

Alaska Regional Initiative (2012–2015)



**NOAA
FISHERIES**

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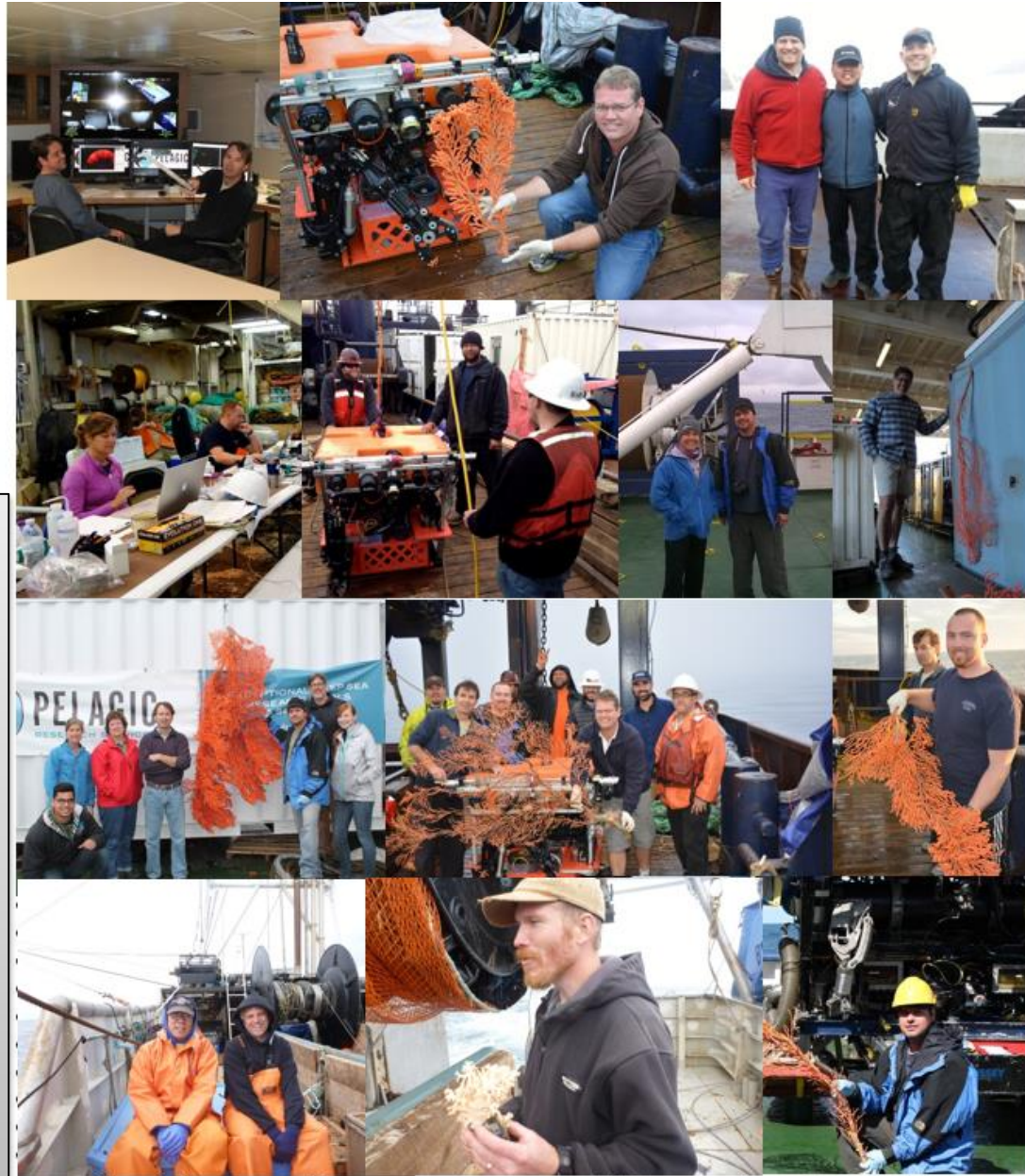
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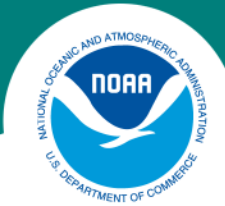
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NOAA's Deep-Sea Coral Research and Technology Program

NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems

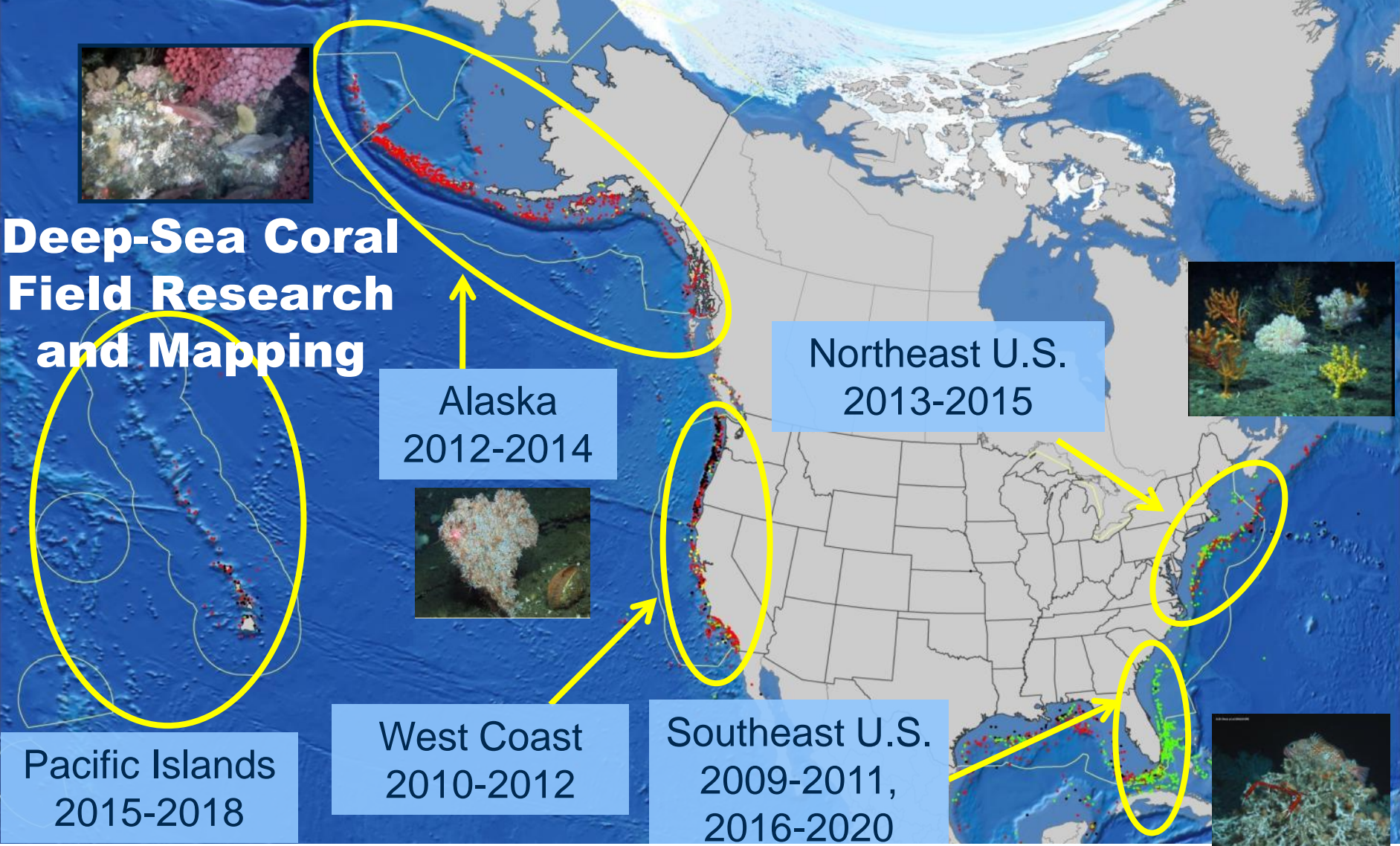
Research, Management, and International Cooperation



Goal:
Improve the understanding,
conservation, and management
of deep-sea coral and sponge
ecosystems

- Exploration and Research
- Conservation and Management
- International Cooperation

Deep-Sea Coral Field Research and Mapping



● Stony Coral ● Gorgonian ● Black Coral ● Gold Coral ● Lace Coral

Structure-Forming Deep-Sea Corals of the U.S.

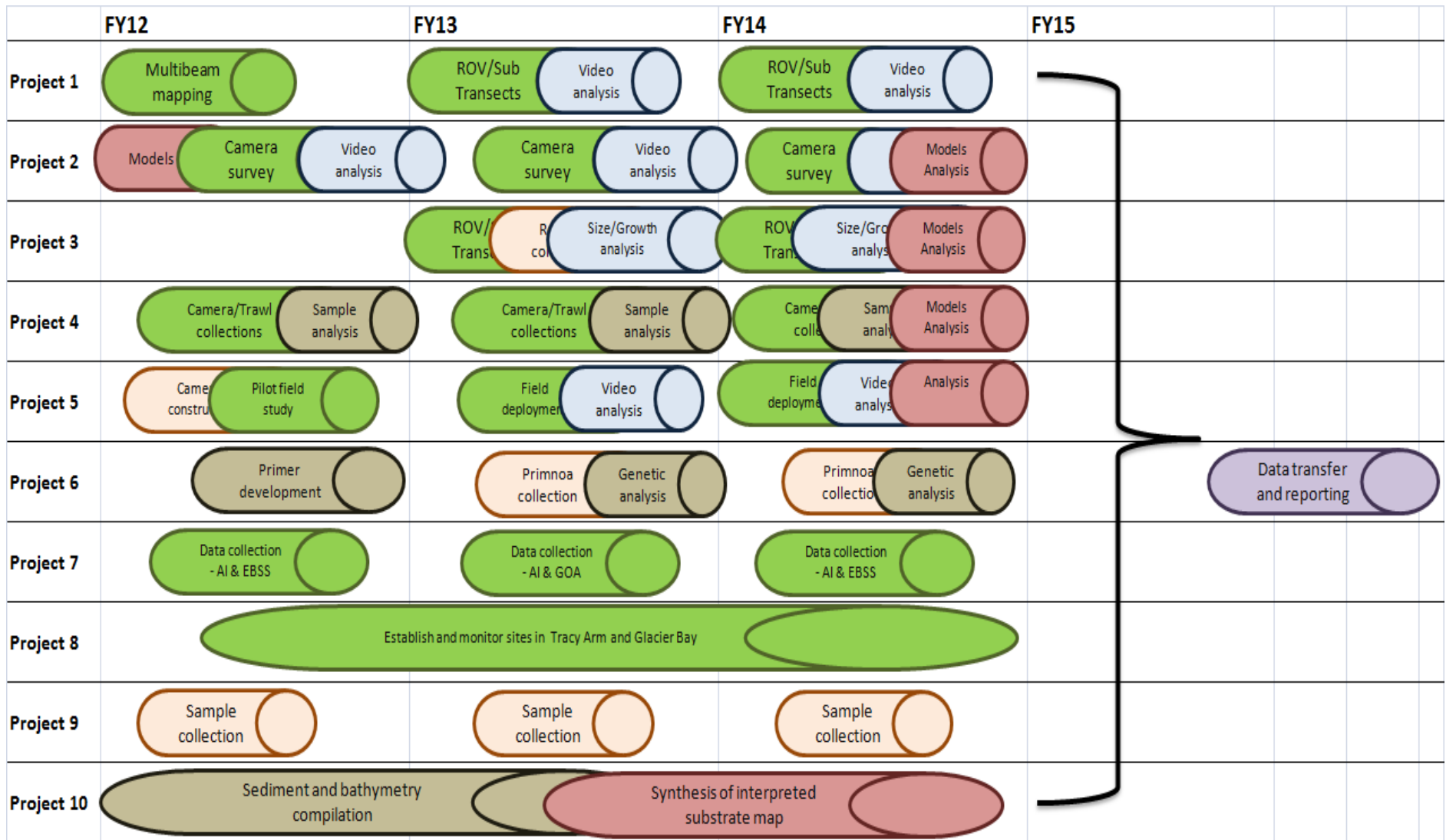
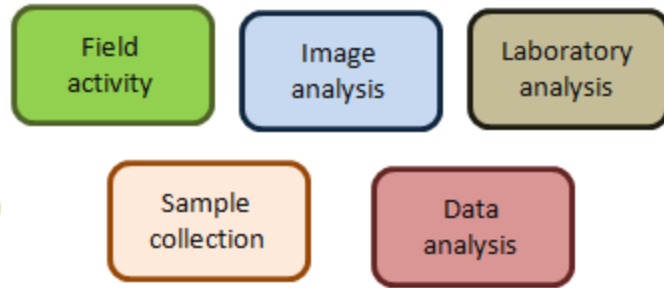


