

Better The Bigger^ the Dot, the Better the Fishing? Habitat Mapping with Community Soundings and Local Tide Data

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Project Partners: George Anderson , Jeremy Anderson, Brandon Daugherty,
Andrew Lind, UW FRI



Bathy Data Sources

- Marine Volunteered Geographic Information (VGI)
- Crowdsourced (CSB)
- Citizen Science
- Trusted Community Bathymetry (TCB)

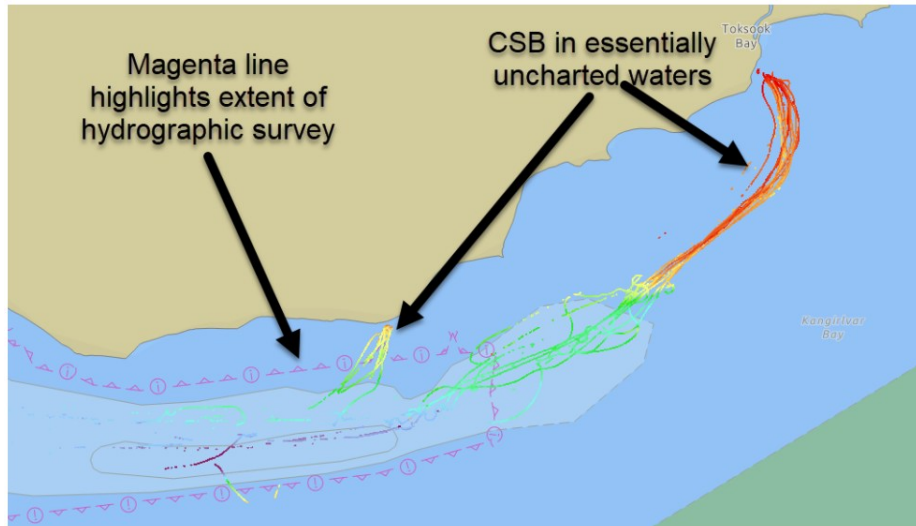
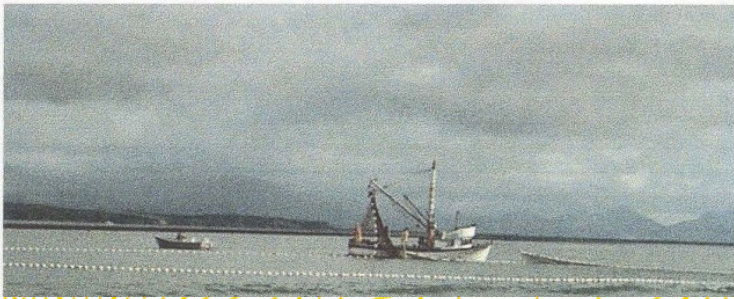


Fig. 1 CSB tracks collected through and past the extent of a NOAA hydrographic survey in Toksook Bay, Alaska. Image courtesy of NOAA.

T. RECOMMENDATIONS ✓

Due to the siltation and concomitant shoaling in an area that is important to the commercial fishing industry, the hydrographer recommends putting a note on Chart 16566 that local knowledge is required to travel south of latitude 56° 19' 00"N. *Concur.*



