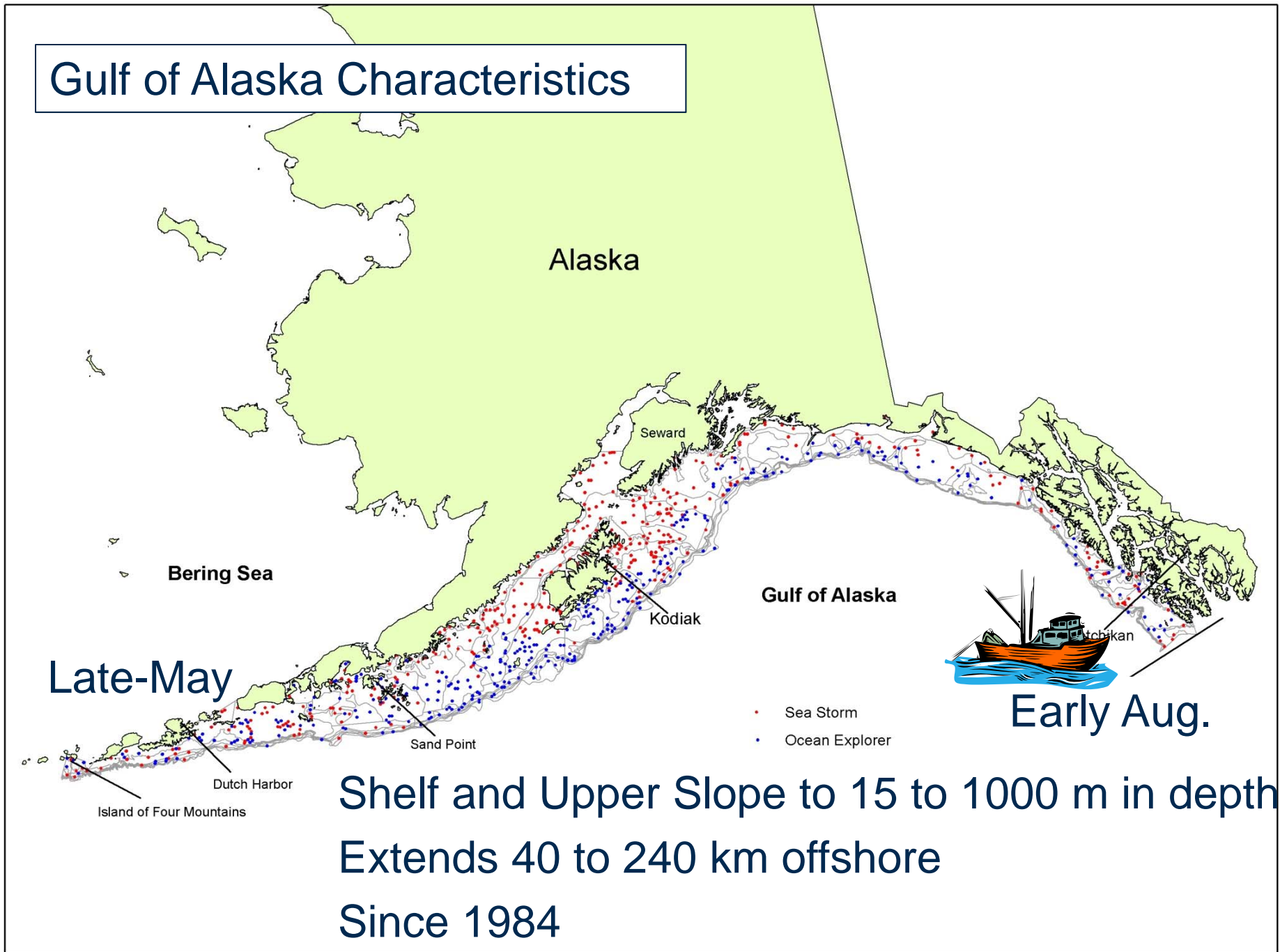
To continue a standardized time series of

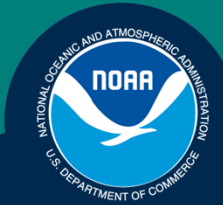
- Abundance
- Distribution
- Biological Condition

of groundfish and invertebrate populations for use in stock assessment.

This the the 14th time!

Gulf of Alaska Characteristics





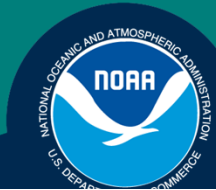
GOA Survey Characteristics

<u>Year</u>	<u>Stations</u>	<u>Max Depth (m)</u>	<u>Comment</u>
1984	929	1000	Duration 30 min
1987	783	1000	
1990	708	500	
1993	775	500	
1996	807	500	15 min duration
1999	764	1000	
2001	489	500	Not in SE AK
2003	809	700	
2005	835	1000	
2007	820	1000	
2009	823	1000	
2011	670	700	2 boats
2013	548	700	2 boats
2015	772	1000	3 Boats



