

County: Clallam  
Grant No: SEANWS-2014-CICoCD-0007

PROJECT TITLE: Kelp Monitoring

DELIVERABLES FOR TASK NO: 6.3

PROGRESS REPORT: ☐

FINAL REPORT ☒

PERIOD COVERED: July 1 – September 30, 2016

DATE SUBMITTED: October 3, 2016

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## Kelp Monitoring

### Introduction

In 2015-16 Clallam MRC initiated the collaboration with the NWSC on the kelp monitoring project. The goal was to monitor the size and density of kelp canopies during low-tide events between July and September, 2016 and develop a georeferenced database of kelp abundance and distribution that can be incorporated into Sound IQ.

The expected outcomes were 1) the identification of long-term kelp monitoring stations along the east-central portion of the Strait of Juan de Fuca, and 2) use of established methods to produce georeferenced density data to evaluate longer-term trends support environmental decision-making.

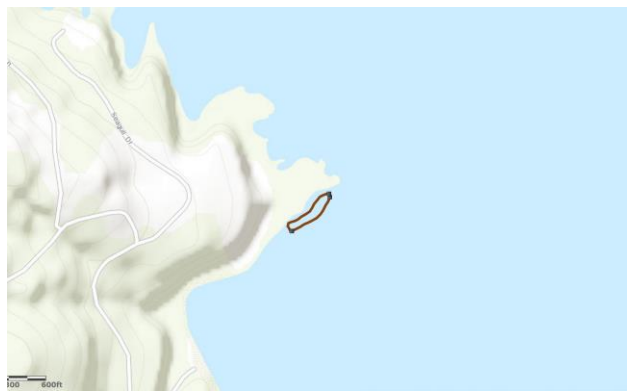
To accomplish these tasks the Clallam MRC participated in all the meetings and training provided by NWSC.

### Kelp Surveys in Freshwater Bay

Four monitoring surveys were conducted in Freshwater Bay between July 1 and September 30, 2016. The following sections provide a brief summary of the four surveys.

#### Survey July 2, 2016

Three surveyors, Haley Gray, Jeff Ward and Alan Clark, conducted a survey of a small kelp bed (FW1) west of the Freshwater Bay boat ramp. The survey of the kelp bed was initiated at 9:28 am under clear skies. The tidal elevation -1.6 ft. at 7:30 am. The perimeter of the kelp bed was 0.2 miles and the area was 0.71 acres (Figure 1.). The datasheets for the survey is provided in Appendix A.



**Figure 1.** The map of kelp bed FW1 based on the field recorded GPS readings taken July 2, 2016.

#### Survey July 20, 2016

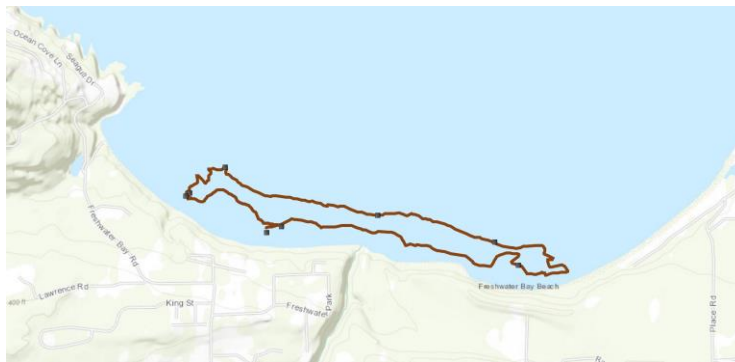
Two surveyors, Haley Gray and Ed Bowlby, conducted a survey of a large kelp bed (FW2) east of the Freshwater Bay boat ramp. The survey of the kelp bed was initiated at 9:28 am under clear skies. The tidal elevation -1.4 ft. at the start of the survey. Because the wind and swells picked up creating large waves along the shoreline the complete perimeter was not delineated. Instead the two surveyors stayed on the outside of the kelp bed. The tracking of the outer edge of the kelp bed is shown in Figure 2. The datasheets for the survey is provided in Appendix A.



