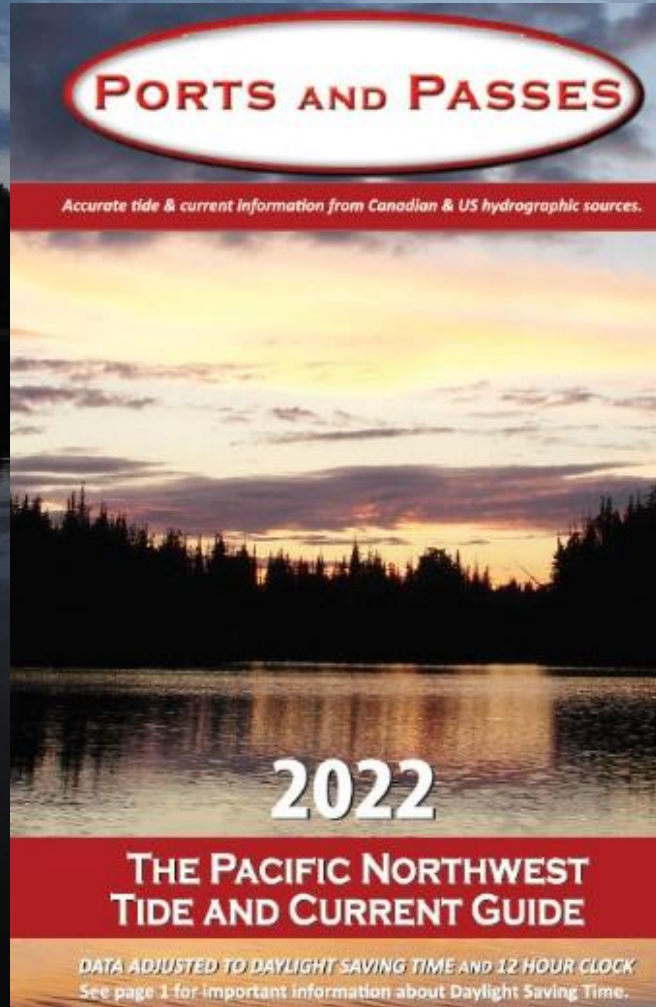


Using

PORTS AND PASSES

The Pacific Northwest Tide and Current Guide



www.portsandpasses.com

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A white and blue motorboat is shown aground on dark, jagged rocks in a body of water. The boat is tilted slightly to the right, with its bow pointing towards the right side of the frame. The water is calm and greyish-blue. In the background, there are dark, forested hills under a grey, overcast sky. The boat has a blue stripe along its hull and a blue canopy over the upper deck. A red buoy is visible on the side of the boat.

The purpose of Tide and Current tables is to help you avoid situations like this.....

PORTS AND PASSES

.....and times like this.



Photo by Kantokano
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Timing is Everything

Know when it's safe to go



Basic Concepts

- High tide is known as “High Water” and low tide as “Low Water”
- There are two “high” tides and two “low” tides per day

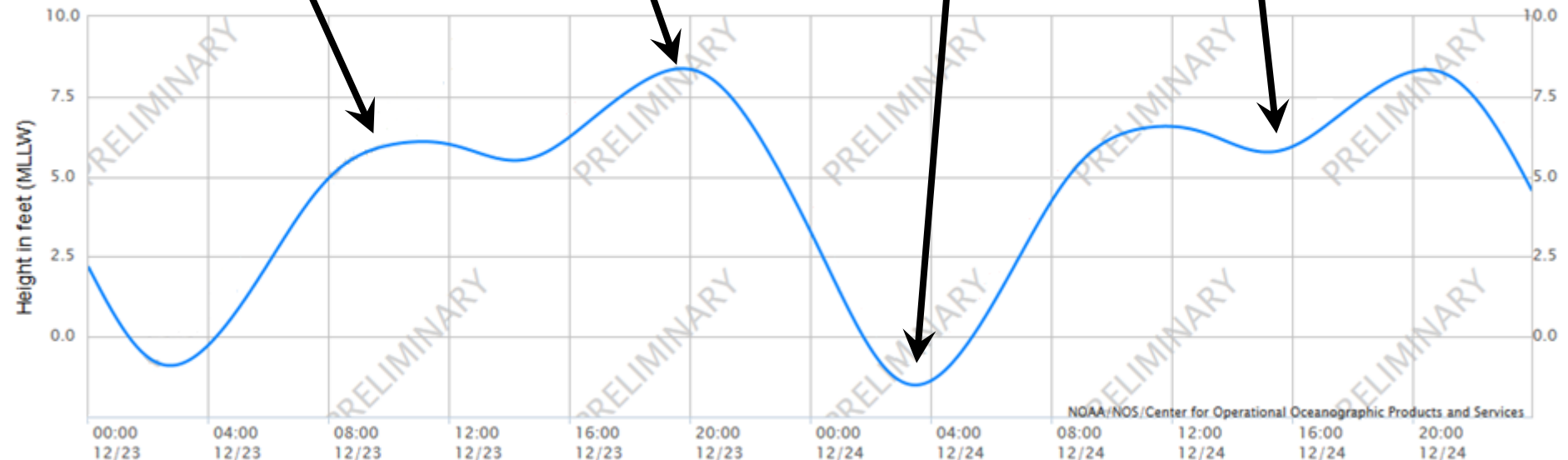
Lower High Water
(LHW)

Higher High Water
(HHW)

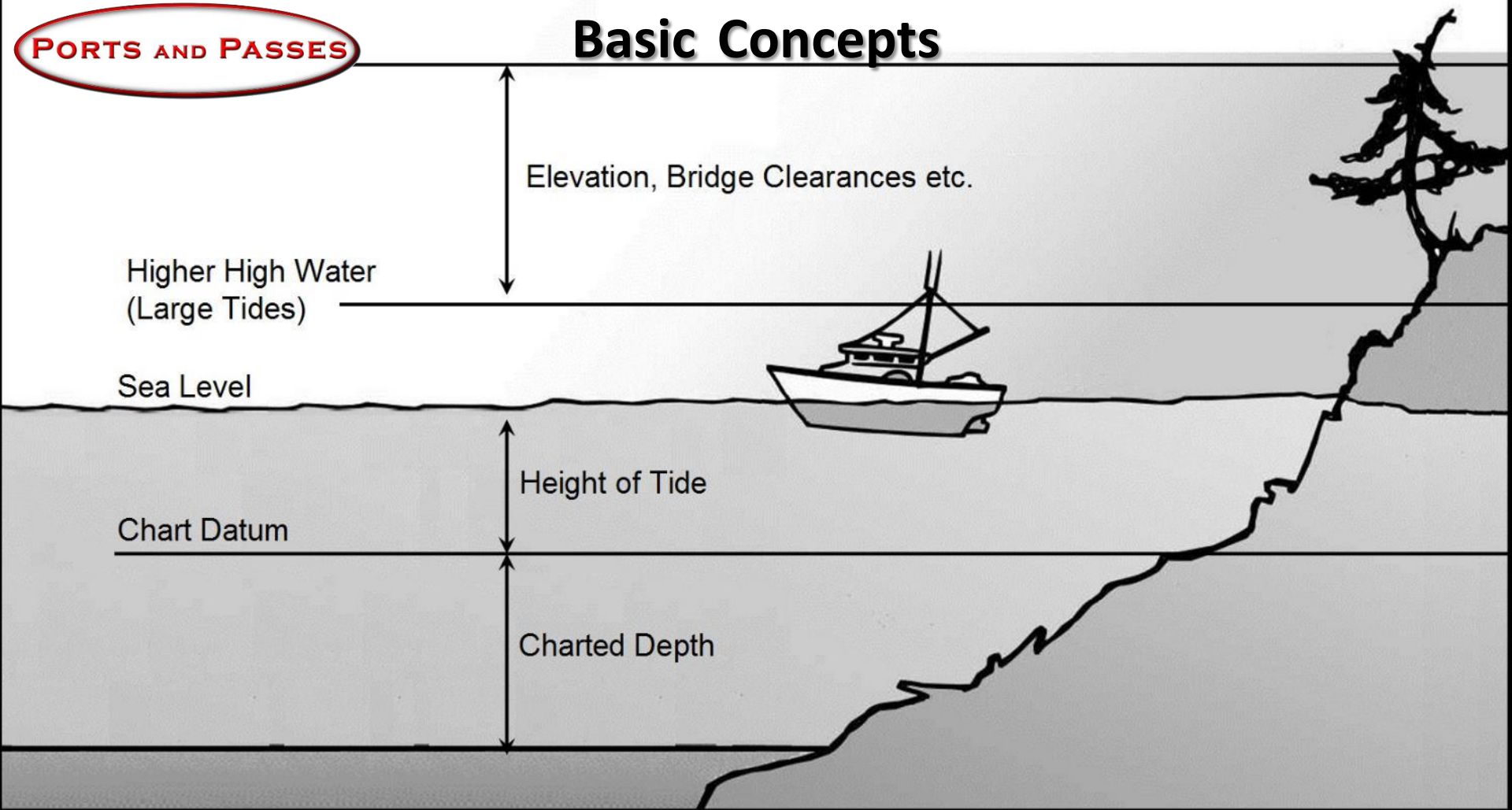
Lower Low Water
(LLW)

Higher Low Water
(HLW)

NOAA/NOS/CO-OPS
Observed Water Levels at 9444090, Port Angeles WA
From 2015/12/23 00:00 GMT to 2015/12/24 23:59 GMT



Basic Concepts



- Tidal Datum (and Chart Datum) is the plane from which tidal heights (and charted depths) are measured.
- In Canada Tidal Datum is the plane of Lowest Normal Tides (below which the tide very seldom falls) but in the US, Tidal Datum is Mean Lower Low Water (MLLW) and negative tides are much more common.

Tidal Predictions

- Tidal predictions are just that—predictions!!
- In extreme cases, predictions may vary from the actual observed time by ½ hour and 0.5 metres height.
- Extreme weather conditions may contribute to (or add to) these differences.

