

2014 MONITORING REPORT
for
OAK CREEK MITIGATION BANK
LEBANON, OR

Submitted to
Oregon Department of State Lands
U.S. Army Corps of Engineers

Submitted by
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January 31, 2015

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LEBANON, OR

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<u>Performance Standard</u>	<u>PC Area (T 1-5)</u>	<u>South Marsh (T 2.1/2.2)</u>	<u>North Marsh (T 5.1)</u>	<u>NE Forest (T 6)</u>	<u>West Forest (T 7)</u>
Dominated by 70% or more desirable plants	73% vegetated 83% FAC or wetter 59% native	66% vegetated 83% FAC or wetter 63% native	71% vegetated 74% FAC or wetter 59% native	40% vegetated* 89% FAC or wetter 88% native	84% vegetated* 91% FAC or wetter 69% native
80% survival of planted trees and shrubs	2007 - 81%	2011 - 94%	2014 - 88%		
Less than 15% listed noxious invasives	0%	1%	0%	1%	1%

*under closed canopy



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This is the sixteenth monitoring report for the Oak Creek Wetland Mitigation Bank Site near Lebanon, OR. Maureen Stellrecht and Richard Novitzki compiled and edited this report and designed and participated in monitoring activities. Maureen Stellrecht conducted or supervised weed management and other site maintenance and monitored pond, stream, and ground water levels. Michael Bollman sampled vegetation in May. Wildlife data were collected by Courtenay Brasier in January and June.

Site Management Activities

In 2010 after the inspection of the OCWMB, a new remedial action plan was developed with the help of Ray Fiori and Pat Thompson. Appendix 1 shows this remedial plan that was created on July 27, 2010. The treatments have been conducted as presented in the management activities summary. This remedial action plan is aimed at removing the seed bank of non-native invasives, and preparing the site for seeding more desirable species. In 2012, Allen Martin and Pat Thompson visited the site twice to see how well the remedial plan is progressing and establish a seeding plan. We continued intense efforts of spraying and monitoring the areas B3-A, A1, A2, and a portion of A4 and A3. These areas finally reached a place where we were comfortable that the seed bank of non-natives was exhausted, and we could seed with confidence in the fall of 2012. We prepped the soil by using a saw toothed harrow, or drag, and then used a broadcast seeder with mixes recommended in the remedial action plan.

In 2013, 2000 potted trees and shrubs were planted throughout the site, as well as 1000 bare root spirea plants along the south west buffer. In 2014, a survival of these planted trees and shrubs was taken. In the PC Area on the south side of Oak Creek (transects 1-3) 1230 trees and shrubs were planted, mostly along buffer of this habitat. In late summer, 1033 were found thriving, for a total of 84% survival rate. On the north side of Oak Creek, 700 potted trees and shrubs were planted in area A4, and 1070 were planted along buffer area of areas A2 and A3. In area A4, which lies between transect 4 and the upland buffer, we found 574 of these planted trees and shrubs surviving for a total of 82%. Of the 1070 trees and shrubs planted along the north east buffer of the site, we found an astonishing 1103 trees and shrubs surviving for a total of 97%. The original total of 3000 trees and shrubs planted resulted in an average of 88% survival rate. This is remarkable, considering the extremely dry summer of 2013. We have far surpassed our performance standard, demonstrating the ability of Oak Creek Mitigation Bank to sustain itself as a successful restored wetland prairie habitat. We will continue to improve the nativity of the site through planted trees, shrubs, and seed.

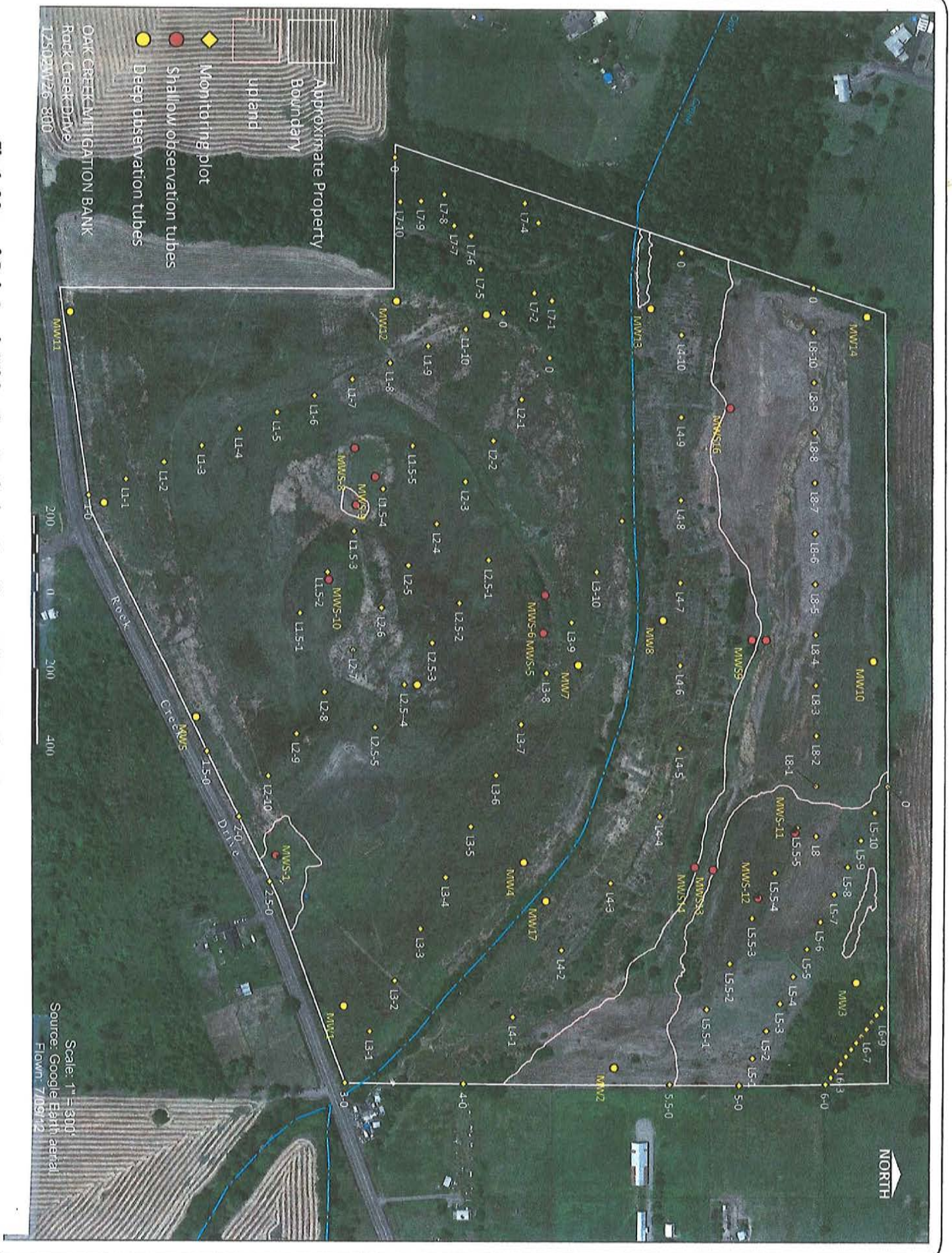


Fig 1. Map of Oak Creek Mitigation Bank showing observation wells (MW), vegetation sampling transects, and habitat types.

Hydrology Monitoring

Ground water levels were measured in 17 observation wells and 13 shallow wells (Figure 1) and at the USFWS reference site. Data for wells 1 through 15, measured monthly, are presented in Table 1. Data for shallow wells S1-S16 are presented in table 2. Water levels are recorded daily in well 16 and the USFWS reference well. Those data are presented in Appendix 3. Precipitation (Table 3) in 2014, was 2.47 inches above the 30 year average. Those wells meeting hydrology criteria (water levels within 12 inches of the surface for more than 15 days during the growing season) are highlighted in Table 1 and Table 2.

Water levels in observation well 17 were recorded four times each day (Appendix 4) to record ground water levels within 45 inches below the surface and to record over-bank flooding up to 35 inches above the surface. The index mark (zero) for well 17 is above land surface; water at land surface registers as -35 inches. Over bank flooding is assumed to occur any time the well registers between zero and -35 inches. Periods of over bank flooding are highlighted in Appendix 4. Oak Creek flooded out of its banks 10 times in 2014, ranging in duration from four hours to six days. This demonstrates the successful hydrological restoration of the site.

Table 3. Monthly precipitation in inches in 2014 at the HYSLOP Weather Station at Corvallis, OR.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Observed	2.78	7.94	7.44	3.02	2.62	0.67	0.63	0.20	1.36	5.23	6.42	7.93	46.26
30-Year Normal	6.46	5.65	4.61	3.09	2.27	1.45	0.60	0.74	1.44	3.07	7.04	7.35	43.77

The small ponds (vernal pools) began to fill in November of 2013 and they contained water into May (Table 4). Oak Creek ceased flowing around July 2014 with small disconnected pools remaining in the river channel throughout the summer. Ponds began to refill in October.

Table 4. Depth of water (in feet) in selected ponds in 2014 at Oak Creek. Ponds are identified by the well nearest to the pond (near well 8; between wells 8 and 13).

Date	Pond Number (nearest well)												Big Pond
	3	4-7	4-7-1	7	8	8-13	12	13	15	7-15	17	6	
1/15/2014	0.46	0.25	0.42	0.62	0.86	1.04	0.54	0.95	0.64	0.70	0.70	1.12	1.60
2/15/2014	0.50	0.30	0.40	0.56	0.70	1.08	0.80	1.12	0.46	0.65	0.92	1.30	1.08
3/1/2014	0.55	0.60	0.66	1.34	1.32	1.47	0.58	1.25	1.04	0.88	1.40	1.42	3.60
3/15/2014	0.50	0.48	0.56	1.02	0.80	0.88	0.40	0.96	0.38	0.72	0.72	0.36	0.54
4/15/2014					0.60	0.72		0.57	0.39	0.69	0.58	0.06	1.57
5/1/2014	0.30	0.18	0.24	0.42	0.72	0.86	0.44	0.84	0.58	0.65	0.72	0.58	1.75
5/15/14				0.15	0.55	0.75	0.30	0.70	0.62	0.68	0.44	0.45	1.44
					Ponds	Dry	During	Summer					
10/14/2014				0.30	0.28	0.08	0.32	0.20	0.36	0.24	0.60	0.08	0.14
11/14/2014		0.30	0.40	0.72	0.78	0.95		0.90	0.08	0.07	0.75	0.34	1.20
12/15/2014	0.42	0.22	0.40	0.60	0.80	1.00	0.50	0.98	0.60	0.70	0.72	1.00	2.60

Oak Creek Date	Observation Well Numbers														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1/15/2014	1	9	4	6	+1	1	3	7	33	3	2	4	18	4	
2/15/2014	+4	4	0	+1	+3		+5	2	25	+5	+1	0	9		
3/1/2014	3	6	0	2	10	0	2	5	20	10	4	2	9	7	
3/15/2014	8	7	0	6	14	13	4	+1	9	32	4	8	8	12	
4/15/2014	11	2	12	15	24	17	0	5	11	44	6	28	26	10	
5/1/2014	3	17	1	9	12	9	+1	4	10	40	4	14	24	6	
5/15/2014	9	24	10	15	19	15	2	6	12	48	7	26	30	9	
6/1/2014	24	38	28	30	28	28	15	12	22	70	14	41	43	29	
6/16/2014	24	49	48	33	50	40	29	22	33	87	24	46	64	26	
7/14/2014	39	69	86	39	66	54	40	31	48	99	41	53	88	45	
8/15/2014	42	82		61	72	58	58	43	39		40	61	87	53	
9/1/2014	40	93		59	70	73	60	44	41		47	59	85	56	
9/15/2014	43	102		47	70	69	32	43	44	72	51	61	44	39	
10/14/2014	31	60	49	9	68	54	14	31	9	64	14	40	27	16	
11/14/2014	1	18	44	3	40	28	1	24	11	60	3	8	49	2	
12/15/2014	5	10	2	4	15	6	0	3	7	32	6	3	18	5	

Table 1. Depth to water (in inches) below land surface in 2014 in Observation Wells.

Oak Creek Date	Shallow Well Numbers															
	S1	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16			
1/15/2014	11	+4	+4	12	10	5	8	+3	+1	11	7	8	15			
2/15/2014	+2	+10	0	8	8	0	1	+4	+4	+10	+2	+4	12			
3/1/2014	+1	+6	+3	11	4	1	3	0	+2	4	0	+2	4			
3/15/2014	4	2	2	13	11	5	8	4	+3	18	8	8	2			
4/15/2014	10	16	0	20	18	15	13	12	6	19	14	13	17			
5/1/2014	11	11	+1	17	17	13	10	9	7	19	12	14	17			
5/15/2014	10	18	5	21	18	18	12	12	6		14	16	16			
6/1/2014		21	23	14				12		19		26	17			
6/16/2014		22									14	26	17			
7/14/2014								12					17			
8/15/2014							18	13					17			
9/1/2014								14		18		18	17			
9/15/2014	13			25	19	19			12	14	15					
10/14/2014	9	13	23	25	24	22	18	6	2	18	6	2	18			
11/14/2014	+3	7	18	24	20	20	17	0	+2	16		12	15			
12/15/2014	12	+3	+6	11	8	7	9	0	1	6	10	11				

Table 2. Depth to water (in inches) below land surface in 2014
in shallow observation wells

Sediment Monitoring

Sediment deposition or scour was measured at ten stations along Oak Creek in 2013 and 2014. The differences between measurements (the amount of deposition or scour) are presented in Table 5. Scour occurred at 5 stations, ranging from .05 to 0.70 inches, and deposition occurred at 5 stations, ranging from 0.10 to 1.40 inches. Because the stations were located randomly along both sides of the stream, they represent the entire riparian zone and the average sediment change is the arithmetic total (+1.10 inches) divided by the number of stations (10) for a net gain of 0.11 inches within the riparian zone. These data confirm that the function of the riparian wetland has been restored.

Table 5. Measurements at sediment monitoring stations in the Oak Creek riparian zone
(Measurements are inches below the top of a 5/8 inch rebar.)

Station:	1	2	3	4	5
Left Bank (2013)	20.50	19.00	22.50	24.90	21.20
Left Bank (2014)	21.00	19.50	21.25	24.75	20.70
Change	-0.50	-0.50	+0.75	+0.15	+0.50
Right Bank (2013)	14.20	19.80	13.70	23.25	22.40
Right Bank (2014)	14.90	18.40	13.55	23.35	22.45
Change	-0.70	+1.40	+0.15	-0.10	-0.05

Since 1999 in the riparian zone there has been annual erosion as great as -0.42 inches and deposition as great as +1.56 inches, resulting in net aggradations of 4.02 inches. This confirms the successful function for the restored riparian area.

2000	+0.42	2006	-0.40	2012	+0.34
2001	+0.06	2007	+0.23	2013	-0.11
2002	-0.43	2008	+1.25	2014	+0.11
2003	+1.56	2009	-0.06		
2004	+1.03	2010	-0.03		
2005	+0.23	2011	-0.18		

Vegetation Monitoring

Vegetation sampling occurred in May and June 2014. The seven permanent sampling transects (Figure 1) previously established at the site were sampled to document the plant community in the open and forested areas. A new transect (#8) was added in 2010 in the northwest upland area. Transect #8 consists of 10 sample plots, approximately 40 meters apart, and runs E-W through the center of the upland area. Sample plot flags were labeled in 2010 with permanent marker for easier identification in the field. Also, in the spring of 2012, the sampling stations were located using a handheld GPS and documented for future use. This will allow the IRT to locate each sample plot during the annual field inspection.

The dominant native plant species in the open prior converted (PC) areas-transect 1-5 were *Deschamsia cespitosa* (tufted hairgrass), *Carex unilateralis* (one-sided sedge), *Alopecurus geniculatis* (water foxtail), and *Hordeum brachyantherum* (meadow barley). Cover was 73%. FAC or better species accounted for 83% of the cover and 59% of the cover was native species. The SMI index is 2.21.

Three transects (Figure 2) were established to sample the wetland created from upland by the berms constructed in September 2006. For the newly-constructed shallow marsh area south of Oak Creek (transects 2.1 and 2.2) the dominant native species were *Deschamsia cespitosa* (tufted hairgrass), *Juncus tenuis* (slender rush), and *Eleocharis ovata* (Ovate spike rush). Cover was 66%, FAC or better species accounted for 83% of the cover and 63% of the cover was native. The SMI was 2.23.

For the newly-constructed shallow marsh area north of Oak Creek (transect 5.1), the dominant native plant species were *Deschamsia cespitosa* (tufted hairgrass), *Agrostis exarata* (spike bentgrass), *Lotus unifoliolatus var. unifoliolatus* (Spanish clover), *Anthoxanthum odoratum* (sweet vernalgrass), *Hordeum brachyantherum* (meadow barley), and *Juncus tenuis* (slender rush). Cover in this area is 71% with 74% of the cover being comprised of FAC or better species and 59% of the cover being native species. The SMI for this area was 2.66.

In the northeast forested area (transect 6) the dominant species were *Fraxinus latifolia* (Oregon ash), *Cammassia leichtlinii* (great camas), *Poa trivialis* (roughstalk bluegrass), and *Allium nigrum* (black garlic). Cover was 40% (under a closed canopy), species FAC or better accounted for 89% and 88% of the cover was native. The SMI was 2.37.

