Northern Gulf of Alaska Long-Term Ecological Research

Cruise Report April/May 2023

Cruise ID: SKQ2023-07S

Cruise DOI on R2R 10.7284/910124

Funding Sources: NSF, NPRB, AOOS, EVOS/GWA

Purpose:

The NGA is a highly productive subarctic Pacific marine biome where intense environmental variability has profound impacts on lower trophic level organisms and community dynamics that, directly or indirectly, support the iconic fish, crabs, seabirds and marine mammals of Alaska. In the NGA, a pronounced spring bloom and regions of sustained summer production support a stable base of energy-rich zooplankton grazers that efficiently transfers primary production up the food chain and a substantial sinking flux of organic matter that exports carbon to the sea bottom communities. The LTER research cruises examine features, mechanisms and processes that drive this productivity and system-wide resilience to understand how short- and long-term climate variability propagates through the environment to influence organisms.

This cruise represents a continuation of sampling begun in fall 1997 under the NSF/NOAA NE Pacific GLOBEC program, and subsequently a consortium of the North Pacific Research Board (NPRB), the Alaska Ocean Observing System (AOOS), and the Exxon Valdez Oil Spill Trustee Council's (EVOSTC) Gulf Watch. This is the fifth year with expanded domain, measurements and investigators under the NSF's Northern Gulf of Alaska Long-term Ecological Program (NGA-LTER). This cruise marks the 25th consecutive spring cruise for the Seward Line in the NGA, including Prince William Sound (PWS), and the 52nd year of observations at GAK1.

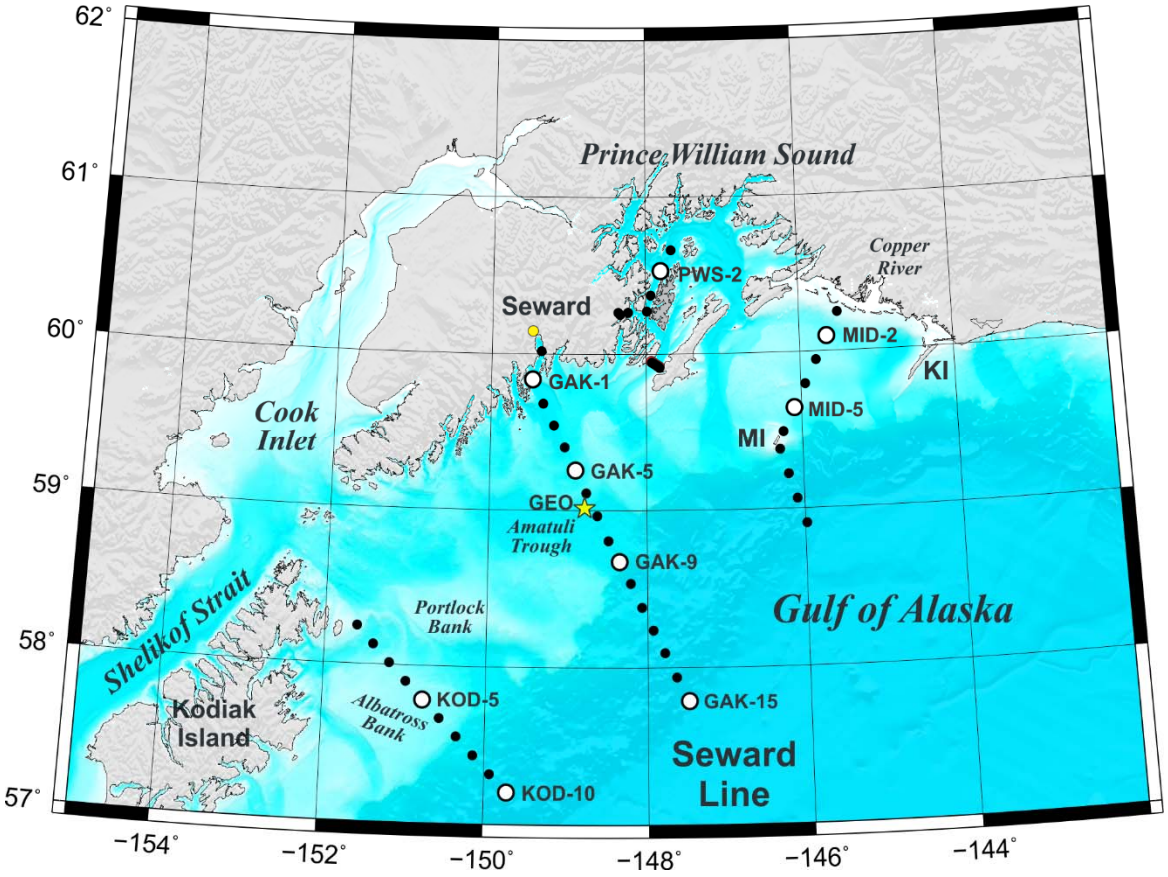

Figure 1. The LTER sampling stations. CTD casts without water sampling as open symbols. Yellow diamonds represent locations of meteorological data from NOAA buoys or ground stations. Star shows position of LTER mooring. Cape Suckling is low priority and not sampled during this cruise.

Scientific Personnel:

	Name	Role	Macro- and micronutrients
1	Ana **Aguilar-Islas** (UAF)	Chief scientist, NGA LTER PI	Macro- and micronutrients
2	Kelley **Bright (WWU)**	Scientist	Phytoplankton/microzooplankton
3	Hana **Busse** (NSF)	Scientist	Phytoplankton/microzooplankton
4	Elizabeth **Cooney** (UBC)	Scientist	Phytoplankton/microzooplankton
5	Dan **Cushing** (USFWS)	Scientist	Seabird, mammals
6	Gwenn **Hennon** (UAF)	Scientist, Project PI	Microbes and genetics
7	Russell **Hopcroft** (UAF)	Scientist, NGA LTER Lead PI	Zooplankton (days)
8	Mette **Kaufman** (UAF)	Scientist	Macro- and micronutrients
9	Thomas **Kelly** (UAF)	Scientist, Post-doc	Biogeochemistry and particle cycling
10	Hannah **Kepner** (UAF)	Graduate student	Zooplankton (nights, DPI lead)
11	Concepcion **Melovidov**	Graduate Student (UAA)	
12	Addie **Norgaard** (UAF)	Graduate student	Inorganic carbon
13	Ryan **Owens** (UAF)	Undergraduate Student	Inorganic carbon, fluorescent OM
14	Minerva **Padilla Villa** (UCSD)	Graduate Student	Macro- and micronutrients, Zr isotopes
15	Alex **Poje** (UAF)	Scientist (Night lead)	Zooplankton (nights)
16	Henry **Rappleyea** (AKCS)	Scientist	Macronutrients
17	Isaac **Reister** (UAF)	Graduate student	Physical parameters, moorings
18	Peter **Shipton** (UAF)	Scientist	Physical parameters, moorings
19	Emily **Stidham** (UAF)	Graduate student	Zooplankton (nights)
20	Suzanne **Strom** (WWU)	Scientist, NGA LTER PI	Phytoplankton/microzoopalnkton
21			
22			
23	Jenny **Grischuk** (UAF)	Marine Technician	
24	Dan **Naber** (UAF)	Marine Technician (lead)	

SKQ2023-07S followed mitigation measures outlined by UNOLS to reduce the risk of COVID-19 transmission. These included pre-travel rapid test (5-10 days prior to the cruise), mindful public behavior, temperature logs, and a rapid testing onboard during the first mobilization day. Strenuous circumstances prevented two members of the science party (Kelley Bright and Henry Rappleyea) from sailing.

Cruise Overview:

General Notes: This was another spring cruise that began earlier than normal, which is less than ideal for two reasons. One, there is an increased likelihood of having to work around large storm systems, and two, it is necessary to leave the GAK Line as the last line to sample in order to collect the data during the month of May. The spring bloom was patchily distributed, sea surface temperatures were between 4-6 ^{o}C and a mesoscale eddy was present at the end of the GAK Line. These features were observed with satellite images and onboard instrumentation.

Station Transects: The bulk of the work during the cruise was devoted to sampling at stations. Station work started at the MID Line, because this allowed us to sample Prince William Sound during an intense storm that developed a few days after the cruise began. Work in Prince William Sound included the stations in Icy Bay, which still had a thin sea ice cover. The KOD line was sampled next starting at KOD 6 with night work, and completed a couple of days later. The Seward Line (GAK stations) was sampled last starting with night work at GAK 4 to concentrate on the inner part of the line while an offshore storm ran its course. The time spent at each line was roughly 2.5 days for the MID and KOD lines, and for PWS; about 6 days on the GAK Line. As per standard design while occupying these transect lines, operations were generally divided into distinct day and night tasks, thus requiring most station to be occupied twice. This structure results in some back-tracking but avoids individual projects needing to supply 2 shifts of scientists. Additionally, day and night station occupation ensures all organisms – especially larger diel-migrating zooplankton – are captured with minimal time-of-day bias. During most morning, an “intensive” station was occupied for primary production experimental work. Intensive stations involve a greater number and types of collections than other stations occupied that day. Stations profiles were supplemented by underway measurements, as is typical of NGA cruises. A subset of stations, including all intensive stations, were also sampled for iron parameters using a dedicated winch and trace metal clean rosette. At these stations the “Fe-fish” was deployed to collect the surface most sample. Bird and mammal observations were conducted continuously during daylight hours while the ship was underway. At times some backtracking was necessary to provide full transects for bird/mammal observations

Sediment Traps: Four lagrangian sediment traps deployments with subsequent-day recovery were successfully done during this cruise. The stations associated with these deployments were PWS2, KOD 10, KOD5, and GAK5. The reoccupation of stations as characteristic of our normal sampling design helps facilitates the integration of sediment traps into the cruise logistics, however, explicit time needs to be built in to accommodate more 24hr-deployments.

Moorings: This cruise involved mooring operations at GAK 1 and the GEO site. At the GEO site unfortunately lack of communication with the deployed mooring prevented recovery, however, we were able to deploy a mooring succcessfully. At GAK1 we recovered the GAK1-2X mooring and deployed the GAK1-2Y mooring.

Tow vehicle: An undulating tow vehicle – the ISIIS-DPI – outfitted with line-scan cameras and seawater sensors (CTD, oxygen, fluorometers, LISST, ACS, SUNA) was deployed along the GAK Line.

Underway Instrumentation: Three instruments were plumbed into the Sikuliaq’s uncontaminated seawater system: A spectrophotometer (AC-s sn338), a particle backscatter (BB3 sn6077), and a fast-repetition-rate fluorometer (FRRf sn12-8679-004). The ship also has a nitrate sensor (ISUS) interfaced with the underway seawater system.

Other: During this cruise an opportunity was provided for a UCSD student to collect samples from the trace metal systems for iron and zirconium isotope analysis, and for the analysis of iron-binding ligands. Opportunity was also provided

Daily summary:

4/18/2023 Nutrient group travels to Seward from UAF with some gear on UAF truck. Nutrient group arrives safely in Seward in the evening and stays at hotel.

4/19/2023 Nutrient group is tested for COVID 19 upon arrival to ship for preliminary set-up. All test negative. Nutrient group begins set up. Most Science party travels to Seward from UAF and WWU. Gear is transported from UAF to Seward in U-Haul. Party arrives safely to Seward in the evening and says at hotel.

4/20/2023 Other science party members are tested for COVID 19. Rapid tests. All negative. Kelley Bright is not sailing due to a rebound from COVID. Loading and set up all day. The rest of the science party from Fairbanks arrives to Seward safely by dinnertime. All also test negative for COVID 19.

4/21/23Set up and loading continued through the day. Science party from Anchorage arrives in the afternoon. 14:00 Briefing with bridge. 14:30 Welcome briefing from ship personnel. 17:30 Short science meeting to cover Code of Conduct and Plan for next 3 days. Freezer in wet lab was not freezing down to -20. The TMCTD was damaged during transect. The brackets that hold the CTD unit to the frame cracked. Ethan was able to use the cracked part to get dimensions and 3D printed 2 brackets and had the parts ready prior to departure.

4/22/23 Sunny, calmed morning. A -20C freezer needs uploading because the freezer in the wet lab is questionable. A chest freezer was uploaded from the marine science center and placed at the end of the table on the wet lab. This freezer has plenty of space for the needs of the cruise.

Got underway at 09:00. RES 2.5 at 9:40 for Calvet1, CTD, Calvet 2. Abandon ship a fire drill in between CTD and Calvet 2. This meant that the CTD sat for about 20-30 minutes without sampling. Everyone sample except for inorganic carbon species. Departed RES 2.5 around 12:00 pm. Transect to GAK 1. Trying on emergency suits along transect. GAK 1 start with Calvet at 13:00, CTD at 13:15. Transect towards MID 7 at 14:00. Arrived at MID 7 at midnight. Calm seas throughout the transect, partially cloudy.

4/23/23 Night work went well. Bongos at all stations without incident. Finished last bongo at 5:30 am. At that point the extra CTD went down to 1500 m. Calm Morning, sun came out, some clouds, some swell. Deep Multinet has problems related to new plastic brackets. The line might need to be reterminated. The brackets need replacing. Not much phytoplankton, but spread down to ~75m. Prod cast and calvets went well. TMC hit the side of the ship on the way down…issue coordinating the speed of the new winch. The winch only goes as fast as 33 mpmin. No damage. Fish hit side of the ship as well; nose was bent. Falling behind in the schedule. MID 9 went well. MID 8: Started to rain, some wind starting to pick up. Miscommunication about location of station (ended up a bit off the line and shallower 530-560 m). Very slow station. TM CTD cast took longer. MID 7i.

4/24/23 Night work started late 2 am, winds picked up. Only able to to MID 5, MID 4, MID3. Very windy at MID 3. Foggy. Started day work at 8:10 am. MID1 went well. MID1i went well. MID2 The CTD had issues with communication that took over 2 hrs to fix. The TM CTD had also communication issues that resulted in a miss-cast and having to redo it. Bongos were deployed

and recovered without incident at ~13:40 (light). CTD was fixed at around 2pm but too late for a ProdCast, so no prod cast at this station. No night work tonight. CTD issue was a bad Y cable from the oxygen sensors. 7pm and only at MID3i. Everything working well. Arriving MID 4 at 8pm. Will skip "i" stations to finish MID 6 tonight and position us close to MID 7. Starboard crane hydraulic system for rotation had a leak and the crane could not operate. The crew took parts from the port crane and was able to get the starboard crane ready for ops on 4/25/23. Engineers found spare parts and the port crane was fixed as well.

4/25/23 No night work. 6:00 MID7, Picked up Calvets at MID6, MID5 Intensive station sampling. All ops went well. Finished by 12:15pm and got underway to PWS3 passing over MID4i to get the transect for bird ops complete. Science meeting at 19:00. Discussed plan in PWS, and gave updates about the work so far. Arrived PWS3 at 21:00. Cold and rainy. Night work began. PWS3 Multinets. PWS2 at 23:40. 2 multinets, 1 sediment trap.

4/26/23 Night work continue. PWS1 1 multinet. KIP2 1 multinet. Snow

Day work: Cloudy with sun trying to burn through the clouds. CTD at KIP0 and transect towards IB stations. IB2, CTD. IB1 CTD. IB0, Calvet, CTD and sea ice pick up with net. Sea ice at IB0 was ~ 4" thick with a thick layer of snow. Very slushy ice that was easy to break. Ops at IB0 were done in an open lead. About 200 + seals. Unfortunately conditions were cloudy with mixed snow/rain. Once back along the main channel, the new Fe-fish (Ferrous Bueler?) was tested for about 1 hr. The fish had the brand new nose and added weight on the front. Testing was done under calm seas, but windy conditions. Fish flew straight and away from the ship after some crane adjustments. Took it up to 10 knots. Transect to PWS2 and waited until 1am for sediment trap pick up. DPI testing…test went well, no spikes on winch. Flat calm conditions.

4/27/23. Day work started at 6:00 am at PWS3 with calvet and CTD. Transect to PWS2 for intensive work. Slow day with ops taking somewhat longer than expected. Dumped grey water after PWS2 and transected to PWS1 for calvet and CTD. KIP2 for Calvet and CTD. CTD back on board around 9 pm. Night work: More DPI testing

4/28/23 Day work began at 3:00 am to get MS stations done by 6:20 am. Rainy and cold. Underway to KOD 6. Large swell at times. Some people felt sea sick, but overall smooth sailing towards the KOD line. No glider pick up at the GEO site. It is Tom Kelly's birthday. Had a Science meeting to talk about tentative plan for GAK and order of opps at the outer KOD line. We arrived KOD 6 @ 21:45 and started night work with Bongos from KOD 6 to KOD 8.

4/29/23: Bongos went fast and well. Transect to KOD 10 for a sediment trap deployment at 3:30 am. Did Bongos at KOD 10. Beautiful calm and sunny day. Feels warm outside. Waited until daylight to do Deep Multinet, then shallow multinet. Prod cast started at 9:30 down to 300 m, then Calvets 2x, then TM CTD starting at 10:35. A second deep multinet and departing fish. KOD 9 went well Calvet + CTD. KOD 8 also went well. Cavet, CTD, TMCTD. Back to KOD 10 to pick up sediment trap (1:30 am).

4/30/23. Night Bongos at KOD 9. Transect to KOD 4. Weather turned. Wind and waves picking up, barometer falling. KOD 9 Calvet and CTD. KOD 5 Prod cast, Calvets 2x, TMCTD, Regular CTD, Sediment trap deployed, Departing fish. All ops went OK, but there was a big spike on the CTD winch wire due to increasing seas and new winch operator learning. We were heading towards KOD 6, but the wind and seas were building fast. Turned around and instead went to KOD 3 to do inshore stations. Completed KOD 3, KOD2, KOD1. The remote pack for the starboard crane malfunction. They used the one for the Port crane, and we were able to finish all the stations. Night work Started at KOD1 about 21:30

5/1/23. Night work continued to KOD 5. Conditions were workable through the night and improved. They finished at 4:30 and called to ask if going to KOD7 was an option because conditions were workable. It was decided to do so. KOD7 work started at 6:30 am with Calvets, then CTD. KOD 6 arriving at 8:30 for Calvets and CTD. Remember why you don't want to do the CS job again. The day improved, winds decreased and the seas layed down somewhat. Wind at about 20 knots. Barometric pressure back up to 1005 hPa. Sunny but chilly (in low 40's). Trap recovery went well. Underway to GAK4 with following seas. Expected arrival time is 21:00. Science meeting at 7pm to discuss options.

5/2/23. Night ops went well with Multinets at GAK 4, GAK3, GAK2 and GAK1. Day work started at 7am with a vertical multinet at GAK1 followed by Reg CTD, TMCTD, Prod Cast Calvets and Departing fish. Fish tubing had a kink and it took a bit longer to get the sample. Under way to GAK2 by 11:05. GAK 2 Calvet, CTD. GAK 3 Calvet, CTD TMCTD and FeFish, GAK4 Calvet, CTD. The day went without incident. Transect to GAK 5 to postion for sediment trap deployment and Night work. Sediment trap deployment went smoothly. Night work began aroun 9:45pm. With Multinets at GAK 5, 6 and 7. New issues with station locations. Artie will use the correct locations, not the ones in the MFP.

5/3/23. Night work went well. Transect to GAK5 in time for 6am ops. GAK5 completed in 4 hours. Reg. CTD, Vertical Multinet, TMCTD, ProdCast, Calavet, Departing fish. Transect to GEO at 10:00 am to pick up glider and start mooring ops. Dry CTD, Glider pick up. Glider was recover without incident. GEO Mooring did not respond to either of the releases. We drove over the coordinates, but did not find it. Hana Busse's Birthday. A mooring will be deployed 2 mi from the location of the other mooring. 3:30 pm starting deployment. Deployment went well. We came back and ping again without the center board, and no response. The GEO CTD cast had to be redone because the vents were left open on most bottles. This put us behind by about 1 hr. Headed for KOD 6 and did calvets and CTD. Headed to pick up the sediment trap which was about 4 nmiles south of GAK5. By the time the trap was picked up and we were underway back to GAK5 it was just past midnight. The DPI will go in at GAK 5 and towed to RES2.5. The wind that was supposed to be here by evening, has not increased much. It is about 20 knots. Conditions are OK for deploying the DPI.

5/4/23. DPI Transect. Windy during deployment but OK to deploy. Transect OK except for acoustics which are not collecting data. Arriving at GAK 1 ~ 9:45 am. Recovering prior to RES 2.5 ~ 11:00. Day work at RES 2.5, Calvets 2X, CTD. Transect to GAK1 to do the mooring (13:00). Pete injured his knew a bit more yesterday when deploying the mooring at GEO. Captain and I are considering taking him onshore via small boat. Start mooring ops at 15:00. All floats released and recovery went smoothly. Dry CTD. Deployment started after dinner and were finished at 6pm. Steaming back inside ResBay to wait for 10pm to start our transect towards GAK9. Note Ailik Bay is at the mouth of Resurection Bay. 3hr transit from GAK1

5/5/23 We were supposed to get to GAK9 by 8:30 am to give Dan a chance to survey GEO to GAK7 at daylight, but Russ said it would be OK to start earlier, so everyone had to rush around in the morning because we started at 7:15 instead of 8:30…remember why you don't want to be chief sci.

The seas layed down throughout the day and the wind eased. We even got sun in the afternoon. GAK 9 multinets had communication issues on 2 casts, the issue was the battery, so they did a 3rd cast at the end of all other work. Prod cast started closer to noon. All other ops went smoothly. GAK 8 no issues, GAK 7 no issues. Finished and back at GAK 8 for night work at 21:00

5/6/23 Rained all night. Rain gear (new float coats and extratoughs were soaked through) for the night crew. The night team ccomplished all 4 stations (GAK 8-11) in the needed time. Day work started at 6am with a CTD. No issues with equipment or timing. GAK 10, GAK 11 calvets and CTD. GAK 12 Prod cast, calvet, CTD and TMCTD, Fish. GAK 13 started at 17:00 with a calvet and moved to a CTD down to 1500 m. Glyder recovery: It took a bit to pick up both points, but it was successfully recored. Final Science Meeting. Night work began right on time at GAK11.

5/7/23 Night work: Deployment recovery of all gear went smoothly. It rained again. Night was finished by 5am at GAK 15. The regualr CTD cast in by 5:00 am, sampling started just after 6am. Tandem Multinet (although advised otherwise). Prod cast in by 8:30 am. Multinet shallow went OK even as tandem. TMCTD in by 9:50 am.

5/8/23 Sunny and flat calm seas. We are able to transect at 12 knots and there is time to pick up the mooring (~ 1hr). Packing and tearing down in full swing. Will be to the SMC by 16:30. Beautiful view of the mountains with clear and distinct outlines since GAK10.

5/9/23 Demob day

The View from Space:

Daily images were processed by Rachel Potter at UAF and provided to field participants throughout the cruise via shore to ship file transfers.

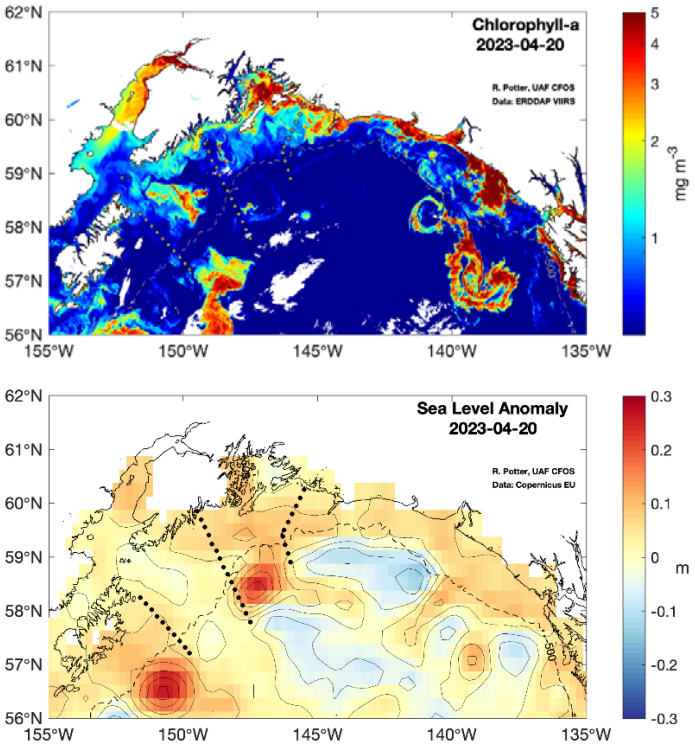

Figure 2. Chlorophyll-a (top) and sea level anomaly (bottom) maps for April 20, 2023.

Physical Parameters:

PI: Seth Danielson
Participants: Peter Shipton and Issac Reister

On SKQ202307S we conducted 70 CTD casts for water column hydrography at 53 stations using a 24-place rosette with 10 liter Niskin bottles. Bottles were tripped on 60 of these 70 casts. For normal operations, bottles were made at standard levels: 0, 10, 20, 30, 40, 50, 75, 100, 125, 150, 200, 250, 500, 750, 1000, 1250 and 1500 m depths and within 5 m of the bottom when the bottom depth was less than 1500 m. On many casts we also collected water at the depth of the chlorophyll a maximum.

The SBE9-11 CTD was outfitted with pressure, dual temperature, dual conductivity, and dual oxygen sensors. Ancillary sensors included a WetLabs fluorometers, WetLabs ECO-Triplett optical sensor, a WetLabs C-Star transmissometer, a Biospherical PAR sensor, and a Tritech altimeter. One channel was assigned to a self-logging Sequoia LISST particle size spectra instrument; one channel provided power and communication to a self-logging SUNA nitrate sensor. A self-logging Underwater Vision Profiler (UVP) was also attached to the CTD rosette frame. The UVP instrument required a 15-meter soak depth. Only one cast at each station required a UVP profile so stations with multiple casts may have had a combination of deep and shallow soak depths. The CTD stations were occupied on three shelf transects (Middleton, Seward, and Kodiak Line; Figures 1 and 2) plus stations in Western Prince William Sound.

Ocean velocity data was collected using a hull-mounted Teledyne RDI 75 kHz Ocean Surveyor instrument and a centerboard-mounted Teledyne RDI 300 kHz Workhorse instrument. The 75 kHz instrument collected data using 16 m bin thickness and the 300 kHz instrument collected data in 2 m bins. Due to hull depth and bubble sweep along the hull, the first good bin of the 75 kHz ADCP was typically at 18 m below the surface or deeper. The 300 kHz instrument measured good data starting at 11 m depth. We ran the ADCPs triggered from the K-sync system so as to provide an interference-free time interval for the EK-60 fisheries acoustics pings. Over shallow waters (< 1000 m depth) all acoustic instruments could be run simultaneously. In deep water (>1000 m depth) the time for the return acoustic pings become exceedingly long so we ran in one of two modes in deeper water. In “night operations mode” we secured the EM302 multibeam and operated only the ADCP and EK-60 so as to have concurrent acoustics data alongside the nighttime trawl operations. In the “day operations mode” we would run the EM-302 so as to map the seafloor along our trackline. Regions previously unmapped by multibeam acoustics were preferentially selected for ship routes in order to map uncharted areas of the seafloor. Many portions of the cruise occurred in previously unmapped regions, including especially portions of Prince William Sound. Future cruises will continue to fill in mapping coverage gaps.

Other underway data collected include the ship’s operational and navigation data, meteorological data, and ocean surface data. Operational data of ship’s equipment (e.g., navigation and winch payout and tensions) were logged and will be archived at the R2R data repository. Navigation data parameters include GMT date time, latitude, longitude and water depth. Atmospheric data parameters measured by the ship’s underway system included

atmospheric pressure, wind speed/direction, air temperature, humidity, CO2, shortwave downwelling irradiance, longwave downwelling irradiance, and PAR. Surface seawater underway data samples included temperature, salinity, chlorophyll-a fluorescence, partial pressure of CO2, and nitrate. Three nitrate dataloggers were used on the cruise. A SUNA instrument was plumbed into the underway uncontaminated seawater throughflow system that feeds the thermosalinograph sensors. This instrument was set to take five samples every five minutes. The second nitrate sensor was a deep SUNA instrument strapped to the CTD frame. This SUNA was powered by a stand-alone battery pack energized when the CTD sent power to the bulkhead connectors. These data were stored internally on the SUNA and this full dataset will require matching time stamps to align the nitrate profile with the rest of the CTD profile. However, a simple analog signal recorded in the CTD data file also provides preliminary estimates. A third SUNA instrument was part of a towed instrument package called the Deep Plankton Imager (DPI), which was towed for sections of the Seward Line.