Dec 20, 2018 Pre-Christmas Storm

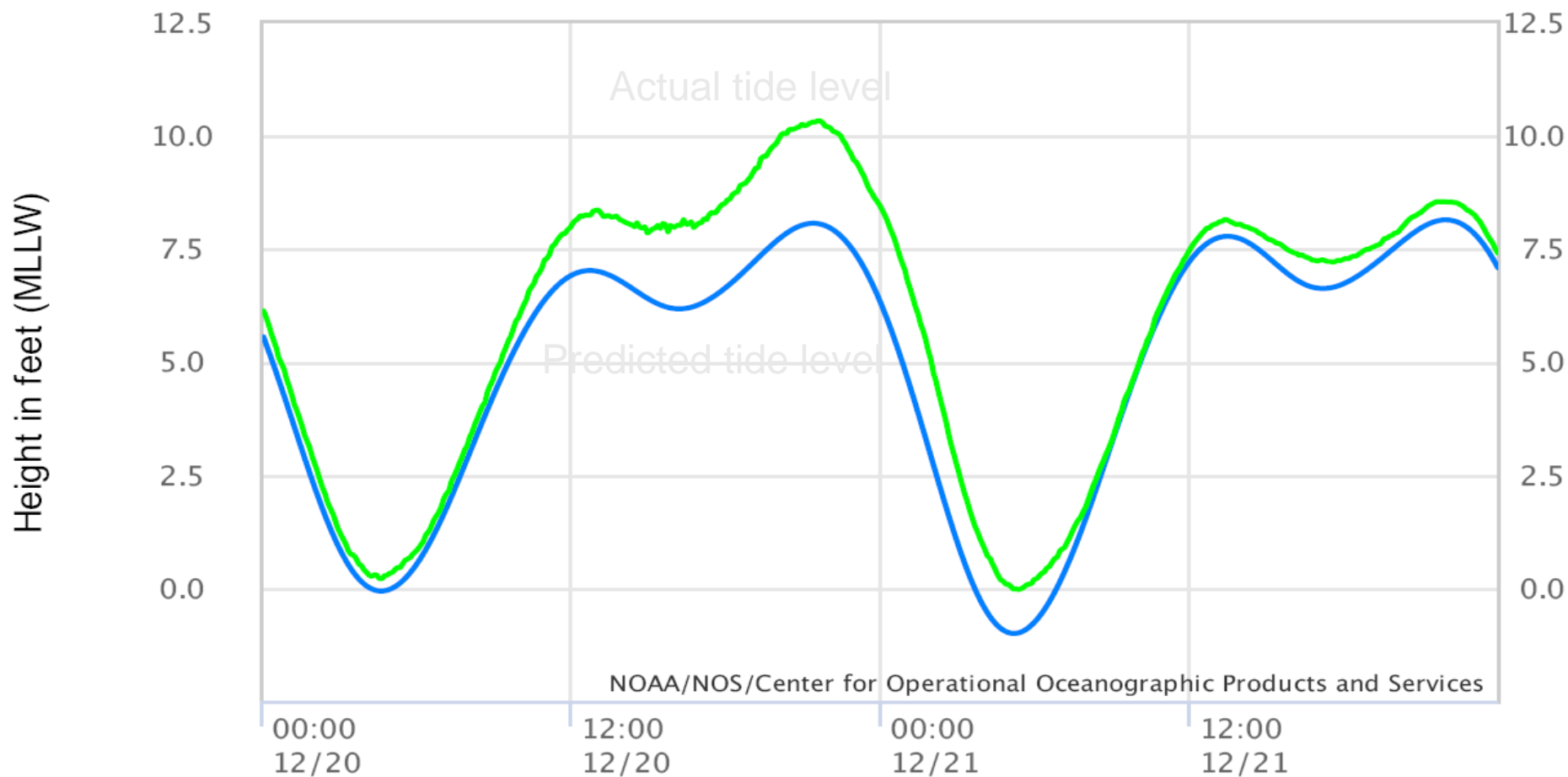


Dec 20, 2018 Pre-Christmas Storm

NOAA/NOS/CO-OPS

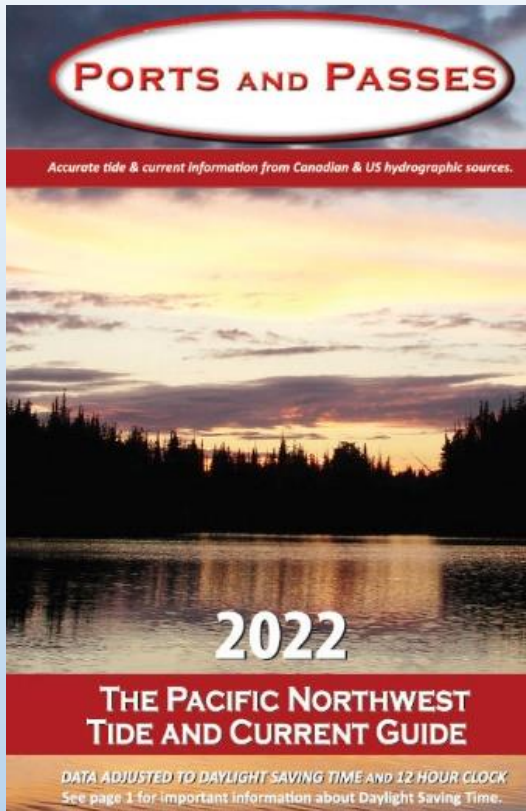
Observed Water Levels at 9449880, Friday Harbor WA

From 2018/12/20 00:00 GMT to 2018/12/21 23:59 GMT



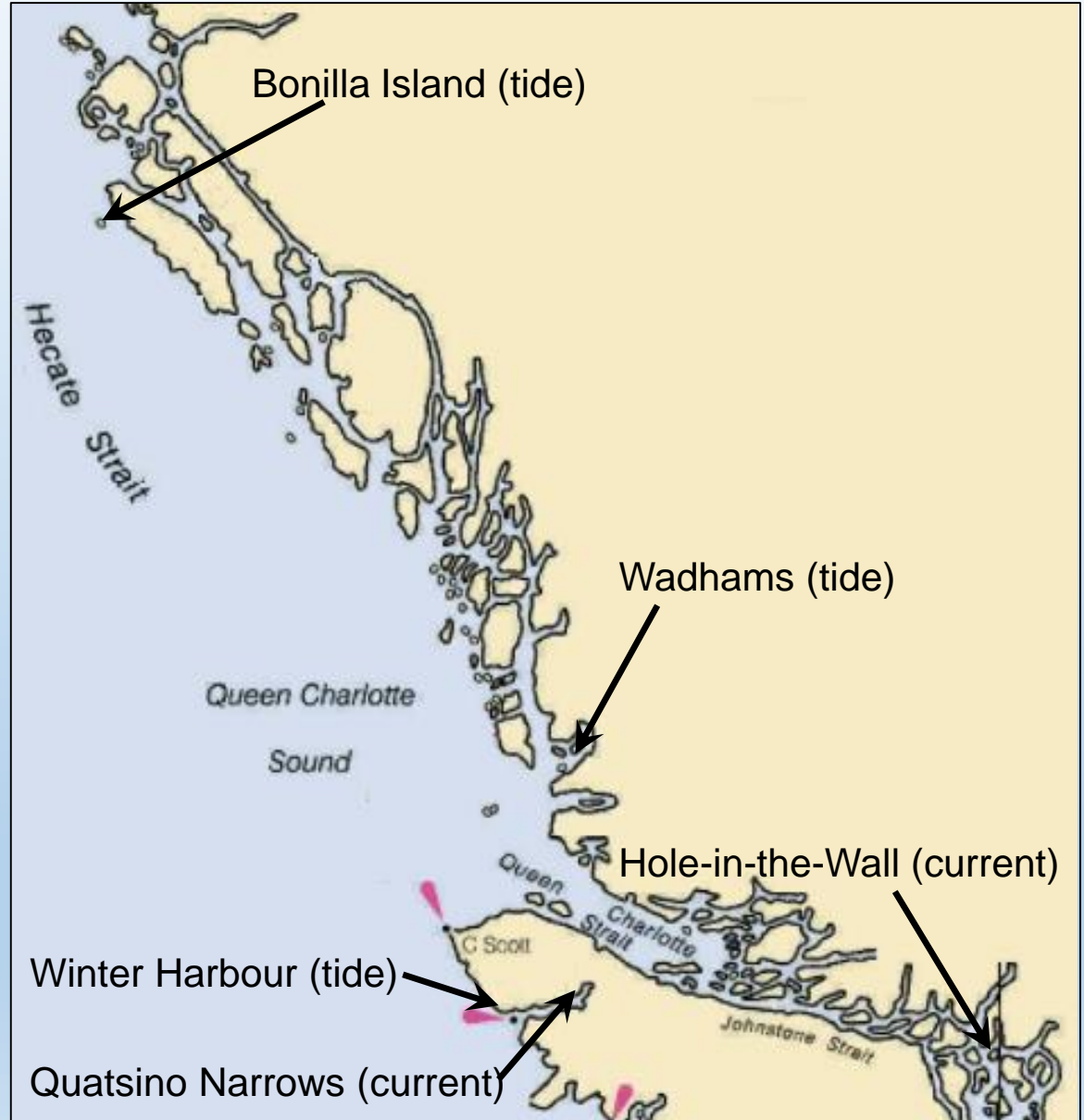
— Predictions — Verified — Preliminary — (Observed - Predicted)