In the west forested area (transect 7) the dominant species were *Fraxinus latifolia* (Oregon ash), *Cammassia leichtlinii* (great camas), *Poa trivialis* (rough stalk blue grass), *Carex leptopoda* (Dewey's sedge), and *Allium nigrum* (black garlic). The cover was 84% (no including the canopy layer), 91% of species were FAC or wetter, and 69% of the species were native. The SMI for the west forested area was 2.38.

A new transect (#8) was created in 2010 in the NW upland area. The dominant species were *Festuca idahoensis ssp. Roemeri* (Roemer's fescue), *Holcus lanatus* (common velvet grass), *Elymus glaucus* (blue wildrye), *Festuca occidentalis* (western fescue), *Agrostis castellana/ capillaris* (colonial bent grass), and *Anthoxanthum odoratum* (sweet vernalgrass). Cover accounted for 77% of the area with native species covering 20%.

We evaluated survival of the 1667 shrubs and trees planted in the riparian area in February 2007 by examining 578 of the 1300 plants that had been flagged. We found 467 of the 578 alive, for a survival of 81%. Although we are meeting the performance standard, we have decided to re-plant 250 trees in 2009 and another 250 in 2010. We reevaluated in spring 2011 and found that 94% of the trees and shrubs planted in 2009 and 2010 had survived. We have surpassed our performance standard by a larger margin with a total survival rate of 88% in the PC area.

Recognizing the importance of species' diversity to a healthy ecosystem, we have listed the number for the bank site as well data available for the reference site.

	USFWS	Stolts Hill	Oak Creek
1999	63	32	53
2000	64	32	96
2001	64	32	51
2002	64	32	64
2003	66	32	93
2004	66	28	83
2005	66	28	87
2006	51	26	84
2007	51	26	81
2008	51	26	96
2009			103
2010			105
2011			97
2012			96
2013	51	26	100
2014	51	26	100

Wildlife Monitoring

Wildlife monitoring had been conducted from 1997 through 2008 before it was suspended. Recognizing the value of those data for assessing the success of the wetland restoration the monitoring program was reinstated in 2013. Four permanent wildlife observation stations at both the bank site and the USFWS reference site were sampled in Winter (January) and Spring (Appendix 6).

During the Winter survey 20 species were observed at the bank site and 33 at the reference site. The abundance of birds at the bank site (599) exceeded that at the reference site (305). Also, several waterfowl species (Green-Winged Teal, Northern Pintail, Wood Duck) and several notable species (Ruby-Crowned Kinglet, Snipe, Swainson's Thrush, and Western Meadow Lark) were observed only at the bank site.

During the Spring survey 43 species were observed at the bank site and 20 at the reference site. The abundance of birds at the bank site (196) exceeded those at the reference site (118).

In nearly every survey conducted since 1997 the number of species and abundance of birds at the bank site are comparable to or exceed those at the reference site.

At the bank site there are 5 beaver dams and evidence of tree cutting has increased. At the reference site the only beaver dam previously observed has been destroyed, and no sign of beaver activity was observed. Woodpecker species increased in the Winter and Spring surveys, including Downey Woodpecker, Hairy Woodpecker, Red-breasted Sapsucker, and Northern Flicker. This suggests that the tree stands are stable and maturing and now include more older, larger, infested trees and snags. Deer and deer tracks are observed occasionally at both sites. Bear tracks were observed on several occasions during the year. These results confirm that the restoration is successful and the site is maturing and has successfully integrated into the local ecosystem.

<u>Oak Creek Mitigation Bank</u>			<u>USFWS Reference Site</u>	
	<u>Species</u>	<u>Individuals</u>	<u>Species</u>	<u>Individuals</u>
Winter	20	599	33	305
Spring	43	196	20	118

Summary

Oak Creek Mitigation Bank continues to demonstrate wetland hydrology, confirming successful site restoration. Saturated conditions persisted through June. Oak Creek flooded out onto its re-connected flood plain five times in 2004, four times in 2005, forty-six times in 2006, fifty-five times in 2007, sixty times in 2008, 12 times in 2009, 35 times in 2010, nine times in 2011, 17 times in 2012, 0 times in 2013, and 10 times in 2014. These suggest that the vegetation is encroaching into the channel and that the stream may cut a new channel segment and abandon a segment of its old channel- a natural phenomenon occurring in undisturbed streams and wetlands. When this occurs, it will further confirm that the re-connection of Oak Creek to its flood plain and the wetland restoration have been successful. The flooding resulted in an average sediment gain of 0.11 inches in the riparian zone during the year.

The site was burned in 2005 and mowed and sprayed in 2006. Vegetation sampling found the plant community in the open PC area is 83% FAC or better and 59% native. South of Oak Creek the wetland created from upland in 2006 is 83% FAC or better and 63% native. North of Oak Creek the wetland created from upland is 74% FAC or better species and 59% native. The plant community in the north east forested area is 89% FAC or better and 88% native. In the west forest the plant community is 91% FAC or better and 69% native.

The remedial treatment plan established in July 2010 has led to more bare area in the aggressive site preparation, in order to remove seed bank of non-native invasives and will establish a greater abundance of native FAC and wetter species. This plan will make the site more self-sustaining in the future.

The wildlife survey that was conducted in previous years was reinstated in 2013. We believe that the surveys done in the past have established OCWMB as a functioning component of the local ecosystem. The 2014 data are comparable to data collected from 1999-2008, confirming that the site has become an integral component of the local ecosystem as evidenced by wildlife usage.

References

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CREDIT SALES — 2014

Date	Credit	Purchaser	Permit #	Impact Location
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No Credit Sales 2014

Credit Balance: 0.01



Appendix 1

Letter from Willamette Valley NWRCS

(Expressing interest in acquiring the site)





In Reply Refer To:
W L Finley NWR

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Willamette Valley National Wildlife Refuge Complex
26208 Finley Refuge Road
Corvallis, Oregon 97333
Phone: (541) 757-7236 FAX: (541) 757-4450



March 11th, 2014

Mr. Richard P. Novitzki
R.P. Novitzki and Associates, Inc.
4853 NW Bruno Place
Corvallis, OR 97330

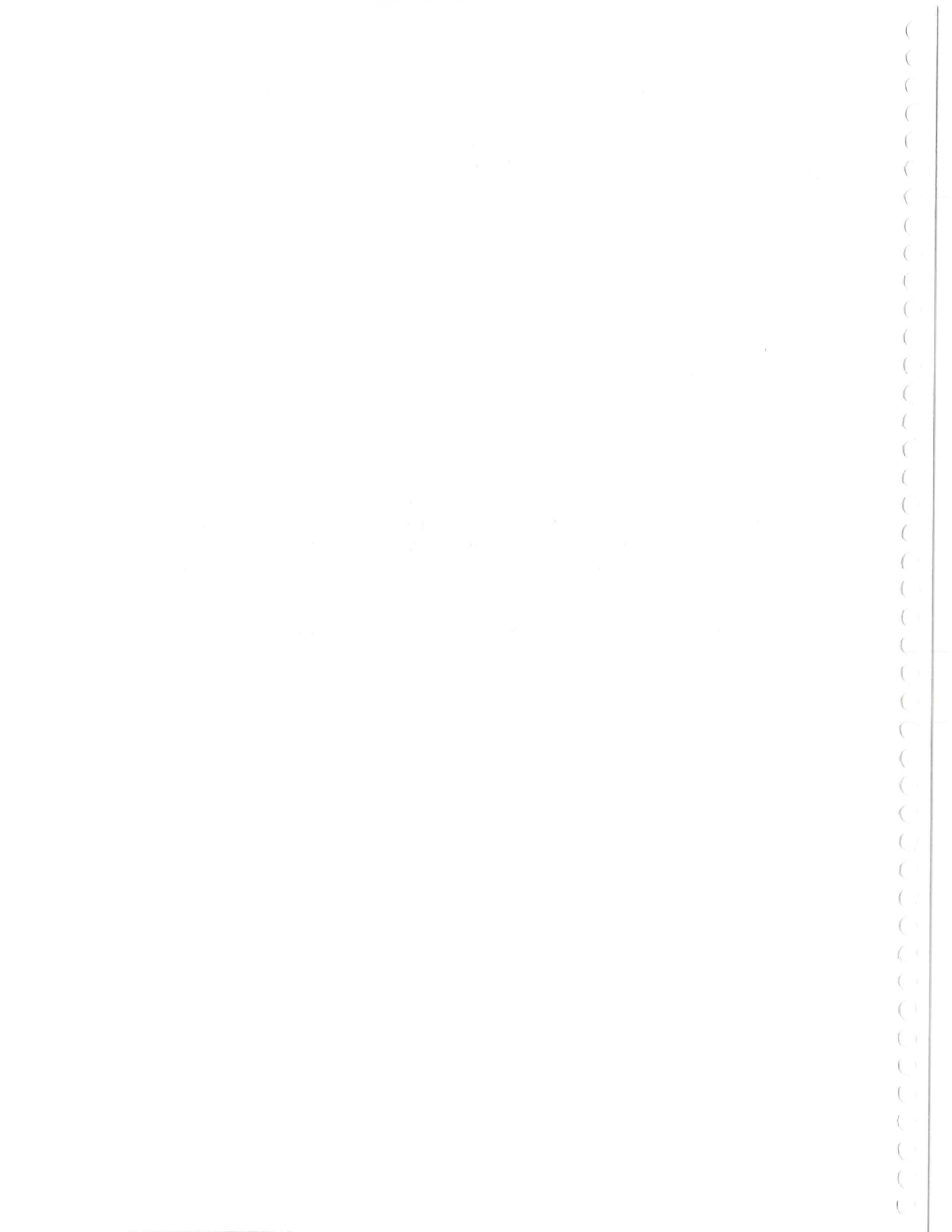
Dear Mr. Novitzki:

It was a pleasure seeing you again and discussing the ongoing restoration efforts at your wetland mitigation sites near Ankeny National Wildlife Refuge and our Oak Creek property. Thank you for providing the monitoring reports for 2012 and 2013. It looks and sounds like you are continuing to make good progress on restoration and monitoring of these important lands.

Thanks again for your time and your continued conservation efforts.

Sincerely,

Damien Miller,
Project Leader
Willamette Valley NWRC



Appendix 2

Addendum Remedial Action Plan



Oak Creek Wetland Mitigation Bank (OCWMB)

Addendum Remedial Action Plan

This document specifies what actions are recommended for continuing remediation to assure success in meeting the performance standards agreed upon for the OCWMB by the bank sponsor, the Department of State Lands (DSL) and the U.S. Army Corps of Engineers (USACOE).

A site reconnaissance was conducted on July 27, 2010, by the Bank Sponsor, Dick Novitzki, Ray Fiori of RTF consulting, Pat Thompson of Patrick S. Thompson Consulting, Allen Martin of Geo Sources Inc. and Maureen Stellrecht, biologist for OCWMB. The purpose of this reconnaissance was to map problem areas where non native species were gaining the upper hand on native desirable species and agree on a treatment strategy for each area identified, decide the critical timing for the treatment, and exactly who would be in charge of providing the treatment for each area.

Pat Thompson and Allen Martin outlined nine treatment areas and assigned each one an identification number. Allen Martin then created a GPS map of the areas on an aerial photo to show the locations of each area. At the end of the document, the general weed control guidelines are outlined, so they don't need to be repeated in each section, as well as a general wet prairie mix and emergent marsh mix recommendation. Where different planting mixes are recommend they are outlined in the prescription. A prescription for treatment was agreed upon by the entire team for each of these areas and the prescriptions are as follows.

Area A-1 (1.2 acres)

Existing Conditions:

This area is a small open canopy riparian wetland. There are scattered trees with a significant non-native understory. Problem species include: Velvet grass, Teasel, Pennyroyal and non-native bent grass species.

Target Conditions:

A forested riparian wetland dominated by native species.

Recommendations to Reach Target Conditions:

- This entire area should be sprayed out ASAP, while avoiding the existing trees.
- Area should be sprayed again following the fall of 2010 green up, prior to heavy winter rains.
- Watch this area closely in spring of 2011, spraying should occur after significant germination occurs, but prior to any non-native species beginning to flower.
- During summer of 2011 this area should be monitored often to detect any new problems. Thistles, Pennyroyal, Queen Anne's lace and St John's wort can all germinate with very little moisture and should be treated if needed.
- During fall of 2011 this area should be assessed for planting. If there is significant rains (2"-3") followed by warm temperatures to get weeds germinated, the site should be planted followed by a broad spectrum herbicide treatment. If rains come rapidly, the area should be sprayed when weather allows and planted in the spring of 2012.

Area A-2 (5.5 acres)

Existing Conditions:

This area is prairie with a few scattered trees. This area has a significant population of non native grasses and forbs. Target same species as A-1 for grasses as well as sweet vernal grass, and target the following non native forbs: Pennyroyal, St. Johns wort, Centurion, Queen Anne's lace, prickly sow thistle, Cats ear dandy lion and parentucellia.

Target Conditions:

Wet prairie dominated by native facultative or wetter species with scattered woody vegetation.

Recommendations to Reach Target Conditions:

- This entire area should be sprayed out ASAP.
- Area should be sprayed again following fall of 2010' green up, prior to heavy winter rains.
- Watch this area closely in the spring of 2011, spraying should occur after significant germination occurs, but prior to any non-native species beginning to flower.
- Depending on spring rains, this area will likely need sprayed again in June. If there is still significant dead organic matter (over 50% ground cover) the area should be mowed with a 4 blade rotary mower (mulching type) or a flail mower.
- During the summer of 2011 this area should be monitored weekly to detect any new

- problems. Thistle, Pennyroyal, Queen Anne's lace and St Johns wart can all germinate with very little moisture and should be treated if needed.
- During the fall of 2011 this area should be assessed for planting. If there is significant rains (2"-3") followed by warm temperatures to get weeds germinated, the site should be planted followed by a broad spectrum herbicide treatment. If rains come rapidly, the area should be sprayed when weather allows and planted in spring of 2012.

Area A-3 (4.4 acres)

Existing Conditions:

This area is a combination of emergent and wet prairie. The emergent is in fair condition, but the wet prairie is being invaded by non native species. Problem species for grasses include sweet vernal grass, Velvet grass, and non-native Bent grass spp. Problem species for non native forbs include: Pennyroyal, Curly dock, Oxeye daisy, St. Johns wort, Centurion, Queen Anne's lace, prickly sow thistle, Cats ear dandy lion and parentucellia.

Target Conditions:

A combination of emergent and wet prairie dominated by native facultative or wetter species.

Recommendations to Reach Target Conditions:

- This area should be sprayed out ASAP with the exception of the two wetter areas near each side of the existing berm. A combination of a broad spectrum and broadleaf herbicide should be utilized to control established hard to kill weeds.
- The emergent areas are sparsely vegetated. They should be spot sprayed for non natives and re-planted to a mix of Dowingia, Popcorn flower, and Ovate spike-rush.
- The constructed dike along the north side of this area should be breached to allow surface flows to enter site from the adjoining property to the north. This berm should be sprayed out ASAP and then replanted with upland species such as blue wildrye, slender wheatgrass and California oatgrass once non-natives are under control (likely late fall of 2011).
- Follow recommendation in A-2.

Upland Area (6.9 acres)

Existing Conditions:

The upland area is in fair shape with ~ 50-60% native species. Blue wildrye is the dominant native species, and velvet grass is the dominant non-native species. Weeds in this area present a contamination problem for adjacent wetland areas if not managed. The following option

appears to be the preferred option discussed in a meeting on September 7, 2010 by the bank sponsor, Pat Thompson and the regulatory agencies to limit the contamination issue.

Target Conditions:

Native upland prairie if buffer credits are sufficient to warrant the work it will take to keep it that way.

Recommendations to Reach Target Conditions:

If restoring this area is the goal, follow site preparation measures outlined in A-2, with final planting in the fall of 2012. Due to abundant bio-mass, mowing will be necessary here this fall to accomplish full restoration. Re-plant to a combination of the following seed mix, which is in order of the highest percentage of mix first: blue wild rye, slender wheatgrass, Roemer's fescue, and California oatgrass. Follow planting with 2 years of broad-leaf weed control. Once broad-leaf weeds are under control, plant to a native forbs mix of aggressive habitat generalists such as: Common yarrow, Meadow checkermallow, Streamside lupine, and Bi-color lupine.

This area will be deemed successful if at least 50 percent of the vegetation is native upland prairie, with not more than 15 percent non native invasives and the remainder either native or non intrusive non native species (eg. Parentucellia, curly dock and centurion).

Area A-4 (7.2 acres)

Existing Conditions:

This area is mostly wet prairie with a few scatter trees. The vegetation is mostly non native grasses and forbs such as bent grass, velvet grass, cats ear dandelion, oxeye daisy, and pennyroyal.

Target Conditions:

A combination of forested wetland, scrub/shrub wetland and wet prairie.

