Building Early Ontogeny Pelagic Exposure Profiles for GOA-IERP Species based on Historical Ichthyoplankton Data—Sablefish

Miriam Doyle Joint Institute for the Study of the Atmosphere and Ocean, College of the Environment, University of Washington, Seattle, WA
Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Seattle, WA

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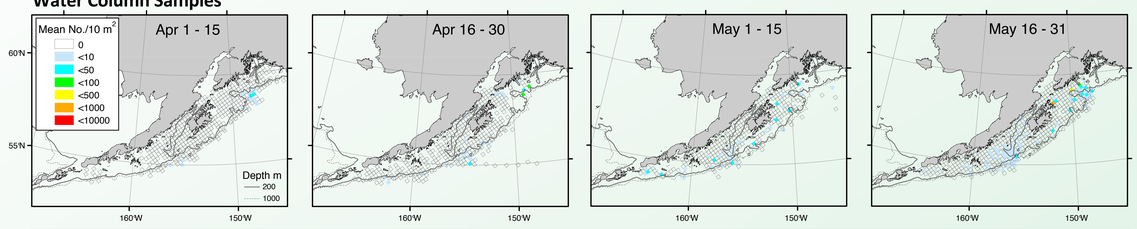
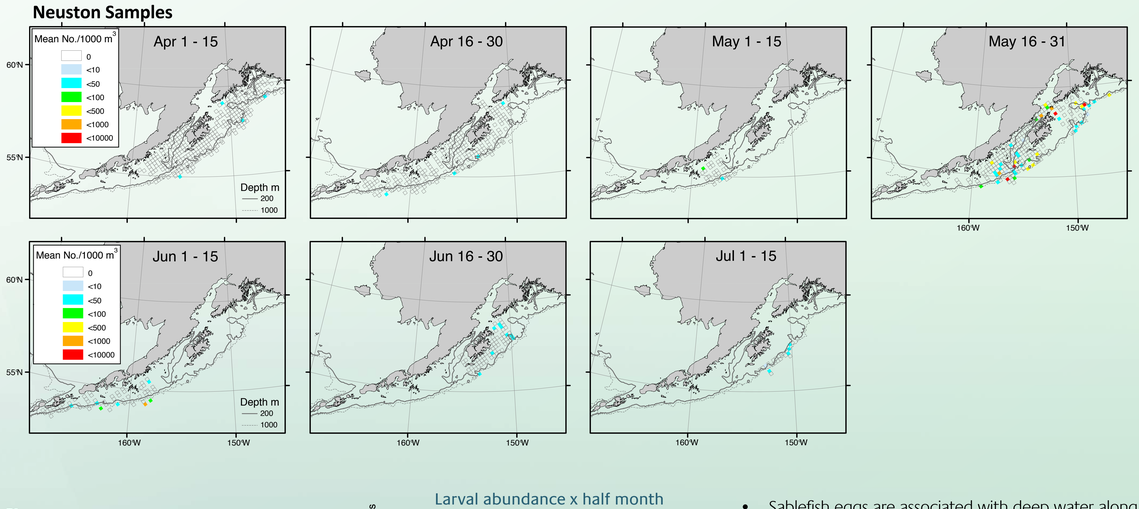
Seasonal Patterns

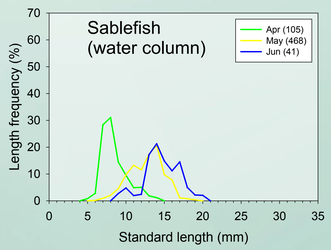
Seasonal Progression in Distribution of Larvae

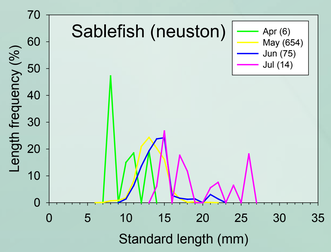
Water Column Samples



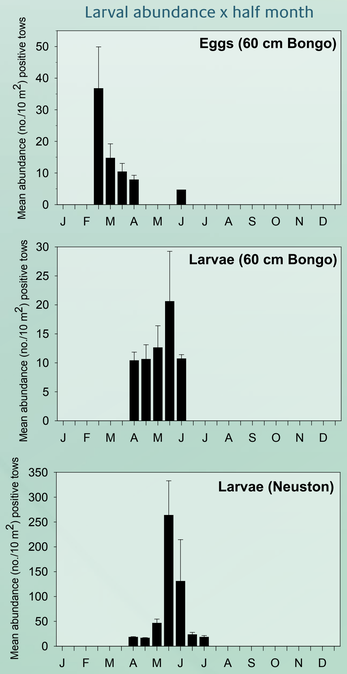
Neuston Samples





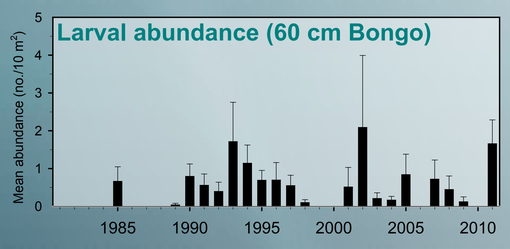


Larval abundance x half month



- Sablefish eggs are associated with deep water along the slope during late winter and early spring and seem to be most abundant in the water column during February in the western GOA. Larvae are common in the water column during April through June, but are most abundant in the neuston especially during May and June. Larvae >15 mm do not seem to be sampled efficiently by either the 60 cm Bongo or neuston nets.
- Larvae occur primarily near the surface and migrate to the neuston soon after hatching. They are rare in historical MOCNESS samples.
- Length frequency distributions suggest relatively fast growth rates during spring to summer months.
- Larvae are most abundant in slope and shelf water in the vicinity of Amatuli Trough and the entrance to Shelikof Strait, and also over the slope and outer Shelikof Sea Valley, which seem to be significant regions of cross shelf larval transport during spring.