Changes to the 2022 Edition of **PORTS AND PASSES**

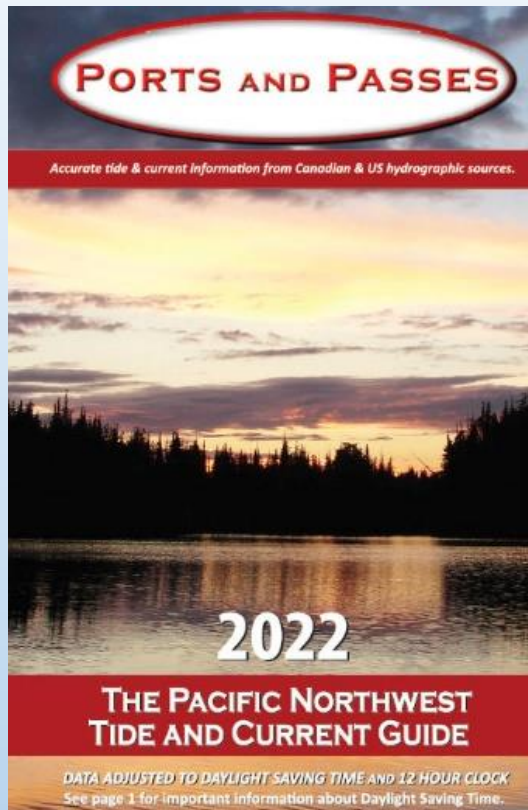


Re-organized for 2022

- Five new tide and current stations

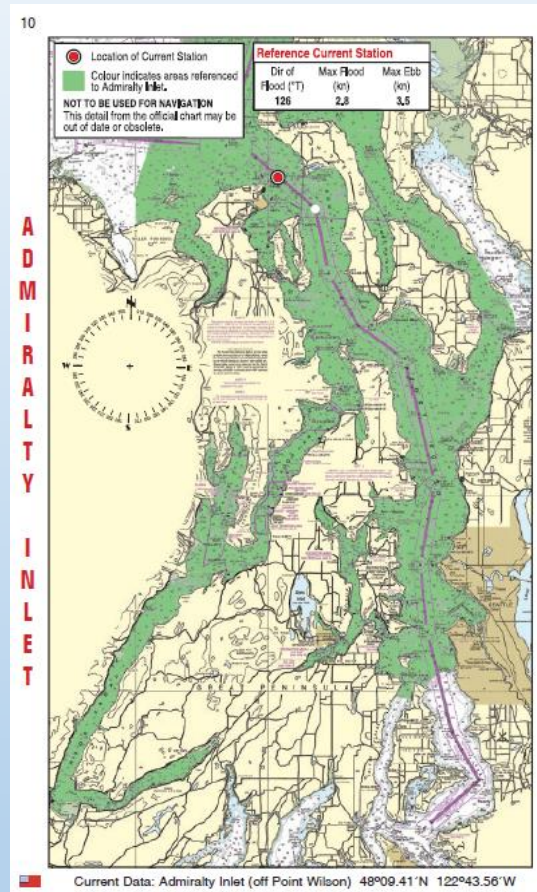


Changes to the 2022 Edition of **PORTS AND PASSES**



Re-organized for 2022

- Secondary Tables now co-located with Reference Stations



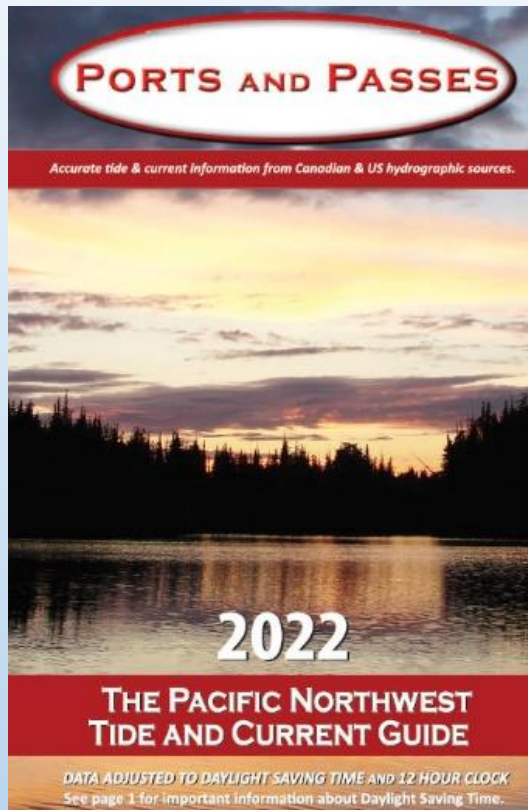
11

Secondary Current Stations

Current Station	Dir. of Flood	Position		Time Differences				Speed Ratio		Avg Speed	
		Lat N	Long W	Trn to Fid	Max Fid	Trn to Ebb	Max Ebb	Fid	Ebb	Max Fid	Max Ebb
				h min	h min	h min	h min			kn	kn
Juan de Fuca Strait	True										
Violet Pt (3.7 mi N)	102	48 10	122 56	-1 51	-1 06	-1 08	-1 22	0.3	0.2	0.6	0.6
Kanem Pt (1.5 mi SW)	117	48 06	122 56	-0 37	-0 54	-0 35	-0 25	0.2	0.4	0.7	1.4
Smith Is (1.4 mi SSW)	090	48 18	122 51	+0 33	+0 14	+0 03	+0 30	0.3	0.3	0.7	1.0
Smith Is (3.4 mi ESE)	114	48 18	122 47	+0 28	+0 23	-0 21	+0 33	0.2	0.3	0.4	1.0
Pt Partridge (3.7 mi W)	140	48 14	122 52	+0 06	+0 28	-0 50	+0 47	0.1	0.8	0.4	2.1
Admiralty Inlet											
Point Wilson											
0.6 mi NE	120	48 09	122 45	-0 36	-0 39	-0 30	-0 27	0.7	0.7	2.0	2.5
2.7 mi NE	138	48 10	122 42	-0 42	-0 06	-0 06	-0 29	1.0	1.0	2.7	3.5
0.6 mi E	165	48 09	122 44	-0 14	-0 09	+0 01	-0 49	0.9	0.7	2.5	2.6
Pt Hudson (0.5 mi E)	115	48 07	122 44	-2 42	-2 25	-3 06	-2 21	0.4	0.2	1.2	0.6
Marrowstone Point	100	48 07	122 42	-2 52	-2 09	-1 28	-1 37	0.5	0.4	1.3	1.3
1.1 miles NW	129	48 0	122 40	-0 30	+0 04	-0 18	-0 24	1.1	0.9	3.0	3.2
0.6 mile NE	145	48 07	122 40	+0 04	+0 09	-0 09	+0 09	0.9	0.7	2.5	2.5
Nodule Pt (0.5 mi SE)	182	48 02	122 40	-0 06	-0 23	-1 28	-0 28	0.7	0.6	1.9	2.1
Bush Pt Lt (0.5 mi NW)	189	48 02	122 37	-0 35	-0 24	-0 31	-0 31	0.8	0.7	2.3	2.5
Bush Pt	150	48 02	122 36	+0 17	-0 01	-0 30	+0 03	0.6	0.7	1.8	2.5
Mudry Bay (3.3 mi SE of Bush Pt)	133	47 59	122 33	-	-2 00	-	-2 20	0.4	0.3	1.0	1.1
Olele Pt (1.6 mi ENE)	149	47 59	122 39	-0 12	+0 07	-0 22	-0 39	0.3	0.3	0.9	1.1
Port Townsend Canal	140	48 02	122 44	-1 57	-2 20	-2 48	-1 56	0.9	1.0	2.6	3.4
Hood Canal											
Foulweather Bluff	153	47 56	122 36	-0 06	-0 29	-0 43	-0 06	0.3	0.2	0.6	0.8
Port Gamble Bay Ent.	197	47 51	122 35	-1 03	-0 54	-0 36	-0 25	0.4	0.2	1.0	0.7
South Point	230	47 49	122 41	-0 30	-0 55	-0 43	-0 31	0.3	0.3	0.8	0.9
Hazel Point	161	47 41	122 46	-1 03	-1 15	-1 06	-0 58	0.2	0.2	0.7	0.6
The Great Bend	049	47 21	123 02	-	-0 55	-	-0 45	0.1	0.1	0.4	0.5
Puget Sound											
Foulweather Bluff (1.9 mi NE)	125	47 57	122 35	+0 12	+0 22	-0 36	-0 36	0.6	0.5	1.6	1.9
Edmonds (2.5 mi W of)	161	47 48	122 27	+0 21	+0 17	-0 01	-0 16	0.1	0.2	0.3	0.6
Apple Cove (0.5 mi E)	188	47 49	122 28	-	0 00	-	-0 24	0.2	0.2	0.5	0.8
President Pt (1.5 mi E)	177	47 46	122 26	+0 54	+0 19	-0 42	-0 29	0.1	0.2	0.3	0.6
Agate Passage, N	230	47 43	122 33	-0 49	-0 49	-0 44	-0 54	0.4	0.5	1.2	1.6
Agate Passage, S	203	47 43	122 34	-0 55	-0 51	-0 43	-0 39	0.9	0.8	2.6	2.1
Liberty Bay, Entrance	267	47 42	122 36	-0 30	-0 14	-0 03	+0 18	0.3	0.2	0.6	0.7
West Point (W of)	234	47 40	122 27	-1 06	-0 46	-1 07	-1 45	0.3	0.2	0.9	0.5
Alki Point (W of)	215	47 35	122 26	+0 08	-0 06	-0 32	-0 20	0.2	0.2	0.5	0.6
Blake Island (3 of)	244	47 31	122 29	+2 14	+1 17	+0 14	+1 27	0.2	0.4	0.4	1.3

2022 PORTS AND PASSES

Changes to the 2022 Edition of **PORTS AND PASSES**



Re-organized for 2022

- New method of finding secondary stations

Changes in the 2022 Edition

In this 2022 Edition we have brought in a couple of major changes:

- First, we have added five new stations; Bonilla Island, Hole-in-the-Wall, Quatsino Narrows, Wadhams and Winter Harbour.
- Second, we have re-organized the book so that all the secondary tables associated with any reference station are now co-located with the predictions for that reference station. This will make the book easier and more intuitive to use.

How to Use This Book

Tides

1. Wherever you are on the west coast, there is a tide station near you (known as a reference station) for which tide predictions are tabulated. Using one of the overview charts on pages viii, x, xii or xiv, identify the coloured area that includes your location.
2. Each coloured area is associated with a particular reference station. Turn to the page of that reference station. In this case, you are in Halmoon Bay in the yellow area, which is associated with the reference station, **POINT ATKINSON**.
3. In the secondary station tables associated with the reference station, find the location closest to your location.



Secondary Current Stations											
Current Station	No.	Position		Time Difference				Area			
		Lat	Long	PM	PL	PM	PL	PM	PL	PM	PL
Point Atkinson	100	49° 10' N	123° 05' W	0000	0000	0000	0000	0000	0000	0000	0000
Point Atkinson	100	49° 10' N	123° 05' W	0000	0000	0000	0000	0000	0000	0000	0000

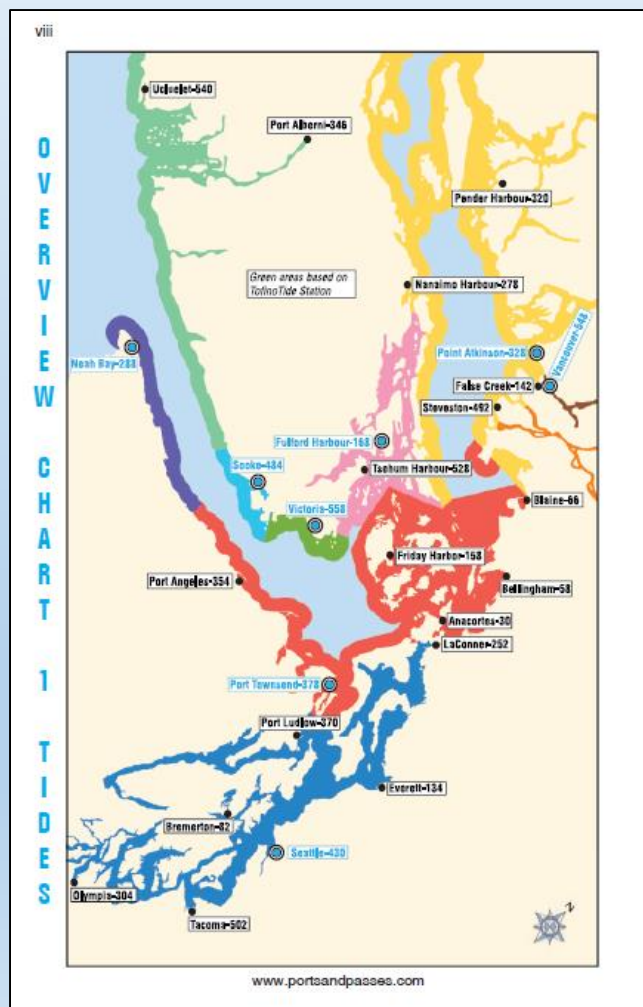
Secondary Tide Stations											
Secondary Station	Location	Time and Height Differences				Height				Range	
		Lat	Long	Time	Time	Low	High	Low	High	Low	High
Point Atkinson	Point Atkinson	49° 10' N	123° 05' W	0000	0000	0000	0000	0000	0000	0000	0000
Point Atkinson	Point Atkinson	49° 10' N	123° 05' W	0000	0000	0000	0000	0000	0000	0000	0000

4. In the line for that secondary location, you will find corrections for the height and the time of high or low water. Add (or subtract) these corrections from the height or times of the predicted tides at the reference station (**POINT ATKINSON**) for the day in question.