Recommendations to Reach Target Conditions:

- This entire area should be sprayed out ASAP. The existing trees and shrubs should be avoided during spraying when possible.
- Area should be sprayed again following fall of 2010' green up, prior to heavy winter

- Watch this area closely in the spring of 2011, spraying should occur after significant germination occurs, but prior to any non-native species beginning to flower.
- Depending on spring rains, this area will likely need sprayed again in June. If there is still significant dead organic matter (over 50% ground cover) the area should be mowed with a 4 blade rotary mower (mulching type) or a flail mower.
- During the summer of 2011 this area should be monitored weekly to detect any new problems. Thistle, Pennyroyal, Queen Anne's lace and St John's-wort can all germinate with very little moisture and should be treated if needed.
- During the fall of 2011 this area should be assessed for planting. If there is significant rains (2"-3") followed by warm temperatures to get weeds germinated, the site should be planted followed by a broad spectrum herbicide treatment. If rains come rapidly, the area should be sprayed when weather allows and planted in spring of 2012.

Area A-5 (9.8 acres)

Existing Conditions:

This area is approximately half wet prairie and half emergent wetland. The wet prairie area is nearly dominated by non native undesirable species such as bent grass, velvet grass, cats ear dandelion, oxeye daisy, and pennyroyal.

Target Conditions:

A combination of emergent wetland and wet prairie dominated by facultative or wetter native wetland species.

Recommendations to Reach Target Conditions:

- This area needs intensive spot spraying for pennyroyal and curly dock. Due to the hardiness of these species, a mix of broad spectrum and broadleaf specific herbicides should be utilized. Boom spraying will likely be more efficient in areas of heavy infestation.
- Re-plant emergent marsh areas this fall if non-natives are prevented from going to seed this year or if infestations limited enough for spot spraying to be effective next year (ie less than 25% non-native cover).
- The entire wet prairie portion should be sprayed out ASAP and follow site prep protocols outlined in A-2.

Area B-1 (22.3 acres)

Existing Conditions:

This area is fairly good native wet prairie for the most part, however, if left unattended this area will eventually be overtaken by non native species, predominately velvet grass.

Target Conditions:

Wet prairie dominated by at least 70% native facultative or wetter species.

Recommendations to Reach Target Conditions:

- In this area target those areas where the velvet grass is approaching approximately 15% or more cover and spray these areas out with Round-up® as needed through fall of 2011. Re-plant sprayed out areas to wet prairie.
- The areas that are less than 15% velvet grass should be spot sprayed. All pennyroyal should also be spot sprayed and other non-natives that are encountered.

Area B-2 (18.8 acres)

Existing Conditions:

This area is a combination of emergent wetland behind a dike and wet prairie. This area is also in fair condition, but in danger of becoming overtaken by non native velvet grass in the wet prairie and pennyroyal in the emergent areas.

Target Conditions:

A combination of emergent wetland and wet prairie dominated by at least 70% native facultative or wetter species.

Recommendations to Reach Target Conditions:

- The area east of the berm needs to be spot sprayed targeting barnyard grass and pennyroyal. This area would greatly benefit from additional emergent planting to increase native plant cover and diversity.
- In the area west of the dike, intensive spot spraying needs to target pennyroyal, velvet grass and bent grass. If sufficient cover of these species is not reduced by early June, the area should be mowed prior to seed set, and spot spraying should continue as seed heads appear to aid in identification.

Area B-3-A (3.2 acres & Area-B-3- B 1.2 acres)

Existing Conditions:

The western portion of this area is wet prairie in fairly good condition; the eastern portion is wet prairie in very poor condition as far as native species is concerned.

Target Conditions:

Wet prairie in the short term, transitioning into riparian forested along Oak Creek.

Recommendations to Reach Target Conditions:

- The western portion of this area needs to be spot sprayed for velvet grass, cat's ear dandelion, and pennyroyal.
- The eastern portion should be sprayed out ASAP, and follow site prep/planting protocols outlined in A-2 followed by wet prairie seeding.
- Once the herbaceous layer is established, plant a mix of native trees and shrubs along Oak Creek.
- The small upland area that remains in the southern upland area delineated by Pacific Habitat Services in 1997 should be sprayed out for 2 growing season and planted with native species.

Conclusion

This plan is designed to correct vegetative deficiencies within the Oak Creek Mitigation Bank. Every attempt was made to define BMP's (best management practices) for each area and the anticipated timing of each activity. These recommendations are based on many years of experience and typical weather patterns. Timing/quantity of precipitation, Soil temperatures, and various other environmental variables will ultimately dictate the timing of management activities, and there effectiveness. This should be accomplished through field visits by an experienced professional. Contracts should be drawn up as soon as possible for the critical spraying that needs to take place this fall and the spring of 2011 to assure meeting the recommended critical time frames.

In follow-up to this plan, a minimum of three yearly inspections will be conducted by Ray Fiori and Pat Thompson, or other wetland professionals. The first site visit should take place in the early spring (March-April) the second in mid-June to assess how treatments are progressing and the third in August to determine if or what additional treatments are necessary. A memo

outlining this information will be immediately passed on to the bank sponsor, DSL and the USACOE for review and comment.

General Weed Control Guidelines

Broadcast/Spot Spraying

- For areas that are designated to be sprayed out and for spot spraying, a broad spectrum herbicide such as Glyphosate should be utilized. Round-up™ power max with 5.5 Lbs of active ingredient has proven to be the most effective on established perennial species, and should be utilized whenever possible.
- When broadcast spraying, utilizing well calibrated equipment with adequate spray volume is absolutely necessary for complete control. For broad spectrum herbicides like Round-up™, a minimum of 7 gal/ac. total solution should be utilized, with higher volumes for dense foliage. For broad-leaf specific herbicides such as Garlon 3A™, a minimum of 10gal/ac total solution should be utilized, with higher volumes for dense foliage.
- When spot spraying, a high visibility dye (red works best) should be utilized. This aids in follow up treatments, and also allows for evaluation of herbicide effectiveness on target species.
- In order for this plan to be successful, it is critical in areas designated for management that no non-native species are permitted to seed throughout this intensive management period.
- It is also critical to monitor herbicide success following each treatment. Using a broad spectrum herbicide does not guarantee all plants will be killed and broadleaf herbicides are very selective. Weather conditions, spray equipment, and stage of plant growth all play important roles in success, and corrective measures may need to be taken.

Velvet Grass (*Holcus lanatus*)

- Once established a Round-up® product with 5.5Lbs of active ingredient is necessary for control
- For areas designated for spot spraying, foggy mornings in early spring or a heavy dew aid in identification as the fuzzy leaf surface collects water droplets and distinguishes it from desirable native species.
- During its first growing season following germination this species can be difficult to identify until late June when seed heads begin to appear. This is the best time for spot

treatment control, but it is imperative to cover these areas multiple times to ensure no plants produce viable seed.

Non-Native Bent grass species (*Agrostis species*)

- Once established a Round-up™ product with 5.5Lbs of active ingredient is necessary control.
- Although spring treatments are necessary to keep these species from producing seed, fall application are best for rhizome control.
- These species tend to germinate in late fall, several weeks after significant precipitation, so a late herbicide application just prior to heavy winter rains is very advantageous.

Sweet vernal grass (*Anthoxanthum odoratum*)

- Although this species is a perennial, it remains fairly small in poor soils with limited nutrients.
- The best defense is to eliminate the seed bank through site prep.
- During its first season after germination, it is difficult to distinguish from other natives. Spot spraying is best after seed heads begin to appear, but prior to producing viable seed.
- Mowing can help prevent it from going to seed and subsequent spot spraying, but has little benefit for long term control.
- Once established, spot spraying is the best control. It can be mistaken for meadow foxtail (which should be controlled) as well as Blue wildrye and Meadow barley

Oxeye daisy (*Leucanthemum vulgare*)

- Once established, it can be difficult to kill with a broad spectrum herbicide.
- When using broadleaf specific herbicides, Milestone™ is the most effective.
- Mixing the two together is best for spot spraying.

Teasel (*Dipsacus sylvestris*)

- Once established, it creates abundant seed and spreads rapidly, but since it is a biennial, it takes 2 years to go to seed
- Most herbicides are effective on it in the rosette stage, before it starts to bolt, and should be controlled at that stage.

- Mowing is ineffective for long term control, but will delay seed production.

Pennyroyal (*Menthe pulegium*)

- This species spreads rapidly from existing roots and seed, and is mostly associated with emergent drawdown zones, and similar habitats.
- Hand pulling and mowing have no effect on control.
- Depending on the year, plants can begin to appear in late June, and continue into the fall. Control should begin as soon as flowers appear to aid in detection, but areas should be covered at least once weekly to prevent seed production.
- Due to its spreading nature, areas of previous infestations should be checked frequently.
- When spot treating, a Round-up™ product with 5.5Lbs of active ingredient is necessary control.
- Garlon 3A™ is fairly effective as a broad-leaf specific treatment, but stage of growth and weather play a big role.

Curley dock (*Rumex crispus*)

- Once established, it can be difficult to kill with a broad spectrum herbicide.
- When using broadleaf specific herbicides, Milestone™ is the most effective.
- Mixing the two together is best for spot spraying.

Thistle Species (*Cirsium arvense*)

- These species can germinate most months of the year with little moisture necessary.
- They are fast to reproduce when stressed during hot weather and early detection and control is the best defense. Once vegetation is established, competition from native species is the best long-term strategy, with limited ground disturbance.

Wet Prairie Planting List

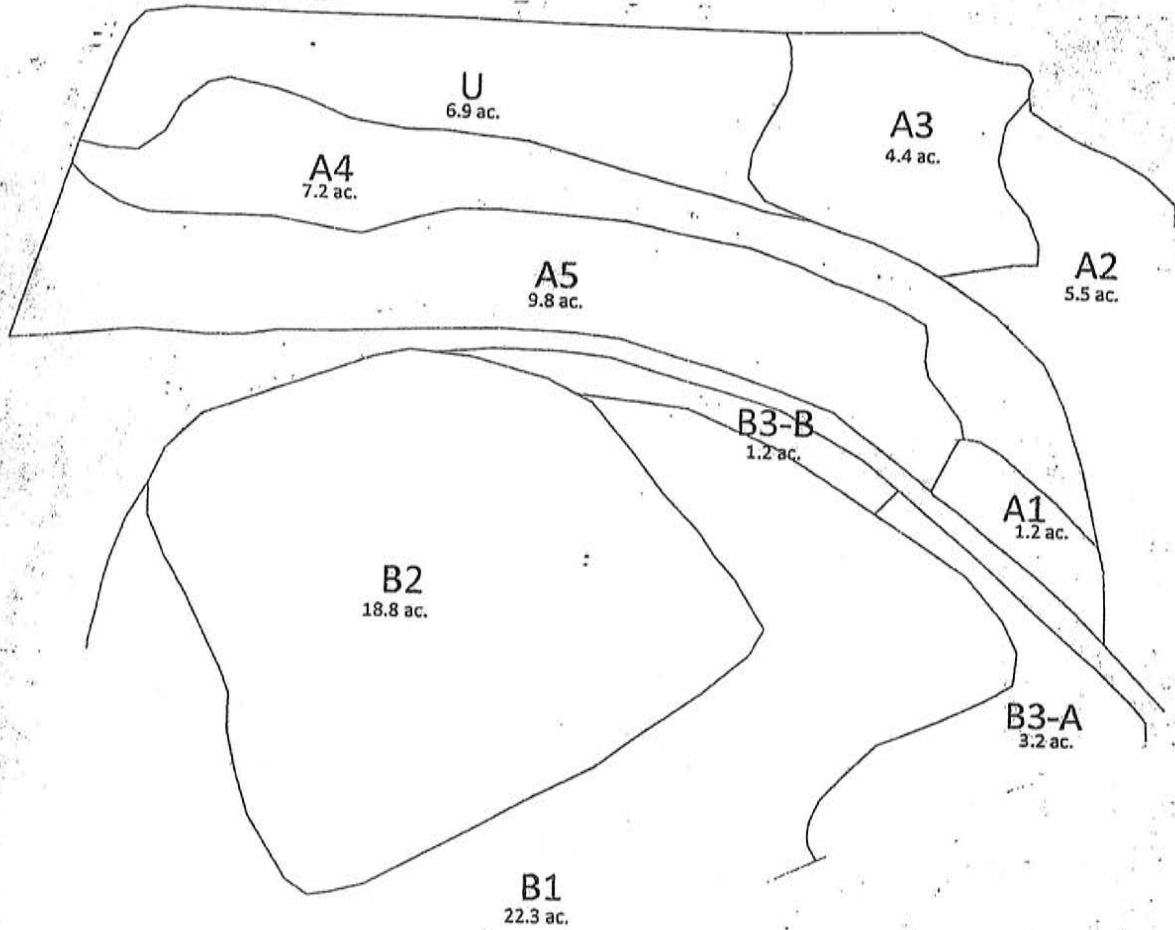
Common Name	Latin Name	LBS/ Acre
Tufted hairgrass	<i>Deschampsia cespitosa</i>	0.25
Water foxtail	<i>Alopecurus geniculatus</i>	0.5

Spike bentgrass	<i>Agrostis exarata</i>	0.25
Western mannagrass	<i>Glyceria occidentalis</i>	0.5
Meadow barley	<i>Hordeum Brachyantherum</i>	1
Slender hairgrass	<i>Deschampsia elongata</i>	1
Annual hairgrass	<i>Deschampsia danthonioides</i>	1
American sloughgrass	<i>Beckmania syzigachne</i>	1

Emergent Marsh Planting Mix

Common Name	Latin Name	LBS/ Acre
Water Plantain	<i>Alisma plantago aquatica</i>	1
American sloughgrass	<i>Beckmania syzigachne</i>	2
Water foxtail	<i>Alopecurus geniculatus</i>	1
Western mannagrass	<i>Glyceria occidentalis</i>	1
Ovate spike rush	<i>Eleocharis ovate</i>	0.5
Creeping spike rush	<i>Eleocharis palutris</i>	0.5
Showy downingia	<i>Downingia elegans</i>	0.25
Fragrant popcorn flower	<i>Plagiobothrys figuaratus</i>	1

OAK CREEK MITIGATION BANK REMEDIATION AREAS



Scale: 1:4,320

Appendix 3

Water Levels in Well 16

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USFWS Reference site well

Well 16 automatically records ground water levels daily (6:00 am) so that measurements obtained at other observation wells once a month could be viewed in the context of annual ground-water fluctuation. Well 16 was installed in the wetland along Rock Hill Rd. and across from the Sodaville Cutoff Rd on the south side of Oak Creek (figure 1).



Oak Creek Well 16 – 2014 Data (12 inches have been subtracted so data listed below are inches below land surface.) Serial # - 02B25C5 Data logged Jan 12, 2015

