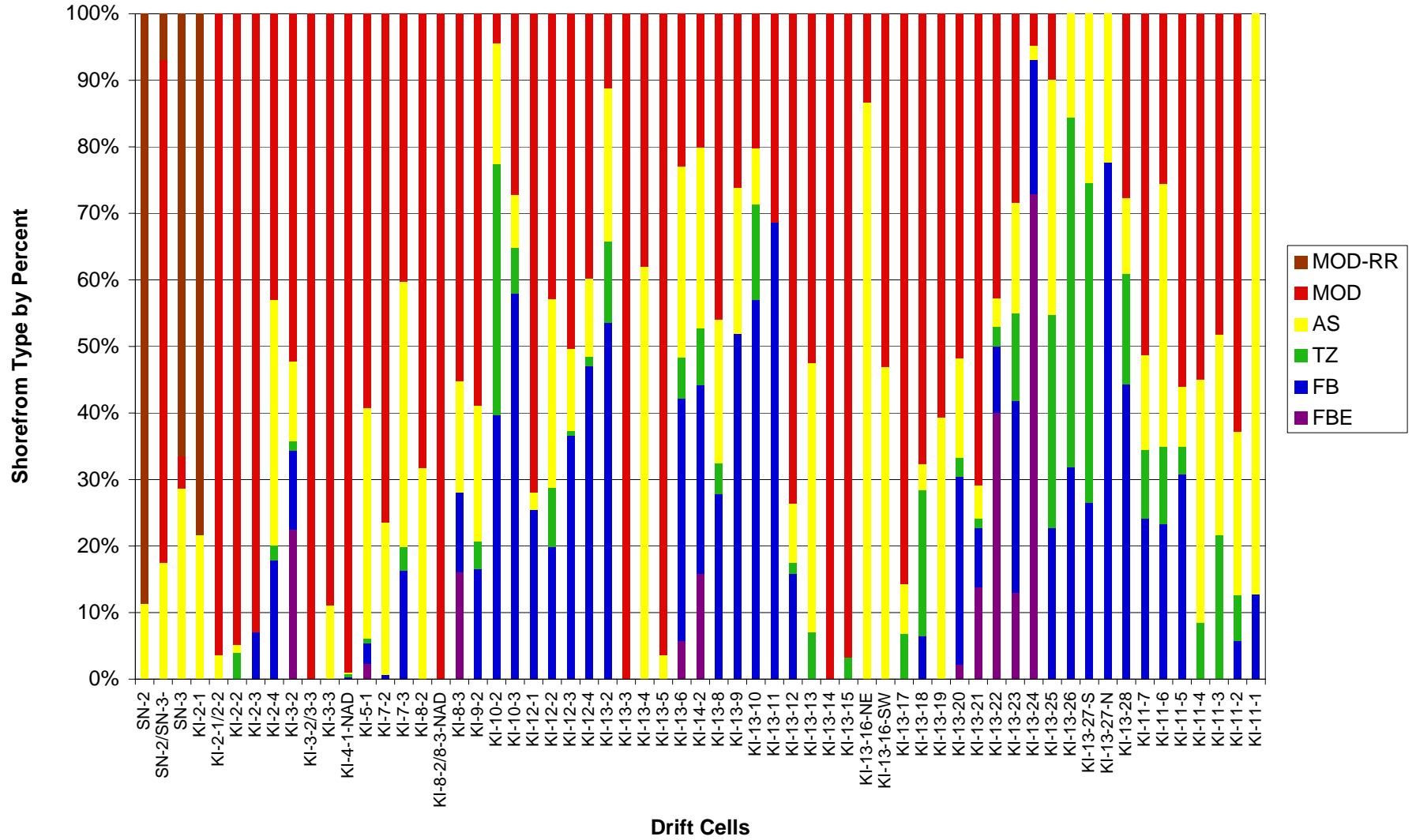
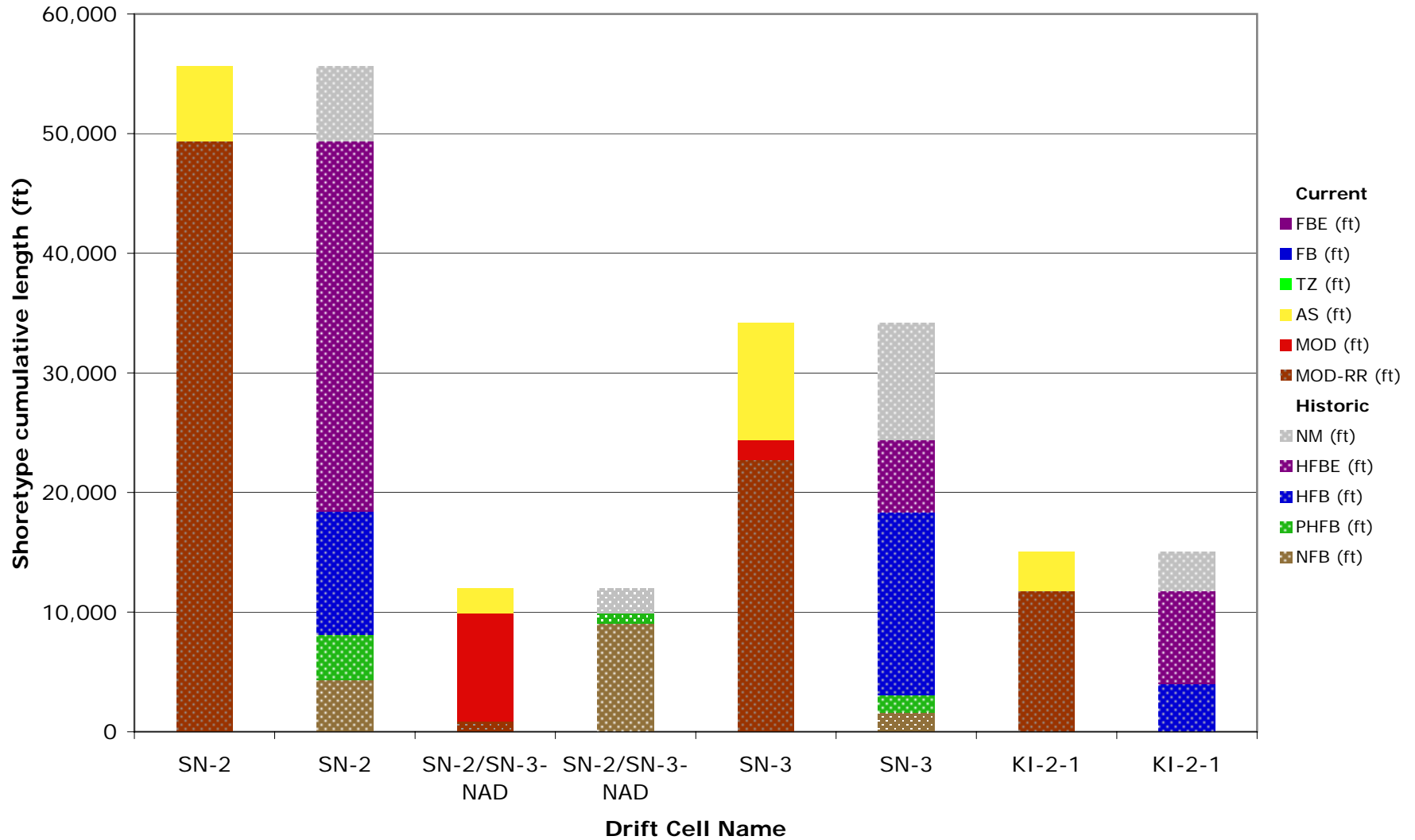


