Cornet Bay Phase 1 and 2 Vegetation Monitoring 2016

Introduction:

The Cornet Bay Phase 1 planting project was completed in 2012 and 2013. Phase 2 of the Cornet Bay planting project was installed in the fall of 2015 and spring of 2016. Both of the planting projects were planted with a similar planting scheme. Zone 4 is the highest elevation planting and planted with a back beach tree and shrub community. Zone 3 is considered a salt-spray community which was planted with the expectation of occasional salt water exposure. Zone 2 was designated as a beach grass community and expected to experience tidal inundation during part of the day. This monitoring report is intended to track survival of vegetation planted to date and to make suggestions for replanting. The Cornet Bay Phase 1 and 2 planting project was monitored on June 16 and July 6th, 7th, 8th, and August 25th, 2016, by staff, interns and volunteers from Skagit Fisheries Enhancement Group (SFEG).

Figure 1. Zones 2 and 3 in Cornet Bay Phase 1

Methods:

In Zone 4, all planted species were assessed by height and a mortality rating (M rating) was assigned based on the health and vigor of each plant (See Table 1).

1	Dead or nearly dead
2	Live plant with dead portions and/or signs of stress
3	Signs of new vegetative growth
4	Poor reproduction (Few and poorly developed flowers/fruit)
5	Healthy reproduction (Many well developed flower/fruit)

Figure 2. Description of parameters used to assess M rating

Monitoring of Zones 2-3 were approached differently. For this area, three transects were laid throughout the planting area parallel to the shoreline and spaced 4 ft. apart from each other and from the shoreline to the fence line. Along the transect, 4 ft. X 4 ft. quadrats were placed at intervals of 16 ft. creating a 25% sample size. For each quadrat sampled, the surveyors identified all plants and determined if they were alive or dead. The number of live plants determined the density of native plants in each quadrat.

To determine stocking, quadrat density was determined by the number of native plants per quadrat. If a quadrat had 3 or more native planted plants, the survival rate was considered to be 80% or higher. Anything less than 3 plants per quadrat was considered under-stocked. SFEG determined 3 plants per quadrat was approximately the spacing during initial planting in 2013 (for the Phase 1 area) or 2016 (for the Phase 2 area.)

Coverage was estimated for each quadrat in three categories: native vegetation, non-native vegetation, and bare ground. This was done by counting vertices within the quadrat grid for each cover class. Each quadrat was comprised of 121 vertices created by crossing 11 lines of string spaced 4'' apart by 11 perpendicular lines of the same spacing. At each vertex the cover class was recorded.

Figure 3. Volunteer and Intern collect data within a quadrat.

Results:

Phase1:

Zone 4:

Zone 4 has an average of 90% survival. While some species are not faring well, overall the health in zone 4 is good. Note that 881 plants were given a mortality rating of 2 (Live plant with dead portions and/or signs of stress). 351 plants are recorded as naturally recruited; the parameters used for determining natural recruitment are based on appearance, proximity to planted plants, and original planted species list. For example, all of the red alders recorded as naturally recruited are in the seedling stages. Snowberry that are considered natural recruits were a distinct plant from that of the parent but most likely growing from a rhizome. Oceanspray shows a survival rate of 4%, and red-flowering currant shows a survival rate of 617%. SFEG believes this is a surveyor error; more than likely many of the oceanspray were misidentified as red-flowering currant. These plants were heavily browsed and thus difficult to identify.