Community-based Bathymetric Data

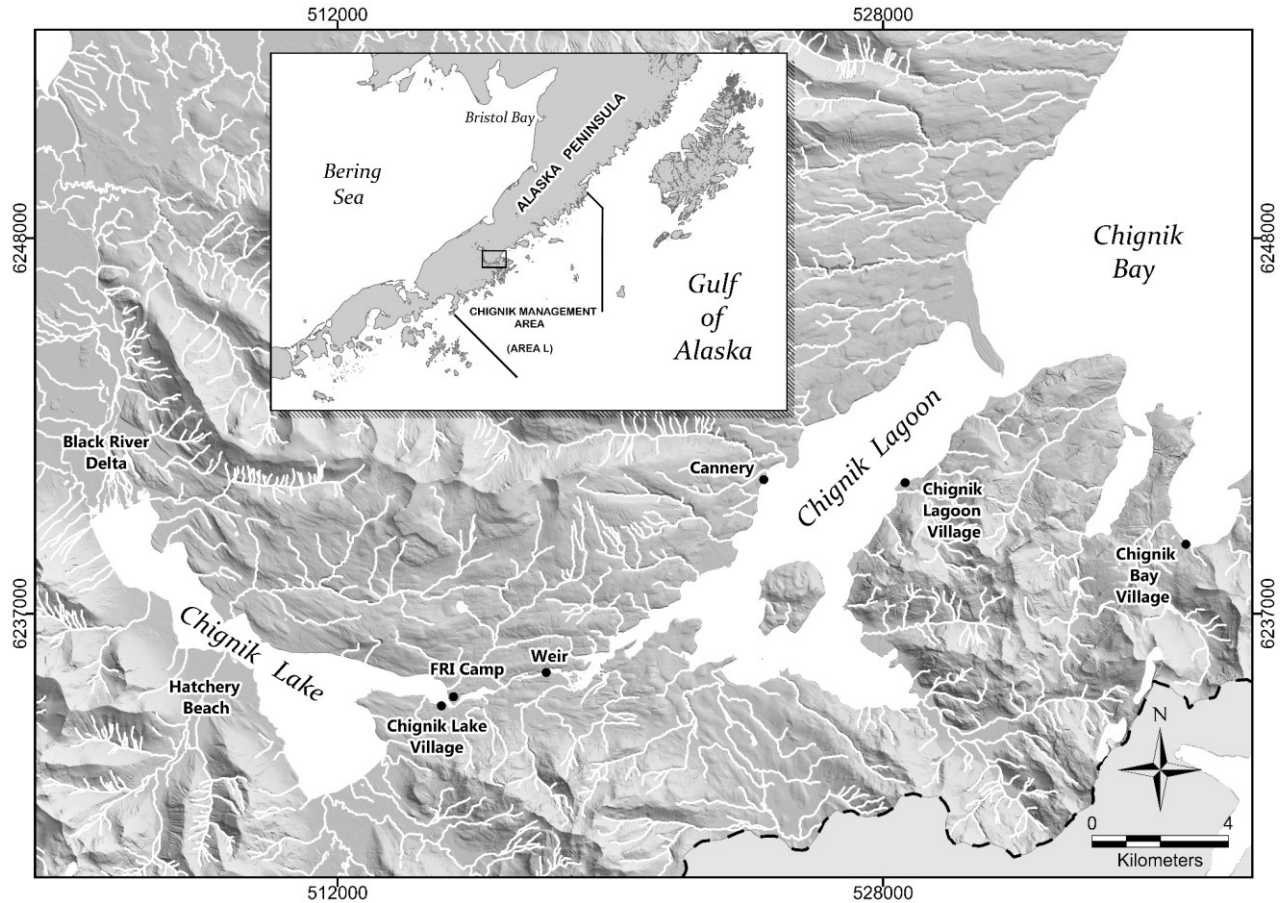
Local knowledge & mobilization

Local priorities (e.g., fisheries)