2015 GOA Survey

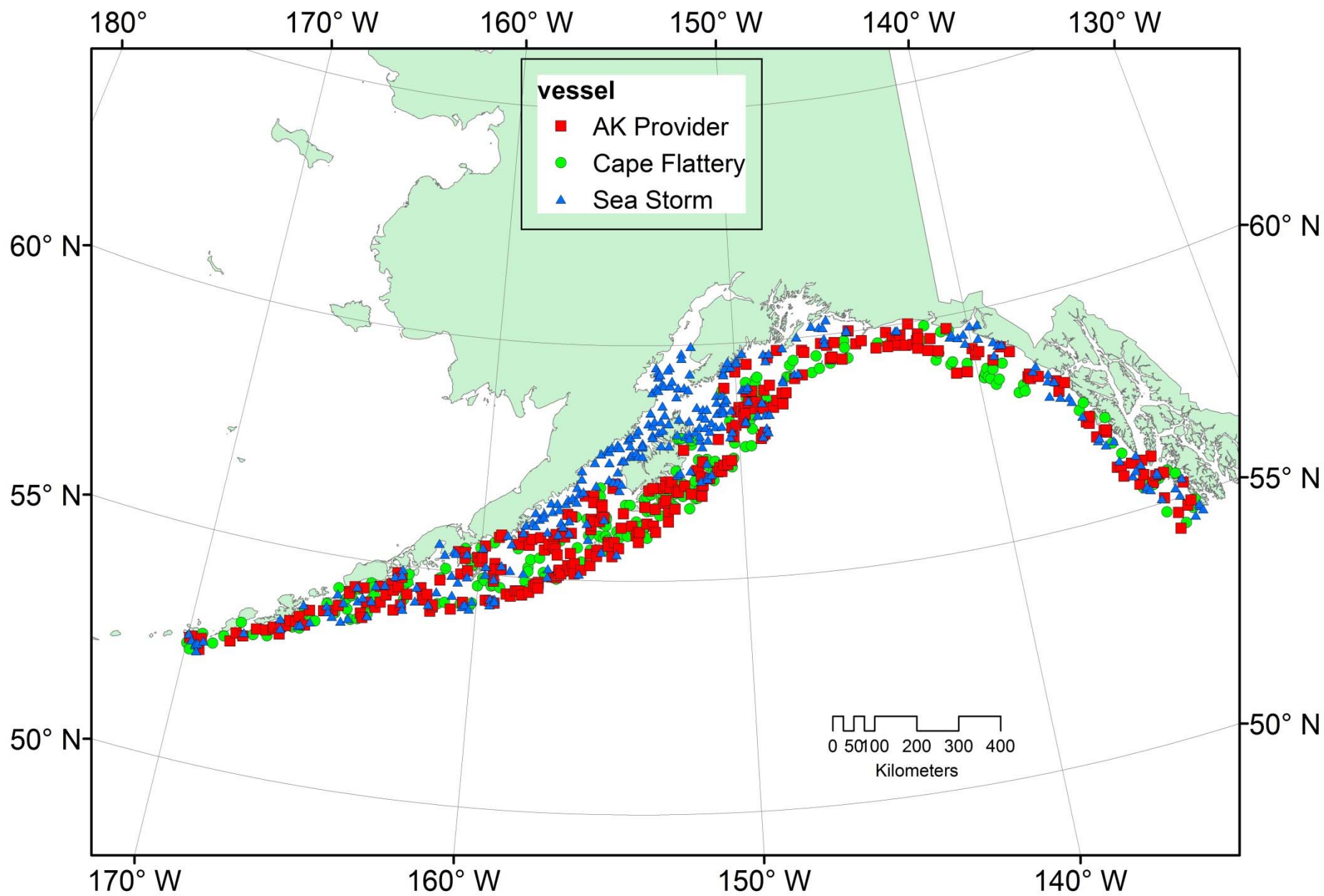
- 800 Planned Stations
- 79 days F/V Sea Storm and F/V Alaska Provider
- 60 days F/V Cape Flattery
- 19 May to 14 Aug
- 3-4 Legs (Dutch Harbor, Sand Point, Kodiak, Seward, Ketchikan)
- FPCs: Paul von Szalay, Nate Raring, Ned Laman, Lyle Britt, Chris Rooper, Wayne Palsson, Mark Zimmermann, Elaina Jorgensen