Table 1 Survivorship in Cornet Bay Phase 1

		M. Rating									
Common Name	*Plant Code*	1	2	3	4	5	Total	Installed Originally	Live 2016	% Surv.	Average of Height (ft)
Sword Fern	POMU	2	27	2	3		34	50	32	64%	0.65
Low Oregon Grape	BENE		5	2			7	50	7	14%	0.67
Salal	GASH	3	41	58	120	24	246	420	243	58%	0.67
Ocean Spray	HODI		4				4	100	4	4%	1.63
Black Twinberry	LOIN	1	17	15	1	1	35	50	34	68%	2.35
Tall Oregon Grape	MOAQ	2	41	59	4	1	107	115	105	91%	1.41
Osoberry	OMCE	1	59	2			62	60	61	102%	2.00
Sitka Spruce	PISI		75	24		3	102	57	102	179%	2.40
Red-flowering Currant	RISA	5	157	26	1	1	190	30	185	617%	1.76
Nootka Rose	RONU	5	157	30	11	6	209	200	204	102%	1.24
Salmonberry	RUSP		46	3		1	50	50	50	100%	1.06
Pacific Willow	SALU		3				3	50	3	6%	0.65
Red Elderberry	SARA		1				1	50	1	2%	0.40
Scoulers Willow	SASC		1	1	1		3	20	3	15%	2.48
Snowberry	SYAL	9	186	92	39	4	330	300	321	107%	1.54
Western Red Cedar	THPL	1	41	11	3	3	59	57	58	102%	3.61
Unknown	Unknown	62	1	1	1		65	0	3	n/a	0.00
	Grand Total	92	881	341	185	47	1546	1609	1454	90%	1.49

Table 2 Natural recruitment in Cornet Bay Phase 1

Naturally Recruited		
Common Name	***Plant Code***	**Total**
Big Leaf Maple	ACMA	3
Red Alder	ALRU	95
Shorepine	PICO	4
Western Red Cedar	THPL	11
Douglas Fir	PSME	33
Sitka Spruce	PISI	100
Fat Hen Salt Bush	ATPA	5
Tall Oregon Grape	BEAQ	3
Short Oregon Grape	BENE	2
Salal	GASH	15
Soft Rush	JUEF	4
Black Twinberry	LOIN	2
Osoberry	OMCE	1
Sword Fern	POMU	3
Red-flowering Currant	RISA	6
Nootka Rose	RONU	17
Salmonberry	RUSP	29
Pacific Willow	SALU	1
Sitka Willow	SASI	1
Snowberry	SYAL	11
Soft Rush	JUEF	4
	Grand Tota	350

Zone 2 and 3:

Pacific Silverweed is the most abundant species within Zones 2 and 3, representing almost 33% of all plants counted. There is still a significant percentage of bare ground cover at 45%, however, it was obvious while monitoring that the majority of the bare ground is on the planting closest to tidal influence and may be due to wood recruitment. Still, 51% of the area was covered by native plants, and only 4% was non-native cover. Cover continues to increase steadily, from approximately 5% the first year, 13% in 2014, and 28% in 2015.

Zone 2 and 3 are also well stocked. SFEG considered any quadrat with 3 or more plants per quadrat as well stock because that is what was expected as the approximate spacing at the time of planting. There was a total of 143 quadrats measured. 11 quadrats were poorly stocked with 0-2 plants per quadrat. The majority of quadrats had 50-99 plants per quadrat.

Table 3 Plant distribution in zones 2 and 3 in Cornet Bay Phase 1

Zone 2 and 3 Plant distribution					
COMMON NAME	NO. LIVE	%			
Salt grass	12	0.1495%	Pearly Everlasting	4	0.0498%
Lyngbys Sedge	279	3.4749%	Thistle	7	0.0872%
Dune Rye	1103	13.7377%	Buttercup	11	0.1370%
Balt. Rush	971	12.0937%	Shepherd's Purse	1	0.0125%
Soft Rush	101	1.2579%	Nooka Rose	13	0.1619%
Tuft. Hairgrass	141	1.7561%	Red Flowering Current	1	0.0125%
Pac. Silverweed	2622	32.6566%	Curly Dock	2	0.0249%
Coast Gumweed	1167	14.5348%	Oregn Grape	2	0.0249%
Sea Pink	11	3.9427%	Sitka Spruce	1	0.0125%
Sea Plantain	54	0.6726%	Slough Sedge	14	0.1744%
Pineapple Weed	6	0.0747%	Remunculus	4	0.0498%
Sitka Willow	16	0.1993%	Snowberry	4	0.0498%
NonNative Pasture Grass	292	3.6368%	Trailing B Berry	2	0.0249%
Prostrate Knotweed	36	0.4484%	Salal	2	0.0249%
Horsetail	115	1.4323%	Birdsfoot Treefoil	1	0.0125%
Alder	31	0.3861%	Bulrush	51	0.6352%
Clover	265	3.3005%	Canada Bluegrass	517	6.4392%
Broadleaf Plantain	19	0.2366%	Cow Parsnip	1	0.0125%
Smooth Hawks Beard	1	0.0125%	Black Medic	24	0.2989%
Beach Sand Spurry	2	0.0249%	American Seasperry	12	0.1495%
Fat Hen Salt Bush	85	1.0587%	Salmonberry	3	0.0374%
Dandilion	15	0.1868%	Creeping Spike Rush	8	0.0996%
				8029	100.0000%