Figure 37. Current Conditions of Drift Cell by Shoretype



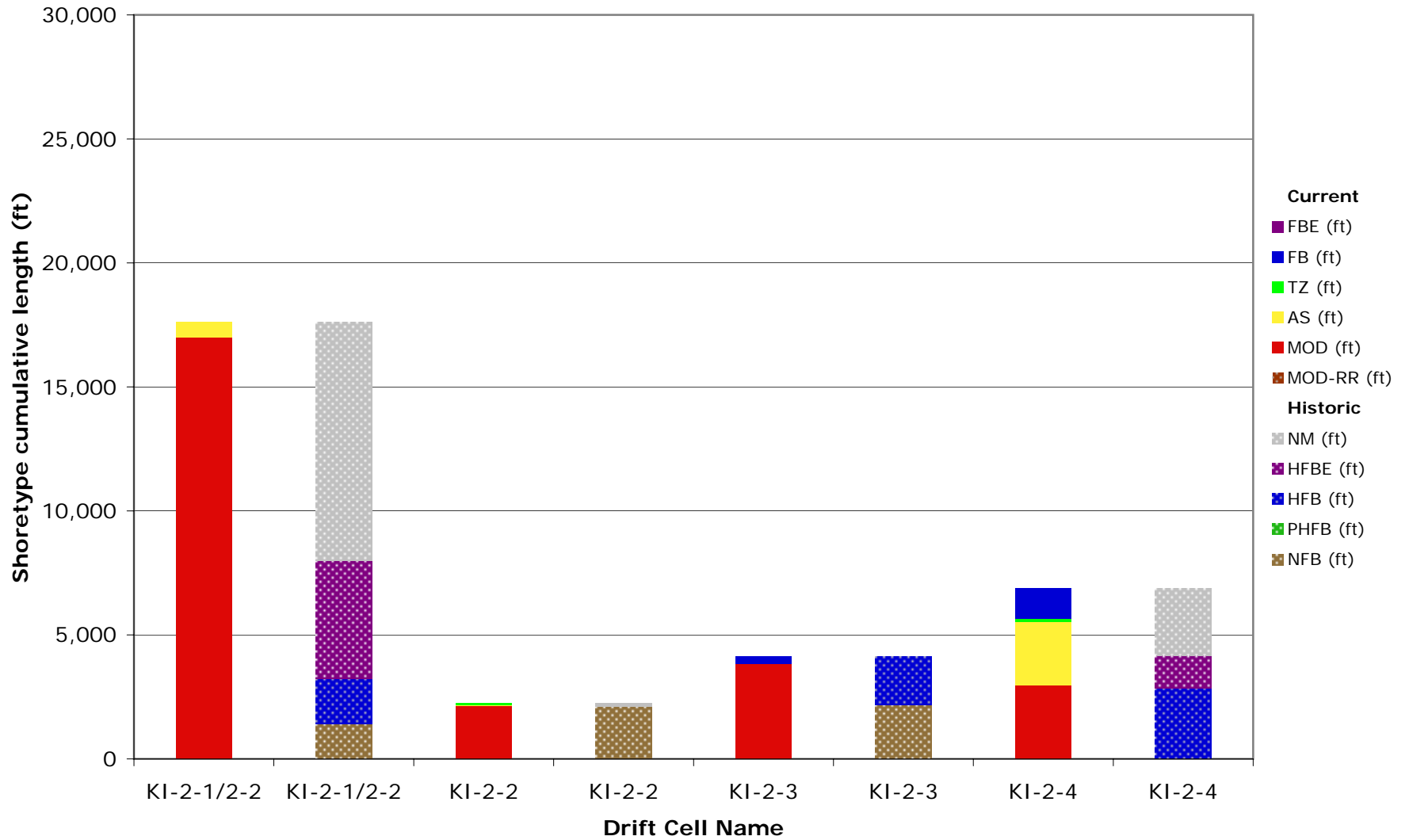
**Figure 38. Current and Historic Conditions Comparison by Drift Cell (ft)**

**Northern Railroad sub area**



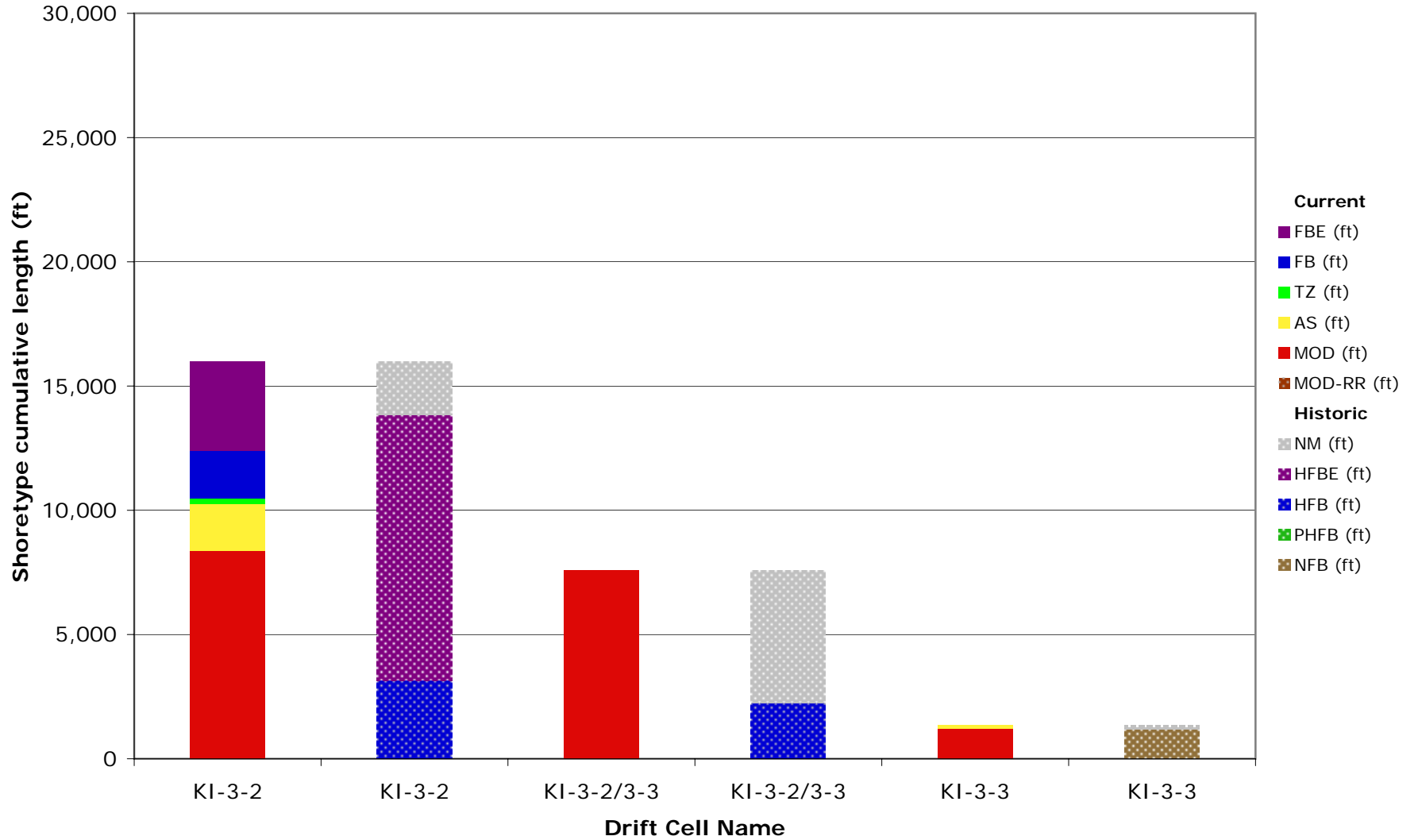
**Figure 39. Current and Historic Conditions Comparison by Drift Cell (ft)**

