COUNTY: Clallam

Grant Number: SEANWS-2019-ClCoCD-00004

PROJECT TITLE: Bull Kelp Summary Report

TASK NUMBER: 2.3

PERIOD COVERED: June 1 – September 30, 2020

DATE SUBMITTED: September 30, 2020

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2020 Kelp Monitoring

Introduction

In 2020 Clallam MRC continued the collaboration with the Northwest Straits Commission on the kelp monitoring project. The goal was to monitor the size and density of kelp canopies at three locations during low-tide events between July and September, 2020.

The expected outcomes were 1) to use established methods to produce georeferenced density data to be incorporated into SoundIQ and potentially the Department of Natural Resources database 2) to contribute georeferenced density data which can be used to evaluate longer-term trends, and support environmental decision-making.

Kelp Survey in Clallam Bay July 23, 2020

Three surveyors, Alan Clark, Jeff Ward and Alisa Taylor, conducted a survey of the kelp bed identified in Clallam Bay during the 2016 land based reconnaissance survey. The survey was initiated at 11:45 am with a tidal elevation of -0.63 ft. and completed at 12:25 pm. The perimeter of the kelp bed was approximately 1.0 miles and the total kelp bed area was approximately 13.14 acres (Figure 1). The bed consisted of a mix of bull and giant kelp with giant kelp more densely present at the center of the bed. The water temperature was 12.0°C and the water depth was 9 ft. near the shore and 25 ft. farthest way from the shore. Figure 2 presents photos from the survey. The survey datasheets are provided in Appendix A.

Figure 1. The map of the kelp bed in Clallam Bay based on the field GPS readings taken July 23, 2020.

The kelp bed sizes between 2017 and 2020 are summarized in Table 1.

Table 1. Kelp bed size between 2017 and 2020.

Date	Area (acres)
July 2020	13.14
July 2019	22.3
July 2018	18.8
July 2017	25.1

Figure 2. Pictures of the kelp bed in Clallam Bay taken during the 2020 survey.

Kelp Surveys in Freshwater Bay

Two monitoring surveys were conducted by Alisa Taylor and Alan Clark in Freshwater Bay on August 19, 2020. The following sections provide a brief summary of the two surveys.

Large Kelp Bed

The survey of the large kelp bed east of the boat ramp was initiated at 10:40 am with a tidal elevation of 4 ft. and completed at 1:17 pm. The perimeter of the kelp bed was approximately 5.4 miles and the total kelp bed area was approximately 112.67 acres (Figure 3). Most of the area was dominated by bull kelp. The water temperature was 12.2°C and the water depth was 6 ft. near the shore and 32 ft. farthest way from the shore. Figure 4 and 5 present photos from the survey. Figure 6 represents temperature data gathered over 1 month, July 27 - September 26 2020, from two Hobo temperature monitors deployed at mid-water-column level, and seafloor level. At the mid-water-column level the temperature ranged between 7.9 and 12.1°C and at the bottom between 7.7 and 12.1°C. The survey datasheets are provided in Appendix A.

Figure 3. The map of the large kelp bed at Freshwater Bay based on the field GPS readings taken August 19, 2020.

The kelp bed sizes between 2016 and 2020 are summarized in Table 2.

Table 2. Large kelp bed size between 2016 and 2020.

Date	Area (acres)
August 2020	112.67
July 2019	117.86
July 2018	78.0
August 2017	174.7
July 2016	141.1