Table 4 Percent ground cover in zones 2 and 3 in Cornet Bay Phase 1

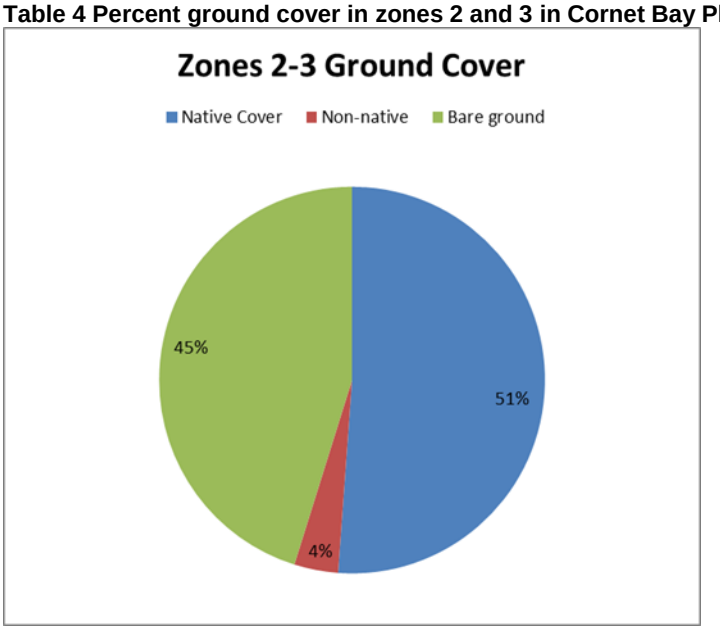
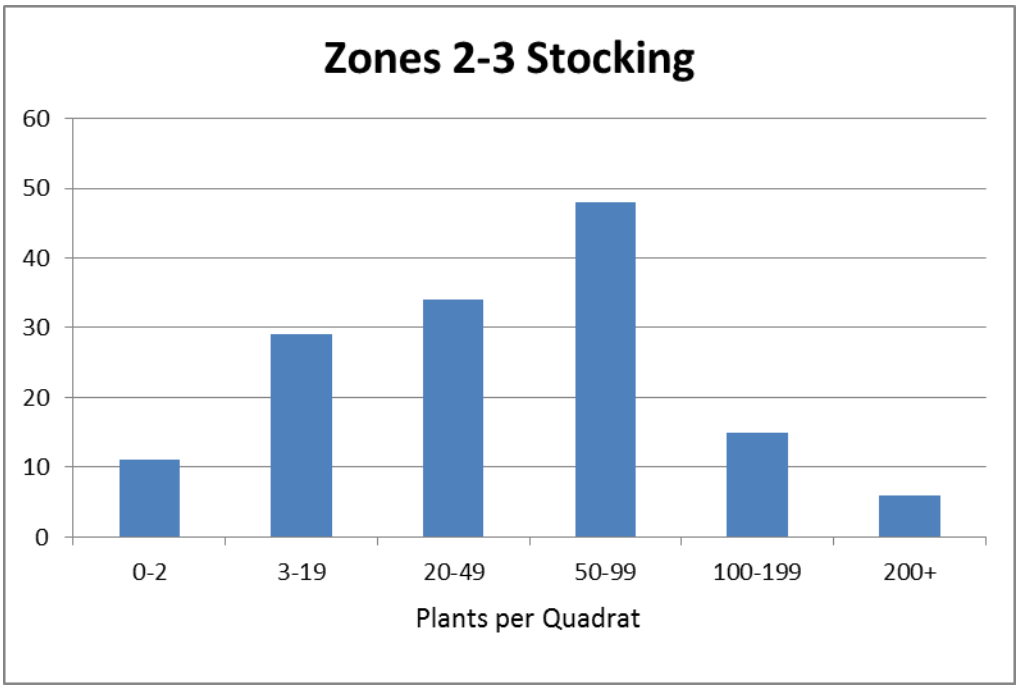