**Shilshole sub area**



**Figure 40. Current and Historic Conditions Comparison by Drift Cell (ft)**

**Magnolia sub area**



**Figure 41. Current and Historic Conditions Comparison by Drift Cell (ft)**

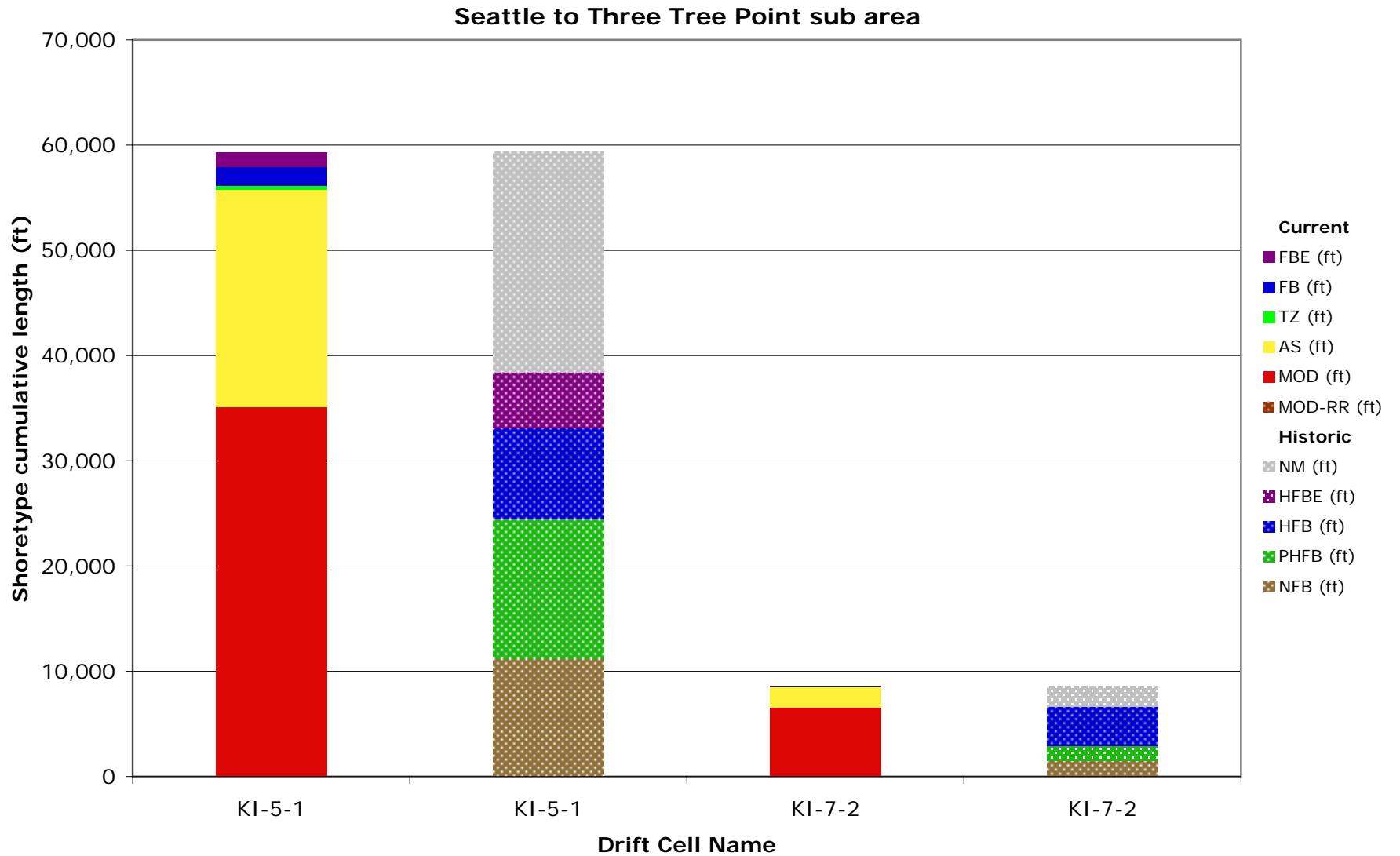
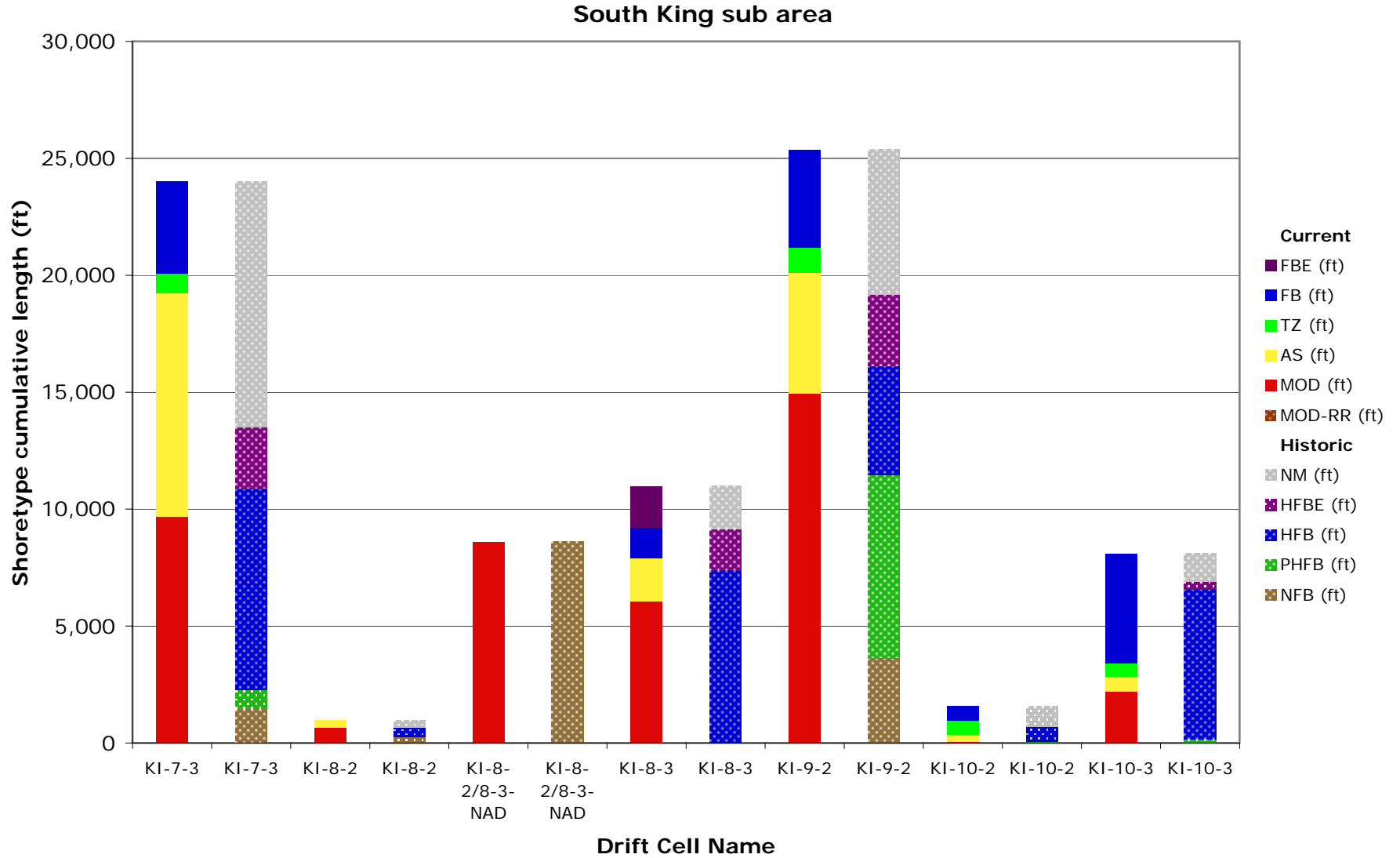
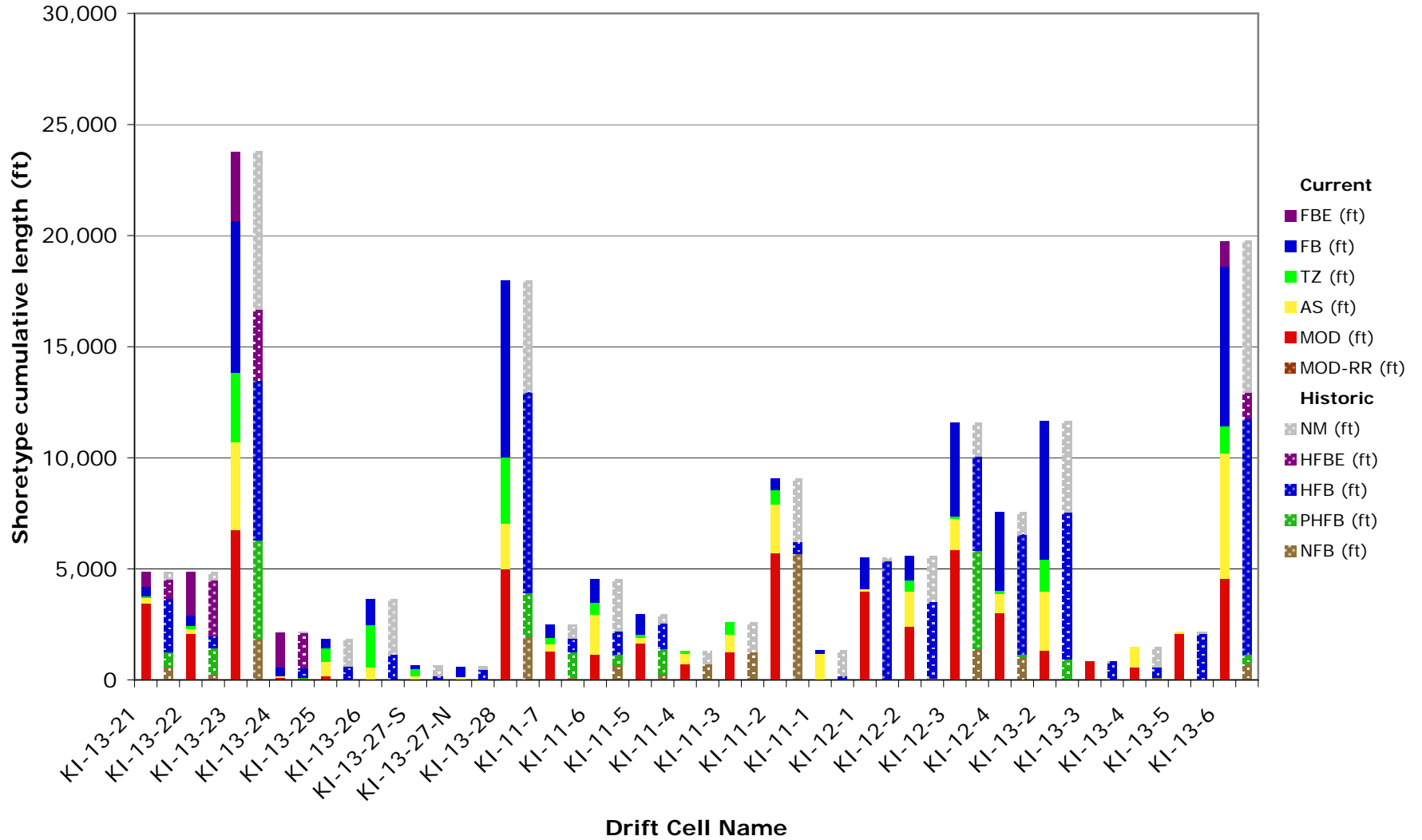