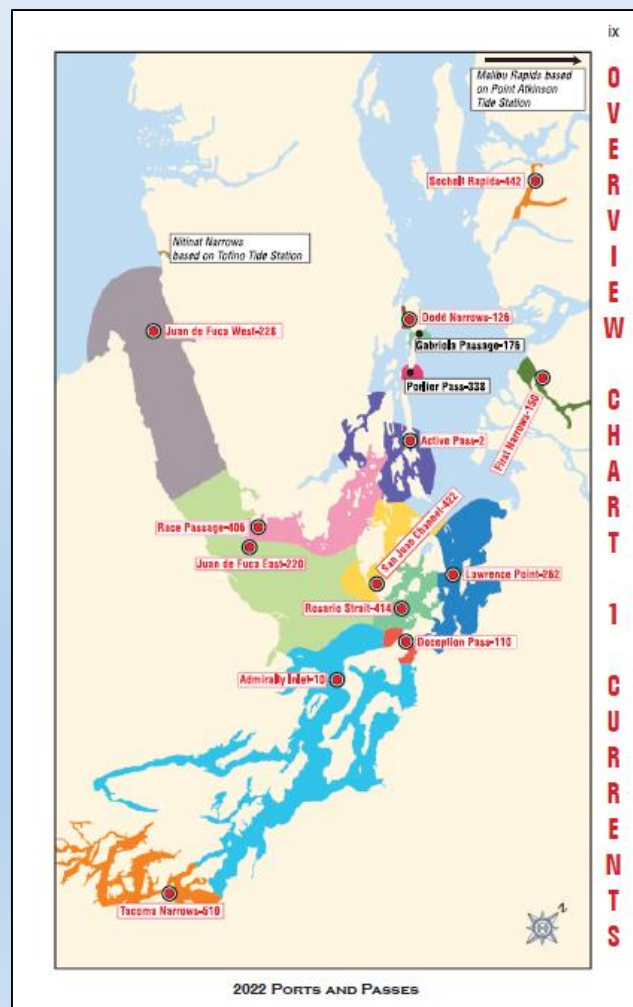
5. The result will be the height or time of the tide at the secondary location on that day.

- If you are in the coloured area associated with any reference station, go to the pages for that reference station.
- If you are in a port identified with a black dot, go directly to the pages for that port.

Tides (left hand page)



Currents (right hand page)





Point Atkinson

If the tidal characteristics for a large area are similar, the entire area can be referenced to a single reference station—in this case **Point Atkinson** in West Vancouver.

Tides in the green area are referenced to the tides at **Point Atkinson**, with local corrections.

The list of secondary stations referenced to **Point Atkinson** appears opposite the map page.



Age	Weight (kg)	Weight (lb)
4.1	4.4	9.7
5.1	5.4	11.9
6.1	6.4	14.1
7.1	7.4	16.3
8.1	8.4	18.5
9.1	9.4	20.7
10.1	10.4	22.9
11.1	11.4	25.1
12.1	12.4	27.3
13.1	13.4	29.5
14.1	14.4	31.7
15.1	15.4	33.9
16.1	16.4	36.1
17.1	17.4	38.3
18.1	18.4	40.5
19.1	19.4	42.7
20.1	20.4	44.9
21.1	21.4	47.1
22.1	22.4	49.3
23.1	23.4	51.5
24.1	24.4	53.7
25.1	25.4	55.9
26.1	26.4	58.1
27.1	27.4	60.3
28.1	28.4	62.5
29.1	29.4	64.7
30.1	30.4	66.9
31.1	31.4	69.1
32.1	32.4	71.3
33.1	33.4	73.5
34.1	34.4	75.7
35.1	35.4	77.9
36.1	36.4	80.1
37.1	37.4	82.3
38.1	38.4	84.5
39.1	39.4	86.7
40.1	40.4	88.9
41.1	41.4	91.1
42.1	42.4	93.3
43.1	43.4	95.5
44.1	44.4	97.7
45.1	45.4	99.9
46.1	46.4	102.1
47.1	47.4	104.3
48.1	48.4	106.5
49.1	49.4	108.7
50.1	50.4	110.9
51.1	51.4	113.1
52.1	52.4	115.3
53.1	53.4	117.5
54.1	54.4	119.7
55.1	55.4	121.9
56.1	56.4	124.1
57.1	57.4	126.3
58.1	58.4	128.5
59.1	59.4	130.7
60.1	60.4	132.9
61.1	61.4	135.1
62.1	62.4	137.3
63.1	63.4	139.5
64.1	64.4	141.7
65.1	65.4	143.9
66.1	66.4	146.1
67.1	67.4	148.3
68.1	68.4	150.5
69.1	69.4	152.7
70.1	70.4	154.9
71.1	71.4	157.1
72.1	72.4	159.3
73.1	73.4	161.5
74.1	74.4	163.7
75.1	75.4	165.9
76.1	76.4	168.1
77.1	77.4	170.3
78.1	78.4	172.5
79.1	79.4	174.7
80.1	80.4	176.9
81.1	81.4	179.1
82.1	82.4	181.3
83.1	83.4	183.5
84.1	84.4	185.7
85.1	85.4	187.9
86.1	86.4	190.1
87.1	87.4	192.3
88.1	88.4	194.5
89.1	89.4	196.7
90.1	90.4	198.9
91.1	91.4	201.1
92.1	92.4	203.3
93.1	93.4	205.5
94.1	94.4	207.7
95.1	95.4	209.9
96.1	96.4	212.1
97.1	97.4	214.3
98.1	98.4	216.5
99.1	99.4	218.7
100.1	100.4	220.9

From PORTS AND PASSES

Tide Table for Point Atkinson

Point Atkinson is a tide station, so the name at the edge of the page is shown in blue.

332

332

January 2022

February

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DAY	TIME	FT	M	DAY	TIME	FT	M	DAY	TIME	FT	M	DAY	TIME	FT	M
1	5:27a 15.4 4.7 10:00a 12.5 3.8 Sat 2:40p 15.1 4.0 10:30p 0.3 0.1			16	0:11a 15.1 4.0 11:21a 12.1 3.7 Sun 3:00p 13.1 4.0 10:53p 2.3 0.7			1	0:30a 15.7 4.8 11:54a 11.2 3.4 Tue 4:30p 14.4 4.0 11:50p 1.0 0.3			16	0:28a 14.8 4.5 11:58a 10.5 3.2 Wed 4:40p 13.1 4.0 11:41p 3.0 0.9		
2	0:15a 16.1 4.9 11:07a 12.5 3.8 Sun 3:37p 15.1 4.0 11:17p 0.0 0.0			17	0:42a 15.1 4.0 11:55a 12.1 3.7 Mon 3:48p 13.5 4.1 11:27p 2.3 0.7			2	7:10a 16.1 4.9 12:44p 10.5 3.2 Wed 5:33p 13.8 4.2			17	0:50a 14.8 4.5 5:27p 13.1 4.0		
3	0:50a 16.4 5.0 12:03p 12.1 3.7 Mon 4:31p 14.8 4.5			18	7:11a 15.4 4.7 12:20p 11.8 3.0 Tue 4:31p 13.1 4.0			3	12:32a 2.0 0.0 7:43a 16.1 4.0 Thu 1:34p 9.5 2.0 0:20p 13.1 4.0			18	12:14a 3.3 1.0 7:11a 15.1 4.0 Fri 1:00p 8.9 2.7 0:17p 13.1 4.0		
4	12:04a 0.0 0.0 7:43a 16.4 5.0 Tue 12:50p 11.8 3.0 5:20p 14.4 4.4			19	12:01a 2.3 0.7 7:38a 15.4 4.7 Wed 1:04p 11.5 3.5 5:15p 13.1 4.0			4	1:11a 3.0 0.0 8:14a 15.7 4.8 Fri 2:20p 8.5 2.0 7:20p 12.5 3.8			19	12:48a 4.3 1.3 7:33a 15.1 4.0 Sat 1:45p 7.9 2.4 7:10p 12.8 3.0		
5	12:40a 0.7 0.2 8:24a 16.4 5.0 Wed 1:50p 11.2 3.4 0:23p 13.5 4.1			20	12:34a 2.6 0.8 8:04a 15.4 4.7 Thu 1:43p 10.8 3.3 0:03p 12.8 3.0			5	1:50a 4.6 1.4 8:44a 15.7 4.8 Sat 3:17p 7.5 2.3 8:30p 11.8 3.0			20	1:23a 5.2 1.0 7:58a 15.1 4.0 Sun 2:28p 6.9 2.1 8:11p 12.5 3.8		
6	1:33a 1.8 0.5 9:03a 16.4 5.0 Thu 3:04p 10.2 3.1 7:24p 12.5 3.8			21	1:08a 3.3 1.0 8:20a 15.4 4.7 Fri 2:27p 10.2 3.1 0:55p 12.5 3.8			6	2:20a 6.6 2.0 9:12a 15.1 4.0 Sun 4:08p 6.9 2.1 0:58p 11.5 3.5			21	2:01a 6.9 2.1 8:24a 15.1 4.0 Mon 3:14p 5.9 1.8 0:23p 12.1 3.7		
7	2:17a 3.3 1.0 9:41a 16.1 4.9 Fri 4:10p 9.2 2.8 8:35p 11.5 3.5			22	1:43a 3.9 1.2 8:55a 15.4 4.7 Sat 3:14p 9.2 2.8 7:50p 11.8 3.0			7	3:10a 8.2 2.5 9:40a 14.8 4.5 Mon 4:58p 5.9 1.8 11:38p 11.5 3.5			22	2:44a 8.5 2.0 8:53a 14.8 4.5 Tue 4:04p 4.9 1.5 10:51p 12.5 3.8		
8	2:50a 4.9 1.5 10:16a 15.7 4.8 Sat 5:12p 8.2 2.5 10:00p 10.6 3.3			23	2:20a 5.2 1.0 9:22a 15.4 4.7 Sun 4:05p 8.2 2.5 0:00p 11.2 3.4			8	3:50a 9.8 3.0 10:07a 14.1 4.3 Tue 5:48p 5.6 1.7			23	3:37a 10.2 3.1 9:25a 14.4 4.4 Wed 4:58p 4.3 1.3		
9	3:45a 6.9 2.1 10:50a 15.4 4.7 Sun 6:07p 6.9 2.1 11:58p 10.8 3.3			24	3:01a 6.9 2.1 9:52a 15.4 4.7 Mon 4:50p 6.9 2.1 10:42p 11.2 3.4			9	1:23a 12.1 3.7 5:15a 11.2 3.4 Wed 10:35a 13.5 4.1 0:40p 4.9 1.5			24	12:34a 12.8 3.0 4:40a 11.5 3.5 Thu 10:03a 14.1 4.3 5:50p 3.8 1.1		
10	4:38a 8.9 2.7 11:23a 14.8 4.5 Mon 6:50p 5.9 1.8			25	3:48a 8.5 2.0 10:24a 15.1 4.0 Tue 5:40p 5.8 1.7			10	2:52a 12.8 3.0 7:08a 12.1 3.7 Thu 11:08a 12.8 3.0 7:32p 4.6 1.4			25	2:08a 13.5 4.1 9:31a 12.1 3.7 Fri 10:54a 13.5 4.1 7:04p 3.0 0.0		
11	1:50a 11.5 3.5 5:50a 10.5 3.2 Tue 11:55a 14.4 4.4 7:40p 4.9 1.5			26	12:33a 11.5 3.5 4:40a 10.2 3.1 Wed 10:50a 14.8 4.5 0:42p 4.3 1.3			11	3:51a 13.8 4.2 8:40a 12.1 3.7 Fri 11:54a 12.5 3.8 8:23p 4.3 1.3			26	3:17a 14.4 4.4 8:13a 12.1 3.7 Sat 12:04p 13.1 4.0 8:00p 2.6 0.8		
12	3:20a 12.5 3.8 7:20a 11.5 3.5 Wed 12:27p 13.8 4.2 8:22p 4.3 1.3			27	2:10a 12.8 3.0 6:12a 11.5 3.5 Thu 11:40a 14.8 4.5 7:37p 3.0 0.0			12	4:32a 14.1 4.3 9:52a 12.1 3.7 Sat 12:57p 12.5 3.8 0:00p 3.9 1.2			27	4:08a 14.8 4.5 9:23a 11.8 3.0 Sun 1:27p 13.1 4.0 0:00p 2.3 0.7		
13	4:20a 13.5 4.1 8:45a 12.1 3.7 Thu 1:02p 13.5 4.1 0:02p 3.8 1.1			28	3:35a 13.8 4.2 7:47a 12.1 3.7 Fri 12:20p 14.4 4.4 8:32p 2.0 0.0			13	5:00a 14.4 4.4 10:31a 11.8 3.0 Sun 2:04p 12.5 3.8 0:52p 3.3 1.0			28	4:40a 15.1 4.0 10:13a 10.8 3.0 Mon 2:45p 13.5 4.1 10:02p 2.0 0.0		
14	5:02a 14.4 4.4 9:52a 12.1 3.7 Fri 1:41p 13.1 4.0 0:40p 3.3 1.0			29	4:31a 14.8 4.5 9:08a 12.5 3.8 Sat 1:28p 14.4 4.4 0:25p 1.3 0.4			14	5:30a 14.8 4.5 11:01a 11.5 3.5 Mon 3:02p 12.8 3.0 10:31p 3.0 0.0						
15	5:38a 14.8 4.5 10:42a 12.1 3.7 Sat 2:23p 13.1 4.0 10:17p 2.6 0.8			30	5:18a 15.4 4.7 10:11a 12.1 3.7 Sun 2:32p 14.4 4.4 10:17p 0.7 0.2			15	6:04a 14.8 4.5 11:29a 11.2 3.4 Tue 3:53p 13.1 4.0 11:00p 3.0 0.0						
				31	5:50a 15.7 4.8 11:04a 11.8 3.0 Mon 3:30p 14.4 4.4 11:05p 0.7 0.2										

