

Form Rev. 10.3.14

1. Program Number: *See*, Reporting Policy at III (C) (1).

15120114-J

2. Project Title: *See*, Reporting Policy at III (C) (2).

Long term monitoring: Environmental drivers component - The Seward Line: Marine Ecosystem monitoring in the Northern Gulf of Alaska.

3. Principal Investigator(s) Names: *See*, Reporting Policy at III (C) (3).

Russell R Hopcroft

4. Time Period Covered by the Report: *See*, Reporting Policy at III (C) (4).

February 1, 2015-January 31, 2016

5. Date of Report: *See*, Reporting Policy at III (C) (5).

March 1, 2016

6. Project Website (if applicable): *See*, Reporting Policy at III (C) (6).

Text www.gulfwatchalaska.org and <https://www.sfos.uaf.edu/sewardline/>

7. Summary of Work Performed: *See*, Reporting Policy at III (C) (7).

This project revolves around executing multidisciplinary oceanographic cruises along the Seward Line and in Prince William Sound (PWS) each May and September. The objectives that are met each cruise are:

1. Determine thermohaline, velocity, and nutrient structure of the Seward Line across the Gulf of Alaska shelf, and at stations throughout PWS
2. Determine phytoplankton biomass and size distribution (chlorophyll)
3. Determine the distribution and abundance of micro-zooplankton (starting in 2014)
4. Determine the distribution and abundance of meta-zooplankton
5. Opportunistically, determine rates of growth and egg production of selected key zooplankton species
6. Support determination of carbonate chemistry (i.e., ocean acidification)
7. Determine distribution and composition of seabirds (and marine mammals) along the Seward Line, PWS and Kenai coastline
8. Provide at-sea experience for graduate students within the University of Alaska

Deliverable/Milestone	Status
Execute May 2015 cruise	Completed
Execute September 2015 cruise	Completed
Attend Principal Investigator meeting and Alaska Marine Science Symposium to present results	Completed

The spring 2015 cruise was conducted during one of the largest warm-water anomalies observed in the North Pacific during the past 50 years. Above average temperatures extend deep into the water column. Within the upper-100m temperatures averaged 1.06°C above the long-term May mean making in the warmest may in the 19 year time-series (panel A, Figure 1). By September the intensity of the anomaly had declined, and averaged 0.50° above the long-term mean (Panel B, Figure 1).