Table 5 Stocking of each quadrat in Zone 2 and 3 in Cornet Bay Phase 1. 3 or more plants per quadrat are considered well stocked.



Discussion:

Zone 4:

Browsing by deer continues to be an issue. However, the plants are still maintaining new growth and continuing to establish themselves. Deer exclusion fences have been effective in protecting the planted conifers; however, the plants in the Phase 1 area are starting to become constrained, and red alder have begun to establish themselves inside the fences. SFEG recommends removing the fence this fall and salvaging the alders to be used in other restoration projects.

Zones 2 and 3:

Native grasses and forbs are flourishing in this area; the most abundant native species Pacific silverweed is growing readily and competing with the few weeds.

These zones do not have a significant issue with weeds but will continue to be checked during SFEG monthly volunteer weeding parties. SFEG will continue to support this effort by assigning our AmeriCorps intern to organize, lead and recruit volunteers.

Phase 2:

Zone 4

Zone 4 in the recently completed Phase 2 planting area has an average of 74% survival. While some species are not faring well, overall the health in zone 4 is good. Note that 226 plants were given an M rating of 2 (Live plant with dead portions and/or signs of stress). Nootka Rose has the best survival at 100% and Sitka willow has the poorest survival at 0%. 61 plants are recorded as naturally recruited; the parameters used for determining natural recruitment were based on appearance, proximity to planted plants, and original planted species list.

Table 6 Survivorship for Zone 4 in Cornet Bay Phase 2

			M. Rating								
Common Name	*Plant Code*	*1*	2	3	4	5	Total	Installed Originally	Live 2016	% Surv.	Average of Height (ft)
Tall Oregon Grape	BEAQ		19				19	30	19	63%	0.59
Dull Oregon Grape	BENE		2				2		2	n/a	0.75
Salal	GASH	1	31	5	10		47	50	46	92%	0.81
Oceanspray	HODI	2	28				30	30	28	93%	1.63
Sitka Spruce	PISI		1	4			5	5	5	100%	11.22
Douglas Fir	PSME	1	2	1			4	5	3	60%	5.58
Red Flowering Current	RISA		11		1		12		12	n/a	2.33
Nootka Rose	RONU		43				43	**43**	43	100%	1.13
Salmonberry	RUSP	1	27				28	30	27	90%	0.83
Scouler's Willow	SASC	2	27				29	50	27	54%	2.32
Snowberry	SYAL	1	28				29	30	28	93%	1.14
Western Red Cedar	THPL	1	3		1		5	5	4	80%	3.68
Sitka Willow	SASI							50	0	0%	0.00
Unknown	UNKNOWN	1					1		0	n/a	0.00
Total		10	226	10	12	0	258	328	244	74%	1.55

Table 7 Natural Recruitment Zone 4 in Cornet Bay Phase 2

Naturally Recruited			
Common Name	*Plant Code*	Total	Average of Height (ft)
Bigleaf Maple	ACMA	5	0.16
Red Alder	ALRU	47	0.26
Black Cottonwood	POBA	1	0.40
Salal	GASH	2	0.25
Nootka Rose	RONU	1	1.90
Salmonberry	RUSP	5	0.18
Grand Total		61	0.28

Zone 2 and 3:

Non-native clover was the most abundant species within Zones 2 and 3, representing 58.13% of the plants counted. Planted dune wild rye represented 38.25 % of all plants counted. There is still a significant percentage of bare ground (84%) this first season after planting. However, this is not unusual for a planting that is still becoming established. Stocking was estimated to be 3 plants per quadrat, quadrats with 3 or more plants were considered well stocked at 80% survival. Zone 2 and 3 of the Phase 2 area are faring well, with only 3 of of 23 quadrats under-stocked (i.e. 0-2 plants per quadrat), 14 well-stocked with 3-19 plants per quadrat, and 5 with more than 20 plants per quadrat.