-2.7,	01-Jan-14,	+1.0,	05-Mar-14,	-7.0,	07-May-14,	-41.0,	09-Jul-14,
-3.3,	02-Jan-14,	+0.7,	06-Mar-14,	-9.0,	8-May-14,	-42.0,	10-Jul-14,
+00.7,	03-Jan-14,	+0.3,	07-Mar-14,	-9.0,	09-May-14,	-43.0,	11-Jul-14,
-01.0,	04-Jan-14,	+0.3,	08-Mar-14,	+1.0,	10-May-14,	-43.6,	12-Jul-14,
-1.3,	05-Jan-14,	+2.0,	09-Mar-14,	+1.0,	11-May-14,	-45.0,	13-Jul-14,
-2.3,	06-Jan-14,	+0.7,	10-Mar-14,	+1.3,	12-May-14,	-46.0,	14-Jul-14,
-0.0,	07-Jan-14,	+0.3,	11-Mar-14,	-4.3,	13-May-14,	-46.3,	15-Jul-14,
+1.3,	08-Jan-14,	-0.3,	12-Mar-14,	-7.6,	14-May-14,	-59.0,	16-Jul-14,
+0.7,	09-Jan-14,	-0.0,	13-Mar-14,	-10.3,	15-May-14,	-47.9,	17-Jul-14,
+2.0,	10-Jan-14,	+1.0,	14-Mar-14,	-14.6,	16-May-14,	-48.9,	18-Jul-14,
+1.7,	11-Jan-14,	+0.3,	15-Mar-14,	-15.6,	17-May-14,	-49.9,	19-Jul-14,
+1.0,	12-Jan-14,	-0.3,	16-Mar-14,	-15.3,	18-May-14,	-50.6,	20-Jul-14,
+1.3,	13-Jan-14,	+0.3,	17-Mar-14,	-14.3,	19-May-14,	-51.6,	21-Jul-14,
-0.3,	14-Jan-14,	-0.3,	18-Mar-14,	-13.3,	20-May-14,	-51.9,	22-Jul-14,
-0.0,	15-Jan-14,	-0.0,	19-Mar-14,	-15.3,	21-May-14,	-52.9,	23-Jul-14,
-0.0,	16-Jan-14,	-1.7,	20-Mar-14,	-15.6,	22-May-14,	-52.9,	24-Jul-14,
-0.3,	17-Jan-14,	-4.7,	21-Mar-14,	-16.0,	23-May-14,	-53.3,	25-Jul-14,
-0.7,	18-Jan-14,	-6.3,	22-Mar-14,	-16.3,	24-May-14,	-53.6,	26-Jul-14,
-1.3,	19-Jan-14,	-8.0,	23-Mar-14,	-17.3,	25-May-14,	-53.9,	27-Jul-14,
-1.7,	20-Jan-14,	-8.6,	24-Mar-14,	-18.0,	26-May-14,	-54.6,	28-Jul-14,
-3.3,	21-Jan-14,	-8.0,	25-Mar-14,	-18.6,	27-May-14,	-55.6,	29-Jul-14,
-3.3,	22-Jan-14,	+0.7,	26-Mar-14,	-18.6,	28-May-14,	-56.6,	30-Jul-14,
-4.0,	23-Jan-14,	+0.3,	27-Mar-14,	-19.6,	29-May-14,	-57.6,	31-Jul-14,
-6.3,	24-Jan-14,	+0.7,	28-Mar-14,	-20.0,	30-May-14,	-70.6,	1-Aug-14,
-7.3,	25-Jan-14,	+1.0,	29-Mar-14,	-20.0,	31-May-14,	-59.3,	02-Aug-14,
-7.6,	26-Jan-14,	+0.3,	30-Mar-14,	-21.0,	01-Jun-14,	-59.6,	03-Aug-14,
-7.3,	27-Jan-14,	-0.0,	31-Mar-14,	-21.3,	02-Jun-14,	-60.3,	04-Aug-14,
-6.0,	28-Jan-14,	+0.3,	01-Apr-14,	-22.3,	03-Jun-14,	-61.3,	05-Aug-14,
+1.7,	29-Jan-14,	-0.0,	02-Apr-14,	-23.3,	04-Jun-14,	-61.6,	06-Aug-14,
+0.7,	30-Jan-14,	+0.3,	03-Apr-14,	-24.0,	05-Jun-14,	-62.3,	07-Aug-14,
+0.3,	31-Jan-14,	+0.3,	04-Apr-14,	-24.6,	06-Jun-14,	-62.9,	08-Aug-14,
-0.0,	01-Feb-14,	+0.7,	05-Apr-14,	-25.3,	07-Jun-14,	-63.6,	09-Aug-14,
+0.3,	02-Feb-14,	+0.7,	06-Apr-14,	-25.6,	08-Jun-14,	-63.9,	10-Aug-14,
-0.0,	03-Feb-14,	+0.7,	07-Apr-14,	-26.3,	09-Jun-14,	-63.9,	11-Aug-14,
+0.3,	04-Feb-14,	+0.3,	08-Apr-14,	-37.0,	10-Jun-14,	-64.6,	12-Aug-14,
-1.7,	05-Feb-14,	-1.0,	09-Apr-14,	-27.3,	11-Jun-14,	-63.9,	13-Aug-14,
-5.0,	06-Feb-14,	-5.7,	10-Apr-14,	-28.0,	12-Jun-14,	-63.3,	14-Aug-14,
-2.7,	07-Feb-14,	-8.3,	11-Apr-14,	-27.3,	13-Jun-14,	-64.3,	15-Aug-14,
-0.7,	08-Feb-14,	-10.6,	12-Apr-14,	-28.3,	14-Jun-14,	-64.3,	16-Aug-14,
-0.3,	09-Feb-14,	-12.3,	13-Apr-14,	-29.0,	15-Jun-14,	-64.9,	17-Aug-14,
-0.0,	10-Feb-14,	-14.0,	14-Apr-14,	-29.0,	16-Jun-14,	-64.9,	18-Aug-14,
+0.7,	11-Feb-14,	-16.0,	15-Apr-14,	-29.0,	17-Jun-14,	-65.3,	19-Aug-14,
+1.7,	12-Feb-14,	-16.3,	16-Apr-14,	-29.3,	18-Jun-14,	-65.3,	20-Aug-14,
+1.7,	13-Feb-14,	-15.0,	17-Apr-14,	-30.0,	19-Jun-14,	-65.3,	21-Aug-14,
+1.0,	14-Feb-14,	-6.3,	18-Apr-14,	-30.3,	20-Jun-14,	-65.6,	22-Aug-14,
+0.3,	15-Feb-14,	-7.0,	19-Apr-14,	-31.3,	21-Jun-14,	-65.6,	23-Aug-14,
+0.3,	16-Feb-14,	-5.3,	20-Apr-14,	-32.0,	22-Jun-14,	-65.9,	24-Aug-14,
-0.3,	17-Feb-14,	-7.6,	21-Apr-14,	-32.6,	23-Jun-14,	-65.6,	25-Aug-14,
+0.3,	18-Feb-14,	-2.0,	22-Apr-14,	-33.3,	24-Jun-14,	-65.9,	26-Aug-14,
-0.0,	19-Feb-14,	+0.3,	23-Apr-14,	-33.6,	25-Jun-14,	-65.6,	27-Aug-14,
+0.3,	20-Feb-14,	+1.0,	24-Apr-14,	-33.0,	26-Jun-14,	-65.6,	28-Aug-14,
+0.3,	21-Feb-14,	+0.7,	25-Apr-14,	-32.6,	27-Jun-14,	-65.6,	29-Aug-14,
-0.0,	22-Feb-14,	+0.7,	26-Apr-14,	-33.0,	28-Jun-14,	-65.3,	30-Aug-14,
-0.7,	23-Feb-14,	+0.7,	27-Apr-14,	-33.3,	9-Jun-14,	-65.6,	31-Aug-14,
+1.0,	24-Feb-14,	+0.7,	28-Apr-14,	-34.3,	30-Jun-14,	-65.6,	01-Sep-14,
+0.3,	25-Feb-14,	+0.7,	29-Apr-14,	-33.6,	01-Jul-14,	-65.3,	02-Sep-14,
-0.3,	26-Feb-14,	+0.3,	30-Apr-14,	-35.0,	02-Jul-14,	-65.6,	03-Sep-14,
-0.3,	27-Feb-14,	-4.3,	01-May-14,	-36.0,	03-Jul-14,	-65.9,	04-Sep-14,
+1.0,	28-Feb-14,	-8.0,	02-May-14,	-36.6,	04-Jul-14,	-65.9,	05-Sep-14,
+0.7,	01-Mar-14,	-11.0,	03-May-14,	-37.0,	05-Jul-14,	-65.9,	06-Sep-14,
+1.0,	02-Mar-14,	-0.0,	04-May-14,	-37.6,	06-Jul-14,	-65.9,	07-Sep-14,
+2.0,	03-Mar-14,	+0.3,	05-May-14,	-39.0,	07-Jul-14,	-65.9,	08-Sep-14,
+0.7,	04-Mar-14,	-3.3,	06-May-14,	-39.3,	08-Jul-14,	-65.6,	09-Sep-14,

-65.6,	10-Sep-14,	-4.3,	17-Nov-14,
-65.9,	11-Sep-14,	-5.3,	18-Nov-14,
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USFWS Reverence Well – Serial # - 0214039 Data logged Mon Jan 12, 2015

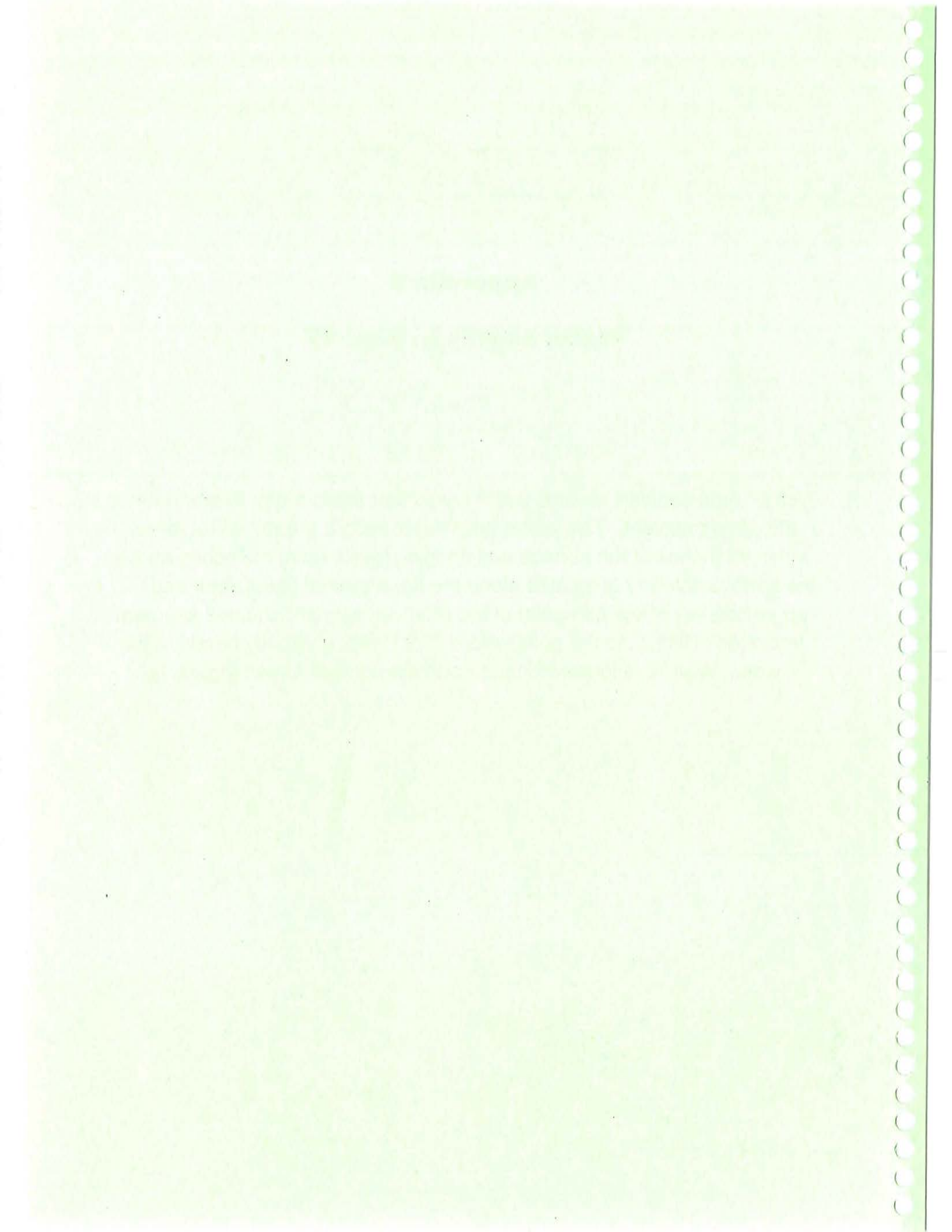
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Appendix 4

Water Levels in Well 17

Well 17 automatically records water levels four times a day (6 am; noon; 6 pm.; and midnight). The well is installed to record ground water levels within 45 inches of the surface and flooding levels up to 35 inches above the surface. Well 17 is located along the right bank of Oak Creek and approximately at the mid-point of the relatively straight channel segment from Rock Hill Rd. to the point where Oak Creek gradually bends to the west. Well 17 is located on the north side of Oak Creek (figure 1).

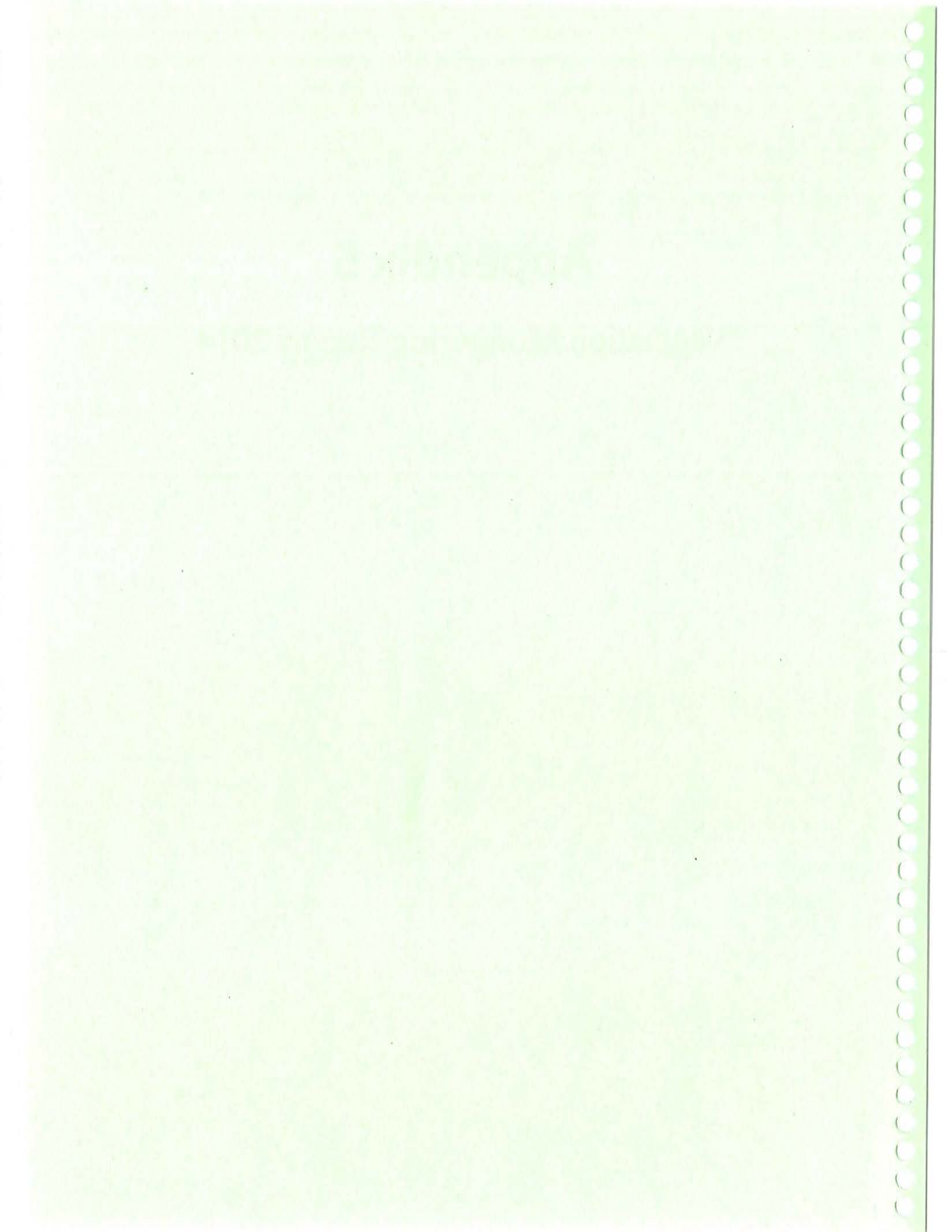


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-42.5, 18:00:00,	13-Dec-14,	-44.1, 06:00:00,	02-Jan-15,
-42.5, 00:00:00,	14-Dec-14,	-43.1, 12:00:00,	02-Jan-15,
-42.5, 06:00:00,	14-Dec-14,	-43.5, 18:00:00,	02-Jan-15,
-41.5, 12:00:00,	14-Dec-14,	-43.5, 00:00:00,	03-Jan-15,
-42.5, 18:00:00,	14-Dec-14,	-43.5, 06:00:00,	03-Jan-15,
-42.5, 00:00:00,	15-Dec-14,	-42.1, 12:00:00,	03-Jan-15,
-42.5, 06:00:00,	15-Dec-14,	-43.1, 18:00:00,	03-Jan-15,
-41.5, 12:00:00,	15-Dec-14,	-43.1, 00:00:00,	04-Jan-15,
-42.5, 18:00:00,	15-Dec-14,	-42.1, 06:00:00,	04-Jan-15,
-42.5, 00:00:00,	16-Dec-14,	-41.1, 12:00:00,	04-Jan-15,
-42.5, 06:00:00,	16-Dec-14,	-40.1, 18:00:00,	04-Jan-15,
-41.1, 12:00:00,	16-Dec-14,	-40.1, 00:00:00,	05-Jan-15,
-42.1, 18:00:00,	16-Dec-14,	-39.8, 06:00:00,	05-Jan-15,
-42.5, 00:00:00,	17-Dec-14,	-39.1, 12:00:00,	05-Jan-15,
-42.5, 06:00:00,	17-Dec-14,	-40.8, 18:00:00,	05-Jan-15,
-41.5, 12:00:00,	17-Dec-14,	-41.5, 00:00:00,	06-Jan-15,
-41.5, 18:00:00,	17-Dec-14,	-42.1, 06:00:00,	06-Jan-15,
-41.8, 00:00:00,	18-Dec-14,	-40.1, 12:00:00,	06-Jan-15,
-41.8, 06:00:00,	18-Dec-14,	-41.1, 18:00:00,	06-Jan-15,
-40.8, 12:00:00,	18-Dec-14,	-41.8, 00:00:00,	07-Jan-15,
-40.8, 18:00:00,	18-Dec-14,	-42.5, 06:00:00,	07-Jan-15,
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-41.5, 06:00:00,	19-Dec-14,	-41.5, 18:00:00,	07-Jan-15,
-40.1, 12:00:00,	19-Dec-14,	-42.5, 00:00:00,	08-Jan-15,
-41.1, 18:00:00,	19-Dec-14,	-42.5, 06:00:00,	08-Jan-15,
-40.8, 00:00:00,	20-Dec-14,	-41.8, 12:00:00,	08-Jan-15,
-40.1, 06:00:00,	20-Dec-14,	-42.1, 18:00:00,	08-Jan-15,
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-36.1, 18:00:00,	20-Dec-14,	-42.8, 06:00:00,	09-Jan-15,
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-35.8, 18:00:00,	21-Dec-14,	-42.8, 06:00:00,	10-Jan-15,
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-35.8, 06:00:00,	22-Dec-14,	-41.5, 18:00:00,	10-Jan-15,
-35.1, 12:00:00,	22-Dec-14,	-41.1, 00:00:00,	11-Jan-15,
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-37.8, 00:00:00,	23-Dec-14,	-40.5, 12:00:00,	11-Jan-15,
-37.1, 06:00:00,	23-Dec-14,	-40.1, 18:00:00,	11-Jan-15,
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-37.1, 00:00:00,	24-Dec-14,		
-39.1, 06:00:00,	24-Dec-14,		
-33.3, 12:00:00,	24-Dec-14,		
-36.1, 18:00:00,	24-Dec-14,		



Appendix 5

Vegetation Monitoring Report 2014



Oak Creek Mitigation Bank Vegetation Monitoring - 2014

Introduction and Methods

Vegetation monitoring was conducted in 2014 at the Oak Creek Mitigation Bank site on May 26th, 30th, and 31st; and June 1st, 2014. The sampling protocol followed was that used in 1999 through 2013 at the site and is described in detail in the report for the 1999 vegetation monitoring. In brief, it consisted of 10 equally spaced sampling stations along each of 7 transects at the site, with 5 transects in the Prior Converted Wetland area and one transect each in the Forested areas in the northeast corner and along the west edge of the site. Sample stations were marked in 1999 with 5/8-inch steel rods, which were recovered in later years using descriptions of station locations, flags placed near the rods, and a magnetic locator if needed. In addition, in 2007 three new transects consisting of 5 sample stations each were added in areas of new construction, one each (Transects 2.1 and 2.2) placed 50 meters on either side of Transect #2 and parallel to it, and one (Transect 5.1) placed 50 meters south of Transect #5 and parallel to it. In 2010 one new transect (Transect 8) consisting of 10 sample stations was added in the upland area in the NW portion of the site. In 2014 one new transect (Transect 5.2), consisting of 5 sample stations, was placed between Transects #5 and 5.1, and parallel to them.

