Regional Operations Centre
Canadian Coast Guard – Pacific

PACIFIC REGION CCG VESSEL - POST CRUISE REPORT

Line P Program – Fisheries and Oceans Canada

NAME OF SHIP/PLATFORM: John P Tully

DATE: **FROM:** 2 May 2021 **TO:** 18 May 2021

SCIENCE CRUISE NUMBER: 2021-006 **SHIP'S PATROL NUMBER:** 21-02

CHIEF SCIENTIST[S]: Marie Robert

SCIENTIFIC PERSONNEL:

Female	Male
Moira Galbraith (IOS)	Michael Arychuk (IOS)
Marie Robert (IOS)	Mark Belton (IOS)
Hayleigh Rados (IOS)	Rowan Fox (IOS)
	Michael Livingston (UVic)
	Kyle Simpson (IOS)

AREAS OF OPERATION: Haro Strait, Juan de Fuca Strait, Line P, Hecate Strait, Chatham Sound.

INTRODUCTION/PROGRAMS BACKGROUND:

Line P

Line P is a long standing monitoring program which surveys a 1400 km long section 3 times annually. Data have been collected along this line since 1956 and show evidence of the impact of climate variability on ocean productivity. It is the only Canadian long time-series that allows scientists to monitor climate changes so far offshore in the Pacific Ocean. It is also the best opportunity for other programs (e.g. Universities) to do research in the Pacific since the Line P data give them background as well as current water properties. We were fortunate to sail with one university student on this cruise.

Chatham Sound nutrient budget

Nutrients from wastewater or other land-based discharges can cause problems for marine life, including fish. Environmental impact assessments of new coastal developments often include an assessment of the release of nutrients, but these assessments do not usually include the natural cycle of nitrogen. The goal of this project is to determine the natural sources, burial and exchange of nutrients in Chatham Sound to provide context for future development around Prince Rupert.

Since 2018 we have collected water samples for nutrient analysis (nitrate + nitrite, phosphate, silicate) throughout Chatham Sound and its approaches, in late summer, autumn and winter. We have also collected other types of samples and data that will help to interpret the nutrient data: temperature, salinity, dissolved oxygen, suspended particles, dissolved and total organic carbon, dissolved inorganic carbon, and oxygen stable isotopes. Data collected during this cruise will provide crucial information about the distribution of nutrients and other water properties in late spring, during the freshet of the snow-fed Skeena and Nass Rivers.

CRUISE OBJECTIVE/OBJECTIVES: Water properties, zooplankton, and trace metal sampling along Line P; data collection in Dixon Entrance, Hecate Strait and Chatham Sound.

CRUISE DESCRIPTION: This cruise went really well on all accounts. It was the first Tully cruise where the rapid COVID-19 tests were used, and everyone tested negative on all three testing. Having the rapid tests done on board was a lot simpler logistically than having the tests done at Saanich Peninsula Hospital and receiving the results a few days later, as prior to the February 2021 cruise. Due to the pandemic affecting the schedule on other vessels, we were asked to do some work in Chatham Sound after our Line P work. Thanks to Captain Corfield using two engines when appropriate to give us more speed we managed to do all the planned work.

DAYS ALLOCATED: 16 **DAYS OF OPERATION:** 15

DAYS LOST DUE TO WEATHER: Maybe an hour on our way to P16 due to high winds.

SAMPLING:

- The cruise was very successful. All Line P stations were sampled as planned and all casts were done. We also managed to do a calibration cast at the PA-015 NOAA mooring, and 46 more stations in Dixon Entrance, Hecate Strait and Chatham Sound.
- The samples collected include:
    1) Underway: Thermosalinograph (Temperature, Conductivity, Fluorescence), acoustic sounder, ADCP, pCO_2.
    2) "E-data" from CTD: Pressure, Temperature, Conductivity, Dissolved Oxygen, Transmissivity x2, Irradiance, Fluorescence.
    3) From the Rosette: Dissolved oxygen, salinity, nutrients, chlorophyll, pigments (HPLC), dissolved inorganic carbon (DIC), alkalinity, phytoplankton, total organic carbon (TOC), dissolved organic carbon (DOC), coloured dissolved organic matter (CDOM), Oxygen-18, suspended particulate concentration (SPC) **– UVic (Livingston):** chlorophyll, particulate carbon and nitrogen, carbon gels, nutrients, particulate/biogenic silica, carbon update (size fractionated), silica update (size fractionated), nitrogen uptake = "new production" (size fractionated), bacteria, particulate phosphate, fatty acids, DNA.
    4) Zooplankton nets: Vertical net hauls using a Bongo, 236 µm mesh size, with casts to the bottom when shallower than 250 m and for coastal stations; 250 m casts and 1200 m casts offshore. Two casts were done with the "mini-net", 64 µm, to 50 m (P4 and P26). One cast was done to 610 m with the multinet at CH01.
    5) Trace metal Go-flos: trace metals filtered, trace metals unfiltered, ligands, speciation of trace elements, lead, nutrients, salinity.