2015 GOA Survey Schedule

2015 Gulf of Alaska Bottom Trawl Survey SS, AP 79 Days; V3 60 Days

	Leg 1 Dutch Hbr to Sand Point Sea Storm May 19 - June 8 (21 days)	Leg 2 Sand Point to Kodiak June 9 - June 28 (20 days)	Leg 3 Kodiak to Seward June 29 - July 17 (19 days)	Leg 4 Seward to Ketchikan July 18 - Aug 5 (19 days)	
FPC	Nate Raring*	Nate Raring*	Chris Rooper*	Paul von Szalay*	79
DB	Caroline Robinson	Christina Conrath*	Heather Kenney*	Christina Conrath*	
Scientist 1	Ron Payne *	Olav Ormseth	Lou Rugolo	Robert Alexander, NEFSC	
Scientist 2	Dereck Chamberlin, Observer	Dereck Chamberlin	Dereck Chamberlin	Dereck Chamberlin	
Scientist 3	Paul Logan, IPHC	Paul Logan, IPHC	Paul Logan, (IPHC	Paul Logan, IPHC	
Stomach scanner	Sean Rohan	Riek Hibpshman	Kim Sawyer	Riek Hibpshman	
	Alaska Provider May 21 - June 8 (19 days)	June 9 - June 28 (20 days)	June 29 - July 17 (19 days)	July 18 - Aug 7 (21 days)	
FPC	Ned Laman*	Lyle Britt*	Wayne Palsson*	Wayne Palsson*	79
DB	Nancy Roberson*	Ned Laman*	Peter Munro*	Peter Munro*	
Scientist 1	Todd Tenbrink	OBSERVER A	Jeff Napp	Bob Caruso	
Scientist 2	Will Nettler, Observer	Will Nettler	Will Nettler	Will Nettler	
Scientist 3	Hannah Grout, Observer	Hannah Grout	Hannah Grout	Hannah Grout	
Scientist 4	Lt. Theresa Smith, OMAO*	Katie Moyer (Student Volunteer)	Jakub Kircun, NEFSC	Sarah Neumeyer	
Camera Imager	Pam Tyhurst	Pam Tyhurst	Pam Tyhurst	Pam Tyhurst	
	Cape Flattery	Dutch Hbr to Kodiak June 16 - July 6 (21 days)	Kodiak to Seward July 7 - July 26 (20 days)	Seward to Ketchikan July 27 - Aug 14 (19 days)	
FPC		Paul von Szalay*	Mark Zimmermann*	Elaina Jorgensen*	60
DB		Jerry Hoff *, note may be late to boat	Nancy Roberson*	Mark Zimmermann*	
Scientist 1		Elaina Jorgensen (FPC in-Training)*	Steve Intelmann	Adriana Myers	
Scientist 2		Michael Malpezzi	Michael Malpezzi	Michael Malpezzi	
Scientist 3		Autumn Smith	Autumn Smith	Autumn Smith	
Scientist 4 (Stomach Collections)		OBSERVER B	OBSERVER C	Troy Buckley	



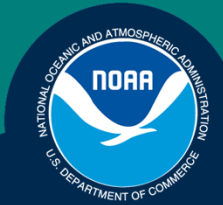


General Survey Design



- Chartered commercial fishing vessels
- Vessels must be at least 30.6 m in length, 1500 HP
- 5-6 crew + 6 scientists (Except 7 on Alaska Provider)

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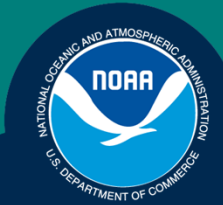


F/V Sea Storm



- Captain Jerry Ellefson
- 123' in length
- Been surveying for over 10 years

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F/V Alaska Provider



- Captain Bud Hanson
- 176' in length
- Been surveying for over 2 years

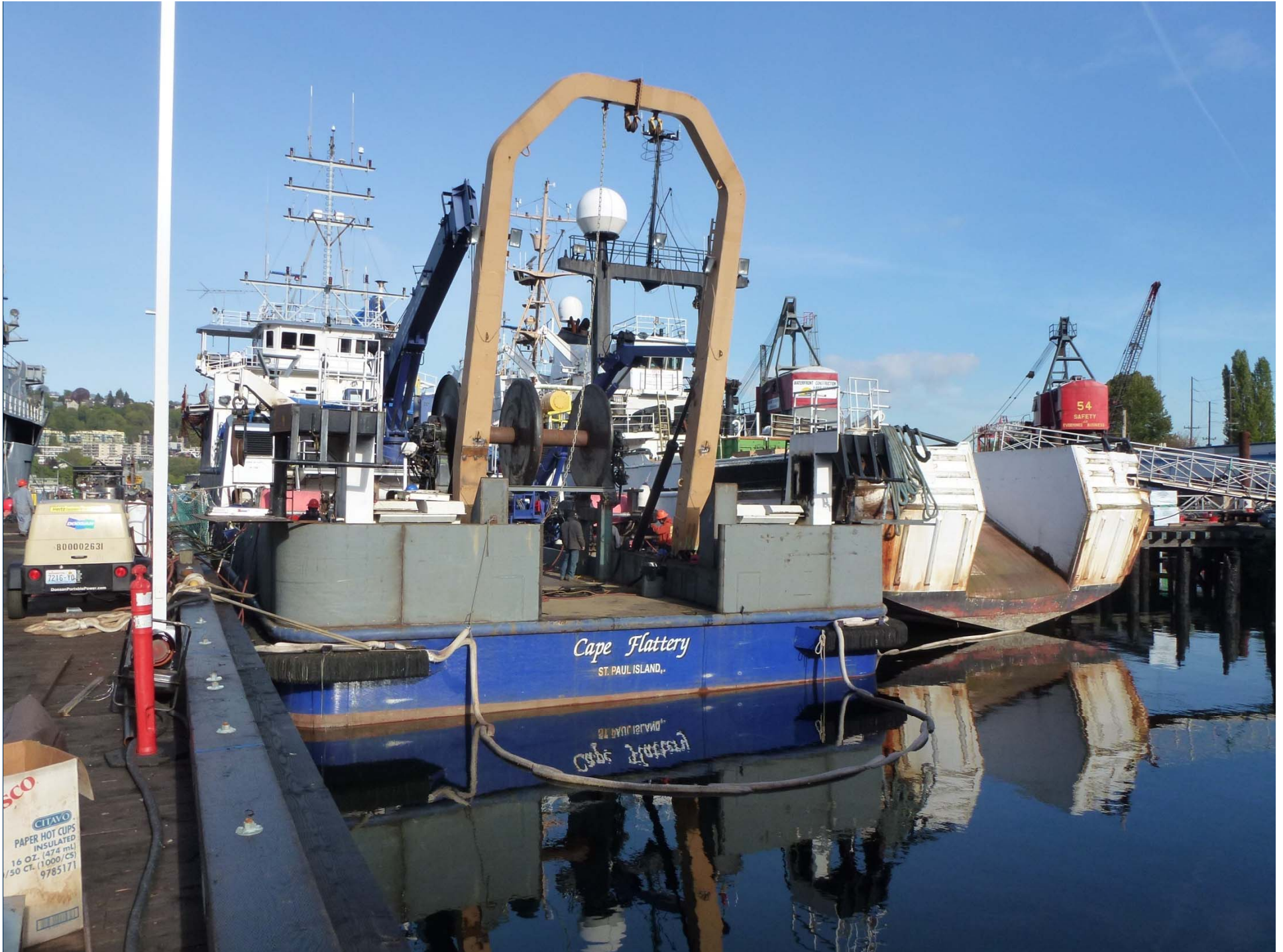
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F/V Cape Flattery



