Plant Species of Camp Polk Meadow

A Survey to Determine the Success of Whychus Creek Restoration

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Introduction

When dams were built in the early half of the twentieth century they blocked the passage of native anadromous fish to their upstream freshwater spawning and rearing habitats (Back to Home Waters website). People have now begun to realize the impact that the blockage has on the populations of the fish. Many dams are being relicensed and rebuilt to consider the passage of fish upstream. It has been 40 years since Steelhead *(Oncorhynchus mykiss*) and others have returned from the ocean to spawn and rear in the Upper Deschutes River Basin.

In Oregon the Dechutes Basin Land Trust has partnered with the Upper Deschutes Watershed Council and the Deschutes National Forest to restore spawning and migration habitat. The Whychus Creek is one of many streams that is important for restoring historical fish habitat. The Land Trust acquired Camp Polk Meadow, a 145-acre preserve because it protects a substantial amount of Whychus Creek and particularly it had some of the highest-quality spawning habitat. However, due to agricultural practices a diversion dam was built north of the town of Sisters in the late 1800's. The diversions for irrigation reduce the amount of water that reaches Camp Polk Meadow. Currently there is a decrease in 150 cubic feet per second between

April and September (Wychus Creek Restoration Project 2007). The part of the stream that runs through the meadow had been altered and no longer followed a natural meander through its floodplain. This caused a loss of 4200 feet from the length of the creek, which lead to a drastic increase in velocity. When the creek was shortened on the same elevation gradient it gained speed and the ability to carry sediment downstream. This caused it to incise and decrease the frequency of events that overtop its bank and fill its floodplain. The various alterations all lead to an unhealthy stream and low quality habitat for fish (Karen Allen, pers. comm.).

In order to reintroduce the native fish it is important to restore the habitat to support the success of their survival (Back to Home Waters Website). All the aspects of the ecosystem are important. Because the creek has been altered so much, the Land Trust is planning on returning it to its original channel with construction efforts. The success of the project depends on the riparian plant species to ensure strong bank stabilization and lower velocity flows. To have baseline data to compare the success of the project a study has been started. This study has set up transects to chart what is currently present in the meadow. This will also give baseline data for studying effects of stream restoration on invasive species such as cheat grass (*Bromus tectorum.)*

Methods

On June 26th, 2007 a group of students conducted a monitoring survey of Camp Polk Meadow Preserve. First a 150 foot square quadrat was setup between permanent groundwater wells number five and six (see Figure 1). This was our best guess of the vicinity of where the new stream channel will meander through. Multiple 165-foot measuring tapes were used to make a grid. The grid was made by running the tape 150 feet from well number five towards well number six and then 40 degrees Northeast 150 feet at both the zero and 150 foot ends. Then we put pin flags at each ten-foot increment (0 ft, 10 ft, 20 ft…150 ft) naming the x-axis (the

Northeast direction) by alphabetical letter A through P. We then ran another tape perpendicular, along the y-axis (from well 5 towards 6), and at each ten foot increment we dropped a pin flag and whatever plant species touched the flag was recorded. We recorded on data sheets like in Figure 2. Each species was recorded by the first letter of the genus and species according to a key. We tried to identify all species with plant identification books and keys. If we came to an unidentifiable species we named it unknown and will hope to determine it later. We recorded the point intercept measurements along the entire transect forming a ten foot by ten foot grid.

In addition, we took photo points to be able to visually compare the difference between pre and post restoration. One photo point was taken standing at the A on the x axis and the 0 y axis corner facing the P on the x axis and the 0 on the y axis corner. This was also done at the A and 75 point looking towards the P and 75 point and at the A, 150 point looking at the P, 150 point. These points together show the two sides and middle of the transect (Figures 3, 4, 5).

Results

After the data was recorded it was translated into percent coverage. There was a total of 256 points that we placed a flag at for data counting. The percent cover was found by taking the number of times that each species touched the pin divided by the total number of squares (ie. *Juncus Balticus* was recorded 69 times, which is 27.7% out of 256). The data was compiled into a graph (Figure 6). Upon completion of the stream restoration a team will need to survey this transect again as close to the end of June as possible to get comparable data. Optimally, recording data for this site each year, during each season, for the next five to ten years will give the best results. This study is geared towards finding out what is currently present and if the restoration is successful at creating high-quality habitat.