Figure 42. Current and Historic Conditions Comparison by Drift Cell (ft)



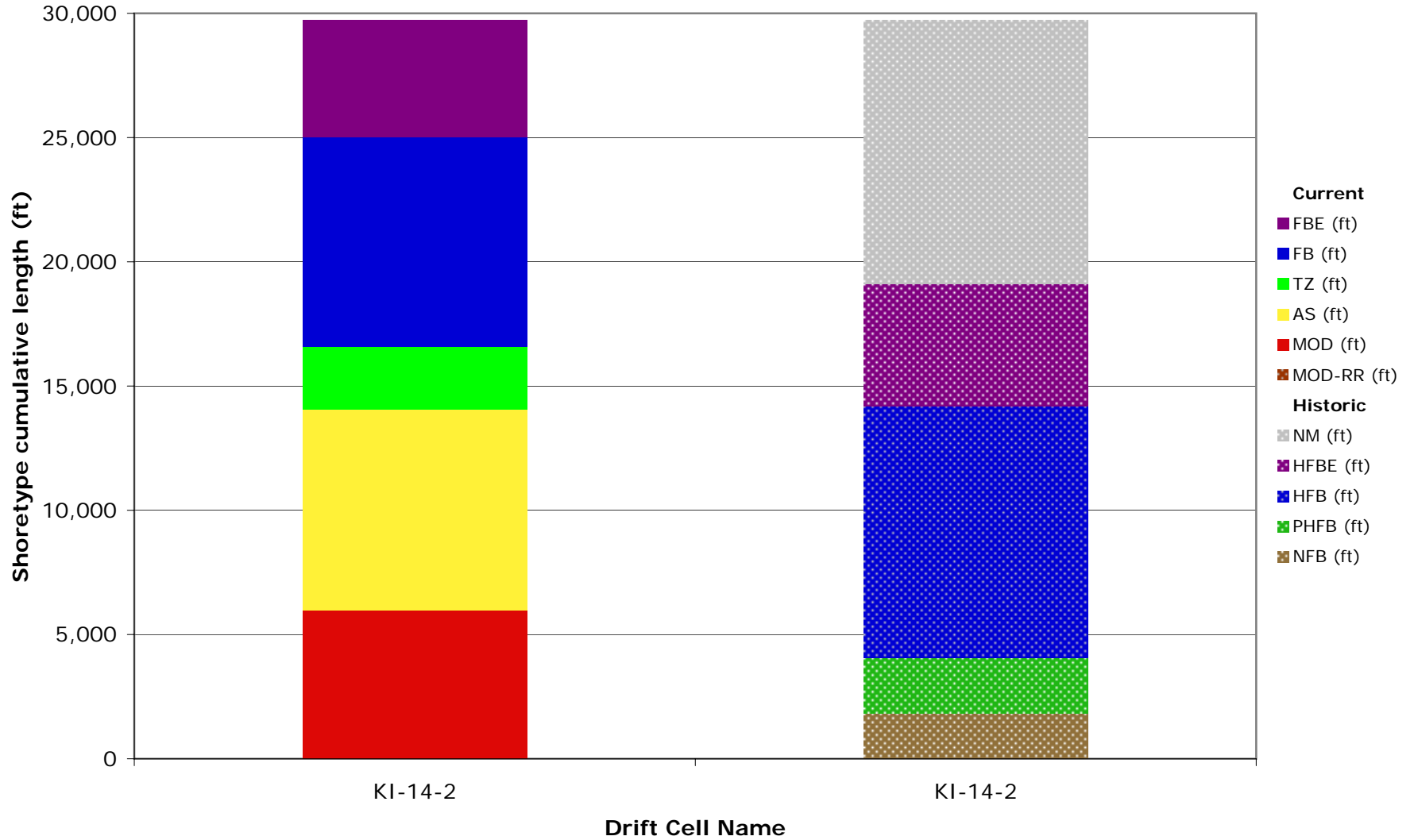
**Figure 43. Current and Historic Conditions Comparison by Drift Cell (ft)**

**Vashon-N. Maury sub area**



**Figure 44. Current and Historic Conditions Comparison by Drift Cell (ft)**

SE Maury Is. sub area



**Figure 45. Current and Historic Conditions Comparison by Drift Cell (ft)**

**Quartermaster Harbour sub area**

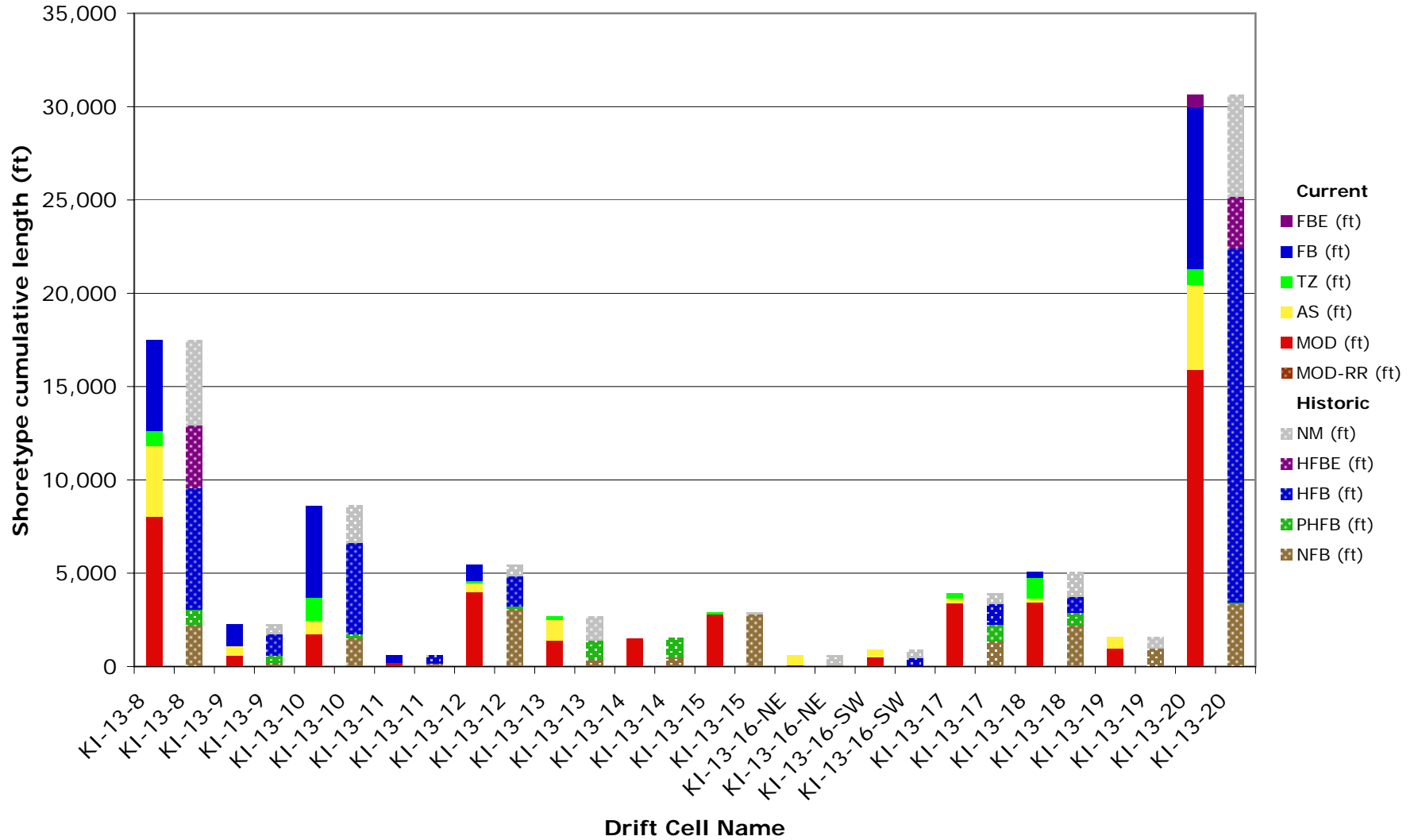
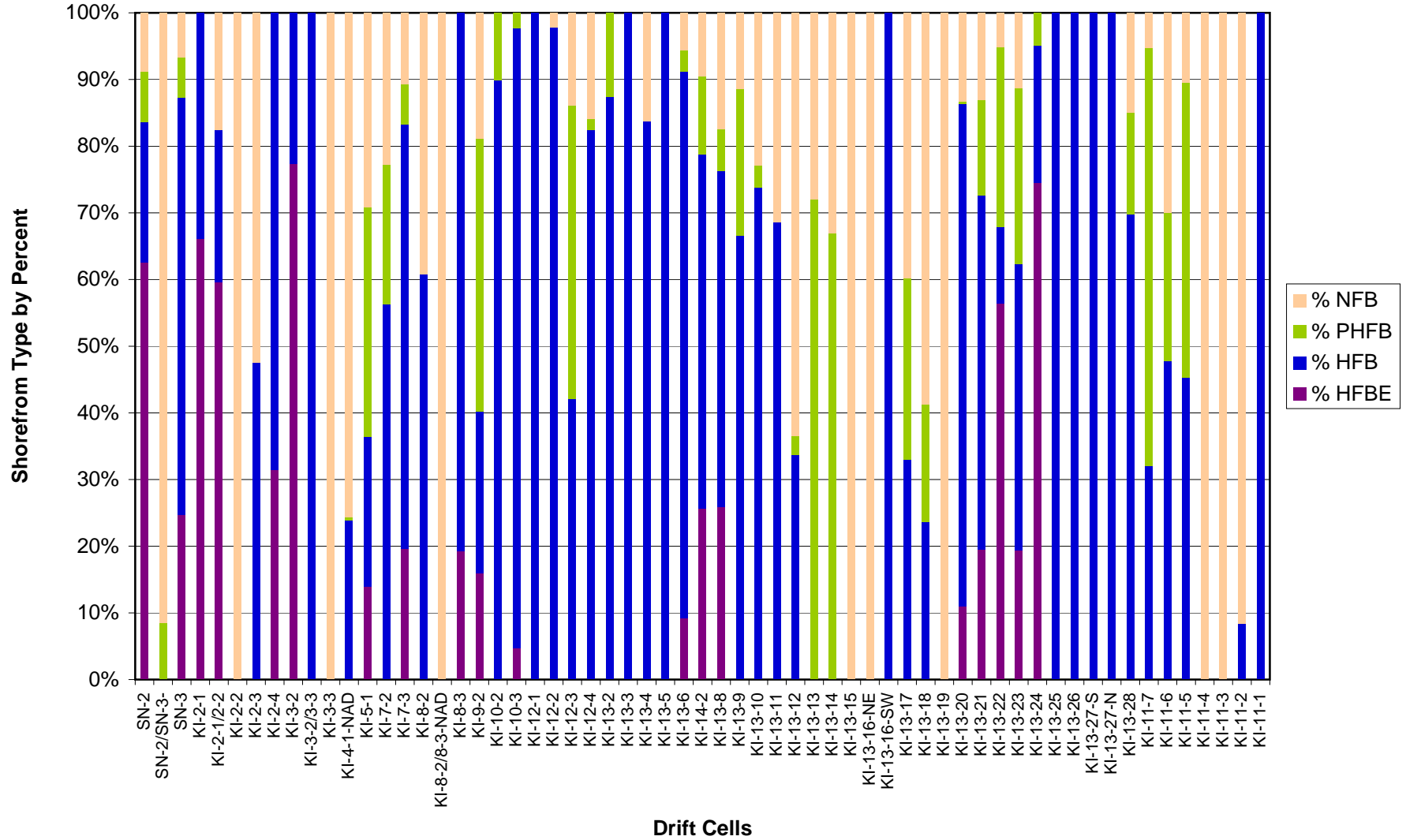


