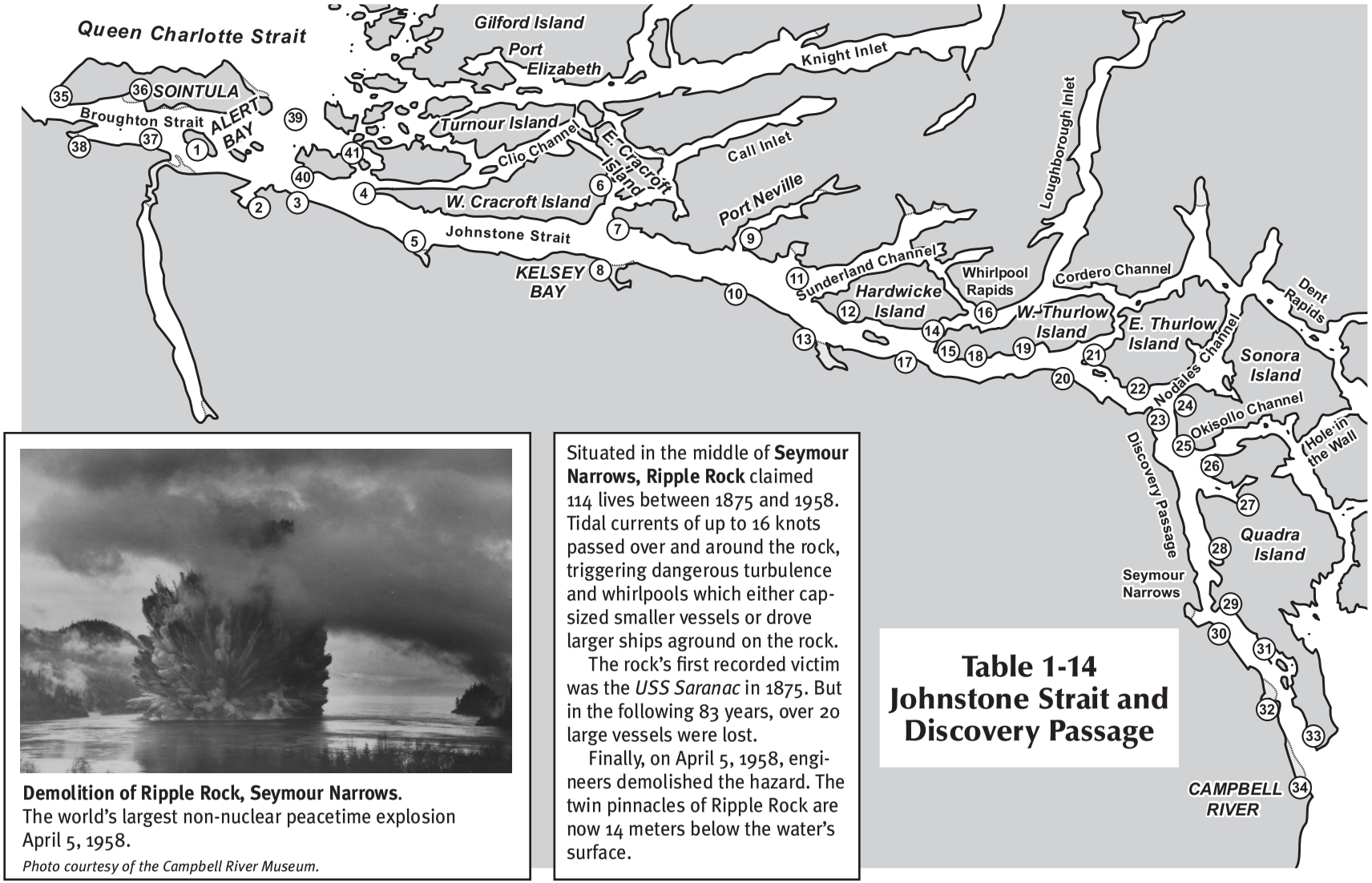


Table 1-14
Johnstone Strait and Discovery Passage

Demolition of Ripple Rock, Seymour Narrows.
The world's largest non-nuclear peacetime explosion April 5, 1958.
Photo courtesy of the Campbell River Museum.

Situated in the middle of **Seymour Narrows, Ripple Rock** claimed 114 lives between 1875 and 1958. Tidal currents of up to 16 knots passed over and around the rock, triggering dangerous turbulence and whirlpools which either cap-sized smaller vessels or drove larger ships aground on the rock.

The rock's first recorded victim was the *USS Saranac* in 1875. But in the following 83 years, over 20 large vessels were lost.