**Figure 2.** The map of the outer edge of kelp bed FW2 based on the field recorded GPS readings taken July 20, 2016.

#### Survey July 30, 2016

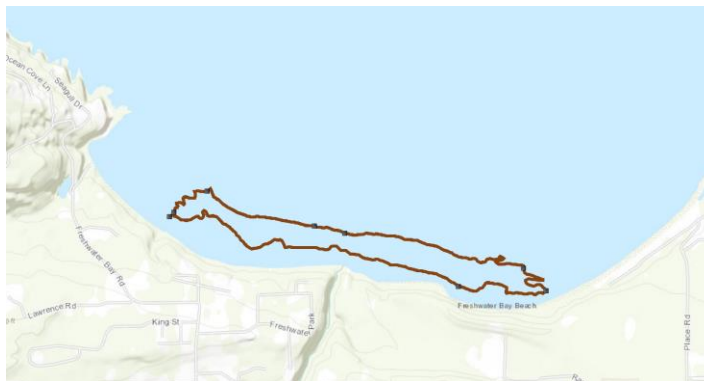
Three surveyors, Haley Gray, Alan Clark and Peter Jepsen, conducted a survey of the large kelp bed (FW2) east of the Freshwater Bay boat ramp. The survey of the kelp bed was initiated at 8:25 am under clear skies and ended at 9:54 am. The tidal elevation 0.0 ft. at 8:00 am. The perimeter of the kelp bed was 5.08 miles and the area was 145.1 acres (Figure 3.). The datasheets for the survey is provided in Appendix A.



**Figure 3.** The map of kelp bed FW2 based on the field recorded GPS readings taken July 30, 2016.

#### Survey August 19, 2016

Four surveyors, Haley Gray, Alan Clark, Jeff Ward and Peter Jepsen, conducted a survey of the large kelp bed (FW2) east of the Freshwater Bay boat ramp. The survey of the kelp bed was initiated at 8:25 am under clear skies and ended at 10:50 am. The tidal elevation 0.0 ft. The area of the kelp bed was 169.9 acres (Figure 4.). The datasheets for the survey is provided in Appendix A.



**Figure 4.** The map of kelp bed FW2 based on the field recorded GPS readings taken August 19, 2016.

## 2016 Intern Project

The kelp monitoring project was used as one of the 2016 intern projects. Haley Gray coordinated and participated in the four kelp bed surveys. She summarized the information in a poster which she presented at the Intern Celebration, August 15, 2016.