Species found in a one-square meter rectangular quadrat placed at each of the sampling stations were recorded and the cover of each was estimated as a percent of the quadrat area. In addition to the cover data in quadrats, other species encountered along transects were recorded as being present in the area. As in previous years, these latter data were not used in the calculations of average cover. Estimates of bare ground and other non-vegetated space were made at each quadrat. Estimates of overstory cover (canopy) were also included, when present. Sample stations with over about 16 inches of water at sampling time and with no emergent or aquatic vegetation (i.e. vernal pools) were not included in the vegetation analyses.

Data were entered into a spreadsheet and cover was averaged by species for each transect. Tables are included for the Prior Converted Wetlands area (Transects 1 through 5) as a whole which includes summary data for all transects. Data are presented separately for the added transects on the south side of Oak Creek (Transects 2.1 and 2.2) and the north side of Oak Creek (Transects 5.1 and 5.2), for the Forested areas (Transects 6 and 7), and for the NW upland area (Transect 8).

To calculate the relative proportion of typical wetland species, those with an indicator status of FAC or better were considered. Species were assigned the indicator status for the Northwest region from the USFWS 1996 list. The most conservative National indicator status was used when the indicator status for the Northwest region was "NI" or blank. In determining proportions of cover for FAC and better species, the cover of those species was calculated as a percentage of the total cover. Calculations were also made which included: 1) the percentage of the total cover comprised of native taxa, and 2) a Soil Moisture Index (SMI). The SMI was calculated by weighting the cover of individual

species by their fidelity to wetland habitats (i.e. OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5). All species not on the USFWS 1996 list, taxa identified only to genus, and unknown taxa were assigned a value of 5 for calculating the SMI. The sum of the weighted cover values for all taxa in the plot was then divided by the total un-weighted cover of all taxa in the plot. SMI values for a plant community can range from 1.0 (all plants present are obligate wetland species) to 5.0 (all plants present are upland species), and a value of 3.0 is considered to be the break-point between wetlands and uplands.

Results and Discussion

The following paragraphs describe the overall cover for the Prior Converted Wetlands area, for the south side and north side new construction areas, for the Forested areas, and for the NW upland area. The separate transects within the Prior Converted Wetlands area are not discussed individually.

In 2014, the dominant species found in the Prior Converted Wetlands area (Transects #1 through #5) were *Deschampsia cespitosa* (tufted hairgrass), *Hypochaeris radicata* (hairy cat's ear), *Carex unilateralis* (one-sided sedge), *Alopecurus geniculatis* (water foxtail), and *Lythrum portula* (spatulaleaf loosestrife). Species with an indicator status of FAC or better accounted for about 83% of the total cover in this area. Native species accounted for about 59% of the total cover in this area. The SMI for this area was 2.21, and 73% of the area was vegetated.

For the south side new construction area (Transects 2.1 and 2.2), the dominant species were *Deschampsia cespitosa* (tufted hairgrass), *Juncus tenuis* (slender rush), *Lythrum portula* (spatulaleaf loosestrife), *Holcus lanatus* (common velvetgrass), and *Hypochaeris radicata* (hairy cat's ear). Species with an indicator status of FAC or better accounted for about 83% of the total cover in this area. Native species accounted for about 63% of the total cover in this area. The SMI for this area was 2.23, and 66% of the area was vegetated.

For Transect 5.1 in the north side new construction area the dominant species were *Deschampsia cespitosa* (tufted hairgrass), *Hypochaeris radicata* (hairy cat's ear), *Agrostis castellana/capillaris* (highland/colonial bentgrass), *Hordeum brachyantherum* (meadow barley), and *Holcus lanatus* (common velvetgrass). Species with an indicator status of FAC or better accounted for about 74% of the total cover in this area. Native species accounted for about 59% of the total cover in this area. The SMI for this area was 2.66, and 71% of the area was vegetated.

For Transect 5.2 in the north side new construction area the dominant species were *Deschampsia cespitosa* (tufted hairgrass), *Hypochaeris radicata* (hairy cat's ear), *Juncus bufonius* (toad rush), and *Holcus lanatus* (common velvetgrass). Species with an indicator status of FAC or better accounted for about 87% of the total cover in this area. Native species accounted for about 81% of the total cover in this area. The SMI for this area was 2.32, and 77% of the area was vegetated.

For the northeast Forested area (Transect #6), the dominant species were *Fraxinus latifolia* (Oregon ash), *Camassia leichtlinii* (great camas), *Allium nigrum* (black garlic), *Poa trivialis* (roughstalk bluegrass), and *Ranunculus uncinatus* (small-flowered buttercup). Species with an indicator status of FAC or better accounted for about 89% of the total cover in this area. Native species accounted for about 88% of the total cover in this area. The SMI for this area was 2.37, and 40% of the ground was vegetated (beneath the canopy layer).

For the west Forested area (Transect #7), the dominant species were *Fraxinus latifolia* (Oregon ash), *Camassia leichtlinii* (great camas), *Poa trivialis* (roughstalk bluegrass), *Lysimachia nummularia* (creeping jenny), and *Agrostis castellana/capillaris* (highland/colonial bentgrass). Species with an indicator status of FAC or better accounted for about 91% of the total cover in this area. Native species accounted for about 69% of the total cover in this area. The SMI for this area was 2.38, and 84% of the ground was vegetated (beneath the canopy layer).

For the NW upland area (Transect #8), the dominant species were *Holcus lanatus* (common velvetgrass), *Festuca idahoensis* ssp. *roemerii*/ *F. occidentalis* (Roemer's fescue/ western fescue), *Hypochaeris radicata* (hairy cat's ear), *Vicia tetrasperm* (slender vetch), and *Leucanthemum vulgare* (oxeye daisy). Native species accounted for about 20% of the total cover in this area, and 77% of the area was vegetated.

Oak Creek Mitigation Bank Plant Monitoring, 2014																	
Prior Converted Habitat Type - Transect 1																	
Cover (%)																	
Date(s) Sampled: 5/26/14; 5/31/14																	
Species	Common Name	Native	Indicator	Wet	MTI	1	2	3	4	5	6	7	8	9	10	Mean	
<i>Deschampsia cespitosa</i>	tufted hairgrass	yes	FACW	y	2	80	42	20	10	22	30	22	26	11	26.3		
<i>Hypochoeris radicata</i>	hairy cat's ear		FACU		4	40	2								13		
<i>Eleocharis palustris</i>	creeping spikerush	yes	OBL	y	1					67					6.7		
<i>Epilobium ciliatum</i> ssp. watsonii	Watson's willowherb	yes	FACW-	y	2		5	7				27	11	7	1	5.8	
<i>Alopecurus geniculatis</i>	water foxtail		OBL	y	1				52							5.2	
<i>Holcus lanatus</i>	common velvetgrass		FAC	y	3	4	2	17				5	20	1	1	5	
<i>Anthoxanthum odoratum</i>	sweet vernalgrass		FACU		4		2	18				1	1	5	2	2.9	
<i>Carex feta</i>	green-sheathed sedge	yes	FACW	y	2								19	2	2	2.1	
<i>Bidens frondosa</i>	leafy beggar's ticks	yes	FACW+	y	2						18					1.8	
<i>Juncus bufonius</i>	toad rush	yes	FACW	y	2	3					1		2	8	2	1.6	
<i>Agrostis exarata</i>	spike bentgrass	yes	FACW	y	2	1	2		10					1		1.4	
<i>Agrostis castellana/capillaris</i>	highland/colonial bentgrass	yes	FACW	y	3	4	4		8							1.2	
<i>Parentucella viscosa</i>	parentucella		FAC-	y	3	1	6					1	2	1		1.1	
<i>Rumex acetosella</i>	sheep sorrel/ sour dock		FACU+		4							10				1	
<i>Hordeum brachyantherum</i>	meadow barley	yes	FACW-	y	2				4				4		1	0.9	
<i>Rorippa curvisiliqua</i>	western yellowcress	yes	OBL	y	1								5		4	0.9	
<i>Lythrum portula</i>	spatulateleaf loosestrife		OBL	y	1							6			2	0.8	
<i>Plagiobothrys figuratus</i>	fragrant popcornflower	yes	FACW	y	2								8			0.8	
<i>Carex unilateralis</i>	one-sided sedge	yes	FACW	y	2			5						2		0.7	
<i>Poa trivialis</i>	rough [roughstalk] bluegrass		FACW	y	2		1								4	0.5	
<i>Montia linearis</i>	narrow-leaved montia	yes	NOL	u	5									2	2	0.4	
<i>Myosotis discolor</i>	yellow and blue forget-me-not		FACW	y	2							1	3			0.4	
<i>Hypericum anagalloides</i>	bog St. John'swort	yes	OBL	y	1									3		0.3	
<i>Mentha pulegium</i>	pennyroyal		OBL	y	1					2	1					0.3	
<i>Rosa pisocarpa</i>	clustered rose	yes	FAC	y	3			3								0.3	
<i>Gnaphalium palustre</i>	western marsh cudweed	yes	FAC+	y	3									1	1	0.2	
<i>Lapsana communis</i>	nipplewort		FAC	y	3							1				0.1	
	bare (soil, mud, rock)					4	8	2									6.4
	moss, duff, dead vegetation, etc. (includes sprayed vegetation)					12	6	38	25	32	48	23	15	7	1	20.7	
	standing water (inches)									trace							

Oak Creek Mitigation Bank Plant Monitoring, 2014																	
Prior Converted Habitat Type - Transect 3																	
Cover (%)	Date(s) Sampled: 5/30/14																
	1	2	3	4	5	6	7	8	9	10	Mean						
Species	Common Name	Native	Indicator	Wet	MTI	Sample Station					10	Mean					
Deschampsia cespitosa	tufted hairgrass	yes	FACW	y	2	15	4	60	44	27	25	32	15	3	17	24.2	
Hordeum brachyantherum	meadow barley	yes	FACW-	y	2	42	65	17	15	32	15	10	4		5	20.5	
Poa trivialis	rough [roughstalk] bluegrass		FACW	y	2	25	58								5	8.8	
Mentha pulegium	pennyroyal		OBL	y	1	3			1	20	23				2	25	7.4
Agrostis exarata	spike bentgrass	yes	FACW	y	2			15	32	3		5		15	7	7	
Montia linearis	narrow-leaved montia	yes	NOL	u	5				1					50	7	5.8	
Carex unilateralis	one-sided sedge	yes	FACW	y	2	3				13	18				20	5.4	
Epilobium ciliatum ssp. watsonii	Watson's willowherb	yes	FACW-	y	2	1	1	1	1	4	4	1	20	8	4	4	
Holcus lanatus	common velvetgrass		FAC	y	3	5	2	1	1	1	18	8	3	3.9			
Bromus hordeaceus ssp. hordeaceus	soft brome		FACU		4	4							12	20		3.6	
Lotus corniculatus	birdsfoot trefoil		FAC	y	3										28	2.8	
Juncus tenuis	slender rush	yes	FACW-	y	2					2	3	20				2.5	
Alopecurus geniculatus	water foxtail		OBL	y	1	15	2								1	1.8	
Rumex crispus	curly dock		FAC+	y	3					1	2				2	3	0.8
Deschampsia danthonioides	annual hairgrass	yes	FACW-	y	2	7										0.7	
Plagiobothrys figuratus	fragrant popcornflower	yes	FACW	y	2					3			1		2	0.6	
Beckmannia syzigachne	American slough grass	yes	OBL	y	1					3					2	0.5	
Epilobium densiflora	dense spike-primrose	yes	FACW-	y	2										2	0.4	
Myosotis laxa	small flowered forget-me-not	yes	OBL	y	1					3	1					0.4	
Vicia tetrasperma	slender vetch		NOL	u	5								1		2	0.3	
Rorippa curvisiliqua	western yellowcress	yes	OBL	y	1									2		0.2	
Anthoxanthum odoratum	sweet vernalgrass		FACU		4								2			0.2	
Epilobium brachycarpum	autumn [tail annual] willowherb	yes	UPL		5	1							1			0.2	
Hypochoeris radicata	hairy cat's ear		FACU		4									1		0.1	
Parentucellia viscosa	parentucellia		FAC-		3											0.1	
Myosotis discolor	yellow and blue forget-me-not		FACW	y	2										1	0.1	
Centaurium erythraea	European centaury		FAC	y	3									1		0.1	
Anagallis arvensis	scarlet pimpernel		FAC	y	3									1		0.1	
Fraxinus latifolia	Oregon ash	yes	FACW	y	2									1		0.1	
Gallium parisiense	creeping [wall] bedstraw		UPL		5	1										0.1	
bare (soil, mud, rock)	DOES NOT INCLUDE CANOPY, IF ANY																
moss, duff, dead vegetation, etc. (includes sprayed vegetation)	"																
						25	2	17	8	40	12	7	45	2	5	16.3	

Oak Creek Mitigation Bank Plant Monitoring, 2014

Prior Converted Habitat Type - Transect 4

Date(s) Sampled: 5/30/14

Cover (%)	Species	Common Name	Native	Indicator	Wet	MTI	Sample Station										Mean
							1	2	3	4	5	6	7	8	9	10	
	Carex unilateralis	one-sided sedge	yes	FACW	Y	2	4	33	62	6	15	10	70	7	18	22.5	
	Alopecurus geniculatus	water foxtail		OBL	Y	1	92	67	1				55	2	21.7		
	Mentha pulegium	pennyroyal		OBL	Y	1	1	2	17	52	9	10	6	1	6	10.4	
	Deschampsia cespitosa	tufted hairgrass	yes	FACW	Y	2	5	4		20	12	7	6	8	5	6.7	
	Lythrum hyssopifolia	hyssop loosestrife		OBL	Y	1				1	40		4	8	3	5.6	
	Veronica scutellata	marsh speedwell	yes	OBL	Y	1		22	24							4.6	
	Agrostis exarata	spike bentgrass	yes	FACW	Y	2	20				1		18	2		4.1	
	Holcus lanatus	common velvetgrass	yes	FAC	Y	3	5	1	4		6				22	3.8	
	Beckmannia syzigachne	American slough grass	yes	OBL	Y	1	7		3	5	7	13				3.5	
	Spiraea douglasii	Douglas' spiraea/ hardhack	yes	FACW	Y	2				27						2.7	
	Lythrum portula	spatulateleaf loosestrife		OBL	Y	1			8				1	17		2.6	
	Epilobium ciliatum ssp. watsonii	Watson's willowherb	yes	FACW-	Y	2	2		20		2					2.4	
	Bromus hordeaceus ssp. hordeaceus	soft brome		FACU		4							4		18	2.2	
	Myosotis laxa	small flowered forget-me-not	yes	OBL	Y	1	1		16						5	2.2	
	Monarda linearis	narrow-leaved montia	yes	NOL	U	5	2		1				1		15	1.9	
	Eleocharis acicularis	needle spikerush	yes	OBL	Y	1				1			15	2		1.8	
	Veronica americana	American speedwell [brooklime]	yes	OBL	Y	1	18									1.8	
	Myosotis discolor	yellow and blue forget-me-not		FACW	Y	2			5		1				10	1.6	
	Poa trivialis	rough [roughstalk] bluegrass		FACW	Y	2	7			4					2	1.3	
	Hordeum brachyantherum	meadow barley	yes	FACW-	Y	2	7	5								1.2	
	Eleocharis ovata	ovate spikerush	yes	OBL	Y	1				5	5	1				1.1	
	Plagiobothrys figuratus	fragrant popcornflower	yes	FACW	Y	2	3			3			1			0.9	
	Eleocharis palustris	creeping spikerush	yes	OBL	Y	1							8			0.8	
	Leucanthemum vulgare	oxeye daisy		UPL		5									8	0.8	
	Juncus bufonius	toad rush	yes	FACW	Y	2				5					1	0.6	
	Vicia tetrasperma	slender vetch		NOL	U	5									5	0.5	
	Rosa pisocarpa	clustered rose	yes	FAC	Y	3						5				0.5	
	Valerianaella locusta	Lewiston cornsalad		NOL	U	5									4	0.4	
	Juncus tenuis	slender rush	yes	FACW-	Y	2			3							0.3	
	Geranium carolinianum	Carolina geranium	yes	NOL	U	5								3		0.3	
	Gnaphalium palustre	western marsh cudweed	yes	FAC+	Y	3					1			1		0.2	
	Agrostis stolonifera	creeping bentgrass		FACW	Y	2					2					0.2	
	Rumex crispus	curly dock		FAC+	Y	3				1						0.1	
	Epilobium densiflora	dense spike-primrose	yes	FACW-	Y	2				1						0.1	
	Rottippa curvisiliqua	western yellowcress	yes	OBL	Y	1					1					0.1	
	Anthoxanthum odoratum	sweet vernalgrass		FACU	Y	4					1					0.1	
	Hypochoeris radicata	hairy cat's ear		FACU		4	1									0.1	
	Hypericum anagalloides	bog St. John'swort	yes	OBL	Y	1			1							0.1	
	Alisma subcordatum	American water plantain	yes	OBL	Y	1								1		0.1	
	Daucus carota	Queen Anne's lace		NOL	U	5							1			0.1	
	Sonchus asper	prickly sowthistle		FAC-		3							1			0.1	
	bare (soil, mud, rock)	DOES NOT INCLUDE CANOPY, IF ANY					2	1	1			15	10	5	2	35	7.4
	moss, duff, dead vegetation, etc. (includes sprayed vegetation)	"					3	2	4	5	32	10	5	8	5	7	8.1