Figure 46. Historic Conditions of Drift Cell by Shoretype



In general toe erosion was more common south of Normandy Park on the south mainland and on Vashon and Maury Island (Map 9, Appendix 2). Several long reaches of shore both north and south of West Point had recent toe erosion. Otherwise, toe erosion did not occur on the mainland shore except at several areas north and south of Des Moines, and at the unstable slopes between Redondo and Dash Point. On the islands, recent toe erosion was fairly common on the west and east sides of Maury Island, and along southwest and northwest shores of Vashon Island. Scattered smaller reaches occurred elsewhere on Vashon Island. The distribution of toe erosion areas throughout the study area was influenced by the presence/absence of bulkheads.

## Historic Conditions Analysis

The results of the Historic Conditions mapping was summarized throughout the *Results* section, in Maps 10-14, Appendix 2, and in Tables 10-14. Methods relied on combining current conditions mapping of Feeder Bluff units and analysis of modified units using the newly-developed Historic Sediment Source Index (HSSI), discussed above. Historic shoretype occurrence is shown graphically by drift cell in Figure 46 and for each sub-area in Figures 38-45.

Comparison of current conditions and historic conditions mapping revealed that widespread and far-reaching changes have occurred to coastal processes and the nearshore area throughout much of the study area. Historic analysis (combined with current conditions mapping) revealed that the most common shoretype mapped in pre-development conditions was Historic Feeder Bluff, which occurred along 35.3% of the 120-mile study area shore (Table 15b). Historic Feeder Bluff Exceptional was mapped along 15% of the shore, bringing the total Historic sediment sources to 50.3% of the shore, as compared to 18.4% in current conditions mapping. An additional 8.6% of shore was *Potentially* Historic Feeder Bluff, but was not counted as Feeder Bluff/sediment source areas due to the lack of certainty for these units. When comparing current to historic conditions this constituted a 63.4% loss of sediment sources across the entire study area, leaving only 36.6% of the historic sediment sources currently intact (this does not include *Potential* Feeder Bluffs).

Due to limitations and inconsistencies in the historic data sources, there were likely more Historic Feeder Bluff sediment source areas in portions of the study area. This likely applied to areas far from the central mainland shore and Northern Railroad area, where less detailed landslide mapping and other types of mapping have taken place in recent decades. These areas also had lower quality historic air photos. In the Snohomish County portion of the study area (WRIA 8), 1946 photos were the oldest available—which was a long time after the construction of the railroad in the 1890s, allowing the bluffs time to become less unstable and therefore the frequency of landslides to be reduced prior to 1946.

Table 15b. CGS historic (pre-development) conditions mapping summary for entire study area.

Shore Segment	Total Length (ft)	Approx % of Study Area
Historic Feeder Bluff Exceptional	95,019	15.0%
Historic Feeder Bluff	223,055	35.3%
Potential Historic Feeder Bluff	54,555	8.6%
Historic Transport Zone*	207,608	32.9%**
Historic Accretion Shoreform**	209,842	33.2%**
Sum		125.1%**

\* Historic transport zone Current Transport Zone segments + Historic Not Feeder Bluff

\*\* Percentages are of current Shorezone shoreline length are greater than 100% because bluff mapping and accretion shoreform mapping used different methods. Historic Accretion Shoreforms and bluff/modified units mapping had some overlap.

Additionally, the HSSI methodology weighted a number of factors that include high-elevation bluffs with long fetches, coarse sediment, and documented past landslides. The index appeared to perform well with the understanding that all portions of the study area were evaluated as a group and low energy shores with very low sediment input and net shore-drift volumes would not

necessarily be scored as Historic Feeder Bluffs (HFB) in the index. The choice was made to use the HSSI to keep the weighting consistent throughout the study area and not make scores relative to each drift cell or geographic area. For example, running of the index for Quartermaster Harbor resulted in a number of short drift cells with no HFB at all. This was because of the short fetch and low banks/bluffs that were apparently providing limited sediment input.

In the drift cell context, certain bluff units were locally important for sediment input that did not always show up in the HSSI score. The solution to this was the creation of a table that listed the three highest scoring modified segments in each drift cell (discussed below). In this local context, the few relatively high-scoring modified segments would be the best choice for restoration planning within that drift cell.

Historic transport zones occurred along 32.9% of the study area shore by summing transport zones mapped in current conditions work and the Not Feeder Bluff units derived from the HSSI (some of which overlapped with Historic Accretion Shoreforms, such that this total is higher than the actual percentage) (Table 15b).

Historic Accretion Shoreform mapping was performed independently from the HSSI analysis of modified units. The entire shore of the study area was examined for mapping of Historic Accretion Shoreforms using the best historic sources (see *Methods*). Results were presented in Maps 10-14 (Appendix 2). Historic Accretion Shoreforms were mapped along 33.2% of the shore-equivalent length (Table 15b). Due to the different methods, some overlap of the Historic Accretion Shoreforms and other units (mapped in current conditions work) occurred. In any event, almost 40 miles of Accretion Shoreform was mapped in pre-development conditions, far more than the approximately 22 miles mapped during current conditions fieldwork.

Detailed analysis and description of Historic Accretion Shoreforms is not included here due to the quantity and complexity of these features. Additionally, this report was intended to be primarily a mapping effort and sediment source prioritization, and not a detailed investigation into functions and values of Historic Accretion Shoreforms. Additional research and analysis should be carried out into the functions and values of various types of Accretion Shoreforms, using the data sets generated in this report as a starting point. All features were presented on the large map sheets and summarized in drift cell summaries in the *Results* section.

