

A total of 28 plankton net pulls were conducted in the waters of Juneau during from May 9 to September 17, 2018. Protocol followed permit CF-19-065 issued by the Alaska Department of Fish and Game.

SEA-GEAR Model 9100 Student Plankton Net, 8 cm diameter 3:1 size is attached to a 65-foot-long Willapa Marine Leaded Line rope marked with a knot at 50 feet. A 4-pound lead weight attached to the collar to weight the fall to the bottom of the photo zone, 50 feet. A collection jar screws into a collet at the base of the net.

Samples are processed in the office to filter out the ocean water leaving only the plankton residue on a sterile filter. This is wrapped in aluminum foil and placed in a zip lock bag along with the data collection sheet and placed in the freezer. We do no analysis of the plankton samples.

The samples have been provided to Dr. Elizabeth D. Tobin, Postdoctoral Fellow and Biological Oceanographer with the College of Fisheries and Ocean Sciences of the University of Alaska Fairbanks at the Juneau Center. She is using this as part of her social-ecological systems research addressing the ecology of *Alexandrium* harmful algal blooms and their sociocultural impacts in Southeast Alaska as well as further understanding the role of phytoplankton in our ocean environment.

Plankton pulls are made in Stephens Passage (usually called “Back of Douglas”), the waters of South Shelter Island, Favorite Channel, Saginaw Channel and North Pass.

As part of our plankton pull, we also measure the water temperature and salinity. Temperature is measured with an alcohol thermometer and salinity with a Vee Gee salinity refractometer.

A four-year sampling comparison may be found at the end of this report.

Plankton Trends

The plankton pulls of 2019, as was 2018, are consistently unremarkable in the quantity of plankton. Visually, most of the bottles had the appearance of very light iced tea. The thickness of the pressed plankton was much thinner than previous years, and especially noticeable when compared with 2016 when the pressed samples were often 3 mm or more thick! Like 2018 they averaged 1.5 mm.

In previous years, the amount of pressed plankton (not measured, just estimated) correlated well with the amount of light: the thickness of the sample increased with light until the light began to diminish and the thickness diminished. This year’s samples are very similar to 2019 and are consistent through the season.

When conditions allowed, most naturalists observed the krill and plankton layer on the fish finders on our boats. This year the krill seem to remain below 30 meters, much deeper than the 15 of 2018. The krill layer was remarkably consistent from 30 to 45 meters depth. Our pulls are to 50 feet (15.24 meters) so this 2019, like 2018, so we didn’t approach the krill layer. This is normally the photoactive zone.

It appears the exceptionally sunny weather caused the plankton to drop below their normal layers in response to the much more powerful light.