RADIOISOTOPE USE:

The fume hood of the Rad-Van was tested and certified at the beginning of the cruise. Radioisotopes (^{32}Silica) were used during the cruise. The Rad-Van was decommissioned at the end of the cruise.

PROBLEMS [SCIENTIFIC GEAR AND OPERATIONS]:

When we went to use the multinet, the main shackle wasn't attached to the frame of the multinet. The whole unit got lifted only by the conductive wire, which damaged the electrical termination. It was reterminated later during the cruise.

SUCCESSES [SCIENTIFIC]:

New TSG with separate flow and flow meter to the fluorometer helps clean that sensor without having to stop everything.

The DMS system worked very well this cruise. There were some initial minor issues with the MQ water blanks at P2 and P4 but they were gone by P12. This is not an uncommon problem as the MQ system does give better water as it is used and so it is reasonable to assume that as the cruise progresses the water will become cleaner. Nevertheless, some alternate sources of clean water should be explored for the first few days of the cruise. One solution, for example, is to bring some water from the lab that has been tested beforehand and proven to be clean of DMS. Several options will be explored for future cruises to try and address this problem.

PROBLEMS [SHIP'S EQUIPMENT/OPERATIONS/PLATFORM SUITABILITY]:

There seemed to be more "tank breaks" than usual during this cruise. It is a little surprising that the grey water tanks don't have some sort of level indicator, they only have an alarm once it's almost too late. Even though "tank breaks" were scheduled for the long stations, extra breaks had to be added which delayed some of our work.

The weather station is still not functioning properly, giving us air temperatures in the -20s.

A hydraulic line blew up in the LARS head, covering the rosette in hydraulic fluid.

Now that the COVID situation is evolving (more people vaccinated, rapid testing being performed at sea) the rules have to be evolving to follow the situation. Mainly, they should be the same for both ship crew and science crew, otherwise it can get quite confusing and people don't know what to expect. For example, science crew keep their activities to "essential only" for 4 days before sailing, with no possibility of going to IOS to work, whereas ship crew can be sent on all kinds of errands just prior to sailing, or might even travel from out of province. The rules should be consistent for everyone.

SUCCESSES [SHIP]:

The loss of GPS string reported as a problem during the February cruise seems to be fixed; the problem did not repeat itself.

The COVID rapid tests were easier to go through than the test at Saanich Peninsula, and it was good that we could get the results almost right away and get more tests done once underway.

DELAYS [OTHER THAN WEATHER]:

A few hours for extra "tank breaks".
~15 hours for training.
~2 hours for a hydraulic leak in the LARS head.
~3.5 hours for fueling.

SAFETY CONCERNS:

Since wearing the masks is mandatory, so should be the COVID testing.

HAZARDOUS OCCURRENCES:

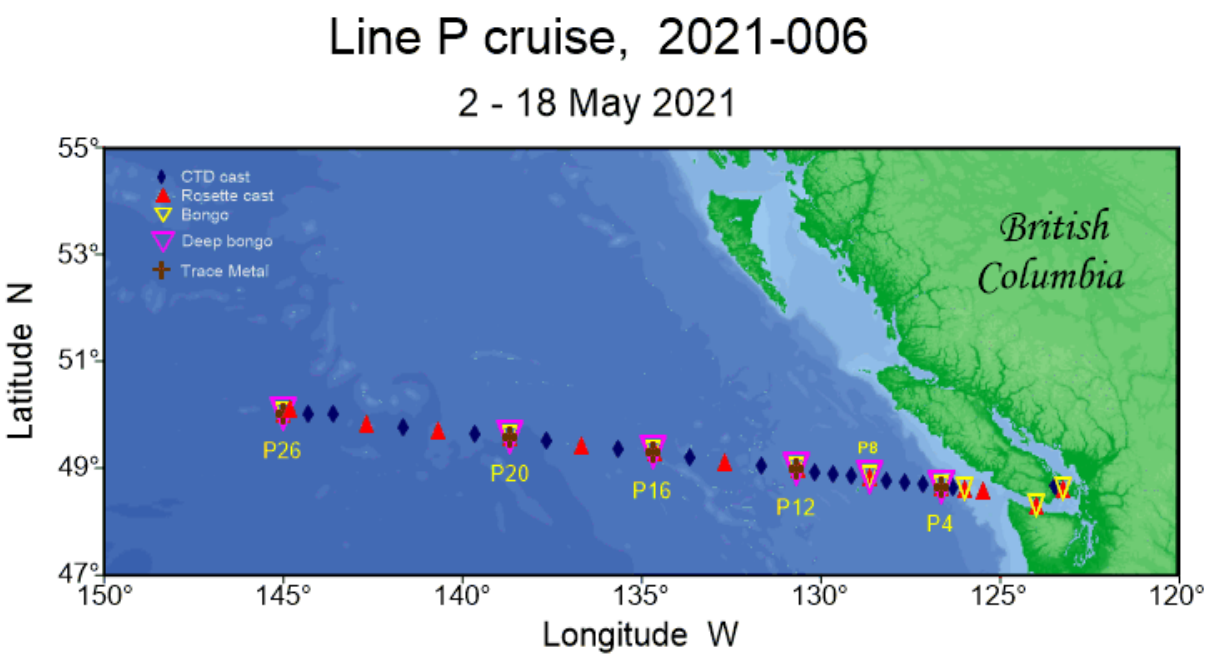
None.