- Captain Jarl Hogsweth
- 186' in length
- New to the Survey
- Deep water trawling capacity
- SLOW

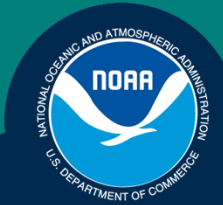


SCO
CITAVO
PAPER HOT CUPS
INSULATED
16 OZ. (474 ml)
/50 CT. (1000/CS)
9785171



General Survey Design

- Stratified-random survey of trawlable habitat
- 59 Strata based on geography, habitat, and depth
- Station allocation based upon abundance, variance, survey area, and economic value
- 15 minute trawl, usually 1.5 km distance
- Poly Nor 'Eastern net with rollers & bobbins
- Estimate catch per unit effort (kg/km²)
- Length, age, and other biological samples



Stratified-Random w/o Replacement

By regulatory area

By depth zone

- Shelf: 10-100, 101-200, 201-300 & 301-500 m
- Slope (GOA only) 501-700 & 701-1000 m

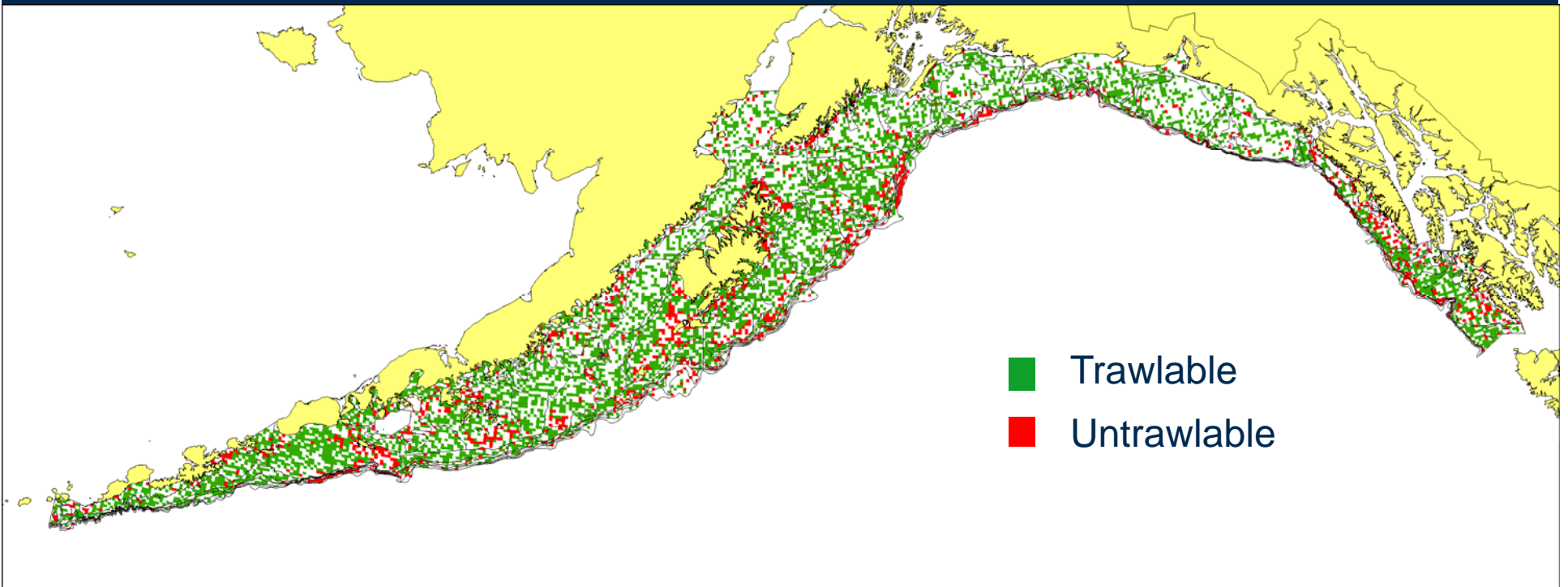
(GOA only) By habitat classification

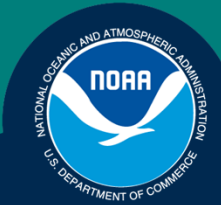
- Shelf - 74% of survey area
- Gullies – 20% of survey area
- Slope – 6% of survey area

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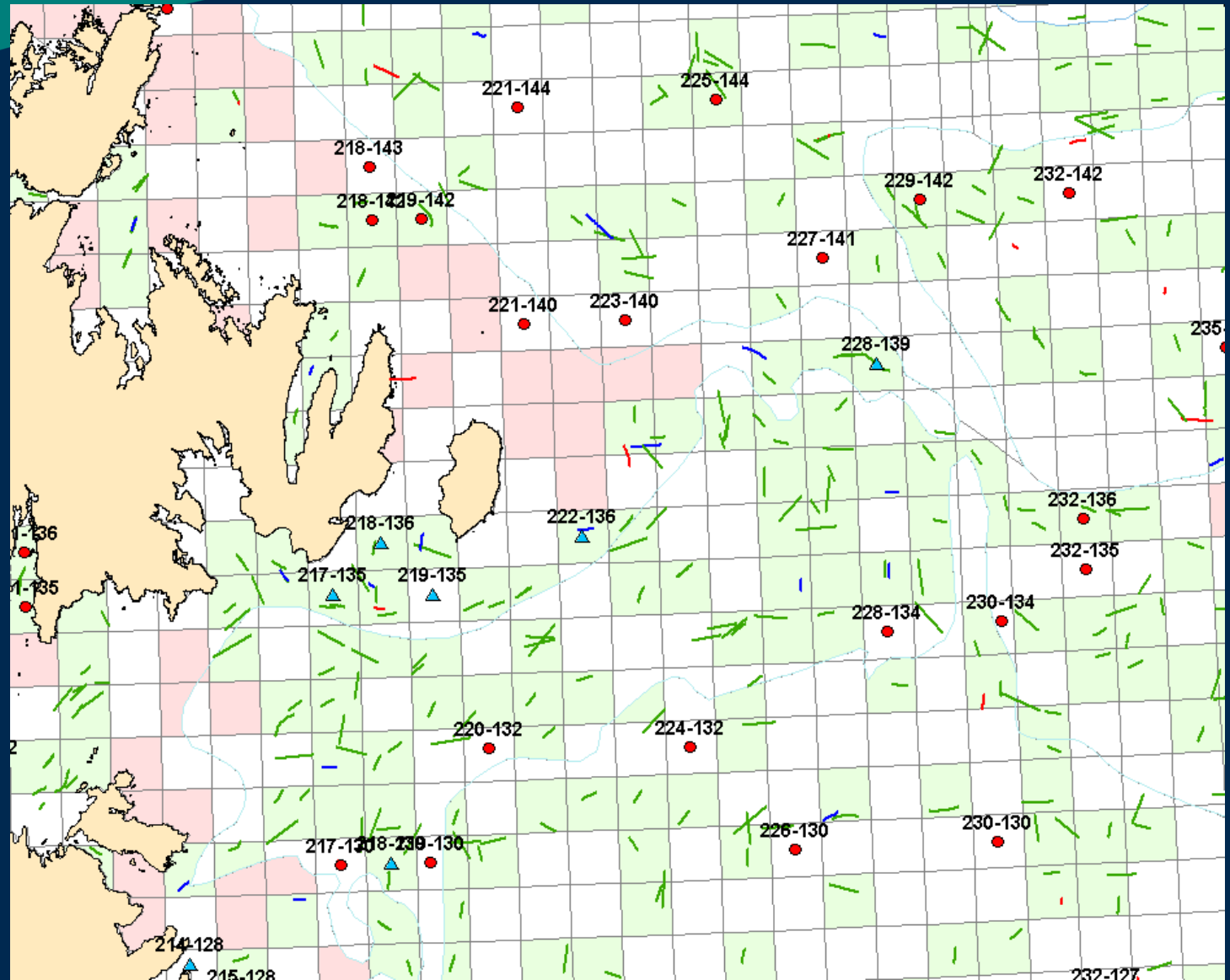