Finally, on April 5, 1958, engi-neers demolished the hazard. The twin pinnacles of Ripple Rock are now 14 meters below the water's surface.

Table 1-14 JOHNSTONE STRAIT AND DISCOVERY PASSAGE

Most Direct Route (All passages via Race Passage except where underlined)

Locations in **bold lowercase** appear in other detail tables.

No.	Location	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1	**ALERT BAY**																																	
2	**TELEGRAPH COVE**	4.5																																
3	**Blinkhorn Peninsula**	6.5	2.5																															
4	**Cracroft Point**	10.5	6.5	4																														
5	Robson Bight	15	11	8	5																													
6	**Port Harvey**	28	24	21	17	14																												
7	**Broken Islands**	26	22	19	15	11	3																											
8	Adam River	27	23	20	17	13	5.5	3																										
9	**PORT NEVILLE**	35	31	28	24	20	13	9	8																									
10	Hickey Point	34	30	27	24	20	12	9	7.5	2.5																								
11	**Fanny Island**	39	35	32	28	24	16	13	11	4.5	3.5																							
12	Earl Ledge	42	38	35	31	27	19	17	15	8.5	7	4																						
13	**KELSEY BAY**	41	37	34	30	26	18	15	14	8	6	4	2																					
14	**Eden Point**	**47**	**43**	**40**	**36**	**32**	**24**	**21**	**20**	**14**	**12**	**9**	**5**	6.5																				
15	Tyee Point	48	44	41	36	32	24	22	20	14	12	9	**5**	7	1																			
16	**D'Arcy Point**	**51**	**47**	**44**	**40**	**36**	**28**	**25**	**24**	**17**	**16**	**12**	**8**	10	3	4																		
17	Camp Point	46	42	39	35	31	23	20	19	13	11	9	**4**	5	2	1.5	5																	
18	Vansittart Point	50	46	43	38	34	26	23	22	16	14	11	**8**	8.5	2.5	2	6	3.5																
19	**Needham Point/Knox Bay**	55	51	48	44	40	32	29	28	21	20	17	**14**	14	8	7.5	12	9	5.5															
20	Ripple Point	56	52	49	45	41	33	30	29	22	21	18	**14**	15	9	8.5	14	9.5	6.5	1														
21	**Edith Point (Mayne Passage)**	57	53	50	46	42	34	31	30	24	22	19	**15**	16	10	9.5	15	10	7.5	1.5	1													
22	**Turn Island Light**	61	57	54	52	48	40	37	36	27	28	24	**19**	20	15	13	19	14	11	5.5	4.5	4												
23	**Chatham Point**	62	58	55	53	49	41	36	37	28	29	25	**20**	21	15	15	20	16	12	7.5	6	5	1											
24	**Howe Island (Nodales Channel)**	64	60	57	54	50	42	39	38	29	30	26	**21**	22	17	15	21	16	13	7.5	6.5	6	2	1										
25	**Cinque Islands**	66	62	59	56	52	44	41	40	31	32	28	**23**	24	19	17	23	18	15	9.5	8.5	8	4	3	3									
26	**Granite Point (Okisollo Channel)**	67	63	60	57	53	45	42	41	32	33	29	**24**	25	20	18	24	19	16	11	9.5	9	5	4	4	1								
27	Granite Bay	71	67	64	61	57	49	46	45	36	37	33	**28**	29	24	22	28	23	20	15	14	13	9	8	8	5	4							
28	Separation Head	72	68	65	63	59	51	46	47	38	39	35	**30**	31	26	25	30	25	22	17	16	15	11	10	10	7	6	7.5						
29	Maud Island/Seymour Narrows	75	71	68	66	62	54	49	50	41	42	38	**33**	34	29	28	33	28	25	20	19	18	14	13	13	10	9	11	3					
30	Race Point	78	74	71	68	64	56	53	52	43	44	40	**35**	36	31	29	35	30	27	22	21	20	16	15	15	12	11	12	4.5	1.5				
31	Steep Islet/Duncan Bay	80	76	73	71	67	59	54	55	46	47	43	**38**	39	34	33	38	33	30	25	24	28	19	18	18	15	14	16	8	5	3			
32	**CAMPBELL RIVER**	83	79	76	74	70	62	57	58	49	50	46	**41**	42	37	36	41	36	33	28	27	31	22	21	21	18	17	19	11	8	6	3		
33	**Cape Mudge**	86	82	79	76	72	64	60	60	51	52	49	**44**	45	39	39	43	38	35	30	30	34	24	23	24	21	20	22	14	11	9	6	3	
34	Willow Point	87	83	80	77	73	65	62	61	52	53	49	**44**	45	40	38	44	39	36	31	30	29	25	24	25	22	21	23	15	12	10	7	4	1