Two Slocum gliders were recovered during the transit of the Seward Line. Glider serial number 191 was launched on 15 Feb 2023 and recovered on 3 May 2023. The glider successfully completed a mission to transect the Seward line from GAK 1 to the GEO mooring site and then monitor GEO water column properties before and during the spring bloom. Glider serial number 507 was launched on 21 March 2023 and recovered 6 May 2023. The glider successfully completed a mission to transect the Seward line from GAK 1 to GAK 15. Gliders were recovered using the vessel's starboard crane without incident in seas less than 3 feet.

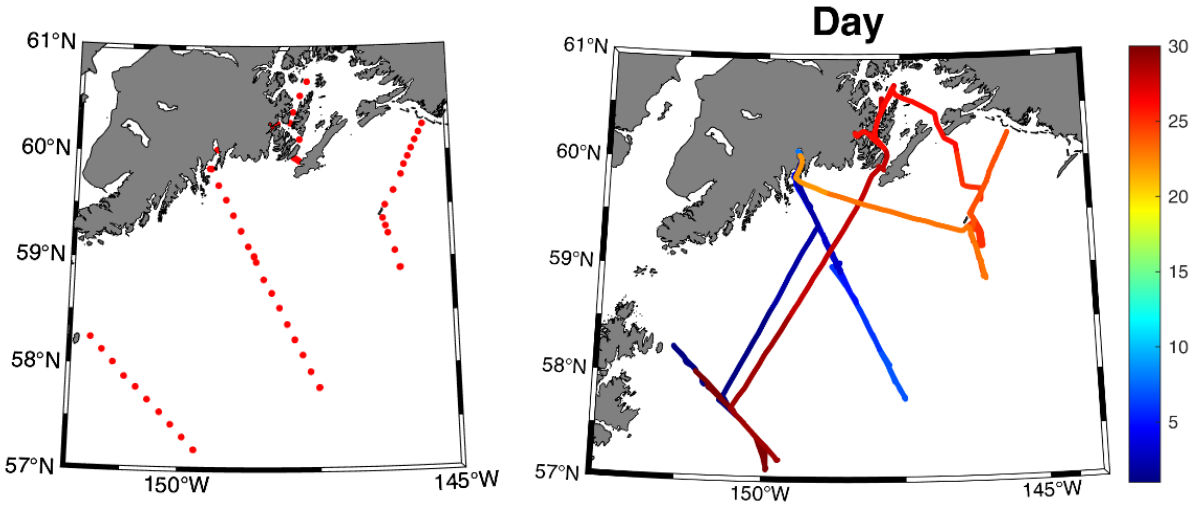

Figure 3. Map of CTD stations occupied in SKQ202307S (left) and trackline (right) with colors denoting the day of the month over 22 April to 9 May 2023. The CTD stations were occupied on three shelf transects (Kodiak, Middleton and Seward Line; plus stations in Prince William Sound, including stations across Montague Strait, in Icy Bay, and along Knight Island Passage.

Hydrography:

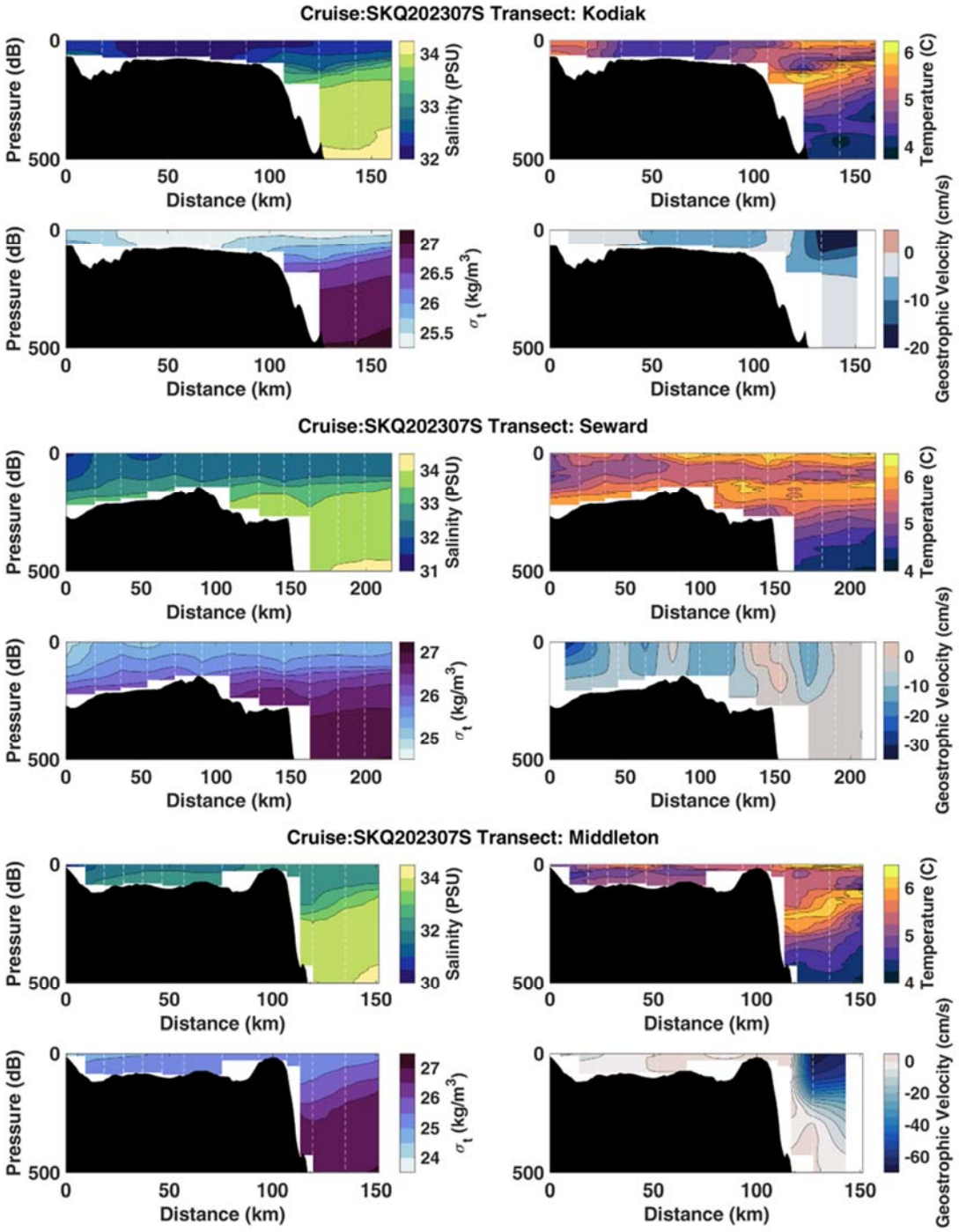

Figure 4: Hydrographic sections over 500 dB of the Kodiak, Seward and Middleton lines in four-panel grouping showing (clockwise from upper left) temperature, salinity, density (sigma-t) and geostrophic velocity referenced to 500 dB.

Underway Sensor Data:

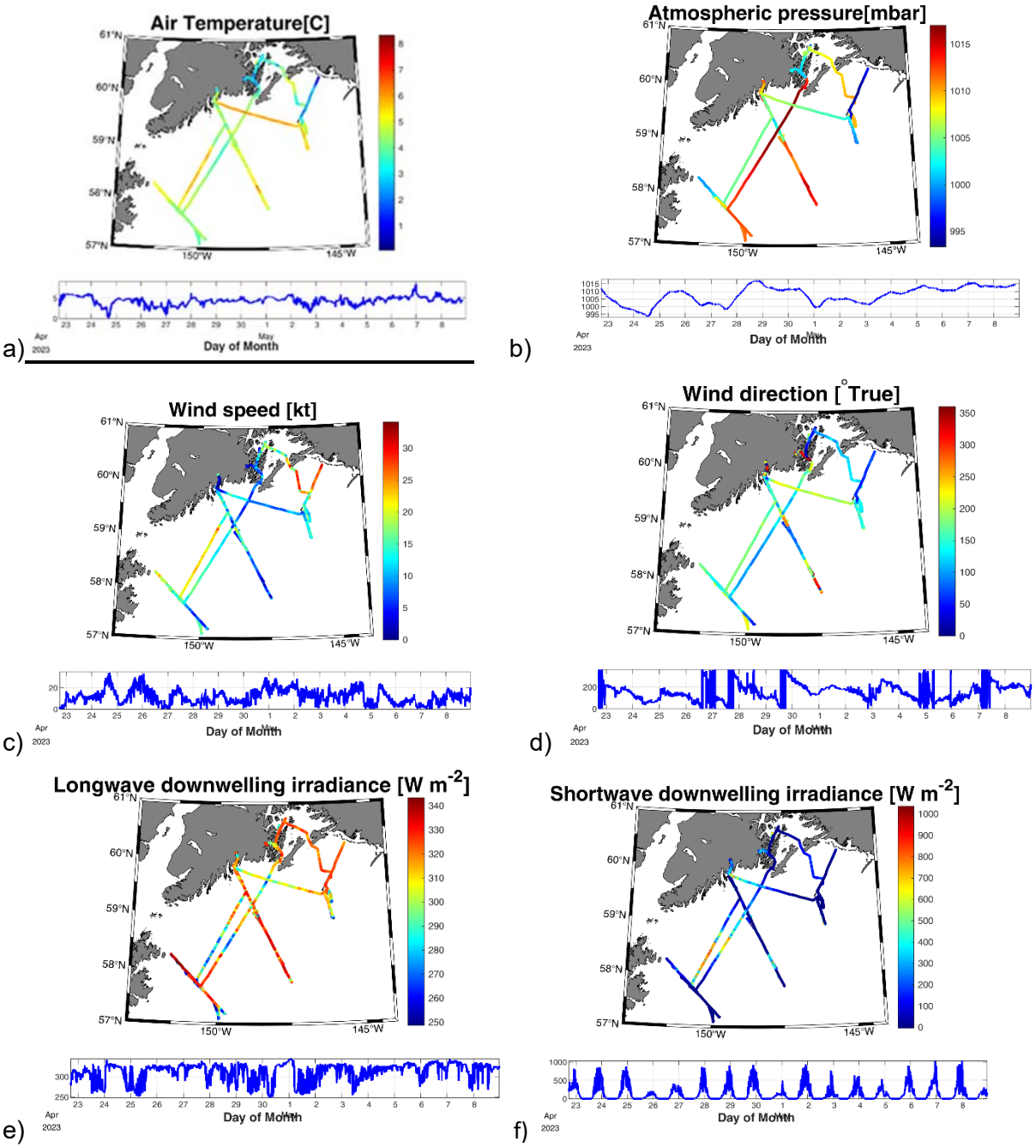

Figure 5a-f. Underway atmospheric and surface sensor data for the cruise track. Lower graphs for each pair show the parameter as a function of the day of the month (April and May).

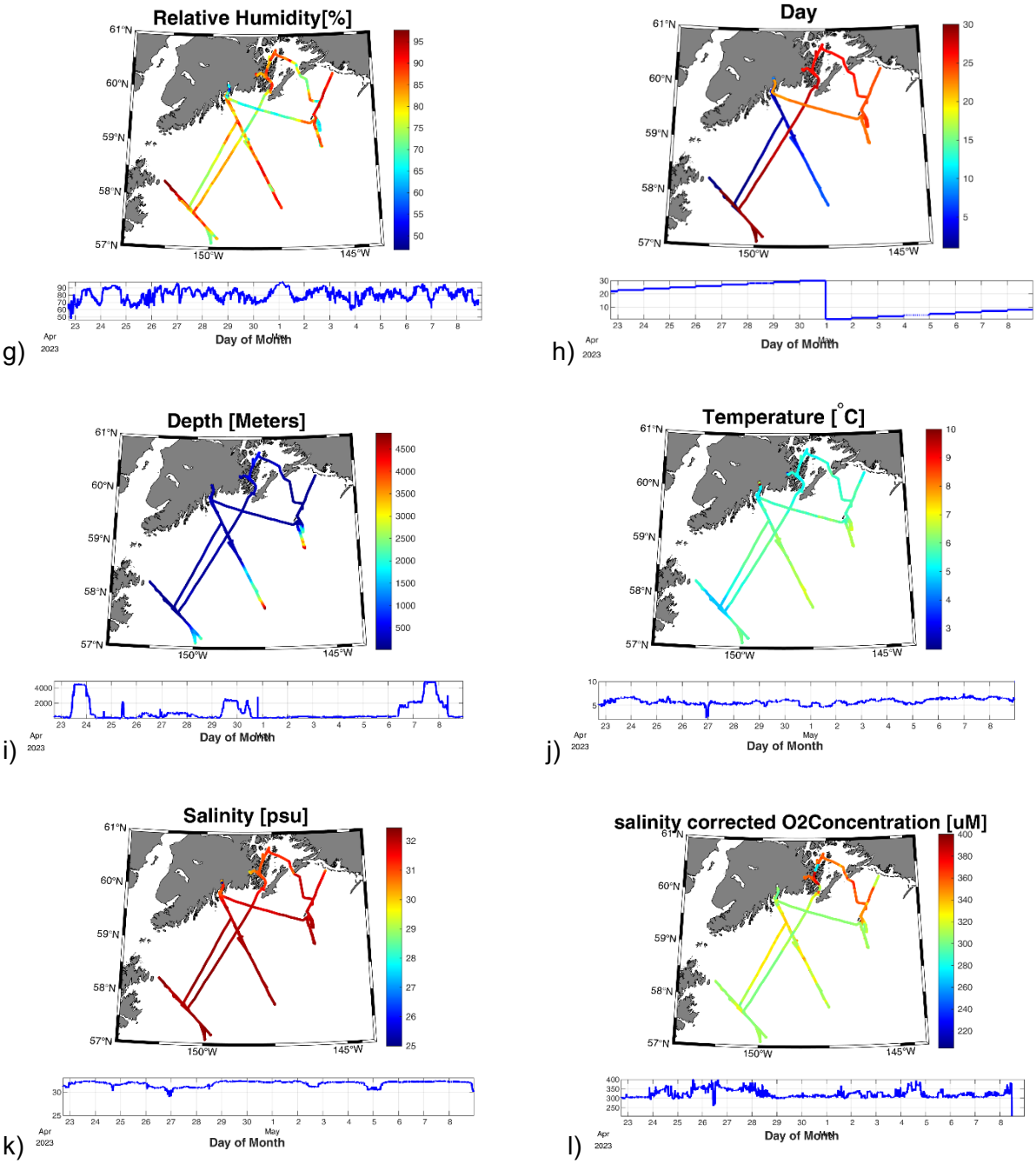

Figure 5g-l. Underway atmospheric and surface sensor data for the cruise track. Lower graphs for each pair show the parameter as a function of the day of the month (April and May).

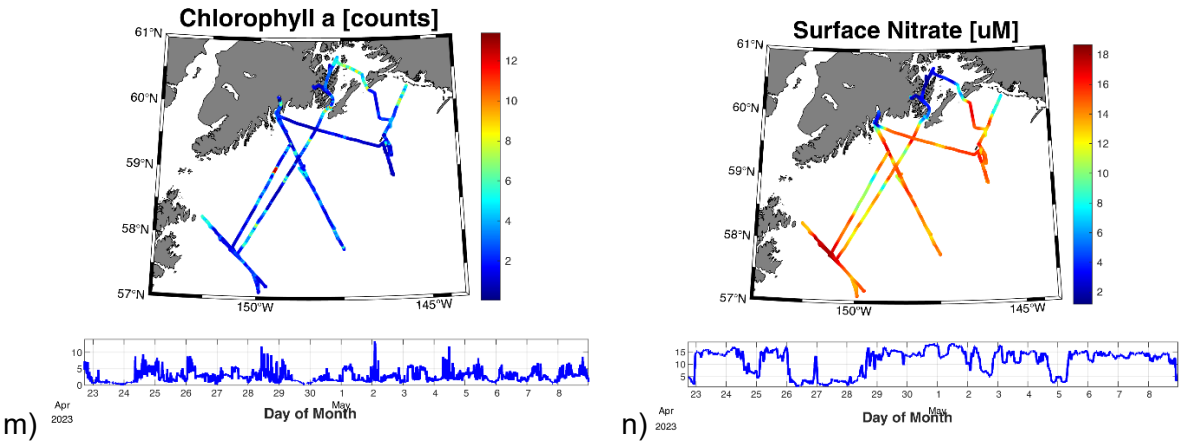

Figure 5m-n. Underway surface sensor data for the cruise track. Lower graphs show each parameter as a function of the day of the month (April and May).

Macro- and Micronutrient:

PI: Ana M. Aguilar-Islas
Participants: Ana Aguilar-Islas, Mette Kaufman, Minerva Padilla-Villa (SIO)

During this field effort our goal was to determine ambient distribution of dissolved inorganic macronutrients (nitrate, nitrite, ammonium, phosphate and silicic acid) and the micronutrient iron across the three main NGA LTER lines (KOD, GAK, MID) and Prince William Sound. Nutrient distributions in conjunction with hydrography are used to determine resource variability to the phytoplankton community in space and time and to identify the relative importance of various processes in supplying nutrients to surface waters.

Externally funded Collaboration: A secondary aim was to collect seawater samples for the Barbeau Lab at the California Current Ecosystem (CCE) LTER. Samples for Fe isotopes and zirconium isotopes were collected

Table 1. Samples collected for Nutrient Analysis
Intensive stations are in bold. Additional samples collected from primary production (PP) casts and surface transects are under "OTHER"

STATION	# samples	STATION	# samples	STATION	# samples
RES 2.5	13	MID1	3	KOD1	7
RES 2.5b	13	**MID2**	9	KOD2	9
GAK1	13	MID3	8	KOD3	7
GAK2	11	MID4	8	KOD4	7
GAK3	12	**MID5**	8	**KOD5**	8
GAK4	11	MID6	4	KOD6	8
GAK5	11	MID7	7	KOD7	11
GAK6	10	MID8	14	KOD8	14
GAK7	12	MID9	15	KOD9	15
GAK8	13	**MID10**	15	**KOD10**	17
GAK9	13				
GAK10	15	**PWS2**	14		
GAK11	15	PWS3	14	OTHER	# samples
GAK12	15	PWS1	13	TM Fish/profile	5
GAK13	16	KIP0	13	PP casts	30
GAK14	15	KIP2	14		
GAK15	16	MS2	11		
		IB0	13		
GEO Mooring	13	IB1	13		
		IB2	10	**TOTAL**	**580**

Sample collection and processing for macronutrient analysis:
Filtered seawater samples were collected from 44 vertical profiles (see Table 1) from surface to 1500 m using the ship's CTD rosette bottles. Samples were filtered through 0.45 um cellulose acetate filter disks using a syringe, and were frozen (-80 ^{o}C) following collection. Samples were also obtained from primary production casts (55) and surface water from the trace metal surface sampler (1). Kaufman was responsible for CTD macronutrient sampling with some help from Emily Ortega and Josianne Haag. In total 553 samples were collected for nutrient analysis.

Sample collection for iron analysis:
a) Seawater samples were collected from 16 vertical profiles (see Table 2) from 15 -1000 m using a trace metal clean (TMC) rosette made of powder coated aluminum and loaded with Teflon-coated Niskin bottles with external springs. A dedicated winch with 5/16" Amsteel line and a TMC block mounted on the starboard crane were used to deploy/recover the TMC rosette. The winch was borrowed from the UNOLS West Coast winch pool. All participants were involved in deck operations, with assistance from crew and marine technician.
b) Surface seawater samples were collected underway while arriving (or departing) the stations where TMC casts took place. These samples are used to complete vertical profiles. Surface seawater samples were also collected during transit between the MID and KOD lines. These

samples were obtained from a custom-made surface sampler (FeFish) (Figure 9) deployed from the starboard crane, and kept at a distance between 3-5 m from the hull while being towed at ~3 knots. Water was pumped with the use of an air actuated diaphragm pump that delivered the sample into "the bubble" (Figure 9) through Teflon-lined polyethylene tubing. Ortega, Kaufmann and Aguilar-Islas were involved in deck operations, with assistance from the crew and marine technician.

Table 2. Samples for iron parameters
DFe = dissolved iron (< 0.2 um), TDFe = total dissolvable iron (unfiltered),
PFe = particulate iron (> 0.2 um), Ligands = Iron-binding organic ligands (< 0.2 um).

STATION	DFe	Fe Isotopes	TDFe	Ligands	PFe
GAK1	10	0	13	0	1
GAK3	8	0	8	8	0
GAK5	9	0	9	0	0
GAK7	10	0	5	0	2
GAK9	11	0	11	11	0
GAK12	13	0	13	0	0
GAK15	13	0	13	7	0
GAK TOTAL	**74**	**0**	**72**	**26**	**3**
MID10	14	0	12	0	3
MID8	10	0	0	0	0
MID5	7	0	1	0	1
MID2	7	0	4	0	1
MID TOTAL	**38**	**0**	**17**	**0**	**5**
KOD10	13	0	4	0	1
KOD8	11	0	0	0	0
KOD5	7	0	0	0	0
KOD TOTAL	**31**	**0**	**4**	**0**	**1**
PWS2	11	0	0	0	0
GRAND TOTAL	**154**	**0**	**93**	**26**	**9**

Sample processing for iron analysis:
A positive-pressure, plastic enclosure supplied with HEPA filtered air (the "bubble") was constructed in the analytical lab to house the Niskin bottles, IronFish sampling spigots and filtration rigs. Immediately after collection Niskin bottles were transferred to the bubble for subsampling. Filtered (through 0.2 um Acropak capsules) subsamples for dissolved Fe analysis were processed from all casts at all depths, and from all IronFish samples. Filtered subsamples for the analysis of iron-binding organic ligands, unfiltered samples for total dissolvable iron analysis, and filters for particulate iron analysis were obtained from a subset of samples (see Table 2). Particles were collected on 0.2 μm polycarbonate filter discs (Nuclepore) using trace metal clean techniques. Padilla-Villa and Aguilar-Islas was responsible for subsampling and filtration. Ultrafiltration for soluble iron was not carried out during this cruise. In total there were 154 DFe samples, 93 TDFe samples, 26 Ligand samples, and 9 particulate samples collected and processed during the cruise.

Figure 6. The FeFish being deployed along the GAK Line.

General Notes
We had a successful cruise and were able to accomplish all the programmed sampling for macro-nutrients and iron parameters. We were also able to collect samples for collaborators at the CCE LTER.

The warehouse was easy to access before and after the cruise, and the SMC personnel were helpful during loading and offloading. The marine technicians provided excellent support throughout the cruise. The crew was always helpful responding promptly to requests in a happy and professional manner. We experienced no issues with ship's facilities needed for macro- and micronutrient work. Laboratory spaces were adequate, the ship's deck gear, -80 oC freezer and walk-in refrigerator were in good working condition. Internet access was excellent. The quality of the food was excellent. Living quarters were in good condition, as were the linens provided.

Carbonate Chemistry:

PI: Claudine Hauri
Participants: Addie Norgaard

Pre-filtered dissolved inorganic carbon, total alkalinity and pH samples were taken at specific stations along the Seward, Kodiak, and Middleton Lines, and in Prince William Sound. Samples were filtered with a 0.45 micron membrane filter using a peristaltic pump to remove particulate inorganic carbon. **[Except for Kodiak stations because there was such a large bloom that it was impossible to filter].** Triplicates were taken at GAK1, GAK3, GAK5, GAK9, KOD2, KOD3, KOD5, IB1, PWS1, PWS2, PWS3, and GEO. In total 265 samples were collected.

Table 3: Carbonate Chemistry Samples

Station	Number of samples	Station	Number of samples	Station	Number of samples
GAK1	15	PWS1 PWS2	15	MID1	3
GAK2	10	PWS2	16	MID2	8
GAK3	12	PWS3	18	MID3	6
GAK4	10	IB0	10		
GAK5	11	IB1	12	KOD2	14
GAK6	9	IB2	9	KOD3	9
GAK7	11			KOD4	7
GAK9	13	RES2.5	13	KOD5	10
GAK13	2	GEO	10		
GAK15	13				
Total number of samples				**265**	

Biogeochemistry and particle cycling:

PI: Andrew McDonnell.
Participant: Thomas Kelly

Sediment Trap:

Four (4) Lagrangian sediment trap deployments were conducted on SKQ202307S at PWS2, KOD10, KOD5, and GAK5 (Figure 7). Each deployment lasted between 22 to 27 hours thereby capturing gravitationally settling flux at between 1 and 3 depths (depending on station depth). Samples were screened at 200 µm and visually processed to remove swimmers. Samples were routinely screened at 50 µm as well yielding as many as three size fractions from some analyses. While pigment analyses (chlorophyll and phaeopigment) were performed at sea, filters for other measurements were preserved for future analysis, including PIC, POC, PON, C and N isotopic analysis, and biogenic and lithogenic silica. In total 52 pigment, 106 POM, and 53 silica samples were collected.

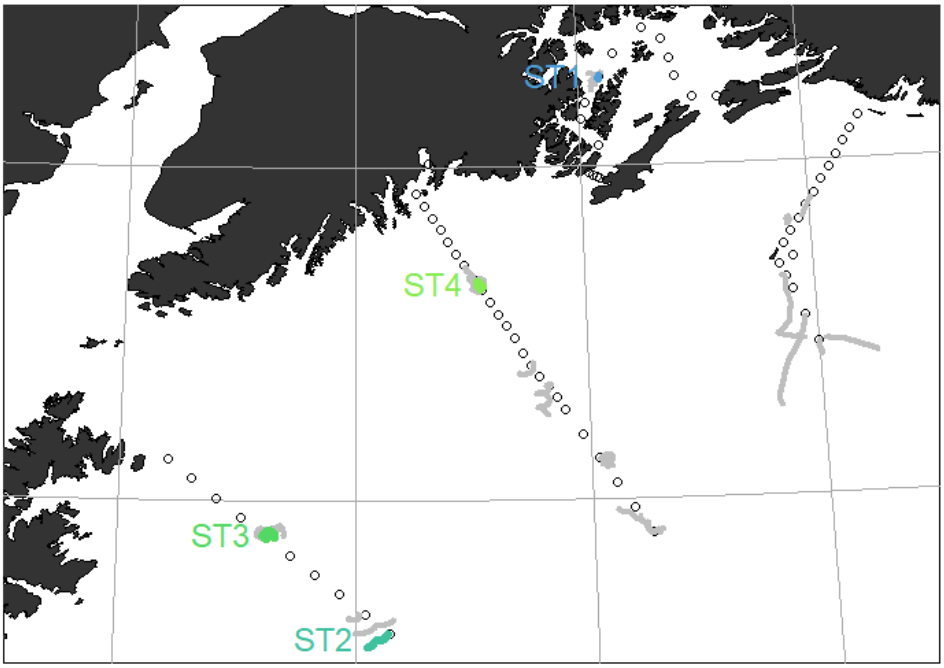

Figure 7. Lagrangian sediment trap deployments in the NGA. Locations for the 4 sediment trap deployments during SKQ202307S are as indicated (note PWS2 station in the north).

One diagnostic use of pigment measurements is the ratio between chlorophyll and phaeopigment (the acid degradation product of chlorophyll). More phaeopigments present relative to chlorophyll in a sample indicates more fecal pellet-derived material and less “fresh”, un-processed phytoplankton material. Based on prior NGA LTER sediment traps (Figure 8), deployments for SKQ202307S were generally indicative of high flux regimes. Flux at PWS2 and GAK5 was clearly dominated by more degraded material such as fecal pellets, while KOD5 likely included many intact, and likely living, phytoplankton cells. KOD10 was a site of low flux overall.