Table 8 Distribution for Zones 2 and 3 in Cornet Bay Phase 2

Zone 2 Plant Distribution		
COMMON NAME	**NO. LIVE**	**%**
Dune Rye	127	38.253%
Soft Rush	5	1.506%
Pac. Silverweed	12	3.614%
Sea Plantain	42	12.651%
Uknown Willow	6	1.807%
Pineapple Weed	2	0.602%
NonNative Pasture Grass	63	18.976%
Prostrate Knotweed	29	8.735%
Horsetail	5	1.506%
Alder	2	0.602%
Clover	194	58.434%
Fat Hen Salt Bush	8	2.410%
Dandilion	6	1.807%
Thistle	2	0.602%
Vetch	2	0.602%
Himalayan Blackberry	1	0.301%
Pickleweed	18	5.422%
Total	332	100

Table 9 Percentage of Ground Cover for Zones 2 and 3 in Cornet Bay Phase 2

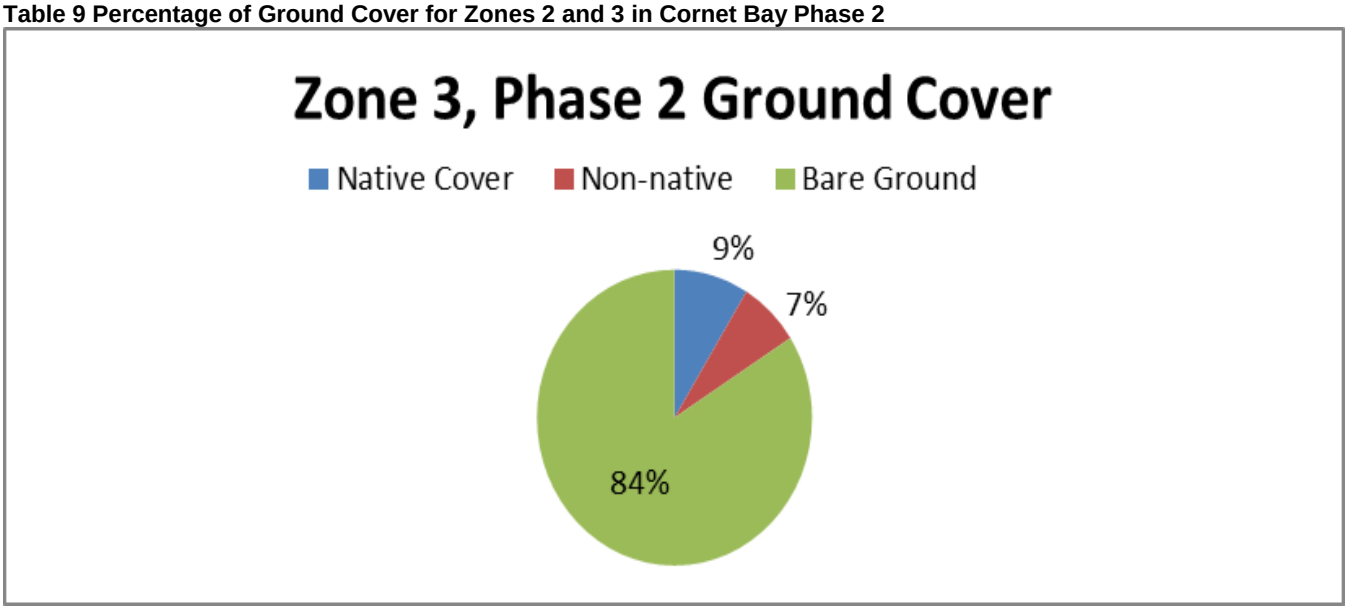
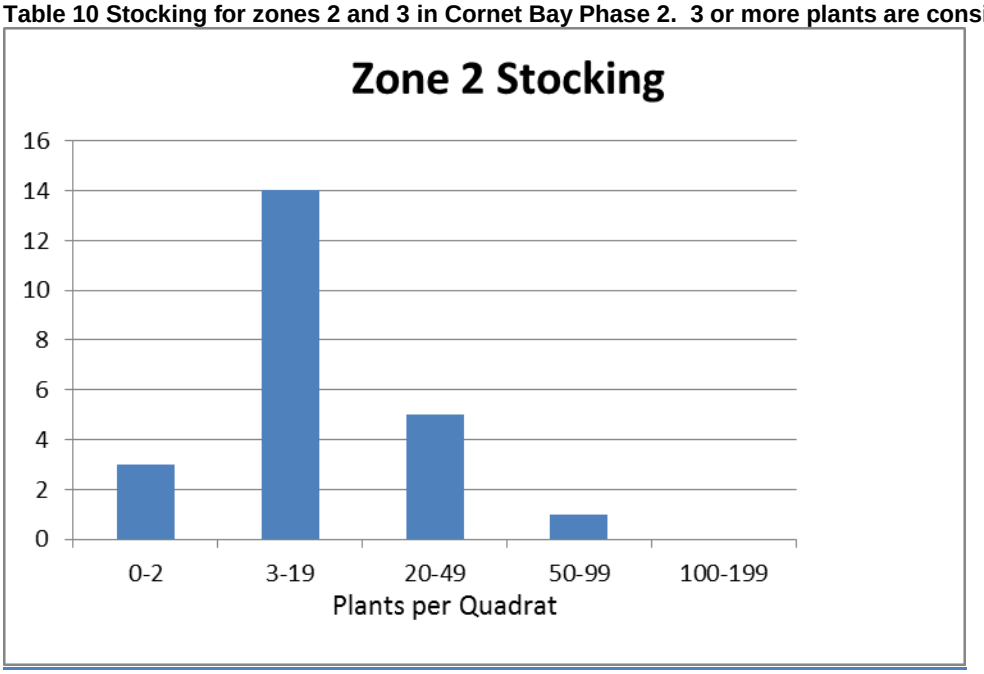