By analyzing the graph (Figure 6) it is clear to see that dense silky-bent (*Apera*

interrupta) had the highest percent cover. *A. interrupta* is an introduced grass species native to Europe and Asia, which means that restoration efforts would hope to lessen the percent cover for the future. (Jepson manual website) The second highest percent cover was Cheatgrass (*Bromus tectorum)* also a non-native grass. *B. tectorum* affects soil nutrient availability (USDA website) and increases the frequency of fire-cycles which has a negative effect on riparian ecosystems and the whole watershed integrity (Rocky Mountain Research Station website). Experts say that the increase in the water table height should help eradicate the *B. tectorum,* but only time will tell. This study should be able to help us learn more about how invasive species respond to restoration efforts. The third highest percent cover was Baltic rush (*Juncus balticus)*. USGS classifies this as an aquatic/wetland vascular plant (USGS website). It likes the high water availability of freshwater marshes, mountain meadows, and riparian zones. *J. balticus* forms stiff root clumps arising from runners and tolerates low drainage, which makes it an excellent species for a high quality stream because it helps stabilize the bank. There were many other species present but at 0-10% cover, (see figure 6) which is less significant, but does indicate that there is diversity.

The data was also presented by a color chart (see figure 7) to show the distribution of the various species across the transect. When future data is acquired, it can be compared to the chart to see if the species have moved and redistributed according to the presence or absence of the stream channel. The color chart coupled with the photo points gives a visual aid to see the coverage and distribution of the species without being locally present. In the photos the dark green area is mostly the *J. balticus* and the golden area is mostly the *A. interrupta and B. tectorum.*

Discussion

Future data will allow the study to determine if the stream restoration is a success. If there is a high percent cover of plants like the *J. balticus* it will indicate an increase in the health of the stream by stabilizing the bank, providing shade, slowing the movement of the water, and creating habitat for wildlife. The many invasive grasses are adapted to hot, dry conditions in well-drained soil. By re-meandering the stream there is a hypothesis that the invasive species will be out competed by native plant species that thrive in the moist, poorly drained soil conditions. The study depends on whether the new stream channel goes in between wells 5 and 6. If it does not then the results will be able to only show if invasive species are still present or not with the heightened water table. If the stream does go between wells 5 and 6 and part of the transect is in the stream and part is away from the stream, then the results will be able to show if the riparian zone is healthy as well as showing if the restoration also eradicated invasive species.

