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Observations on Fish Larvae Collected During GOA-IERP Cruises in 2011

NOAA FISHERIES

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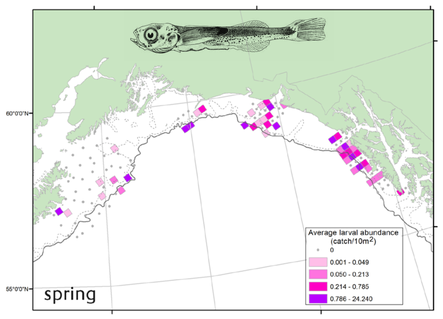
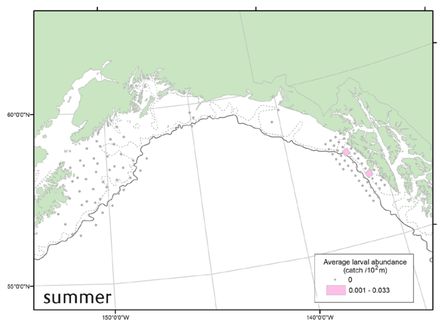
Larval Collections 2011: All five taxa were collected in spring, but only rockfish and sablefish were present in summer.

Sablefish

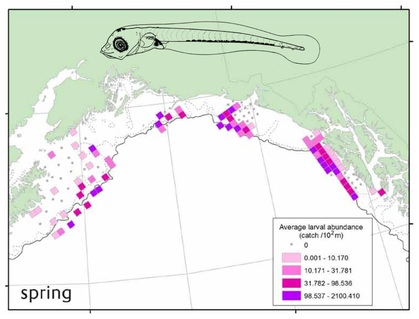
Larvae were found in spring throughout the GOA. Greater abundances were observed on the eastern side with most larvae occurring at the shelf break. Larvae were collected in summer only in the eastern GOA and at very low abundances.

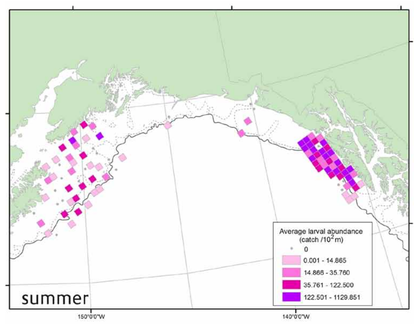




Rockfish

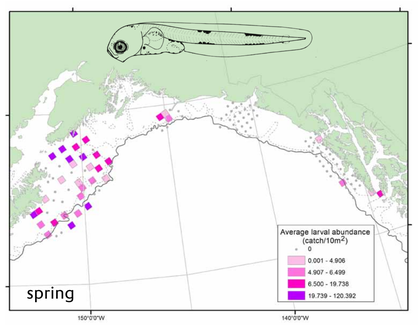
Rockfish were ubiquitous and frequently encountered throughout the study area. Most rockfish larvae were collected in spring in deep water; those found in summer were collected mainly on the shelf.





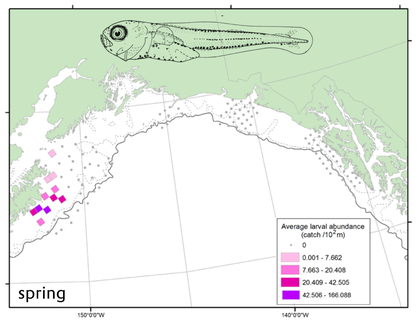
Walleye Pollock

Collected only in spring, few walleye pollock were found in the eastern GOA. Larvae collected in the western GOA were distributed over the shelf and shelf break.



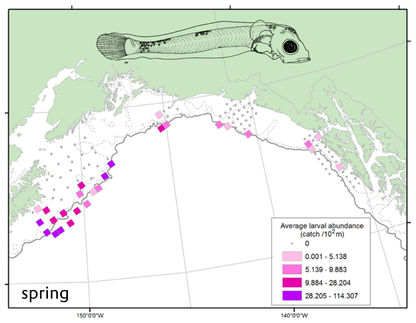
Pacific Cod

Pacific cod were found at the westernmost stations in the western GOA in spring. No larvae were collected in the eastern GOA.