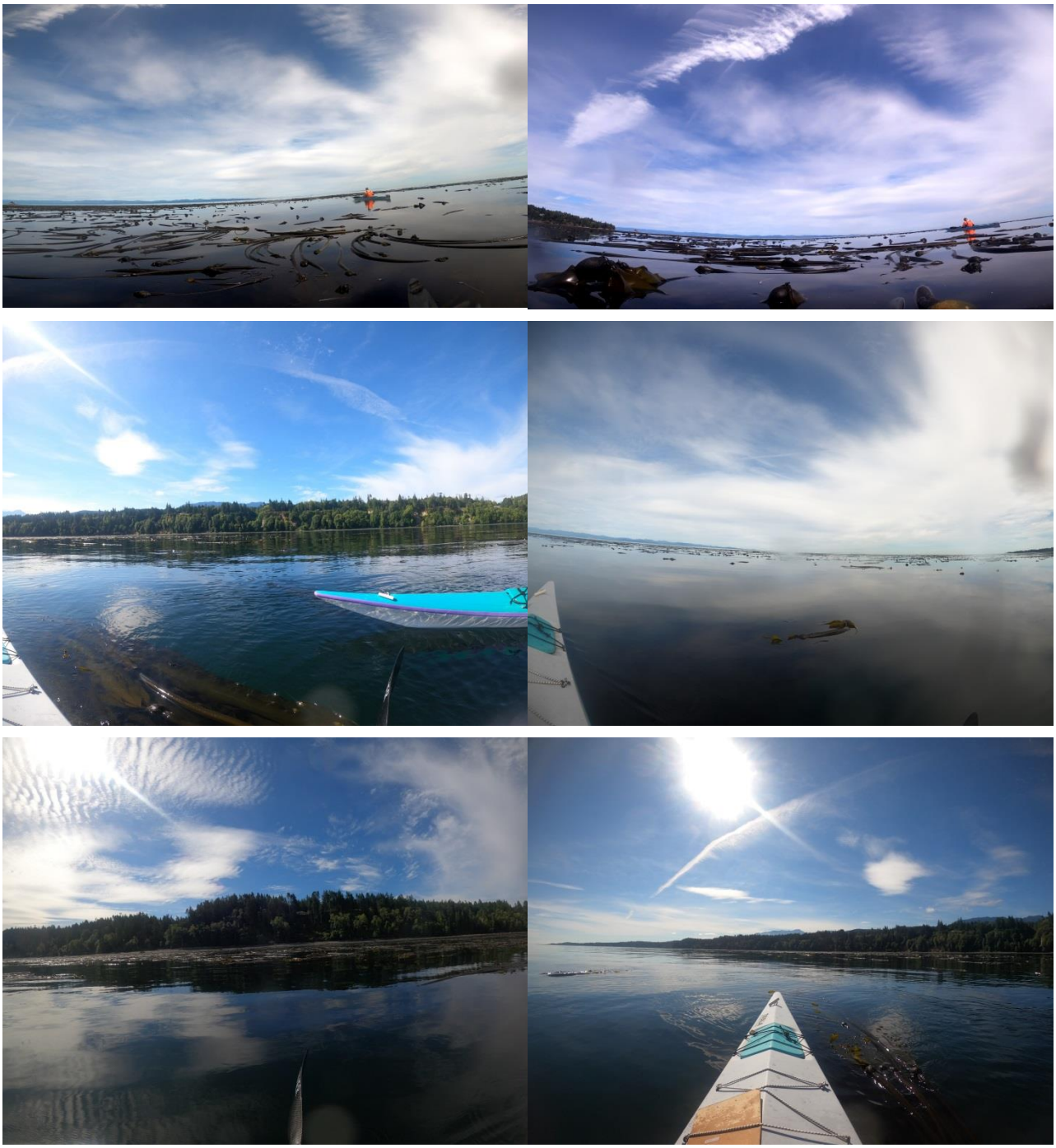