Surface Temperature

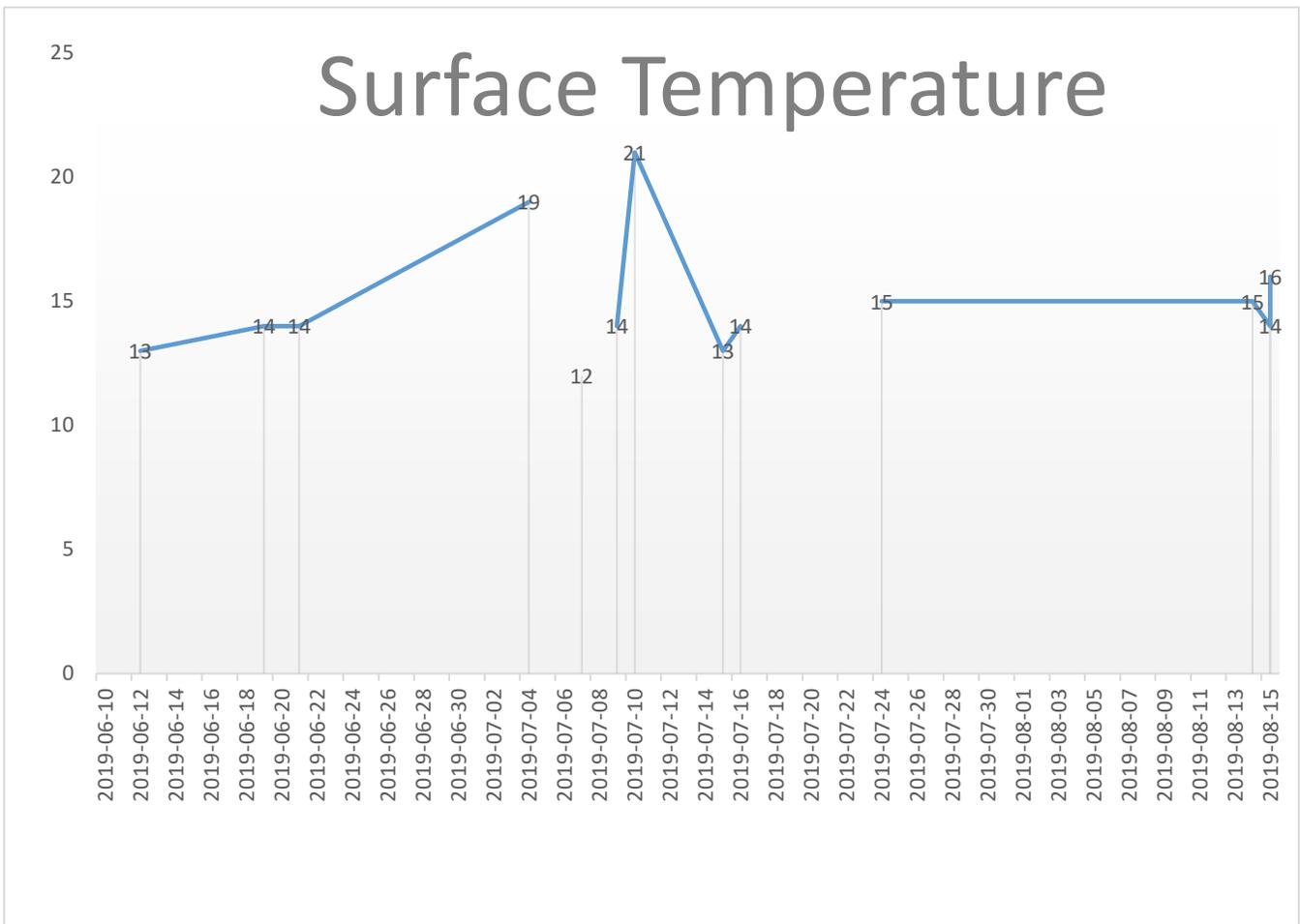
Surface temperature was *much* higher than 2018.

Temperature °C	2018	2019	CHANGE
AVERAGE	12	14	+2
MINIMUM	4	11	+7
MAXIMUM	15	21	+6

The trend line shows a fairly rapid rise followed by a precipitous drop then a plateau near the average temperature.

This surely corresponds with exceptionally sunny and warm summer of 2019

Our sampling locations location are in the influence zone of the Mendenhall River and the 2019 jökulhlaup event of July 13-16 corresponds completely with this and explains the sudden drop in water temperature. It coincides perfectly with the salinity measurements as well.