Interannual Patterns: Late-Spring Shelikof Time-Series

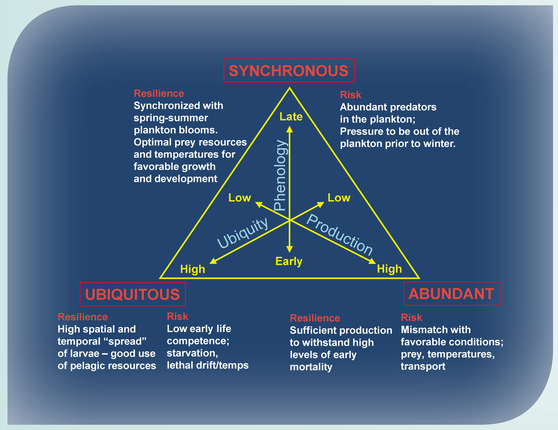


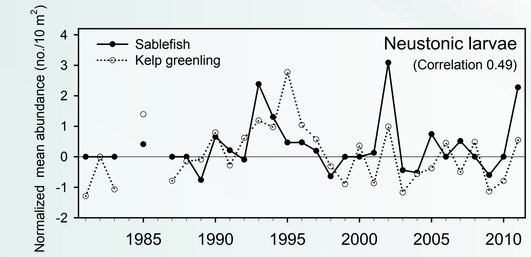
- The late-spring GOA time-series for sablefish larvae is a poor representation of interannual variation in larval abundance as most larvae occur in the neuston. Nevertheless, a pattern of periodicity in abundance is apparent that is characterized by occasional strongly positive anomalies.
- Late spring abundance of larvae in the Shelikof region has not been associated previously with fluctuating environmental conditions. Historical neuston sampling is intermittent on an interannual scale.

Multispecies Perspective

Early Life History (ELH) Exposure-Response Framework

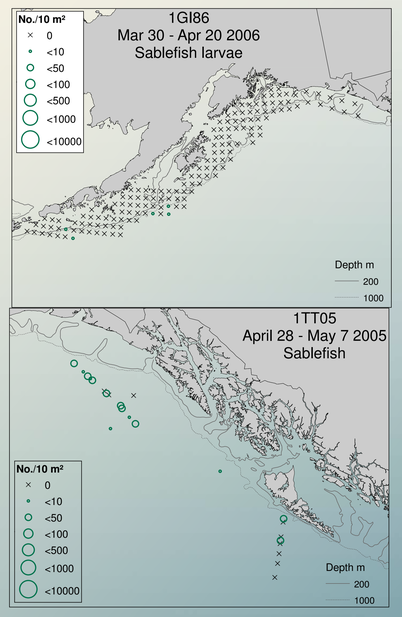
Doyle and Mier 2012



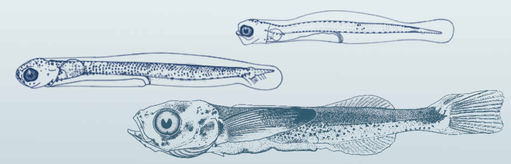


- Sablefish belong to a neustonic assemblage of larval fish species in the WGOA that spend their early ontogeny mostly near the ocean surface during spring through early summer (Doyle et al., 1995).
- Although the high fecundity and relatively narrow spring peak in larval abundance of sablefish places them in the "Abundant" group in terms of early life strategy, their neustonic early life makes them somewhat of an outlier in terms of pelagic exposure (Doyle and Mier, 2012). This neustonic habitat restricts their access to zooplankton prey resources. Kelp greenling is another species that is abundant during spring in the WGOA and associated with the neuston.
- Despite the limited representation of these larvae in the GOA late spring abundance time-series, a degree of synchrony is observed in their abundance that may reflect their shared neustonic habitat.

Eastern vs. Western GOA



- During spring, sablefish abundance in the EGOA seems comparable to patterns observed in the WGOA with highest densities of larvae associated with deep water.



Synthesis

- **Temporal Exposure** of sablefish larvae is characterized by an extended period in the neuston through spring and summer.
- **Spatial Exposure** extends throughout WGOA and EGOA waters along the continental slope and in deep water, but with larvae also occurring in shelf waters during spring.
- **Vertical Distribution** of larvae is limited to newly hatched larvae and most of the pelagic phase is spent near the ocean surface. Surface circulation models and wind forcing may be most important in terms of determining patterns of larval drift.
- The **Early Life History strategy** (ELH) of abundant production of larvae during early spring is characteristic of the "Abundant", high production ELH strategy group. However, the association of larvae with the neuston makes them an outlier in terms of pelagic exposure dominated by surface conditions and likely limited food supply. This neustonic early life is also shared with species such as the hexagrammid kelp greenling.
- **Pelagic exposure-response coupling:** The shared pattern of neustonic larval habitat during spring for sablefish and kelp greenling seems to be reflected in a significant degree of synchrony observed across the larval abundance time-series (Doyle and Mier, 2012).
- Occurrence and abundance of larvae seems comparable in the **EGOA** relative to the **WGOA**.
- Gaps in ELH knowledge:
  - Spawning areas and ELH habitat in the EGOA
  - Larval feeding ecology in the neuston
  - Larval predation in the neuston
  - Habitat and ecology of late stage and transitioning larvae
  - Age-0 through juvenile stage ecology

References

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