Objectives of the Alaska Initiative

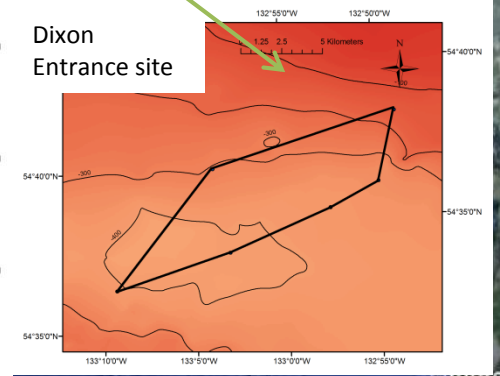
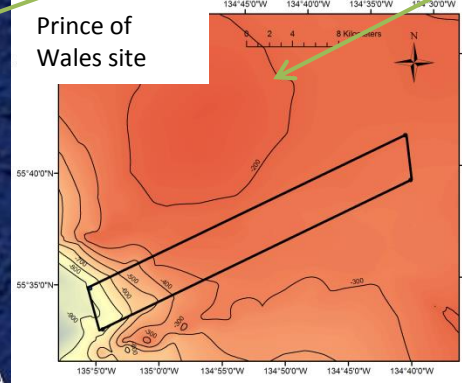
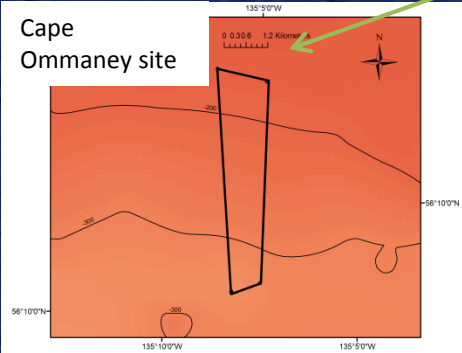
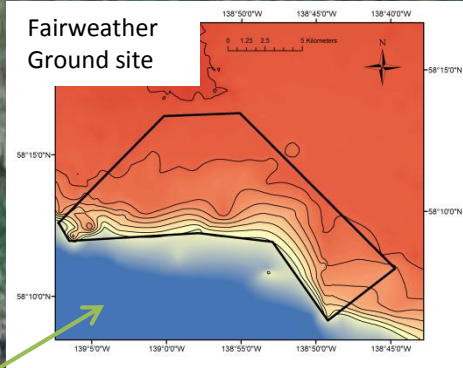
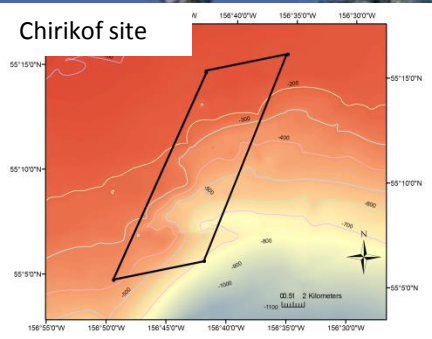
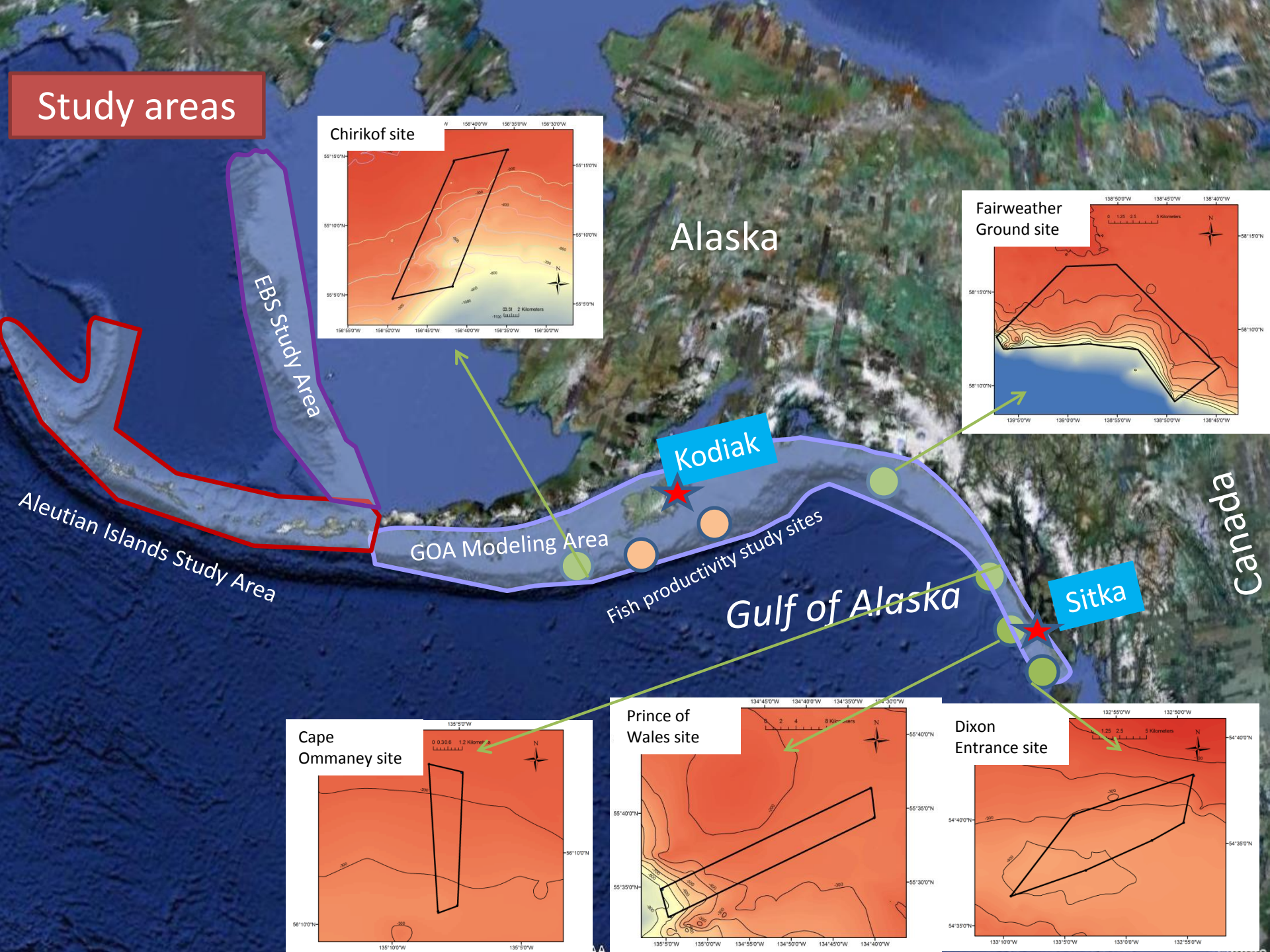
- Maps of distribution, abundance and diversity of sponge and coral
- Habitat and substrate maps
- Associations with FMP species and contribution to fisheries production
- Impacts of by gear type and modifications to reduce impacts
- Recovery and recruitment rates
- Long-term monitoring program for climate change & ocean acidification

