Clayoquot Sound Weather Station Field Report

(CruiseID: 2025-084)

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Overview:

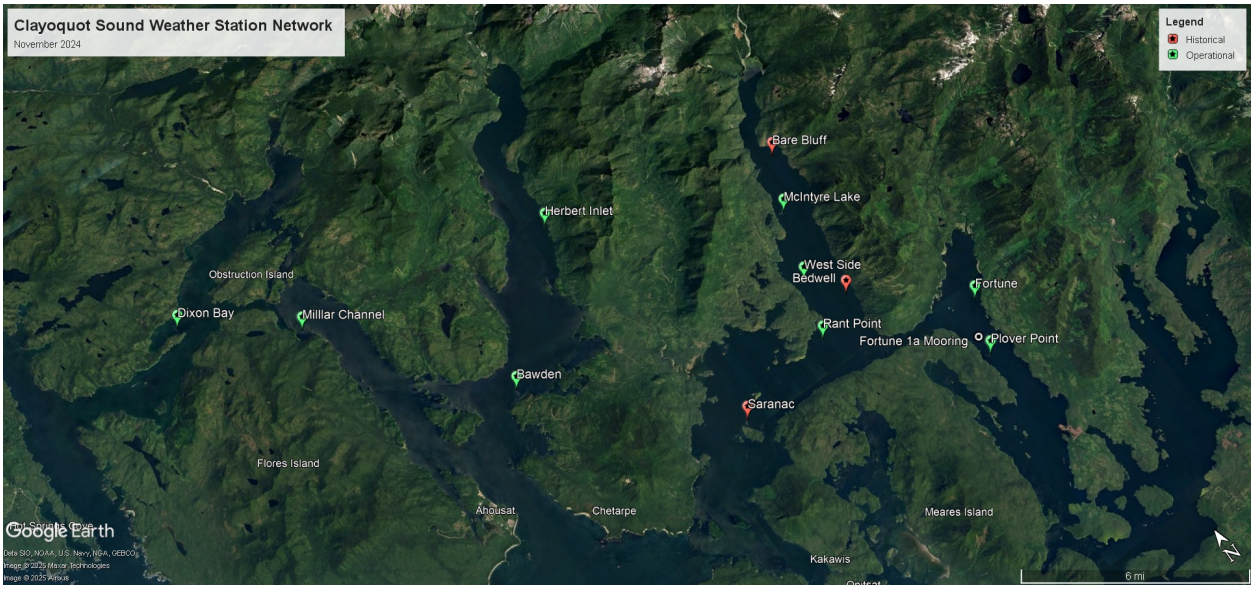
In collaboration with Cermaq, a meteorological network was established in the Clayoquot Sound in December of 2017, and were last serviced in November 2024. Figure 1 shows the operational weather station site status as of the November 2024, as well as the historical sites.

Since our last visit in November, I was advised by Cermaq's regional manager that West Side fish farm had moved to Bedwell lease site, and the McIntyre Lake site had shut down and had moved to the Bare Bluff lease site. These sites had our equipment that either had to be recovered or inspected as they had changed location.

Pramod Thupaki and Brandon McNabb recently acquired Sequoia's LISST (laser in-situ scattering and transmissometery) instrument and wanted to collect in situ particle data around Cermaq's Rant Point fish farm. The goal was to spend two days, over an entire tidal cycle, collecting both spatial and temporal particle data. An RBR CTD was attached to the cage of the LISST to capture physical oceanographic data simultaneously.

Pramod Thupaki, Brandon McNabb, Samantha Huntington, and I visited the area from November 24th to December 1st, 2025, with the OSD small vessel Doug Anderson. The mission objectives were to: collect in situ particle data with newly acquired LIIST, perform critical servicing of all the operational weather stations, recover abandoned weather station equipment, and collect physical oceanographic data and zooplankton samples for the Ocean Science Division's Ecology group.

Figure 1: Operational and Historical Ocean Science Division weather station sites in Clayoquot Sound.



Field Objectives:

1. Collect both physical oceanographic data and in situ spatial and temporal particle data around Cermaq's Rant fish farm with LIIST and CTD.
2. Recover weather station and console with IP logger from McIntyre Lake fish farm pens and barge.
3. Service and download internally logged data from Herbert Inlet land-based weather station.
4. Perform maintenance and repairs on all the Northern and Southern region farm weather stations.
5. Collect physical oceanographic data at Dr. Cheryl Greengrove's (University of Washington Tacoma) historical sampling sites using an RBR CTD with a dissolved oxygen, and fluorometer sensor.
6. Collect zooplankton samples using a SCOR net at the following sites: Bedwell 2, Herbert 3, Shelter 4, Tofino 2, and Warren Bay.