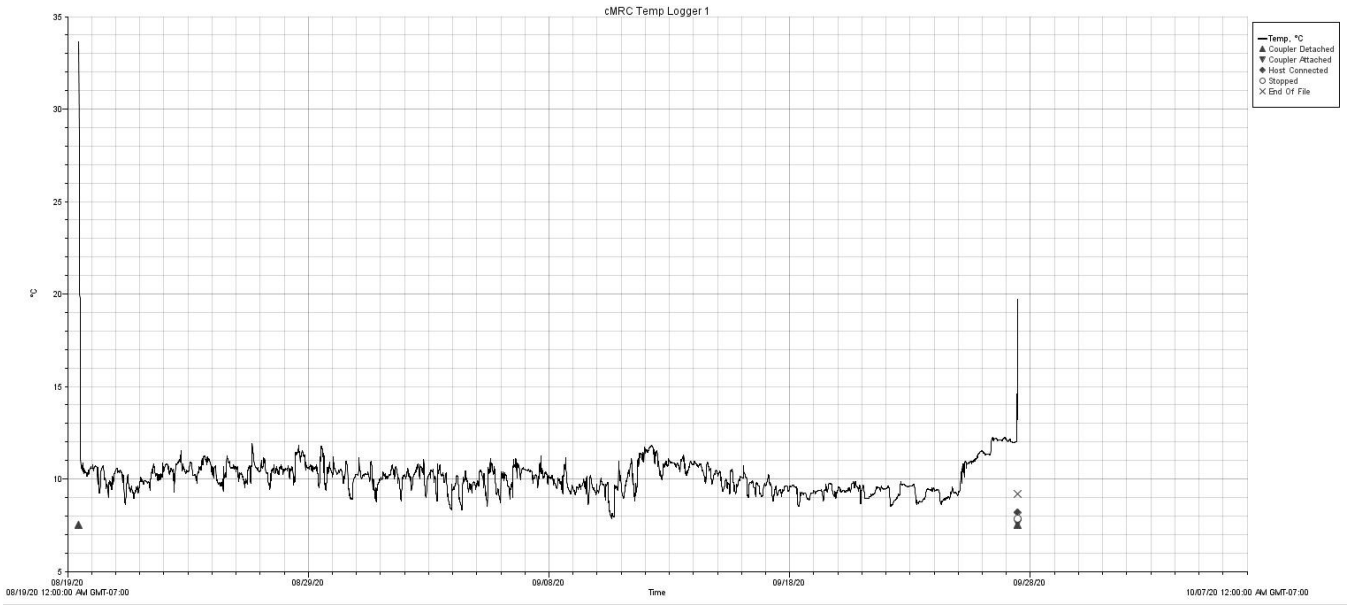