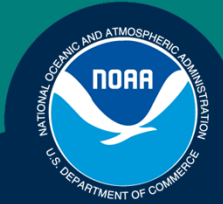
GOA Trawlable Habitat





Overlaid 5x5 km grids = stations





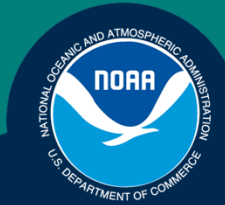
Trawling Procedures (2005 National Protocols)

Primary Goal

- To ensure that the trawl is in fishing configuration (height and width) when it makes bottom contact
- To ensure that the proper trawl warp length (from the scope table) is used
- To ensure that the procedure is easily repeatable

Secondary Goal

To ensure that the trawl reaches bottom quickly to minimize the midwater catch



Trawling Procedures

Towing

- To maintain the trawl in fishing configuration (height and width at a continuous towing speed of 3 knots)

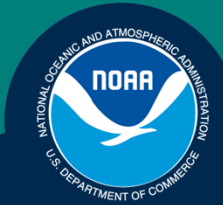
Haulback

- To maintain the trawl in fishing configuration until it leaves bottom
- To ensure that the net leaves bottom quickly to avoid changes in fishing configuration due to decreased scope and changes in net spread over ground (usually requires an increase in RPM)
- To ensure that the procedure is easily repeatable



Successful Tows

- Daylight hours
- 2.8 to 3.2 knots
- Footrope on bottom
- No significant tears
- 10 minutes or greater
- Net always making forward progression
- Less than 20 m depth change
- No gear conflicts



Poly Nor'eastern Net Characteristics

- 12.7 cm mesh with
- 3.2 cm liner
- 4 seams/panels
- 3 bridles
- 36 cm bobbins
- 10 disks
- Net width 8 to 20 m
- Height ~ 7 m





Mensuration



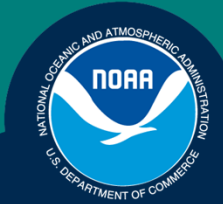
- Spread Sensors at the wings
- Height Sensor at center headrope
- Bathythermograph on headrope (gear depth)
- Bottom Contact Sensor on Footrope (on/off bottom)
- GPS integrated wheelhouse program
- Separate Navigation Software (Globe)

Catch Processing



- All living specimens are sorted to lowest possible taxon, weighed and counted
- Sub-sampling at various levels of catch and specimen numbers





Data Processing

- At Sea Data Checks
- Import to Oracle Tables
- GIDES-QA/QC system
- Effort Review
- Data Finalization
- Abundance Estimation and other products
- Data and Estimates Made Available
 - Oracle Tables
 - AFSC website (survey data only)
 - AKFIN
 - Tech Memos

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Survey-based Estimator -Area Swept Technique

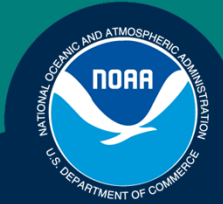
For each Haul:

$$\text{CPUE} = \text{Catch} / \text{Area Swept}$$

For each Stratum:

$$\text{Abundance} = \text{mean (CPUE)} \times \text{Stratum Area}$$

$$\text{Var}(\text{Abundance}) = \text{Var}(\text{CPUE}) \times \text{Stratum Area}^2$$