The most frequently occurring Historic Accretion Shoreforms were stream mouths, longshore lagoons, and depositional open beaches. These features were most common at drift cell termini, but also occurred frequently within drift cells, usually where a change in shore orientation occurred. Further work should be carried out on evaluating the distribution of Historic Accretion Shoreforms.

## Restoration and Conservation Prioritization Summary

After completing the analysis of historic sediment sources in WRIA 8 and 9, all modified Feeder Bluff units were prioritized for restoration, and all intact Feeder Bluffs were prioritized for conservation. The methods applied in the prioritizations are described within *Restoration and Conservation Prioritization Methods*, and the results are summarized below and in Maps 15-9 (Appendix 2) and Tables 16-21. Prioritization was undertaken in three ways, two at a regional or study-area wide scale, and one at a drift cell scale. Each method serves a slightly different purpose, but they can be used in conjunction with one another.

Prioritization analyses were based solely on geomorphic features that are present or were present in the study area. This report did not evaluate biological or habitat values, such that the data produced in this report may be of higher value when incorporated with biological data. In addition, consideration should be given to the position of individual bluff restoration candidate sites within drift cells, which was not considered herein. For example, a priority unit near the origin of a drift cell would likely provide down-drift benefits for a longer time period than a bluff unit near the terminus of a drift cell where net shore-drift sediment would likely have a lesser residence time on the beach

as sediment is often lost to deep water from the terminus of a cell.

This prioritization does not include consideration of socioeconomic factors, such as cost to restore or preserve shore units, (which would vary greatly over the study area), or property owner willingness to restore feeder bluffs. A detailed evaluation and specific feasibility analysis of potential restoration sites within individual drift cells should be conducted prior to initiating large-scale restoration projects.

As discussed in the above section, the scoring of bluff units in the HSSI likely under-valued the sediment source input potential from bluff units in the Northern Railroad and islands, both for modified bluff units (for restoration prioritization) and for existing sediment source areas (for conservation prioritization).

### **Individual Bluff Unit Prioritization Results**

The first method of prioritization compared all individual modified (restoration) or intact (conservation) Feeder Bluff units against each other throughout the study area. The prioritization for individual modified bluff units was simply done by including units that scored more than one standard deviation higher than the mean of all modified Feeder Bluff and Feeder Bluff Exceptional segments. The same was done for the conservation prioritization by using intact Feeder Bluffs and Feeder Bluff Exceptional segments instead of modified units. The scores were derived from physical parameters of the bluffs in the Historic Sediment Source Index (HSSI) developed by Coastal Geologic Services for this study. The index used parameters such as bluff height, landslide history, and landscape setting to rank individual units.

The results of the individual unit restoration prioritization are displayed in Map 15 (Appendix 2) and summarized in Table 16. The Historic Feeder Bluffs of the highest priority for restoration are found throughout the study area. Analysis of the top 25 units reveal that the high rated bluff restoration units are most abundant in the Northern Railroad sub-area, where the BNSF railway impedes the influx of valuable beach sediment from unstable bluffs. Additional clusters of high priority bluff restoration sites are found at Magnolia Bluffs, the shore between Normandy Park and Des Moines, and at the entrance to Quartermaster Harbor. Several shorter reaches of priority restoration bluff are found along the high bluff shore of east Vashon Island.

The results of the individual unit conservation prioritization area displayed in Map 16 (Appendix 2) and summarized in Table 17. Due to the extensive amount of modification in WRIA 8 and northern Seattle, the northern most bluff unit of conservation priority is located just north of West Point. The Feeder Bluffs of the highest priority for conservation are found in southern Quartermaster Harbor. Smaller clusters of high conservation priority units are found in the South King sub-area west of Dumas Bay, as well as several units in the Vashon and North Maury Island sub area, predominantly along the southwest shore of Vashon Island. A number of high conservation priority sites were located along Southeast Maury Island, although this area already seems to have an unnaturally high sediment input due to the long history of gravel mining in the area.

### **Prioritization Within Drift Cells**

The second prioritization approach followed the same scoring system as the individual unit prioritizations above. However, in this case the scores were compared against *only* the other units within individual drift cells. This method of examining restoration and conservation potential should be valuable for prioritizing restoration or protection within drift cells where sediment sources are deemed locally critical, without relying on the total potential yield of particular bluff segments area-wide. This may be the case where Accretion Shoreforms or pocket estuaries are lost or threatened due to sediment supply. Use of this data would be most appropriate for lower energy/more protected areas.

**Table 16.** Restoration prioritization. Historic feeder bluff scores greater than one standard deviation above the mean (Mean=25.7, Stdev=14.7). Higher scores represent areas of great restoration priority. See Map 15 for locations.

Unit No.	Sub-area	Drift Cell	Historic Shoretype	Unit Length	RP Score
326	Northern Railroad	SN-2	FBE	11,371	59
216	Southeast Maury Island	KI-13-8	FBE	136	59
217	Southeast Maury Island	KI-13-8	FBE	73	59
215	Southeast Maury Island	KI-13-8	FBE	61	59
213	Southeast Maury Island	KI-13-8	FBE	1,323	57
148	Vashon and N Maury Island	KI-13-22	FBE	80	56
146	Vashon and N Maury Island	KI-13-22	FBE	71	54
21	South King	KI-9-2	FBE	436	53
286	Northern Railroad	SN-3	FBE	6,018	52
302	South King	KI-8-1	FBE	813	52
214	Vashon and N Maury Island	KI-13-8	FBE	270	52
160	Quartermaster Harbor	KI-13-20	FBE	244	52
283	Northern Railroad	SN-2	FBE	1,269	51
145	Vashon and N Maury Island	KI-13-23	FBE	135	51
147	Vashon and N Maury Island	KI-13-22	FBE	103	51
280	Northern Railroad	SN-2	FBE	6,830	50
284	Northern Railroad	SN-2	FBE	6,386	50
212	Southeast Maury Island	KI-13-8	FBE	740	50
211	Quartermaster Harbor	KI-13-8	FBE	736	50
12	South King	PI-1-1	FBE	185	50
22	South King	KI-9-2	FBE	102	50
282	Northern Railroad	SN-2	FBE	5,036	49
65	Magnolia Bluffs	KI-3-2	FBE	7,107	47
291	Northern Railroad	KI-2-1	FBE	4,375	47
293	Northern Railroad	KI-2-1	FBE	3,409	47
156	Vashon and N Maury Island	KI-13-21	FBE	214	47
10	South King	PI-1-1	FBE	168	47
161	Quartermaster Harbor	KI-13-20	FBE	132	47
303	South King	KI-8-1	FBE	66	47
16	South King	KI-9-2	FBE	2,447	46
162	Quartermaster Harbor	KI-13-20	FBE	1,731	46
245	Shilshole to Salmon Bay	KI-3-1	FBE	1,333	46
311	Shilshole to Salmon Bay	KI-2-1/KI-2-2	FBE	4,766	45
49	Shilshole to Salmon Bay	KI-5-1	FBE	3,853	45
251	South King	KI-8-1	FBE	1,861	45
150	Vashon and N Maury Island	KI-13-22	FBE	227	45
219	Southeast Maury Island	KI-14-2	FBE	205	45
149	Vashon and N Maury Island	KI-13-22	FBE	113	45
312	Northern Railroad	SN-2	FB	6,516	44
80	Vashon and N Maury Island	KI-12-2	FB	733	44
34	South King	KI-8-1	FB	598	44
163	Quartermaster Harbor	KI-13-20	FB	132	44
79	Vashon and N Maury Island	KI-12-2	FB	64	44
262	Vashon and N Maury Island	KI-13-1	FB	775	43
158	Quartermaster Harbor	KI-13-21	FB	707	43
144	Vashon and N Maury Island	KI-13-23	FB	147	43
28	South King	KI-8-3	FB	99	43
292	Northern Railroad	SN-3	FB	10,537	42
72	Shilshole to Salmon Bay	KI-2-1/KI-2-2	FB	1,818	42
101	Vashon and N Maury Is	KI-13-2	FB	354	42
159	Quartermaster Harbor	KI-13-20	FB	304	42
314	Shilshole to Salmon Bay	KI-5-1	FB	5,493	41
246	Shilshole to Salmon Bay	KI-2-3	FB	527	41
8	South King	PI-1-1	FB	47	41

**Table 17.** Conservation prioritization. Historic feeder bluff scores greater than one standard deviation above the mean. (Mean=25.7, Stdev=14.7). Higher scores represent areas of great restoration priority. See Map 17 for locations.