Table 10 Stocking for zones 2 and 3 in Cornet Bay Phase 2. 3 or more plants are considered well stocked



Discussion:

Zone 4:

Browsing by deer is an issue for unprotected plants in Zone 4. However, the plants are still maintaining new growth and continuing to establish themselves. Deer exclusion fences have been effective in protecting the conifers planted, and will remain on the trees until they become a hindrance to the growth.

Zones 2 and 3:

Much of Zone 2 and 3 is currently bare ground; however, this is not unusual for a planting that is being established. The plants that are present look healthy and will most likely begin to spread in the next growing season.

Though the most abundant plant in these zones is clover, it should be easily out-competed by the aggressively growing dune wild rye; however, SFEG will continue monthly volunteer weeding parties. SFEG will continue to support this effort by assigning our AmeriCorps intern to organize, lead and recruit volunteers for monthly weeding parties. SFEG will supplement field staff when appropriate.

Recommendations:

Phase 1:

SFEG will continue to host monthly weeding parties in the summer months, April – August, to reduce the weed load competing with the native community. The fencing will be removed from the conifers to ensure they have room to grow beyond there fences (as needed). Excess Red Alders and Sitka spruce will be thinned and salvaged by volunteer school groups this fall and spring to be used on other restoration projects.

Phase 2:

SFEG's monthly weeding parties will be expanded to include Phase 2 in 2017. Willow live stakes will be harvested from the willow community between the Phase 1 and Phase 2 sites in fall 2016. They will then be staked around the ponded area in Phase 2, as willow whips originally installed there showed poor survival. Zone 2-3 will have temporary goose exclusion fencing placed around the perimeter. This fencing will not be netting and will ensure that wild life cannot get entangled in the materials and will be installed in the spring to avoid damage caused by tides, winds and driftwood.

SFEG recommends replanting Zones 2 and 3 to decrease the percentage of bare ground cover and ensure the community continues to fill in the bare ground to out compete local weeds. A list of recommended plants and number will accompany this report in a separate attachment.