Data Sovereignty

Collaborative, intentional & structured

Study Site



Project Objectives

Community-based bathymetry

Partner with and supply
local vessel operators
with recreational grade
SBES

Continuous water level monitoring

Install sensors to obtain
hyperlocal data and to
process bathymetry

Seamless elevation modeling

Process and compare
depth measurements
with high precision
elevation data

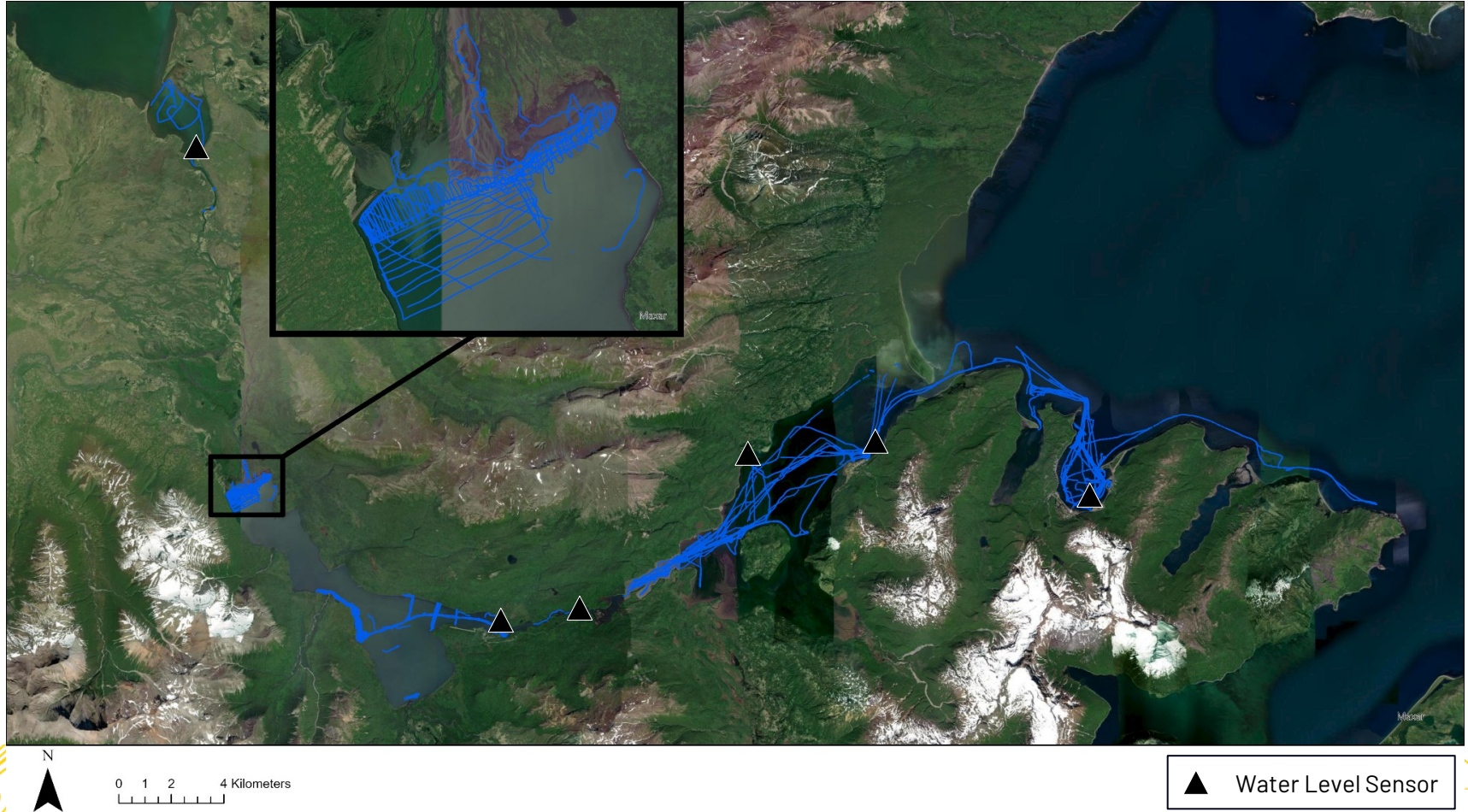


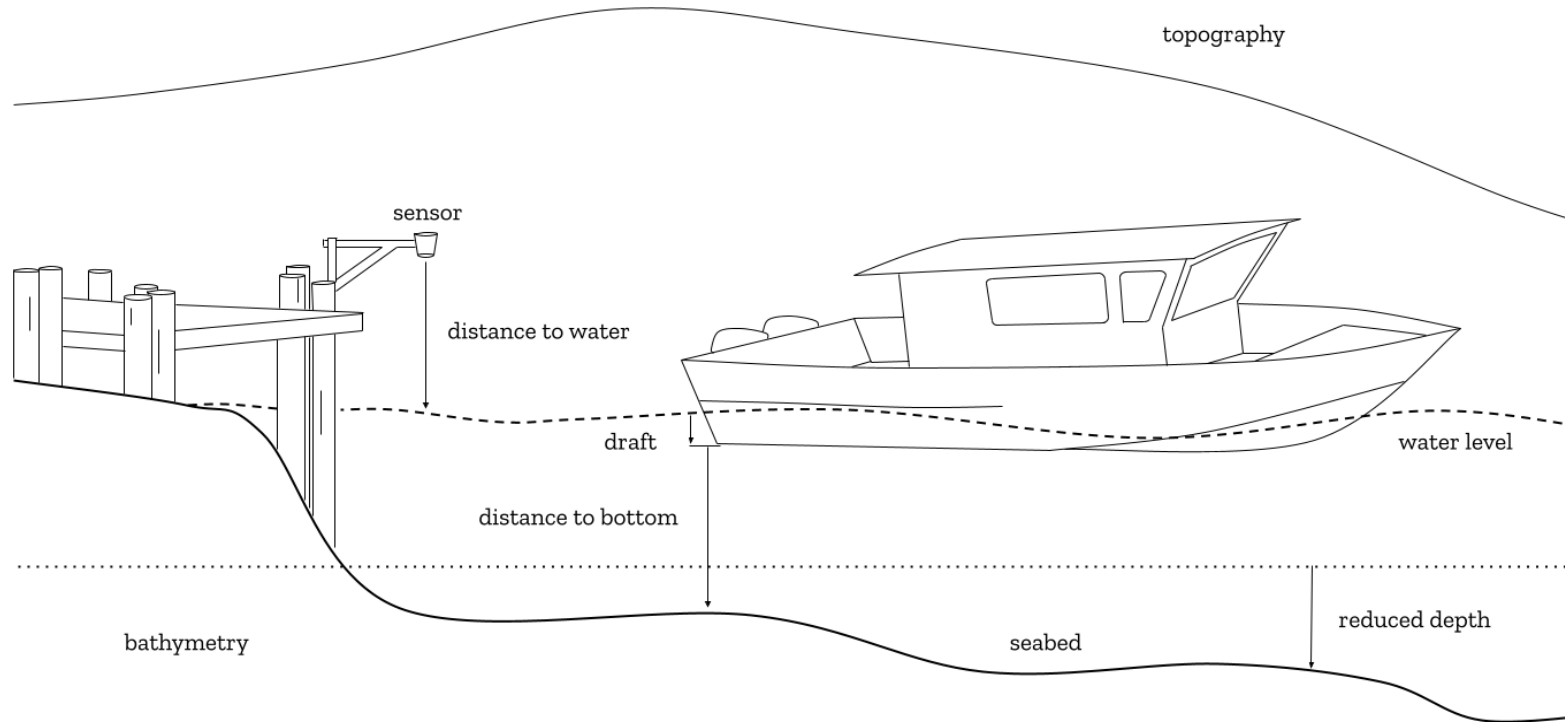
Checklist

- ✓ 1. Community partners
- ✓ 2. Local vessel(s)
- ✓ 3. Recreational Grade
Fishfinder/Chartplotter



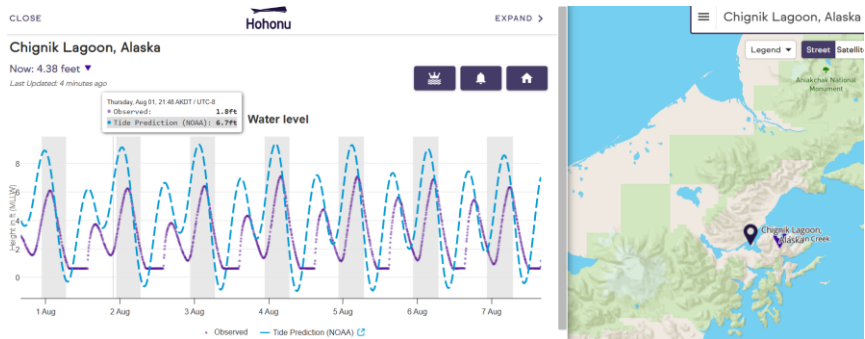
Single Beam Survey Track Lines (2023-24)