Objective Results:

1. An RBR CTD was integrated with the LISST instrument (Figure 2), and data was collected over 2 days over a full tidal cycle both temporally and spatially. A total of 31 sites were sampled, with 68 casts performed, and LIIST#34 site sampled over a 1-hour period (Figure 3).

Figure 2. RBR CTD integrated with LIIST instrument

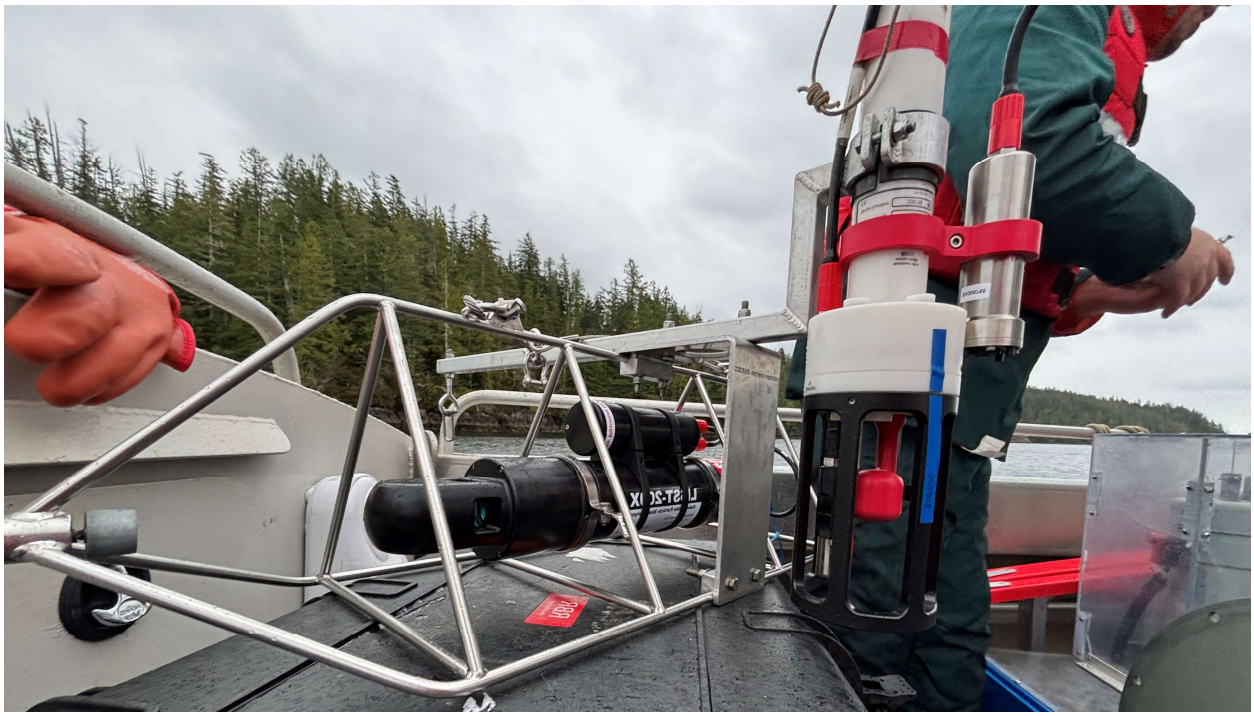
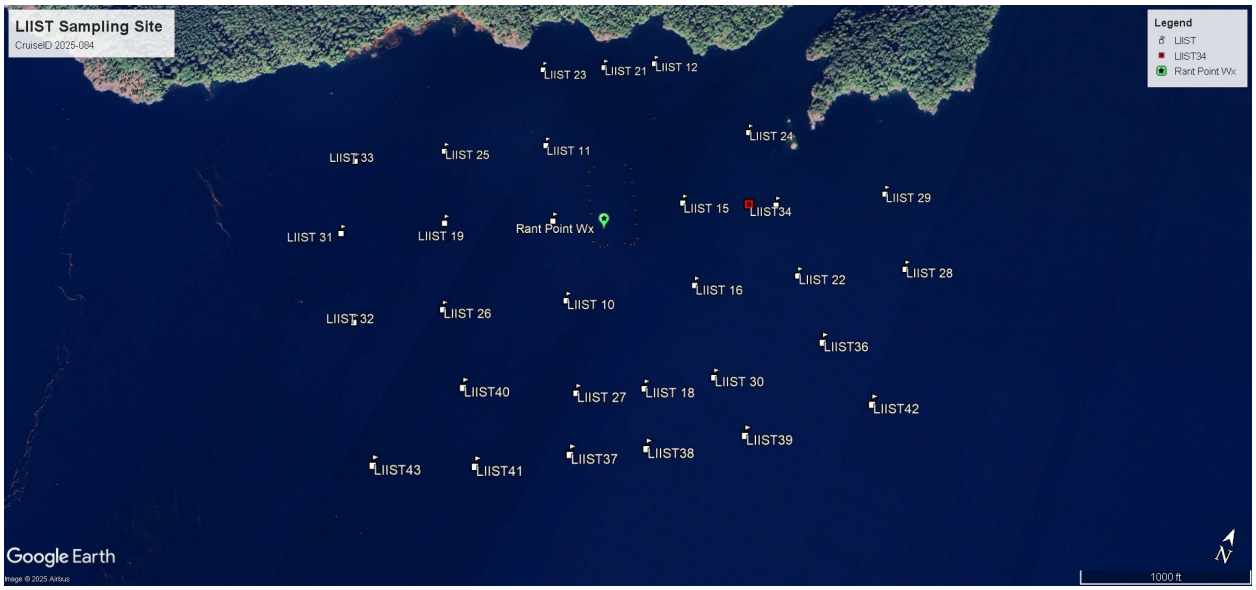