BROUGHTON STRAIT

Location	36	37	38	1	39	40	2	41	3	4	No.
Pulteney Point	5.5	5.5	7	10	14	15	15	19	16	19	35
SOINTULA		1.5	3.5	5	9	10	9	15	11	15	36
Haddington Island			2	3.5	8	9	8	14	10	13	37
PORT MCNEIL				6	10	11	10	16	12	15	38
ALERT BAY					5.5	5.5	4.5	11	6.5	10	1
Stubbs Island						2	3.5	6	4	7	39
Weynton Island							2	5.5	2	5	40
TELEGRAPH COVE								6.5	2.5	6	2
Blackney Passage									4.5	1	41
Blinkhorn Peninsula										4	3
Cracroft Point											4

Table 2 Managing Tidal Rapids

Table 2-1 — General Principles for Managing Tidal Rapids

Laminar Flow

When a body of water moves rapidly along a relatively smooth channel or canal, the sides and bottom of the channel don't restrict the movement of the water. The result is that the water flows smoothly, without turbulence, and consequently, small vessels may navigate in relative comfort. This type of smooth water flow is known as **laminar flow**.

Most navigable rivers exhibit laminar flow. Chatham Channel, in BC's central coast, and Myers Passage in the north, are both excellent examples of small channels with laminar flow. Though Chatham Channel flows at up to seven knots, it does so relatively smoothly even at maximum current. Conditions dangerous to small craft develop only when strong to gale force winds oppose the peak current.

Turbulent Flow in Tidal Rapids

Pronounced irregularities in the sides or bottom of a channel deflect some of the current in a different direction than the rest of the stream. A single irregularity causes a single standing wave with localized turbulence. However, numerous irregularities or obstructions interfering with