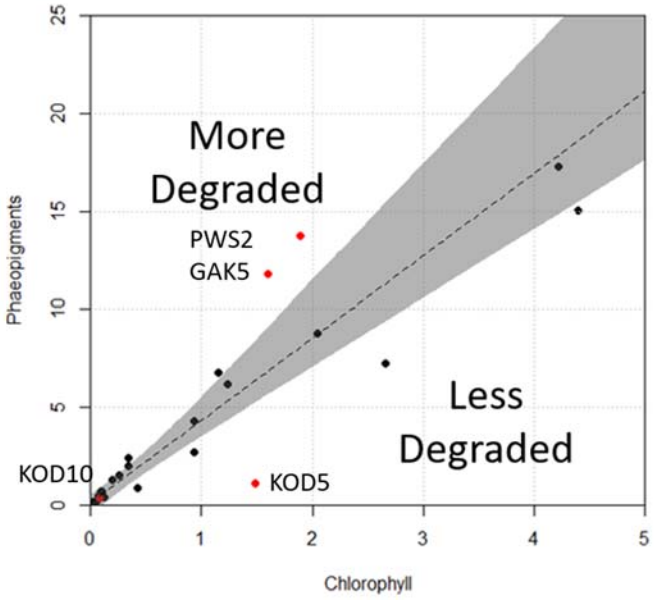

Figure 8. Chlorophyll and phaeopigment fluxes out of the euphotic zone for SKQ202307S (red) and previous NGA LTER cruises (black). Traps at PWS2 and GAK5 are consistent with more degraded material (e.g. fecal pellets) compared to KOD5 and KOD10.

The moored sediment trap was not recovered during SKQ202307S since the mooring did not return our attempts to communicate. See mooring section for more detail. The 2023-2024 mooring was successfully deployed at GEO, which contained a 24 position Hydrobios sediment trap and a Sexton in situ particle camera system.

Particle Distributions:

Attached to the rosette frame were two optical particle sensors: UVP6HF (sn162) and LISST-DEEP (v2). The UVP6HF captures images of particles within the water column during the downcast and automatically processes them during the deployment. The LISST-DEEP uses radial photodetectors to measure the refraction angle of a laser, with the diffraction angle related to bulk particle sizes. Data were collected by the LISST-DEEP on all casts (n = 86), while only a subset of casts were captured by the UVP6HF (n = 20).

Underway Instrumentation

Three instruments were plumbed into the Sikuliaq's uncontaminated seawater system: (1) spectrophotometer (AC-s sn338), (2) particle backscatter (BB3 sn6077), and (3) a fast repetition rate fluorometer (FRRf sn12-8679-004). The AC-s and BB3 were plumbed in series with an automated valve that switched from raw seawater (120 minutes) to filtered seawater (1 micron prefilter; 0.2 micron final filter; 20 minutes). The filtered seawater provided a blank for the BB3 backscatter instrument and a dissolved sample for the spectrophotometer. In addition, 4freshwater blanks and 2 ultrapure water blanks were collected during the cruise to monitor biofouling and ensure high data quality. The flowpath "a" of the ACs instrument was non-functional due to a damaged bulb. The FRRf was set up in automated mode and collected a

new sample from the seawater inlet every ~40 minutes for 681 discrete measurements. The sample was dark acclimated for 20 minutes prior to collection of the fluorescent light curve. All instruments were setup continuously during the voyage.

Dissolved Organic Carbon

Samples for dissolved organic carbon were collected at each intensive station at standard depths (i.e. 0, 10, 20, 30, 40, 50, 75, 150, 250, 750, and 1000) as station depths allowed. Samples were collected directly from Niskin rosette and filtered with an inline 47 mm filter holder containing precombusted GF/F. Acid-washed HDPE bottles (60ml) were filled to approximately 50%. Samples will remain frozen until analyzed.

Oxygen Measurements

Dissolved oxygen samples (n = 65) were collected at 17 stations from across the NGA LTER study site to provide calibration values of the dissolved oxygen sensor on the CTD rosette. Titrations were performed via automated amperometric titration (Langdon Industries sn58) at sea following the approach in *Determination of Dissolved Oxygen in Seawater by Winkler Titration using the Amperometric Technique* (Langdon 2010).

Here we are analyzing the precision of winkler titrations based on Niskin bottles that were sampled 3 or more times. Table 4 shows concentrations and SD of replicate samples:

Table 4: Replicate dissolved oxygen measurements

Cruise	Stn	Cast	Niskin	n	Oxygen µmol kg	Oxygen SD µmol kg
Q202307S	GAK1	2	1	3	134.26	0.50
SKQ202307S	GAK1	2	20	3	367.92	0.04
SKQ202307S	MID8	7	1	4	28.70	0.29
SKQ202307S	MID8	7	16	3	303.68	0.44
SKQ202307S	MID1	9	12	3	329.05	0.47
SKQ202307S	MID5	19	13	3	314.64	0.18
SKQ202307S	PWS2	27	24	3	340.74	0.49
SKQ202307S	GAK1	46	24	3	336.02	0.89

The range of oxygen uncertainties, which is based on standard deviation was 0.044 - 0.888 µmol kg^{-1} and a median value of 0.351 µmol kg^{-1}.

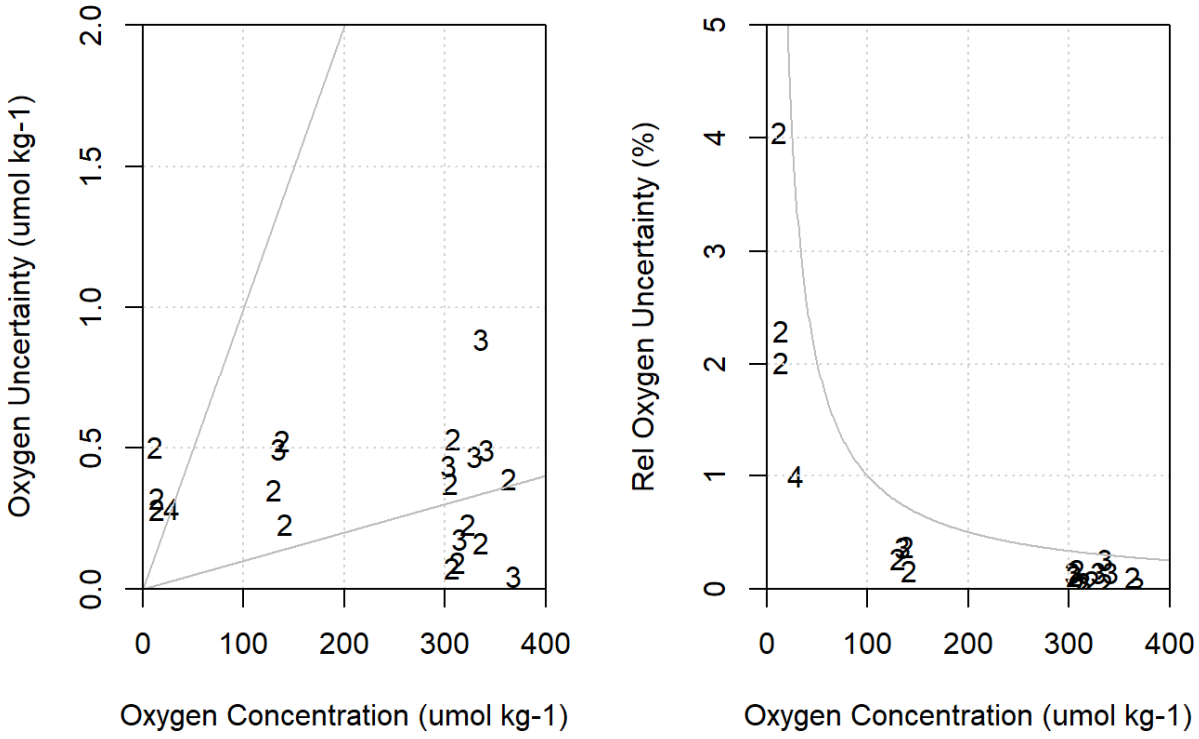

Figure 9. Oxygen precision as indicated by replicate Winkler titrations (number of replicates as shown).

Replicate accuracy was quite high (Figure 9) and consistent with a constant analytical uncertainty of <0.5 µmol kg^{-1} independent of concentration.

CTD oxygen sensor calibrations

Two oxygen sensors (SBE38: sn2945 & sn2643) were mounted to the CTD rosette. Agreement between the two oxygen sensors was quite good with a linear correction from the primary to the secondary sensor of : Primary = 1.017 * secondary + 0.914 µmol kg^{-1}. Similarly agreement between the CTD oxygen downcast values and the discrete titrations were quite high with a small linear correction possible: Winkler = 1.025 * primary - 3.00 and Winkler = 1.045 * secondary - 2.64. Corrections for this offset would result in a modification of the downcast oxygen data by approximately +3 µmol kg^{-1} in surface waters and approximately -2 µmol kg^{-1} within the core of the oxygen minimum zone. It is recommended to contact the PI, Thomas Kelly (tbkelly@alaska.edu), for most up-to-date oxygen correction factors.

Phytoplankton and Microzooplankton:

PI: Suzanne Strom
Participants: Suzanne Strom, Hana Busse (WWU); Liz Cooney (UBC)

State and Rate Measurements:

All three of the standard LTER transect lines (KOD, GAK, MID) were sampled in their entirety, as well as 8 stations in Prince William Sound. Nine intensive stations were sampled spanning the PWS-to-offshore gradient (see red station labels in sampling table).

Phytoplankton biomass and production: Phytoplankton biomass was characterized by size-fractionated chlorophyll at all non-intermediate shelf stations, all Prince William Sound stations, and at the GEO mooring site. Both GAK1 and RES2.5 were sampled twice, once in April (first day of cruise) and once in early May. Samples were analyzed fluorimetrically on board. Primary production estimates were made at all intensive stations except for MID2, as well as the non-intensive station GAK12 (total = 10) using the 13-C method and 24-h deck incubations. Six 'light depths' were sampled per station based on the attenuation coefficient as estimated from the CTD PAR profile. Chlorophyll (size-fractionated into >3 and <3 µm size fractions, see below) and nutrient samples were also taken from each light depth during experiment set-up.

Community characterization: Samples were fixed in acid Lugol's for standard microzooplankton biomass and composition estimates; these were taken from 10 m only at most stations and from 4 depths at intensive stations. At a slightly lower sampling frequency (see table), samples from 10 m were fixed in borate-buffered formalin for diatom characterization. Additional microscopy samples, collected at a similar frequency to the acid Lugol's samples, were fixed in glutaraldehyde, DAPI-stained, and made into slides for epifluorescence microscopy, yielding biomass and composition of nano- and picoplankton. At intensive stations only, samples were taken from 10 m (in duplicate) for molecular (18S rRNA) characterization of the protist community by the Rynearson laboratory at URI. HPLC sampling for phytoplankton accessory pigments was not done on this cruise.

External funding from the North Pacific Research Board allowed for closer examination of the picophytoplankton (<3 µm) size class during this cruise. This was accomplished by adding additional chl-a size fractionation, conducting duplicate primary productivity experiments at each intensive station, and adding flow cytometry sampling for characterization of the pico- and nanoplankton communities. Picophytoplankton characterization was focused on the upper 30 m of the water column.

Externally funded collaborator Dr. Liz Cooney focused on isolating individual protist cells for genomic and transcriptomic sequencing, to be conducted post-cruise in the Keeling laboratory at the University of British Columbia. Cells were obtained from CalVET and Multinet tows, a 20 µm mesh 'hand net' used at the sea surface, and gravity settling of samples from CTD Niskins, including both near-surface and deep (1,000 m) collections. Protists isolated (>300 cells) included dinoflagellates, other flagellates, ciliates, and Rhizaria.

Organic carbon characterization: At intensive stations only, 4 depths were sampled for POC and PIC (total profiles = 10). These samples will return to UAF for analysis by the Kelly lab. Dissolved organic carbon (DOC) sampling transitioned entirely to Tom Kelly during this cruise.

Preliminary observations:

The spring bloom was modest and patchy this year, as evident in fragmentary VIIRS satellite imagery and in our chlorophyll-a data. With the exception of the innermost shelf and some stations in PWS, nitrate concentrations appeared to be moderate to high throughout the region. Apparently an extensive, intense bloom had yet to develop (and may never), possibly due to persistent cloud cover. High abundances of heterotophic dinoflagellates (predators on diatoms) and larvaceans seemed to be present - if confirmed by preserved sample analysis, elevated grazing pressure could also be part of the explanation for sluggish bloom development. In terms of interannual comparison, the previous two years saw substantially higher chl-a throughout the study region in spring (Fig. 10).

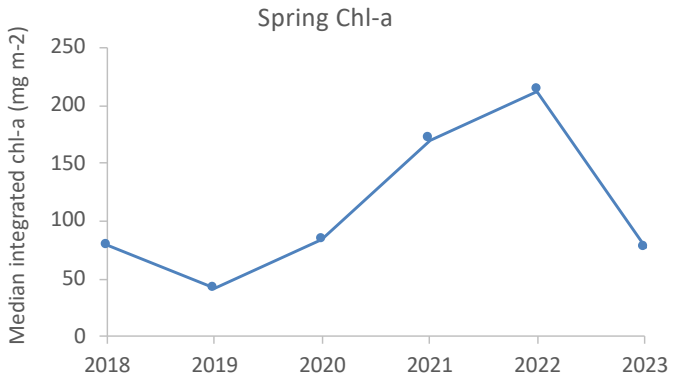

Figure 10. Median integrated (0-75 m or bottom) chl-a (mg m^{-2}) for all KOD, MID and GAK stations sampled during late April-early May cruises to the NGA from 2018 to present. Only the Seward Line (GAK) was sampled in 2020.

In spite of the overall modest chl-a concentrations, diatoms were present at most stations with only the outer ends of the MID and KOD lines clearly dominated by cells <20 µm (Fig. 11). Relatively high concentrations of large phytoplankton on the outer GAK line might have been associated with an anticyclonic eddy centered around GAK12-13. The highest chl-a concentrations observed on the cruise were at MID1 and 2 and MS2 (10-11 µg/liter in near-surface samples). The relationship between integrated chl-a and chl-a size composition (Fig. 11) showed a classic spring pattern with higher chl-a regions almost entirely dominated by large cells.

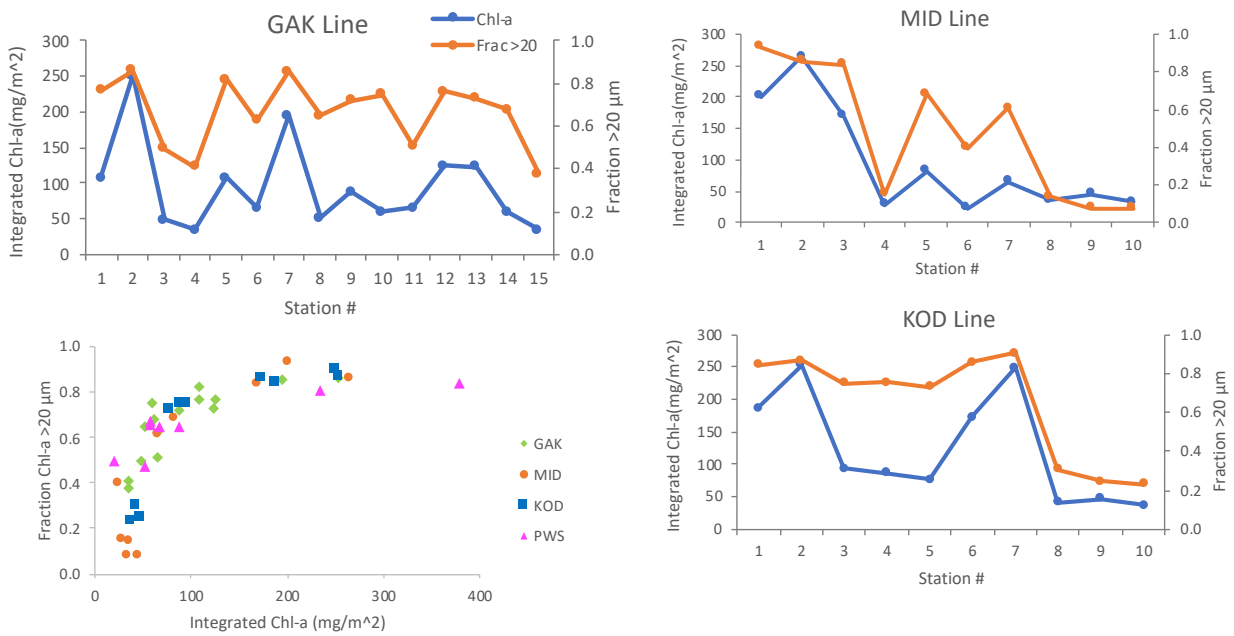

Figure 11. Cross-shelf distribution of integrated (0-75 m or bottom) chl-a and chl-a size composition on GAK, MID, and KOD lines, as well as relationship between chl-a biomass and phytoplankton size composition (lower left).

Table 5. Sampling effort for SKQ2023-07S, by station. Intensive stations shown in **red**.

Station	SF Chl	Lugols µzoo	Diatom	Nano/ pico	3 µm chl	Euk Mol	POC/ PIC	13C prod
RES2.5 (Apr)	x							
GAK1 (Apr)	x							
MID10	x	x	x	x	x	x	x	x
MID9	x	x						
MID8	x							
MID1	x							
MID2	x	x	x	x	x	x	x	
MID3	x	x						
MID4	x	x						
MID6	x	x						
MID7	x	x		x	x			
MID5	x	x	x	x	x	x	x	x
IB2	x							
IB1	x							
IB0.5	x							
PWS3	x							
PWS2	x	x	x	x	x	x	x	x
PWS1	x							
KIP2	x							
MS2	x							
KOD10	x	x	x	x	x	x	x	x
KOD9	x			x	x			
KOD8	x							
KOD4	x							
KOD5	x	x	x	x	x	x	x	x
KOD3	x	x		x	x			
KOD2	x							
KOD1	x	x		x	x			
KOD7	x	x		x	x			
KOD6	x							
GAK1 (May)	x	x	x	x	x	x	x	x
GAK2	x							
GAK3	x	x	x	x	x			
GAK4	x							
GAK5	x	x	x	x	x	x	x	x
GEO	x							
GAK6	x							
RES2.5 (May)	x							
GAK9	x	x	x	x	x	x	x	x
GAK8	x							
GAK7	x	x		x	x			
GAK10	x							
GAK11	x	x		x	x			
GAK12	x	x		x	x			x
GAK13	x	x		x	x			
GAK15	x	x	x	x	x	x	x	x
GAK14	x	x		x	x			
Totals:	**47**	**24**	**11**	**21**	**21**	**10**	**10**	**10**

Table 5 Key:

SF Chl: size-fractionated chlorophyll-a; water sample filtered in series through a 20 µm pre-size filter followed by a glass fiber filter (effective pore size 0.7 µm)

Lugol's µzoo: water sample preserved in acid Lugol's iodine solution (final concentration 5%) for microscopy analysis of size and composition of ciliate and dinoflagellate microzooplankton (cells ≥15 µm). Samples taken from 10 m except at intensive stations, where a 4-depth profile was collected (10, 20, 30, 50 m)

Diatom: water sample (10 m) preserved in borate-buffered formalin (final concentration 2% formaldehyde) for microscopy analysis of diatom community.

Nano/pico: water sample (10 m) pre-screened through 100 µm Nitex mesh, preserved in glutaraldehyde (final concentration 0.5%), and stained with DAPI for on-board filtration and slide preparation (0.8 µm pore size). Slides stored frozen for epifluorescence microscopy analysis of cyanobacteria and protists <20 µm in size. Samples (1.5 ml, also 100 µm prescreened) were also fixed with 94 µL paraformaldehyde, flash frozen in liquid N2 after 10 min dark fixation, and stored at -80°C for flow cytometry analysis of pico- and nanophytoplankton. Four depths sampled at each indicated station (0, 10, 20, 30 m).

Euk Mol: water sample filtered (0.2 µm) and frozen in liquid N_2 for molecular analysis of eukaryotic microbial community composition.

POC/PIC: Paired samples from a single Niskin filtered through pre-combusted glass fiber filters and filters stored frozen for analysis of particulate organic and particulate inorganic carbon. Samples taken from 10, 30, 50, 75 m.

13C prod: Water column primary productivity measured via 24-h incubation of samples from different depths with 13C-labeled sodium bicarbonate. Two bottles were incubated per light depth. One was filtered through a GFF for determination of total production; the other was pre-screened through 20 µm Nitex mesh and a 3 µm pore-size polycarbonate filter, and the <3 µm size fraction captured on a GFF filter for determination of picophytoplankton production.

Microbes and Genetics:

PI: Gwenn Hennon
Participants: Gwenn Hennon, Concepcion Melovidov

Sample collection at the NGA-LTER stations:

At all intensive stations plus select stations, four depths were sampled for DNA and flow cytometry (Table X), one depth for RNA was sampled at intensive stations only (Table X). We used a quasi-adaptive sampling scheme for the four depths at which DNA and FCM samples were collected, with two fixed depths and two depths that were chosen based on downcast CTD features. We sampled the surface and 10 m for the fixed depths. We sampled the deep chlorophyll max (DCM) when present or a depth corresponding to the pycnocline if the DCM was absent. The DCM varied in depth, sitting at ~10- 25 m depending on the station. For the final depth, we sampled the bottom (~5 m above the seafloor) or oxygen minimum if it did not coincide with the bottom of the profile. Typically, the oxygen minimum of the profile coincided with the bottom depth over the shelf, but was found at approximately 800-1000m for the deeper stations.

Whole water for DNA samples was collected in 4L acid-clean brown plastic bottles, prefiltered with a 200 μm mesh screen to remove mesozooplankton, filtered on a 0.2 μm sterivex filter, and stored at -80 C. The volumes filtered for each DNA sample were variable according to the biomass present in the water and were recorded for each filter, ranging from 1.4 – 4 L.

Flow cytometry (FCM) samples were collected from the same 4L brown plastic bottles as the DNA samples, 1mL of whole seawater was removed and fixed with 20 μL of 25% glutaraldehyde and incubated for 10 min in the dark. The FCM samples were then flash frozen in liquid nitrogen and stored at -80 C.

Size-fractionated RNA samples were collected in duplicate at all intensive stations from 10 m depth from the productivity cast. Whole water for RNA samples was collected in duplicate with acid-clean 10 L polycarbonate bottles, prefiltered with a 200 μm mesh screen to remove mesozooplankton. RNA samples were filtered in series on a 20 μm nylon mesh 47mm filter and a 0.2 μm sterivex filter, flash frozen and stored in liquid nitrogen.

Table 6: Summary of Genetic and FCM samples.

Station	DNA	FCM	RNA	notes
RES2.5	8	8	--	Occupied 4/22/23 and 5/4/23
GAK1	8	8	8	Occupied 4/22/23 and 5/2/23
GAK5	4	4	4	
GAK9	4	4	4	
GAK12	4	4	4	
GAK15	4	4	4	
GEO	2	--	--	Duplicate DNA at 23m
MID1	4	4	--	
MID2	4	4	4	
MID5	4	4	4	
MID7	4	4	--	
MID10	4	4	4	
PWS2	4	4	4	
IB1	4	4	--	
IB0.5	4	4	--	Attempted to collect a sea ice sample, but failed to get a clean bottom ice sample
KOD1	4	4	--	
KOD2	4	4	--	
KOD5	4	4	4	
KOD7	4	4	--	
KOD10	4	4	4	
Totals:	**85**	**83**	**48**	

Meso/Macro Zooplankton:

PI: Hopcroft,
Participants: Caitlin Smoot, Emily Stidham, Hannah Kepner, Alex Poje

Zooplankton sampling operations were divided into distinct day and night activities. During daytime, Quadnets/Calvets (Quad frame has 4 nets, 2 of 150 µm mesh and 2 of 53 µm mesh) casts were conducted with the underwire winch on the starboard crane at all stations (except intermediate "i" stations) to 100 m depth, or within 5 m of the bottom at shallower stations. At intensive stations, an additional Quadnet cast was taken, with the 150 µm net preserved in ethanol for molecular studies and the 53µm nets used for live sorting. Quantitative counts of *Neocalanus* species and stages were made at Seward Line and PWS intensive stations from either one or both of the 53µm nets. Additionally, at intensive stations along the Seward Line and at PWS2, a Multinet equipped with 150 µm mesh nets was deployed vertically to 200 m (shelf) with a second cast deployed to 750 m (PWS2) dividing strata at 600, 400, 300, 200,100, 60, 40, and 20 m. A Deep Multinet was also deployed at GAK15 and KOD10 to 1200 m dividing strata at 600, 400, 300, 200,100, 60, 40, and 20 m.

During night-time, a Multinet equipped with 505 µm-mesh nets was towed obliquely to 200 m depth (or 5 m above the bottom) dividing strata at 100, 60, 40, and 20 m. A second collection was made at Intensive stations and preserved in Ethanol for molecular analysis. Bongo nets (60cm) were employed instead of the multinet along the Kodiak and Middleton Lines. An SBE 49 "Fastcat" CTD sampling at 16 Hz was attached to the Bongo Nets (deployed off the side arm crane or stern) and used to collected pressure data to gauge the depth. One net from each Bongo deployment, and the drogue net from the Multinet, were sent to NOAA Eco-FOCI for larval fish analysis.

The ISIIS-DPI was deployed along the Seward Line from GAK1-GAK6i, and during weather days in Prince William Sound for instrument test. All instruments and imaging systems worked as planned with the exception of acoustics where licensing issues precluded operation. Safe-working-load tension on the optical cable remained a significant operational concern.

Development of *Neocalanus* species seemed somewhat delayed compared to recent years with most *N. flemingeri* at Stage CV while *N. plumchrus* were split between stages CIII and CIV.

Externally funded collaboration:
Project: Neocalanus preparation for diapause (NSF project - UHM & UAF; PIs: Lenz, Hopcroft, and Hartline)

Research Activities: Live Quad nets samples at PWS2 and Seward Line intensive Stations were sorted for Neocalanus CV (up to 60 individuals for each species and stage), and then imaged for determination of lipid sac volume. Typically only N. flemingeri were imaged due to very low abundances of N. plumchrus CV.

Table 7. Sampling effort for Zooplankton. Intensive stations highlighted. *samples taken for bulk genetics, sorting or imaging. ^ - sample taken once at beginning and once nearer end of cruise

Station	Calvet-Quad	Multi Vert.	Multi Tow	Bongo
RES2.5^	x			
GAK1^	X*	x	x	
GAK2	x		x	
GAK3	x		x	
GAK4	x		x	
GAK5	X*	x	x	
GAK6	x		x	
GAK7	x		x	
GAK8	x		x	
GAK9	X*	x	x	
GAK10	x		x	
GAK11	x		x	
GAK12	x		x	
GAK13	x		x	
GAK14	x		x	
GAK15	x	X*	x	
MS2				
KIP2	x		x	
PWS1	x		x	
PWS2	X*	X*	X	
PWS3	x		x	
IB0	X*			
IB1	x			
IB2	X*			
KOD1	x			X
KOD2	x			X
KOD3	x			X
KOD4	x			X
KOD5	X*			X
KOD6	x			
KOD7	x			X
KOD8	x			X
KOD9	x			X
KOD10	X*	x		X
MID1				
MID2	X*			X
MID3	x			X
MID4	x			X
MID5	X*			X
MID6	x			X
MID7	x			X
MID8	x			X
MID9	x			X
MID10	X*	x		X
TOTAL	**42**	**7**	**19**	**18**

Marine bird and marine mammal surveys (USFWS)

PI: Elizabeth Labunski and Robert Kaler U.S. Fish and Wildlife Service
Participant: Dan Cushing, Pole Star Ecological Research LLC,
onboard observer and report author

Background:
We conducted marine bird and marine mammal surveys in the Northern Gulf of Alaska (NGA), April 22 to May 8, 2023, aboard the 80-m *R/V Sikuliaq*, as a component of the NGA Long-term Ecological Research / Seward Line (NGA-LTER) cruise lead by chief scientist Ana Aguilar-Islas of the University of Alaska Fairbanks. The seabird component is primarily funded by the North Pacific Research Board (Project L37-01A) and the Exxon Valdez Trustee Council (Project 20120114-M). Station-based sampling was conducted along the Seward, Middleton, and Kodiak Lines, and in Prince William Sound (PWS). Seabird and marine mammal surveys were conducted when the vessel was underway, including transits between sampling stations and sampling lines.