AK Initiative Timeline

3 – Year Science Plan (Nov 2011)



Study areas

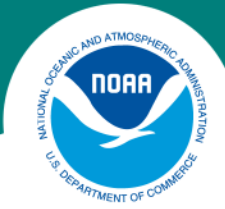


Summary of Work to Date

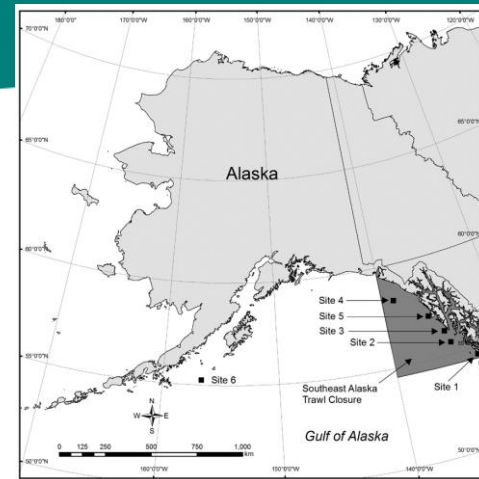
- 3 major field programs
- 12 associated analyses
- Some projects were piggy-backed onto vessels/cruises of opportunity
- Generally, lab analyses have been completed
- Image analyses mostly complete
- Products on track to be delivered for all 10 projects
- Integrated into 2015 EFH review and other management processes where possible

Research Highlights





Primnoa distribution in SE AK



Objective:

Identify and map thickets of *Primnoa* corals

Method:

Multibeam mapping with ROV and camera surveys

Platform for multiple other studies

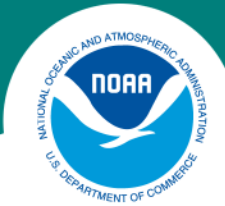
Result:

Expanded the known range of *Primnoa* thickets in 2 of 5 areas

Observed evidence of coral degradation in Dixon Entrance

Observations of corals at 2 previously undocumented sites (no new thickets)