EVENT LOG:

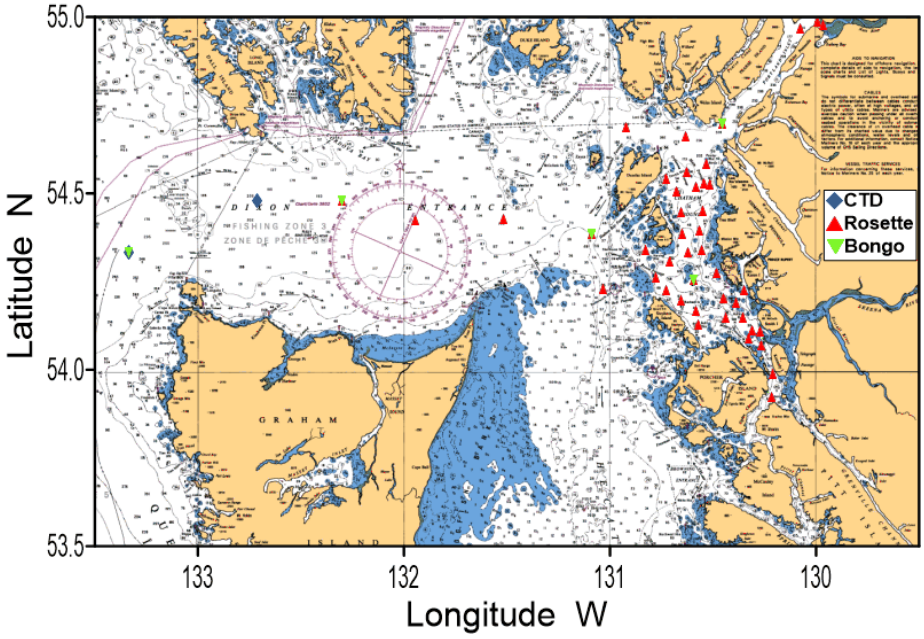
Wednesday 28 April:	Science crew start self-isolating at home.
Friday 30 April:	IOS loading team loads equipment in the trucks and fork-lift more equipment to the Tully. Ship crew starts loading some science gear.
Sunday 2 May:	Ship crew loads winches and containers in the morning. Science crew meet on the Tully for noon and get the first COVID rapid test, then load the science equipment on board. Safety meeting at 1400. Short science meeting at 1630. Keep setting up and securing during the rest of the evening.
Monday 3 May:	Leave the dock around 0730. Saanich Inlet test cast, then ~1 hour of rosette deployments/recoveries for training purposes. Fire and boat muster. Haro59, JF1 to JF4.
Tuesday 4 May:	P1 to P6.
Wednesday 5 May:	P7 to P11, start P12. Second COVID testing.
Thursday 6 May:	Complete P12, P13, P14.
Friday 7 May:	P15 to P17.
Saturday 8 May:	P18 to P20.
Sunday 9 May:	P21 to P24.
Monday 10 May:	P25, P35, P26, PA-015. Start heading east.
Tuesday 11 May:	Transit to Dixon Entrance. Third COVID testing.
Wednesday 12 May:	End of transit. DIX5 to DIX3.
Thursday 13 May:	DIX2, DIX1, CH03, CH02, Port3, Port2, Port1, CH01, CH06, CH05, CH04, CH07, CHAT3, CH08, CH09, CH11.

Friday 14 May:	CH10, CH13, CH12, CH17, CH16, CH15, CH14, HECS8, HECS7, CHAT2, CH20, CH21, CH19, CH18, PRHR74, CH23, CHAT1, CH22, CH24, CH25, CH26.
Saturday 15 May:	CH27, CH28, CH29, MP55, OGCH50, OGCH46. Transit south.
Sunday 16 May:	Fuel in Port Hardy. Transit south.
Monday 17 May:	Arrive in Pat Bay. Offload.

CRUISE TRACK:



Chatham Sound work



SUMMARY/FINAL COMMENTS:

- Many thanks to "Kenny and his team" at IOS (Kenny, Steve, Marty, Sarah-Ann and Julian) for loading our gear on Friday 30 April, and to Scott for the fork-lifting on Sunday May 2nd and May 17th.
- And "thank you" to the entire Tully crew for such a successful and pleasant cruise! Sorry we showed up in the middle of your cycle, 'forcing' you to wear masks until the very end … thank you ALL for all your help and hard work, in all departments! The extra speed and "quietness" from the bridge, all the help on deck (especially with the Go-flos!), the repairs of broken things, and the yummy meals, always. Thanks too for starting to load some gear before the "official" start of the cruise, this is much appreciated. Finally, a big thanks for adjusting the fueling time so we could do our work where it really mattered! See you all in August for another adventure to Papa ☺