Methods:
Observer D. Cushing conducted visual surveys during daylight hours while the vessel was underway. Surveys were conducted from the bridge, using a modified line-transect protocol. The observer searched an area within a 300m, 90◦ arc from the bow to the beam, using hand-held 10x binoculars when necessary. Observations were recorded using four distance bins: 0–50m, 51–100m, 101–200m, and 201–300m. Observations of rare birds or large flocks, or marine mammals observed outside of the sampling window were recorded as “off-transect”. Observations were recorded directly into a laptop computer using software Dlogv3 (R.G. Ford Consulting, Portland, OR) which logged the geographic coordinates of each sighting, as well as the track line and environmental conditions (Beaufort Sea state, weather, glare, ice coverage) at 20 sec intervals. Data were processed by subdividing survey transects into 3-km segments to calculate density (birds km-2) for each taxon in each transect segment.

Preliminary Results:
We conducted a total of 1602 linear km of surveys during the April–May 2023 cruise (Figure 12). On-transect, we observed a total of 5917 individuals of 36 species of birds, with an additional 15 species observed off-transect (Table 8). Averaged across all 3-km transect segments, the mean density of total birds (all bird species combined) was 12.5 birds km^{-2}. The highest densities occurred over banks and near the coast (Figure 13).

Compared to 20 other spring surveys of Seward Line from GAK1–GAK13 during 1998–2022 (the longest available time-series), the average density of total birds was 5.9 birds km^{-2}, which was the 5th lowest value. The low densities along the Seward Line during spring 2023 was consistent with a pattern of below-average densities observed since 2019, which was the lowest year in the time-series.

Short-tailed and sooty shearwaters were the two most abundant avian species observed on transect, and composed 24.8% and 23.1% of the total, respectively (Table 8). The highest densities of shearwaters occurred over banks (Figure 14), including Albatross bank (both species), Portlock bank (both species), an unnamed bank southwest of Montague Island (short-tailed shearwaters), and in the vicinity of Middleton Island (short-tailed shearwaters).

The third most abundant bird was the red-necked phalarope (19.2% of total). Red-necked phalaropes were the most abundant avian species observed on transect (28.9% of total; Table 8). They occurred in flocks of up to 200 birds, with most observations along fronts in Resurrection Bay (Figure 15). Phalaropes are shorebirds that feed while swimming, and at sea they feed on zooplankton captured near the water surface, often at fronts. The April–May period coincides with their seasonal migration, with hundreds of thousands moving through the northern Gulf of Alaska region.

Black-legged kittiwakes composed 8.6% of sightings. While kittiwakes were widely distributed, their highest densities occurred over banks, including the same areas where shearwaters were concentrated, as well as Montague Strait (Figure 16). Common murres composed 7.8% of sightings. Murres were most abundant over Albatross and Portlock Banks (Figure 17), as well as near Resurrection Bay and in Hinchinbrook Entrance.

While albatrosses and murrelets each composed relatively low proportions of total avian sightings, both groups are of conservation concern. Murrelet species composed 3.2% of sightings. Most were marbled murrelets (Table 8); concentrations of marbled murrelets occurred near Middleton Island, south of Hinchinbrook Island, and over Albatross Bank (Figure 18). Kittlitz's murrelets were observed in Icy Bay. Ancient murrelets primarily occurred near Resurrection Bay. Black-footed and Laysan albatrosses composed 0.4% and 0.1% of sightings, respectively. Their highest numbers occurred over the continental slope and the outer continental shelf (Figure 19). Ducks, geese, and loons were observed migrating over marine waters, with 15 species of waterfowl observed during the cruise.

Two dead birds were encountered during the cruise, a northern fulmar and a tufted puffin. Both were observed on May 8, with the fulmar observed near station GAK6 and the puffin near GAK1.

We observed a total of 13 species of marine mammal (Table 9), with 48 individuals on-transect and 337 off-transect. The most abundant toothed whale (odontocete) species was the Dall's porpoise, which were widespread, but especially abundant in Resurrection Bay (Figure 20). Killer whales were widely distributed on the shelf. A sperm whale was observed near the shelf-break on the Kodiak Line. The most abundant baleen whale (mysticete) species was the fin whale (Table 9), which was widely distributed (Figure 21). Humpback whales were observed in PWS and Resurrection Bay. Gray whales were observed near Middleton Island. Harbor Seals were the most abundant pinniped; most were hauled out on glacial ice in PWS (Figure 22). Steller sea lions were seen in PWS and Resurrection Bay. Four northern fur seals were observed, two over the continental shelf and two in oceanic waters. Sea otters were observed in PWS and Resurrection Bay, and river otters were observed in PWS.

Table 8. Birds observed during the April-May 2023 NGA-LTER cruise. On-transect observations only. Off-transect observations during surveys or while on station are indicated by an asterisk.

Common name	Scientific name	Number	% of total
Brant	*Branta bernicla*	3	0.1
Cackling goose	*Branta hutchinsii*	*	*
Canada goose	*Branta canadensis*	*	*
Northern shoveler	*Spatula clypeata*	*	*
Mallard	*Anas platythynchos*	42	0.7
Northern pintail	*Anas acuta*	10	0.2
Greater scaup	*Aythya marila*	3	0.1
Lesser scaup	*Aythya affinis*	*	*
Harlequin duck	*Histrionicus histrionicus*	*	*
Surf scoter	*Melanitta perspicillata*	*	*
White-winged scoter	*Melanitta fusca*	3	0.1
Black scoter	*Melanitta americana*	*	*
Long-tailed duck	*Clangula hyemalis*	2	< 0.1
Barrow's goldeneye	*Bucephala islandica*	*	*
Red-breasted merganser	*Mergus serrator*	5	0.1
Unidentified duck	*Anatidae* spp.	1	< 0.1
Red-necked phalarope	*Phalaropus lobatus*	1135	19.2
Pomarine jaeger	*Stercorarius pomarinus*	4	0.1
Parasitic jaeger	*Stercorarius parasiticus*	1	< 0.1
Common murre	*Uria aalge*	461	7.8
Pigeon guillemot	*Cepphus columba*	15	0.3
Marbled murrelet	*Brachyramphus marmoratus*	149	2.5
Kittlitz's murrelet	*Brachyrmaphus brevirostris*	*	*
Marbled or Kittlitz's murrelet	*Brachyramphus* spp.	23	0.4
Ancient murrelet	*Synthliboramphus antiquus*	15	0.3
Cassin's auklet	*Ptychoramphus aleuticus*	1	< 0.1
Parakeet auklet	*Aethia psittacula*	2	< 0.1
Rhinoceros auklet	*Cerorhinca monocerata*	8	0.1
Horned puffin	*Fratercula corniculata*	1	< 0.1
Tufted puffin	*Fratercula cirrhata*	89	1.5
Black-legged kittiwake	*Rissa tridactyla*	511	8.6
Sabine's gull	*Xema sabini*	4	0.1
Short-billed gull	*Larus brachyrhynchus*	4	0.1
Herring gull	*Larus argentatus*	18	0.3
Glaucous-winged gull	*Larus glaucescens*	196	3.3
Arctic tern	*Sterna paradisaea*	40	0.7
Red-throated loon	*Gavia stellata*	1	< 0.1
Pacific loon	*Gavia pacifica*	7	0.1
Black-footed albatross	*Phoebastria nigripes*	25	0.4
Laysan albatross	*Phoebastria immutabilis*	7	0.1
Fork-tailed storm-petrel	*Hydrobates furcatus*	152	2.6
Leach's storm-petrel	*Oceanodroma leucorhoa*	10	0.2
Unidentified gadfly petrel	Pterodroma spp.	*	*
Northern fulmar	*Fulmarus glacialis*	86	1.5
Short-tailed shearwater	*Ardenna tenuirostris*	1468	24.8
Sooty shearwater	*Ardenna grisea*	1364	23.1

Sooty or short-tailed shearwater	*Ardenna tenuirostris or grisea*	38	0.6
Red-faced cormorant	*Phalacrocorax urile*	*	*
Pelagic cormorant	*Phalacrocorax pelagicus*	13	0.2
Double-crested cormorant	*Nannopterum auritus*	*	*
Bald eagle	*Haliaeetus leucocephalus*	*	*
Peregrine falcon	*Falco oeregrinus*	*	*
Unidentified passerine	*Passeriformes spp.*	*	*
Total		5917	100.0%

Table 9. Marine mammals observed during the April-May 2022 NGA-LTER cruise.

Common name	Scientific name	Number on-transect	Number off-transect
Fin whale	*Balaenoptera physalus*	2	11
Common minke whale	*Balaenoptera acutorostrata*	0	2
Humpback whale	*Megaptera novaeangliae*	1	1
Gray whale	Eschrichtius robustus	0	3
Sperm whale	*Physeter macrocephalus*	0	1
Killer whale	*Orcinus orca*	8	18
Unidentified whale	*Cetacea* spp.	0	22
Dall's porpoise	*Phocoenoides dalli*	24	43
Harbor porpoise	*Phocoena phocoena*	2	0
Northern fur seal	*Callorhinus ursinus*	4	1
Steller sea lion	*Eumetopias jubatus*	3	0
Harbor seal	*Phoca vitulina*	1	226
Unidentifed pinniped	*Pinnipedia* spp.	0	1
Sea otter	*Enhydra lutris*	3	7
River otter	*Lontra canadensis*	0	1
Total		**48**	**337**

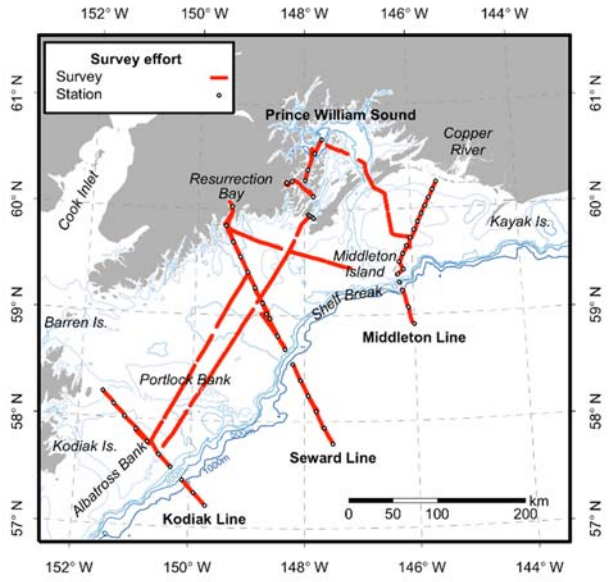

Figure 12. Location of seabird and marine mammal surveys (red).

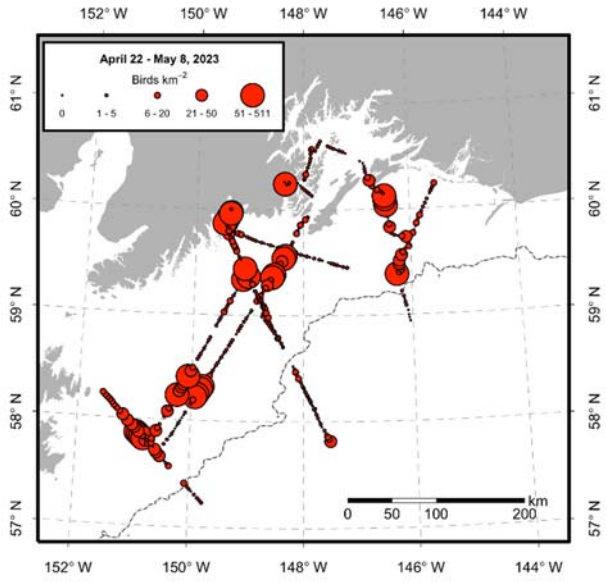

Figure 13. Densities (birds km^{-2}) of total seabirds (all species combined).

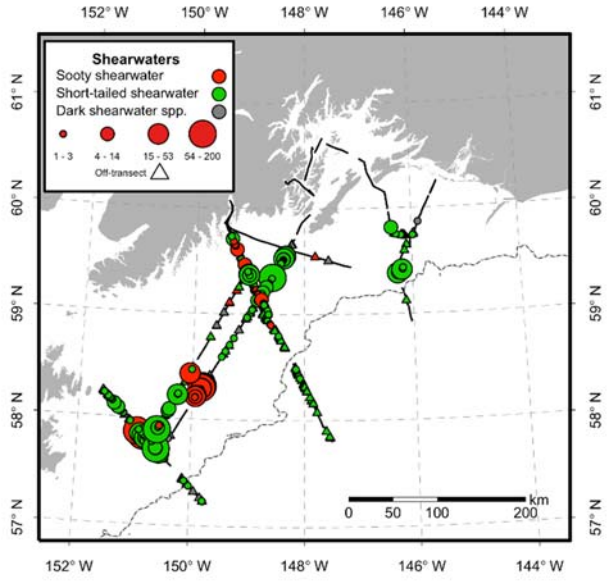

Figure 14. Shearwaters.

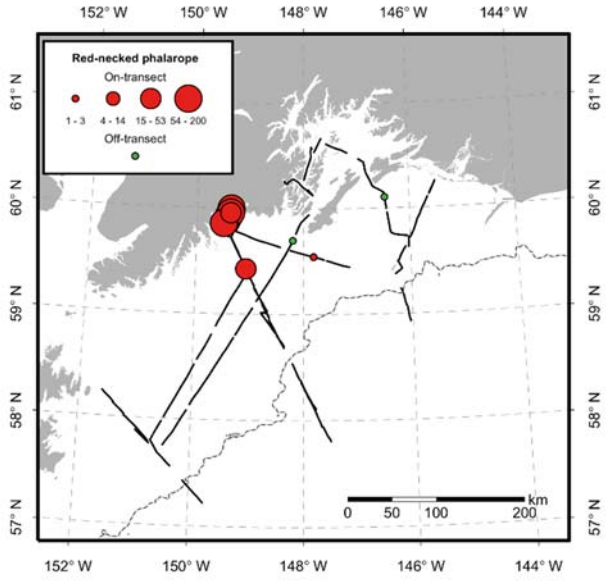

Figure 15. Red-necked phalarope.

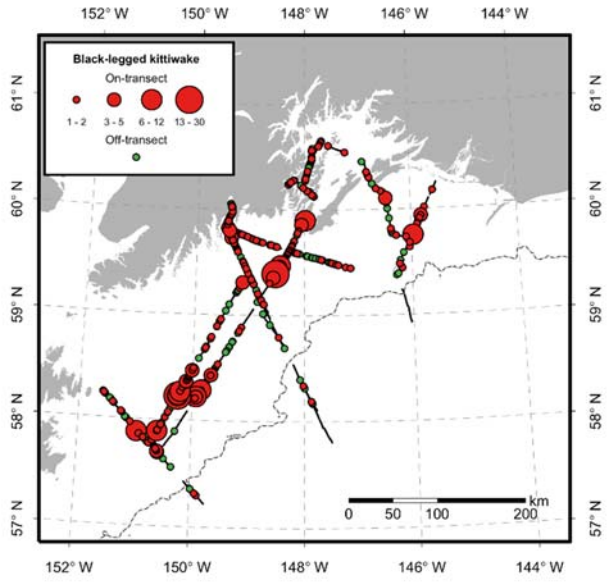

Figure 16. Black-legged kittiwake.

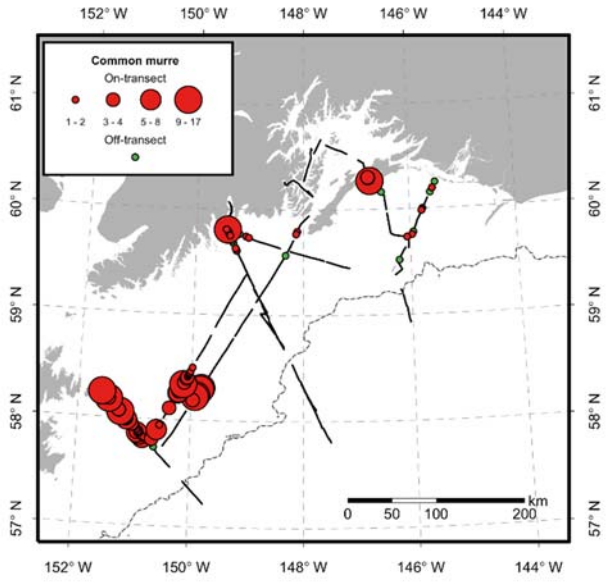

Figure 17. Common murre.

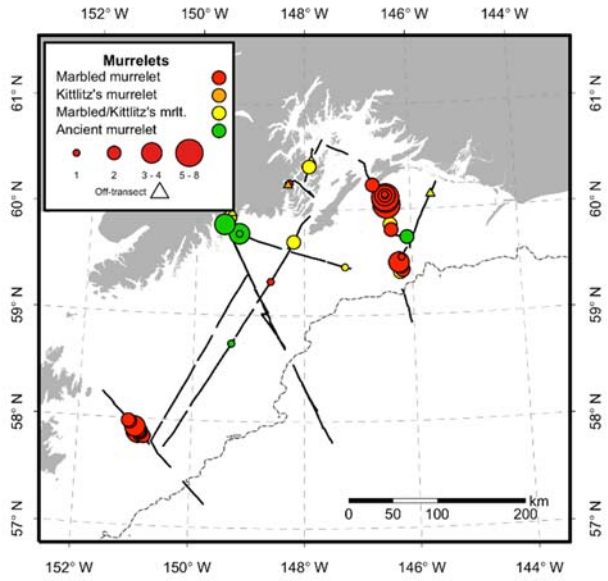

Figure 18. Murrelets.

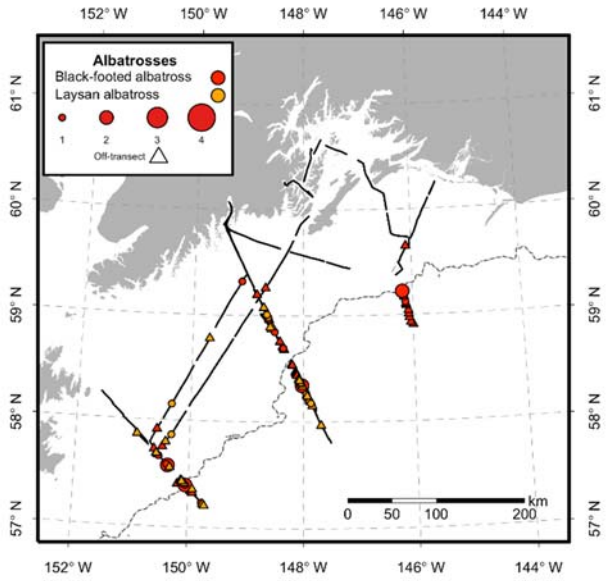

Figure 19. Albatrosses.

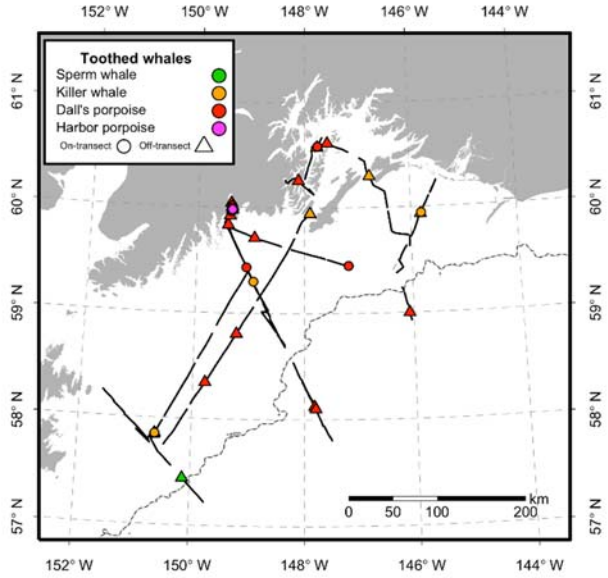

Figure 20. Toothed whales.

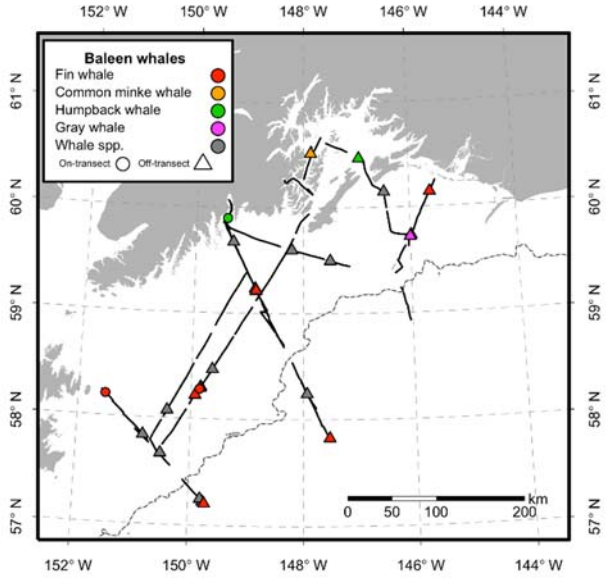

Figure 21. Baleen whales.

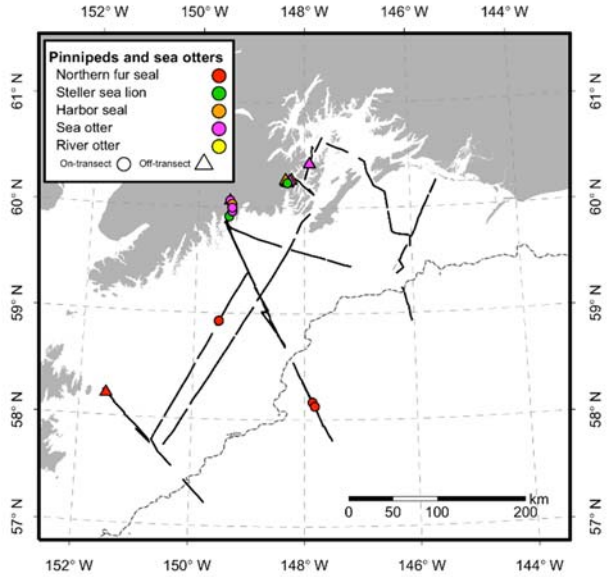

Figure 22. Pinnipeds and otters.

Appendix. STANDARD STATIONS (intensive stations highlighted)

Latitude N (degrees, minutes)		Longitude W (degrees, minutes)		Station Name	Depth
Resurrection Bay Station					
60	1.5	149	21.5	RES2.5	298
Seward Line					
59	50.7	149	28	GAK1	269
59	46	149	23.8	GAK1I	
59	41.5	149	19.6	GAK2	228
59	37.6	149	15.5	GAK2I	
59	33.2	149	11.3	GAK3	213
59	28.9	149	7.1	GAK3I	
59	24.5	149	2.9	GAK4	201
59	20.1	148	58.7	GAK4I	
59	15.7	148	54.5	GAK5	167
59	11.4	148	50.3	GAK5I	
59	7	148	46.2	GAK6	151
59	2.7	148	42	GAK6I	
58	58.3	148	37.8	GAK7	243
58	52.9	148	33.6	GAK7I	
58	48.5	148	29.4	GAK8	288
58	44.6	148	25.2	GAK8I	
58	40.8	148	21	GAK9	276
58	36.7	148	16.7	GAK9I	
58	32.5	148	12.7	GAK10	1459
58	23.3	148	4.3	GAK11	1410
58	14.6	147	56	GAK12	2134
58	5.9	147	47.6	GAK13	2058
57	*56.6*	*147*	*39*	*GAK14*	*3518*
57	*47.5*	*147*	*30*	*GAK15*	*4543*
Prince William Sound Stations					
60	7.5	147	50	KIP0	
60	16.7	147	59.2	KIP2	588
60	22.78	147	56.17	PWS1	248
60	32.1	147	48.2	PWS2	798
60	40	147	40	PWS3	742
60	49..25	147	24	PWSA	472
60	45	147	14	PWSB	
60	38.1	147	10	PWSC	245
60	31.5	147	7.6	PWSD	
60	24.3	147	58.3	PWSE	291
60	24	146	45	PWSF	
Columbia Glacier					
61	7.4	147	3.8	CG0	
60	59.5	147	4.2	CG1	192
60	57.6	147	5.9	CG2	
Icy Bay					
60	16.3	148	21.7	IB0	
60	15.5	148	20.1	IB1	172
60	16.3	148	14	IB2	157
Montague Strait Line					
59	57.257	147	55.602	MS1	
59	56.6	147	53.7	MS2	194
59	55.9	147	51.4	MS3	169
59	55.2	147	49.7	MS4	119

Latitude N (degrees, minutes)		Longitude W (degrees, minutes)		Station Name	Depth
Kodiak Line					
58	14.7	151	35.4	KOD1	71
58	7.8	151	23.07	KOD2	127
58	0.9	151	10.74	KOD3	84
57	54	150	58.17	KOD4	78
57	47.1	150	45.6	KOD5	87
57	40.26	150	32.97	KOD6	102
57	33.42	150	20.34	KOD7	178
57	26.37	150	7.95	KOD8	708
57	19.32	149	55.56	KOD9	1310
57	12.27	149	43.17	KOD10	2503
Cape Suckling Line					
59	56.35	143	53.5	CS1	63
59	53.85	143	53.5	CS1.25	85
59	51.35	143	53.5	CS1i	104
59	48.85	143	53.5	CS1.75	116
59	46.35	143	53.5	CS2	124
59	41.35	143	53.5	CS2i	134
59	36.35	143	53.5	CS3	193
59	31.35	143	53.5	CS3i	1316
59	26.35	143	53.5	CS4	2010
59	16.35	143	53.5	CS5	2810
Middleton Island Line					
60	15	145	30	MID1	35
60	10.5	145	34.5	MID1i	100
60	6	145	39	MID2	116
60	1.5	145	43.5	MID2i	98
59	57	145	48	MID3	87
59	52.5	145	52.5	MID3i	100
59	48	145	57	MID4	90
59	43.5	146	1.5	MID4i	72
59	39	146	6	MID5	97
59	34.5	146	10.5	MID5i	114
59	30	146	15	MID6	41
59	25.7	146	10	MID6i	65
59	23	146	18	MID7	65
59	18.267	146	15	MID7i	420
59	13.534	146	12	MID8	611
59	4.067	146	6	MID9	2900
58	54.6	146	0	MID10	4444

Date	Event	Instrument	Action	Transect	Station	Cast	Latitude	Longitude	Seafloor	Author	#	Comment
Sat 22 Apr 2023 16:55:17 +0000	20230422.1654.001	Ship	startCruise	NaN	NaN	NaN	60.097867	-149.441758		jmgrischuk		There are 621 entries, not counting this one
Sat 22 Apr 2023 17:41:34 +0000	20230422.1722.001	CalVet net	deploy	NaN	RES2.5	1	NaN	NaN	300	rHopcroft1	1	2023/04/22 17:40:00 60.025553 N -149.358950
Sat 22 Apr 2023 17:46:22 +0000	20230422.1741.001	CalVet net	recover	NaN	RES2.5	1	60.025433	-149.358846	290	rHopcroft1	2	
Sat 22 Apr 2023 17:55:17 +0000	20230422.1754.001	CTD911	deploy	Seward Line	RES2.5	1	NaN	NaN	294	pShipton1	3	
Sat 22 Apr 2023 18:46:04 +0000	20230422.1846.001	CTD911	recover	Seward Line	RES2.5	1	NaN	NaN	294	pShipton1	4	
Sat 22 Apr 2023 19:22:28 +0000	20230422.1922.001	CalVet net	deploy	NaN	RES2.5	1A	60.025131	-149.358615	290	rHopcroft1	5	Lauren
Sat 22 Apr 2023 19:25:00 +0000	20230422.1924.001	CalVet net	recover	NaN	RES2.5	1A	60.025131	-149.358612	290	rHopcroft1	6	Lauren
Sat 22 Apr 2023 20:57:10 +0000	20230422.2057.001	CalVet net	deploy	NaN	GAK1	2	59.845913	-149.464675	268	rHopcroft1	7	
Sat 22 Apr 2023 21:05:08 +0000	20230422.2057.002	CalVet net	recover	NaN	GAK1	2	NaN	NaN	268	rHopcroft1	8	2023/04/22 21:05:00 59.845905 N -149.464684
Sat 22 Apr 2023 21:54:59 +0000	20230422.2153.001	CTD911	deploy	Seward	Gak1	2	59.846147	-149.463743	269	pShipton1	9	start time of 21:17:48
Sat 22 Apr 2023 22:04:16 +0000	20230422.2204.001	CTD911	recover	Seward	Gak1	2	59.846177	-149.463657	269	pShipton1	10	out of water time 22:03:55
Sun 23 Apr 2023 08:02:52 +0000	20230423.0737.001	Bongo Net	deploy	Middleton Island	MID07	1	59.375752	-146.298568		aPoje1	11	
Sun 23 Apr 2023 08:23:23 +0000	20230423.0823.001	Bongo Net	recover	Middleton Island	MID07	1	59.371783	-146.283066		aPoje1	12	
Sun 23 Apr 2023 09:32:02 +0000	20230423.0917.001	Bongo Net	deploy	Middleton Island	MID08	2	59.228479	-146.18865		aPoje1	13	
Sun 23 Apr 2023 09:59:08 +0000	20230423.0959.001	Bongo Net	recover	Middleton Island	MID08	2	59.219304	-146.177303		aPoje1	14	
Sun 23 Apr 2023 10:38:01 +0000	20230423.1037.001	EM302	stop	NaN	NaN	NaN	59.128728	-146.124952		jmgrischuk	15	
Sun 23 Apr 2023 11:04:20 +0000	20230423.1056.001	Bongo Net	deploy	Middleton Island	MID09	3	59.073002	-146.091246	1381	aPoje1	16	
Sun 23 Apr 2023 11:32:41 +0000	20230423.1132.001	Bongo Net	recover	Middleton Island	MID09	3	59.062388	-146.080046	1381	aPoje1	17	
Sun 23 Apr 2023 12:38:18 +0000	20230423.1238.001	Bongo Net	deploy	Middleton Island	MID10		58.915704	-146.007533	4385	aPoje1	18	
Sun 23 Apr 2023 13:02:36 +0000	20230423.1302.001	Bongo Net	recover	Middleton Island	MID10		58.907303	-145.996205	4385	aPoje1	19	BON04