Modeling coral and sponge distribution



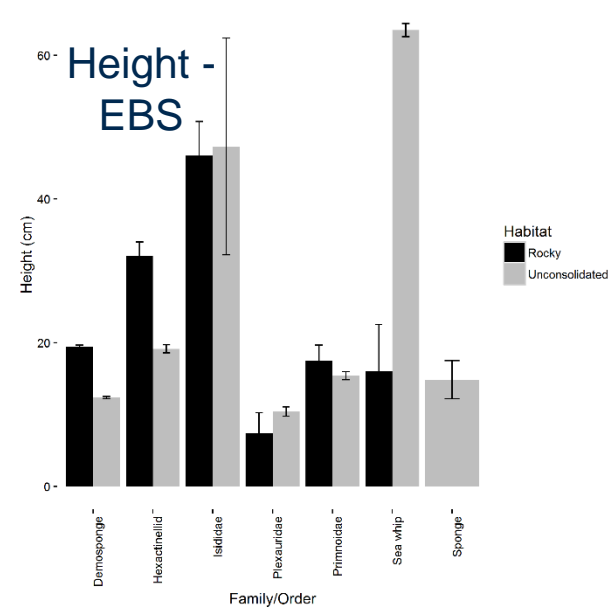
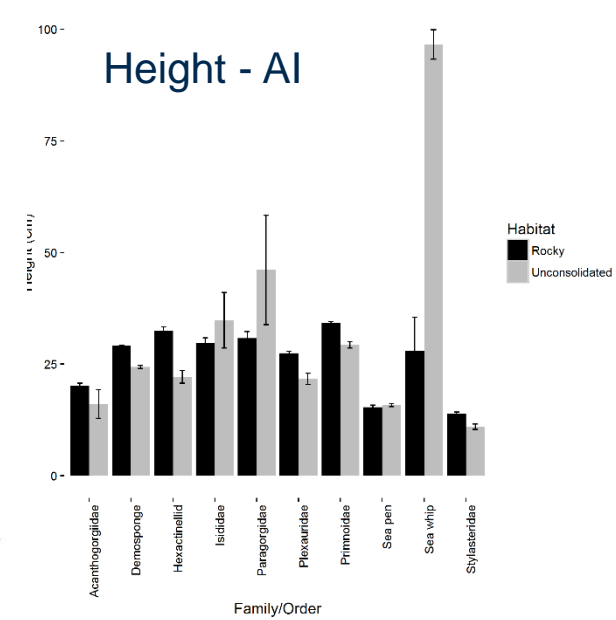
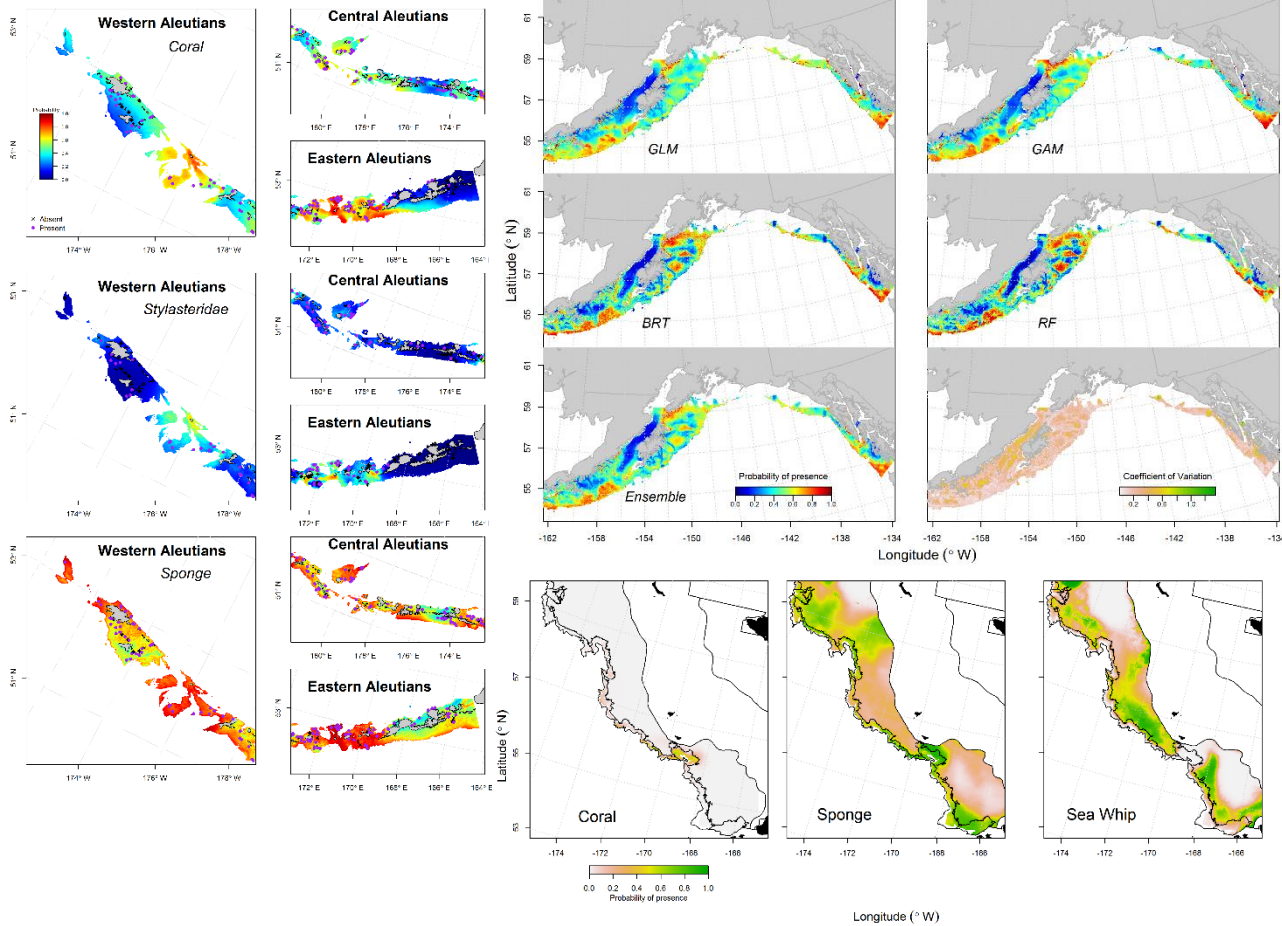
Objective: Predict and groundtruth the distribution and areas of high abundance and diversity of deep-sea corals and sponges

Area covered: Gulf of Alaska, EBS slope and shelf & Aleutian Islands

Results: Predictive models developed for all regions based on bottom trawl survey data

Groundtruthing conducted in AI and EBS*

Bonus: Spin-offs to fish association project, bottom typing, EFH, etc. Further development of new stereo video technology and analysis software (now in nationwide use)



- n = 466 transects in AI and EBS
- Size structure for corals and sponges
- Validated distribution models and density models
- On 1 ha grid
- All data published and available from DSC web portal
- Analyses ongoing

Rockfish production in coral habitat

Objective: Compare production measures of rockfish species inside/outside coral habitat