PORTS AND PASSES

Time of high or low water

Height in feet

Height in metres

DAY	TIME	FT	M
1	6:36a	15.7	4.8
	11:54a	11.2	3.4
Tue	4:36p	14.4	4.4
	11:50p	1.8	0.3
2	7:10a	16.1	4.9
	12:44p	10.5	3.2
Wed	5:33p	13.8	4.2
	12:32a	2.0	0.6
3	7:48a	16.1	4.9
Thu	1:34p	9.5	2.9
	6:29p	13.1	4.0
4	1:11a	3.0	0.9
	8:14a	15.7	4.8
Fri	2:26p	8.5	2.6
	7:29p	12.5	3.8
5	1:50a	4.6	1.4
	8:44a	15.7	4.8
Sat	3:17p	7.5	2.3
	8:36p	11.8	3.6
6	2:29a	6.6	2.0
	9:12a	15.1	4.6
Sun	4:08p	6.9	2.1
	9:58p	11.5	3.5

Tide Table for Point Atkinson

- On February 2, at 7:10 AM the tide will be high at 16.1 feet (4.9 metres) This is HHW (higher high water)
- Low tide is at 12:44 PM (10.5 feet—3.2 metres) This is HLW (higher low water)
- The next high tide is at 5:33 PM (13.8 feet – 4.2 metres) This is LHW (lower high water)
- The next low tide is not until the early hours of the following day, at 12:32 AM (2.0 feet – 0.6 metres) This is LLW (lower low water)

Reference Stations and Secondary Stations

Calculating Tides and Currents

Reference and Secondary Stations

A reference tide or current station is a location at which the tide or current data has been studied over a significant length of time. These are the stations for which daily tables are published by national hydrographic agencies.

Secondary tide and secondary current stations have been studied for a much shorter period of time than the reference stations - sometimes for as little as one month. Most national hydrographic agencies do not publish daily predictions for secondary stations. Instead, to provide the approximate values for the secondary stations, they supply a table showing the corrections which must be applied to the times and heights of high or low water or the time and speed of currents. These corrections consist of time differences, height differences, height ratios and speed ratios. If applied properly, the corrections found in the secondary tables provide reasonably accurate approximations for all navigational purposes.

A table of corrections for secondary stations accompanies each reference station.

These corrections are based on the average difference between the reference and secondary stations. Although the comparisons are between stations with similar characteristics, no two stations in the world are identical and the predictions made by applying the corrections can never be considered as accurate as the full predictions for a reference port. Accuracy of the figures also depends on the quality and quantity of the observations, as well as meteorological conditions during the period. However, the tables provide reasonably accurate approximations for all navigational purposes. The differences due to meteorological conditions are probably much greater.

For the reader's convenience, PORTS AND PASSES also includes daily predictions for some of the most popular secondary stations.

Anacortes	False Creek	Port Hardy
Bellingham	Friday Harbor	Port Ludlow
Blaine	Greene Point Rapids	Sidney (Tsehum Harbour)
Bremerton	La Conner	Steveston
Comox	Nanaimo	Tacoma
Desolation Sound	Olympia	Porter Harbour
Everett		

These predictions and corrections in the secondary tables are based on the average difference between the reference and secondary stations. Although the comparisons are between stations with similar characteristics, no two stations in the world are identical and the predictions made by applying the corrections can never be considered as accurate as the full predictions for a reference port. Accuracy of the figures also depends on the quality and quantity of the observations, as well as meteorological conditions during the period. However, the tables provide reasonably accurate approximations for all navigational purposes. The differences due to meteorological conditions are probably much greater.

For your convenience, corrections. Use per visit www.portsandpasses.com

Secondary Tide Corrections

1) Follow the procedure

2) Determine if the corrections are given as height differences or as height ratios. Use the height differences.

- Reference tide and current stations are studied over a long period of time – usually at least one year.
- Other (secondary) stations that have similar tidal characteristics are compared to these “reference stations” and corrections determined.
- Secondary stations may have a data record for as little as one month.

When applied to the Reference station data, the corrections from the Secondary tables provide “...reasonably accurate approximations for all navigational purposes”.

These corrections are based on the average difference between the reference and secondary stations. Although the comparisons are between stations with similar characteristics, no two stations in the world are identical and the predictions made by applying the corrections can never be considered as accurate as the full predictions for a reference port. Accuracy of the figures also depends on the quality and quantity of the observations, as well as meteorological conditions during the period. However, the tables provide reasonably accurate approximations for all navigational purposes. The differences due to meteorological conditions are probably much greater.

Secondary Tide Stations

Secondary Port	Position		Time and Height Differences						Range	
	Lat N	Long W	High Water			Low Water			Mn Tide	Lrg Tide
			Time	Mean Tide	Large Tide	Time	Mean Tide	Large Tide		
	° /	° /	h min	feet	feet	h min	feet	feet	feet	feet
Sechart Inlet										
Egmont	40 45	123 50	+0 03	+0.7	+0.7	+0 01	0.0	-0.3	11.2	17.1
Storm Bay	40 40	123 50	+2 38	-0.2	-0.0	+2 01	-2.3	-0.7	0.0	10.2
Porpoise Bay	40 20	123 40	+2 40	-0.2	-0.0	+1 58	-2.0	-0.3	0.0	8.0
Strait of Georgia East										
Blind Bay	40 43	124 11	+0 05	+1.0	+1.3	+0 01	+0.3	+0.3	11.5	17.4
Saltory Bay	40 47	124 11	+0 02	+1.0	+1.0	+0 04	+0.3	0.0	11.2	17.1
Powell River	40 32	124 33	+0 04	+1.0	+1.3	+0 08	+0.3	0.0	11.3	17.4
Lund	40 50	124 40	+0 07	+1.3	+1.3	+0 00	+0.3	0.0	11.5	17.4
Twinn Islands	50 02	124 58	+0 08	+0.7	+1.3	+0 12	0.0	0.0	11.3	17.4
Mitlenatch Island	40 57	125 00	+0 05	+0.3	+0.7	+0 12	0.0	0.0	10.8	10.7
Strait of Georgia West										
Harmac	40 08	123 51	+0 04	-0.3	-0.3	+0 04	-0.3	-0.3	10.8	10.1
Nanaimo	40 10	123 50	+0 04	+0.7	+0.7	+0 04	+0.3	0.0	10.8	10.4
Nanoose Bay	40 10	124 08	See pages 282-287 for daily predictions at Nanaimo							
Winchelsea Islands	40 18	124 05	+0 05	+0.3	+0.3	+0 04	0.0	0.0	10.8	10.4
Northwest Bay	40 18	124 12	+0 03	+0.7	+0.7	+0 03	+0.3	+0.3	10.8	10.4
French Creek	40 21	124 22	+0 04	+0.3	+0.3	+0 05	-0.3	-0.3	11.2	10.7
Little River	40 44	124 55	+0 04	+0.7	+1.0	+0 07	0.0	-0.3	11.2	17.1
Hornby Island	40 30	124 41	+0 12	+0.7	+0.7	+0 10	+0.3	0.0	10.8	10.7
Denman Island	40 32	124 40	See pages 104-100 for daily predictions at Comox							
Comox	40 40	124 50	+0 07	+0.7	+0.7	+0 07	0.0	+0.3	11.2	10.4
Lasqueti & Texada										
False Bay	40 20	124 21	+0 03	+0.7	+1.0	+0 05	0.0	-0.3	11.2	17.1
Skerry Bay	40 30	124 14	+0 11	0.0	0.0	+0 00	0.0	-0.3	10.5	10.4
Welcome Bay	40 42	124 33	+0 05	+0.7	+1.0	+0 00	-0.3	0.0	11.5	17.1
Blubber Bay	40 48	124 37	+0 00	+1.0	+1.0	+0 10	+0.3	+0.3	11.2	10.7
Desolation Sound										
Okeover Inlet	40 50	124 42	+0 13	+1.0	+1.0	+0 20	+0.7	+0.3	11.5	17.7
Prideaux Haven	50 00	124 40	See pages 120-125 for daily predictions at Desolation Sound							
Channel Island	50 10	124 45	+0 07	+1.3	+1.3	+0 12	+0.3	0.0	11.5	17.4
Redonda Bay	50 10	124 57	+0 10	+0.7	+1.0	+0 12	+0.3	+0.3	11.2	10.7
Heriot Bay	50 00	125 13	+0 00	+0.7	+1.0	+0 11	+0.7	+0.7	10.8	10.4
Gorge Harbour	50 00	124 50	+0 17	+1.0	+2.3	+0 08	+1.0	+0.7	11.5	17.7
Whaletown Bay	50 00	125 03	+0 07	+1.0	+1.0	+0 00	+0.3	0.0	11.2	17.1
Surge Narrows	50 14	125 07	+0 11	+0.7	+1.0	+0 07	0.0	+0.3	11.2	10.7
Bute Inlet										
Orford Bay	50 30	124 52	+0 10	+1.3	+1.3	+0 14	+0.3	0.0	11.5	17.4
Waddington Harbour	50 52	124 50	+0 10	+0.3	+0.3	+0 10	-0.7	-1.0	11.5	17.4

Table of Secondary Tide Stations

Provides corrections to a reference station for:

- Time of high water and low water
- Height of a mean tide and a large tide
- The range of heights for a mean tide and a large tide for that station.