Figure 4. Pictures of the large kelp bed in Freshwater Bay taken during the 2018 survey.

Figure 5. Pictures of the large kelp bed in Freshwater Bay taken during the 2018 survey.

(a)



(b)

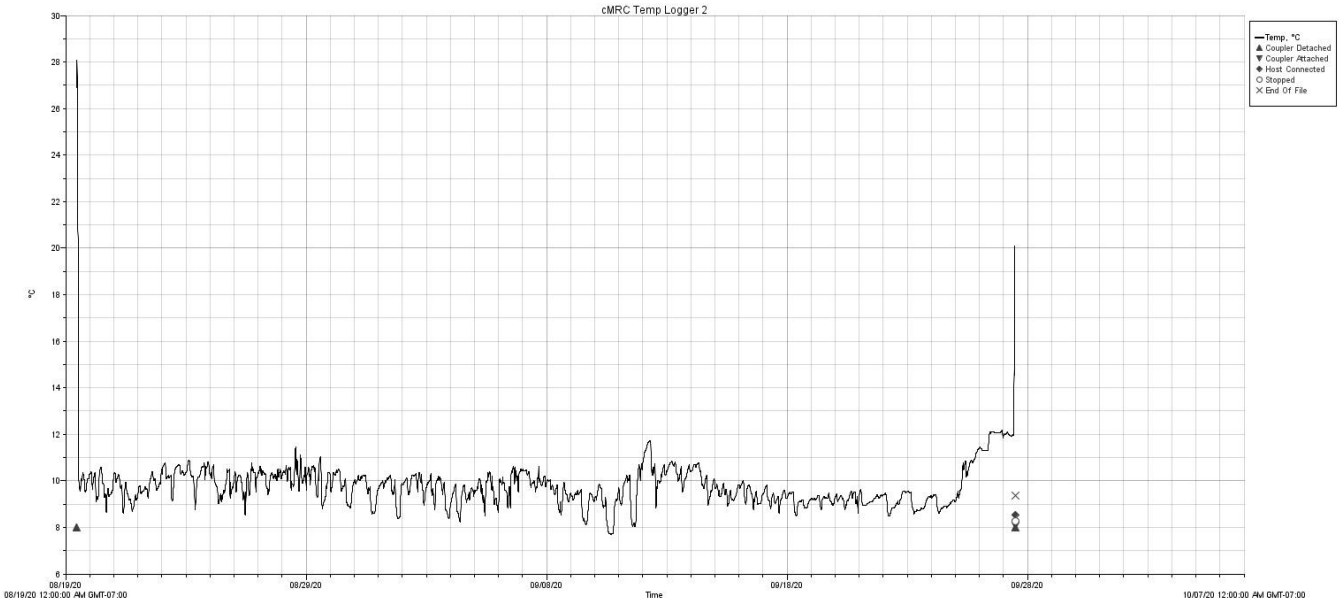


Figure 6. Temperature data recorded via: (a) temperature monitor deployed at mid water-column level; (b) temperature monitor deployed at the seafloor level.

Small Kelp Bed

The survey of the small kelp bed west of the boat ramp was initiated at 1:26 pm with a tidal elevation of 14 ft. and completed at 1:34 pm. The perimeter of the kelp bed was approximately 0.21 miles and the total kelp bed area was approximately 0.64 acres (Figure 7). All of the area was dominated by bull kelp. The water temperature was 11.1°C and the water depth was 12 ft. near the shore and 24 ft. farthest way from the shore. Figure 8 and 9 present photos from the survey. The survey datasheets are provided in Appendix A.

Figure 7. The map of the small kelp bed at Freshwater Bay based on the field GPS readings taken August 19, 2020.

The kelp bed sizes between 2016 and 2020 are summarized in Table 3.

Table 3. Small kelp bed size between 2016 and 2020.

Date	Area (acres)
August 2020	0.64
July 2019	0.97
August 2018	1.06
September 2017	0.92
July 2016	0.71

Figure 8. Pictures of the small kelp bed in Freshwater Bay taken during the 2020 survey.

Figure 9. Pictures of the small kelp bed in Freshwater Bay taken during the 2020 survey.

Appendix A – Field Data Sheets

Bull Kelp Survey Data Sheet (on shore)

Pre-Survey Section (on the beach)

Names of surveyors: Alan Clark, Jeff Ward, Alisa Taylor

Location: Clallam Bay

Date: 23 July 20 Weather conditions (circle one)