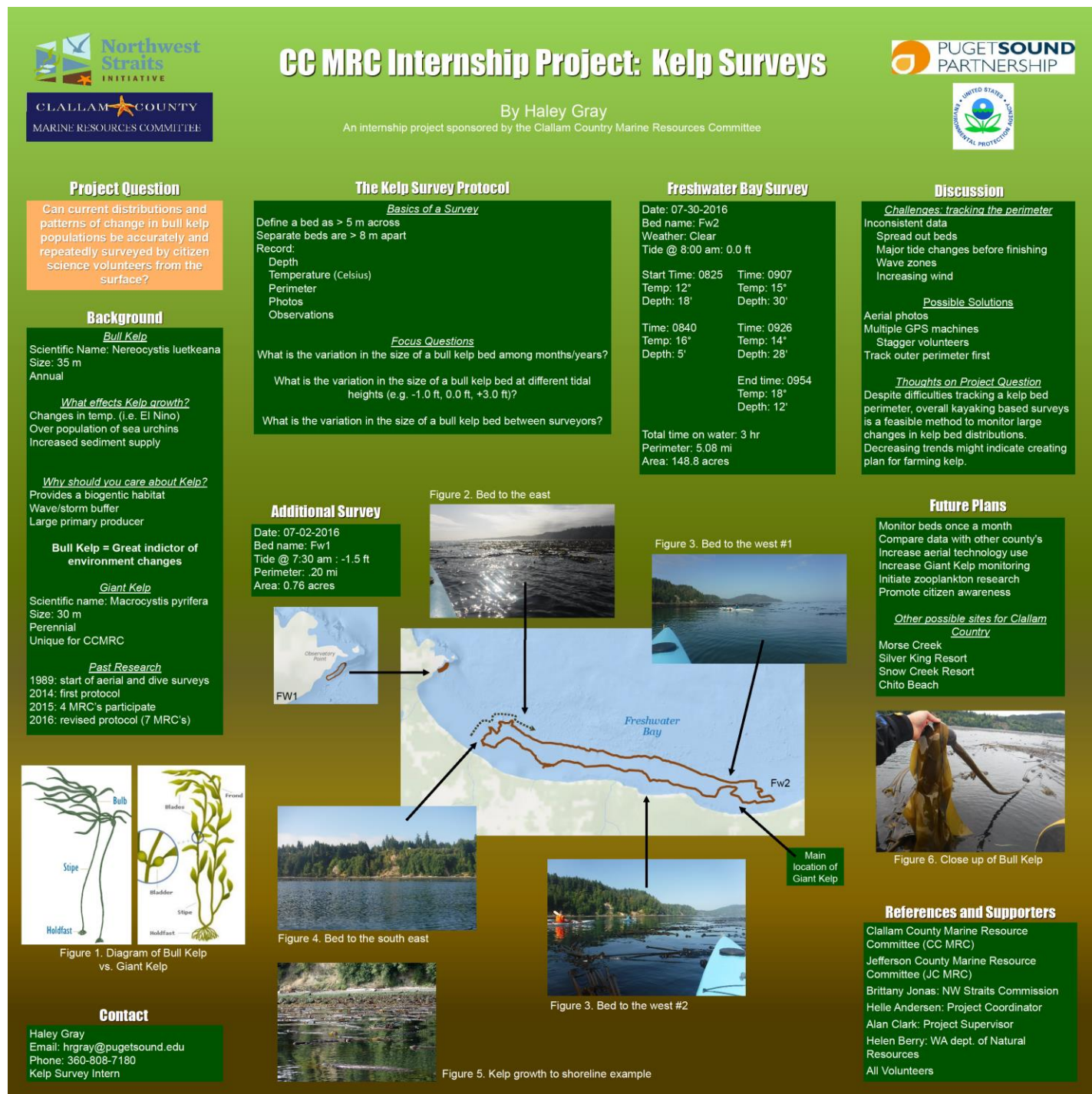


Figure 5. Haley Gray's intern poster of the kelp monitoring project.



## Land Based Survey of Potential Kelp Monitoring Sites

On July 17, 2016 a land-based survey was conducted of potential kelp monitoring sites west of Freshwater Bay. Based on information from Helen Berry, DNR, three potential locations had been identified: Silver King east of Pillar Point, Chito Beach and Snow Creek Resort east of Neah Bay.

The survey found none of these locations suitable monitoring sites. The road to Silver King Resort was blocked with a gate and a posted sign stated that the area was for sale. The kelp beds at Chito Beach and Snow Creek resort were very large and could therefore not be surveyed in a reasonable amount of time.

One small kelp bed at the Clallam Bay “West” beach access park was identified as a potential future monitoring site. The site can safely be accessed from a small breakwater protected harbor (Figure 6.) and the kelp bed, which is smaller than the large kelp bed in Freshwater Bay, is located in the relatively protected area of Clallam Bay (Figure 7.).



**Figure 6.** Entrance of small harbor next to potential kelp monitoring site in Clallam Bay.



**Figure 7.** Potential kelp monitoring site in Clallam Bay.

**Task Number: 6.3**

**What was the goal of this project and did you accomplish it?**

The goals of the 2016 field season was to identify suitable kelp monitoring sites, train volunteers in conducting the monitoring effort and conduct several surveys. All of these goals were accomplished.

