

Seward Line CRUISE PLAN
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Chief Scientist: Russ Hopcroft, Zooplankton (Canadian), hopcroft@ims.uaf.edu
Institute of Marine Science
University of Alaska
Fairbanks, AK 99775-1080
Phone: 907-474-7842

Co-Chief Scientist: Ken Coyle, Zooplankton, IMS-UAF

Scientific Personnel: (tentative)

Seth Danielson	Physics, IMS-UAF
Alexei Pinchuk	Zooplankton, IMS-SMC (Russian)
Thomas Kline	Zooplankton, PWSSC
Jenefer Bell	Zooplankton, IMS-UAF
Terry Whitledge	Nutrients/Chlorophyll, IMS-UAF
Stephanie Moreland or TBA	Nutrients/Chlorophyll, IMS-UAF
Sarah Thornton or TBA	Nutrients/Chlorophyll, IMS-UAF (Canadian)
Steven Hartz	Marine Technician, IMS-SMC

Scientific Purpose:

This cruise represents a continuation of the 1998-2004 NE Pacific GLOBEC program whose purpose is to develop a mechanistic understanding of the response of this marine ecosystem to climate variability. Toward this end, the Seward Line cruises on the Gulf of Alaska shelf will determine the physical-chemical structure, primary production and the distribution and abundance of zooplankton, along with their seasonal and inter-annual variations. Some of the data will be compared with historical data sets whereas other data sets will be a product of the continuing systematic sampling effort on this shelf. This cruise marks the eight consecutive May for long-term observation program (LTOP) sampling in the GOA.

Cruise Objectives

1. Determine thermohaline, velocity, and nutrient structure of the Gulf of Alaska shelf, emphasizing Seward Line, C. Fairfield Line, and Prince William Sound stations (Table 1). Other lines as time permits.
2. Determine primary production and phytoplankton biomass distribution.
3. Determine the distribution and abundance of zooplankton.
4. Determine copepod rates of egg production.
5. Characterize the carbon and nitrogen stable isotope concentrations in zooplankton.

SAMPLING

DAYTIME ACTIVITIES

1. Occupy the various hydrographic transects and collect vertical CTD-chlorophyll-PAR profiles. Station Transect priorities are (in order): Seward, W. PWS, C. Fairfield (These can also be performed at night after zooplankton work is completed.) (see **Table 1**)
2. Collect ADCP, sea surface salinity (SSS), temperature (SST) and fluorescence (SSF) using seacrest sensors.
3. Collect discrete bottle samples at these stations for nutrients and chlorophyll pigments. Chlorophyll Size Fractionation will be done at the whole numbered Seward Line and PWS stations and at every other C. Fairfield Line station.
4. Measure Primary Productivity at Stations GAK 1, 4, 9, and 13.
5. 1 CalVet Net cast will be done (CalVet frame has 4 nets) after the CTD cast along the Seward Line and at PWS stations. THERE WILL BE NO CALVET sampling at the "i" stations on the Seward Line.
6. At Seward Line stations (GAK1, 4, 9, 13) and one PWS station, Hopcroft will perform 2 ring net tows over the upper 50m for zooplankton incubations.
7. Time permitting, we will do one deep MOCNESS tow (to 600 m) near the end of the Seward Line and at PWS2. This may be done at night in conjunction with Coyle's MOCNESS work at that station.
8. If the ISUS nitrate instrument is functional we would like to run it at all (CTD stations at depths of less than 1000m. It should be mounted in the horizontal position within the CTD rosette.

NIGHTTIME ACTIVITIES

1. MOCNESS discrete samples along the Seward Line, and at 3 PWS Stations.
2. Fine mesh nets may be will be swapped into the MOCNESS at intermittent stations for euphausiid collection.

Sampling Strategy

It is important that all MOCNESS collections, with the exception of those to 600m, be completed during darkness to allow comparison to prior years. We anticipate that 4-5 MOCNESS collections can be conducted per night, meaning that 3 nights will be required to complete the line. We will back-track during the daytime to complete the remainder of activities at these stations. There is a greater period of light available than of darkness, so execution of daytime stations and activities is designed around being in position to commence MOCNESS sampling as soon as it is sufficiently dark.

If everything goes perfectly, we should be able to complete both the planned daytime and nighttime activities in PWS, otherwise we will lack the transit time required to reach those stations, and will instead occupy the Cape Fairfield Line.