Sun 23 Apr 2023 13:25:28 +0000	20230423.1317.001	CTD911	deploy	Middleton Island	MID10	3	58.910475	-146.000356	4445	iReister1	20	extra cast. not prod or regular cast
Sun 23 Apr 2023 14:55:30 +0000	20230423.1455.001	CTD911	recover	Middleton Island	MID10	3	58.910492	-146.000322	4445	iReister1	21	
Sun 23 Apr 2023 15:19:32 +0000	20230423.1519.001	multinet	deploy	Middleton Island	MID10	1D	58.910491	-146.000274	4445	rHopcroft1	22	vert deep
Sun 23 Apr 2023 16:45:11 +0000	20230423.1645.001	multinet	recover	Middleton Island	MID10	1D	58.8938	-145.997193	4445	rHopcroft1	23	
Sun 23 Apr 2023 17:22:52 +0000	20230423.1707.001	CTD911	deploy	Middleton Island	MID10	4	58.91063	-145.998865	4445	iReister1	24	PROD
Sun 23 Apr 2023 17:36:07 +0000	20230423.1735.001	Underway Science seawater	service	NaN	NaN	NaN	58.909524	-146.000167		jmgrischuk	25	filter change
Sun 23 Apr 2023 18:08:10 +0000	20230423.1808.001	CTD911	recover	Middleton Island	MID10	4	58.908464	-146.002824	4445	iReister1	26	
Sun 23 Apr 2023 18:25:54 +0000	20230423.1825.001	CalVet net	deploy	MID	MID10	3	58.909459	-146.002099	4440	rHopcroft1	27	
Sun 23 Apr 2023 18:30:01 +0000	20230423.1830.001	CalVet net	recover	MID	MID10	3	58.909119	-146.00307	4440	rHopcroft1	28	
Sun 23 Apr 2023 18:48:04 +0000	20230423.1848.001	CalVet net	deploy	MID	MID10	3A	58.909786	-146.001704	4440	rHopcroft1	29	
Sun 23 Apr 2023 18:53:31 +0000	20230423.1853.001	CalVet net	recover	MID	MID10	3A	58.909422	-146.003542	4440	rHopcroft1	30	
Sun 23 Apr 2023 19:34:58 +0000	20230423.1934.001	Trace Metal Bottle	deploy	MID	MID10	TM01	58.909714	-146.003085	4440	aAguilarIslas1	31	
Sun 23 Apr 2023 21:11:16 +0000	20230423.2111.001	Trace Metal Bottle	recover	MID	MID10	TM01	58.903572	-146.035625	4440	aAguilarIslas1	32	
Sun 23 Apr 2023 21:45:20 +0000	20230423.2140.001	CTD911	deploy	Middleton Island	MID10	5	58.909804	-146.004725	4445	iReister1	33	
Sun 23 Apr 2023 23:06:06 +0000	20230423.2306.001	CTD911	recover	Middleton Island	MID10	5	58.908668	-146.044345	4445	iReister1	34	
Sun 23 Apr 2023 23:56:13 +0000	20230423.2355.001	FeFish	recover	MID	MID10	TM01	58.935172	-146.042085		aAguilarIslas1	36	
Sun 23 Apr 2023 23:58:30 +0000	20230423.2358.001	FeFish	deploy	MID	MID10	TM01	58.911374	-146.047968		aAguilarIslas1	35	Deployed at around 15:20 local 23:20 UTC
Mon 24 Apr 2023 00:57:02 +0000	20230424.0043.001	CalVet net	deploy	MID	MID9	4	59.067332	-146.087378	4440	rHopcroft1	36	
Mon 24 Apr 2023 01:01:44 +0000	20230424.0101.001	CalVet net	recover	MID	MID9	4	59.067581	-146.089134	4440	rHopcroft1	37	
Mon 24 Apr 2023 01:20:02 +0000	20230424.0119.001	CTD911	deploy	Middleton Island	MID9	6	59.070177	-146.087102	3078	iReister1	38	
Mon 24 Apr 2023 02:38:31 +0000	20230424.0238.001	CTD911	recover	Middleton Island	MID9	6	59.072398	-146.1123	2587	pShipton1	39	

Mon 24 Apr 2023 03:42:34 +0000	20230424.0333.001	FeFish	deploy	MID	MID8	TM02	59.193004	-146.166995		aAguilarIslas1	40	
Mon 24 Apr 2023 03:52:51 +0000	20230424.0352.001	EM302	start				59.200638	-146.171369		dNaber1	41	
Mon 24 Apr 2023 03:59:39 +0000	20230424.0359.001	FeFish	recover	MID	MID8	TM02	59.205193	-146.173755		aAguilarIslas1	42	
Mon 24 Apr 2023 04:35:21 +0000	20230424.0435.001	CalVet net	deploy	MID	MID8	5	59.235491	-146.209284	446	rHopcroft1	43	
Mon 24 Apr 2023 04:39:43 +0000	20230424.0439.001	CalVet net	recover	MID	MID8	5	59.235725	-146.209664	546	rHopcroft1	44	
Mon 24 Apr 2023 04:57:01 +0000	20230424.0447.001	CTD911	deploy	Middleton Island	MID8	7	59.235934	-146.209693	540	pShipton1	45	
Mon 24 Apr 2023 05:50:18 +0000	20230424.0550.001	CTD911	recover	Middleton Island	MID8	7	59.236652	-146.209943	537	pShipton1	46	
Mon 24 Apr 2023 06:23:26 +0000	20230424.0623.001	Trace Metal Bottle	deploy	MID	MID8	5	59.237632	-146.206218	546	aAguilarIslas1	47	
Mon 24 Apr 2023 07:04:45 +0000	20230424.0704.001	Trace Metal Bottle	recover	MID	MID8	5	59.239554	-146.207329	546	aAguilarIslas1	48	
Mon 24 Apr 2023 07:52:28 +0000	20230424.0716.001	CTD911	deploy	Middleton Island	MID7i	8	59.304112	-146.251483	433	pShipton1	49	
Mon 24 Apr 2023 08:14:19 +0000	20230424.0814.001	CTD911	recover	Middleton Island	MID7i	8	59.304703	-146.251731	433	pShipton1	50	dry ctd
Mon 24 Apr 2023 09:45:19 +0000	20230424.0931.001	Bongo Net	deploy	Middleton Island	MID06		59.499825	-146.25464		aPoje1	51	BON05
Mon 24 Apr 2023 10:49:22 +0000	20230424.1049.001	Bongo Net	recover	Middleton Island	MID06		59.61029	-146.118911	37	aPoje1	52	
Mon 24 Apr 2023 11:00:46 +0000	20230424.1100.001	Bongo Net	deploy	Middleton Island	MID06		59.627788	-146.095072	103	aPoje1	53	
Mon 24 Apr 2023 11:13:42 +0000	20230424.1113.001	Bongo Net	recover	Middleton Island	MID06		59.634293	-146.087037	103	aPoje1	54	
Mon 24 Apr 2023 12:25:35 +0000	20230424.1225.001	Bongo Net	deploy	Middleton Island	MID04		59.782447	-145.939547	97	aPoje1	55	
Mon 24 Apr 2023 12:42:09 +0000	20230424.1242.001	Bongo Net	recover	Middleton Island	MID04		59.789518	-145.927528	97	aPoje1	56	
Mon 24 Apr 2023 13:52:56 +0000	20230424.1352.001	Bongo Net	deploy	Middleton Island	MID03		59.947251	-145.805941	97	aPoje1	57	BON07
Mon 24 Apr 2023 14:13:46 +0000	20230424.1413.001	Bongo Net	recover	Middleton Island	MID03		59.961869	-145.791503	97	aPoje1	58	
Mon 24 Apr 2023 15:56:25 +0000	20230424.1556.001	Underway Science seawater	service				60.209547	-145.541417		jmgrischuk	59	filter change
Mon 24 Apr 2023 16:23:44 +0000	20230424.1614.001	CTD911	deploy	Middleton Island	MID1	9	60.249794	-145.501555	18	iReister1	60	

Mon 24 Apr 2023 16:37:36 +0000	20230424.1637.001	CTD911	recover	Middleton Island	MID1	9	60.249794	-145.501656	18	iReister1	61	
Mon 24 Apr 2023 17:26:36 +0000	20230424.1701.001	CTD911	deploy	Middleton Island	MID1i	10	60.174554	-145.576993	97	iReister1	62	
Mon 24 Apr 2023 17:42:30 +0000	20230424.1734.001	CTD911	recover	Middleton Island	MID1i	10	60.176139	-145.578979	98	iReister1	63	upcast no good. After troubleshooting the cause was a faulty Y cable. See log sheets for more details if needed.
Mon 24 Apr 2023 18:18:32 +0000	20230424.1818.001	FeFish	deploy	MID	MID2	3	60.124927	-145.62517	546	aAguilarIslas1	64	
Mon 24 Apr 2023 18:48:13 +0000	20230424.1848.001	FeFish	recover	MID	MID2	3	60.100783	-145.65071	546	aAguilarIslas1	65	
Mon 24 Apr 2023 18:57:29 +0000	20230424.1857.001	CalVet net	deploy	MID	MID2	6	60.100316	-145.655355	119	rHopcroft1	66	
Mon 24 Apr 2023 19:16:50 +0000	20230424.1916.001	CalVet net	deploy	MID	MID2	6A	60.101618	-145.652918	119	rHopcroft1	67	
Mon 24 Apr 2023 19:20:55 +0000	20230424.1920.001	CalVet net	recover	MID	MID2	6A	60.101993	-145.653472	119	rHopcroft1	68	
Mon 24 Apr 2023 20:54:43 +0000	20230424.2054.001	Trace Metal Bottle	deploy	MID	MID2	TM03	60.100366	-145.651304		aAguilarIslas1	69	
Mon 24 Apr 2023 21:30:30 +0000	20230424.2130.001	Bongo Net	deploy	Middleton Island	MID2	8	60.101531	-145.650445	98	rHopcroft1	70	
Mon 24 Apr 2023 21:36:54 +0000	20230424.2136.001	Trace Metal Bottle	recover	MID	MID2	TM03	60.103195	-145.644341		aAguilarIslas1	71	
Mon 24 Apr 2023 21:39:38 +0000	20230424.2139.001	Bongo Net	deploy	Middleton Island	MID2	8	60.103891	-145.641969	118	rHopcroft1	72	
Mon 24 Apr 2023 21:47:32 +0000	20230424.2147.001	Bongo Net	other	Middleton Island	MID2	8	60.105888	-145.63493	118	rHopcroft1	73	
Mon 24 Apr 2023 21:50:57 +0000	20230424.2150.001	Bongo Net	recover	Middleton Island	MID2	8	60.106684	-145.631904	118	rHopcroft1	74	
Mon 24 Apr 2023 22:11:41 +0000	20230424.2209.001	CTD911	deploy	Middleton Island	MID2	11	60.101954	-145.653105	119	iReister1	75	
Mon 24 Apr 2023 22:46:56 +0000	20230424.2246.001	CTD911	recover	Middleton Island	MID2	11	60.10321	-145.654011	119	iReister1	76	
Mon 24 Apr 2023 23:17:01 +0000	20230424.2316.001	Trace Metal Bottle	deploy	MID	MID2	TM04	60.10361	-145.654289		aAguilarIslas1	77	
Mon 24 Apr 2023 23:29:13 +0000	20230424.2329.001	Trace Metal Bottle	recover	MID	MID2	TM04	60.104045	-145.65295		aAguilarIslas1	78	
Tue 25 Apr 2023 00:14:25 +0000	20230424.2358.001	CTD911	deploy	Middleton Island	MID2i	12	60.02584	-145.727235	99	pShipton1	79	
Tue 25 Apr 2023 00:30:03 +0000	20230425.0030.001	CTD911	recover	Middleton Island	MID2i	12	60.026158	-145.727987	99	pShipton1	80	

Tue 25 Apr 2023 01:21:12 +0000	20230425.0121.001	CalVet net	deploy	MID	MID3	7	59.951034	-145.798225	88	rHopcroft1	81	
Tue 25 Apr 2023 01:26:03 +0000	20230425.0126.001	CalVet net	recover	MID	MID3	7	59.951039	-145.798242	88	rHopcroft1	82	83m
Tue 25 Apr 2023 01:44:24 +0000	20230425.0129.001	CTD911	deploy	Middleton Island	MID3	13	59.950667	-145.797359	88	pShipton1	83	
Tue 25 Apr 2023 02:15:14 +0000	20230425.0144.001	CTD911	recover	Middleton Island	MID3	13	59.950354	-145.796605	88	pShipton1	84	
Tue 25 Apr 2023 01:52:51 +0000	20230425.0148.001	Underway Science seawater	start				NaN	NaN		dNaber1	85	4/22/2023 17:25:00 60.036273 N -149.3690034
Tue 25 Apr 2023 02:20:49 +0000	20230425.0220.001	PCO2	start				NaN	NaN		dNaber1	86	4/22/2023 17:15:00 60.061595 N -149.397671
Tue 25 Apr 2023 03:05:44 +0000	20230425.0253.001	centerBoard	deploy				NaN	NaN		dNaber1	87	4/22/2023 18:45:00 60.025130 N -149.35861
Tue 25 Apr 2023 03:13:36 +0000	20230425.0312.001	CTD911	deploy	Middleton Island	MID3i	14	59.875748	-145.874218	104	pShipton1	88	
Tue 25 Apr 2023 03:17:15 +0000	20230425.0317.001	CTD911	recover	Middleton Island	MID3i	14	59.875793	-145.873646	104	pShipton1	89	
Tue 25 Apr 2023 03:51:36 +0000	20230425.0348.001	EK80 broadband	start				NaN	NaN		dNaber1	90	4/22/2023 20:52:00 59.845885 N -149.464885
Tue 25 Apr 2023 03:56:13 +0000	20230425.0351.001	UHDAS	start				NaN	NaN		dNaber1	91	WH300 and OS75 started. Centerboard in deployed position 4/22/2023 19:00:00 60.025132 N -149.358616
Tue 25 Apr 2023 04:09:28 +0000	20230425.0409.001	CalVet net	deploy	Middleton Island	MID4	8	59.784319	-145.934624	99	pShipton1	92	
Tue 25 Apr 2023 04:15:16 +0000	20230425.0415.001	CalVet net	recover	Middleton Island	MID4	8	59.78421	-145.935132	96	pShipton1	93	
Tue 25 Apr 2023 04:26:25 +0000	20230425.0415.002	CTD911	deploy	Middleton Island	MID4	15	59.784135	-145.935487	96	pShipton1	94	
Tue 25 Apr 2023 04:50:46 +0000	20230425.0450.001	CTD911	recover	Middleton Island	MID4	15	59.784108	-145.935629	96	pShipton1	95	
Tue 25 Apr 2023 05:00:49 +0000	20230425.0459.001	Underway Science seawater	other				59.777921	-145.941799		tKelly1	96	Oxygen sample Taken
Tue 25 Apr 2023 05:26:43 +0000	20230425.0526.001	Underway Science seawater	other				59.713247	-146.008278		tKelly1	97	Oxygen sample 2
Tue 25 Apr 2023 07:08:48 +0000	20230425.0629.001	CTD911	deploy	Middleton Island	MID6	16	59.499884	-146.250001	36	pShipton1	98	
Tue 25 Apr 2023 07:23:04 +0000	20230425.0723.001	CTD911	recover	Middleton Island	MID6	16	59.499713	-146.249967	36	pShipton1	99	
Tue 25 Apr 2023 09:42:43 +0000	20230425.0941.001	EK80 broadband	stop				59.438749	-146.173225		jmgrischuk	100	secured EK80 for multibeam mapping survey

Tue 25 Apr 2023 13:56:19 +0000	20230425.1348.001	CalVet net	deploy	Middleton Island	MID07	9	59.375706	-146.297946	66	aPoje1	101	CVQ9
Tue 25 Apr 2023 14:00:55 +0000	20230425.1400.001	CalVet net	recover	Middleton Island	MID07	9	59.375857	-146.297809	66	aPoje1	102	
Tue 25 Apr 2023 14:13:28 +0000	20230425.1405.001	CTD911	deploy	Middleton Island	MID7	17	59.376174	-146.297424	65	iReister1	103	
Tue 25 Apr 2023 14:43:24 +0000	20230425.1443.001	CTD911	recover	Middleton Island	MID7	17	59.376528	-146.297059	65	iReister1	104	
Tue 25 Apr 2023 15:01:57 +0000	20230425.1500.001	EK80 broadband	start				59.776903	-145.942903		jmgrischuk	105	restarted ek80 after mapping complete
Tue 25 Apr 2023 15:06:18 +0000	20230425.1506.001	Underway Science seawater	service				59.39881	-146.239042		jmgrischuk	106	filter change
Tue 25 Apr 2023 16:05:53 +0000	20230425.1605.001	CalVet net	deploy	MID	MID6	10	59.499607	-146.247934	37	rHopcroft1	107	32m
Tue 25 Apr 2023 16:09:03 +0000	20230425.1609.001	CalVet net	recover	MID	MID6	10	59.499538	-146.24788	37	rHopcroft1	108	net hit botto,35m out
Tue 25 Apr 2023 17:34:03 +0000	20230425.1724.001	CTD911	deploy	Middleton Island	MID5	18	59.635152	-146.08789	98	iReister1	109	PROD
Tue 25 Apr 2023 18:07:43 +0000	20230425.1807.001	CTD911	recover	Middleton Island	MID5	18	59.635503	-146.085664	98	iReister1	110	
Tue 25 Apr 2023 18:14:23 +0000	20230425.1814.001	CalVet net	deploy	MID	MID5	11	59.635596	-146.085221	96	rHopcroft1	111	
Tue 25 Apr 2023 18:19:32 +0000	20230425.1819.001	CalVet net	recover	MID	MID5	11	59.635444	-146.085429	96	rHopcroft1	112	92m
Tue 25 Apr 2023 18:36:00 +0000	20230425.1835.001	CalVet net	deploy	MID	MID5	11A	59.635377	-146.08551	96	rHopcroft1	113	
Tue 25 Apr 2023 18:41:28 +0000	20230425.1841.001	CalVet net	recover	MID	MID5	11A	59.635367	-146.085526	96	rHopcroft1	114	93m
Tue 25 Apr 2023 19:01:43 +0000	20230425.1901.001	Trace Metal Bottle	deploy	MID	MID5	TM05	59.636012	-146.084761	96	aAguilarIslas1	115	
Tue 25 Apr 2023 19:21:06 +0000	20230425.1901.002	Trace Metal Bottle	recover	MID	MID5	TM05	59.636123	-146.084562	96	aAguilarIslas1	116	
Tue 25 Apr 2023 19:28:03 +0000	20230425.1928.001	CTD911	deploy	Middleton Island	MID5	19	59.636298	-146.084258	96	pShipton1	117	
Tue 25 Apr 2023 19:52:15 +0000	20230425.1952.001	CTD911	recover	Middleton Island	MID5	19	59.636884	-146.083515	96	pShipton1	118	
Tue 25 Apr 2023 20:04:56 +0000	20230425.2004.001	FeFish	deploy	MID	MID5		59.637037	-146.08058	96	aAguilarIslas1	119	
Tue 25 Apr 2023 20:11:11 +0000	20230425.2011.001	FeFish	recover	MID	MID5		59.635071	-146.074072	96	aAguilarIslas1	120	
Wed 26 Apr 2023 05:49:14 +0000	20230426.0517.001	multinet	deploy	Prince William Sound	PWS3		60.663841	-147.674129	735	aPoje1	121	MNT1

Wed 26 Apr 2023 05:59:46 +0000	20230426.0559.001	multinet	maxDepth	Prince William Sound	PWS3		60.667243	-147.664703	735	aPoje1	122	
Wed 26 Apr 2023 06:30:20 +0000	20230426.0630.001	multinet	recover	Prince William Sound	PWS3		60.677399	-147.635032	735	aPoje1	123	
Wed 26 Apr 2023 07:40:51 +0000	20230426.0729.001	multinet	deploy	Prince William Sound	PWS2		60.543384	-147.7906	715	aPoje1	124	MNT2
Wed 26 Apr 2023 07:52:39 +0000	20230426.0752.001	multinet	maxDepth	Prince William Sound	PWS2		60.538205	-147.799459	715	aPoje1	125	
Wed 26 Apr 2023 08:19:29 +0000	20230426.0819.001	multinet	recover	Prince William Sound	PWS2		60.525953	-147.812297	715	aPoje1	126	
Wed 26 Apr 2023 08:53:06 +0000	20230426.0853.001	SedimentTrap	deploy		PWS2	ST1	60.525483	-147.813863		tKelly1	127	
Wed 26 Apr 2023 09:11:48 +0000	20230426.0905.001	multinet	deploy	Prince William Sound	PWS2		60.529076	-147.81324	715	aPoje1	128	MNT3 EtOH
Wed 26 Apr 2023 09:20:01 +0000	20230426.0920.001	multinet	maxDepth	Prince William Sound	PWS2		60.532517	-147.807359	730	aPoje1	129	
Wed 26 Apr 2023 09:48:48 +0000	20230426.0948.001	multinet	recover	Prince William Sound	PWS2		60.544752	-147.788503	730	aPoje1	130	
Wed 26 Apr 2023 10:12:52 +0000	20230426.1012.001	multinet	deploy	Prince William Sound	PWS2		60.53943	-147.791657	730	aPoje1	131	MNT3 EtOH redo
Wed 26 Apr 2023 10:28:42 +0000	20230426.1028.001	multinet	maxDepth	Prince William Sound	PWS2		60.533751	-147.805286	728	aPoje1	132	
Wed 26 Apr 2023 10:55:53 +0000	20230426.1055.001	multinet	recover	Prince William Sound	PWS2		60.518547	-147.806356	728	aPoje1	133	
Wed 26 Apr 2023 11:59:23 +0000	20230426.1159.001	multinet	deploy	Prince William Sound	PWS1		60.389567	-147.937105	355	aPoje1	134	
Wed 26 Apr 2023 12:10:07 +0000	20230426.1210.001	multinet	maxDepth	Prince William Sound	PWS1		60.38346	-147.937152	355	aPoje1	135	MNT4
Wed 26 Apr 2023 12:39:20 +0000	20230426.1239.001	multinet	recover	Prince William Sound	PWS1		60.36621	-147.942746	355	aPoje1	136	
Wed 26 Apr 2023 13:17:24 +0000	20230426.1317.001	multinet	deploy	Prince William Sound	KIP02		60.28854	-147.985738	574	aPoje1	137	MNT5
Wed 26 Apr 2023 13:28:16 +0000	20230426.1328.001	multinet	maxDepth	Prince William Sound	KIP02		60.282298	-147.987333	574	aPoje1	138	
Wed 26 Apr 2023 13:57:40 +0000	20230426.1357.001	multinet	recover	Prince William Sound	KIP02		60.265172	-147.988401	574	aPoje1	139	
Wed 26 Apr 2023 16:02:31 +0000	20230426.1555.001	CTD911	deploy	Prince William Sound	KIP0	20	60.124635	-147.818689	294	iReister1	140	
Wed 26 Apr 2023 16:39:50 +0000	20230426.1639.001	Underway Science seawater	service				60.124663	-147.818514		jmgrischuk	141	filter change
Wed 26 Apr 2023 16:56:34 +0000	20230426.1656.001	CTD911	recover	Prince William Sound	KIP0	20	60.124662	-147.818514	294	iReister1	142	

Wed 26 Apr 2023 18:51:58 +0000	20230426.1851.001	CalVet net	deploy	Icy Bay	IB2	12	60.271361	-148.234101	156	rHopcroft1	143	
Wed 26 Apr 2023 18:56:38 +0000	20230426.1856.001	CalVet net	recover	Icy Bay	IB2	12	60.27137	-148.234108	156	rHopcroft1	144	
Wed 26 Apr 2023 19:05:48 +0000	20230426.1900.001	CTD911	deploy	Prince William Sound	IB2	21	60.27137	-148.234106	156	iReister1	145	
Wed 26 Apr 2023 19:45:48 +0000	20230426.1943.001	UHDAS	stop				60.271368	-148.234108		dNaber1	146	WH300 and OS75 stopped to raise centerboard to flush
Wed 26 Apr 2023 19:46:37 +0000	20230426.1945.001	EK80 broadband	stop				60.271368	-148.234107		dNaber1	147	stopped to raise centerboard to flush
Wed 26 Apr 2023 19:50:05 +0000	20230426.1950.001	CalVet net	deploy	Icy Bay	IB2	12L	60.271373	-148.234109	156	rHopcroft1	148	
Wed 26 Apr 2023 19:54:22 +0000	20230426.1954.001	CalVet net	recover	Icy Bay	IB2	12L	60.271368	-148.234107	156	rHopcroft1	149	
Wed 26 Apr 2023 20:13:06 +0000	20230426.2012.001	UHDAS	start				60.258971	-148.26928		dNaber1	150	WH300 and OS75 started with CB in flush position
Wed 26 Apr 2023 20:13:56 +0000	20230426.2013.001	centerBoard	recover				60.271047	-148.235024		dNaber1	151	Centerboard in flush position for Icy Bay
Wed 26 Apr 2023 20:14:49 +0000	20230426.2014.001	EK80 broadband	start				60.25676	-148.275131		dNaber1	152	Centerboard in flush position for Icy Bay
Wed 26 Apr 2023 20:25:58 +0000	20230426.2025.001	UHDAS	other				60.244013	-148.29903		dNaber1	153	Bottom track started for WH300 with CB in flush position
Wed 26 Apr 2023 21:00:53 +0000	20230426.2100.001	CalVet net	deploy	Icy Bay	IB1	13	60.24131	-148.334176	153	rHopcroft1	154	
Wed 26 Apr 2023 21:04:05 +0000	20230426.2104.001	CalVet net	recover	Icy Bay	IB1	13	60.241308	-148.334176	153	rHopcroft1	155	
Wed 26 Apr 2023 21:09:58 +0000	20230426.2106.001	CTD911	deploy	Prince William Sound	IB1	22	60.241309	-148.334177	153	pShipton1	156	
Wed 26 Apr 2023 21:42:26 +0000	20230426.2142.001	CTD911	recover	Prince William Sound	IB1	22	60.24131	-148.334173	153	pShipton1	157	altimeter and pressure sensor indicate depth of 148
Wed 26 Apr 2023 22:40:36 +0000	20230426.2238.001	CalVet net	deploy	Icy Bay	IB0	14	60.263462	-148.360329	325	rHopcroft1	158	
Wed 26 Apr 2023 22:44:19 +0000	20230426.2244.001	CalVet net	recover	Icy Bay	IB0	14	60.263456	-148.360342	325	rHopcroft1	159	
Wed 26 Apr 2023 22:54:14 +0000	20230426.2254.001	CTD911	deploy	Prince William Sound	IB0	23	60.263619	-148.360775	326	pShipton1	160	
Wed 26 Apr 2023 23:40:06 +0000	20230426.2340.001	CTD911	recover	Prince William Sound	IB0	23	60.26344	-148.360911	326	pShipton1	161	
Wed 26 Apr 2023 23:41:53 +0000	20230426.2341.001	CalVet net	deploy	Icy Bay	IB0	14A	60.263438	-148.360914	325	rHopcroft1	162	
Wed 26 Apr 2023 23:46:18 +0000	20230426.2346.001	CalVet net	recover	Icy Bay	IB0	14A	60.263439	-148.360915	325	rHopcroft1	163	