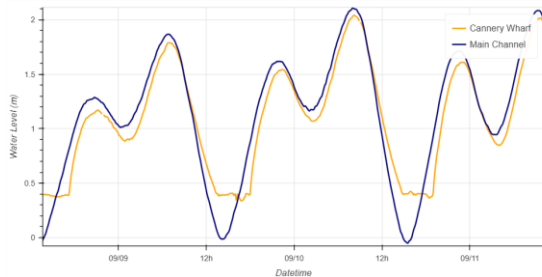
Schematic of measurements and offsets to obtain corrected depths

$$\text{Depth}_{\text{NAVD88}} = (H_{\text{NAVD88}}) - (+D_{\text{water}}) + (-D_{\text{draft}}) + (-D_{\text{bottom}})$$



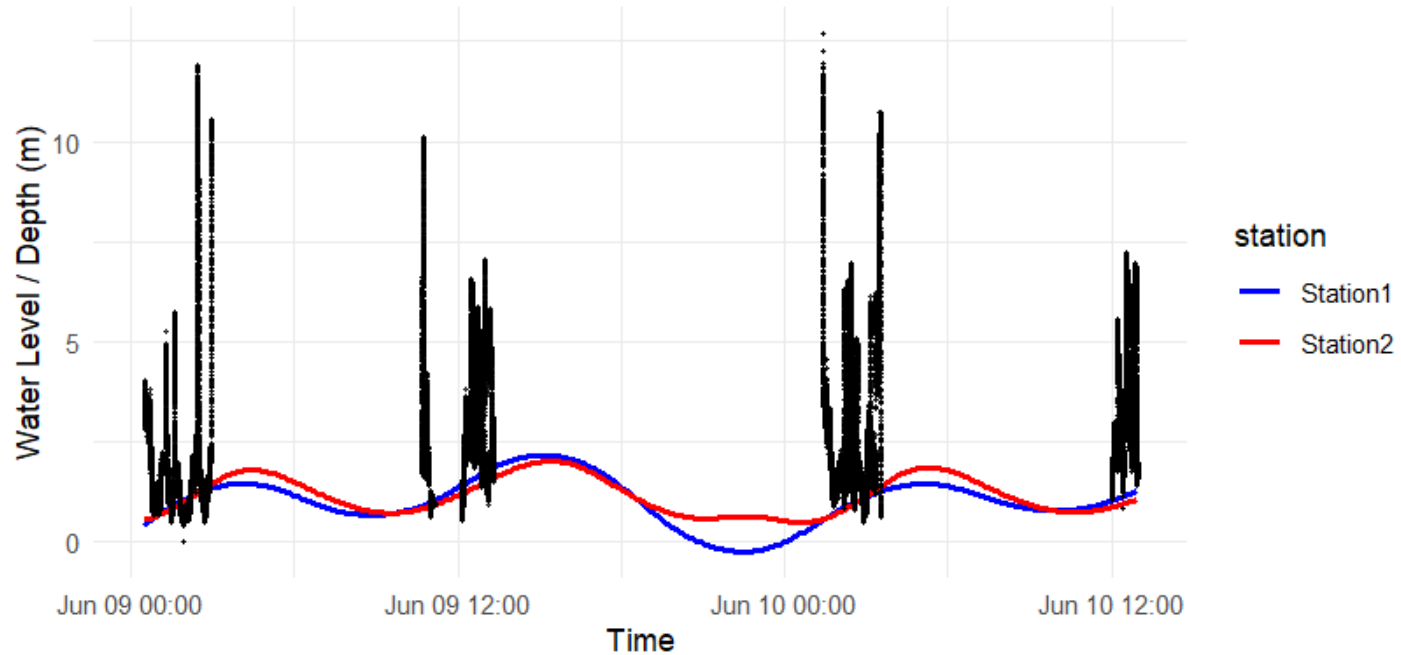
Station Datum

- Vertical Reference frame
- Accuracy & Validation
- Hyperlocal data



Raw Bathymetry Depth with Tide Station Water Levels

Black points = raw depth measurements; Blue/Red lines = tide levels (NAVD88)