Clear | (Clouds) | Heavy rain | Light rain | Fog/mist

Tide height (ft): Start -0.63 Tide station: NOAA Sekiu/Clallam Bay

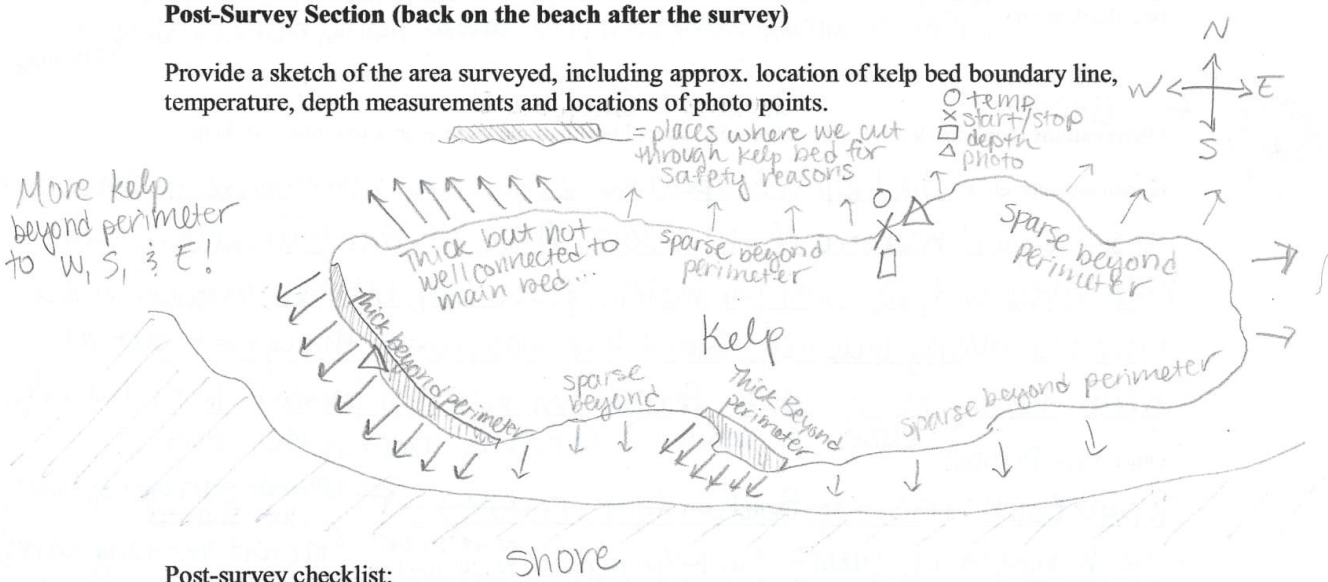
Current (knots): 3 Station/source: Alan Clark (observation)

Name of GPS unit or phone app Garmin GPSMap 78sc Accuracy of GPS: +/- 12 ft

☐ Proceed to page 2 to conduct survey. Following your survey, fill out Post-Survey section below.

Post-Survey Section (back on the beach after the survey)

Provide a sketch of the area surveyed, including approx. location of kelp bed boundary line, temperature, depth measurements and locations of photo points.



Post-survey checklist:

- ☑ Kelp bed perimeter track is saved in one or more GPS units
- ☑ GPS units are collected for storage until next survey
- ☑ Data sheets are completely filled out and legible.
- ☑ Photo points have been taken (and are later uploaded with properly labeled names)

Bull Kelp Survey Data Sheet (on the water)

Kelp Bed number or Name Clallam Bay

Start time (time of temperature measurement): 11:45am

Water Temp. (°C): 12°C (52°F)

Depth (ft):

Edge closest to shore: 9 ft, GPS Point name: N 48°15.238 W 124°16.195 Time: 12:30pm → (Began Survey from outside - farthest from shore - edge)

Edge farthest to shore: 25 ft, GPS Point name: N 48°15.427' W 124°16.438' Time: 11:45am

Perimeter:

GPS point name at beginning of paddle around bed: N 48°15.427' W 124°16.438'

GPS perimeter track name: Track_2020-07-23 122459

GPS point name at end of paddle around bed: N 48°15.395 W 124°16.322

Photo points: (take first photo, then immediately take a photo of this data sheet with the corresponding box checked off) Fewer photos available ~ cameraman was focused on safety of interns & windy/wavy conditions caused slightly rushed ending of survey.

☑ **ToBe** ☐ **ToWa** ☑ **BeL** ☑ **BeR** ☑ **Volunteer photos**

← GH011043-9 GH010042-9 GH010042-8

apologies for water droplets on lens!

Observations (consider density, animals present, overall health of blades, presence of understory kelp, human impacts, etc.): The kelp bed appeared larger and more dense, in comparison to surveyors' memory of it in 2019. There was much understory bull kelp throughout, esp. @ N perimeter. Sparse kelp extended beyond in all directions, mostly Bull kelp. Giant kelp was present throughout, but at greater density in the center. Feather Boa kelp was present from the edge closest to shore (S), extending towards the shore.