Method: Stereo imaging, semipelagic net, lab work

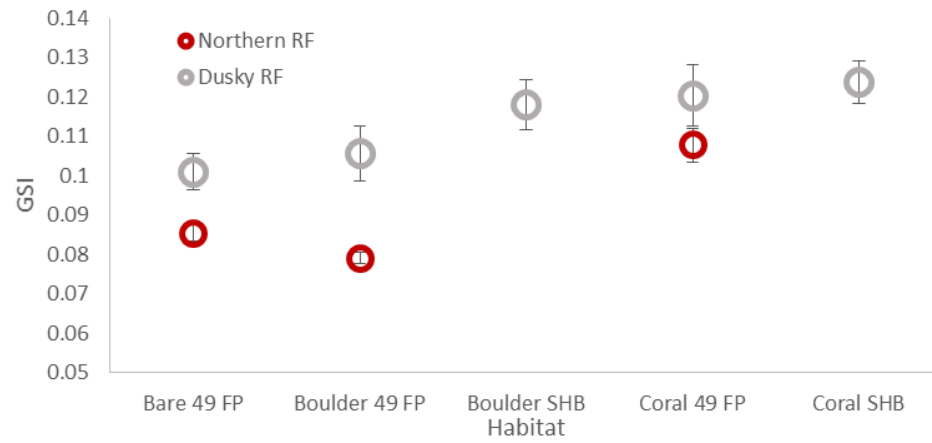
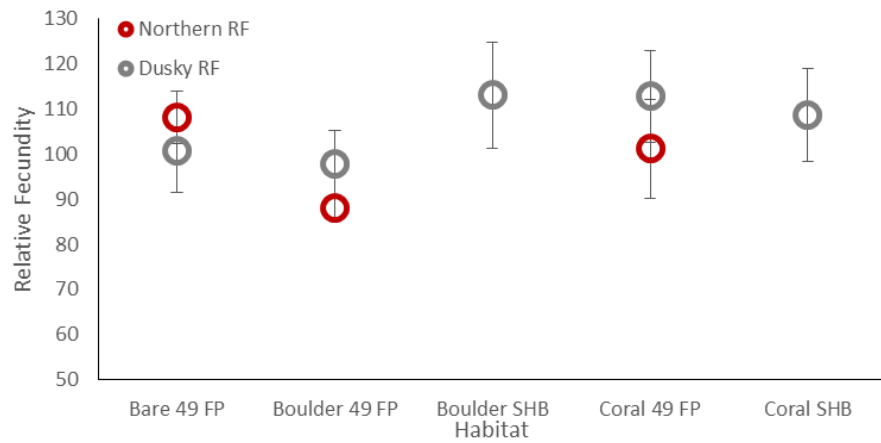
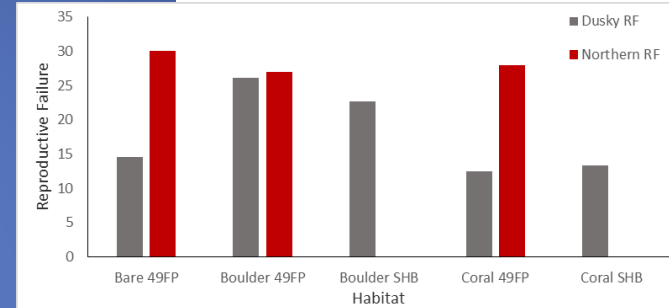
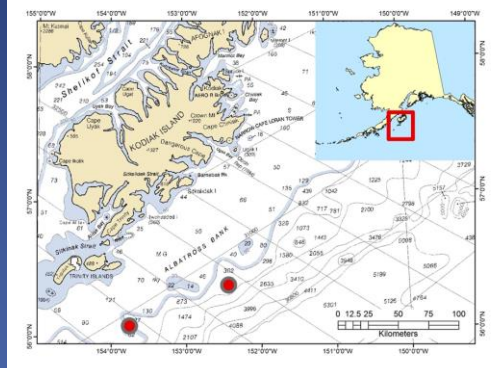
Results: Densities higher in coral and rocky habitat

Fecundity higher in coral habitat

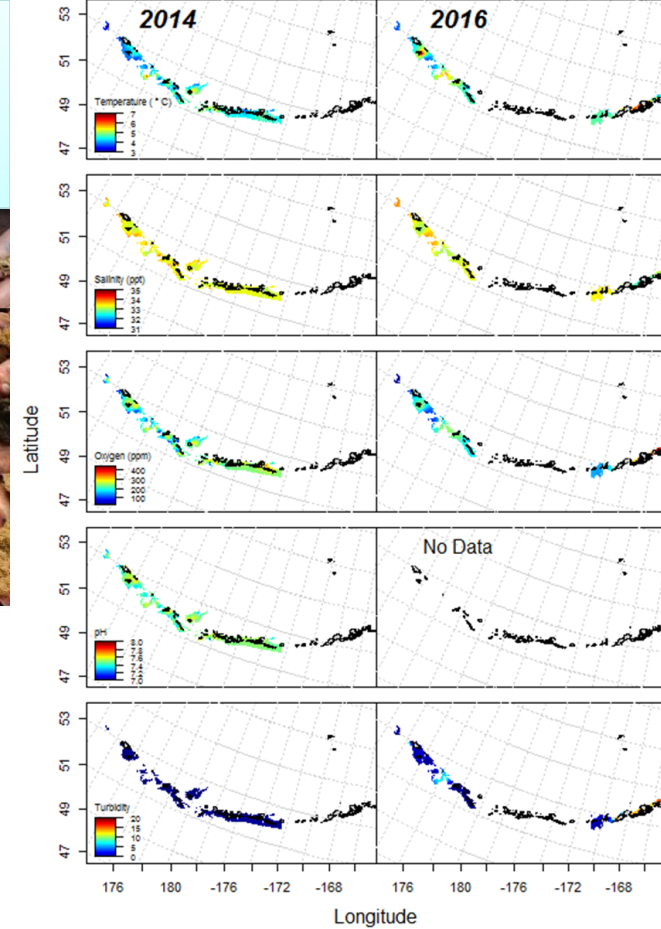
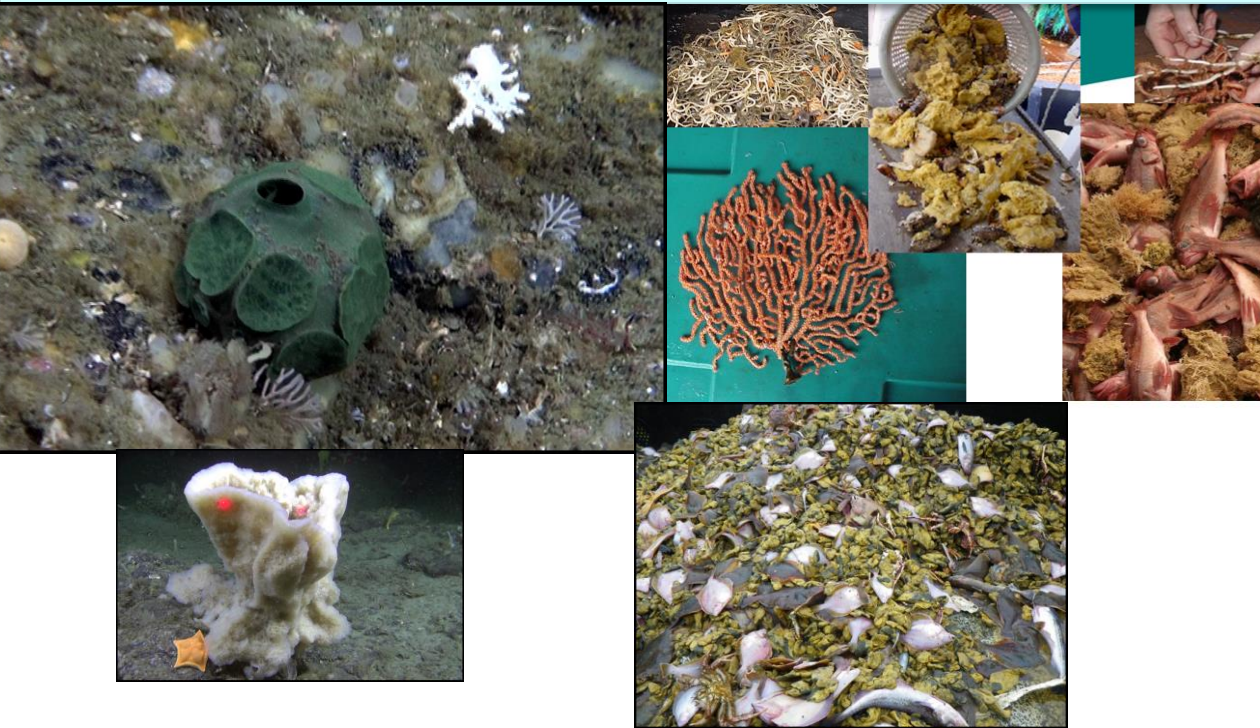
Energy content was higher in coral and rocky habitat