Methods

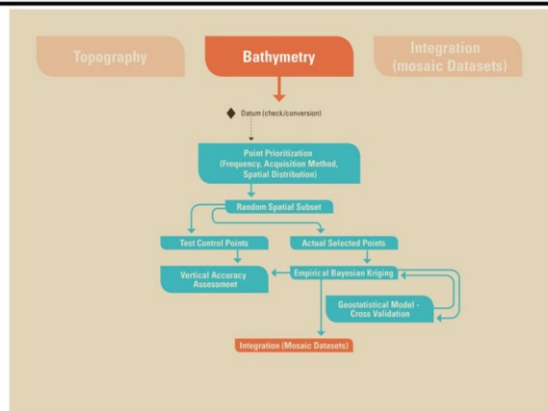
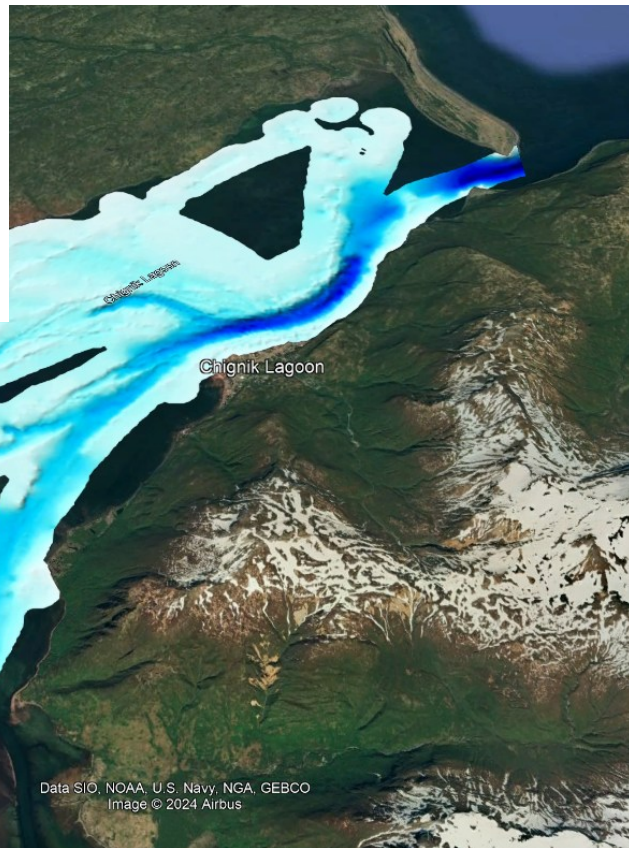
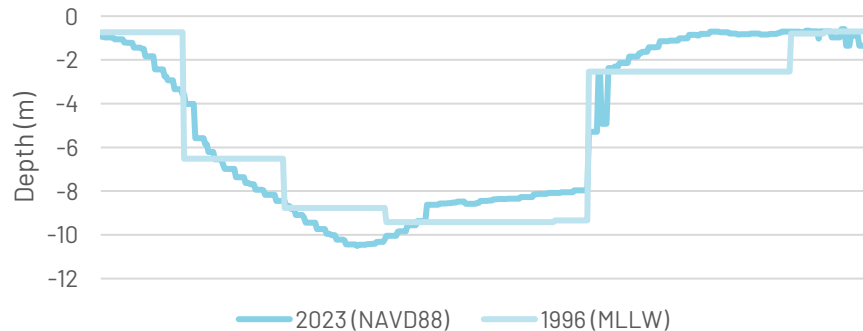


Figure 3. Bathymetry component of the topobathymetric elevation model.