Oak Creek Mitigation Bank Plant Monitoring, 2014																
Prior Converted Habitat Type - Transect 5																
Cover (%)																
Date(s) Sampled: 5/30/14																
Species	Common Name	Native	Indicator	Wet	MTI	1	2	3	4	5	6	7	8	9	10	Mean
Hypochoeris radicata	hairy cat's ear		FACU		4	1	2	10	7	9	30	42	40	11	12	16.4
Holcus lanatus	common velvetgrass		FAC	y	3			5	9	8		3	25	12	15	7.7
Lythrum portula	spatulateleaf loosestrife		OBL	y	1					52	22	1			1	7.6
Agrostis exarata	spike bentgrass	yes	FACW	y	2	1	1	50	15		5					7.2
Deschampsia cespitosa	tufted hairgrass	yes	FACW	y	2	1	10	6	17	4	2				5	4.5
Juncus bufonius	toad rush	yes	FACW	y	2	2	1		4		25					3.2
Anthoxanthum odoratum	sweet vernalgrass		FACU		4								23	5		2.8
Rumex acetosella	sheep sorrel/ sour dock		FACU+		4	1	3	6	8				1	1	1	2.1
Panicum capillare	common witchgrass	yes	FACU+		4	4	1				1	15				2.1
Bromus hordeaceus ssp. hordeaceus	soft brome		FACU		4										18	1.8
Daucus carota	Queen Anne's lace		NOL	u	5				5		13					1.8
Spiraea douglasii	Douglas' spiraea/ hardhack	yes	FACW	y	2										16	1.6
Centaurium erythraea	European centaury		FAC	y	3		2	4	1	3	1	1	1			1.2
Mentha pulegium	pennyroyal		OBL	y	1				3				1	4	1	0.9
Epilobium ciliatum ssp. watsonii	Watson's willowherb	yes	FACW-	y	2		2									0.8
Juncus tenuis	slender rush	yes	FACW-	y	2										7	0.7
Eleocharis ovata	ovate spikerush	yes	OBL	y	1					6						0.6
Deschampsia danthonioides	annual hairgrass	yes	FACW-	y	2		1		4		1					0.6
Parentucellia viscosa	parentucellia		FAC-		3			3					1	1		0.5
Lythrum-hyssopifolia	hyssop loosestrife		OBL	y	1		2				1				1	0.4
Hordeum brachyantherum	meadow barley	yes	FACW-	y	2				2		1					0.3
Agrostis castellana/capillaris	highland/colonial bentgrass		FAC	y	3		2		1							0.3
Leucanthemum vulgare	oxeye daisy		UPL		5						1	1				0.2
Geranium carolinianum	Carolina geranium	yes	NOL	u	5										2	0.2
Epilobium brachycarpum	autumn [tall annual] willowherb	yes	UPL		5							1	1			0.2
Crepis setosa	bristly hawkbeard		NOL	u	5					2						0.2
Montia linearis	narrow-leaved montia	yes	NOL	u	5								1			0.1
Myosotis discolor	yellow and blue forget-me-not		FACW	y	2								1			0.1
Plagiobothrys figuratus	fragrant popcornflower	yes	FACW	y	2					1						0.1
Gnaphalium palustre	western marsh cudweed	yes	FAC+	y	3	1										0.1
bare (soil, mud, rock)	DOES NOT INCLUDE CANOPY, IF ANY					30	15	12	12	28	5	2	2	8	2	11.6
moss, duff, dead vegetation, etc. (includes sprayed vegetation)	"					60	65	17	27	2	25	5	10	60	50	32.1

Oak Creek Mitigation Bank Plant Monitoring, 2014

Prior Converted Habitat Type - Transect Means

Cover (%)

Species	Common Name	Native	Indicator	Wet	MTI	Transect					Mean
						1	2	3	4	5	
<i>Deschampsia cespitosa</i>	tufted hairgrass	yes	FACW	y	2	26.3	11.2	24.2	6.7	4.5	14.58
<i>Hypochaeris radicata</i>	hairy cat's ear		FACU		4	13.0	1.7	0.1	0.1	16.4	6.26
<i>Carex unilateralis</i>	one-sided sedge	yes	FACW	y	2	0.7	1.7	5.4	22.5	0.0	6.06
<i>Alopecurus geniculatis</i>	water foxtail		OBL	y	1	5.2	0.5	1.8	21.7	0.0	5.84
<i>Lythrum portula</i>	spatulateleaf loosestrife		OBL	y	1	0.8	16.4	0.0	2.6	7.6	5.48
<i>Hordeum brachyantherum</i>	meadow barley	yes	FACW-	y	2	0.9	0.9	20.5	1.2	0.3	4.76
<i>Holcus lanatus</i>	common velvetgrass		FAC	y	3	5.0	2.6	3.9	3.8	7.7	4.60
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	Watson's willowherb	yes	FACW-	y	2	5.8	8.8	4.0	2.4	0.8	4.36
<i>Agrostis exarata</i>	spike bentgrass	yes	FACW	y	2	1.4	1.2	7.0	4.1	7.2	4.18
<i>Mentha pulegium</i>	pennyroyal		OBL	y	1	0.3	0.2	7.4	10.4	0.9	3.84
<i>Juncus bufonius</i>	toad rush	yes	FACW	y	2	1.6	8.6	0.0	0.6	3.2	2.80
<i>Montia linearis</i>	narrow-leaved montia	yes	NOL	u	5	0.4	4.0	5.8	1.9	0.1	2.44
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood	yes	FAC	y	3	0.0	10.7	0.0	0.0	0.0	2.14
<i>Poa trivialis</i>	rough [roughstalk] bluegrass		FACW	y	2	0.5	0.0	8.8	1.3	0.0	2.12
<i>Anthoxanthum odoratum</i>	sweet vernalgrass		FACU		4	2.9	2.0	0.2	0.1	2.8	1.60
<i>Eleocharis palustris</i>	creeping spikerush	yes	OBL	y	1	6.7	0.2	0.0	0.8	0.0	1.54
<i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>	soft brome		FACU		4	0.0	0.0	3.6	2.2	1.8	1.52
<i>Lythrum hyssopifolia</i>	hyssop loosestrife		OBL	y	1	0.0	0.5	0.0	5.6	0.4	1.30
<i>Rumex acetosella</i>	sheep sorrel/ sour dock		FACU+		4	1.0	2.5	0.0	0.0	2.1	1.12
<i>Veronica scutellata</i>	marsh speedwell	yes	OBL	y	1	0.0	0.8	0.0	4.6	0.0	1.08
<i>Beckmannia syzigachne</i>	American slough grass	yes	OBL	y	1	0.0	1.3	0.5	3.5	0.0	1.06
<i>Juncus tenuis</i>	slender rush	yes	FACW-	y	2	0.0	1.4	2.5	0.3	0.7	0.98
<i>Spiraea douglasii</i>	Douglas' spiraea/ hardhack	yes	FACW	y	2	0.0	0.1	0.0	2.7	1.6	0.88
<i>Panicum capillare</i>	common witchgrass	yes	FACU+		4	0.0	2.0	0.0	0.0	2.1	0.82
<i>Rorippa curvisiliqua</i>	western yellowcress	yes	OBL	y	1	0.9	2.7	0.2	0.1	0.0	0.78
<i>Lotus corniculatus</i>	birdsfoot trefoil		FAC	y	3	0.0	0.0	2.8	0.0	0.0	0.56
<i>Myosotis laxa</i>	small flowered forget-me-not	yes	OBL	y	1	0.0	0.0	0.4	2.2	0.0	0.52
<i>Rosa pisocarpa</i>	clustered rose	yes	FAC	y	3	0.3	1.8	0.0	0.5	0.0	0.52
<i>Carex feta</i>	green-sheathed sedge	yes	FACW	y	2	2.1	0.4	0.0	0.0	0.0	0.50
<i>Myosotis discolor</i>	yellow and blue forget-me-not		FACW	y	2	0.4	0.2	0.1	1.6	0.1	0.48
<i>Plagiobothrys figuratus</i>	fragrant popcornflower	yes	FACW	y	2	0.8	0.0	0.6	0.9	0.1	0.48
<i>Eleocharis ovata</i>	ovate spikerush	yes	OBL	y	1	0.0	0.4	0.0	1.1	0.6	0.42
<i>Parentucellia viscosa</i>	parentucellia		FAC-		3	1.1	0.4	0.1	0.0	0.5	0.42
<i>Daucus carota</i>	Queen Anne's lace		NOL	u	5	0.0	0.0	0.0	0.1	1.8	0.38
<i>Bidens frondosa</i>	leafy beggar's ticks	yes	FACW+	y	2	1.8	0.1	0.0	0.0	0.0	0.38
<i>Eleocharis acicularis</i>	needle spikerush	yes	OBL	y	1	0.0	0.0	0.0	1.8	0.0	0.36
<i>Veronica americana</i>	American speedwell [brooklime]	yes	OBL	y	1	0.0	0.0	0.0	1.8	0.0	0.36
<i>Agrostis castellana/capillaris</i>	highland/colonial bentgrass		FAC	y	3	1.2	0.0	0.0	0.0	0.3	0.30
<i>Centaureum erythraea</i>	European centaury		FAC	y	3	0.0	0.1	0.1	0.0	1.2	0.28
<i>Deschampsia danthonioides</i>	annual hairgrass	yes	FACW-	y	2	0.0	0.0	0.7	0.0	0.6	0.26
<i>Leucanthemum vulgare</i>	oxeye daisy		UPL		5	0.0	0.0	0.0	0.8	0.2	0.20
<i>Rumex crispus</i>	curly dock		FAC+	y	3	0.0	0.0	0.8	0.1	0.0	0.18
<i>Vicia tetrasperma</i>	slender vetch		NOL	u	5	0.0	0.0	0.3	0.5	0.0	0.16
<i>Gnaphalium palustre</i>	western marsh cudweed	yes	FAC+	y	3	0.2	0.2	0.0	0.2	0.1	0.14
<i>Geranium carolinianum</i>	Carolina geranium	yes	NOL	u	5	0.0	0.0	0.0	0.3	0.2	0.10
<i>Epilobium densiflora</i>	dense spike-primrose	yes	FACW-	y	2	0.0	0.0	0.4	0.1	0.0	0.10
<i>Epilobium brachycarpum</i>	autumn [tall annual] willowherb	yes	UPL		5	0.0	0.0	0.2	0.0	0.2	0.08
<i>Hypericum anagalloides</i>	bog St. John'swort	yes	OBL	y	1	0.3	0.0	0.0	0.1	0.0	0.08
<i>Valerianella locusta</i>	Lewiston cornsalad		NOL	u	5	0.0	0.0	0.0	0.4	0.0	0.08
<i>Crepis setosa</i>	bristly hawksbeard		NOL	u	5	0.0	0.0	0.0	0.0	0.2	0.04
<i>Agrostis stolonifera</i>	creeping bentgrass		FACW	y	2	0.0	0.0	0.0	0.2	0.0	0.04
<i>Gnaphalium ebracteata</i>	bractless hedgehyssop	yes	OBL	y	1	0.0	0.1	0.0	0.0	0.0	0.02
<i>Anagallis arvensis</i>	scarlet pimpernel		FAC	y	3	0.0	0.0	0.1	0.0	0.0	0.02
<i>Sonchus asper</i>	prickly sowthistle		FAC-		3	0.0	0.0	0.0	0.1	0.0	0.02

Oak Creek Mitigation Bank Plant Monitoring, 2014											
Prior Converted Habitat Type - Transect Means											
Cover (%)											
Transect											
Species	Common Name	Native	Indicator	Wet	MTI	1	2	3	4	5	Mean
Fraxinus latifolia	Oregon ash	yes	FACW	y	2	0.0	0.0	0.1	0.0	0.0	0.02
Lapsana communis	nipplewort		FAC	y	3	0.1	0.0	0.0	0.0	0.0	0.02
Alisma subcordatum	American water plantain	yes	OBL	y	1	0.0	0.0	0.0	0.1	0.0	0.02
Galium parisiense	creeping [wall] bedstraw		UPL		5	0.0	0.0	0.1	0.0	0.0	0.02
bare (soil, mud, rock)	DOES NOT INCLUDE CANOPY, IF ANY					6.4	14.2	3.5	7.4	11.6	8.6
moss, duff, dead vegetation, etc. (includes sprayed vegetation)	"					20.7	15.3	16.3	8.1	32.1	18.5
Total cover:						82	86	103	112	66	90
FAC and better cover:						63	73	92	106	38	74
Native cover:						50	59	73	61	22	53
Percent FAC and better of total:						77	85	90	94	57	83
Percent native of total:						61	68	71	54	34	59
Moisture Index:						2.35	2.25	2.24	1.69	2.89	2.21
Number of native species:											32
Number of introduced species:											26

Oak Creek Mitigation Bank Plant Monitoring, 2014

Prior Converted Habitat Type - Transects 2.1 and 2.2

Date(s) Sampled: 5/26/14; 5/31/14

Species	Common Name	Native	Indicator	Wet	MTI	Sample Station										Mean	
						2.1-1	2.1-2	2.1-3	2.1-4	2.1-5	2.2-1	2.2-2	2.2-3	2.2-4	2.2-5		
Deschampsia cespitosa	tufted hairgrass	yes	FACW	y	2	78	37	14	32	35							23.9
Juncus tenuis	slender rush	yes	FACW-	y	2	1			38				53				9.2
Lythrum portula	spatulateleaf loosestrife		OBL	y	1						2	80					8.2
Holcus lanatus	common velvetgrass		FAC	y	3	7	4	7	15	1					7	17	5.8
Hypochoeris radicata	hairy cat's ear		FACU	y	4	1	4	35	1						1	13	5.5
Eleocharis ovata	ovate spikerush	yes	OBL	y	1					1	45						4.6
Mentha pulegium	pennyroyal		OBL	y	1				4	2	1	1					3.5
Anthoxanthum odoratum	sweet vernalgrass		FACU	y	4		12	10						27			2.8
Epiobium ciliatum ssp. watsonii	Watson's willowherb	yes	FACW-	y	2								1	9	15		2.5
Lotus unifoliolatus var. unifoliolatus	Spanish clover	yes	UPL		5		23	2									2.5
Hordeum brachyantherum	meadow barley	yes	FACW-	y	2				12					1			1.3
Rubus discolor	Himalayan blackberry	invasive	FACU		4				12								1.2
Hypericum anagalloides	bog St. John'swort	yes	OBL	y	1				10	2							1.2
Juncus ensifolius	daggerleaf rush	yes	FACW	y	2				11								1.1
Centaureum erythraea	European centaury		FAC	y	3	3	2	1						2			0.8
Spiraea douglasii	Douglas' spiraea/ hardhack	yes	FACW	y	2	1							5				0.6
Parentucella viscosa	parentucella		FAC-	y	3		2	1									0.3
Agrostis exarata	spike bentgrass	yes	FACW	y	2				1								0.2
Panicum capillare	common witchgrass	yes	FACU+	y	4									2			0.2
Gnaphalium palustre	western marsh cudweed	yes	FAC+	y	3						1			1			0.2
Carex unilateralis	one-sided sedge	yes	FACW	y	2				2								0.2
Carex sp.	sedge	yes	--	u	5					2							0.2
Rumex acetosella	sheep sorrel/ sour dock		FACU+		4									1			0.1
Carex feta	green-sheathed sedge	yes	FACW	y	2									1			0.1
Beckmannia syzigachne	American slough grass	yes	OBL	y	1						1						0.1
Lotus micranthus	small-flowered lotus	yes	NOL	u	5			1									0.1
Lythrum hyssopifolia	hyssop loosestrife		OBL	y	1						1						0.1
Bidens frondosa	leafy beggar's ticks	yes	FACW+	y	2									1			0.1
Gratiola ebracteata	bractless hedgehyssop	yes	OBL	y	1						1						0.1
Cerastium glomeratum	sticky chickweed		UPL		5										1		0.1
bare (soil, mud, rock)	DOES NOT INCLUDE CANOPY, IF ANY						1	10	1	1	95	15	2	1	1		12.7
moss, duff, dead vegetation, etc. (includes sprayed vegetation)	"																
							12	20	20	4	45	1	1	40	30	37	21
			Moisture Index: 2.23											Total cover:			77
														FAC and better cover:			64
														Native cover:			48
														Percent FAC and better of total:			83
														Percent native of total:			63