Corrections are usually just a few minutes, but in some places can be more than 1 ½ hours.

Ports and Passes has tabulated a number of secondary stations from basic constituents for popular locations. More accurate than from secondary correction tables.

Using the Table of Secondary Tide Stations (*Canada and US)

DAY	TIME	FT	M
1	6:36a	15.7	4.8
	11:54a	11.2	3.4
Tue	4:36p	14.4	4.4
	11:50p	1.8	0.3
2	7:10a	16.1	4.9
	12:44p	10.5	3.2
Wed	5:33p	13.8	4.2
3	12:32a	2.0	0.6
	7:43a	16.1	4.9
Thu	1:34p	9.5	2.9
	6:29p	13.1	4.0
4	1:11a	3.0	0.9
	8:14a	15.7	4.8
Fri	2:26p	8.5	2.6
	7:29p	12.5	3.8
5	1:50a	4.6	1.4
	8:44a	15.7	4.8
Sat	3:17p	7.5	2.3
	8:36p	11.8	3.6
6	2:29a	6.6	2.0
	9:12a	15.1	4.6
Sun	4:08p	6.9	2.1
	9:58p	11.5	3.5

To find the tides for a secondary station (eg. **Lund**)

1. Record the times of high and low water at **Point Atkinson** in columns 1 and 2 of Worksheet 1.
2. Record the time and height corrections for **Lund** in columns 3 and 4 of Worksheet 1
3. Add (or subtract) the height and time differences in columns 3 and 4 to the times and heights in columns 1 and 2
4. Record this in columns 5 and 6. These are the corrected tide times and heights for **Lund**

*Note – For many tide stations in the US, especially in Puget Sound, **height ratios** are provided.
If a **height ratio** is given use Worksheet 2.
If a **height difference** is given, use Worksheet 1.

Secondary Tides Calculations (Height difference) (Canada & US)

Reference Station: *Point Atkinson*

Date: *February 2, 2022*

Secondary Station: *Lund*

Worksheet 1

	Reference Station		Corrections		Secondary Station	
	Time	Height ft / metres	Time difference hr min	Height [*] difference ft / metres	Time	Height ft / metres
LW			+ -	+ -	=	=
HW	<i>7:10 AM</i>	<i>16.1</i>	+ <i>+0 07</i> -	+ <i>+ 1.3</i> -	= <i>7:17 AM</i>	= <i>17.4</i>
LW	<i>12:44 PM</i>	<i>10.5</i>	+ <i>+0 09</i> -	+ <i>+ 0.3</i> -	= <i>12:53 PM</i>	= <i>10.8</i>
HW	<i>5:33 PM</i>	<i>13.8</i>	+ <i>+0 07</i> -	+ <i>+1.3</i> -	= <i>5:40 PM</i>	= <i>15.1</i>
LW			+ -	+ -	=	=

^{*} (Canada Only) If the nearest high tide at the reference station is a large tide, apply the correction for a large tide. Otherwise, apply the correction for a mean tide.

Using the Table of Secondary Tide Stations (US – height ratios only)

DAY	TIME	FT	M
1 Tue	5:36a	9.6	2.9
	10:00a	6.7	2.1
	3:04p	8.6	2.6
	10:07p	2.2	-0.7
2 Wed	6:09a	9.6	2.9
	10:53a	6.0	1.8
	4:05p	8.2	2.5
	10:52p	-1.5	-0.5
3 Thu	6:41a	9.5	2.9
	11:47a	5.3	1.6
	5:06p	7.7	2.3
	11:34p	-0.5	-0.2
4 Fri	7:11a	9.4	2.9
	12:42p	4.4	1.4
	6:09p	7.0	2.1
5 Sat	12:16a	0.8	0.2
	7:38a	9.2	2.8
	1:37p	3.6	1.1
	7:17p	6.4	2.0
6 Sun	12:57a	2.2	0.7
	8:04a	9.0	2.8
	2:32p	2.8	0.9
	8:40p	6.0	1.8

To find the tides for a secondary station (eg. Roche Harbor)

1. Record the times of high and low water at **Point Townsend** in columns 1 and 2 of Worksheet 2.
2. Record the time difference and height ratio for **Point Roberts** in columns 3 and 4 of Worksheet 2
3. Add (or subtract) the time difference in column 3 to the time in columns 1
4. Multiply the tidal height in column 2 by the height ratio in column 4.
5. Record these in columns 5 and 6. These are the corrected tide times and heights for **Point Roberts**.

*Note – For many tide stations in the US, especially in Alaska, **height differences** are provided. Use Worksheet 1.

If a **height ratio** is given, use Worksheet 2.

Using the Table of Secondary Tide Stations (US – height ratios only)

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Secondary Tide Stations

Secondary Port	Position		Time and Height Differences			
			High Water		Low Water	
	Lat N	Long W	Time	Height Ratio	Time	Height Ratio
	° /	° /	h min		h min	
Hale Passage	48 43.9	122 40	+0 41	1.04	+1 10	0.97
Gooseberry Point	48 45	122 43	+0 56	+0.1 ft *	+0 51	0.0 ft *
Point Migley						
Lummi Island	48 43	122 43	+0 44	1.01	+1 12	1.02
Village Point						
Orcas Island	48 38.8	122 52	+0 26	0.92	+0 41	0.92
Rosario, East Sound	48 36	122 57	+0 33	0.90	+0 56	0.90
Orcas						
Lopez Island	48 34.3	122 53	+0 26	0.92	+0 42	0.92
Upright Head	48 26.8	122 54	-0 27	0.85	-0 12	0.84
Richardson						
Harney Channel	48 35.1	122 56	+0 31	0.90	+0 56	0.99
Shaw Island, Ferry Terminal						
San Juan Island	48 32.7	123 01	See pages 162-167 for daily predictions			
Friday Harbor						
Echo Bay, Sucia Islands	48 45	122 54	+1 01	+0.1 ft *	+1 34	0.0 ft *
Ferndale	48 50	122 43	+0 49	+0.5 ft *	+1 20	0.0 ft *
Point Roberts	48 58.5	123 05	+1 01	1.14	+1 33	1.08
Semiahmoo Bay	48 59.5	122 46	See pages 68-73 for daily predictions			
Blaine						
San Juan Island	48 29.1	123 05	-0 19	0.86	-0 04	0.89
Kanaka Bay	48 34.7	123 10	+0 12	0.89	+0 28	0.93
Hanbury Pt, Mosquito Pass	48 36.6	123 09	+0 33	0.90	+0 47	0.99
Roche Harbor						
Patos Island Wharf	48 47	122 58	+1 03	+0.2 ft *	+1 30	0.0 ft *

For some stations height corrections are provided instead of height ratios. For these *stations, the height correction must be added or subtracted from the predicted height of tide at the reference station (Port Townsend). See Worksheet 1, page xviii.

Provides corrections to a reference station for:

- Time of high water and low water

Corrections are usually just a few minutes, but in this situation, the time correction for low water at Point Roberts is more than 1 ½ hours.

Secondary Tides Calculation (Height ratio) (US)

Reference Station: *Port Townsend*

Date: *February 2, 2022*

Secondary Station: *Point Roberts*

Worksheet 2

	Reference Station		Corrections		Secondary Station	
	Time	Height ft / metres	Time difference hr min	Height ratio	Time	Height ft / metres
LW			+	x	=	=
			-			
HW	<i>6:09 AM</i>	<i>9.6 ft.</i>	<div> <div>+</div> <div><i>+ 1: 01</i></div> </div>	<i>x 1.14</i>	<i>= 7:10 AM</i>	<i>= 10.9 ft.</i>
			-			
LW	<i>10:53 AM</i>	<i>6.0 ft.</i>	<div> <div>+</div> <div><i>+ 1: 33</i></div> </div>	<i>x 1.08</i>	<i>= 12:26 PM</i>	<i>= 6.5 ft.</i>
			-			
HW	<i>4:05 PM</i>	<i>8.2 ft.</i>	<div> <div>+</div> <div><i>+ 1: 01</i></div> </div>	<i>x 1.14</i>	<i>= 5:06 PM</i>	<i>= 9.3 ft.</i>
			-			
LW	<i>10:52 PM</i>	<i>-1.5 ft.</i>	<div> <div>+</div> <div><i>+ 1: 33</i></div> </div>	<i>x 1.08</i>	<i>= 12:25 AM</i>	<i>= -1.6 ft.</i>
			-			

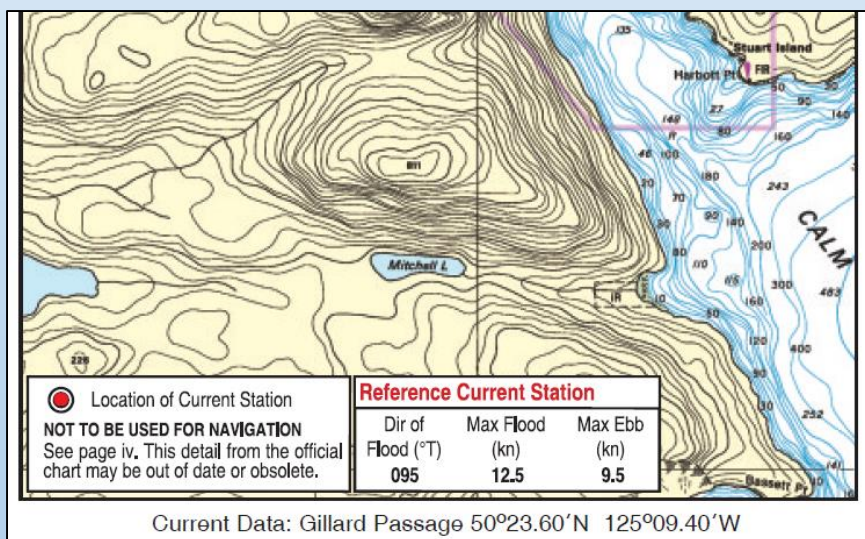
The “Rule of Twelfths” for Estimating Intermediate Tidal Heights

The rule assumes that, for a six-hour duration, in the first hour the tide rises $1/12$ of the range, in the second hour $2/12$ of the range, and in the third hour $3/12$ of the range. Thus, by the end of the third hour, the tide has risen one half its range ($1/12 + 2/12 + 3/12 = 6/12$ or $1/2$).