Figure from Danielson, et al. 2016

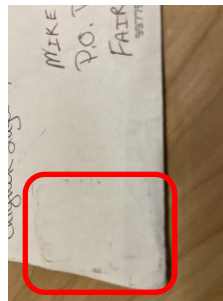
Takeaways:

Benefits

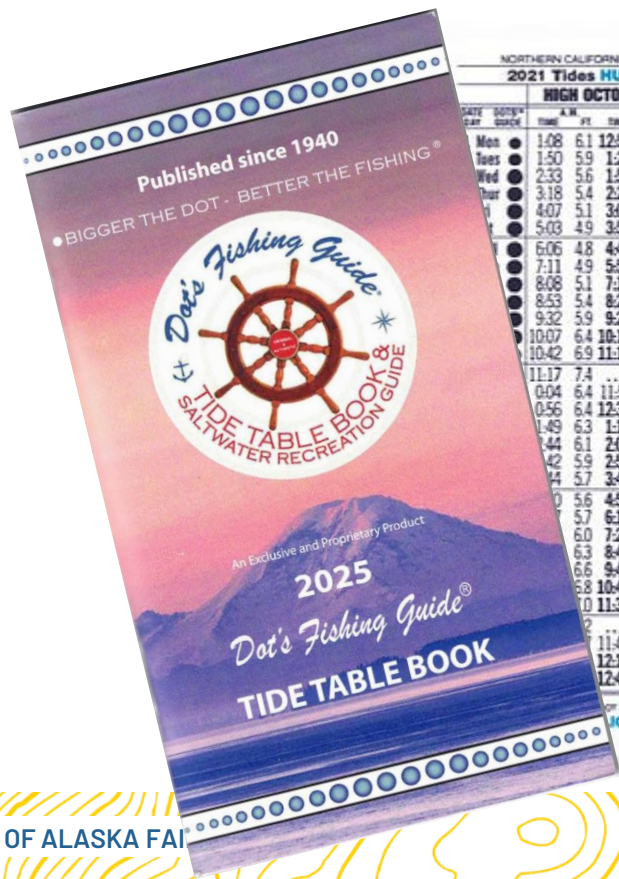
- Local data ownership
- Affordable, intuitive equipment
- Low recon, mobility & acquisition costs
- High temporal resolution

Challenges

- Quality control
- Postprocessing
- Gaps
- Proprietary equipment & services
- ...Data transfer



Better the dot, the better the fishing?



NORTHERN CALIFORNIA AND SOUTHERN OREGON
2021 Tides **HUMBOLDT** District

HIGH OCTOBER				LOW OCTOBER			
DATE	DAY	TIME	FT.	DATE	DAY	TIME	FT.
1	Mon	1:08	6.1	12:56	7.0	6:46	1.7
2	Tues	1:50	5.9	1:26	6.9	7:20	2.1
3	Wed	2:33	5.6	1:56	6.8	7:53	2.6
4	Thur	3:18	5.4	2:29	6.5	8:27	2.9
5	Fri	4:07	5.1	3:07	6.3	9:05	3.2
6	Sat	5:03	4.9	3:52	6.0	9:50	3.5
7	SUN	6:06	4.8	4:49	5.7	10:52	3.7
8	Mon	7:11	4.9	5:59	5.6	0:05	1.0
9	Tues	8:08	5.1	7:12	5.5	1:06	1.0
10	Wed	8:53	5.4	8:20	5.6	2:02	1.0
11	Thur	9:32	5.9	9:22	5.8	2:52	0.9
12	Fri	10:07	6.4	10:19	6.1	3:37	0.9
13	Sat	10:42	6.9	11:12	6.2	4:19	1.0
14	SUN	11:17	7.4	.....	.....	5:00	1.1
15	Mon	0:04	6.4	11:54	7.8	5:41	1.4
16	Tues	0:56	6.4	12:33	8.0	6:23	1.7
17	Wed	1:49	6.3	1:14	8.1	7:07	2.0
18	Thur	2:44	6.1	2:00	7.9	7:53	2.4
19	Fri	3:42	5.9	2:51	7.6	8:45	2.7
20	Sat	4:41	5.7	3:49	7.1	9:45	3.0
21	SUN	5:40	5.6	4:56	6.6	10:58	3.1
22	Mon	6:39	5.7	6:11	6.1	.....	.....
23	Tues	7:38	6.0	7:29	5.8	0:58	0.3
24	Wed	8:37	6.3	8:43	5.6	1:58	0.7
25	Thur	9:36	6.6	9:49	5.6	2:53	1.0
26	Fri	10:35	6.8	10:46	5.7	3:41	1.3
27	Sat	11:34	7.0	11:36	5.7	4:23	1.6
28	SUN	12:33	7.2	.....	.....	5:02	1.9
29	Mon	1:32	7.1	11:46	7.2	5:39	2.3
30	Tues	2:31	7.1	12:16	7.2	6:14	2.6
31	Wed	3:30	7.1	12:47	7.1	6:49	2.8