Outside funding to do seasonal cruises (NPRB & AFSC/AKRO-HEPR)

Area for further research



Improving coral & sponge taxonomy & specimen collections



Collections from ROV study and bottom trawl surveys

- 23 species of sponges described (plus many range and depth extensions)
- Biomedical research on *Latrunculia austini*
- Genetics samples for population studies on *Primnoa pacifica*
- Growth, reproduction and feeding ecology studies on *Primnoa pacifica*
- New O₂, salinity, pH time series in the AI and GOA (reported in Eco. Cons.)

Applications (to date)

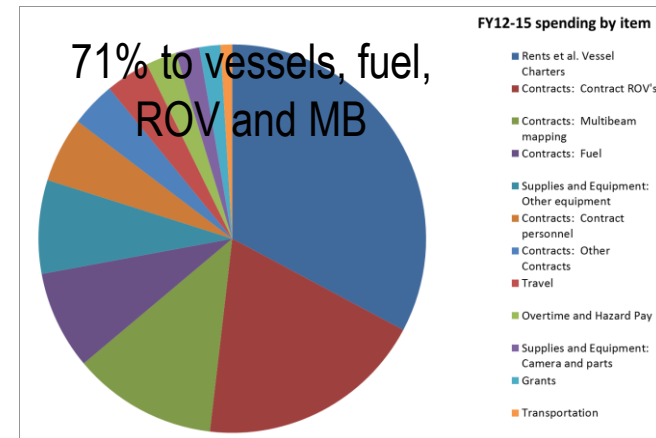
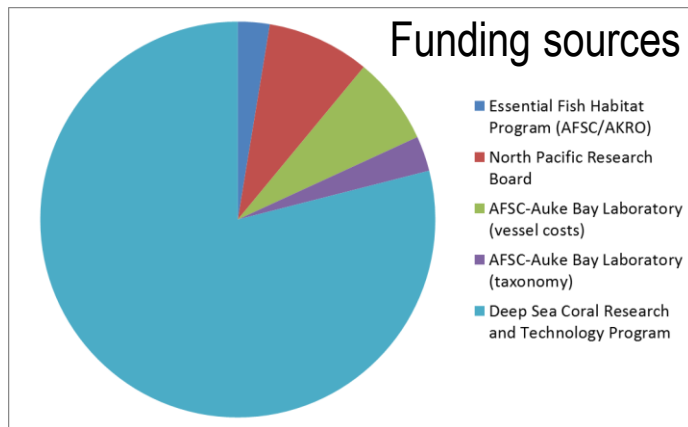
- Sediment/bathy/models used in EFH revisions
- Monitoring data used in Ecosystem Considerations chapter of SAFE
- Coral data incorporated into AI Integrated Ecosystem Assessment
- 18 publications in review, press or published
- Incorporation of analyses and data into NPFMC decision on EBS canyons
- **Final report submitted – December 2016, available at https://deapseacoraldata.noaa.gov/library/NOAA-DSCRTP_OHC2017TM_AK-DSC-InitiativeReport.pdf**

Progress on NPFMC Research Priorities

ResearchID	Title	Council/SSC Priority
183	Research the role of habitat in population dynamics and ecosystem processes	Important
190	Collect and maintain time series of ocean pH	Critical Ongoing Monitoring
235	Investigate gear modifications and changes in fishing practices to reduce bycatch and PSC	Urgent
237	Improved habitat maps	Important
238	Develop a GIS relational database for habitat, to include a historical time series of the spatial intensity of interactions between commercial fisheries and habitat.	Strategic
239	Assess the extent of the distribution of corals	Urgent
244	Collect and maintain time-series data on the community composition, production and biomass of benthic invertebrate and vertebrate fauna	Strategic
184	Evaluate efficacy of habitat closure areas and habitat recovery	Important
216	Assess whether Bering Sea canyons are habitats of particular concern	Important
217	Impact of fisheries on benthic habitat and trophic interactions	Urgent