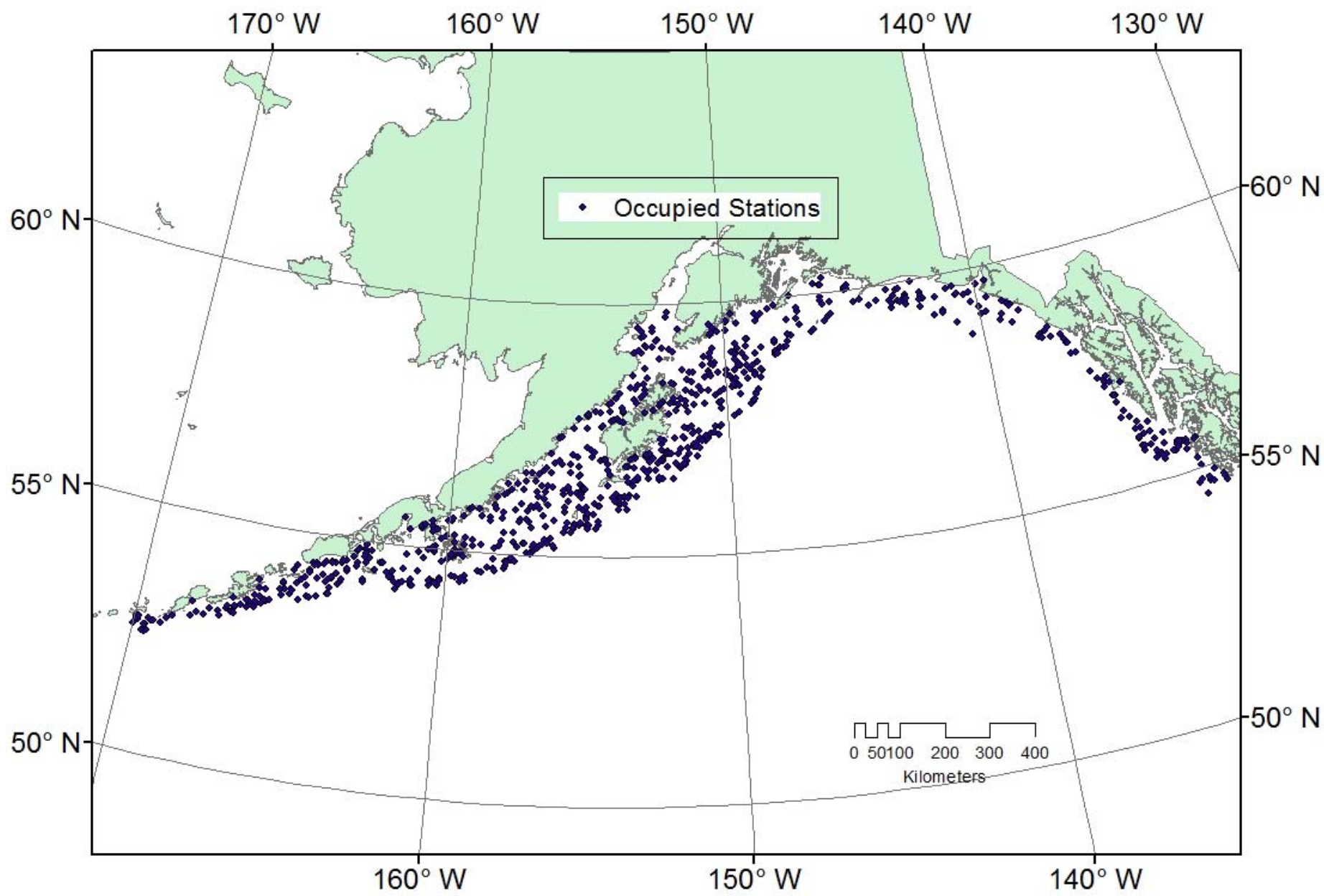
What's Old, What's New

•Old

- Polycorders
- Ichthysticks
- Continue collaboration with other FSC

•New

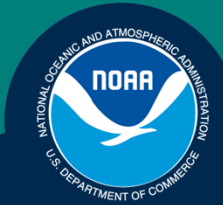
- New boat
- Two test tows
- Random otoliths
- 1-3 Observers on each vessel-leg





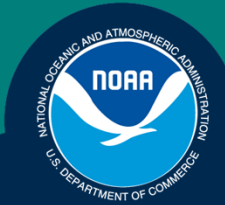
2015 GOA Stations (Preliminary)

Planned	800
Attempted	836
Successful	771



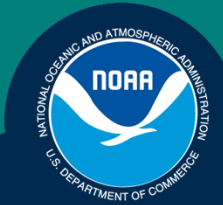
2015 GOA Stations- Geographic Coverage

Area	Planned	Successful
Shumagins	191	190
Chirikof	179	179
Kodiak	259	256
Yakutat	100	79
Southeast	71	67
Total	800	771