Acknowledgements

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Figure 1

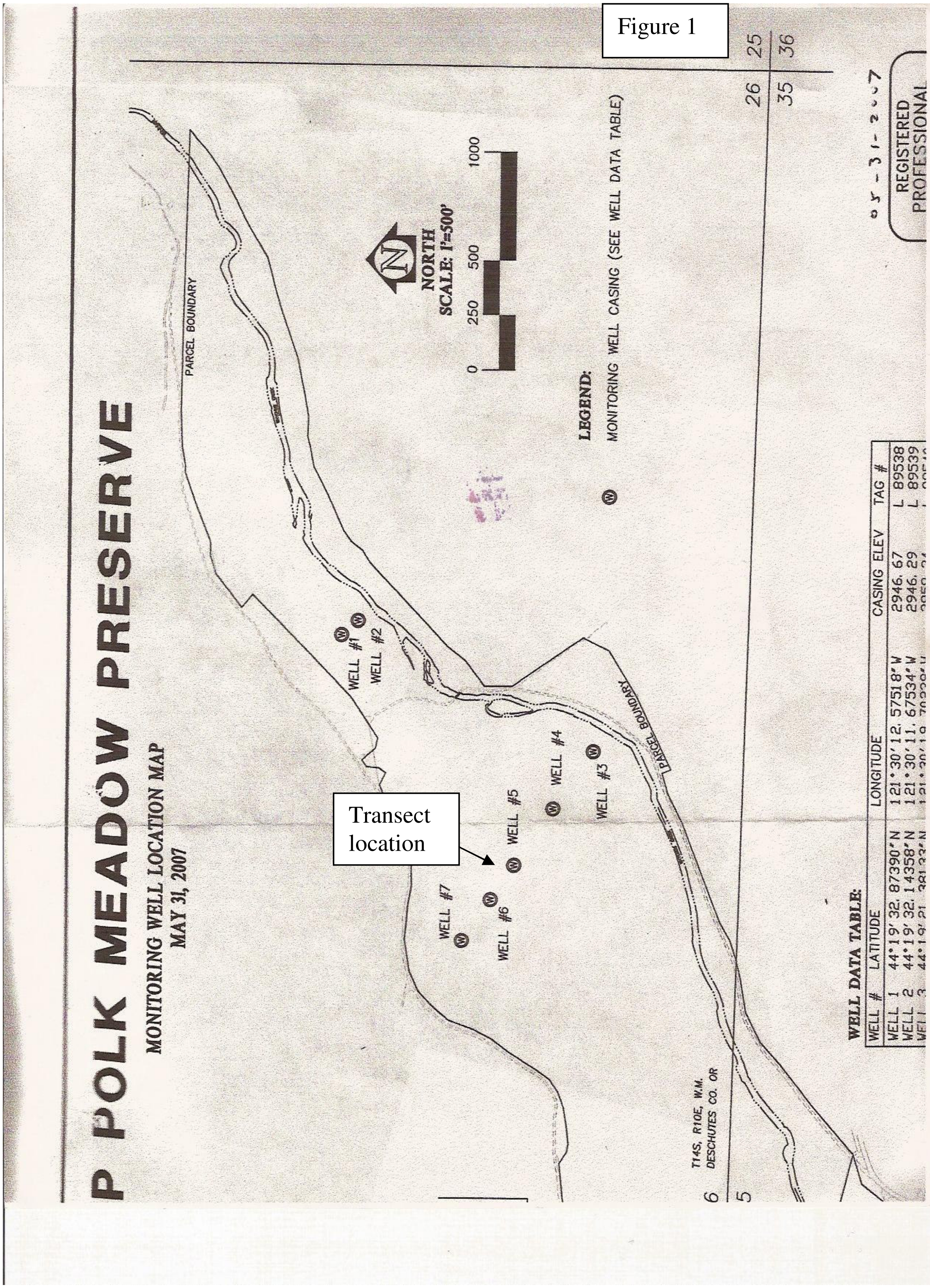

P POLK MEADOW PRESERVE
MONITORING WELL LOCATION MAP
MAY 31, 2007
PARCEL BOUNDARY
NORTH
SCALE: 1"=500'
0
250
500
1000
LEGEND:
MONITORING WELL CASING (SEE WELL DATA TABLE)
WELL #1
WELL #2
WELL #3
WELL #4
WELL #5
WELL #6
WELL #7
Transect location
T14S, R10E, W.M.
DESCHUTES CO. OR
WELL DATA TABLE:
WELL # LATITUDE LONGITUDE CASING ELEV TAG #
WELL 1 44°19' 32.87390" N 121°30' 12.57518" W 2946.67 L 89538
WELL 2 44°19' 32.14358" N 121°30' 11.67534" W 2946.29 L 89539
26
25
35
36
6
5
05-31-2007
REGISTERED
PROFESSIONAL

Figure 2

Esp - Erigeron sp. Rc - Rubex Crispex Es - Epilobium sp
NF Ec - Erodium cicutarium Up - Unknown plant
Ps Potentilla sp. Ap - Alopecurus pratensis

Bg - Base ground
Um - Unknown moss

Bt - Bromus tectorum
Ai - Aperia interrupta
Vt - Verbascum thapsis
Jb - Juncus balticus
Sa - Sisymbrium altissimum
Er - Elymus repens
Ds - Descurainia Sophia
As - Ansinckia sp

Project Site: Camp Polk Meadow
~~Transect~~ Grid Number: 1
Community I.D.:

Date: 6-26-07
Transect Length: 150 feet
Transect Location:

Investigators: USDA Ecological Restoration Field Course
Data Point Interval: 10 feet
Transect Orientation:

	Species	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	16	17	18	19	20	21	22	23	24	25	Total
A		well	Bt	Ai	Vt	Jb	Bt	Bt	Bt	Jb Vt	Jb	Jb	Jb	Er Jb	Jb	Ai	Bg											
B		Bt	Bg	Bt Ai	Ai	Ai	Ai	Ai	Sa Ai	Bt Vt Up	Jb	Jb	Jb Ds	Jb	Jb	Jb Er	Jb Um											
C		Bg	Bt	Bt As	Vt Ai	Ai	Ai	Ai	Bt	Jb	Ai	Jb	Sa	Bg	Jb	Jb	Jb											
D		Bg	Bt	Bt	Jb	Ai	Ec	Jb	Jb	Rc	Ai	Ai	Jb	DS	Jb	Jb	Jb											
E		Bg	Ai	Ai	Ai	Vt Bt	Vt	Ds	Bg	Jb	Ap	Jb	Ai	Jb	Jb	Jb	Jb											
F		Ai Bt	Ai Bt	Ai Esp	Ai Bt	Er Ai	Vt	Ps	Jb	Jb	Jb	Jb	Um Ap	Ai	Ap	DS Jb	Jb											
G																												
H																												
I																												
J																												
K																												
L																												
M																												
N																												
O																												
P																												

Comments:
Grid Pattern established by 150ft transect from well #5 towards well #6. 150ft Square grid created by spanning 150ft @ 40° NE From well #5 & Connecting Square. Then lay out 150ft transect From well #5/#6 position in 40° NE direction @ 10 ft intervals. Took pin intercept readings by placing flag @ 10 ft intervals on 15 transects From well #5/#6 line to end of grid (transects labled A through P) (See Map!)

end points

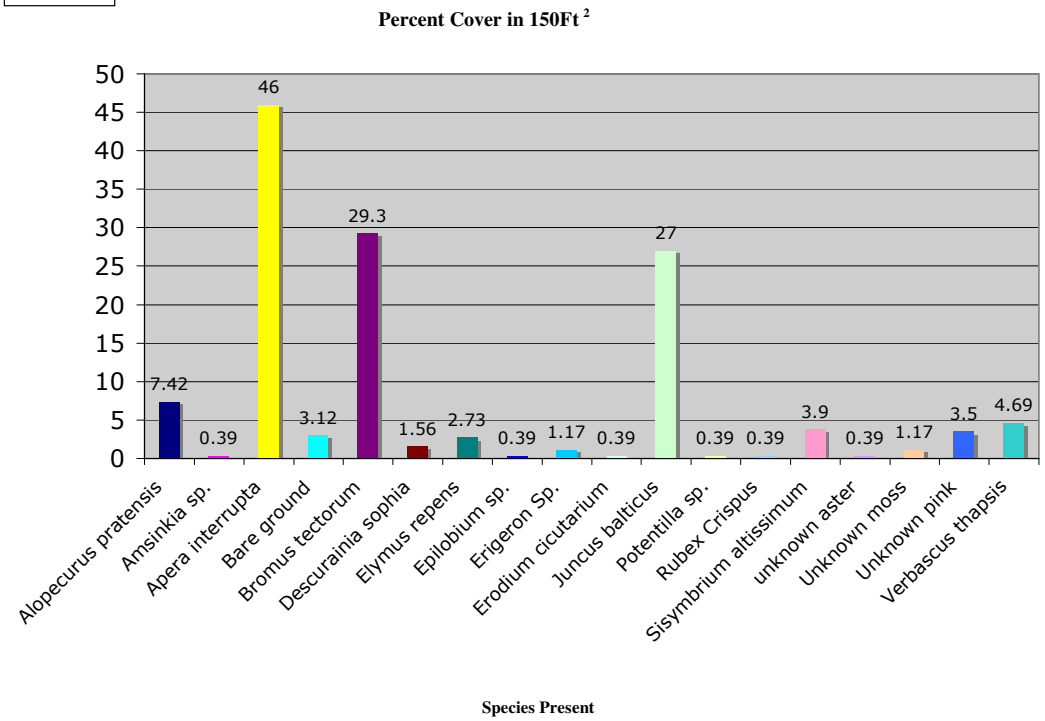
NOTE: Include all species that intercept pin/flag on way to ground @ sample sites (10ft intervals)


Figure 3


Figure 4

Figure 5

Figure 6



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