Ship Equipment Needed:

CTD w/ PAR, Fluorometer, Transmissometer, Altimeter, spares
Rosette w/5 or 10 liter Niskin bottles
ADCP, Seachest sensors,
Please check distilled water cartridge to insure high quality distilled water.
Science Freezer for chlorophyll and nutrient samples
Walk-in incubator for copepod incubations

Scientists Equipment Needed:

3 cases of salinity bottles,
CalVet and ring nets [nets, flowmeters, frames, swivels, weights, spares]
Primary Productivity on-deck incubator
MOCNESS system, (coarse and fine nets, spare cod ends/nets)
8 cases of 16-oz zooplankton sample bottles
3 cases of 32-oz zooplankton sample bottles
ISUS in-situ nutrient analyzer, associated cables and hardware
Microscopes and supplies for handling and incubation of copepods
Nutrient autoanalyzer (tentative)

Hazmet: (tentative)

Formaldehyde - 20L carbouy
Rose Bengal Stain 50g
Ethanol – 500ml.
Chemical required for nutrient analysis (tentative).

CRUISE ACTIVITY SCHEDULE

5/7 Science party arrives Seward
5/8 Morning: Exchange of science teams and equipment. UAF will hire a fishing vessel capable of doing this in a single trip.
5/8 Afternoon: set equipment and steam for RES2.5 station, then end of Seward Line, which end will be determined by timing and weather forecast.
5/12 Return to Seward by mid-afternoon. Adequate time must be available to complete exchange of scientists and equipment to allow ship's exit of Resurrection Bay prior to dusk.

MOCNESS protocol. We will sample large zooplankton and micronekton at night at 13 standard stations along the Seward Line, plus 3 stations in PWS. Samples were taken with a 1-m² MOCNESS equipped with 0.5 mm mesh nets. The MOCNESS will be fished at 20 m depth intervals between 100 m and the surface at all stations and if time permits to 600m at PWS2 and Gak13. MOCNESS will be deployed while ship heads into the seas at 2kts SOG. Stern safety wires are taken down. Marine Tech will run the stern A-frame while 2 scientists will deploy the MOCNESS using tag lines. AB will operate the winch during deployment and ensure the MOCNESS remains close to the deck during deployment from its cradle, and play wire out at ~0.5m/sec or as advised by scientists operating the MOCNESS data collection system. Stern safety wire is reconnected once nets are deployed. Our goal is to filter ~150 m³ per net. Once back at the surface the final net is triggered, safely wires removed and recovery commences. The Marine Tech operates the A-frame while 2 scientists use snatch hooks to tag the MOCNESS. AB operates the winch to ensure MOCNESS remains close to deck while repositioned into cradle. Stern safety wires are reconnected, nets are washed down, cod ends removed and contents preserved. Science team re-cocks the MOCNESS. Deck to deck time for MOCNESS is typically ~40 minutes.

Table 1.

NEP GLOBEC LTOP STANDARD STATIONS				
Latitude N (degrees, minutes)		Longitude W (degrees, minutes)		Station Name
<i>Resurrection Bay Station</i>				
60	1.5	149	21.5	RES2.5
<i>Seward Line</i>				
59	50.7	149	28	GAK1
59	46	149	23.8	GAK1I
59	41.5	149	19.6	GAK2
59	37.6	149	15.5	GAK2I
59	33.2	149	11.3	GAK3
59	28.9	149	7.1	GAK3I
59	24.5	149	2.9	GAK4
59	20.1	148	58.7	GAK4I
59	15.7	148	54.5	GAK5
59	11.4	148	50.3	GAK5I
59	7	148	46.2	GAK6
59	2.7	148	42	GAK6I
58	58.3	148	37.8	GAK7
58	52.9	148	33.6	GAK7I
58	47.5	148	29.4	GAK8
58	44.6	148	25.2	GAK8I
58	40.8	148	21	GAK9
58	36.7	148	16.7	GAK9I
58	32.5	148	12.7	GAK10
58	23.3	148	4.3	GAK11
58	14.6	147	56	GAK12
58	5.9	147	47.6	GAK13
<i>Cape Fairfield Line</i>				
59	54.5	148	52	CF1
59	53	148	52	CF2
59	51	148	52	CF3
59	49	148	52	CF4
59	47	148	52	CF5
59	45	148	52	CF6
59	43	148	52	CF7
59	41	148	52	CF8
59	39	148	52	CF9
59	37	148	52	CF10
59	35	148	52	CF11
59	33	148	52	CF12
59	31	148	52	CF13
59	29	148	52	CF14
59	27	148	52	CF15
<i>Prince William Sound Stations</i>				

60	22.78	147	56.17	PWS1
60	32.1	147	48.2	PWS2
<i>Knight Island Passage Station</i>				
60	16.7	147	59.2	KIP2
<i>Optional stations follow</i>				
<i>Hogan Bay Line</i>				
60	11.57	147	42	HB1
60	10.754	147	38.5	HB2
60	9.855	147	34.508	HB3
60	8.807	147	30.04	HB4
<i>Montague Strait Line</i>				
59	57.257	147	55.602	MS1
59	56.6	147	53.7	MS2
59	55.9	147	51.4	MS3
59	55.2	147	49.7	MS4

NEP GLOBEC Standard Station Map