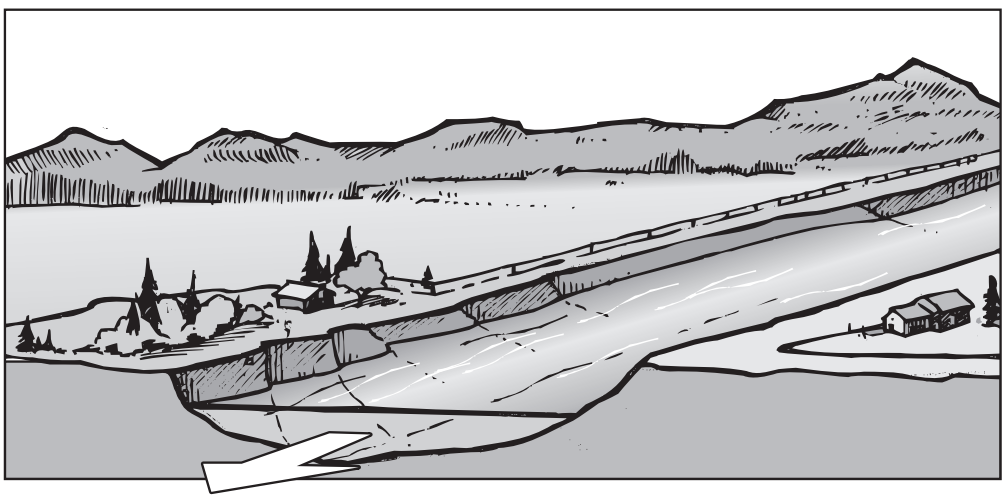


Fig 2-1 Laminar Flow in a smooth sided canal

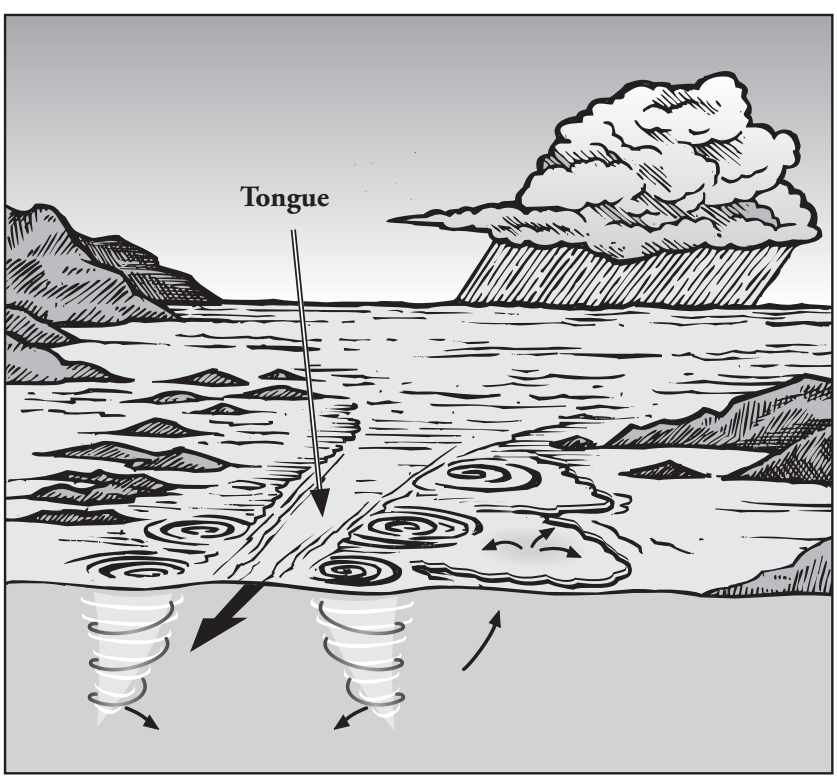


Fig 2-2 Subsidence (Whirlpools) and Upwelling (Boils) in a Tidal Rapids.

At the interface between the laminar flowing tongue and the surrounding water, a series of whirlpools and boils develops. Water subsiding in whirlpools is circulated to the surface in boils (upwellings). Anything lost in a whirlpool (including small boats) will surface again in a boil, sometimes a long distance away.

the flow of the current cause extensive turbulence—usually filling the channel from one side to the other and for a distance downstream. Where a restriction in a channel significantly interferes with the flow of water in a tidal channel, the result is a tidal rapids. These rapids have many common characteristics.

From the upstream to the downstream side of the rapids, the water level flows down a slope. (If there were no difference in level there would be no tidal current.) A tongue of relatively smooth water flows through the opening, defined by curved zones of turbulence on either side that extend from the point of restriction and curve downstream toward the middle of the channel. Forming the boundary between the merely turbulent surrounding water and the relatively smooth tongue you will find a series of whirlpools (subsidence) and boils (upwelling). This area may be very hazardous to small craft, and is usually lower than the tongue.

The tongue extends downstream until it loses its identity in the general turbulence. This turbulence often extends downstream for several hundred meters. In Seymour Narrows the turbulence from the flood current extends past Race Point, more than 1.5 Nm downstream (2800 m).

Fig 2-3
Deception Pass during a Flood

To the west of Pass Island, the tongue is defined on the north by the curved zone of turbulence generated by Lighthouse Point. The tongue flows toward Pass Island, then along the south side of the island as it passes under the highway bridge. Once past the island, the relatively smooth flowing currents in the tongue disappear into a highly tubulent stream which extends to Strawberry Island and beyond. Note that the boat in the upper right is maneuvering to avoid the worst of the turbulence by entering the tongue just to the east of Pass Island.