Thu 27 Apr 2023 01:05:34 +0000	20230427.0102.001	UHDAS	stop				60.236934	-148.311619		dNaber1	164	stopped to lower centerboard to deployed position
Thu 27 Apr 2023 01:15:10 +0000	20230427.0113.001	UHDAS	start				60.245089	-148.298942		dNaber1	165	WH300 and OS75 startedwith CB in deployed position. WH300 bottom track off.
Thu 27 Apr 2023 01:15:42 +0000	20230427.0115.001	EK80 broadband	start				60.246424	-148.297001		dNaber1	166	centerboard in deployed position. Drop keel mistakenly left at 2.44m from 2023/04/26 20:14:49 to 202304/27 01:15:00
Thu 27 Apr 2023 01:19:40 +0000	20230427.0119.001	EK80 broadband	stop				60.237109	-148.311274		dNaber1	167	stopped to raise centerboard to flush.
Thu 27 Apr 2023 01:26:24 +0000	20230427.0125.001	centerBoard	deploy				60.236045	-148.321812		dNaber1	168	lowered to deploy postion
Thu 27 Apr 2023 06:24:30 +0000	20230427.0624.001	Underway Science seawater	service				60.535994	-147.817948		dNaber1	169	strainer change
Thu 27 Apr 2023 09:09:21 +0000	20230427.0738.001	SedimentTrap	recover		PWS2	ST1	60.542786	-147.795805		tKelly1	170	
Thu 27 Apr 2023 10:51:34 +0000	20230427.1051.001	DPI	deploy	Prince William Sound		1	60.546671	-147.788399		aPoje1	171	
Thu 27 Apr 2023 13:22:49 +0000	20230427.1322.001	DPI	recover	Prince William Sound		1	60.70678	-147.615073		aPoje1	172	
Thu 27 Apr 2023 14:05:06 +0000	20230427.1358.001	CTD911	deploy	Prince William Sound	PWS3	24	60.667563	-147.669089	743	iReister1	173	
Thu 27 Apr 2023 14:24:46 +0000	20230427.1424.001	CTD911	recover	Prince William Sound	PWS3	24	60.667565	-147.669094	743	iReister1	174	Not a full cast! CTD recovred to take off the ECO Triplet
Thu 27 Apr 2023 14:31:17 +0000	20230427.1424.002	CTD911	deploy	Prince William Sound	PWS3	25	60.667559	-147.669084	741	iReister1	175	
Thu 27 Apr 2023 15:46:40 +0000	20230427.1534.001	CTD911	recover	Prince William Sound	PWS3	25	60.667545	-147.669041	742	iReister1	176	
Thu 27 Apr 2023 15:47:42 +0000	20230427.1547.001	CalVet net	deploy	Prince William Sound	PWS3	15	60.667547	-147.66904	742	aPoje1	177	
Thu 27 Apr 2023 15:53:38 +0000	20230427.1553.001	CalVet net	recover	Prince William Sound	PWS3	15	60.667545	-147.66905	742	aPoje1	178	
Thu 27 Apr 2023 16:22:47 +0000	20230427.1622.001	Underway Science seawater	service				60.618388	-147.717304		jmgrischuk	179	filter change
Thu 27 Apr 2023 17:10:05 +0000	20230427.1639.001	multinet	deploy	Prince William Sound	PWS2	2D	60.53481	-147.803085	728	rHopcroft1	180	vertical deep
Thu 27 Apr 2023 17:53:39 +0000	20230427.1753.001	multinet	recover	Prince William Sound	PWS2	2D	60.534799	-147.803065	728	rHopcroft1	181	720m
Thu 27 Apr 2023 18:03:43 +0000	20230427.1756.001	CTD911	deploy	Prince William Sound	PWS2	26	60.534798	-147.803063	733	iReister1	182	PROD
Thu 27 Apr 2023 18:43:45 +0000	20230427.1843.001	CTD911	recover	Prince William Sound	PWS2	26	60.5348	-147.803056	733	iReister1	183	

Thu 27 Apr 2023 18:51:08 +0000	20230427.1851.001	multinet	deploy	Prince William Sound	PWS2	2S	60.5348	-147.803065	728	rHopcroft1	184	veret shallow
Thu 27 Apr 2023 19:06:03 +0000	20230427.1906.001	multinet	recover	Prince William Sound	PWS2	2S	60.5348	-147.803063	728	rHopcroft1	185	
Thu 27 Apr 2023 19:28:49 +0000	20230427.1928.001	multinet	deploy	Prince William Sound	PWS2	3D	60.534792	-147.802979	728	rHopcroft1	186	deep live
Thu 27 Apr 2023 20:14:06 +0000	20230427.2014.001	multinet	recover	Prince William Sound	PWS2	3D	60.534797	-147.802895	728	rHopcroft1	187	deep live
Thu 27 Apr 2023 20:26:45 +0000	20230427.2017.001	CTD911	deploy	Prince William Sound	PWS2	27	60.5348	-147.802882	731	pShipton1	188	
Thu 27 Apr 2023 21:23:49 +0000	20230427.2123.001	CTD911	recover	Prince William Sound	PWS2	27	60.5348	-147.802873	722	pShipton1	189	
Thu 27 Apr 2023 21:38:08 +0000	20230427.2126.001	Trace Metal Bottle	deploy	Prince William Sound	PSW2	TM06	60.534802	-147.802871	733	aAguilarIslas1	190	
Thu 27 Apr 2023 22:45:39 +0000	20230427.2245.001	Trace Metal Bottle	recover	Prince William Sound	PSW2	TM06	60.5348	-147.802869	733	aAguilarIslas1	191	
Thu 27 Apr 2023 22:51:42 +0000	20230427.2251.001	CalVet net	deploy	Prince William Sound	PSW2	16	60.5348	-147.802872	733	rHopcroft1	192	
Thu 27 Apr 2023 22:55:11 +0000	20230427.2255.001	CalVet net	recover	Prince William Sound	PSW2	16	60.534803	-147.802871	733	rHopcroft1	193	
Thu 27 Apr 2023 23:10:49 +0000	20230427.2310.001	CalVet net	deploy	Prince William Sound	PSW2	16A	60.534802	-147.80287	733	rHopcroft1	194	
Thu 27 Apr 2023 23:14:06 +0000	20230427.2314.001	CalVet net	recover	Prince William Sound	PSW2	16A	60.534801	-147.802871	733	rHopcroft1	195	
Thu 27 Apr 2023 23:57:05 +0000	20230427.2357.001	FeFish	deploy	Prince William Sound	PSW2		60.536354	-147.80057	733	aAguilarIslas1	196	
Fri 28 Apr 2023 00:03:10 +0000	20230428.0003.001	FeFish	recover	Prince William Sound	PSW2		60.540058	-147.799556	733	aAguilarIslas1	197	
Fri 28 Apr 2023 02:03:08 +0000	20230428.0203.001	CalVet net	deploy	Prince William Sound	PSW1	17	60.38008	-147.932791	327	rHopcroft1	198	
Fri 28 Apr 2023 02:10:05 +0000	20230428.0210.001	CalVet net	recover	Prince William Sound	PSW1	17	60.380081	-147.932793	327	rHopcroft1	199	
Fri 28 Apr 2023 02:16:15 +0000	20230428.0216.001	CTD911	deploy	Prince William Sound	PWS1	28	60.38008	-147.932791	326	pShipton1	200	
Fri 28 Apr 2023 03:06:12 +0000	20230428.0306.001	CTD911	recover	Prince William Sound	PWS1	28	60.38008	-147.93279	328	pShipton1	201	
Fri 28 Apr 2023 04:03:14 +0000	20230428.0403.001	CalVet net	deploy	Prince William Sound	KIP2	18	60.278345	-147.986294	580	rHopcroft1	202	
Fri 28 Apr 2023 04:08:20 +0000	20230428.0408.001	CalVet net	recover	Prince William Sound	KIP2	18	60.278343	-147.986295	580	rHopcroft1	203	
Fri 28 Apr 2023 04:13:58 +0000	20230428.0413.001	CTD911	deploy	Prince William Sound	KIP2	29	60.278344	-147.986299	582	pShipton1	204	

Fri 28 Apr 2023 05:10:12 +0000	20230428.0510.001	CTD911	recover	Prince William Sound	KIP2	29	60.278342	-147.986302	583	pShipton1	205	
Fri 28 Apr 2023 06:39:22 +0000	20230428.0632.001	DPI	deploy	MONTAGUE		2	60.219296	-147.976066		hKepner1	206	
Fri 28 Apr 2023 10:33:35 +0000	20230428.1033.001	DPI	recover	MONTAGUE		2	59.940168	-147.848417		hKepner1	207	
Fri 28 Apr 2023 11:00:20 +0000	20230428.1057.001	CTD911	deploy	MONTAGUE	MS3	30	59.932176	-147.855206	165	iReister1	208	
Fri 28 Apr 2023 11:42:38 +0000	20230428.1101.001	CTD911	recover	MONTAGUE	MS3	30	59.932162	-147.855141	165	iReister1	209	
Fri 28 Apr 2023 11:46:25 +0000	20230428.1146.001	CTD911	deploy	MONTAGUE	MS4	31	59.920785	-147.82854	112	iReister1	210	
Fri 28 Apr 2023 12:04:04 +0000	20230428.1204.001	CTD911	recover	MONTAGUE	MS4	31	59.920755	-147.828497	112	iReister1	211	
Fri 28 Apr 2023 12:45:59 +0000	20230428.1204.002	CTD911	deploy	MONTAGUE	MS1	32	59.95412	-147.9258	170	iReister1	212	
Fri 28 Apr 2023 13:05:43 +0000	20230428.1305.001	CTD911	recover	MONTAGUE	MS1	32	59.954134	-147.925796	170	iReister1	213	
Fri 28 Apr 2023 13:35:29 +0000	20230428.1308.001	CTD911	deploy	MONTAGUE	MS2	33	59.943753	-147.895354	193	iReister1	214	
Fri 28 Apr 2023 14:19:35 +0000	20230428.1419.001	CTD911	recover	MONTAGUE	MS2	33	59.943753	-147.895362	193	iReister1	215	
Fri 28 Apr 2023 14:23:21 +0000	20230428.1422.001	CalVet net	deploy	MONTAGUE	MS2	19	59.943758	-147.895358	193	aPoje1	216	
Fri 28 Apr 2023 14:29:13 +0000	20230428.1429.001	CalVet net	recover	MONTAGUE	MS2	19	59.943757	-147.895362	193	aPoje1	217	
Fri 28 Apr 2023 17:46:14 +0000	20230428.1745.001	Underway Science seawater	service				59.484064	-148.43246		jmgrischuk	218	filter change
Fri 28 Apr 2023 20:45:03 +0000	20230428.2044.001	PCO2	stop				59.038859	-148.958061		dNaber1	219	stopped to restart computer to try and get NoMachine working again
Fri 28 Apr 2023 20:50:59 +0000	20230428.2050.001	PCO2	start				59.024503	-148.975797		dNaber1	220	restart of PCO2 computer reset NoMachine connection to allow remote in Wet Lab to work
Sat 29 Apr 2023 05:10:43 +0000	20230429.0509.001	UHDAS	other				57.775046	-150.443936		dNaber1	221	stopped and started WH300 and OS75 to do bottom tracking with WH300 after deployment of CB
Sat 29 Apr 2023 06:06:22 +0000	20230429.0555.001	Bongo Net	deploy	Kodiak Island	KOD06		57.67521	-150.554375		aPoje1	222	BON10
Sat 29 Apr 2023 06:18:48 +0000	20230429.0618.001	Bongo Net	recover	Kodiak Island	KOD06		57.671122	-150.544753		aPoje1	223	
Sat 29 Apr 2023 07:21:17 +0000	20230429.0720.001	UHDAS	other				57.569014	-150.360366		dNaber1	224	stopped and started WH300/OS75 to stop bottom tracking on WH300
Sat 29 Apr 2023 07:30:07 +0000	20230429.0729.001	Underway Science seawater	service				57.561845	-150.347262		dNaber1	225	swapped strainer

Sat 29 Apr 2023 07:30:52 +0000	20230429.0730.001	Bongo Net	deploy	Kodiak Island	KOD07		57.561582	-150.346776	170	aPoje1	226	BON11
Sat 29 Apr 2023 07:52:03 +0000	20230429.0752.001	Bongo Net	recover	Kodiak Island	KOD07		57.552627	-150.330893	170	aPoje1	227	
Sat 29 Apr 2023 08:54:46 +0000	20230429.0854.001	Bongo Net	deploy	Kodiak Island	KOD08		57.444646	-150.145487	170	aPoje1	228	BON12
Sat 29 Apr 2023 09:14:34 +0000	20230429.0857.001	Bongo Net	recover	Kodiak Island	KOD08		57.437598	-150.13089	682	aPoje1	229	BON12
Sat 29 Apr 2023 11:50:21 +0000	20230429.1149.001	SedimentTrap	deploy		KOD10	ST2	57.203818	-149.73266		tKelly1	230	
Sat 29 Apr 2023 11:57:27 +0000	20230429.1157.001	Bongo Net	deploy	Kodiak Island	KOD10		57.203688	-149.727152	2475	aPoje1	231	BON13
Sat 29 Apr 2023 12:18:24 +0000	20230429.1218.001	Bongo Net	recover	Kodiak Island	KOD10		57.205747	-149.705654	2475	aPoje1	232	
Sat 29 Apr 2023 14:50:31 +0000	20230429.1437.001	multinet	deploy	Kodiak Island	KOD10	4D	57.20448	-149.719951	2525	aPoje1	233	MNV4D
Sat 29 Apr 2023 15:59:54 +0000	20230429.1559.001	Underway Science seawater	service				57.204479	-149.719956		jmgrischuk	234	filter change
Sat 29 Apr 2023 16:05:48 +0000	20230429.1605.001	multinet	recover	Kodiak Island	KOD10	4D	57.204471	-149.719943	2525	aPoje1	235	
Sat 29 Apr 2023 16:29:53 +0000	20230429.1629.001	multinet	deploy	Kodiak Island	KOD10	4S	57.20443	-149.719868	2525	aPoje1	236	MNVS
Sat 29 Apr 2023 16:46:27 +0000	20230429.1640.001	multinet	recover	Kodiak Island	KOD10	4S	57.204435	-149.719868	2537	aPoje1	237	MNV2S
Sat 29 Apr 2023 16:53:28 +0000	20230429.1652.001	CTD911	deploy	Kodiak Island	KOD10	34	57.204431	-149.719865	2523	iReister1	238	
Sat 29 Apr 2023 17:03:31 +0000	20230429.1702.001	EM302	stop	KOD			57.940365	-150.238844		jmgrischuk	239	secured 302 when going off the shelf
Sat 29 Apr 2023 17:45:01 +0000	20230429.1745.001	CTD911	recover	Kodiak Island	KOD10	34	57.204434	-149.719863	2523	iReister1	240	PROD
Sat 29 Apr 2023 17:47:33 +0000	20230429.1747.001	CalVet net	deploy	Kodiak Line	KOD10	20	57.204432	-149.719874	2537	rHopcroft1	241	
Sat 29 Apr 2023 17:51:48 +0000	20230429.1751.001	CalVet net	recover	Kodiak Line	KOD10	20	57.204471	-149.720615	2537	rHopcroft1	242	
Sat 29 Apr 2023 17:53:27 +0000	20230429.1753.001	EM302	start				57.204488	-149.72087		jmgrischuk	243	turned em302 on briefly to get accurate water depth
Sat 29 Apr 2023 17:54:18 +0000	20230429.1753.002	UHDAS	stop				57.204482	-149.72089		jmgrischuk	244	turned off briefly to get EM302 water depth
Sat 29 Apr 2023 17:54:51 +0000	20230429.1754.001	EK80 broadband	stop				57.204483	-149.720885		jmgrischuk	245	turned off briefly to get EM302 water depth
Sat 29 Apr 2023 18:07:50 +0000	20230429.1807.001	CalVet net	deploy	Kodiak Line	KOD10	20A	57.204484	-149.720955	2537	rHopcroft1	246	

Sat 29 Apr 2023 18:12:54 +0000	20230429.1812.001	CalVet net	recover	Kodiak Line	KOD10	20A	57.204582	-149.722615	2537	rHopcroft1	247	
Sat 29 Apr 2023 18:35:02 +0000	20230429.1835.001	Trace Metal Bottle	deploy	Kodiak Line	KOD10	TM07	57.204434	-149.721674	2537	aAguilarIslas1	248	
Sat 29 Apr 2023 20:15:07 +0000	20230429.2015.001	CTD911	deploy	Kodiak Island	KOD10	35	57.204997	-149.725908	2485	iReister1	249	
Sat 29 Apr 2023 20:28:10 +0000	20230429.2028.001	Trace Metal Bottle	recover	Kodiak Line	KOD10	TM07	57.204995	-149.725905	2537	aAguilarIslas1	250	
Sat 29 Apr 2023 22:07:37 +0000	20230429.2207.001	CTD911	recover	Kodiak Island	KOD10	35	57.20501	-149.725913	2485	iReister1	251	
Sat 29 Apr 2023 22:14:53 +0000	20230429.2214.001	multinet	deploy	Kodiak Island	KOD10	5D	57.205006	-149.72592	2525	rHopcroft1	252	live sort
Sat 29 Apr 2023 23:30:04 +0000	20230429.2330.001	multinet	recover	Kodiak Island	KOD10	5D	57.205018	-149.725912	2525	rHopcroft1	253	
Sat 29 Apr 2023 23:54:26 +0000	20230429.2354.001	FeFish	deploy	Kodiak Line	KOD10		57.205774	-149.724857	2537	aAguilarIslas1	254	
Sun 30 Apr 2023 00:02:28 +0000	20230430.0001.001	SUNA	stop				57.205006	-149.725912		dNaber1	255	stopped to run 30 uMol standard. 20:55 sampling to be ignored.
Sun 30 Apr 2023 00:03:10 +0000	20230430.0003.001	SUNA	start				57.205004	-149.725914		dNaber1	256	
Sun 30 Apr 2023 00:12:40 +0000	20230430.0012.001	FeFish	recover	Kodiak Line	KOD10		57.21858	-149.745425	2537	aAguilarIslas1	257	
Sun 30 Apr 2023 01:14:10 +0000	20230430.0112.001	CalVet net	deploy	Kodiak Line	KOD9	21	57.322847	-149.928977	1305	rHopcroft1	258	
Sun 30 Apr 2023 01:19:11 +0000	20230430.0119.001	CalVet net	recover	Kodiak Line	KOD9	21	57.32285	-149.928979	1305	rHopcroft1	259	
Sun 30 Apr 2023 01:30:26 +0000	20230430.0130.001	CTD911	deploy	Kodiak Island	MID9	36	57.322843	-149.928977	1305	pShipton1	260	
Sun 30 Apr 2023 02:38:12 +0000	20230430.0238.001	CTD911	recover	Kodiak Island	MID9	36	57.322324	-149.928652	1305	pShipton1	261	
Sun 30 Apr 2023 02:44:33 +0000	20230430.0243.001	Underway Science seawater	other				57.32288	-149.926817		dNaber1	262	Flow rate for the Wet Wall sensors was about 3 liters/min for the transit from KOD10 to KOD9. Now back to 4 l/min.
Sun 30 Apr 2023 03:28:17 +0000	20230430.0327.001	EM302	start				57.409582	-150.079134		dNaber1	263	coming up on the shelf
Sun 30 Apr 2023 03:43:11 +0000	20230430.0343.001	FeFish	deploy	Kodiak Line	KOD8		57.42486	-150.107601		aAguilarIslas1	264	
Sun 30 Apr 2023 03:56:35 +0000	20230430.0356.001	FeFish	recover	Kodiak Line	KOD8		57.431497	-150.120273		aAguilarIslas1	265	
Sun 30 Apr 2023 04:08:50 +0000	20230430.0408.001	CalVet net	deploy	Kodiak Line	KOD8	22	57.439812	-150.132576	715	rHopcroft1	266	

Sun 30 Apr 2023 04:14:48 +0000	20230430.0414.001	CalVet net	recover	Kodiak Line	KOD8	22	57.439829	-150.132613	715	rHopcroft1	267	
Sun 30 Apr 2023 04:20:01 +0000	20230430.0419.001	CTD911	deploy	Kodiak Island	KOD8	37	57.43983	-150.132608	715	pShipton1	268	
Sun 30 Apr 2023 05:22:43 +0000	20230430.0522.001	CTD911	recover	Kodiak Island	KOD8	37	57.439834	-150.13261	715	pShipton1	269	
Sun 30 Apr 2023 05:40:03 +0000	20230430.0540.001	Trace Metal Bottle	deploy	Kodiak Line	KOD8	TM08	57.439821	-150.132598		aAguilarIslas1	270	
Sun 30 Apr 2023 06:54:31 +0000	20230430.0654.001	Trace Metal Bottle	recover	Kodiak Line	KOD8	TM08	57.441182	-150.13613		aAguilarIslas1	271	
Sun 30 Apr 2023 08:05:39 +0000	20230430.0805.001	EM302	stop				57.27794	-150.000016		dNaber1	272	out past the shelf. Off to keep EK80 and WH300 happy.
Sun 30 Apr 2023 09:54:05 +0000	20230430.0953.001	SedimentTrap	recover		KOD10	ST2	57.11511	-149.920464		tKelly1	273	
Sun 30 Apr 2023 11:08:36 +0000	20230430.1055.001	Bongo Net	deploy	Kodiak Island	KOD09		57.314268	-149.927963	1598	aPoje1	274	BON14
Sun 30 Apr 2023 11:34:01 +0000	20230430.1134.001	Bongo Net	recover	Kodiak Island	KOD09		57.322284	-149.926481	1598	aPoje1	275	
Sun 30 Apr 2023 12:16:00 +0000	20230430.1215.001	EM302	start				57.399316	-150.069414		jmgrischuk	276	approching shelf break so em302 back on
Sun 30 Apr 2023 16:13:40 +0000	20230430.1549.001	CalVet net	deploy	Kodiak Line	KOD4	23	57.885093	-150.969882	76	rHopcroft1	277	
Sun 30 Apr 2023 16:17:27 +0000	20230430.1617.001	CalVet net	recover	Kodiak Island	KOD04	23	57.885097	-150.969862	76	aPoje1	278	71m
Sun 30 Apr 2023 16:23:11 +0000	20230430.1621.001	CTD911	deploy	Kodiak Island	KOD4	38	57.885098	-150.969869	76	iReister1	279	
Sun 30 Apr 2023 16:52:05 +0000	20230430.1652.001	CTD911	recover	Kodiak Island	KOD4	38	57.885091	-150.969864	76	iReister1	280	
Sun 30 Apr 2023 17:10:08 +0000	20230430.1709.001	Underway Science seawater	service				57.862615	-150.926795		jmgrischuk	281	filter change
Sun 30 Apr 2023 18:06:50 +0000	20230430.1803.001	CTD911	deploy	Kodiak Island	KOD5	39	57.786363	-150.760761	89	iReister1	282	PROD
Sun 30 Apr 2023 18:42:15 +0000	20230430.1842.001	CTD911	recover	Kodiak Island	KOD5	39	57.786225	-150.761023	89	iReister1	283	PROD
Sun 30 Apr 2023 18:46:28 +0000	20230430.1845.001	EM302	stop				57.786093	-150.761257		jmgrischuk	284	troubleshooting sound speed manager. need the 302 off
Sun 30 Apr 2023 18:48:53 +0000	20230430.1848.001	CalVet net	deploy	Kodiak Line	KOD5	24	57.786123	-150.761202	89	rHopcroft1	285	
Sun 30 Apr 2023 18:54:36 +0000	20230430.1854.001	CalVet net	recover	Kodiak Line	KOD5	24	57.786232	-150.761032	89	rHopcroft1	286	84m
Sun 30 Apr 2023 19:09:43 +0000	20230430.1909.001	CalVet net	deploy	Kodiak Line	KOD5	24A	57.786165	-150.759963	89	rHopcroft1	287	

Sun 30 Apr 2023 19:14:37 +0000	20230430.1914.001	CalVet net	recover	Kodiak Line	KOD5	24A	57.786425	-150.759535	89	rHopcroft1	288	
Sun 30 Apr 2023 19:43:01 +0000	20230430.1942.001	Trace Metal Bottle	deploy	Kodiak Line	KOD5	9	57.786925	-150.75879	89	aAguilarIslas1	289	
Sun 30 Apr 2023 19:57:24 +0000	20230430.1957.001	Trace Metal Bottle	recover	Kodiak Line	KOD5	9	57.786994	-150.758616	89	aAguilarIslas1	290	
Sun 30 Apr 2023 20:04:37 +0000	20230430.1957.002	CTD911	deploy	Kodiak Island	KOD5	40	57.786877	-150.758954	89	iReister1	291	
Sun 30 Apr 2023 20:38:42 +0000	20230430.2038.001	CTD911	recover	Kodiak Island	KOD5	40	57.78727	-150.758011	89	iReister1	292	
Sun 30 Apr 2023 21:25:23 +0000	20230430.2125.001	FeFish	recover	Kodiak Line	KOD5	9	57.778275	-150.749346	89	aAguilarIslas1	293	
Sun 30 Apr 2023 21:27:06 +0000	20230430.2126.001	SedimentTrap	deploy		KOD5	ST3	57.785934	-150.75793		tKelly1	294	
Sun 30 Apr 2023 22:21:12 +0000	20230430.2221.001	EM302	start				57.854595	-150.862688		dNaber1	295	SSM fixed
Sun 30 Apr 2023 23:58:39 +0000	20230430.2358.001	CalVet net	deploy	Kodiak Line	KOD3	25	58.01613	-151.180627	80	rHopcroft1	296	
Mon 01 May 2023 00:02:56 +0000	20230501.0002.001	CalVet net	recover	Kodiak Line	KOD3	25	58.016379	-151.180224	81	rHopcroft1	297	
Mon 01 May 2023 00:15:49 +0000	20230501.0015.001	CTD911	deploy	Kodiak Island	KOD3	41	58.017148	-151.178793	81	pShipton1	298	
Mon 01 May 2023 00:35:49 +0000	20230501.0035.001	CTD911	recover	Kodiak Island	KOD3	41	58.017553	-151.178045	81	pShipton1	299	
Mon 01 May 2023 02:06:44 +0000	20230501.0204.001	CTD911	deploy	Kodiak Island	KOD2	42	58.13088	-151.382334	125	pShipton1	300	
Mon 01 May 2023 02:41:37 +0000	20230501.0241.001	CTD911	recover	Kodiak Island	KOD2	42	58.131037	-151.381758	125	pShipton1	301	
Mon 01 May 2023 02:52:27 +0000	20230501.0252.001	CalVet net	deploy	Kodiak Line	KOD2	26	58.130953	-151.382879	126	rHopcroft1	302	
Mon 01 May 2023 02:56:50 +0000	20230501.0256.001	CalVet net	recover	Kodiak Line	KOD2	26	58.131026	-151.382363	126	rHopcroft1	303	
Mon 01 May 2023 04:28:46 +0000	20230501.0418.001	CalVet net	deploy	Kodiak Line	KOD1	27	58.246057	-151.590598	69	rHopcroft1	304	