Arrowtooth Flounder

Arrowtooth flounder larvae were collected in spring mostly along the shelf break and in deep water. Greater abundances were observed in the western GOA.



West Summer 2011 (2-21 August)

- Rockfish was the only taxon collected.
- Rockfish larvae were collected mostly on the shelf.

East Summer 2011 (3-17 July)

Of the five target taxa, only larvae of rockfish and sablefish were collected.

East Spring 2011 (30 April-21 May)

- Rockfish were the most abundant larvae, with the majority collected in deep water.
- Highest abundance of sablefish larvae was observed in the neuston layer at the shelf break.
- Low numbers of arrowtooth flounder were collected in deep water.
- Larvae of walleye pollock were rare and Pacific cod were absent.

West Spring 2011 (26 April-11 May)

- All five target taxa were collected.
- More rockfish larvae were collected near the shelf break than on the shelf.
- Pacific cod were found only during this time period and location at westernmost stations on the shelf.

Emerging Questions

Was 2011 unusual in terms of timing of spawning and subsequent development rates of larvae?

- Could timing of spawning explain differences in the genetic results of the percentage of POP in 2010 vs 2011?

How do taxonomic composition, levels of abundance among species, larval sizes and distribution patterns from the eastern GOA compare with the western GOA?

- Why do the larvae of deep spawning taxa appear to have more contiguous distribution than shallow spawning taxa?
- Where are the gadid larvae in the EGOA?

Are the areas of high concentrations of target taxa larvae found in areas of unique physics?

- How do the physics in these areas explain patterns of distribution and abundance?

Ranked Frequency of Occurrence (FO) of top 20 taxa in the western and eastern Gulf of Alaska (GOA).

WESTERN GOA

Spring		Summer	
Taxa	Percent FO	Taxa	Percent FO
Hexagrammos decagrammus	80.85	***Sebastes* spp.**	**69.81**
Stenobrachius leucopsarus	71.74	*Bathymaster* spp.	20.75
Theragra chalcogramma	**60.87**	*Artedius harringtoni*	16.98
***Sebastes* spp.**	**56.52**	*Mallotus villosus*	16.98
Ammodytes hexapterus	43.48	*Lepidopsetta bilineata*	15.09
Atheresthes stomias	**36.96**	*Stenobrachius leucopsarus*	15.09
Icelinus spp.	32.61	*Hexagrammos octogrammus*	14.55
Bathyagonus alascanus	30.43	*Sebastolobus* spp.	9.43
Lepidopsetta polyxystra	28.26	*Protomyctophum thompsoni*	5.66
Lumpenus maculatus	26.09	*Ronquilus jordani*	5.66
Cryptacanthodes aleutensis	25.53	*Ruscarius meanyi*	5.66
Bathylagus pacificus	23.91	*Liparis fucensis*	3.77
Gadus macrocephalus	**23.91**	*Liparis mucosus*	3.77
Hippoglossoides elassodon	21.74	*Mallotus villosus*	3.64
Hippoglossus stenolepis	21.74	*Coryphaenoides acrolepis*	1.89
Hemilepidotus hemilepidotus	21.28	*Glyptocephalus zachirus*	1.89
Hexagrammos lagocephalus	19.15	*Isopsetta isolepis*	1.89
Ophiodon elongatus	19.15	*Limanda proboscidea*	1.89
Anoplopoma fimbria	**17.02**	*Liparis* spp.	1.89
Anoplarchus insignis	15.22	*Osmeridae*	1.89

Names of target taxa bolded.

