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**FROM:** Amy Lawrence and Wayne Wright, GeoEngineers, Inc.  
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**FILE:** 6193-007-00  
**SUBJECT:** Summary of 2000-2001 Biological Data for Rich Passage – Bainbridge Island Sites

In 2000 and 2001, Washington State Ferries (WSF) conducted extensive biological sampling at seven sites along Rich Passage and in the immediate area. Three of the seven were on Bainbridge Island along Rich Passage and near Point White, and are relevant to this technical memorandum:

- Site 3: Located approximately 0.5 miles northwest of Pt. Glover near Point White (a site proposed for beach nourishment)
- Site 5: Located approximately 0.5 miles north of Pt. Glover and north of Point White; this site is approximately 400 yards away from Site 3;
- Site 12: Located approximately 1 mile north of Point White, this site is referred to as Crystal Springs and is due east of Illahee State Park. It lies outside of the Rich Passage study area but was used as a reference site for the study.

Biological sampling was conducted in April and May of each year. In 2000, it was conducted during low-speed POFF operations; in 2001 it was conducted as follow-up to POFF operations. Each site was sampled using identical methods along a transect at the same relative elevation (“Middle Elevation,” or +2.0 tidal elevation relative to 0.0 MLLW). Ten random sample locations were selected along each transect. At each of the 10 locations, a 0.1 square meter quadrant was excavated to a depth of between 10 and 15 centimeters. The contents of the sample area were transferred to a stack of three 12-inch diameter sieves with screen sizes of 0.5 inches (in), 4 millimeters (mm), and 1 mm, respectively. Contents of the 0.5-inch sieve were sorted, identified to species, and counted; contents of the other two sieves were stored and transported to a laboratory for further analysis. A full description of study methods can be found in AES 2001. Results of the 2000 and 2001 sampling on the three Bainbridge Island sites follow.

Table 1. Species Richness across Bainbridge Island Sample Sites (2000)

Site	Location	Species Richness		
		1 mm	4 mm	0.5 in
3	Point White – S	8	9	3
5	Point White – N	10	14	3
12 (Reference Site)	Crystal Springs	13	15	8

In 2000, the Crystal Springs site (Site 12) showed the greatest species richness at all three sieve sizes, while the site on the southernmost tip of Point White (Site 3) showed the least.

Table 2. Species Richness across Bainbridge Island Sample Sites (2001)

Site Number	Location	Species Richness		
		1 mm	4 mm	0.5 in
3	Point White – S	13	15	4
5	Point White – N	2	1	3
12 (Reference Site)	Crystal Springs	11	15	9

Again in 2001, the Crystal Springs site (Site 12) showed relatively high species richness. However, the southernmost Point White site was quite similar in richness, and, in fact, showed greater species richness at the 1 mm sieve size than the Crystal Springs reference site. The site northeast of Point White (Site 5) showed much lower species richness in 2001 at all three sieve sizes (and particularly 1 mm and 4 mm) than the other two sites on Bainbridge Island during the same sampling period. During the 2001 sampling window, there were substantial differences in species richness between the two Point White sites, which are within 400 meters of one another.

Table 3. Species Abundance\* across Bainbridge Island Sampling Sites -- 2000 (1 mm sieve size)

Species (Common Name)	Species (Scientific Name)	Abundance Pt. White - South (Site 3)	Abundance Pt. White - North (Site 5)	Abundance Crystal Springs (Site 12)
Beach Hopper (Sand Flea)	<i>Traskorchestia traskiana</i>	--	--	5
Green Shore Crab	<i>Hemigrapsus oregonensis</i>	--	--	63
Brokenback Shrimp	<i>Heptacarpus spp.</i>	1	3	--
Hardshell Clam	<i>Unidentified</i>	1	49	32
Shield Limpet	<i>Lottia (Collisella) pelta</i>	--	--	58
Checkered Periwinkle	<i>Littorina scutulata</i>	4	41	176
Mussels	<i>Mytilus edulis</i>	--	42	2
Channeled Whelk	<i>Nucella (Thais) canaliculata</i>	1	1	30
Calcareous Tube Worm	<i>Phyllochaetopterus prolifica</i>	--	9	1
Calcareous Tube Worm	<i>Mesochaetopterus taylori</i>	1	2	1
Bristleworms	<i>Polychaeta spp.</i>	88	28	161
Ribbon worms	<i>Micrura verrilli</i>	--	3	--
Snails	N/A	3	--	7
Marine pillbug	<i>Gnorimosphae roma oregonense</i>	1	1	46
<b>Total</b>		<b>100</b>	<b>179</b>	<b>582</b>

\* Sum across all quadrants at site.

Table 3 shows species abundance at the three Bainbridge Island sites sampled during the 2000 WSF sampling. This particular year (2000) and sample method (1mm sieve) was used as an indicator of differences in species abundance among Bainbridge Island sample sites. Data are available and similar tables could be prepared for the 2001 sampling campaign as well as the other two sample methods (4 mm and 0.5 inch sieves) for both years.

Biological sampling from 2000 indicates that of the three Bainbridge Island sites, Crystal Springs was clearly the most productive. Results indicate that there was a much greater overall abundance of benthic organisms at the Crystal Springs site compared to the two Point White sites. This mirrors the slightly greater species richness at this site (see also Table 1), but the true difference among sites seems to be that total abundance of the same species (e.g., checkered periwinkle, bristle worms, marine pillbugs) was simply much greater at the Crystal Springs site compared to the two Point White sites. Only three additional species were found at the Crystal Springs site than were found at the two Point White sites.

The two Point White sites were roughly similar in total abundance of all species. However, nearly 90% of the total abundance of species at the southern Point White site (Site 3) was made up of one type of species – the bristleworms. None of the six additional species present at Site 3 were highly abundant (the maximum abundance was 4). In contrast, at the northern Point White site (Site 5), four different species contributed substantially to overall species abundance at the site, and an additional six species were present in some quantity. This indicates that two shoreline locations within close proximity to one another (approximately 400 meters) can exhibit measurable differences in biological productivity. Of the two Point White sites, the northernmost site appears to have been the more biologically productive in 2000.