

Blaine Harbor Area Circulation Study – September 10, 2002

This circulation study was performed by Puget Sound Restoration Fund (PSRF) with support from Ami Stillings, Whatcom County Water Resources Shellfish Coordinator and Don Lennartson, Washington State Department of Health, Office of Shellfish programs. It was funded by Whatcom County under an ongoing contract with PSRF for focused projects to support the Community Oyster Farm project and shellfish restoration efforts in Drayton Harbor.

Methods and Materials

Numbered grapefruits and custom-made surface floats, were deployed in several locations in and around the Blaine Harbor with about two hours remaining in an ebb tide on September 10, 2002. One float and two grapefruits were released at each of six locations and checked regularly for the duration of the ebb tide and approximately two hours into a flooding tide. Floats were deployed at the following locations in Drayton Harbor between 1210 and 1224 hours: DOH ambient stations 15 and 8 and inside of the Blaine Harbor at POB sites C, D, E, and H. Floats were tracked using the Community Oyster Farm skiff. All floats were retrieved by 1555 hours. Floats were not deployed at POB sites A,B, or I based upon the results from the September 9 ebb tide observations. In the early flood stage, we made use of DOH's handheld GPS unit to more accurately position floats deployed at stations 8 and 15. A second deployment was done at site 8

Conditions during the Study

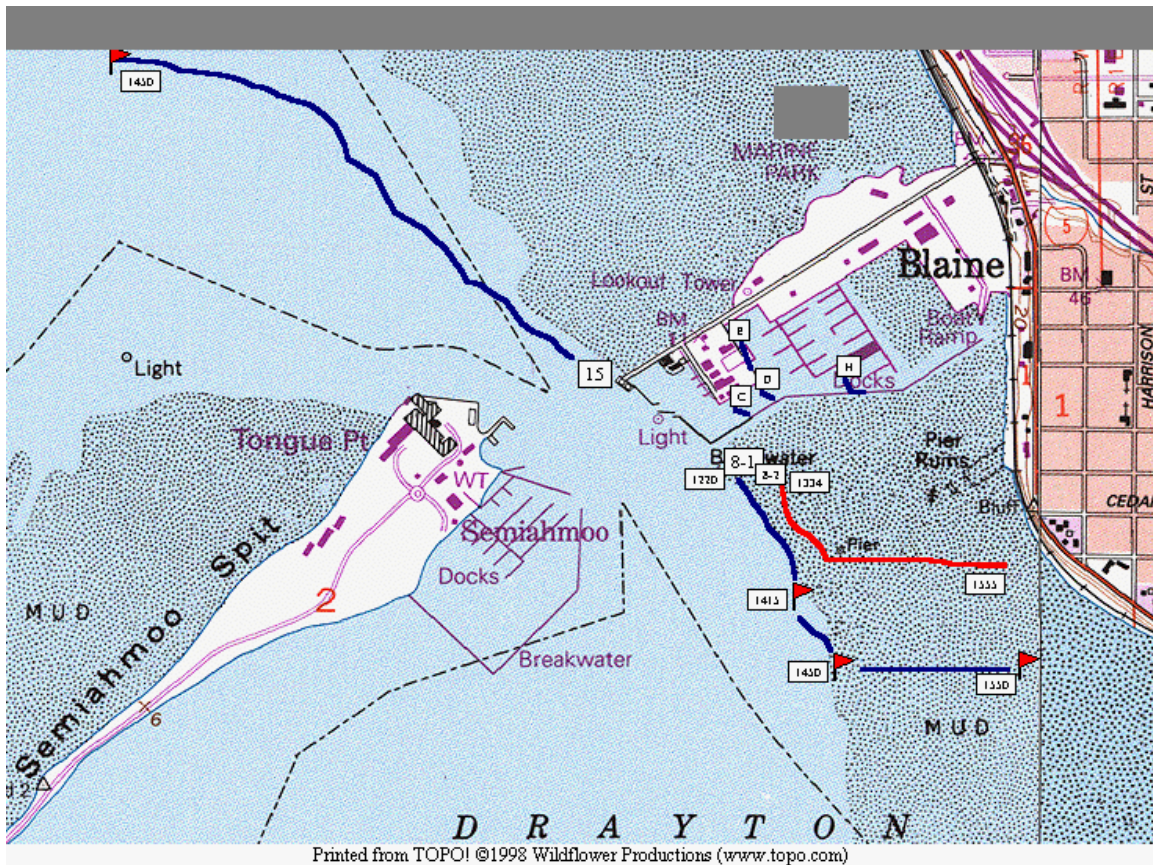
Low tide was at approximately 1430, with elevation of +2.2 ft.. The high tide was at 2030, with elevation of +8.6 ft. There was a very light wind from the NW during this study.

The crew contracting with the Port to replace the breakwater at the Blaine Harbor entrance had placed a large barge inside the marina entrance, but it appeared unlikely that this had a significant effect on the routes taken by the floats deployed inside of the marina.

Results

The table below shows the deployment and retrieval times for each float that was placed out along with general comments about the course that each one followed. Float movement is also illustrated in the attached map.

<u>Release site</u>	<u>Float #</u>	<u>Deployment time</u>	<u>Retrieval Time</u>	<u>General Comments on Tracking</u>
DOH 15	15	1224	1435	Northwesterly course towards International boundary marker in Semiahmoo Bay.
DOH 8	8-1	1220	1555	Southerly direction towards station 6 during ebb, then easterly towards east Blaine shore line
DOH 8	8-2	1334	1555	Southerly direction for one hour, then easterly towards east Blaine shoreline with flooding tide
POB C	C	1216	1530	Moved southward very slowly to breakwater. Never left marina entrance
POB D	D	1215	1530	Moved directly south to breakwater, re-deployed then back into breakwater. Never left marina entrance.
POB E	E	1214	1525	Moved south under sawtooth dock about half the distance to site D
POB H	H	1210	1533	Originally deployed near boathouse. Moved south to breakwater



Results continued

All of the floats deployed inside of Blaine Harbor stayed within the harbor, moving generally in a southeasterly direction.

Floats deployed at site 15 travelled a northwesterly course and were actually north of the International border (although this map does not show it) at slack low tide. The GPS position was Lat:49.006, Long: 122.7851. The longitude is shown correctly on this map.

Floats deployed at site 8 must have been trapped in a back eddy causing them to move southeasterly on the ebb tide. Once the flood started, both floats moved easterly towards the east Blaine shoreline. They were both pulled from less than one foot of water just before 3 pm.

Discussion

The most interesting result from this study was the course travelled by floats deployed at DOH site 8. This was a very different course than observed from this location the previous day when floats were deployed at the start of the ebb tide compared to deployment late in the ebb tide in this study. The precise position of deployment relative to the current might have also affected the course travelled on this day versus the previous day. There was a dramatic shift in course with the onset of the flood tide with both of the deployment timings at this site.

Further discussion with DOH on the results of this series of studies will help shape any additional circulation testing that seems to be needed. Possible ideas are

- Deeper water drogues placed inside of Blaine Harbor on an ebb tide
- Surface water floats placed at stations 15 and 8 on a full flood tide. This would be a replication of the August 19 study with the currently improved float design.