Stenobrachius leucopsarus

Hexagrammos decagrammus

Ophiodon elongatus

Bathyagonus alascanus

Liparis fucensis

Glyptocephalus zachirus

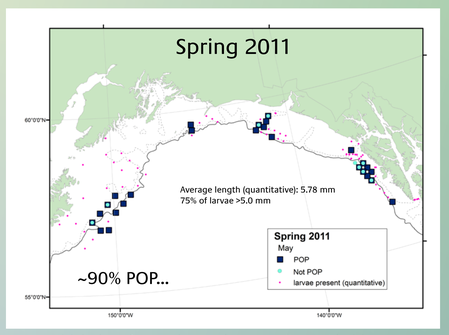
Lepidopsetta bilineata

EASTERN GOA

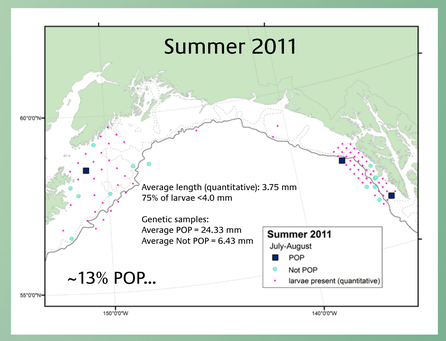
Spring		Summer	
Taxa	Percent FO	Taxa	Percent FO
Stenobrachius leucopsarus	68.42	***Sebastes* spp.**	**89.80**
***Sebastes* spp.**	**52.63**	*Stenobrachius leucopsarus*	53.06
Anoplopoma fimbria	**37.07**	*Liparis fucensis*	16.33
Hexagrammos decagrammus	30.17	*Artedius harringtoni*	8.16
Liparis fucensis	19.30	*Radulinus asprellus*	8.16
Bathylagus pacificus	16.67	*Glyptocephalus zachirus*	6.12
Leuroglossus schmidti	15.79	*Leuroglossus schmidti*	6.12
Cryptacanthodes aleutensis	15.52	*Bathylagus pacificus*	4.08
Hemilepidotus spinosus	13.79	*Liparis mucosus*	4.08
Ophiodon elongatus	12.93	*Mallotus villosus*	4.08
Hexagrammos lagocephalus	12.07	*Ruscarius meanyi*	4.08
Poroclinus rothrocki	11.40	***Anoplopoma fimbria***	**3.85**
Ammodytes hexapterus	10.53	*Icelinus* spp.	2.04
Bathyagonus alascanus	9.65	*Lepidopsetta bilineata*	2.04
Atheresthes stomias	**8.77**	*Malacocottus zonurus*	2.04
Protomyctophum thompsoni	8.77	*Myctophidae*	2.04
Clupea pallasi	6.14	*Paricelinus hopliticus*	2.04
Cryptacanthodes aleutensis	6.14	*Protomyctophum thompsoni*	2.04
Theragra chalcogramma	**6.14**	*Radulinus boleoides*	2.04
Zaprora silenus	6.14	*Scorpaenichthys marmoratus*	2.04

Names of target taxa bolded.

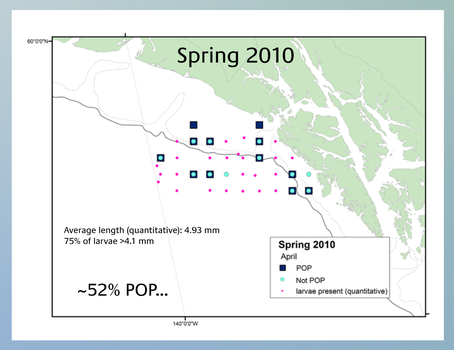
Do the genetic results solve the larval rockfish identification problem?



- Majority of genetic specimens collected in May were identified as POP.



- Average size of rockfish larvae collected was smaller than in spring. Only a few large specimens (>15 mm) were collected.
- From the genetic results, smaller specimens (<15 mm) were Not POP, while larger specimens (>15 mm) were POP.



- Sampled one month earlier than 2011.

Emerging Questions

How do the genetic identification results for the spring and summer relate to larval rockfish distribution patterns?

Do we have enough genetic information to make assumptions about rockfish identification?

- Many stations where rockfish larvae were collected in the quantitative sample were not sampled for genetics. Could more genetic samples representing a greater size range help solve the identification problem?

Can we call the rockfish larvae collected in spring POP?

Additional Samples for Analysis

In the summer of 2012, F/V *Northwest Explorer* collected 65 bongo samples in the southeast and 61 bongo samples in the western GOA. Estimated completion: Fall 2013.

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