Oak Creek Mitigation Bank Plant Monitoring, 2014												
Prior Converted Habitat Type - Transect 5.1												
Cover (%)												
Date(s) Sampled: 5/31/14												
Station												
Species	Common Name	Native	Indicator	Wet	MTI	1	2	3	4	5	Mean	
<i>Deschampsia cespitosa</i>	tufted hairgrass	yes	FACW	y	2	47		20	44	32	28.6	
<i>Hypochaeris radicata</i>	hairy cat's ear		FACU		4	2	12	30	6	4	10.8	
<i>Agrostis castellana/capillaris</i>	highland/colonial bentgrass		FAC	y	3		20	6	10	4	8.0	
<i>Hordeum brachyantherum</i>	meadow barley	yes	FACW-	y	2	4			2	18	4.8	
<i>Holcus lanatus</i>	common velvetgrass		FAC	y	3	2	6	12	1	1	4.4	
<i>Agrostis exarata</i>	spike bentgrass	yes	FACW	y	2	7			8	3	3.6	
<i>Juncus tenuis</i>	slender rush	yes	FACW-	y	2		4	2		9	3.0	
<i>Lythrum portula</i>	spatulateleaf loosestrife		OBL	y	1	2		1	7		2	
<i>Panicum capillare</i>	common witchgrass	yes	FACU+		4	9					1.8	
<i>Anthoxanthum odoratum</i>	sweet vernalgrass		FACU		4	1	6	1			1.6	
<i>Juncus bufonius</i>	toad rush	yes	FACW	y	2	5		2			1.4	
<i>Rumex acetosella</i>	sheep sorrel/ sour dock		FACU+		4	2	1	3		1	1.4	
<i>Parentucella viscosa</i>	parentucella		FAC-		3		1	3		1	1.0	
<i>Leucanthemum vulgare</i>	oxeye daisy		UPL		5		5				1.0	
<i>Lotus unifoliolatus</i> var.	Spanish clover	yes	UPL		5			3	1	1	1.0	
<i>Lotus micranthus</i>	small-flowered lotus	yes	NOL	u	5					3	0.6	
<i>Veronica peregrina</i> ssp. xalapense	hairy purslane speedwell	yes	OBL	y	1	1			1	1	0.6	
<i>Mentha pulegium</i>	pennyroyal		OBL	y	1				2		0.4	
<i>Daucus carota</i>	Queen Anne's lace		NOL	u	5		1				0.2	
<i>Centaurium erythraea</i>	European centaury		FAC	y	3			1			0.2	
<i>Epilobium ciliatum</i> ssp. watsonii	Watson's willowherb	yes	FACW-	y	2	1					0.2	
<i>Gnaphalium palustre</i>	western marsh cudweed	yes	FAC+	y	3	1					0.2	
<i>Carex unilaterialis</i>	one-sided sedge	yes	FACW	y	2				1		0.2	
<i>Dianthus armeria</i>	grass pink		UPL		5					1	0.2	
<i>Trifolium repens</i>	white clover		FAC-		3					1	0.2	
bare (soil, mud, rock)	DOES NOT INCLUDE CANOPY, IF ANY						12	15	20	17	25	17.8
moss, duff, dead vegetation, etc. (includes sprayed vegetation)	"						10	30	3	8	5	11.2
			Moisture Index: 2.66				Total cover:					77
							FAC and better cover:					58
							Native cover:					46
							Percent FAC and better of total:					74
							Percent native of total:					59

Oak Creek Mitigation Bank Plant Monitoring, 2014

Prior Converted Habitat Type - Transect 5.2

Date(s) Sampled: 5/31/14

Cover (%)	Species	Common Name	Native	Indicator	Wet	Station					Mean
						MTI	1	2	3	4	
	<i>Deschampsia cespitosa</i>	tufted hairgrass	yes	FACW	y	2	95	48	75	82	60.0
	<i>Hypochoeris radicata</i>	hairy cat's ear		FACU		4	3	5	18	2	7.6
	<i>Juncus bufonius</i>	toad rush	yes	FACW	y	2			15	5	4.0
	<i>Holcus lanatus</i>	common velvetgrass		FAC	y	3	17				3.4
	<i>Centaurium erythraea</i>	European centaury		FAC	y	3	1	5	1	1	1.6
	<i>Anthoxanthum odoratum</i>	sweet vernalgrass		FACU		4	2	1	2	1	1.4
	<i>Epilobium ciliatum</i> ssp. watsonii	Watson's willowherb	yes	FACW-	y	2	1		1	4	1.4
	<i>Rumex acetosella</i>	sheep sorrel/ sour dock		FACU+		4	2	1			0.6
	<i>Parentucellia viscosa</i>	parentucellia		FAC-		3			1	2	0.6
	<i>Sonchus asper</i>	prickly sowthistle		FAC-		3			2		0.4
	<i>Agrostis castellana/capillaris</i>	highland/colonial bentgrass		FAC	y	3	1				0.2
	<i>Geranium carolinianum</i>	Carolina geranium	yes	NOL	u	5	1				0.2
	bare (soil, mud, rock)	DOES NOT INCLUDE CANOPY, IF ANY				8	1	12	7	3	6.2
	moss, duff, dead vegetation, etc. (includes sprayed vegetation)	"				67	5	3	3	5	16.6
				Moisture Index: 2.32			Total cover:				81
							FAC and better cover:				71
							Native cover:				66
							Percent FAC and better of total:				87
							Percent native of total:				81

Oak Creek Mitigation Bank Plant Monitoring, 2014

Forested Habitat Type - Transect 7

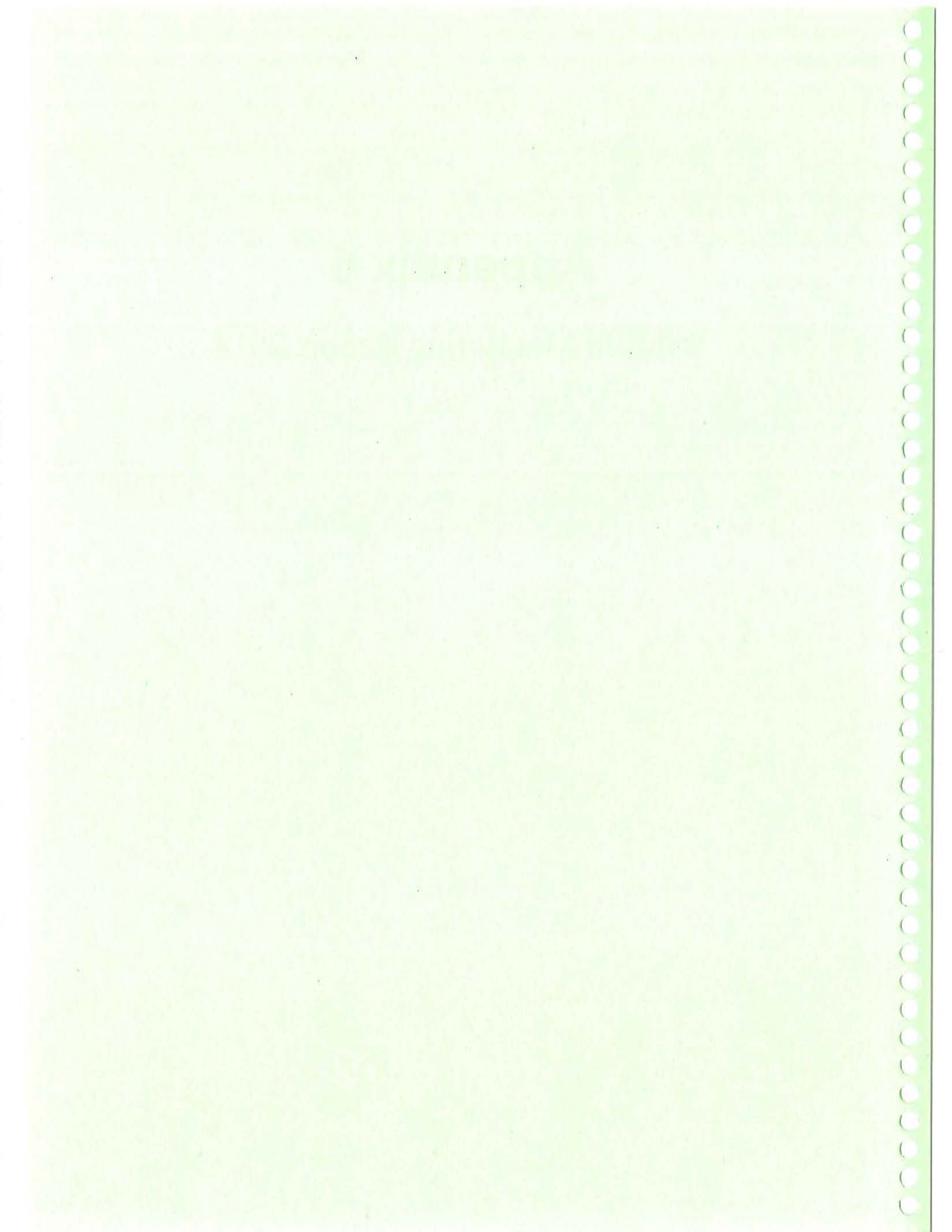
Date(s) Sampled: 5/31/14; 6/1/14

Cover (%)

Species	Common Name	Native	Indicator	Wet	MTI	Sample Station										Mean
						1	2	3	4	5	6	7	8	9	10	
<i>Fraxinus latifolia</i>	Oregon ash	yes	FACW	y	2	10	95	80	98	50	85	99	30	78	95	72
<i>Camassia leichtlinii</i>	great camas	yes	FACW-	y	2					9	85	20	70	95	27.9	
<i>Poa trivialis</i>	rough [roughstalk] bluegrass		FACW	y	2	2	15			18	52	67	2		15.6	
<i>Lysimachia nummularia</i>	creeping jenny		FACW	y	2			80	67						14.7	
<i>Agrostis castellana/capillaris</i>	highland/colonial bentgrass		FAC	y	3	95				27					12.2	
<i>Crataegus douglasii</i>	black hawthorn	yes	FAC	y	3					80					8	
<i>Lapsana communis</i>	nipplewort		FAC	y	3		58			1			1	2	6.2	
<i>Tellima grandiflora</i>	fringecup	yes	FACU		4									38	3.9	
<i>Prunella vulgaris</i>	self-heal	yes	FACU+		4								3	25	2.8	
<i>Galium aparine</i>	cleavers	yes	FACU		4		12			1			8	3	2.7	
<i>Carex leptopoda</i>	Dewey's sedge	yes	FAC	y	3			6	17				1		2.6	
<i>Rumex conglomeratus</i>	clustered dock		FACW	y	2	1	1	5	10	2			6		2.5	
<i>Geum macrophyllum</i>	large leaved avens	yes	FAC+	y	3		1						18		1.9	
<i>Geranium lucidum</i>	shining geranium		NOL	u	5		4						9	1	1.8	
<i>Dipsacus fullonum</i>	common teasel		FACW-	y	2	12	1						4		1.7	
<i>Symphoricarpos albus</i>	snowberry	yes	FACU		4							15	2		1.7	
<i>Lotus corniculatus</i>	birdsfoot trefoil		FAC	y	3					15					1.5	
<i>Agrostis exarata</i>	spike bentgrass	yes	FACW	y	2					12					1.2	
<i>Oenanthе sarmentosa</i>	Pacific water-parsley	yes	OBL	y	1				4				8		1.2	
<i>Epilobium ciliatum ssp. watsonii</i>	Watson's willowherb	yes	FACW-	y	2				3	2			6		1.1	
<i>Brachypodium sylvaticum</i>	false brome		NOL	u	5		1					7			0.8	
<i>Carex feta</i>	green-sheathed sedge	yes	FACW	y	2	8									0.8	
<i>Rubus discolor</i>	Himalayan blackberry	invasive	FACU		4									8	0.8	
<i>Torilis arvensis</i>	spreading hedgeparsley		NOL	u	5		3			1				3	0.7	
<i>Vicia tetrasperma</i>	slender vetch		NOL	u	5					3			4		0.7	
<i>Ranunculus uncinatus</i>	hooked [small-flowered] buttercup	yes	FAC	y	3		3						3		0.6	
<i>Veronica scutellata</i>	marsh speedwell	yes	OBL	y	1				4						0.4	
<i>Geranium carolinianum</i>	Carolina geranium	yes	NOL	u	5	1				1			1		0.3	
<i>Heracleum maximum</i>	cow parsnip	yes	FAC+	y	3							3			0.3	
<i>Rosa nutkana</i>	Nootka rose	yes	FAC-		3								3		0.3	
<i>Rubus ursinus</i>	trailing blackberry	yes	FACU		4					1				2	0.3	
<i>Toxicodendron diversilobum</i>	poison oak	yes	NOL	u	5							3			0.3	

Appendix 6

Wildlife Monitoring Report 2014



Wildlife Monitoring
 Oak Creek and USFWS Oak Creek Reference Site
 Winter and Spring 2014
 Surveyed by Marion Courtenay Brasier

Wildlife monitoring had been conducted from the year 1997 through 2008, when it was suspended. Recognizing the value of the data that had been collected during that time period the Wildlife Monitoring was reinstated in 2012. Four permanent stationary observation points were designated at the Oak Creek Mitigation Bank (Oak Creek Site) and the USFWS Oak Creek Reference site (Reference Site) for their diversity and location. Starting at a specific time of day, at/or immediately after sunrise for that day, from a previously designated location the observer starts recording any Avian, Reptilian, or Mammalian activity by sight, sound, scat, and tracks. Walking a previously routed path to each observation point, a traveling observation of any wildlife is recorded. At the arrival of an observation point (see reference maps) 15 minutes are spent taking a stationary record of any activity that is observed. The surveys are conducted in the month of January for the Winter Survey, and in month of June for the Spring Survey.

The data has consistently reflected more of species, and larger numbers of individuals at the Oak Creek Site, than the Reference Site.

The Reference Site underwent changes that should be noted, the large Beaver Dam that had always been at the site was destroyed over the winter, and the invasive Blackberry population has taken over a majority of the site. See lower table for examples and numbers.

A large change in the Oak Creek Site was an large increase of Beaver sign and dams.

An increase in woodpecker species should also be noted. Woodpeckers tend to populate more established tree stands due to the increase in older, larger, and infested snags and trees. Again this demonstrates a stable ecosystem at the Oak Creek Site, that is supporting many varieties, larger populations, and trophic levels of species. Woodpecker Species that were observed in the winter and spring surveys include: Downey Woodpecker, Hairy Woodpecker, Red-breasted Sapsucker, and Northern Flicker.

Species	<u>Oak Creek Mitigation Bank</u>		<u>USFS Reference Site</u>	
	<u>Species</u>	<u>Individuals</u>	<u>Species</u>	<u>Individuals</u>
Winter	20	599	33	305
Spring	43	196	20	118

Table 5: Totals for Winter and Spring of 2014 for the Oak Creek Mitigation Bank and the Oak Creek USFS Reference Site.

Oak Creek Winter 2014 Wildlife Survey

Species	Oak Creek Wetlands	ODFW Reference Site
American Crow	2	
American Robin		42
Belted Kingfisher		5
Black-Capped Chickadee	60	44
Bushtit		1
Canada Goose	20	45
Dark-Eyed Junco		4
Downey Woodpecker	2	2
Eurasian Wigeons	20	
European Starling	10	6
Fox Sparrow	15	2
Green-Winged Teal	250	
Hairy Wood Pecker		1
Kill Deer		4
Lincoln Sparrow		2
Mallard Duck	20	6
Mourning Dove		1
Northern Flicker	20	9
Northern Harrier	4	
Northern Pintail	20	
Pileated WoodPecker		1
Red-Breasted Sapsucker		4
Red-Tailed Hawk	2	1
Red-Winged Black Bird		30
Ruby-Crowned Kinglet	22	

Oak Creek Winter 2014 Wildlife Survey-1

Species	Oak Creek Wetlands	ODFW Reference Site
Snipe	70	
Song Sparrow	45	29
Spotted Sandpiper		5
Spotted Towhee		7
Steller Jay		4
Swainsons Thrush	1	
Townsend's Warbler		1
Tundra Swan		4
Turkey Vulture		5
Violet-Green Swallow		3
Western Meadow Lark	4	
Western Scrub-Jay	10	1
Wood Duck	2	
Yellow-Crowned Sparrow		1
Unknown Thrush		19
Unknown Heron		3
Unknown Hummingbird		4
* Unknown Ducks		9
Totals	599	305
Least Chipmunk		2
White Tailed Deer		2
Deer Tracks		4
Raccoon Tracks		4
Beaver tracks		1
Beaver Dam	8	

Table: 2 Comparison of Wildlife Survey Results Including Flyovers, Calls, and all Sightings.