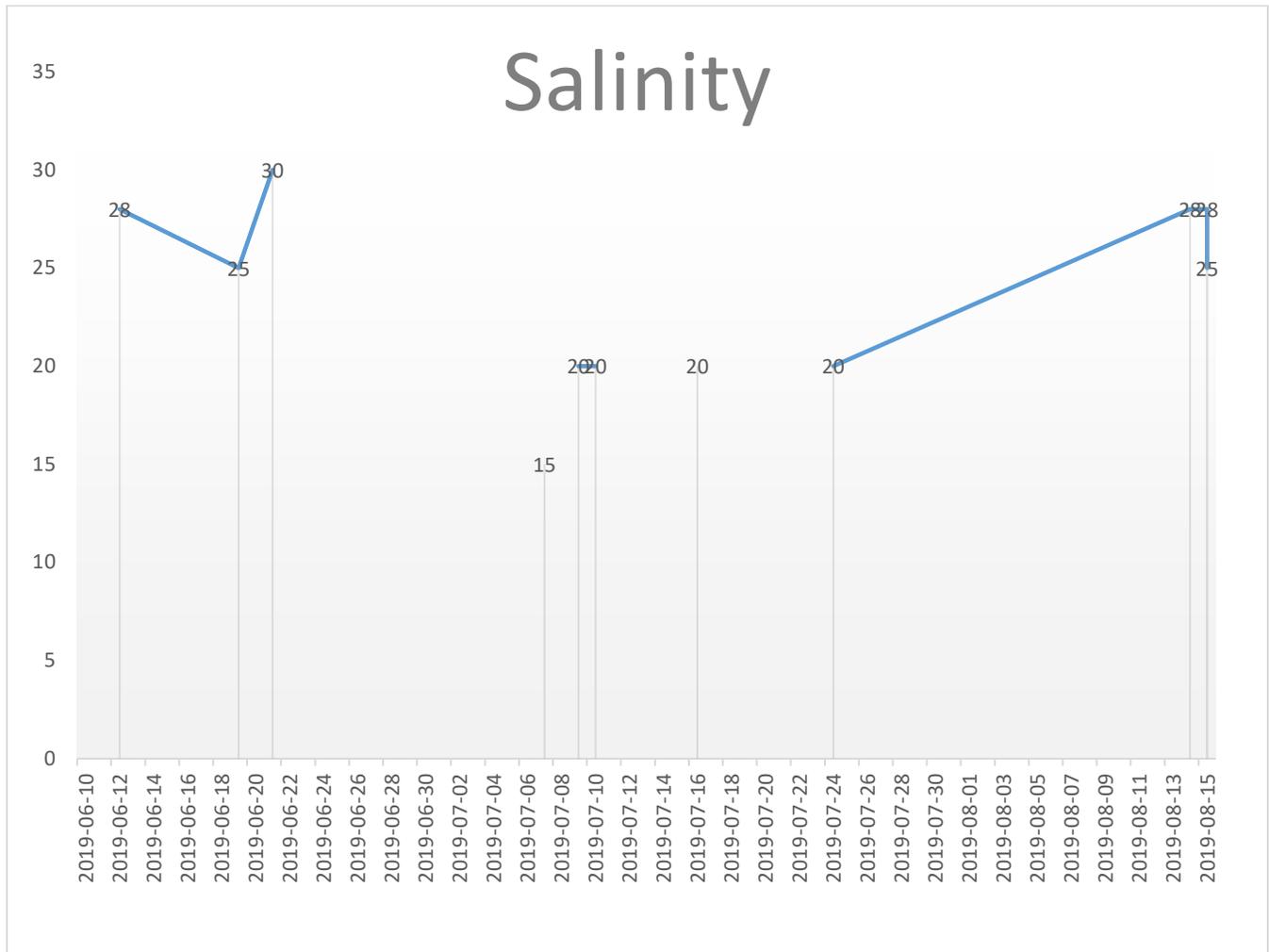
Salinity

The numbers for salinity generally represent a lowering of salinity in our waters, but just slightly on the average. The outliers are also interesting as the low outlier is very low and the high outlier is very small.

SALINITY ‰	2018	2019	CHANGE
AVERAGE	29	28	-1
MINIMUM	20	15	-15
MAXIMUM	37	40	+3

Salinity ranged from 20 to 37 parts per thousand (‰) with an average of 2 ‰. The trend is fairly uniform with the exception of a notable outlier of 20 ‰ occurred on July 15. This location is in the influence zone of the Mendenhall River and this was at the beginning of the jökulhlaup and may explain the sudden drop in water temperature. It coincides perfectly with the temperature.

Salinity shows a steady decline during the sampling season.



Four Year Sampling Trends

Year	Low Temp	Hi Temp	Ave Temp	Low Salinity	High Salinity	Ave Salinity
2015	Not measured in 2015			17‰	37‰	26.0‰
2016	7°C	19°C	12.4°C	16‰	40‰	26.7‰
2017	6°C	18°C	12.2°C	19‰	35‰	27.3‰
2018	4°C	16°C	11.9°C	20‰	37‰	29.0‰
2019	11°C	21°C	14.3C	15‰	40‰	27.6‰

With only a five-year sampling period, conclusions based upon these results may not be representative of any long-term trend.

The range of **temperature** from 2016 to 2018 is in a narrow band of 0.5°C and then comes 2019 with an increase 2.1°C! This increase is likely due to the exceptionally warm and sunny summer.

Summer 2019 Weather Service Records JNU	Ave Temp °F	Departure from Normal	Precipitation inches	Departure from Normal
April	42.2	+1.6	3.01	-0.07
May	51.5	+2.9	2.80	-0.60
June	57.0	+2.4	3.54	+0.30
July	60.7	+3.8	2.13	-2.47
August	58.3	+2.4	4.81	-0.92
September	51.6	+1.6	6.78	-1.86

The **salinity** is interesting in that it shows a slight increase of 3‰ from 2015 to 2018 but a significant dip in 2019. This drop in salinity is certainly not due to added runoff from rain as we had a dry summer with only one month with a positive departure from normal. It surely must be due to the added flow from glacier melt from the warm and sunny summer.



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