Unit no.	Sub-area	Drfit Cell	Unit Length	CP Score
210	Vashon North Maury Island	KI-13-23	715	49
144	Quartermaster Harbor	KI-13-8	45	49
145	Quartermaster Harbor	KI-13-8	173	49
164	Quartermaster Harbor	KI-13-8	57	49
182	South King	KI-10-3	658	49
179	Vashon North Maury Island	KI-13-23	3,560	47
152	Southeast Maury Island	KI-14-2	1,389	47
17	South King	KI-9-2	1,218	47
110	Quartermaster Harbor	KI-13-20	455	46
113	Quartermaster Harbor	KI-13-20	2,949	46
115	Quartermaster Harbor	KI-13-20	1,107	46
143	Quartermaster Harbor	KI-13-8	1,134	46
165	Quartermaster Harbor	KI-14-2	1,343	46
6	South King	KI-10-3	1,097	46
189	Magnolia Bluffs	KI-3-2	2,661	45
178	Quartermaster Harbor	KI-13-20	1,488	44
141	Quartermaster Harbor	KI-13-8	245	44
142	Quartermaster Harbor	KI-13-8	54	44
157	Vashon North Maury Island	KI-14-1	949	44
184	South King	KI-7-3	1,689	44
11	South King	KI-10-3	2,118	44
46	Vashon North Maury Island	KI-12-2	171	44
93	Vashon North Maury Island	KI-13-26	1,153	43
111	Quartermaster Harbor	KI-13-20	115	43
203	Vashon North Maury Island	KI-13-23	1,516	42
138	Quartermaster Harbor	KI-13-8	323	42
148	Southeast Maury Island	KI-14-2	229	42
150	Southeast Maury Island	KI-14-2	1,364	42
151	Southeast Maury Island	KI-14-2	720	42
176	Southeast Maury Island	KI-14-2	631	42
177	Southeast Maury Island	KI-14-2	345	42
200	Southeast Maury Island	KI-14-2	119	42
66	Vashon North Maury Island	KI-13-2	1,122	42
185	Southeast Maury Island	KI-14-2	641	42
187	Southeast Maury Island	KI-14-2	649	42
192	Southeast Maury Island	KI-14-2	486	42
181	South King	KI-10-2	619	41
47	Vashon North Maury Island	KI-12-2	170	41
109	Quartermaster Harbor	KI-13-20	559	41
114	Quartermaster Harbor	KI-13-20	142	41
98	Vashon North Maury Island	KI-13-23	856	41
39	Shilshole to Salmon Bay	KI-2-4	1,229	41
7	South King	KI-10-3	270	41
8	South King	KI-10-3	38	41
12	South King	KI-10-3	403	41
193	Vashon North Maury Island	KI-13-22	1,208	41
153	Southeast Maury Island	KI-14-2	531	40

**Table 18.** Restoration prioritization listing top 3 scoring modified units in each drift cell. NA, not applicable, indicates that there are no historic sediment sources in the drift cell to restore. See Map 1 for drift cell locations.

Driftcell name	1st Priority		2nd Priority		3rd Priority	
	Unit ID	Unit Score	Unit ID	Unit Score	Unit ID	Unit Score
SN-2	326	59	283	51	280	50
SN-2/SN-3	243	21	241	6	240	6
SN-3	286	52	292	42	310	39
KI-2-1	291	47	293	47	290	38
KI-2-1/KI-2-2	311	45	72	42	296	2
KI-2-2	69	15	71	15	70	15
KI-2-3	246	41	67	34	68	19
KI-2-4	245	46	66	34	NA	NA
KI-3-2	65	47	63	39	64	39
KI-3-2/KI-3-3	278	39	74	NA	NA	NA
KI-3-3	298	6	297	4	NA	NA
KI-4-1-NAD	NA	NA	NA	NA	NA	NA
KI-5-1	49	45	314	41	48	36
KI-7-2	45	34	309	30	248	27
KI-7-3	302	52	303	47	251	45
KI-8-2	250	34	275	14	NA	NA
KI-8-2/KI-8-3	252	8	274	5	NA	NA
KI-8-3	28	43	29	40	31	40
KI-9-2	21	53	22	50	16	46
KI-10-2	7	23	NA	NA	NA	NA
KI-10-3	NA	NA	NA	NA	NA	NA
KI-12-1	77	30	NA	NA	NA	NA
KI-12-2	79	44	80	44	82	40
KI-12-3	85	27	89	25	88	24
KI-13-1	262	43	95	37	93	36
KI-13-2	101	42	263	25	103	24
KI-13-3	265	36	NA	NA	NA	NA
KI-13-4	264	36	236	10	NA	NA
KI-13-5	267	38	NA	NA	NA	NA
KI-13-6	226	40	234	37	266	34
KI-14-2	219	45	218	39	221	39
KI-13-8	216	59	217	59	215	59
KI-13-9	201	20	200	19	NA	NA
KI-13-10	199	22	198	14	197	11
KI-13-11	276	5	NA	NA	NA	NA
KI-13-12	193	32	194	22	192	18
KI-13-13	188	25	187	5	NA	NA
KI-13-14	253	24	254	15	NA	NA
KI-13-15	186	15	256	15	NA	NA
KI-13-16-NE	255	15	NA	NA	NA	NA
KI-13-16-SW	299	33	NA	NA	NA	NA
KI-13-17	257	33	184	30	185	22
KI-13-18	177	31	176	25	179	18
KI-13-19	258	13	NA	0	NA	NA
KI-13-20	160	52	161	47	162	46
KI-13-21	156	47	158	43	157	37
KI-13-22	148	56	146	54	147	51
KI-13-23	145	51	144	43	143	40
KI-13-24	135	21	NA	NA	NA	NA
KI-13-25	134	31	NA	NA	NA	NA
KI-13-26	NA	NA	NA	NA	NA	NA
KI-13-27-S	NA	NA	NA	NA	NA	NA
KI-13-27-N	NA	NA	NA	NA	NA	NA
KI-13-28	132	40	125	39	126	38
KI-11-7	319	27	117	23	118	6
KI-11-6	113	29	116	21	114	13
KI-11-5	109	31	110	29	111	22
KI-11-4	268	18	108	11	NA	0
KI-11-3	271	9	107	7	106	7
KI-11-2	75	19	322	19	104	18
KI-11-1	NA	NA	NA	NA	NA	NA

**Table 19.** Conservation prioritization listing top 3 scoring existing sediment sources in each drift cell. NA, not applicable, indicates that there are no intact sediment sources in the drift cell to conserve. When high-scoring segment scores were the same within a drift cell, the longest segments were chosen and listed here. See Map 1 for drift cell locations.

Driftcell name	1st Priority		2nd Priority		3rd Priority	
	Unit ID	Unit Score	Unit ID	Unit Score	Unit ID	Unit Score
SN-2	NA	NA	NA	NA	NA	NA
SN-2/SN-3	NA	NA	NA	NA	NA	NA
SN-3	NA	NA	NA	NA	NA	NA
KI-2-1	NA	NA	NA	NA	NA	NA
KI-2-1/KI-2-2	NA	NA	NA	NA	NA	NA
KI-2-2	NA	NA	NA	NA	NA	NA
KI-2-3	40	14	42	14	41	12
KI-2-4	39	41	NA	NA	NA	NA
KI-3-2	189	45	37	36	197	36
KI-3-2/KI-3-3	NA	NA	NA	NA	NA	NA
KI-3-3	32	0	NA	NA	NA	NA
KI-4-1-NAD	NA	NA	NA	NA	NA	NA
KI-5-1	207	32	196	29	31	21
KI-7-2	27	21	NA	NA	NA	NA
KI-7-3	184	44	24	32	22	31
KI-8-2	NA	NA	NA	NA	NA	NA
KI-8-2/KI-8-3	NA	NA	NA	NA	NA	NA
KI-8-3	21	37	190	37	195	37
KI-9-2	17	47	20	36	18	34
KI-10-2	181	41	NA	NA	NA	NA
KI-10-3	182	49	6	46	11	44
KI-12-1	173	34	NA	NA	NA	NA
KI-12-2	46	44	47	41	45	29
KI-12-3	48	33	52	24	50	22
KI-13-1	63	39	58	35	54	32
KI-13-2	66	42	67	33	64	29
KI-13-3	NA	NA	NA	NA	NA	NA
KI-13-4	NA	NA	NA	NA	NA	NA
KI-13-5	NA	NA	NA	NA	NA	NA
KI-13-6	157	44	160	39	156	39
KI-14-2	152	47	165	46	150	42
KI-13-8	145	49	164	49	144	49
KI-13-9	132	20	169	20	NA	NA
KI-13-10	129	28	130	28	127	23
KI-13-11	167	27	NA	NA	NA	NA
KI-13-12	124	7	123	5	126	2
KI-13-13	NA	NA	NA	NA	NA	NA
KI-13-14	NA	NA	NA	NA	NA	NA
KI-13-15	NA	NA	NA	NA	NA	NA
KI-13-16-NE	NA	NA	NA	NA	NA	NA
KI-13-16-SW	NA	NA	NA	NA	NA	NA
KI-13-17	NA	NA	NA	NA	NA	NA
KI-13-18	NA	NA	NA	NA	NA	NA
KI-13-19	NA	NA	NA	NA	NA	NA
KI-13-20	113	46	115	46	110	46
KI-13-21	212	36	106	36	107	36
KI-13-22	193	41	102	36	198	36
KI-13-23	210	49	179	47	203	42
KI-13-24	211	30	95	13	NA	NA
KI-13-25	175	26	94	21	NA	NA
KI-13-26	93	43	NA	NA	NA	NA
KI-13-27-S	92	3	NA	NA	NA	NA
KI-13-27-N	171	27	NA	NA	NA	NA
KI-13-28	91	34	86	31	81	28
KI-11-7	79	0	NA	NA	NA	NA
KI-11-6	77	29	76	26	74	23
KI-11-5	72	32	71	29	70	19
KI-11-4	NA	NA	NA	NA	NA	NA
KI-11-3	NA	NA	NA	NA	NA	NA
KI-11-2	69	34	43	30	NA	NA
KI-11-1	172	34	NA	NA	NA	NA

**Table 20.** Restoration prioritization by drift cell, sorted by RP (restoration prioritization) score. High RP scores indicate high restoration priority. See Map 16 for locations.