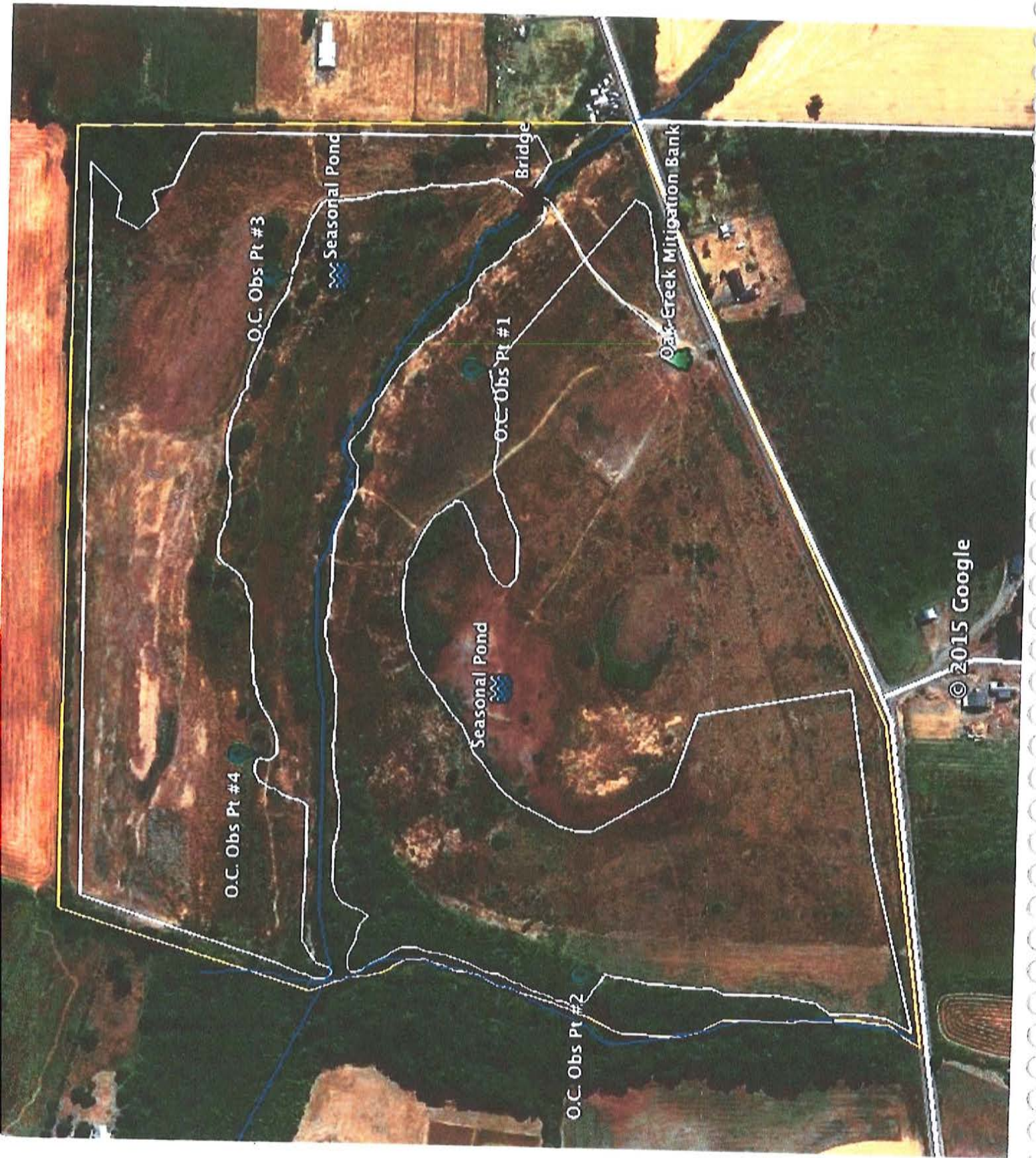
Oak Creek 2014 Spring Wildlife Survey

Species	Oak Creek Mitigation Bank	USFWS Reference Site
American Crow	2	
American Goldfinch	11	
American Robin	17	7
Anna's Humminbird	1	
Barn Owl	1	
Barn Swallow		5
Beaver	2	
Bewicks Wren	3	
Black Headed Grosebeak	4	
Black-Capped Chickadee	10	33
Brewers Blackbird	2	1
Bushtit	12	2
Canada Goose	2	
Cedar Waxwing	7	19
Cliff Swallow	9	2
Dark-Eyed Junco	1	2
Downey Woodpecker	1	
European Starling	6	
Golden-Crowned Kinglet		6
Great Blue Heron	1	
Hairy Wood Pecker	1	
House Sparrow		1
Lezull Bunting		4
Lincoln Sparrow	1	
Mallard Duck	2	
Marsh Wren	2	
Mountain Blue Bird	2	1
Mourning Dove	18	
Olive-Sided Flycatcher	1	
Pacific Wren		1

Oak Creek 2014 Spring Wildlife Survey-1

Species	Oak Creek Mitigation Bank	USFWS Reference Site
Purple Finch	1	
Red-Breasted Sapsucker	1	
Red-Tailed Hawk	1	
Red-Winged Black Bird	4	
Ring-Necked Pheasant	1	
Ruby-Crowned Kinglet	1	5
Savanna Sparrow	10	
Savanna Sparrow	4	
Song Sparrow	10	17
Spotted Towhee	10	5
Steller Jay	1	
Swainsons Thrush		1
Swam Saproow	1	
Tree Swallow	1	3
Turkey Vulture	2	
Unknown Finch	5	
Unknown Hummingbird	1	
Western Scrub-Jay	10	
Western Wood-Pewee		2
Willow Flycatcher	13	1
Total	196	118
White Tailed Deer	1	
Beaver Dams	5	
Beaver Sign	13	
Deer Tracks	7	4
Unknown Black Bullet Birds	2	1
Unknown Blackbirds	1	
Unknown Brown Bird Fly-By	4	
Unknown Brown Birds	1	3
Unknown Fly-Bys	3	4

Table: 4 Comparison of Wildlife Survey Results Including Flyovers, Calls, and all Sightings.



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Oak Creek Reference Site

O.C.R. Obs Pt #1

O.C.R. Obs Pt #2

O.C.R. Obs Pt #4

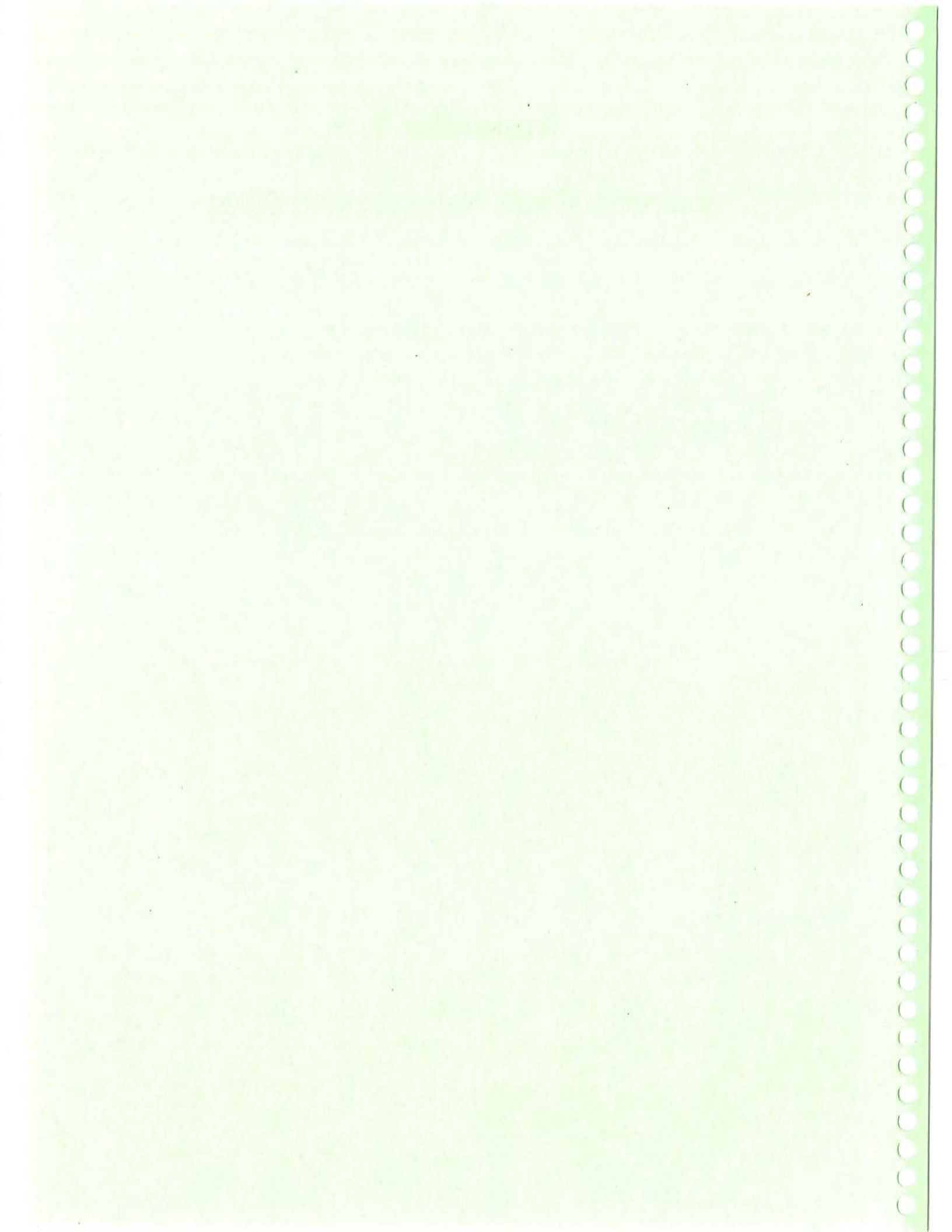
O.C.R. Obs Pt #3





Appendix 7

Journal of Credit Releases and Sales



OAK CREEK MITIGATION BANK

DATE	NAME	LOCATION	PERMIT	ADD	SOLD	BALANCE
8/4/1999	DSL/COE UNCERTIFIED 30%			✓9.350		9.350
10/13/1999	RANCO	MILLERSBURG, OREGON	FP14608		✓0.420	8.930
10/15/1999	CENTRAL TRAINING TRUST	TANGENT, OREGON	FP17275/1999-00395		✓0.420	8.510
1/13/2000	GORDON VOGT	CENTER ST., ALBANY, OR	FP18135/		✓0.360	8.150
3/15/2000	GARY HARTALOO	COVEY RUN, NORTH ALBANY, OR	RF17655		✓0.360	7.790
5/19/2000	CLEAR CHANNEL BROADCASTING	2840 MARION RD., ALBANY, OR	RF18955		✓0.260	7.530
8/16/2000	WESTERN WEBB PRESS	263 29TH AVE., ALBANY, OR	RF22718/2000-00581		✓0.110	7.420
8/16/2000	PAHLISCH NEILSON HOMES	GRAND OAKS SUBDIVISION, CORVALLIS, OR	RF22756		✓0.130	7.290
9/8/2000	CLOUDBURST DEVELOPMENT	5TH AND MAIN STS., LEBANON, OR	RF22824/2008-00659		✓0.470	6.820
9/20/2000	L&H BUILDERS	FIR CT SWEET HOME, OR	RF22478/2000-00365		✓0.130	6.690
10/5/2000	CAMAS COMMONS	53RD AND COUNTRY CLUB, CORVALLIS, OR	2255-1RF/2000-00467		✓0.450	6.240
10/20/2000	CONIFER PL APARTMENTS, LLC	3403 NW 60TH ST., CORVALLIS, OR	22351/20000492		✓1.520	4.720
10/20/2000	TIMBERHILL HOMES, LLC	29TH ST., CORVALLIS, OR	DSL122349		✓0.351	4.369
11/1/2000	DSL/COE CREDITS CERTIFIED			✓6.24		10.609
12/11/2000	ALL STATE PROPERTIES	SKYVIEW ESTATES, LEBANON, OR	FP18844		✓0.740	9.869
1/8/2001	WEYERHAEUSER COMPANY	AMERICAN CEMWOOD SITE, ALBANY, OR	RF22934		✓0.270	9.599
1/27/2001	CITY OF MILLERSBURG	KUMPUKA PROPERTY MT VIEW PL	FP17425/99-00778		✓0.105	9.494
2/18/2001	MONACO COACH	COBURG, OREGON	VIOLATION		✓3.680	5.814
3/15/2001	CITY OF LEBANON	VIOLATION	2001-00207		✓0.339	5.475
6/8/2001	PAHLISCH NEILSON HOMES	THE PARK AT TIMBERHILL	24201RF/2001-00724		✓0.017	5.458
7/27/2001	HARRISON INDUSTRIES	KNOX BUTTE RD AND TIMBER ST., ALBANY, OR	24434FP/2001-00724		✓0.120	5.338
9/22/2001	LINN COUNTY AFFORDABLE HOUSING	LINN COUNTY AFFORDABLE HOUSING	25203FP/2002-00179		✓0.020	5.318
5/25/2002	THE SANDERS DO/TC2 INVESTMENT	45TH STREET NEAR COUNTRY CLUB DR	26256/2002-00901		✓0.190	5.128
2/17/2003	CITY OF ALBANY	OAK CREEK DRAINAGE AT 53RD AVENUE	26401GA/2002-00993		✓0.480	4.648
3/8/2003	BENTON COUNTY PUBLIC HEALTH	CHAPEL DRIVE NEWTON CR. BRIDGE	25849RF/2000-00720		✓0.060	4.588
11/3/2003	CITIES OF ALBANY AND MILLERSBURG	WATER INTAKE, SCAVEL HILL ROAD	31156RF/2003-00622		✓0.105	4.483
1/14/2004	OREGON DEPT OF TRANSPORTATION	I-5 N. JEFFERSON TO N. ALBANY, OR	3106FP/2003-00570		✓0.300	4.183
3/11/2004	BBF DEVELOPMENT, LLC	NE 1/4 SEC. 20, T11S, R3W W. ALBANY, OR	30822FP/2003-00473		✓0.080	4.103
3/11/2004	STILLWATER ASSOC, A WASH LP, WA	T12S, R2W TAX LOT 1400 LEBANON, OR	31618GA/NA		✓0.466	3.637
3/27/2004	LINN COUNTY ROAD DEPARTMENT	CALAPOOIA RIVER (DRIVER ROAD) BRIDGE TANGENT, OR			✓0.047	3.590
5/26/2004	OREGON DEPT OF STATE LANDS	WETLAND MITIGATION BANK REVOLVING FUND			✓0.167	3.423
6/7/2004	TIMBERHILL CORPORATION	KINGS BLVD. EXT. N OF WALNUT BLVD., CORVALLIS, OR	30514FP/2000-00320		✓0.167	3.423
7/20/2004	ROTH BUILT AND BASIC HOMES INC	NW/NE 1/4 SEC3&4 T11S R3W IN ALBANY, OR	32195FP/2004-00280		✓2.464	0.959
5/2/2007	OREGON DEPT OF TRANSPORTATION	I-5 CROSSING OF SODOM DITCH MP221.13 NEAR HALSEY, OR	38105GA/2004-0035		✓0.980	-0.021
4/4/2008	DSL/COE CREDITS RELEASED			✓3.000	✓0.052	-0.073
9/17/2008	CONSUMERS POWER	AIRPORT SUBSTATION SITE NEAR 36394 AIRPORT DR., LEBANON, OR	40366RF/2008-00241		✓0.191	2.927
9/15/2008	DSL/COE CREDITS RELEASED			✓4.000		2.736
12/3/2008	JUSTIFICATION HOLDINGS, LLC	T13S, R1E, SEC29, TAX LOT 6500, SWEETHOME, OR	40059RF/2008-00153		✓0.059	6.677
10/8/2009	CITY OF JEFFERSON	700 N 2ND ST, JEFFERSON, OR	39627/RP/1994-989-1		✓0.250	6.427
10/14/2010	CITY OF PHILOMATH	SEC 18, 19, 20, T5S, R5E5/6W TAX LOT 801	43699RF/2009-00626		✓6.230	0.197
6/26/2012	CITY OF CORVALLIS	T14S R5W SSO T23SEC.26 TAX LOT 500	50275GP/2012-00173		✓0.170	0.03
11/13/2013	LES SCHWAB TIRE CENTERS	2925 SANTIAM HWY SE, ALBANY, OR	NWP2013-00357		✓0.020	0.010