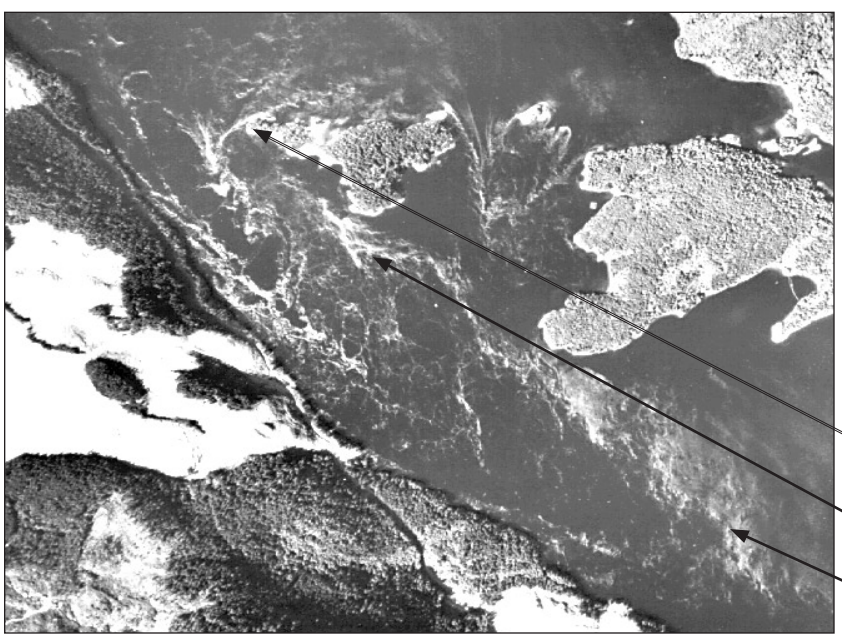


Fig 2-4
Dent Rapids During a Large Flood

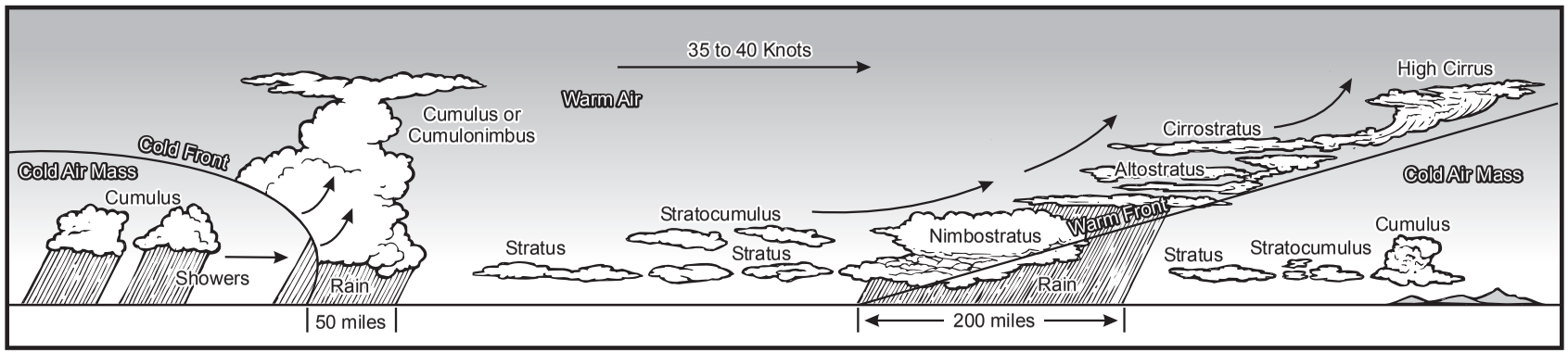
At the time of the photograph, the current in Dent Rapids was running near maximum. At this time Dent Rapids is extremely dangerous and should not be attempted by vessels of any size.

Note:
—Dent Point on Little Dent Island spawns a curved series of whirlpools extending downstream along the side of the tongue.
—A large, dangerous whirlpool forms in the Devil's Hole during peak current.
— The upwelling turbulence extends more than three times the length of the tongue.

Table 19-2 — Cross Section through a Typical Temperate Depression

The descriptions of frontal weather below are generalizations. Every front is different. Some may produce no precipitation while other systems may be very vigorous and produce high winds and torrential rain. When a warm front encounters the seaward side of the Coast Range, the warm air must rise higher and faster, thus producing even heavier rain.

The entire system may travel from West to East at 35 to 40 knots. The entire process outlined below may take up to 48 hours or more.



After Cold Front Passage	In the Warm Sector	In Advance of the Warm Front
Cold air mass forces itself under warm air, causing the warm air to rise rapidly and turbulently. The rapid uplift of warm air creates vigorous cumulus and cumulonimbus clouds to form, and precipitation falls in the form of heavy rain or hail. On passage of the cold front, unstable conditions continue, characterized by rain showers with clearing in between. Barometer falls on approach and passage of the front, then rises as weather clears. Wind squally near frontal passage, then backs a little. Temperature drops suddenly at frontal passage, then stabilizes.	After the passage of the warm front, heavy rain stops, and some clearing may occur, but fog and light rain may continue. Barometer steady. Wind veers—typically from SE to westerly. Temperature rises rapidly at warm front passage then stabilizes. In advance of the cold front, breaks in low cloud cover close up, visibility reduces and the temperature begins to fall.	Warm air mass rises over cold air mass. As the warm air rises, it cools and precipitation in the form of rain or snow falls from the rising air. Air on both sides of the front is essentially stable. The first sign of an approaching warm front is high altitude cirrus clouds, possibly forming a halo around the sun/moon, followed by thickening and lowering cirrostratus and altostratus clouds. Usually within 24 hours, the cloud cover becomes uniform stratus and nimbostratus, and moderate to heavy rain falls until the passage of the warm front. Barometer falling. Wind steady. Temperature steady.

When the wind changes direction it is said to veer or to back. The wind veers when its direction changes in a clockwise direction (ie. from southeast to southwest), and backs when its direction changes in a counter-clockwise direction.