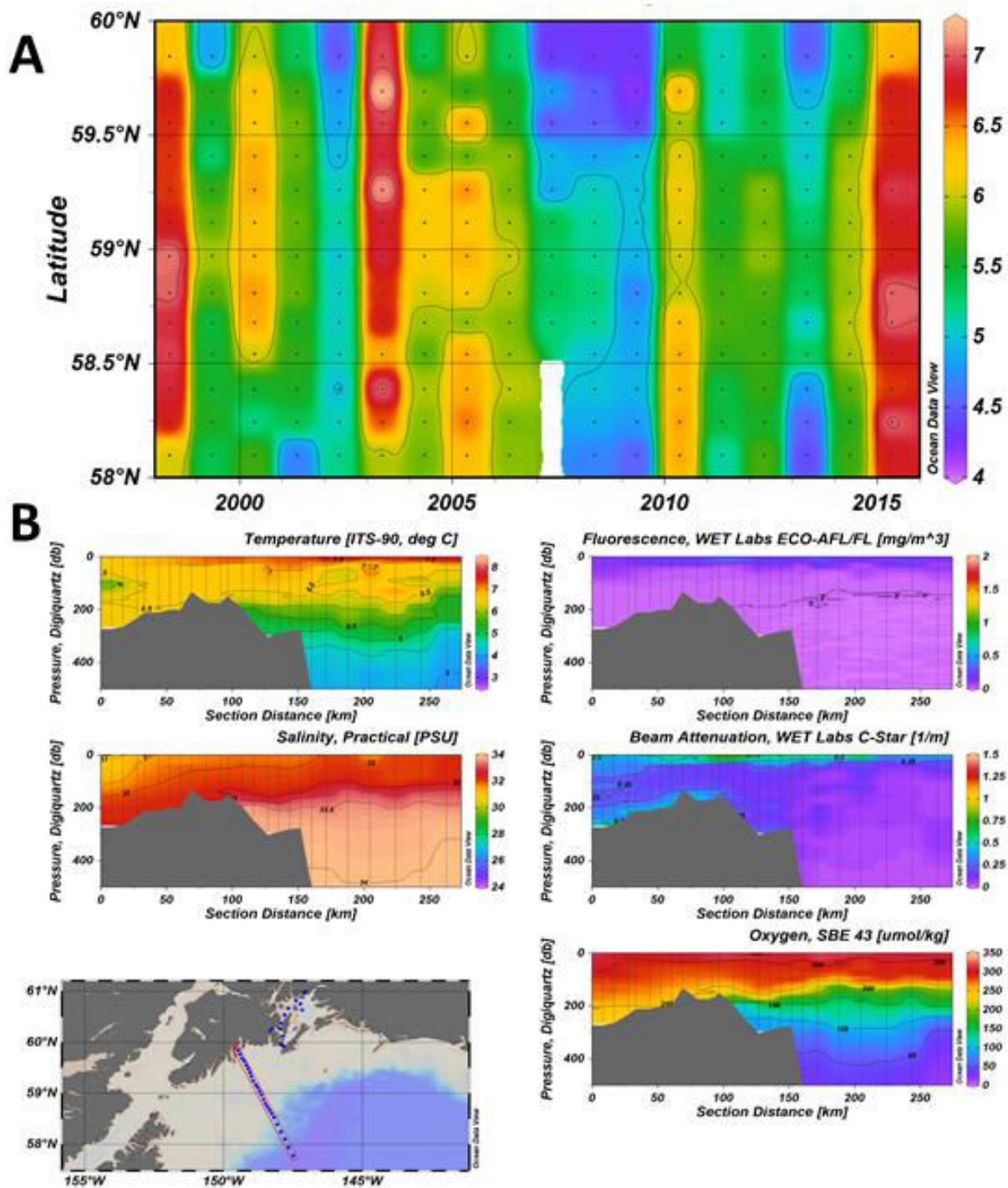


Figure 1. Seward Line May temperature time-series (average of upper 100m) and the detailed May 2015 section. Panel A shows temperature averaged for the first 100 m depth across the Seward line (location on y-axis) by year (x-axis). Panel B illustrates September physical ocean conditions across the Seward line section (x-axis) at depth (y-axis).

Although the zooplankton community was generally typical for the May cruise, it was notable that the southern (i.e., California Current) copepod *Calanus pacificus* was detected in extremely low numbers (Figure 2)

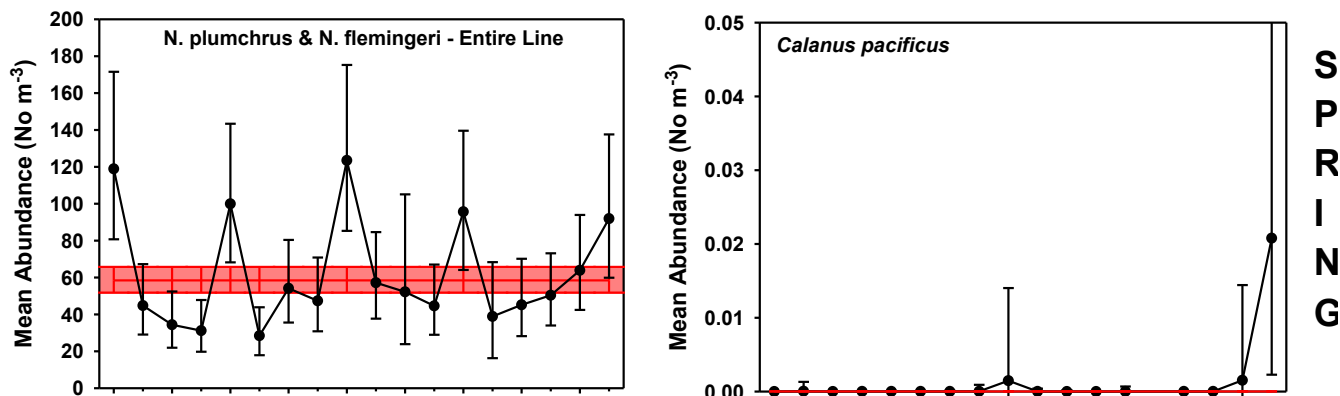


Figure 2. Spring species abundances for key copepod species: *C. pacificus* and *N. plumchrus* over time.

In September significant numbers of *C. pacificus* and other southern copepods were present along the Seward Line. Although their abundances were low compared to the entire copepod community, they were among the highest observed over the 19 years of observations along the Seward Line (Figure 3).