**Please provide a list of measurable outcomes or accomplishments from this project (e.g. number of people trained, miles of shoreline restored, etc.):**

Five Clallam MRC members and volunteers were involved in the monitoring effort. Four surveys were conducted delineating the perimeter and area of two kelp beds in Freshwater Bay. A land-based survey identified one potential future monitoring site at Clallam Bay.

**Please list the specific deliverables associated with this project (e.g. educational/outreach materials, monitoring protocol, summary report):**

Four GPX files containing the GPS data for the four surveys. The 2016 intern poster of the kelp monitoring effort and this report.

**Any difficulties encountered or lessons learned during the project?**

As always when starting a new field project initial difficulties were encountered such as all volunteers learning to operate the GPS. The participants also had to learn how to cope with changing wave and wind conditions. The main challenge which persisted to the end of the survey period was how to identify the edge of the kelp bed consistently between the surveyors.

**If this task was part of an ongoing project, please provide a brief summary of the project to date, including initiation and expected completion dates, overall goals and anticipated outcomes:**

This is a NWSC project supported by all seven MRCs.

**Were any other resources or funding leveraged for this project?**

This is a NWSC project

**Did you work with any partners or other MRCs to carry out this project?**

NWSC and Jefferson MRC.

**What are the regional cumulative significance/impacts/results of this project?**

The amount and condition of floating kelp will be documented along shorelines in seven counties.

**Which NWSC Performance Benchmarks or PSP Near Term Actions does this project address?**

NWSC Goal 3: protect and restore marine species and habitats to improve ecosystem health.

## **Appendix A – Field Data Sheets**

### Bull Kelp Survey Data Sheet (on shore)

#### Pre-Survey Section (on the beach)

Names of surveyors: Haley Gray, Alan Clark, Jeff Ward

Location: Freshwater Bay

Date: 07-02-16

Weather conditions (circle one)

☒ Clear

☐ Clouds

☐ Heavy rain

☐ Light rain

☐ Fog/mist

Tide height (ft): Start -1.6 Tide station: Willy Weather

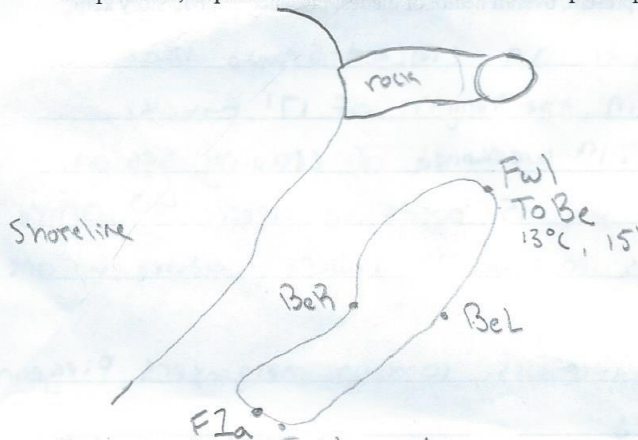
Current (knots): \_\_\_\_\_ Station/source: \_\_\_\_\_

Name of GPS unit or phone app Garmin Accuracy of GPS: +/- 11 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: ToWa, 10\'

- ☒ 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 FW1

Start time (time of temperature measurement): 9:29am

Water Temp. (°C): 13°

Depth (ft):

Edge closest to shore: 10 ft, GPS Point name: F1a Time: 9:33

Edge farthest to shore: 15 ft, GPS Point name: Fw1 Time: 9:28

Perimeter:

GPS point name at beginning of paddle around bed: FW1

GPS point name at end of paddle around bed: Fw1end

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

☐ ToBe

☐ ToWa

☐ BeL

☐ BeR

☒ Volunteer photos

Observations (consider density, animals present, overall health of blades, presence of understory kelp, human impacts, etc.): Good density in a crescent-shaped bed

w/ avg. 4-7 bulbs w/in the length of 17' kayak.

more bulbs underwater. 1st weekend of crabbing season.