DOT - BETTER THE FISHING® P.M. TIDES
LIGHT TYPE BOLD TYPE

NORTHERN CALIFORNIA AND SOUTHERN OREGON
2021 Tides **HUMBOLDT** District

HIGH NOVEMBER				LOW NOVEMBER			
DATE	DAY	TIME	FT.	DATE	DAY	TIME	FT.
1	Thur	2:24	5.5	1:18	6.9	7:24	3.1
2	Fri	3:06	5.4	1:51	6.7	8:00	3.3
3	Sat	3:51	5.3	2:28	6.4	8:40	3.5
4	SUN	4:30	5.2	2:10	6.1	9:27	3.6
5	Mon	5:12	5.2	3:04	5.7	10:28	3.7
6	Tues	5:54	5.3	4:12	5.4	10:42	3.5
7	Wed	6:33	5.6	5:29	5.2	11:58	3.2
8	Thur	7:11	6.0	6:47	5.1	0:01	1.2
9	Fri	7:38	6.5	7:58	5.2	0:54	1.4
10	Sat	8:18	7.0	9:03	5.5	1:45	1.6
11	SUN	8:57	7.5	10:03	5.7	2:34	1.8
12	Mon	9:38	8.0	10:58	6.0	3:22	2.0
13	Tues	10:20	8.4	11:52	6.1	4:10	2.2
14	Wed	11:04	8.5	.....	.....	4:57	2.4
15	Thur	0:45	6.2	11:51	8.5	5:47	2.5
16	Fri	1:38	6.2	12:40	8.2	6:38	2.7
17	Sat	2:32	6.1	1:33	7.7	7:35	2.9
18	SUN	3:28	6.1	2:31	7.0	8:38	2.9
19	Mon	4:25	6.2	3:36	6.3	9:49	2.9
20	Tues	5:21	6.3	4:49	5.7	11:07	2.7
21	Wed	6:15	6.5	6:07	5.2	.....	.....
22	Thur	7:04	6.7	7:26	5.0	0:13	1.3
23	Fri	7:48	6.9	8:39	5.0	1:07	1.8
24	Sat	8:28	7.1	9:41	5.1	1:58	2.2
25	SUN	9:04	7.2	10:33	5.3	2:45	2.6
26	Mon	9:39	7.3	11:18	5.4	3:28	2.9
27	Tues	10:12	7.4	11:58	5.5	4:09	3.1
28	Wed	10:45	7.4	.....	.....	4:47	3.2
29	Thur	0:36	5.6	11:19	7.3	5:24	3.3
30	Fri	1:13	5.6	11:53	7.1	6:02	3.4

A.M. TIDES BIGGER THE DOT - BETTER THE FISHING® P.M. TIDES
LITE TYPE DAYLIGHT TIME THRU NOVEMBER 3 BOLD TYPE