Other notes: Photos:

~~Toward Beach: 002(S); Beach on Right: 003(E)~~ ← another surveyor's photos, not shared

~ The Perimeter track cutoff the kelp bed @ N 48°15.360', W 124°16.284' (to avoid incoming waves)

~ The Perimeter track cut off the kelp bed @ N 48°15.347', W 124°16.475' (to avoid large rocks)

End time (time of last measurement or observation before returning to shore): 12:25pm

Animals Seen: Sea Otter, Great Blue Heron, Kelp Crab, Forage Fish (some jumping!), Bryozoan colonies on some kelp blades

Bull Kelp Survey Data Sheet (on shore)

Pre-Survey Section (on the beach)

Names of surveyors: Alan Clark, Alisa Taylor

Location: Freshwater Bay

Date: 19 Aug 20 Weather conditions (circle one)

Clear semi-clear (Clouds) Heavy rain Light rain Fog/mist

Tide height (ft): Start + 4 Tide station: NOAA: Freshwater Bay/Chichagof Island

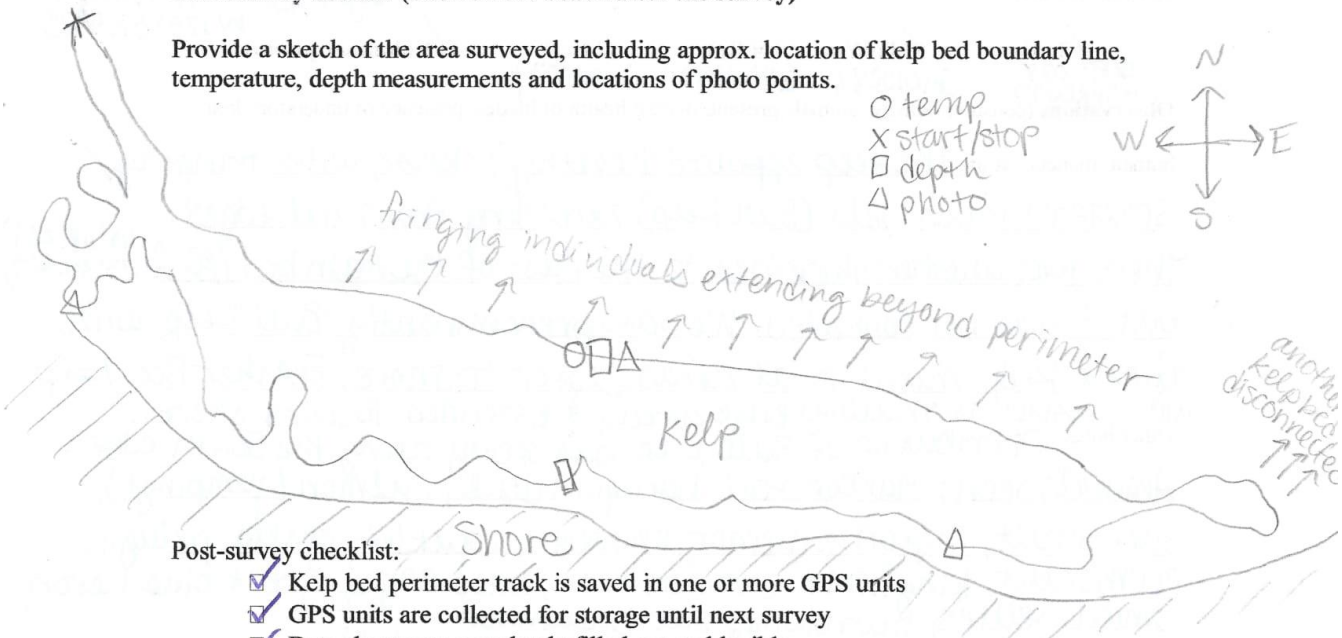
Current (knots): 1 Station/source: Alan Clark (observation)

Name of GPS unit or phone app Garmin GPSMap 78sc Accuracy of GPS: +/- 12 ft

☐ Proceed to page 2 to conduct survey. Following your survey, fill out Post-Survey section below.