Mon 01 May 2023 04:33:55 +0000	20230501.0433.001	CalVet net	recover	Kodiak Line	KOD1	27	58.246054	-151.590917	69	rHopcroft1	305	
Mon 01 May 2023 04:38:49 +0000	20230501.0436.001	CTD911	deploy	Kodiak Island	KOD1	43	58.246034	-151.591008	69	pShipton1	306	
Mon 01 May 2023 05:07:09 +0000	20230501.0507.001	CTD911	recover	Kodiak Island	KOD1	43	58.246185	-151.589771	69	pShipton1	307	
Mon 01 May 2023 06:05:14 +0000	20230501.0550.001	Bongo Net	deploy	Kodiak Island	KOD01		58.247209	-151.589107	70	aPoje1	308	BON015
Mon 01 May 2023 06:16:06 +0000	20230501.0616.001	Bongo Net	recover	Kodiak Island	KOD01		58.243594	-151.586316	70	aPoje1	309	
Mon 01 May 2023 07:38:38 +0000	20230501.0726.001	Bongo Net	deploy	Kodiak Island	KOD2		58.131868	-151.384929	139	aPoje1	310	BON16
Mon 01 May 2023 07:51:21 +0000	20230501.0751.001	Bongo Net	recover	Kodiak Island	KOD2		58.124721	-151.382605	139	aPoje1	311	
Mon 01 May 2023 09:10:03 +0000	20230501.0858.001	Bongo Net	deploy	Kodiak Island	KOD3		58.023942	-151.181123	87	aPoje1	312	BON17
Mon 01 May 2023 09:17:16 +0000	20230501.0914.001	Bongo Net	recover	Kodiak Island	KOD3		58.019937	-151.179504	83	aPoje1	313	
Mon 01 May 2023 10:45:08 +0000	20230501.1045.001	Bongo Net	deploy	Kodiak Island	KOD4		57.888502	-150.968733	75	aPoje1	314	
Mon 01 May 2023 10:52:25 +0000	20230501.1052.001	Bongo Net	recover	Kodiak Island	KOD4		57.884012	-150.966258	75	aPoje1	315	
Mon 01 May 2023 12:01:32 +0000	20230501.1201.001	Bongo Net	deploy	Kodiak Island	KOD5		57.787021	-150.757148	88	aPoje1	316	
Mon 01 May 2023 12:15:19 +0000	20230501.1215.001	Bongo Net	deploy	Kodiak Island	KOD5		57.777889	-150.758981	88	aPoje1	317	
Mon 01 May 2023 14:32:57 +0000	20230501.1432.001	CalVet net	deploy	Kodiak Island	KOD7	28	57.555899	-150.33713	181	aPoje1	318	CVQ27

Mon 01 May 2023 14:38:31 +0000	20230501.1438.001	CalVet net	recover	Kodiak Island	KOD7	28	57.555732	-150.335547	181	aPoje1	319	
Mon 01 May 2023 14:45:51 +0000	20230501.1445.001	CTD911	deploy	Kodiak Island	KOD7	44	57.555568	-150.334076	186	iReister1	320	
Mon 01 May 2023 15:27:14 +0000	20230501.1527.001	CTD911	recover	Kodiak Island	KOD7	44	57.555201	-150.32674	186	iReister1	321	
Mon 01 May 2023 16:39:40 +0000	20230501.1639.001	CalVet net	deploy	Kodiak Island	KOD6	29	57.670516	-150.550341	101	rHopcroft1	322	
Mon 01 May 2023 16:45:41 +0000	20230501.1645.001	CalVet net	recover	Kodiak Island	KOD6	29	57.670617	-150.551489	101	rHopcroft1	323	97m
Mon 01 May 2023 16:48:14 +0000	20230501.1646.001	CTD911	deploy	Kodiak Island	KOD6	45	57.670622	-150.551541	100	iReister1	324	
Mon 01 May 2023 17:19:54 +0000	20230501.1719.001	CTD911	recover	Kodiak Island	KOD6	45	57.670647	-150.551535	100	iReister1	325	
Mon 01 May 2023 17:58:13 +0000	20230501.1757.001	Underway Science seawater	service				57.747369	-150.643335		jmgrischuk	326	filter change
Mon 01 May 2023 18:43:15 +0000	20230501.1825.001	SedimentTrap	recover	Kodiak Line	KOD5	ST3	57.78469	-150.701386	88	tKelly1	327	
Tue 02 May 2023 05:43:26 +0000	20230502.0535.001	multinet	deploy	GAK	GAK04		59.402055	-149.041964	199	aPoje1	328	MNT6
Tue 02 May 2023 05:53:51 +0000	20230502.0553.001	multinet	maxDepth	GAK	GAK04		59.407844	-149.045822	199	aPoje1	329	
Tue 02 May 2023 06:21:48 +0000	20230502.0621.001	multinet	recover	GAK	GAK04		59.421514	-149.056187	199	aPoje1	330	
Tue 02 May 2023 07:19:57 +0000	20230502.0719.001	Underway Science seawater	service				59.542545	-149.188592		dNaber1	331	swapped strainer
Tue 02 May 2023 07:30:42 +0000	20230502.0730.001	multinet	deploy	GAK	GAK03		59.548076	-149.191317	215	aPoje1	332	MNT7
Tue 02 May 2023 07:40:50 +0000	20230502.0740.001	multinet	maxDepth	GAK	GAK03		59.553789	-149.188334	215	aPoje1	333	
Tue 02 May 2023 08:08:52 +0000	20230502.0808.001	multinet	recover	GAK	GAK03		59.569165	-149.181559	215	aPoje1	334	

Tue 02 May 2023 09:07:46 +0000	20230502.0907.001	multinet	deploy	GAK	GAK02		59.678304	-149.327206	224	aPoje1	335	MNT8
Tue 02 May 2023 09:17:47 +0000	20230502.0917.001	multinet	maxDepth	GAK	GAK02		59.683625	-149.327376	226	aPoje1	336	
Tue 02 May 2023 09:45:03 +0000	20230502.0945.001	multinet	recover	GAK	GAK02		59.696885	-149.327975	226	aPoje1	337	
Tue 02 May 2023 10:52:07 +0000	20230502.1052.001	multinet	deploy	GAK	GAK01		59.836292	-149.463786	271	aPoje1	338	MNT9
Tue 02 May 2023 11:02:55 +0000	20230502.1102.001	multinet	maxDepth	GAK	GAK01		59.842443	-149.466623	271	aPoje1	339	
Tue 02 May 2023 11:33:17 +0000	20230502.1133.001	multinet	recover	GAK	GAK01		59.861774	-149.472455	271	aPoje1	340	
Tue 02 May 2023 11:56:27 +0000	20230502.1156.001	multinet	deploy	GAK	GAK01		59.858754	-149.470087	271	aPoje1	341	MNT10 ETOH
Tue 02 May 2023 12:06:07 +0000	20230502.1206.001	multinet	maxDepth	GAK	GAK01		59.853542	-149.468727	267	aPoje1	342	
Tue 02 May 2023 12:33:42 +0000	20230502.1233.001	multinet	recover	GAK	GAK01		59.839577	-149.464444	267	aPoje1	343	
Tue 02 May 2023 15:00:48 +0000	20230502.1500.001	multinet	deploy	GAK	GAK01		59.845144	-149.466719	268	aPoje1	344	MNV4S
Tue 02 May 2023 15:18:01 +0000	20230502.1517.001	multinet	recover	GAK	GAK01		59.845139	-149.466734	268	aPoje1	345	
Tue 02 May 2023 15:30:17 +0000	20230502.1520.001	CTD911	deploy	Seward	GAK1	46	59.845138	-149.466747	269	iReister1	346	
Tue 02 May 2023 16:22:05 +0000	20230502.1622.001	CTD911	recover	Seward	GAK1	46	59.845142	-149.466734	269	iReister1	347	
Tue 02 May 2023 16:32:42 +0000	20230502.1632.001	Trace Metal Bottle	deploy	GAK Line	GAK1	TM10	59.845141	-149.466743	268	aAguilarIslas1	348	
Tue 02 May 2023 17:15:13 +0000	20230502.1715.001	Trace Metal Bottle	recover	GAK Line	GAK1	TM10	59.845094	-149.466851	268	aAguilarIslas1	349	
Tue 02 May 2023 17:19:20 +0000	20230502.1719.001	CalVet net	deploy	GAK Line	GAK1	30	59.845093	-149.466855	270	rHopcroft1	350	
Tue 02 May 2023 17:24:35 +0000	20230502.1724.001	CalVet net	recover	GAK Line	GAK1	30	59.845087	-149.466854	270	rHopcroft1	351	
Tue 02 May 2023 17:41:16 +0000	20230502.1741.001	CalVet net	deploy	GAK Line	GAK1	30A	59.845086	-149.466849	270	rHopcroft1	352	
Tue 02 May 2023 17:46:09 +0000	20230502.1746.001	CalVet net	recover	GAK Line	GAK1	30A	59.845089	-149.466846	270	rHopcroft1	353	
Tue 02 May 2023 17:52:24 +0000	20230502.1748.001	CTD911	deploy	Seward	GAK1	47	59.845107	-149.466829	269	iReister1	354	
Tue 02 May 2023 18:31:36 +0000	20230502.1831.001	CTD911	recover	Seward	GAK1	47	59.845502	-149.466333	269	iReister1	355	

Tue 02 May 2023 18:56:26 +0000	20230502.1856.001	Underway Science seawater	service				59.836633	-149.445956		jmgrischuk	356	filter change
Tue 02 May 2023 19:07:05 +0000	20230502.1907.001	FeFish	recover	GAK Line	GAK1		59.829698	-149.434474	270	aAguilarIslas1	357	
Tue 02 May 2023 20:12:06 +0000	20230502.2007.001	CalVet net	deploy	GAK Line	GAK2	31	59.691628	-149.326843	226	rHopcroft1	358	
Tue 02 May 2023 20:15:27 +0000	20230502.2015.001	CalVet net	recover	GAK Line	GAK2	31	59.691715	-149.326595	226	rHopcroft1	359	
Tue 02 May 2023 20:36:09 +0000	20230502.2036.001	CTD911	deploy	Seward Line	GAK2	48	59.691392	-149.327444	226	iReister1	360	
Tue 02 May 2023 21:16:22 +0000	20230502.2116.001	CTD911	recover	Seward Line	GAK2	48	59.691019	-149.328371	226	iReister1	361	
Tue 02 May 2023 22:16:20 +0000	20230502.2216.001	FeFish	deploy	GAK Line	GAK3		59.573218	-149.205669	216	aAguilarIslas1	362	
Tue 02 May 2023 22:29:37 +0000	20230502.2229.001	FeFish	recover	GAK Line	GAK3		59.562716	-149.197866	216	aAguilarIslas1	363	
Tue 02 May 2023 22:47:47 +0000	20230502.2247.001	CalVet net	deploy	GAK Line	GAK3	32	59.555028	-149.188728	212	rHopcroft1	364	
Tue 02 May 2023 22:57:11 +0000	20230502.2253.001	CTD911	deploy	Seward	GAK3	49	59.555145	-149.186947	214	iReister1	365	
Tue 02 May 2023 23:19:02 +0000	20230502.2319.001	CalVet net	recover	GAK Line	GAK3	32	59.555093	-149.187847	212	rHopcroft1	366	very late
Tue 02 May 2023 23:39:26 +0000	20230502.2339.001	CTD911	recover	Seward	GAK3	49	59.555316	-149.184184	214	iReister1	367	
Tue 02 May 2023 23:52:05 +0000	20230502.2352.001	Trace Metal Bottle	deploy	GAK Line	GAK3	TM11	59.552927	-149.186779	212	aAguilarIslas1	368	
Wed 03 May 2023 00:28:30 +0000	20230503.0028.001	Trace Metal Bottle	recover	GAK Line	GAK3	TM11	59.553184	-149.193249	212	aAguilarIslas1	369	
Wed 03 May 2023 01:44:20 +0000	20230503.0144.001	CalVet net	deploy	Seward Line	GAK4	33	59.409818	-149.051574	198	rHopcroft1	370	
Wed 03 May 2023 01:48:04 +0000	20230503.0148.001	CalVet net	recover	Seward Line	GAK4	33	59.409863	-149.051485	198	rHopcroft1	371	
Wed 03 May 2023 01:52:59 +0000	20230503.0150.001	CTD911	deploy	Seward Line	GAK4	50	59.409794	-149.051667	198	pShipton1	372	
Wed 03 May 2023 02:36:32 +0000	20230503.0236.001	CTD911	recover	Seward Line	GAK4	50	59.409597	-149.052642	198	pShipton1	373	big swells, winch could not cradle CTD

Wed 03 May 2023 04:20:45 +0000	20230503.0420.001	SedimentTrap	deploy		GAK5	ST4	59.26328	-148.909198		tKelly1	374	
Wed 03 May 2023 05:44:15 +0000	20230503.0532.001	multinet	deploy	Seward Line	GAK05		59.25619	-148.907175	167	aPoje1	375	MNT11 EtOH
Wed 03 May 2023 05:52:57 +0000	20230503.0552.001	multinet	maxDepth	Seward Line	GAK05		59.262281	-148.909278	167	aPoje1	376	
Wed 03 May 2023 06:18:16 +0000	20230503.0618.001	multinet	recover	Seward Line	GAK05		59.279111	-148.91317	167	aPoje1	377	
Wed 03 May 2023 06:42:24 +0000	20230503.0642.001	multinet	deploy	Seward Line	GAK05		59.272236	-148.911572	167	aPoje1	378	MNT12
Wed 03 May 2023 06:50:57 +0000	20230503.0650.001	multinet	maxDepth	Seward Line	GAK05		59.268314	-148.909425	167	aPoje1	379	
Wed 03 May 2023 07:16:37 +0000	20230503.0716.001	multinet	recover	Seward Line	GAK05		59.255514	-148.909064	167	aPoje1	380	
Wed 03 May 2023 08:29:58 +0000	20230503.0829.001	multinet	deploy	Seward Line	GAK06		59.124715	-148.765766	147	aPoje1	381	MNT13
Wed 03 May 2023 08:36:16 +0000	20230503.0836.001	multinet	maxDepth	Seward Line	GAK06		59.121529	-148.765853	147	aPoje1	382	
Wed 03 May 2023 09:02:46 +0000	20230503.0902.001	multinet	recover	Seward Line	GAK06		59.108639	-148.770826	147	aPoje1	383	
Wed 03 May 2023 10:29:09 +0000	20230503.1029.001	multinet	deploy	Seward Line	GAK07		58.980344	-148.625273	238	aPoje1	384	MNT14
Wed 03 May 2023 10:39:04 +0000	20230503.1039.001	multinet	maxDepth	Seward Line	GAK07		58.975757	-148.627076	238	aPoje1	385	
Wed 03 May 2023 11:06:02 +0000	20230503.1106.001	multinet	recover	Seward Line	GAK07		58.963603	-148.634674	238	aPoje1	386	
Wed 03 May 2023 14:00:48 +0000	20230503.1357.001	CTD911	deploy	Seward	GAK5	51	59.263549	-148.907882	166	iReister1	387	

Wed 03 May 2023 14:48:31 +0000	20230503.1448.001	CTD911	recover	Seward	GAK5	51	59.265455	-148.907555	166	iReister1	388	
Wed 03 May 2023 14:59:25 +0000	20230503.1450.001	multinet	deploy	Seward Line	GAK05		59.26546	-148.904986	165	aPoje1	389	MnV#4S
Wed 03 May 2023 15:13:22 +0000	20230503.1513.001	multinet	recover	Seward Line	GAK05		59.264316	-148.90375	165	aPoje1	390	
Wed 03 May 2023 15:35:27 +0000	20230503.1535.001	Trace Metal Bottle	deploy	Seward Line	GAK5	TM12	59.263484	-148.90424	165	aAguilarIslas1	391	
Wed 03 May 2023 16:07:27 +0000	20230503.1607.001	Trace Metal Bottle	recover	Seward Line	GAK5	TM12	59.26203	-148.906399	165	aAguilarIslas1	392	
Wed 03 May 2023 16:10:10 +0000	20230503.1610.001	CalVet net	deploy	Seward Line	GAK5	34	59.261812	-148.906594	166	rHopcroft1	393	
Wed 03 May 2023 16:15:52 +0000	20230503.1615.001	CalVet net	recover	Seward Line	GAK5	34	59.261812	-148.906516	166	rHopcroft1	394	
Wed 03 May 2023 16:44:23 +0000	20230503.1644.001	CalVet net	deploy	Seward Line	GAK5	34A	59.261412	-148.907848	166	rHopcroft1	395	
Wed 03 May 2023 16:48:50 +0000	20230503.1648.001	CalVet net	recover	Seward Line	GAK5	34A	59.261575	-148.908201	166	rHopcroft1	396	
Wed 03 May 2023 17:03:37 +0000	20230503.1700.001	CTD911	deploy	Seward	GAK5	52	59.261787	-148.908686	167	iReister1	397	PROD
Wed 03 May 2023 17:32:19 +0000	20230503.1732.001	CTD911	recover	Seward	GAK5	52	59.261782	-148.908682	167	iReister1	398	PROD
Wed 03 May 2023 17:44:39 +0000	20230503.1744.001	FeFish	deploy	Seward Line	GAK5		59.258091	-148.911364	166	aAguilarIslas1	399	
Wed 03 May 2023 17:49:31 +0000	20230503.1749.001	FeFish	recover	Seward Line	GAK5		59.254361	-148.913915	166	aAguilarIslas1	400	
Wed 03 May 2023 17:50:08 +0000	20230503.1749.002	Underway Science seawater	service				59.253934	-148.914197		jmgrischuk	401	filter change

Wed 03 May 2023 19:41:27 +0000	20230503.1937.001	CTD911	deploy	Seward	Glider Recovery Cal Cast	53	59.027036	-148.666493	227	iReister1	402	CAL FOR SHACKLETON
Wed 03 May 2023 21:11:42 +0000	20230503.1951.001	CTD911	recover	Seward	Glider Recovery Cal Cast	53	59.027132	-148.668296	227	iReister1	403	
Wed 03 May 2023 21:12:32 +0000	20230503.2112.001	UHDAS	stop				59.025427	-148.698665		dNaber1	404	WH300 and OS75 stopped to raise centerboard for mooring operations
Wed 03 May 2023 21:13:19 +0000	20230503.2112.002	EK80 broadband	stop				59.0259	-148.698395		dNaber1	405	stopped to raise centerboard to flush for mooring operations
Wed 03 May 2023 21:14:26 +0000	20230503.2113.001	centerBoard	recover				59.019875	-148.700691		dNaber1	406	raised to flush for mooring operations
Wed 03 May 2023 21:26:55 +0000	20230503.2126.001	UHDAS	start				59.019013	-148.700917		dNaber1	407	WH300 on for mooring operations. CB in flush position OS75 off
Wed 03 May 2023 21:44:10 +0000	20230503.2143.001	EM302	stop				59.019091	-148.699652		dNaber1	408	stopped to ping on mooring
Wed 03 May 2023 21:44:37 +0000	20230503.2144.001	UHDAS	stop				59.019064	-148.699537		dNaber1	409	WH300 stopped to ping on mooring
Wed 03 May 2023 23:31:30 +0000	20230503.2331.001	EM302	start				59.037518	-148.665879		dNaber1	410	
Wed 03 May 2023 23:49:38 +0000	20230503.2348.001	centerBoard	deploy				59.045369	-148.656071		dNaber1	411	in deploy position
Wed 03 May 2023 23:52:21 +0000	20230503.2349.001	UHDAS	start				59.050941	-148.645589		dNaber1	412	WH300 and OS75 started with CB in deployed position. WH300 bottom track off.
Wed 03 May 2023 23:52:49 +0000	20230503.2352.001	EK80 broadband	start				59.051202	-148.644347		dNaber1	413	cb in deployed position
Thu 04 May 2023 01:56:53 +0000	20230504.0155.001	CTD911	deploy	Seward Line	GEO2-23	54	59.022293	-148.665761	230	pShipton1	414	cal cast just after GEO2 2023 deployed
Thu 04 May 2023 02:43:31 +0000	20230504.0243.001	CTD911	recover	Seward Line	GEO2-23	54	59.021809	-148.66493	230	pShipton1	415	
Thu 04 May 2023 03:05:48 +0000	20230504.0305.001	CTD911	deploy	Seward Line	GEO2-23	55	59.0217	-148.66832	230	pShipton1	416	redo. 54 had open vents

Thu 04 May 2023 03:57:40 +0000	20230504.0357.001	CTD911	recover	Seward Line	GEO2-23	55	59.021663	-148.669856	230	pShipton1	417	
Thu 04 May 2023 04:07:39 +0000	20230504.0407.001	EK80 broadband	stop				59.017925	-148.682111		dNaber1	418	stopped to ping on mooring
Thu 04 May 2023 04:07:57 +0000	20230504.0407.002	EM302	stop				59.017743	-148.683072		dNaber1	419	stopped to ping on mooring
Thu 04 May 2023 04:08:15 +0000	20230504.0407.003	UHDAS	stop				59.017557	-148.684051		dNaber1	420	stopped to ping on mooring
Thu 04 May 2023 05:10:45 +0000	20230504.0452.001	CalVet net	deploy	Seward Line	GAK6	35	59.116954	-148.77315	149	rHopcroft1	421	dusky (cloudy)
Thu 04 May 2023 05:07:21 +0000	20230504.0506.001	EK80 broadband	stop				59.116669	-148.773472		dNaber1	422	stopped to ping on mooring
Thu 04 May 2023 05:07:39 +0000	20230504.0507.001	EM302	stop				59.11668	-148.773459		dNaber1	423	stopped to ping on mooring
Thu 04 May 2023 05:07:57 +0000	20230504.0507.002	UHDAS	stop				59.116706	-148.773405		dNaber1	424	stopped to ping on mooring
Thu 04 May 2023 05:13:47 +0000	20230504.0513.001	UHDAS	start				59.11722	-148.773241		dNaber1	425	WH300 and OS75 started with CB in deployed position. WH300 bottom track off.
Thu 04 May 2023 05:14:40 +0000	20230504.0514.001	EK80 broadband	start				59.117303	-148.773264		dNaber1	426	
Thu 04 May 2023 05:15:32 +0000	20230504.0514.002	EM302	start				59.11739	-148.773286		dNaber1	427	
Thu 04 May 2023 05:17:02 +0000	20230504.0517.001	CalVet net	recover	Seward Line	GAK6	35	59.117564	-148.773313	149	rHopcroft1	428	
Thu 04 May 2023 05:21:44 +0000	20230504.0521.001	CTD911	deploy	Seward	GAK6	56	59.117635	-148.773271	149	iReister1	429	
Thu 04 May 2023 05:49:44 +0000	20230504.0549.001	EK80 broadband	start				59.02189	-148.694229		dNaber1	430	
Thu 04 May 2023 05:50:39 +0000	20230504.0550.001	EM302	start				59.02189	-148.694229		dNaber1	431	
Thu 04 May 2023 05:51:24 +0000	20230504.0550.002	UHDAS	start				59.02189	-148.694229		dNaber1	432	WH300 and OS75 started. Centerboard in deployed position. Bottom track off
Thu 04 May 2023 06:05:31 +0000	20230504.0605.001	CTD911	recover	Seward	GAK6	56	59.119345	-148.774651	149	iReister1	433	
Thu 04 May 2023 07:35:43 +0000	20230504.0735.001	EM302	stop				59.317643	-148.955639		dNaber1	434	off to ping on mooring
Thu 04 May 2023 07:36:03 +0000	20230504.0735.002	EK80 broadband	stop				59.317511	-148.955452		dNaber1	435	off to ping on mooring
Thu 04 May 2023 07:36:38 +0000	20230504.0736.001	UHDAS	stop				59.317266	-148.955098		dNaber1	436	WH300 and OS75 off to ping on mooring
Thu 04 May 2023 08:07:25 +0000	20230504.0807.001	EM302	start				59.314805	-148.950183		dNaber1	437	

Thu 04 May 2023 08:07:41 +0000	20230504.0807.002	EK80 broadband	start				59.314765	-148.950113		dNaber1	438	
Thu 04 May 2023 08:09:07 +0000	20230504.0807.003	UHDAS	start				59.314444	-148.949546		dNaber1	439	WH300 and OS75 on bottom track off
Thu 04 May 2023 08:10:38 +0000	20230504.0810.001	SedimentTrap	recover		GAK5	ST4	59.315665	-148.952058		tKelly1	440	
Thu 04 May 2023 09:15:36 +0000	20230504.0914.001	DPI	deploy	GAK		3	59.235761	-148.883212		hKepner1	441	
Thu 04 May 2023 16:52:30 +0000	20230504.1652.001	Underway Science seawater	service				59.7748	-149.407292		jmgrischuk	442	filter change
Thu 04 May 2023 19:30:18 +0000	20230504.1930.001	DPI	recover	GAK		3	59.965018	-149.369481		hKepner1	443	
Thu 04 May 2023 19:59:13 +0000	20230504.1959.001	CalVet net	deploy	Seward Line	RES2.5	36	60.024941	-149.358903	300	rHopcroft1	444	
Thu 04 May 2023 20:02:32 +0000	20230504.1959.002	CalVet net	recover	Seward Line	RES2.5	36	60.024945	-149.358903	294	rHopcroft1	445	
Thu 04 May 2023 20:14:03 +0000	20230504.2014.001	CTD911	deploy	Seward	RES2.5	57	60.024942	-149.358903	294	iReister1	446	
Thu 04 May 2023 21:03:47 +0000	20230504.2103.001	CTD911	recover	Seward	RES2.5	57	60.024942	-149.358903	294	iReister1	447	
Thu 04 May 2023 21:05:34 +0000	20230504.2105.001	CalVet net	deploy	Seward Line	RES2.5	36L	60.024944	-149.3589	294	rHopcroft1	448	
Thu 04 May 2023 21:09:38 +0000	20230504.2109.001	CalVet net	recover	Seward Line	RES2.5	36L	60.024941	-149.358899	294	rHopcroft1	449	
Thu 04 May 2023 22:42:29 +0000	20230504.2208.001	EK80 broadband	stop				59.856346	-149.494863		dNaber1	450	stopped for mooring ops
Thu 04 May 2023 22:42:50 +0000	20230504.2242.001	EM302	stop				59.856315	-149.494926		dNaber1	451	stopped for mooring ops
Thu 04 May 2023 22:44:37 +0000	20230504.2242.002	UHDAS	stop				59.855784	-149.495104		dNaber1	452	stopped for mooring ops
Thu 04 May 2023 23:02:29 +0000	20230504.2246.001	centerBoard	recover				59.852666	-149.498785		dNaber1	453	in flush position for mooring recovery
Thu 04 May 2023 23:03:14 +0000	20230504.2302.001	UHDAS	start				59.852375	-149.498983		dNaber1	454	WH300 and OS75 on centerboard in flush position during mooring recovery. WH300 being used for surface current by bridge.
Thu 04 May 2023 23:59:51 +0000	20230504.2359.001	CTD911	deploy	Seward	GAK1	58	59.84635	-149.493774	264	iReister1	455	
Fri 05 May 2023 00:27:24 +0000	20230505.0027.001	CTD911	recover	Seward	GAK1	58	59.847637	-149.487687	264	iReister1	456	
Fri 05 May 2023 00:46:47 +0000	20230505.0046.001	UHDAS	stop				59.857966	-149.492183		dNaber1	457	stopped tto lower centerboard