Parking lot crowded w/ 15 boats in area. 40 Ochre

Stars Pisaster Conracheus in area. Many were mature w/ one juvenile.

Other notes:

Some boob stars, Harlequin ducks, common mergansers, Pigeon  
guillemots, Surf Scoters

End time (time of last measurement or observation before returning to shore): 9:30

## Bull Kelp Survey Data Sheet (on shore)

### Pre-Survey Section (on the beach)

Names of surveyors: Haley Gray ; ed Bowlby

Location: Freshwater Bay

Date: 07/20/2016 Weather conditions (circle one)

Clear

Clouds

Heavy rain

Light rain

Fog/mist

Tide height (ft): Start -1.4 Tide station: Willy Weather

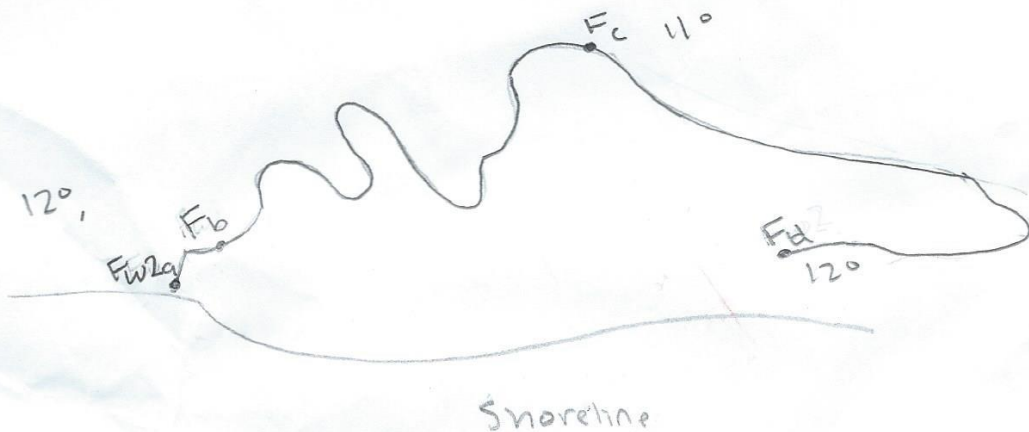
Current (knots): \_\_\_\_\_ Station/source: \_\_\_\_\_

Name of GPS unit or phone app Garmin 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 FW2

Start time (time of temperature measurement): 0928

Water Temp. (°C): 12

Depth (ft):

Edge closest to shore: 1 ft, GPS Point name: Fb Time: 0933

Edge farthest to shore: \_\_\_\_\_ ft, GPS Point name: Fc Time: \_\_\_\_\_

Perimeter:

GPS point name at beginning of paddle around bed: FW2

GPS perimeter track name: 20-JUL-2016

GPS point name at end of paddle around bed: Fd

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

☐ ToBe

☐ ToWa

☐ BeL

☐ BeR

☒ Volunteer photos

Observations (consider density, animals present, overall health of blades, presence of understory kelp, human impacts, etc.): Clear morning. Wind clam and steadily

picked up. Bed larger than expected and went to the  
shoreline. Blades seem healthy and based on bulb  
size are young to avg. size. No old growth.  
various sea birds.

Other notes:

Bed is potentially larger than surveyed.