Post-Survey Section (back on the beach after the survey)

Provide a sketch of the area surveyed, including approx. location of kelp bed boundary line, temperature, depth measurements and locations of photo points.



Post-survey checklist:

- ☑ Kelp bed perimeter track is saved in one or more GPS units
- ☑ GPS units are collected for storage until next survey
- ☑ Data sheets are completely filled out and legible.
- ☑ Photo points have been taken (and are later uploaded with properly labeled names)

Bull Kelp Survey Data Sheet (on the water)

Kelp Bed number or Name Freshwater Bay (Large)

Start time (time of temperature measurement): 10:40 am

Water Temp. (°C): 12.2

Depth (ft):

Edge closest to shore: 6 ft, GPS Point name: N 48°08.269' W 123°36.085 Time: 11:48 am

Edge farthest to shore: 32 ft, GPS Point name: N 48°08.467 W 123°36.924 Time: 10:48 am

Perimeter:

GPS point name at beginning of paddle around bed: N 48°08.745 W 123°37.955

GPS perimeter track name: Track_2020-08-19 131758

GPS point name at end of paddle around bed: N 48°08.450 W 123°37.557

*deviated from perimeter for photos of jellies & cucumbers @ N 48°08.1543 W 123°35.5946

Photo points: (take first photo, then immediately take a photo of this data sheet with the corresponding box checked off)

*deviated from perimeter again @ N 48°08.2838 W 123°37.4925

☑ ToBe	☑ ToWa	☑ BeL	☑ BeR	☑ Volunteer photos
GOPR0078 & GOPR0079	GH010088	GH010089-1	GOPR0077	

Observations (consider density, animals present, overall health of blades, presence of understory kelp, human impacts, etc.): The kelp appeared healthy & dense, with fringing/scattered individuals (Bull kelp) extending from all edges. There was another thick bed to the East of the main bed (@ N 48°08.231' W 123°35.409'), but it was not connected. We saw predominantly Bull kelp, with Giant kelp mixed in at areas closer to shore. Feather Boa kelp was present in shallow edge areas, & extended toward shore.

Other notes: Distribution of Bull kelp was spotty along the South edge. Animals seen: harbor seal, harlequin duck, salmon (jumping!), surf smelt, pigeon guillemot, rhinocerous auklet, gulls, pelagic cormorant, kingfisher, common Loon, bald eagle, great blue heron, small jellies, burrowing sea cucumber

End time (time of last measurement or observation before returning to shore): 1:17 pm

Bull Kelp Survey Data Sheet (on shore)

Pre-Survey Section (on the beach)

Names of surveyors: Alan Clark, Alisa Taylor

Location: Freshwater Bay

Date: 19 Aug 20 Weather conditions (circle one)