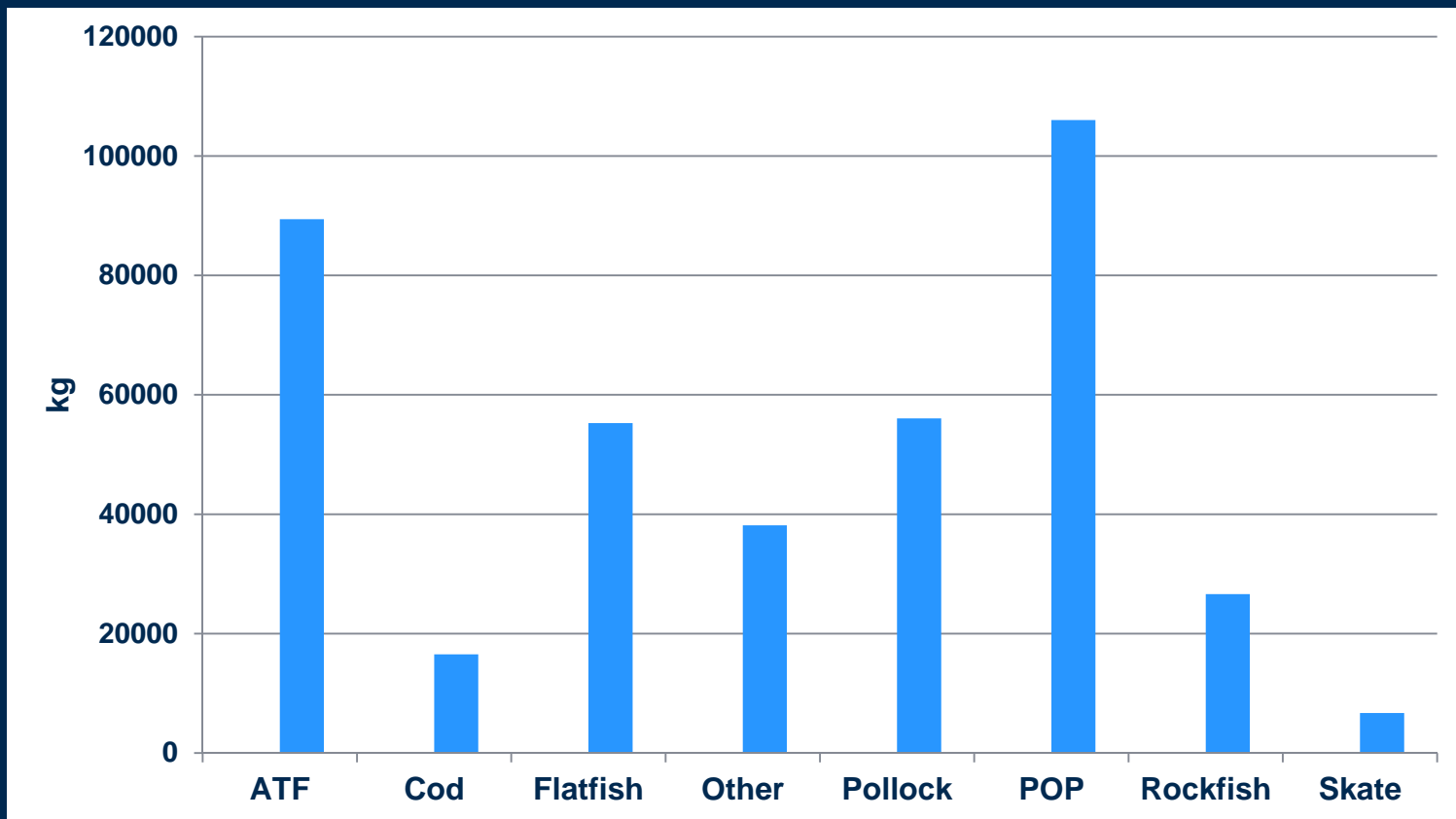


2015 GOA Stations- Depth Coverage

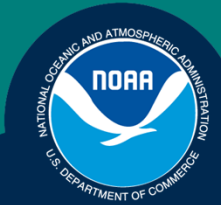
Depth (m)	Planned	Successful
0-100	285	280
101-200	332	321
201-300	115	107
301-500	40	36
501-700	15	15
701-1000	13	12
Total	800	771



2015 GOA Catch Composition



2015 Otolith Collections



REFM	Species	Vessel	Realized 2015	
			All Vessels	Predicted Sum
	Walleye pollock	Sea Storm	1193	1000
	Arrowtooth flounder	Sea Storm	834	850
	Flathead sole	Sea Storm & CF	700	800
	Dover sole	Sea Storm & AP	741	600
	Rex sole	Cape Flattery	234	500
	Northern rock sole	Sea Storm	462	400
	Southern rock sole	Cape Flattery	399	400
	Atka mackerel	All vessels	417	300
	Pacific cod	Cape Flattery	776	800
	ABL			
	Shortspine thornyhead	Alaska Provider	717	600
	Sablefish	All	1076	500
	Rougheye rockfish	Alaska Provider & CF	455	500
	Blackspotted rockfish	Alaska Provider & CF	596	450
	Pacific ocean perch	Cape Flattery	1143	1000
	Northern rockfish	Sea Storm & AP	630	800
	Shortraker rockfish	Alaska Provider	355	400
	Dusky rockfish	Sea Storm & AP	950	800
	Harlequin rockfish	Sea Storm & AP	284	460
	Silvergray rockfish	All	944	600
		Total	12906	11760
		No species	19	19

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2015 Special Projects

Trophic Interactions (Aydin)

rockfish genetics (Heifetz)

Light Meters (Kotwicki)

big skate butchering (Ormseth)

longnose skate butchering (Ormseth)

Halibut Tagging (Sadorus)

Rockfish ovaries (TenBrink)

shark genetics (Tribuzio)

Fall Fisherman Festival (Conner)

image capture (palsson)

Acoustic Data Collection (Rooper)

pH & Oxygen (Rooper)

Observer Training Collection (Stevenson)

coral taxonomy (Berntson)

fish vision (Britt)

catch processing methods (Laman)

skate taxonomy (Orr)

snailfish vouchers (Orr)

snailfish (melanurus) taxonomy (Orr)

rocksole (palsson)

warm event (palsson)

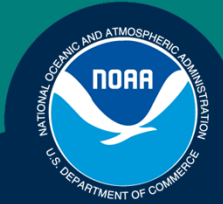
Kam/ATF genetics (paquin)

acoustic data collection (von Szalay)

GOA bathymetry (Zimmermann)

gastropod taxonomy (Clark)

Osteology of fish (Lubinski)



Results Schedule

- This week-Data Finalization
- Monday-Produce Estimates
- Tuesday-Export to AKFIN
- Wednesday-Available?