End time (time of last measurement or observation before returning to shore): 1130

## Bull Kelp Survey Data Sheet (on shore)

### Pre-Survey Section (on the beach)

Names of surveyors: Alan Clark, Haley Gray, Peter Jepsen

Location: Freshwater Bay

Date: 7-30-16 Weather conditions (circle one)

Clear

Clouds

Heavy rain

Light rain

Fog/mist

Tide height (ft): Start 0.0 Tide station: Willy Weather

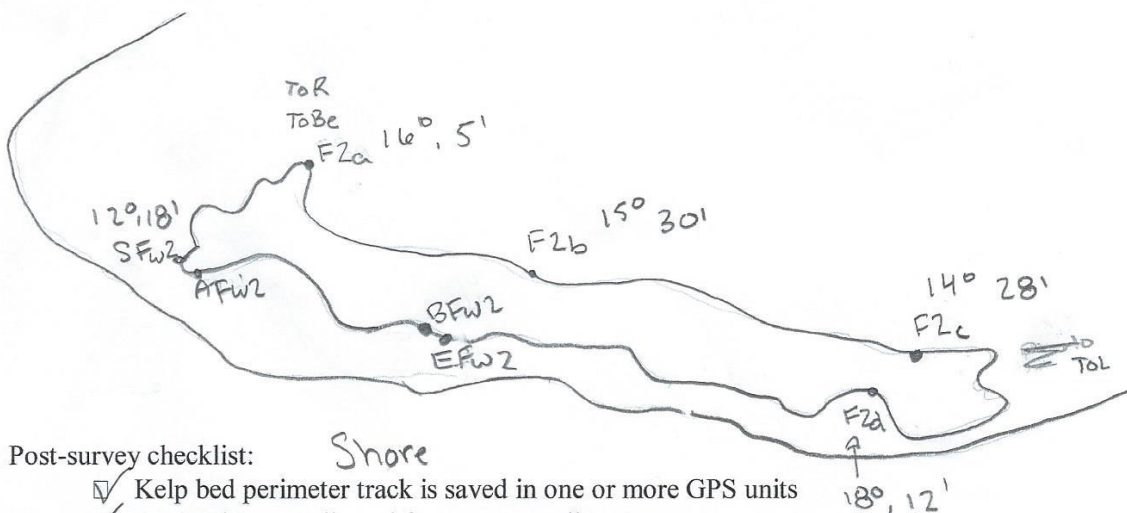
Current (knots): \_\_\_\_\_ Station/source: \_\_\_\_\_

Name of GPS unit or phone app Garmin Accuracy of GPS: +/- 11 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:

Shore

- ☒ 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 FW2

Start time (time of temperature measurement): 0825

Water Temp. (°C): 12 name: SFW2

Depth (ft): 18'

Edge closest to shore: / ft, GPS Point name: / Time: /

Edge farthest to shore: / ft, GPS Point name: / Time: /

**Perimeter:**

GPS point name at beginning of paddle around bed: SFW2

GPS perimeter track name: 30-JUL-16FW2

GPS point name at end of paddle around bed: EFW2

Perimeter of sub-section  
GPS name: AFW2  
GPS track: 30-JUL-16FW2SubSec  
GPS end name: BFW2

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

☒ ToBe    ☒ ToWa    ☒ BeL    ☒ BeR    ☒ Volunteer photos

**Observations** (consider density, animals present, overall health of blades, presence of understory kelp,

human impacts, etc.): Clear day with not a lot of wind.

Bed larger than last survey on 20<sup>th</sup>. (This track is more accurate). Inner Kelp perimeter very close to shoreline. Healthy bed/bulbs.

A lot of sea birds and one harbor sea, Giant Kelp on far west side.

Other notes:

On way back stopped track early by accident. Therefore, did a new track backwards to close gap.