Clear (Clouds) Heavy rain Light rain Fog/mist

Tide height (ft): Start +14 Tide station: NOAA: Freshwater Bay/Chichagof Island

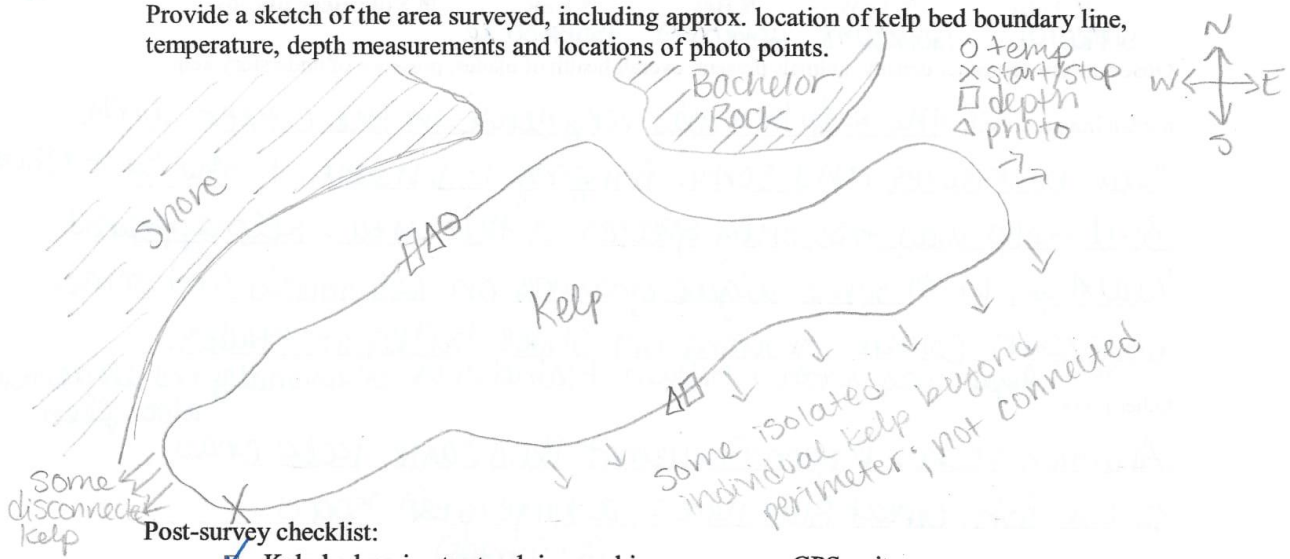
Current (knots): 2.5 Station/source: Alan Clark (observation)

Name of GPS unit or phone app Garmin GPSMap 78SC Accuracy of GPS: +/- 12 ft

☐ Proceed to page 2 to conduct survey. Following your survey, fill out Post-Survey section below.

Post-Survey Section (back on the beach after the survey)

Provide a sketch of the area surveyed, including approx. location of kelp bed boundary line, temperature, depth measurements and locations of photo points.



Post-survey checklist:

- ☑ Kelp bed perimeter track is saved in one or more GPS units
- ☑ GPS units are collected for storage until next survey
- ☑ Data sheets are completely filled out and legible.
- ☑ Photo points have been taken (and are later uploaded with properly labeled names)

Bull Kelp Survey Data Sheet (on the water)

Kelp Bed number or Name Freshwater Bay (small)

Start time (time of temperature measurement): 1:26 pm

Water Temp. (°C): 11.1

Depth (ft):

Edge closest to shore: 12 ft, GPS Point name: N 48°09.013 W123°38.221 Time: 1:36 pm

Edge farthest to shore: 24 ft, GPS Point name: N 48°09.015 W123°38.189 Time: 1:39 pm

Perimeter:

GPS point name at beginning of paddle around bed: N 48°08.996 W 123°38.238

GPS perimeter track name: Track-2020-08-19 135943

GPS point name at end of paddle around bed: N 48°08.998 W 123°38.249

* apologies for extra track line recorded after perimeter was complete ~ forgot to turn off GPS unit!

Photo points: (take first photo, then immediately take a photo of this data sheet with the corresponding box checked off)

- ☑ **ToBe** GOPR0101
- ☑ **ToWa** GOPR0098
- ☑ **BeL** GOPR0099
- ☑ **BeR** GOPR0096
- ☑ **Volunteer photos**

Observations (consider density, animals present, overall health of blades, presence of understory kelp, human impacts, etc.): The kelp bed was very dense in the center with clear boundaries, and some fringing individuals to the East & South. Bull kelp was the only species in this area. Kelp appeared healthy, with some algae growing on individuals, and some bryozoan colonies growing on stipes, bulbs or blades.

Other notes: Algae was green & brown, filamentous. Occasionally red algae was also seen.

Animals seen: Pigeon Guillemot, Bald Eagle, kelp crab, forage fish, Great Blue heron, a large green isopod (≈1.5 inches)

End time (time of last measurement or observation before returning to shore): 1:34 pm

(ended perimeter @ 1... then took temp measurements & left to return to shore @ 1:39 pm)