Drift Cell	Drift Cell Length	% Pre-devel. Sed. Source	% Sed. Source Lost	Rank	Prioritization
KI-13-16-SW	901	53%	100%	100	<b>HIGHEST</b>
KI-13-17	3,935	28%	100%	100	
KI-13-3	843	100%	100%	100	
KI-13-4	1,485	32%	100%	100	
KI-13-5	2,166	96%	100%	100	
KI-2-1	15,026	78%	100%	100	
KI-2-1/KI-2-2	17,629	37%	100%	100	
KI-3-2/KI-3-3	7,584	30%	100%	100	
KI-8-2	982	41%	100%	100	
SN-2	55,603	74%	100%	100	
SN-3	34,176	62%	100%	100	
KI-13-18	5,084	18%	63%	100	
KI-7-2	8,605	43%	98%	99	
KI-2-3	4,135	48%	85%	92	
KI-13-12	5,436	30%	48%	86	
KI-5-1	59,326	23%	77%	85	
KI-12-1	5,512	97%	74%	68	<b>MODERATE PRIORITY</b>
KI-12-2	5,581	61%	68%	67	
KI-2-4	6,887	61%	71%	66	
KI-8-3	10,985	83%	66%	65	
KI-13-21	4,850	68%	67%	65	
KI-7-3	24,012	47%	65%	65	
KI-3-2	15,982	87%	60%	61	
KI-13-8	17,489	56%	51%	58	
KI-13-20	30,641	71%	57%	53	
KI-9-2	25,368	30%	45%	52	
KI-12-4	7,558	71%	34%	33	<b>PRIORITY</b>
KI-13-25	1,845	33%	30%	32	
KI-14-1	8,102	83%	30%	26	
KI-10-3	4,867	63%	21%	26	
KI-13-22	2,933	39%	22%	23	<b>LOW PRIORITY</b>
KI-11-5	17,982	50%	12%	23	
KI-13-28	29,721	51%	13%	14	
KI-14-2	11,648	57%	5%	12	
KI-13-2	23,777	44%	4%	6	
KI-13-23	19,757	59%	29%	4	

**Table 21.** Conservation prioritization by drift cell, sorted by CP (conservation prioritization) score. Higher scores are indicative of sites of high conservation priority. See Map 18 for locations.

Drift Cell Name	Drift Cell Length	% Pre-devel. Sed. Source	Remaining Intact (%)	Rank	Prioritization	
KI-13-18	5,084	18%	37%	100	<b>HIGHEST</b>	
KI-7-2	8,605	43%	2%	99		
KI-2-3	4,135	48%	15%	92	<b>HIGH</b>	
KI-13-12	5,436	30%	52%	86		
KI-5-1	59,326	23%	23%	85		
KI-12-1	5,512	97%	26%	68	<b>MODERATELY HIGH</b>	
KI-12-2	5,581	61%	32%	67		
KI-2-4	6,887	61%	29%	66		
KI-8-3	10,985	83%	34%	65		
KI-13-21	4,850	68%	33%	65		
KI-7-3	24,012	47%	35%	65		
KI-3-2	15,982	87%	40%	61		
KI-13-8	17,489	56%	49%	58		
KI-13-20	30,641	71%	43%	53		
KI-9-2	25,368	30%	55%	52		
KI-12-4	7,558	71%	66%	33		<b>MODERATE PRIORITY</b>
KI-13-25	1,845	33%	70%	32		
KI-14-1	2,254	52%	100%	26		
KI-10-3	8,102	83%	70%	26		
KI-13-22	4,867	63%	79%	23	<b>PRIORITY</b>	
KI-11-5	2,933	39%	78%	23		
KI-13-28	17,982	50%	88%	14		
KI-14-2	29,721	51%	87%	12		
KI-13-2	11,648	57%	95%	6		
KI-13-23	23,777	44%	96%	4	<b>LOW PRIORITY</b>	
KI-13-6	19,757	59%	71%	0		
KI-10-2	1,562	40%	100%	0		
KI-11-1	1,338	13%	100%	0		
KI-11-2	9,051	6%	100%	0		
KI-11-3	2,600	0%	100%	0		
KI-11-4	1,313	0%	100%	0		
KI-11-6	4,517	23%	100%	0		
KI-11-7	2,483	24%	100%	0		
KI-12-3	11,586	37%	100%	0		
KI-13-10	8,625	57%	100%	0		
KI-13-11	587	69%	100%	0		
KI-13-13	2,677	0%	100%	0		
KI-13-14	1,529	0%	100%	0		
KI-13-15	2,903	0%	100%	0		
KI-13-16-NE	607	0%	100%	0		
KI-13-19	1,580	0%	100%	0		
KI-13-26	3,626	32%	100%	0		
KI-13-27-N	600	78%	100%	0		
KI-13-27-S	653	27%	100%	0		
KI-2-2	2,244	0%	100%	0		
KI-3-3	1,346	0%	100%	0		
KI-4-1	46,718	0%	100%	0		
KI-8-2/8-3	8,608	0%	100%	0		
SN-2/SN-3	12,004	0%	100%	0		
KI-13-24	2,150	93%	100%	0		

The top three highest scoring units were listed from each drift cell. The high priority units for restoration are listed in Table 18 and those exceeding the minimum score for a Historic Feeder Bluff are shown in Map 17 (Appendix 2). The highest priority units for conservation are listed in Table 19 and those above the minimum score are shown in Map 17 (Appendix 2). These units represent the greatest potential sediment yield within each drift cell and would therefore constitute the first candidates for recreating or conserving sediment supply in specific cells. Details are not discussed here due to the large number of drift cells in the study area.

### **Drift Cell Prioritization Results**

The third prioritization approach summarizes and scores data for an entire drift cell and compares the scores across the entire study area. The results of drift cell restoration prioritization are summarized in Table 20 and displayed in Map 18 (Appendix 2), while the results of the conservation prioritization are summarized in Table 21 and displayed in Map 19 (Appendix 2). Following the calculation of the restoration ranking (see *Methods* for details), which generally equates to: the more a drift cell sediment sources have been altered, the higher the priority the cell is for restoration or conservation. The top rated cells were categorized as being of:

- highest priority
- high priority
- moderately high priority
- moderate priority
- priority

Results of the restoration prioritization indicate that drift cells of the highest priority for restoration are found along the entire Northern Railroad and Shilshole sub-areas. Additional drift cells of the highest priority include cell KI-7-2, located on the north side of Three Tree Point and cells KI-13-17 and KI-13-18 in Quartermaster Harbor on the north side of the Burton Peninsula. Drift cells of high restoration priority include the longest drift cell in the study area, cell KI-5-1 from Burien to Duwamish Head (that is extensively bulkheaded), and cell KI-13-12, which is located along the northeastern shore of Quartermaster Harbor, just south of the Portage. Drift cells ranking a little lower include many on Vashon Island, in Des Moines, and in close vicinity to Redondo Beach. To find the highest rated units within the highest priority drift cells for restoration, review Table 18.

The results of the conservation prioritization of drift cells show that due to pervasive modifications, largely from the BNSF railway, cells with conservation potential were primarily located in WRIA 9. Drift cells with the highest conservation prioritization include cells KI-7-2 located on the north side of Three Tree Point, and KI-13-18 located on the north side of the Burton Peninsula in Quartermaster Harbor. Other high priority drift cells for conservation include southwest Salmon Bay, east Vashon Island (cell 13-12), and the Burien to Duwamish Head cell.

As unmodified bluffs in the study area continue to gradually recede through erosion and landsliding, there will likely be a continued desire for landowners to build bulkheads. If carried out, this would lead to further sediment impoundment and reduction of the natural sediment supplied to the nearshore system, as well as site-specific impacts to the beach. The possibility of further decreasing sediment supply volumes for net shore-drift cells, along with the lag time of impacts from past modifications, would likely lead to substantially-increased, negative, cumulative impacts to nearshore habitats. Restoration and conservation efforts should proceed with this in mind.

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