End time (time of last measurement or observation before returning to shore): 1050

## Bull Kelp Survey Data Sheet (on shore)

### Pre-Survey Section (on the beach)

Names of surveyors: Haley Gray, Jeff Ward, Alan Clark, Peter Jepsen

Location: Freshwater Bay

Date: 8-19-2016 Weather conditions (circle one)

Clear

Clouds

Heavy rain

Light rain

Fog/mist

Tide height (ft): Start +1 Tide station: Willy Weather

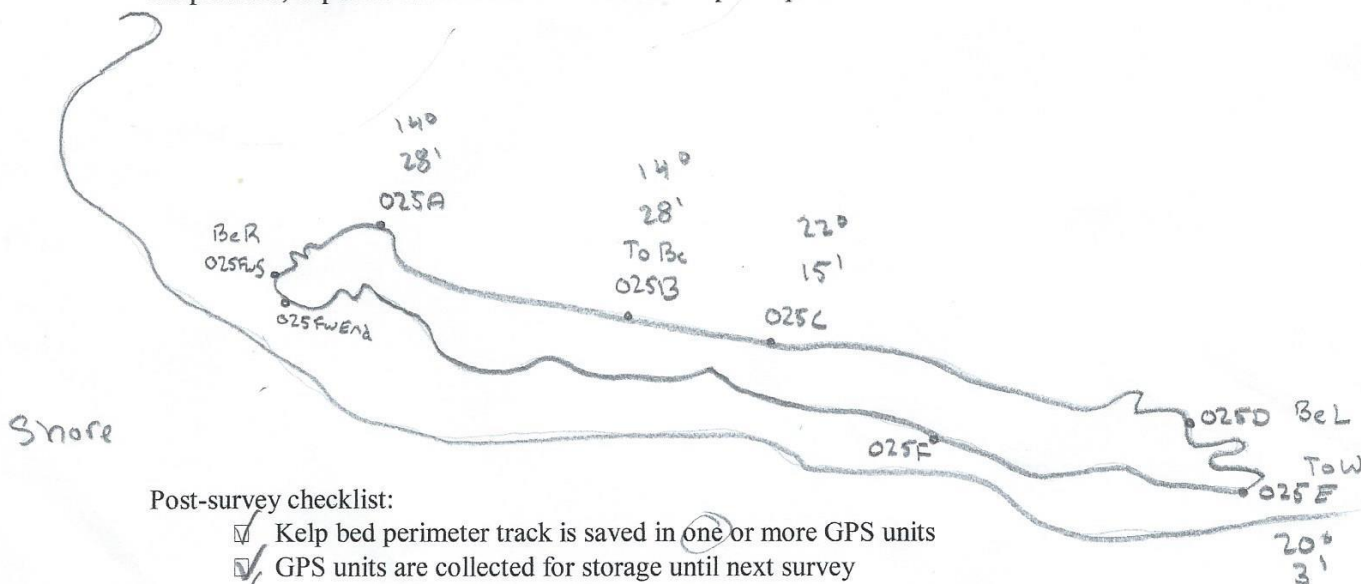
Current (knots): \_\_\_\_\_ Station/source: \_\_\_\_\_

Name of GPS unit or phone app Garmin Accuracy of GPS: +/- 18 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 FW2 025A 025B 025L 025E  
Start time (time of temperature measurement): 0945 14° 14° 22° 20°  
Water Temp. (°C): 14° 28' 28' 15' 3'

Depth (ft): 8' point name: 025FW2S  
Edge closest to shore: / ft, GPS Point name: / Time: /  
Edge farthest to shore: / ft, GPS Point name: / Time: /

#### Perimeter:

GPS point name at beginning of paddle around bed: 025FW2S

GPS perimeter track name: 19-AUG-16FW2

GPS point name at end of paddle around bed: 025FW2End

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

☒ ToBe

☒ ToWa

☒ BeL

☒ BeR

☒ Volunteer photos

Observations (consider density, animals present, overall health of blades, presence of understory kelp,

human impacts, etc.): 3 Survey of this bed. 0.0 tide was  
about a quarter way around bed. Bed was more  
filled in at far east side so counted more outlying bulbs.  
Was a very calm day and therefore was safer to kayak  
very close to shore

Other notes:

Saw harbor sea (1), harbor porpoise (1), river otter (2)

End time (time of last measurement or observation before returning to shore): 1245