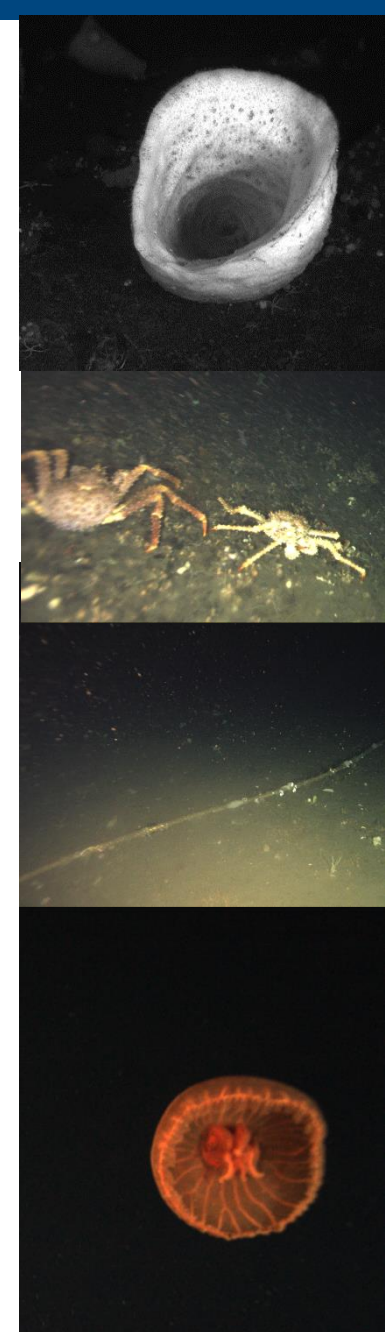
Challenges and Opportunities

- Logistically challenging
 - Ship time not available in AK
 - Short weather window
- Temporary influx of large amount of funding
 - Late funding arrival in FY (Government shutdown)
 - Integrated into existing AFSC programs (at a relatively low priority)
 - Need to hire full time project administrator
- Opportunities
 - 3-year program made it feasible to plan longer term
 - Able to leverage funding from other sources
 - Well defined research questions (NPFMC, HEPR, EFH-EIS)



Future Plans and Priorities

- Field validation of Gulf of Alaska distribution models
- **Assessment of the effectiveness of current fishing closures/spatial management**
- **Population assessment for major corals in each region**
- Longline and pot gear impacts rates for coral and sponge
- **Further research on fish productivity in coral/sponge ecosystems**
- Research in the Arctic?
- Construct benthic habitat maps



EXTRA SLIDES

Small Projects – 12 from FY10-17

Basis for regional fieldwork

- FY09 - A Field Guide to the Deepwater Sponges of the Aleutian Islands Archipelago
- FY11 07 - Data Mining to Support Deep-Sea Coral and Sponge Research in Alaska
- FY12 03 - Predicting Tidal Currents for the Aleutian Islands and Gulf of Alaska
- FY12 02 – Support for Predictive Habitat Modeling for Alaska’s Deep-Sea Coral and Sponge Resources

Seeded by regional fieldwork

- FY16-07 Analyses to assess habitat associations for rockfish and coral, summarize new research on Bowers Bank and Ridge and create a story map for the eastern Bering Sea Canyons

Stand-alone

- FY11 02 - Assessing the Effectiveness of the Aleutian Islands Habitat Conservation Area in Protecting Deep-Sea Coral and Sponge Habitat
- FY12 01 - Assessment of Coral Bycatch from the Alaska Groundfish Trawl Fleet in Collaboration with the North Pacific Fisheries Observer Program
- FY14 01 - Exploring off-bottom trawling and other approaches to avoid interactions with structure-forming invertebrates during Pacific Ocean perch fishing on the Bering Sea slope
- FY15 01 - Summit on role of deep-sea corals and sponges as habitat on West Coast and in Alaska
- FY16-06 - Coral and Sponge Diversity in the eastern Bering Sea of Alaska
- FY16-08 - Extended analyses of deep-sea corals and sponges from past AFSC surveys
- Genetics of Deep-Sea Corals - Taxonomic and Genetic Identification of Fisheries Bycatch of Deep-Sea Corals

Initiative Operation

Things that work

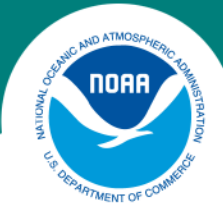
- Multi-year funding was great for designing and accomplishing projects
- Small projects can keep continuity between initiatives and assist in prep work in off-years
- Small projects have also been critical for data mining
- Data portal is being used and is very informative

Suggestions

- Some funding in 2nd Quarter
- Priority on vessel time
- 4th year of synthesis at lower cost?

Operations

	YEAR (DAYS AT SEA)	MB MAP	VESSEL	DIVES			REPORTS	
Project (Location)				NUMBER	ANNOTATION	SUMMARY	CRUISE	SITE CHAR
Southeast Alaska Primnoa study	2012 (12)	573 km ²	R/V Pacific Star				Y	Y
	2013 (14)		F/V Alaska Provider	13 (ROV)	Y	Y	Y	N
	2013 (5)		R/V Medeia	10 (SDC)	Y	Y	Y	N
	2015 (10)		R/V Dorado Discovery	11 (ROV)	N	Y	Y	N
Aleutian Islands mapping study	2012 (15)		F/V Sea Storm	106 (SDC)	Y	Y	Y	Y
	2014 (25)		F/V Alaska Endeavor	110 (SDC)	Y	Y	Y	Y
Gulf of Alaska fish productivity study	2012 (6)		F/V Pacific Storm	19 (SDC)	Y	Y	Y	Y
	2014 (7)		F/V Gold Rush	19 (SDC)	Y	Y	Y	Y
	2014 (8)		F/V Gold Rush	2 (SDC)	Y	Y	Y	Y
TOTAL	102	573		290				



Project 5: Gear impacts on habitat

Objective: Measure potential area swept by longline and pot gear

Method: Stereo camera and inertial instrumentation of gear during fishing operations

Result: Prototypes built and 14 successful deployments of camera
Accelerometer data from 72 units (6 locations on 12 deployments)

Issues: Accelerometer data was very noisy
Camera often tangled and images unusable
Analyses ongoing, but needs work