Fractional Rise or Fall of Tide		Total Rise or Fall of Tide: Fraction / Percent of Total Range	
Hour Zero		$\frac{0}{12}$	0%
During 1st hour tide rises/falls $1/12$ of the range	at end of 1st hour	$\frac{1}{12}$	8.3%
During 2nd hour tide rises/falls $2/12$ of the range	at end of 2nd hour	$\frac{3}{12}$	25%
During 3rd hour tide rises/falls $3/12$ of the range	at end of 3rd hour	$\frac{6}{12}$	50%
During 4th hour tide rises/falls $3/12$ of the range	at end of 4th hour	$\frac{9}{12}$	75%
During 5th hour tide rises/falls $2/12$ of the range	at end of 5th hour	$\frac{11}{12}$	91.7%
During 6th hour tide rises/falls $1/12$ of the range	at end of 6th hour	$\frac{12}{12}$	100%

Current table for Gillard Passage

- Gillard Passage is a current station, so the name at the edge of the page is shown in red.
- Direction of flood and maximum rate is shown on the map pages for each current station



- The list of secondary stations referenced to Gillard Passage appears opposite the map page for Gillard Passage

From PORTS AND PASSES

186

January 2022

February

DAY

SLK

MAX

F/E

DAY

SLK

MAX

F/E

DAY

SLK

MAX

F/E

DAY

SLK

MAX

F/E

1

3:35a
0:20a
2:47p
0:10p

0:33a
12:04p
5:50p

-0.0
+5.0
-8.3

16

4:22a
10:23a
3:28p
0:40p

12:38a
7:23a
12:48p
0:37p

+0.1
-0.0
+4.7
-0.5

1

4:55a
11:01a
4:34p
10:41p

1:24a
7:50a
1:42p
7:37p

+11.2
-7.7
+0.8
-8.1

16

5:00a
11:01a
4:40p
10:30p

1:22a
8:00a
1:40p
7:30p

+0.5
-0.4
+0.4
-7.2

2

4:23a
10:22a
3:41p
10:05p

12:43a
7:28a
12:57p
0:51p

+11.5
-7.4
+0.2
-8.4

17

4:55a
10:50a
4:08p
10:10p

1:10a
7:54a
1:20p
7:10p

+0.5
-0.3
+5.1
-0.8

2

5:35a
11:44a
5:24p
11:25p

2:07a
8:41a
2:20p
8:23p

+11.3
-7.0
+7.0
-8.3

17

5:20a
11:32a
5:18p
11:12p

2:00a
8:28a
2:21p
8:15p

+0.8
-0.7
+7.0
-7.4

3

5:00a
11:13a
4:35p
10:52p

8:10a
1:48p
7:42p

-7.7
+0.4
-8.3

18

5:27a
11:20a
4:47p
10:52p

8:22a
2:03p
7:52p

-0.4
+5.4
-0.0

3

6:15a
12:27p
0:13p

0:21a
3:15p
0:00p

-8.0
+7.0
-7.0

18

5:58a
12:04p
5:58p
11:50p

8:50a
2:56p
8:53p

-7.1
+7.5
-7.3

4

5:55a
12:03p
5:28p
11:30p

2:18a
8:57a
2:40p
8:33p

+11.8
-7.0
+0.0
-8.0

19

5:50a
12:03p
5:27p
11:27p

2:20a
8:57a
2:30p
8:28p

+0.0
-0.5
+5.0
-0.0

4

12:08a
1:00p
7:04p

3:20a
0:50a
3:55p

+10.5
-7.8
+7.8
-0.0

19

6:28a
12:38p
0:41p

3:02a
0:24a
3:34p

+0.0
-7.5
+8.0
-7.1

5

6:40a
12:53p
0:23p

3:05a
0:45a
3:33p

+11.5
-7.0
+0.0

20

6:40a
12:53p
0:08p

3:14p
0:20a
0:00p

+0.0
-0.7
-0.7

5

12:51a
7:31a
7:58p

4:00a
10:38a
4:45p

+0.4
-7.5
+7.7
-0.0

20

7:01a
11:55p
7:20p

3:37a
0:55a
10:10p

+0.5
-8.4
-0.0

6

7:20a
1:43p
7:20p

3:52a
10:38a
4:23p

+10.8
-7.7
+0.5

21

7:03a
1:15p
0:54p

3:20a
10:01a
4:01p

+0.0
-0.8
+5.0

6

1:30a
2:30p
0:01p

4:47a
11:18a
5:30p

+8.0
-7.0
+7.5
-5.0

21

1:14a
7:35a
1:55p
8:23p

4:15a
10:31a
5:00p
11:04p

+8.5
-7.0
+8.7
-5.0

7

8:11a
2:35p
8:23p

1:18a
5:22p
11:11p

-7.4
+0.4
-5.0

22

7:38a
1:55p
7:44p

10:30a
4:46p
10:34p

-7.0
+0.2
-5.8

7

8:47a
3:22p
10:15p

12:01p
0:28p

+0.3
-0.3
+7.2

22

2:04a
8:13a
2:40p
0:28p

5:00a
11:13a
5:53p

+7.2
-7.0
+8.7
-0.8

8

2:02a
8:57a
3:20p
0:30p

5:23a
12:10p
0:10p

+8.5
-0.0
+0.4

23

1:20a
8:15a
2:30p
8:42p

4:43a
11:15a
5:35p
11:22p

+8.8
-7.1
+0.0
-5.2

8

3:28a
2:30p
4:12p
11:35p

0:35a
12:50p
7:30p

+4.7
-5.5
+0.8
+0.0

23

3:05a
8:58a
3:32p
10:44p

5:55a
12:03p
0:54p

+5.0
-0.9
+8.5
+0.0

9

2:58a
0:44a
4:22p
10:57p

0:25a
1:02p
7:28p

-4.0
+7.0
-0.4
+0.5

24

2:10a
8:54a
3:26p
0:50p

5:20a
11:57a
0:30p

+7.7
-7.1
+7.1
0.0

9

4:53a
5:00p

7:51a
8:48p

+3.4
+4.0
+0.0

24

4:21a
0:53a
4:32p

7:00a
1:05p
8:00p

+4.2
-0.1
+8.3

10

4:05a
10:32a
5:15p

7:30a
1:40p
8:35p

+5.5
-5.0
+0.7

25

3:10a
10:38a
4:17p
11:07p

0:24a
12:40p
7:30p

+0.4
-7.0
+7.0
0.0

10

0:35a
11:10a
0:03p

8:50a
2:55p
0:55p

+2.8
-4.5
+0.8

25

5:53a
11:02a
5:30p

8:35a
2:23p
0:23p

+3.5
-5.4
+8.4

11

12:10a
11:23a
0:07p

2:30a
2:50p
0:30p

-3.4
-5.0
+7.1

26

4:32a
10:28a
5:12p

1:40a
1:42p
8:30p

-4.4
-0.8
+8.2

11

7:53a
12:31p
0:50p

10:01a
4:00p
10:53p

+2.0
-4.7
+7.3

26

1:18a
12:24p
0:40p

4:18a
3:45p
10:34p

-5.0
+3.0
-5.0
+0.0

12

1:24a
0:50a
12:10p
0:50p

4:01a
0:38a
3:45p
10:20p

-3.0
+3.8
-5.5
+7.0

27

12:24a
5:55a
11:20a
0:10p

3:04a
8:40a
2:45p
0:43p

-4.5
+4.4
+0.0
+8.0

12

2:40a
8:40a
1:40p
7:52p

5:30a
11:04a
4:50p
11:35p

-4.5
+3.4
-5.2
+8.0

27

2:18a
8:25a
1:44p
7:50p

5:22a
10:54a
4:52p
11:43p

-5.0
+4.7
-0.2
+0.0

13

2:10a
0:02a
1:00p
7:42p

5:14a
10:35a
4:35p
11:22p

-4.3
+3.7
-5.0
+8.2

28

1:33a
7:18a
12:30p
7:00p

4:21a
0:55a
3:52p
10:46p

+5.0
-4.3
-0.0
+0.0

13

3:21a
2:30p
8:38p

0:20a
5:40p

-5.2
-5.8

28

3:00a
0:10a
2:40p
8:53p

0:10a
11:58a
5:54p

-0.7
+5.8
-0.0

14

3:05a
0:02a
2:00p
8:24p

0:07a
11:24a
5:20p

-5.0
+3.0
-5.0

29

2:33a
8:28a
1:37p
8:08p

5:33a
10:57a
4:56p
11:44p

+5.8
-4.7
-7.0
+10.3

14

3:57a
10:00a
3:21p
0:20p

6:57a
12:34p
0:10p

-5.7
+5.0
-0.4

15

12:54a
4:30a
10:31a
4:01p
0:50p

+0.1
7:20a
1:04p
0:55p

-0.1
+5.8
-0.0

15

3:45a
0:45a
2:40p
0:03p

0:40a
12:08p
0:02p

+8.7
-5.0
+4.3
-0.2

30

3:25a
0:20a
2:42p
0:03p

0:25a
12:00p
5:55p

-0.0
+5.4
-7.5

15

4:12a
10:15a
3:41p
0:54p

7:14a
12:53p
0:48p

-7.2
+0.2
-7.0

31

12:30a
4:12a
10:15a
3:41p
0:54p

+10.0
-7.2
+0.2
-7.0

PORTS AND PASSES

Time of slack water (no current)

Time of maximum current

Current speed in knots (1 knot = 1.85 km/hr)

+ means flood current

- means ebb current

DAY	SLK	MAX	F/E
1		1:24a	+11.2
	4:55a	7:59a	-7.7
Tue	11:01a	1:42p	+6.8
	4:34p	7:27p	-8.1
	10:41p		
2		2:07a	+11.3
	5:35a	8:41a	-7.9
Wed	11:44a	2:29p	+7.3
	5:24p	8:23p	-8.0
	11:25p		
3		2:48a	+11.1
	6:15a	9:21a	-8.0
Thu	12:27p	3:15p	+7.6
	6:13p	9:09p	-7.6
4	12:08a	3:29a	+10.5
	6:53a	9:59a	-7.8
Fri	1:09p	3:55p	+7.8
	7:04p	9:57p	-6.9
5	12:51a	4:09a	+9.4
	7:31a	10:38a	-7.5
Sat	1:52p	4:45p	+7.7
	7:58p	10:45p	-6.0
6	1:36a	4:47a	+8.0
	8:09a	11:18a	-7.0
Sun	2:36p	5:36p	+7.5
	9:01p	11:44p	-5.0

Current Table for Gillard Passage

- On February 2, the current will be slack (turning from flood to ebb) at 5:35 AM
- The current speed (ebbing) will rise to a maximum of 7.9 knots at 8:41 AM
- The next slack water (turning from ebb to flood) will be at 11:44 AM
- The current speed (flooding) will rise to a maximum of 7.3 knots at 2:29 PM
- The next slack (turning from flood to ebb) will be at 5:24 PM, rising to a maximum ebb at 8:23 PM then another slack at 11:25 PM

Using the Table of Secondary Current Stations

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Secondary Current Stations

Current Station	Dir. of Flood	Position		Time Differences				Max Rate		% Ref Rate	
		Lat N	Long W	Tm to Fld	Max Fld	Tm to Ebb	Max Ebb	Fld	Ebb	Fld	Ebb
	° True	° /	° /	h min	h min	h min	h min	kn	kn	%	%
Yuculta Rapids (2.4 miles S. of Gillard Pt.)	180	50 23	125 00	+0 25	-	+0 05	-	10.0	8.0	80	85
Dent Rapids	140	50 25	125 13	-0 15	-	-0 25	-	11.0	9.5	90	100

Note – Dent Rapids is associated with and referenced to Gillard Passage reference station.

To find the time and strength of the currents at a secondary current station (eg. **Dent Rapids**)

- Record the times of slack and the speed of maximum current at **Gillard Passage** in columns 1 and 2 of Worksheet 3.
- Record the time difference for **Dent Rapids** in column 3 of Worksheet 3
- Record the speed ratio (in Canada called the % Ref Rate)
- Add (or subtract) the time difference in column 3 to the time in columns 1
- Multiply the speed in column 2 by the speed ratio (% Ref Rate) in column 4.
- Record these in columns 5 and 6. These are the corrected time of slack and maximum current speed for **Dent Rapids**.