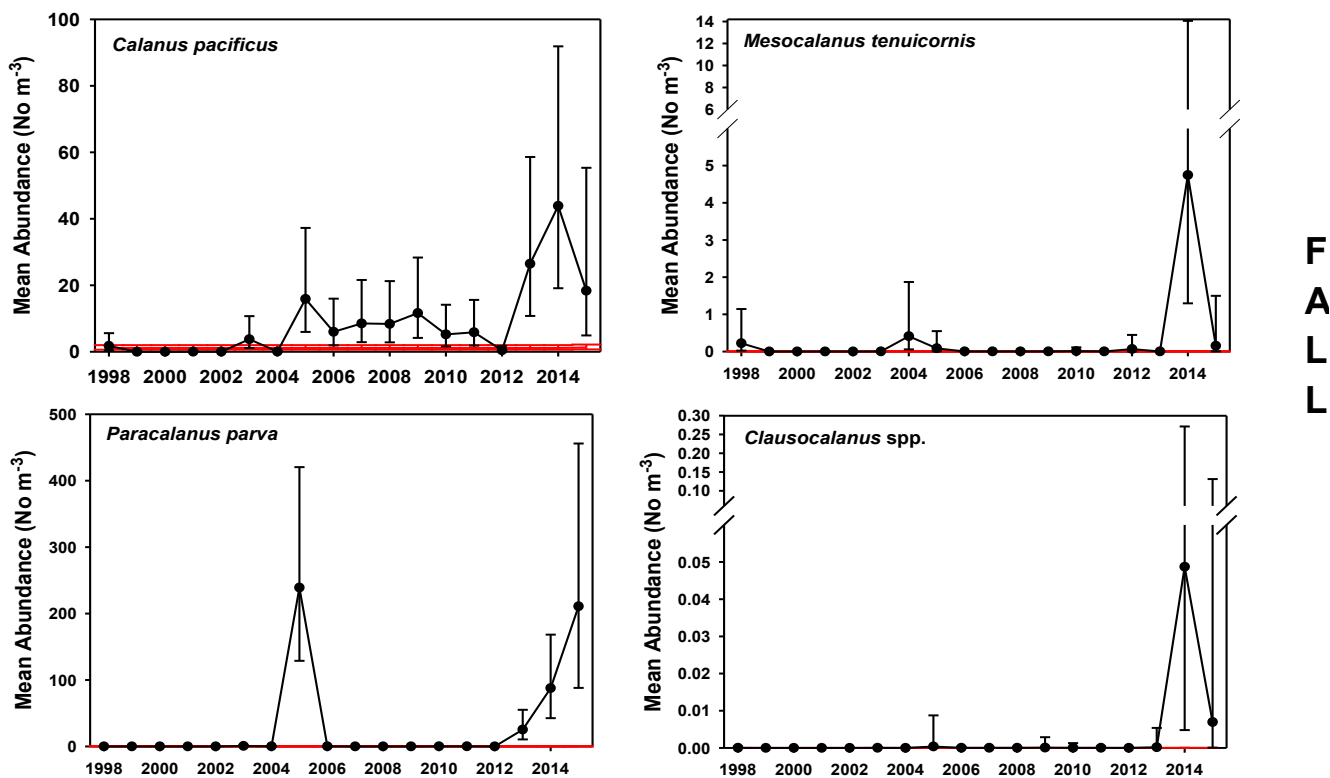


Figure 3. Abundances of key taxa from the Fall Seward line survey through time.

In 2015, the Seward Line provided the logistical foundation for two National Science Foundation projects, one focused on transcriptomics of diapause for the copepod *Neocalanus flemingeri* and one examining vertical flux on the Gulf of Alaska Shelf.

8. Coordination/Collaboration: *See*, Reporting Policy at III (C) (8).

- Hopcroft interacts with other PIs within Environmental drivers component of this program on a regular basis, and is the component team lead.
- Hopcroft servers on the Gulf Watch Science Coordinating Committee
- Hopcroft is involved in other major activities in the Gulf of Alaska funded by the North Pacific Research Board and the National Oceanographic and Atmospheric Association

9. Information and Data Transfer: *See*, Reporting Policy at III (C) (9).

- 2014 datasets delivered to the Oceans workspace, 2015 draft conductivity, temperature, and depth data placed on the Oceans workspace immediately after each cruise
- Presentations related to the Seward Line were made at the Alaska Marine Science Symposium
- Several publications arising from Seward Line sampling are in review or in press for a special issue on the Gulf of Alaska

10. Response to EVOSTC Review, Recommendations and Comments: *See*, Reporting Policy at III (C) (10).

There were no recommendations for this project.

11. Budget: *See*, Reporting Policy at III (C) (11).

See budget form in program work book. Over-runs in Contractual Services are largely associated with costs to load and unload the winch from the *Tiglux* now that Seward Marine Center can no longer provide this service. Overall costs for nutrient analysis have also increased.