Figure 3. LIIST sampling sites 2025-084.



2. <u>McIntyre Lake Weather Station:</u> McIntyre Lake fish farm was shut down in September and moved to the Bare Bluff lease site. The weather station was found still attached to the nonoperational site and was recovered. However, the feed barge was not at the site but was moved to Fortune to replace the old barge at the Fortune site. This explained why the Fortune weather station was no longer collecting data since the barge with Fortune's console was move to Cypress Bay. McIntyre's

console was converted over to Fortune channel's weather station and recovered Fortune's console from the barge now located in Cypress Bay.

3. Herbert Inlet remote weather station: Downloaded data and performed a quick analysis on the data. Identified that the anemometer was faulty and was replaced. WittyPi light was blinking, and last download had occurred on November 25, 2025 @ 00:05. Replaced ISS battery, new desiccant, checked and adjusted guy wires, and cleaned solar panel. Overall, the site was in excellent condition and found the 20Ah battery to be fully charged.

4. Summary for remaining weather station sites. All anemometers were found to be orientated to True North unless otherwise noted. ISS batteries were replaced on all stations and their corresponding console batteries if necessary:

   4.1. Dixon: Replaced failed anemometer. Replaced console batteries. Overall unit in good condition.

   4.2. Millar Channel: Replaced failed anemometer and reorientated to True North. Replaced entire console as C-batteries had leaked out in the console potentially damaged the internal electronics. Prior to mission departure, downloaded data seems to indicate that there is the occasional signal loss between ISS and console. In November 2024 identified that station ID#4 as it seemed to be the furthest away from other channels that showed were being in use. Checked background noise (low) and signal strength which was around 27. This is low and the only way to improve this would be to install a repeater. The problem with repeater is they often get damaged as they are particularly good at getting hung up in bird netting. If the repeater is damaged, then there is a complete loss of data. So, the decision was not to install a repeater and accept a bit of data loss in lieu of possibly having a complete data loss.

   4.3. Bawden: Site in good condition and performed routine maintenance.

   4.4. Rant Point: Site in good condition and performed routine maintenance.

   4.5. Bedwell**:** This site was previously West Side farm. The anemometer was damaged and orientation was slightly off so data unreliable. The anemometer was replaced along with ISS battery. All wind data from September 2025 to November 28th, @ 13:00 PST is not valid as this was when the farm was moved and the unit damaged.

   4.6. Fortune: The weather station recently went offline and upon arrival found out that house barge had been replaced with the McIntyre Lake barge. Set up console so communicating with ISS and confirmed back online and renamed to Fortune.

   4.7. Plover: Replaced console and ISS batteries. Site in good condition and uploading data.

5. A total of 43 CTD casts were completed (Table 1) using RBR Maestro CTD (s/n 208765) with a Fluorometer (Chlorophyll a Turner Cyclops 7F s/n 2110792), Dissolved Oxygen sensor (JFE Advantech Rinko III BT s/n 0447), Turbidity Sensor (Seapoint s/n 208765). CTD sampling locations are based on Cheryl Greengrove's (University of Washington) sites who has been collecting both physical and chemical data from these sites since 2011.

6. We were able to collect 4 of the 5 zooplankton sampling sites. We were unable to collect the Tofino 2 net site due to extreme winds and rough sea state. Samples were collected by vertical net tow using a 60cm in length SCOR net with a 250um mesh size. Samples preserved in 10% buffered formalin (Table 1 - NET). Samples were returned to IOS and will be processed by the OSD Ecology group.