Secondary Currents Calculation (Canada & US)

Reference Station: *Gillard Passage*

Date: *Feb 2, 2022*

Secondary Station: *Dent Rapids*

Reference Station				Corrections			Secondary Station		
	Time of Turn	Time of Max Speed	Max Speed (knots)	Time of Turn (hr min)	Time of Max Speed (hr min)	Speed Ratio*	Time of Turn (hr min) +/- time correction	Time of Max Speed (hr min) +/- time correction	Max Speed (knots) x speed ratio
TTF	10:41 PM	2:07 AM	+ 9.5	-0:15	N/A	90%	10:26 PM		+ 8.6
TTE	5:35 AM	8:41 AM	- 7.9	-0:25	N/A	100%	5:10 AM		- 7.9
TTF	11:44 AM	2:29 PM	+ 7.3	-0:15	N/A	90%	11:29 AM		+ 6.6
TTE	5:24 PM	8:23 PM	- 8.0	-0:25	N/A	100%	4:59 PM		- 8.0
TTF	11:25 PM	2:48 am	+ 11.1	- 0:15	N/A	90%	11:10 PM		+ 10.0
TTE									

* In Canada only -- "Speed Ratio" is given as "% Ref Rate". "% Ref Rate" is not given if the secondary current station is based on a reference tide station.

Using the Table of Secondary Current Stations

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Secondary Current Stations

Current Station	Dir. of Flood	Position		Time Differences				Max Rate		% Ref Rate	
		Lat N	Long W	Trn to Fld	Max Fld	Trn to Ebb	Max Ebb	Fld	Ebb	Fld	Ebb
	° True	° /	° /	h min	h min	h min	h min	kn	kn	%	%
Malibu Rapids	065	50 10	123 51	+0 35	-	+0 25	-	9.0	9.0	-	-

Certain secondary current stations are referenced to a tide station, not a current station.

For instance, **Malibu Rapids** (a current station) is referenced to **Point Atkinson** (a tide station).

Secondary Tide Stations

Secondary Port	Position		Time and Height Differences						Range	
	Lat N	Long W	High Water			Low Water			Mn Tide	Lrg Tide
			Time	Mean Tide	Large Tide	Time	Mean Tide	Large Tide		
	° /	° /	h min	feet	feet	h min	feet	feet	feet	feet
Gulf Islands										
Tumbo Channel	48 48	123 07	+0 12	-2.3	-2.6	-0 07	-1.0	-0.3	9.2	14.1
Samuel Is. N Shore	48 49	123 12	+0 16	-2.0	-2.3	-0 04	-0.7	-0.3	9.2	14.4
Georgina Point	48 52	123 18	+0 12	-1.6	-1.6	+0 01	-1.0	-0.7	9.8	15.1
Miners Bay	48 51	123 18	+0 07	-2.3	-2.6	-0 07	-0.7	0.0	8.9	13.4
Whaler Bay	48 53	123 20	+0 12	-1.6	-1.6	-0 01	-1.0	-0.7	9.8	15.1
Dionizio Point	49 01	123 35	+0 05	-0.3	-0.7	+0 02	-0.3	0.0	10.2	15.4
Valdes Island	49 04	123 37	-0 04	-0.3	-0.3	-0 05	-0.3	+0.3	10.5	15.4
Silva Bay	49 09	123 42	+0 03	+0.3	+0.3	+0 02	+0.3	+0.3	10.5	16.1
Boundary Bay										
White Rock	49 01	122 48	+0 05	-1.3	-1.3	-0 18	-0.3	-0.3	9.5	15.1
Crescent Beach	49 04	122 53	-0 01	-1.6	-2.0	-0 10	0.0	+0.7	8.9	13.4
Fraser Delta										
Tsawwassen	49 00	123 08	+0 01	-1.0	-1.0	-0 13	0.0	+0.3	9.8	14.8
Sand Heads	49 06	123 18	+0 03	-0.3	-0.3	-0 02	-0.7	0.0	10.5	15.7
Steveston	49 08	123 11	See pages 496-501 for daily predictions at Steveston							
Burrard Inlet										
False Creek	49 16	123 07	See pages 144-149 for daily predictions at False Creek							
Kitsilano	49 17	123 08	+0 03	0.0	0.0	0 00	0.0	0.0	10.8	16.1

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Since a tide station has no speed, it is not possible to calculate a maximum speed for **Malibu Rapids**.

However, the range of the tide at **Point Atkinson** will give a rough idea of the strength of the current at **Malibu Rapids**.

Using the Table of Secondary Current Stations

DAY	TIME	FT	M
1	6:36a	15.7	4.8
	11:54a	11.2	3.4
Tue	4:36p	14.4	4.4
	11:50p	1.8	0.3
2	7:10a	16.1	4.9
	12:44p	10.5	3.2
Wed	5:33p	13.8	4.2
3	12:32a	2.0	0.6
	7:43a	16.1	4.9
Thu	1:34p	9.5	2.9
	6:29p	13.1	4.0
4	1:11a	3.0	0.9
	8:14a	15.7	4.8
Fri	2:26p	8.5	2.6
	7:29p	12.5	3.8
5	1:50a	4.6	1.4
	8:44a	15.7	4.8
Sat	3:17p	7.5	2.3
	8:36p	11.8	3.6
6	2:29a	6.6	2.0
	9:12a	15.1	4.6
Sun	4:08p	6.9	2.1
	9:58p	11.5	3.5

To find slack water on February 2, 2022 for a secondary station that is referenced to a tide station (eg. **Malibu Rapids**)

1. Record the times of high and low water at **Point Atkinson** in column 1 (Time of Turn) of Worksheet 3. High water should be entered on a line beginning with TTE (turn to ebb) and low water on the lines TTF (turn to flood)
2. Record the time differences for Malibu Rapids in column 3 of Worksheet 1
3. Add (or subtract) the time differences in column 3 to the times in column 1
4. Record this in column 5. These are the corrected times of slack for **Malibu Rapids**.

Secondary Currents Calculation (Canada & US)

Reference Station: *Poit Atkinson*
 Secondary Station: *Malibu Rapids*

Date: *Feb 2, 2022*

Reference Station				Corrections			Secondary Station		
	Time of Turn	Time of Max Speed	Max Speed (knots)	Time of Turn (hr min)	Time of Max Speed (hr min)	Speed Ratio*	Time of Turn (hr min) +/- time correction	Time of Max Speed (hr min) +/- time correction	Max Speed (knots) x speed ratio
TTF									
TTE	<i>7:10 AM</i>			<i>+ 0:25</i>			<i>7:35 AM</i>		
TTF	<i>12:44 PM</i>			<i>+ 0:35</i>			<i>1:19 PM</i>		
TTE	<i>5:33 PM</i>			<i>+0:25</i>			<i>5:58 PM</i>		
TTF									
TTE									

* In Canada only -- "Speed Ratio" is given as "% Ref Rate". "% Ref Rate" is not given if the secondary current station is based on a reference tide station.

The “Rule of Thirds” for Estimating Intermediate Current Speeds

The “Rule of Thirds” assumes that maximum current strength occurs halfway between the *turns* of the current. You can obtain the time of the *turn* of the current from “Current Tables”. The time of increasing (or decreasing) current is then divided into thirds. For a six-hour current cycle, estimate as follows:

Hour Zero	0% of maximum speed (slack water)
End of 1st hour	50% of maximum speed
End of 2nd hour	90% of maximum speed
End of 3rd hour	100% of maximum speed
End of 4th hour	90% of maximum speed
End of 5th hour	50% of maximum speed
End of 6th hour	0% of maximum speed (slack water)

If the duration of the current is more (or less) than 6 hours, adjust the estimate accordingly.

So Why Go Through All This?

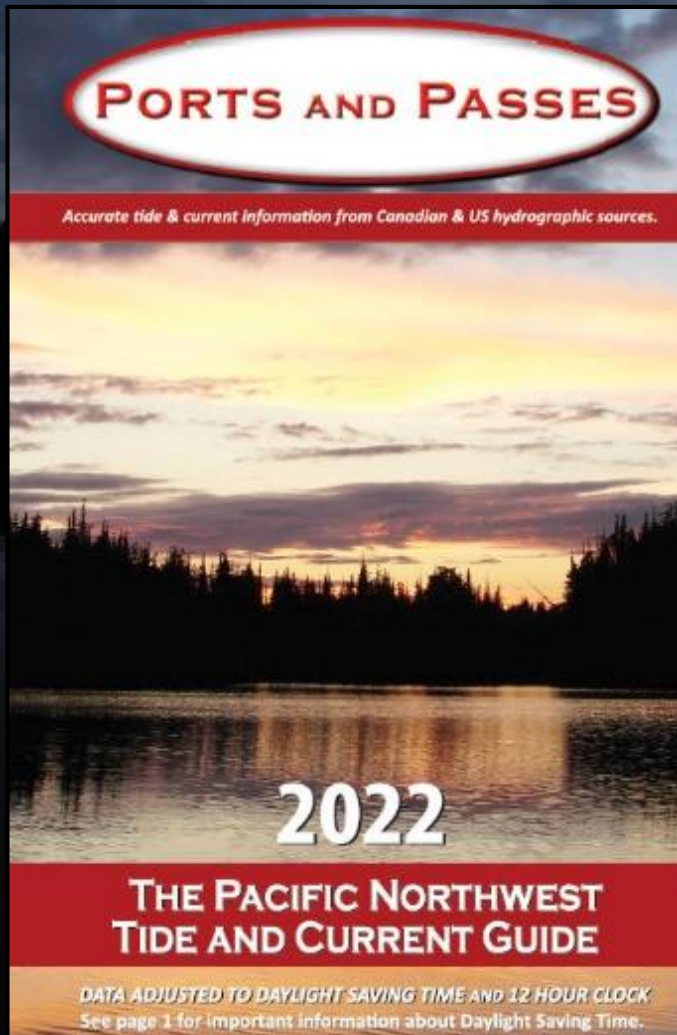
- Why use the paper-based system when it is far more complex than simply using a tide app on my smart phone?
- The measure of the quality of the tidal data is the quality of its source.
- Do you know where your data comes from?
- **PORTS AND PASSES** uses data from official sources only.

Constituents

- *Beware tide (and current) data from unknown sources!!* They may have been calculated from obsolete constituents.
- Over time, a hydrographic agency may update the constituents for a particular station to yield more accurate predictions.
- Certain tide apps claim they are good for the next 100 years...but their predictions are based on the known constituents when the app was purchased.
- If the app's constituents are not updated on a regular basis, over time, the predictions will get out of sync with the official predictions.
- Tide and current apps are useful for approximate times of tide and current, but when it is important to “get it right” use data from official sources only.

PORTS AND PASSES

The Pacific Northwest Tide and Current Guide



*Available at marinas, chandleries,
etc throughout the Pacific
Northwest*

and

in Canada

from

www.portsandpasses.com



in the US

from

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The Pacific Northwest Tide and Current Guide

The PORTS AND PASSES e-Book is available in three volumes, using the free Amazon Kindle e-book app from



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