Fri 05 May 2023 00:54:33 +0000	20230505.0054.001	centerBoard	deploy				59.864105	-149.492307		dNaber1	458	
Fri 05 May 2023 01:00:49 +0000	20230505.0100.001	UHDAS	start				59.86899	-149.492509		dNaber1	459	WH300 and OS75 on bottom track off CB in deployed position
Fri 05 May 2023 01:01:02 +0000	20230505.0100.002	EK80 broadband	start				59.869197	-149.492538		dNaber1	460	
Fri 05 May 2023 01:01:14 +0000	20230505.0101.001	EM302	start				59.86935	-149.492557		dNaber1	461	
Fri 05 May 2023 01:06:15 +0000	20230505.0106.001	EM302	stop				59.873195	-149.492974		dNaber1	462	
Fri 05 May 2023 06:37:10 +0000	20230505.0636.001	EM302	start				59.93682	-149.401978		dNaber1	463	
Fri 05 May 2023 15:25:24 +0000	20230505.1504.001	multinet	deploy	Seward Line	GAK09	8bad	58.679615	-148.350674	276	aPoje1	464	MNV5S
Fri 05 May 2023 15:40:58 +0000	20230505.1540.001	multinet	recover	Seward Line	GAK09		58.678811	-148.346611	276	aPoje1	465	
Fri 05 May 2023 15:58:44 +0000	20230505.1549.001	CTD911	deploy	Seward	GAK9	59	58.679257	-148.346585	275	tKelly1	466	
Fri 05 May 2023 16:32:22 +0000	20230505.1632.001	Underway Science seawater	service				58.680413	-148.346786		jmgrischuk	467	filter swap
Fri 05 May 2023 16:52:23 +0000	20230505.1652.001	CTD911	recover	Seward	GAK9	59	58.680811	-148.346862	275	iReister1	468	
Fri 05 May 2023 16:58:03 +0000	20230505.1653.001	multinet	deploy	Seward Line	GAK09	8Live	58.680489	-148.34676	276	aPoje1	469	MNV6S
Fri 05 May 2023 17:16:08 +0000	20230505.1716.001	multinet	recover	Seward Line	GAK09		58.680319	-148.344353	276	aPoje1	470	
Fri 05 May 2023 17:54:28 +0000	20230505.1721.001	CalVet net	deploy	GAK	GAK09	37	58.679696	-148.349409	278	hKepner1	471	
Fri 05 May 2023 17:54:50 +0000	20230505.1754.001	CalVet net	recover	GAK	GAK09	37	58.679465	-148.348798	278	hKepner1	472	
Fri 05 May 2023 17:57:22 +0000	20230505.1757.001	CalVet net	deploy	GAK	GAK09	37A	58.679406	-148.347819	278	rHopcroft1	473	
Fri 05 May 2023 18:02:46 +0000	20230505.1802.001	CalVet net	recover	GAK	GAK09	37A	58.679285	-148.347654	278	rHopcroft1	474	
Fri 05 May 2023 18:24:02 +0000	20230505.1824.001	Trace Metal Bottle	deploy	GAK	GAK09	TM13	58.680046	-148.347198		aAguilarIslas1	475	
Fri 05 May 2023 19:08:49 +0000	20230505.1908.001	Trace Metal Bottle	recover	GAK	GAK09	TM13	58.68111	-148.346173		aAguilarIslas1	476	
Fri 05 May 2023 19:16:49 +0000	20230505.1911.001	CTD911	deploy	Seward	GAK9	60	58.680633	-148.346355	278	iReister1	477	
Fri 05 May 2023 19:45:43 +0000	20230505.1945.001	CTD911	recover	Seward	GAK9	60	58.681158	-148.347146	278	iReister1	478	fired bottles 9-15 for test purposes

Fri 05 May 2023 19:56:28 +0000	20230505.1956.001	multinet	deploy	Seward Line	GAK09	8	58.681545	-148.347261	276	rHopcroft1	479	third
Fri 05 May 2023 20:15:53 +0000	20230505.2015.001	multinet	recover	Seward Line	GAK09	8S	58.68201	-148.347282	276	rHopcroft1	480	
Fri 05 May 2023 20:37:04 +0000	20230505.2037.001	FeFish	deploy	GAK	GAK09		58.683884	-148.348355		aAguilarIslas1	481	
Fri 05 May 2023 20:51:51 +0000	20230505.2051.001	FeFish	recover	GAK	GAK09		58.697339	-148.350506		aAguilarIslas1	482	
Fri 05 May 2023 21:53:10 +0000	20230505.2153.001	CalVet net	deploy	GAK	GAK08	38	58.8081	-148.491996	291	hKepner1	483	
Fri 05 May 2023 21:57:03 +0000	20230505.2157.001	CalVet net	recover	GAK	GAK08	38	58.80786	-148.492012	291	rHopcroft1	484	
Fri 05 May 2023 22:00:00 +0000	20230505.2158.001	CTD911	deploy	Seward	GAK8	61	58.807925	-148.492003	291	iReister1	485	
Fri 05 May 2023 22:23:58 +0000	20230505.2223.001	EK80 broadband	stop				58.807803	-148.492001		dNaber1	486	stopped to ping on mooring
Fri 05 May 2023 22:24:14 +0000	20230505.2224.001	EM302	stop				58.807814	-148.49201		dNaber1	487	stopped to ping on mooring
Fri 05 May 2023 22:24:34 +0000	20230505.2224.002	UHDAS	stop				58.80783	-148.492013		dNaber1	488	stopped to ping on mooring
Fri 05 May 2023 22:34:31 +0000	20230505.2234.001	EK80 broadband	start				58.807953	-148.492004		dNaber1	489	
Fri 05 May 2023 22:34:44 +0000	20230505.2234.002	EM302	start				58.807949	-148.492008		dNaber1	490	
Fri 05 May 2023 22:35:10 +0000	20230505.2234.003	UHDAS	start				58.807948	-148.492003		dNaber1	491	WH300 and OS75 started. Centerboard in deployed position. Bottom track off
Fri 05 May 2023 22:48:51 +0000	20230505.2248.001	CTD911	recover	Seward	GAK8	61	58.807563	-148.492044	291	iReister1	492	
Fri 05 May 2023 23:59:43 +0000	20230505.2359.001	FeFish	deploy	GAK	GAK07		58.952655	-148.627489	291	aAguilarIslas1	493	
Sat 06 May 2023 00:09:47 +0000	20230506.0009.001	FeFish	recover	GAK	GAK07		58.961914	-148.628176	255	aAguilarIslas1	494	
Sat 06 May 2023 00:29:14 +0000	20230506.0029.001	CalVet net	deploy	GAK	GAK07	39	58.970505	-148.62986	243	hKepner1	495	
Sat 06 May 2023 00:30:40 +0000	20230506.0030.001	EK80 broadband	stop				58.970529	-148.629761		dNaber1	496	stopped to ping on mooring
Sat 06 May 2023 00:30:53 +0000	20230506.0030.002	EM302	stop				58.970533	-148.629744		dNaber1	497	stopped to ping on mooring
Sat 06 May 2023 00:31:21 +0000	20230506.0030.003	UHDAS	stop				58.970532	-148.629704		dNaber1	498	stopped to ping on mooring
Sat 06 May 2023 00:31:57 +0000	20230506.0031.001	CalVet net	recover	Seward Line	GAK07	39	58.970536	-148.629653	243	rHopcroft1	499	

Sat 06 May 2023 00:37:07 +0000	20230506.0034.001	CTD911	deploy	Seward	GAK7	62	58.970594	-148.629283	243	pShipton1	500	
Sat 06 May 2023 00:39:49 +0000	20230506.0039.001	EK80 broadband	start				58.97062	-148.629048		dNaber1	501	
Sat 06 May 2023 00:40:08 +0000	20230506.0039.002	EM302	start				58.970626	-148.629011		dNaber1	502	
Sat 06 May 2023 00:40:31 +0000	20230506.0040.001	UHDAS	start				58.970633	-148.628963		dNaber1	503	WH300 and OS75 started. Centerboard in deployed position. Bottom track off
Sat 06 May 2023 01:18:53 +0000	20230506.0118.001	CTD911	recover	Seward	GAK7	62	58.970977	-148.626557	243	pShipton1	504	
Sat 06 May 2023 01:32:47 +0000	20230506.0132.001	Trace Metal Bottle	deploy	GAK Line	GAK07	TM14	58.970956	-148.626679	243	aAguilarIslas1	505	
Sat 06 May 2023 02:13:51 +0000	20230506.0213.001	Trace Metal Bottle	recover	GAK Line	GAK07	TM14	58.970831	-148.627528	243	aAguilarIslas1	506	
Sat 06 May 2023 03:04:16 +0000	20230506.0303.001	EK80 broadband	stop				59.015534	-148.780608		dNaber1	507	stopped to ping on mooring
Sat 06 May 2023 03:04:42 +0000	20230506.0304.001	EM302	stop				59.015584	-148.782046		dNaber1	508	stopped to ping on mooring
Sat 06 May 2023 03:05:14 +0000	20230506.0304.002	UHDAS	stop				59.015572	-148.783517		dNaber1	509	stopped to ping on mooring
Sat 06 May 2023 03:18:18 +0000	20230506.0305.001	EK80 broadband	start				59.016121	-148.787678		dNaber1	510	
Sat 06 May 2023 03:18:35 +0000	20230506.0318.001	EM302	start				59.016157	-148.787726		dNaber1	511	
Sat 06 May 2023 03:19:43 +0000	20230506.0318.002	UHDAS	start				59.01591	-148.788245		dNaber1	512	WH300 and OS75 on with bottom track off. CB in deployed position
Sat 06 May 2023 03:46:37 +0000	20230506.0346.001	EK80 broadband	stop				58.968675	-148.715691		dNaber1	513	stopped to ping on mooring
Sat 06 May 2023 03:47:05 +0000	20230506.0346.002	EM302	stop				58.968694	-148.71571		dNaber1	514	stopped to ping on mooring
Sat 06 May 2023 03:47:54 +0000	20230506.0347.001	UHDAS	stop				58.968672	-148.715738		dNaber1	515	stopped to ping on mooring
Sat 06 May 2023 03:53:20 +0000	20230506.0353.001	EK80 broadband	start				58.968364	-148.71603		dNaber1	516	
Sat 06 May 2023 03:53:34 +0000	20230506.0353.002	EM302	start				58.968181	-148.715929		dNaber1	517	
Sat 06 May 2023 03:53:53 +0000	20230506.0353.003	UHDAS	start				58.967875	-148.715682		dNaber1	518	
Sat 06 May 2023 06:02:42 +0000	20230506.0539.001	multinet	deploy	Seward Line	GAK08		58.816327	-148.498046	290	aPoje1	519	MNT15
Sat 06 May 2023 06:14:28 +0000	20230506.0614.001	multinet	maxDepth	Seward Line	GAK08		58.809375	-148.491401	290	aPoje1	520	

Sat 06 May 2023 06:45:27 +0000	20230506.0645.001	multinet	recover	Seward Line	GAK08		58.79226	-148.471763	290	aPoje1	521	
Sat 06 May 2023 07:36:13 +0000	20230506.0736.001	multinet	deploy	Seward Line	GAK09		58.689431	-148.361163	290	aPoje1	522	MNT16
Sat 06 May 2023 07:47:37 +0000	20230506.0747.001	multinet	maxDepth	Seward Line	GAK09		58.683869	-148.354758	290	aPoje1	523	
Sat 06 May 2023 08:14:09 +0000	20230506.0814.001	multinet	recover	Seward Line	GAK09		58.672865	-148.340654	290	aPoje1	524	
Sat 06 May 2023 08:32:16 +0000	20230506.0832.001	multinet	deploy	Seward Line	GAK09		58.670869	-148.339269	290	aPoje1	525	MNT17 EtOH
Sat 06 May 2023 09:10:36 +0000	20230506.0910.001	multinet	recover	Seward Line	GAK09		58.690249	-148.361002	290	aPoje1	526	
Sat 06 May 2023 09:57:48 +0000	20230506.0957.001	EM302	stop				58.598515	-148.268108		jmgrischuk	527	headed off the shelf, secured to improve ADCP and EK80 data
Sat 06 May 2023 10:22:03 +0000	20230506.1011.001	multinet	deploy	Seward Line	GAK10		58.552984	-148.221207	1210	aPoje1	528	MNT18
Sat 06 May 2023 10:31:55 +0000	20230506.1031.001	multinet	maxDepth	Seward Line	GAK10		58.548723	-148.217954	1368	aPoje1	529	
Sat 06 May 2023 10:59:48 +0000	20230506.1059.001	multinet	recover	Seward Line	GAK10		58.536616	-148.206943	1368	aPoje1	530	
Sat 06 May 2023 12:05:39 +0000	20230506.1205.001	multinet	deploy	Seward Line	GAK11		58.398627	-148.079314	1396	aPoje1	531	MNT19
Sat 06 May 2023 12:16:04 +0000	20230506.1216.001	multinet	maxDepth	Seward Line	GAK11		58.39384	-148.075234	1396	aPoje1	532	
Sat 06 May 2023 12:43:39 +0000	20230506.1243.001	multinet	recover	Seward Line	GAK11		58.380602	-148.064101	1396	aPoje1	533	
Sat 06 May 2023 14:09:42 +0000	20230506.1406.001	CTD911	deploy	Seward	GAK10	63	58.541446	-148.209308	778	iReister1	534	
Sat 06 May 2023 15:28:00 +0000	20230506.1411.001	CTD911	recover	Seward	GAK10	63	58.541524	-148.209123	778	iReister1	535	
Sat 06 May 2023 14:13:58 +0000	20230506.1413.001	EM302	start				58.541554	-148.209118		jmgrischuk	536	turned em302 on briefly to get accurate water depth
Sat 06 May 2023 14:14:27 +0000	20230506.1414.001	UHDAS	stop				58.541579	-148.209071		jmgrischuk	537	turned off briefly to get EM302 water depth
Sat 06 May 2023 14:14:48 +0000	20230506.1414.002	EK80 broadband	stop				58.541598	-148.209033		jmgrischuk	538	turned off briefly to get EM302 water depth
Sat 06 May 2023 15:30:00 +0000	20230506.1529.001	CalVet net	deploy	GAK	GAK10	40	58.541483	-148.209192	778	aPoje1	539	
Sat 06 May 2023 15:35:01 +0000	20230506.1535.001	CalVet net	recover	GAK	GAK10	40	58.541708	-148.208829	778	aPoje1	540	
Sat 06 May 2023 15:52:49 +0000	20230506.1552.001	Underway Science seawater	service				58.51077	-148.176961		jmgrischuk	541	filter change

Sat 06 May 2023 16:49:52 +0000	20230506.1649.001	CalVet net	deploy	GAK	GAK11	41	58.388756	-148.072081	1458	rHopcroft1	542	
Sat 06 May 2023 16:53:44 +0000	20230506.1653.001	CalVet net	recover	GAK	GAK11	41	58.388492	-148.071611	1458	rHopcroft1	543	
Sat 06 May 2023 16:58:29 +0000	20230506.1655.001	CTD911	deploy	Seward Line	GAK11	64	58.38844	-148.071673	1413	iReister1	544	
Sat 06 May 2023 18:18:27 +0000	20230506.1818.001	CTD911	recover	Seward Line	GAK11	64	58.388597	-148.065562	1413	iReister1	545	
Sat 06 May 2023 19:20:22 +0000	20230506.1838.001	FeFish	deploy	GAK	GAK12		58.257899	-147.946832		aAguilarIslas1	546	
Sat 06 May 2023 19:34:28 +0000	20230506.1934.001	FeFish	recover	GAK	GAK12		58.244673	-147.935312		aAguilarIslas1	547	
Sat 06 May 2023 19:45:10 +0000	20230506.1945.001	CTD911	deploy	Seward	gak12	65	58.242226	-147.93431	1458	pShipton1	548	PROD
Sat 06 May 2023 20:09:49 +0000	20230506.2009.001	CTD911	recover	Seward	gak12	65	58.240775	-147.936916	1458	pShipton1	549	PROD
Sat 06 May 2023 20:16:52 +0000	20230506.2016.001	CalVet net	deploy	GAK	GAK12	42	58.240119	-147.937445	2180	rHopcroft1	550	
Sat 06 May 2023 20:21:25 +0000	20230506.2021.001	CalVet net	recover	GAK	GAK12	42	58.239797	-147.937569	2180	rHopcroft1	551	
Sat 06 May 2023 20:41:02 +0000	20230506.2041.001	CalVet net	deploy	GAK	GAK12	42LIVE	58.245709	-147.933308	2180	rHopcroft1	552	NOT KEPT - FOR LIZ
Sat 06 May 2023 20:46:31 +0000	20230506.2046.001	CalVet net	recover	GAK	GAK12	42LIVE	58.245501	-147.933508	2180	rHopcroft1	553	
Sat 06 May 2023 20:56:59 +0000	20230506.2048.001	CTD911	deploy	Seward	GAK12	66	58.245384	-147.934016	2179	pShipton1	554	
Sat 06 May 2023 22:08:35 +0000	20230506.2208.001	CTD911	recover	Seward	GAK12	66	58.243663	-147.937346	2133	pShipton1	555	
Sat 06 May 2023 22:17:04 +0000	20230506.2217.001	Trace Metal Bottle	deploy	GAK	GAK12	TM15	58.243713	-147.937561	2180	aAguilarIslas1	556	
Sat 06 May 2023 23:55:28 +0000	20230506.2217.002	Trace Metal Bottle	recover	GAK	GAK12	TM15	58.245261	-147.943086	2180	aAguilarIslas1	557	
Sun 07 May 2023 01:03:23 +0000	20230507.0103.001	CalVet net	deploy	GAK	GAK13	43	58.099288	-147.79388	2065	rHopcroft1	558	
Sun 07 May 2023 01:06:55 +0000	20230507.0106.001	CalVet net	recover	GAK	GAK13	43	58.099254	-147.79399	2065	rHopcroft1	559	
Sun 07 May 2023 01:13:06 +0000	20230507.0113.001	CTD911	deploy	Seward	GAK13	67	58.099298	-147.793868	2065	pShipton1	560	
Sun 07 May 2023 02:48:28 +0000	20230507.0248.001	CTD911	recover	Seward	GAK13	67	58.099327	-147.793773	2066	pShipton1	561	
Sun 07 May 2023 06:00:45 +0000	20230507.0549.001	multinet	deploy	Seward Line	GAK12		58.248576	-147.937895	2161	aPoje1	562	MNT20

Sun 07 May 2023 06:14:07 +0000	20230507.0614.001	multinet	maxDepth	Seward Line	GAK12		58.238229	-147.929325	2161	aPoje1	563	
Sun 07 May 2023 06:45:29 +0000	20230507.0645.001	multinet	recover	Seward Line	GAK12		58.215084	-147.912411	2161	aPoje1	564	
Sun 07 May 2023 07:36:22 +0000	20230507.0736.001	multinet	deploy	Seward Line	GAK13		58.106196	-147.800077	2032	aPoje1	565	MNT21
Sun 07 May 2023 07:48:25 +0000	20230507.0748.001	multinet	maxDepth	Seward Line	GAK13		58.097036	-147.792162	2032	aPoje1	566	
Sun 07 May 2023 08:18:55 +0000	20230507.0818.001	multinet	recover	Seward Line	GAK13		58.076172	-147.772681	2032	aPoje1	567	
Sun 07 May 2023 09:09:55 +0000	20230507.0909.001	multinet	deploy	Seward Line	GAK14		57.953631	-147.661601	2780	aPoje1	568	MNT22
Sun 07 May 2023 09:22:02 +0000	20230507.0922.001	multinet	maxDepth	Seward Line	GAK14		57.944693	-147.653759	2780	aPoje1	569	
Sun 07 May 2023 09:52:47 +0000	20230507.0952.001	multinet	recover	Seward Line	GAK14		57.924084	-147.636715	2780	aPoje1	570	
Sun 07 May 2023 10:46:54 +0000	20230507.1046.001	multinet	deploy	Seward Line	GAK15		57.800968	-147.505219	4147	aPoje1	571	MNT23
Sun 07 May 2023 11:01:27 +0000	20230507.1101.001	multinet	maxDepth	Seward Line	GAK15		57.79208	-147.499109	4147	aPoje1	572	
Sun 07 May 2023 11:29:48 +0000	20230507.1129.001	multinet	recover	Seward Line	GAK15		57.773654	-147.485909	4819	aPoje1	573	
Sun 07 May 2023 11:52:35 +0000	20230507.1152.001	multinet	deploy	Seward Line	GAK15		57.780502	-147.492218	4819	aPoje1	574	MNT24 EtOH
Sun 07 May 2023 12:29:36 +0000	20230507.1229.001	multinet	recover	Seward Line	GAK15		57.791783	-147.501518	4819	aPoje1	575	
Sun 07 May 2023 13:01:03 +0000	20230507.1300.001	CTD911	deploy	Seward	GAK15	68	57.791934	-147.503263	4445	iReister1	576	
Sun 07 May 2023 13:10:08 +0000	20230507.1309.001	EK80 broadband	start				57.790904	-147.505941		jmgrischuk	577	brief stop/start to get em302 depth
Sun 07 May 2023 13:10:27 +0000	20230507.1310.001	UHDAS	start				57.790882	-147.506046		jmgrischuk	578	brief stop/start to get em302 depth
Sun 07 May 2023 14:19:43 +0000	20230507.1419.001	CTD911	recover	Seward	GAK15	68	57.786741	-147.51417	4445	iReister1	579	
Sun 07 May 2023 14:49:18 +0000	20230507.1449.001	multinet	deploy	Seward Line	GAK15	9D	57.794366	-147.495351	4819	rHopcroft1	580	VERT 150
Sun 07 May 2023 16:09:03 +0000	20230507.1609.001	multinet	recover	Seward Line	GAK15	9D	57.79363	-147.496486	4819	rHopcroft1	581	
Sun 07 May 2023 16:22:46 +0000	20230507.1617.001	CTD911	deploy	Seward	GAK15	69	57.793689	-147.49662	4575	pShipton1	582	
Sun 07 May 2023 16:55:26 +0000	20230507.1623.001	CTD911	recover	Seward	GAK15	69	57.794231	-147.49783	4565	pShipton1	583	

Sun 07 May 2023 16:59:13 +0000	20230507.1658.001	multinet	deploy	Seward Line	GAK15		57.794234	-147.49785	4537	aPoje1	584	MNV9S
Sun 07 May 2023 17:15:24 +0000	20230507.1715.001	multinet	recover	Seward Line	GAK15		57.79406	-147.497453	4537	aPoje1	585	
Sun 07 May 2023 17:56:13 +0000	20230507.1756.001	Trace Metal Bottle	deploy	GAK	GAK15	TM16	57.792509	-147.497579		aAguilarIslas1	586	
Sun 07 May 2023 19:32:29 +0000	20230507.1932.001	Trace Metal Bottle	recover	GAK	GAK15	TM16	57.793134	-147.498854		aAguilarIslas1	587	
Sun 07 May 2023 20:13:11 +0000	20230507.2009.001	CalVet net	deploy	GAK	GAK15	44	57.791167	-147.500111	4537	rHopcroft1	588	
Sun 07 May 2023 20:17:18 +0000	20230507.2017.001	CalVet net	recover	GAK	GAK15	44	57.791204	-147.500205	4537	rHopcroft1	589	
Sun 07 May 2023 20:31:17 +0000	20230507.2031.001	CalVet net	deploy	GAK	GAK15	44a	57.79159	-147.50108	4537	rHopcroft1	590	genetics
Sun 07 May 2023 20:34:32 +0000	20230507.2034.001	CalVet net	recover	GAK	GAK15	44a	57.79165	-147.50123	4537	rHopcroft1	591	
Sun 07 May 2023 20:52:34 +0000	20230507.2052.001	FeFish	deploy	GAK	GAK15		57.793304	-147.500738		aAguilarIslas1	592	
Sun 07 May 2023 22:11:56 +0000	20230507.2211.001	FeFish	recover	GAK	GAK15		57.92647	-147.635969		aAguilarIslas1	593	
Sun 07 May 2023 22:25:57 +0000	20230507.2225.001	CalVet net	deploy	GAK	GAK14	45	57.942358	-147.651407	3084	rHopcroft1	594	
Sun 07 May 2023 22:29:29 +0000	20230507.2229.001	CalVet net	recover	GAK	GAK14	45	57.942402	-147.651566	3084	rHopcroft1	595	
Sun 07 May 2023 22:31:21 +0000	20230507.2230.001	CTD911	deploy	Seward	GAK14	70	57.942435	-147.651668	3084	pShipton1	596	
Sun 07 May 2023 23:39:29 +0000	20230507.2339.001	CTD911	recover	Seward	GAK14	70	57.93708	-147.664958	3024	pShipton1	597	
Mon 08 May 2023 01:02:06 +0000	20230508.0101.001	DPI	deploy	GAK		4	58.050838	-147.756274		hKepner1	598	
Mon 08 May 2023 08:59:11 +0000	20230508.0858.001	EM302	start				58.614118	-148.279154		jmgrischuk	599	302 back on, returning to shelf
Mon 08 May 2023 09:02:21 +0000	20230508.0859.001	Underway Science seawater	service				57.793534	-147.496452		jmgrischuk	600	filter change
Mon 08 May 2023 17:27:41 +0000	20230508.1725.001	Mooring	other	Seward Line			59.315026	-148.950595		pShipton1	601	ping for GEO2-22

Mon 08 May 2023 17:30:23 +0000	20230508.1730.001	Mooring	other	Seward Line			59.01524	-148.771665		pShipton1	602	ping for GEO2-22
Mon 08 May 2023 17:31:32 +0000	20230508.1731.001	Mooring	other	Seward Line			58.968691	-148.715708		pShipton1	603	ping for GEO2-22
Mon 08 May 2023 19:48:26 +0000	20230508.1948.001	Underway Science seawater	service				59.468368	-149.107178		jmgrischuk	604	filter change
Mon 08 May 2023 21:05:35 +0000	20230508.2103.001	Mooring	deploy	Seward Line	GEO2-23		59.025317	-148.663372	230	pShipton1	605	anchor drop
Mon 08 May 2023 21:07:32 +0000	20230508.2105.001	Mooring	deploy	Seward Line	GAK1-23		59.85013	-149.500534		pShipton1	606	GAK1-23 anchor drop
Mon 08 May 2023 21:08:52 +0000	20230508.2107.001	Mooring	recover	Seward Line	GAK1-22		59.689914	-149.318225		pShipton1	607	mooring on deck time
Mon 08 May 2023 21:21:02 +0000	20230508.2119.001	Mooring	other	Seward Line	GEO2-22		59.016851	-148.700485	230	pShipton1	608	ping for GEO2-22 with centerboard and handheld transducer
Mon 08 May 2023 22:50:09 +0000	20230508.2246.001	Slocum Glider	recover	Seward	GAK13		58.095454	-147.757016		iReister1	609	Recovered Gretel in seas <1 foot
Mon 08 May 2023 22:52:03 +0000	20230508.2250.001	Slocum Glider	recover	Seward	GEO		59.026955	-148.693502		iReister1	610	Recoverd Shackleon in seas <3 feet
Mon 08 May 2023 23:06:17 +0000	20230508.2305.001	UHDAS	stop				60.078242	-149.403376		dNaber1	611	end of cruise. Seward AK
Mon 08 May 2023 23:07:00 +0000	20230508.2306.001	EM302	stop				60.079346	-149.405001		dNaber1	612	end of cruise. Seward AK
Mon 08 May 2023 23:09:13 +0000	20230508.2308.001	EK80 broadband	stop				60.081075	-149.407854		dNaber1	613	end of cruise. Seward AK
Mon 08 May 2023 23:16:56 +0000	20230508.2310.001	centerBoard	recover				60.084825	-149.413067		dNaber1	614	end of cruise. Seward, AK
Mon 08 May 2023 23:37:17 +0000	20230508.2336.001	Underway Science seawater	stop				60.085417	-149.414856		dNaber1	615	end of cruise. Seward AK

Mon 08 May 2023 23:38:02 +0000	20230508.2338.001	Underway Science seawater	service				60.088447	-149.419958		dNaber1	616	Fresh water rinse until 23:34:00
Mon 08 May 2023 23:40:33 +0000	20230508.2340.001	CalVet net	recover	MID	MID2	6	60.100816	-145.65617	119	rHopcroft1	617	
Tue 09 May 2023 00:09:32 +0000	20230509.0009.001	Ship	endCruise				60.098258	-149.442269		dNaber1	618	tied up to SMC pier at Seward Alaska
Tue 09 May 2023 00:46:05 +0000	20230509.0046.001	DPI	recover	GAK		4	58.723711	-148.399298		hKepner1	619	
Tue 09 May 2023 00:53:43 +0000	20230509.0053.001	FeFish	deploy	Kodiak Line	KOD5	9	57.784413	-150.757755	89	aAguilarIslas1	620	
Tue 09 May 2023 00:56:29 +0000	20230509.0056.001	FeFish	recover	GAK Line	GAK1		59.839006	-149.451061	270	aAguilarIslas1	621	