Table 1. CTD and Net sampling sites for cruise 2025-084.

Date (UTC)	Time (UTC)	Station Name	Latitude	Longitude
2025-11-27	22:44:05	Tofino 4	49.16114	-125.66466
2025-11-27	22:57:59	Tranquil head	49.19635	-125.67475
2025-11-27	23:08:35	Tranquil mouth	49.16541	-125.69063
2025-11-27	23:23:30	Tofino 5	49.15116	-125.69371
2025-11-27	23:33:32	Tofino 6	49.13448	-125.71639
2025-11-27	23:44:20	Tofino 7	49.12575	-125.76415
2025-11-27	23:52:58	Tofino Browning passage 1	49.11931	-125.79740
2025-11-28	00:02:57	Tofino Browning passage 2	49.12937	-125.84564
2025-11-28	00:09:32	Tofino Browning passage 3	49.14150	-125.87576
2025-11-28	17:00:05	Fortune channel	49.18589	-125.76268
2025-11-28	17:15:40	Warn bay	49.23766	-125.75722
2025-11-28	17:35:55	Warn Bay - NET	49.23787	-125.75729
2025-11-28	18:23:01	Bedwell head	49.35248	-125.78853
2025-11-28	18:33:04	Bedwell1	49.33586	-125.80471
2025-11-28	19:32:38	Bedwell2	49.29780	-125.81094
2025-11-28	19:44:20	Bedwell2 - NET	49.29798	-125.81056
2025-11-28	20:05:46	Bedwell mouth	49.27069	-125.82133
2025-11-28	22:28:04	Cypress bay	49.24950	-125.87558
2025-11-28	22:40:59	Hecate bay	49.23592	-125.94057
2025-11-28	23:00:20	Herbert Still	49.26013	-126.03811
2025-11-28	23:08:43	Herbert Russell channel	49.23615	-126.03181
2025-11-28	23:39:15	Tofino Offshore	49.11725	-125.91468
2025-11-28	23:50:30	Tofino Mouth Templar channel	49.15114	-125.91583
2025-11-30	17:28:12	Sydney Head	49.50224	-126.29255
2025-11-30	17:39:22	Sydney1	49.48767	-126.28482
2025-11-30	17:49:09	Sydney2	49.46973	-126.27527
2025-11-30	18:02:14	Sydney3	49.43796	-126.25934
2025-11-30	18:50:00	Sydney4	49.42664	-126.24404
2025-11-30	19:00:01	Sydney shelter confluence	49.39936	-126.24404
2025-11-30	19:08:24	Shelter mouth	49.39861	-126.21584
2025-11-30	19:17:44	Shelter6	49.38907	-126.18590
2025-11-30	19:26:18	Shelter5	49.39401	-126.16231
2025-11-30	19:36:29	Shelter Millar confluence	49.40062	-126.13684
2025-11-30	19:46:13	Shelter4	49.41347	-126.12958
2025-11-30	20:01:44	Shelter4 - NET	49.41337	-126.12959

2025-11-30	20:41:30	Shelter3	49.42382	-126.10802
2025-11-30	20:51:57	Shelter2	49.42523	-126.08472
2025-11-30	21:04:07	Shelter1	49.42787	-126.05417
2025-11-30	21:14:07	Shelter head	49.43963	-126.04623
2025-11-30	22:02:50	Millar Channel north	49.37996	-126.08590
2025-11-30	22:16:40	Millar Channel south	49.33700	-126.06875
2025-11-30	22:42:53	Herbert head	49.40898	-125.90705
2025-11-30	22:54:22	Herbert1	49.39245	-125.93881
2025-11-30	23:06:30	Herbert2	49.36086	-125.94536
2025-11-30	23:19:33	Herbert3	49.32827	-125.97796
2025-11-30	23:30:20	Herbert 3 - NET	49.32801	-125.97798

Problems and Concerns:

The only issue encountered on this trip was the few days with high winds. We saw gusts of more than 30 knots around Rant Point and steady 20 knot winds in Tofino Inlet which limited our ability to collect CTD data and the one net sample that were located beyond the Tofino #4 station.

Conclusions and Acknowledgements:

Overall, the mission was extremely successful, and the weather stations were overall in particularly good condition.

I would like to thank the Commanding Officers of the Tofino Canadian Coast Guard base for allowing us to dock our boat at their wharf. This saves us considerable amount of time not having to launch and recover the boat each day.

Thanks to Samantha Huntington for her hard work and assistance before, during and after the mission.