Fishes and Other Aquatic Biota of the Spring Park Natural Area, North Clackamas County, Oregon

Prepared for

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Introduction

In 2015 the Oregon Department of Fish and Wildlife (ODFW) collaborated with the North Clackamas Parks and Recreation District (NCPRD) to characterize fish and amphibian assemblages and water temperature at the Spring Park Natural Area (SPNA) in Milwaukie, Oregon. The SPNA is an 8.3-acre parcel bordering the east bank of the Willamette River near Elk Rock Island. An alcove/side channel area encompasses about one acre at the north end of the park and receives flowing water from the Willamette River during high flow periods (winter and spring) but is often connected only at the downstream end in summer and fall.

Management plans for the SPNA proposed riparian and instream habitat improvements, including the addition of large wood, to benefit Lower Columbia River coho salmon and other native fish species (Draft Spring Park Management Plan 2013); some of this work was completed during the course of this study.

Herein we report briefly on ODFW survey results from the first year of work. A more detailed project completion report will be submitted when additional work (currently proposed) is completed.

Project tasks were to:

1) Conduct fish and amphibian surveys for 1-2 days once per season (winter-autumn) at the SPNA
2) Count and identify fish and amphibians captured. Measure length, and inspect fish for tags/marks/anomalies
3) Tag any anadromous salmonids collected with a passive integrated transponder (PIT) tag (fish >65 mm fork length only)
4) Deploy temperature loggers; recover loggers at project completion and download data
5) Summarize fish, amphibian, and temperature data in a completion report
6) Provide fish, amphibian, and temperature data to NCPRD in Excel format at project completion
7) Pending the availability of additional funding, prepare a scope of work to conduct additional seasonal surveys in FY 2015-2016

Methods

Fish and amphibian collection

We used mini-Oneida net traps (see Monzyk et al. 2014) for sampling at the study site. Oneida net traps have a main box that is approximately 4 x 4 x 4 feet in size with two 7 x 6-foot wings that flare from the main box at a 45^{o} angle and a 90-foot long leader line between the trap and a fixed point on the shore. The traps were deployed mid-morning and retrieved approximately 24-48 hours later. The traps were deployed in winter (3 February), spring (6 May), summer (23 June) and autumn (4 November), 2015 (Table 1).

We recorded the location of the traps within the site, species captured, and fish fork length (FL) in mm (snout-vent length for amphibians) during sampling. Captured fish were separated into tubs and anesthetized using tricaine methansulphonate (MS-222). If there were >30 individuals of the same species caught in the same sample, only the first 30 were measured. Subsequent individuals of the same species were tallied. Juvenile salmon were tagged with a passive integrated transponder (PIT). All specimens were revived and released alive at the site after processing.

Temperature

To characterize seasonal water temperature we deployed two Vemco Minilog-II-T® temperature loggers on 9 March 2015. These were placed together, cabled to the one substantial piece of large wood at the deepest portion of the site (Standard UTM 472268.1 E, 5031385.7 N). The loggers recorded temperature once per hour. One was retrieved in late summer when it appeared the site was in danger of going dry; this may have exposed both units to theft or vandalism. However, the site remained watered and the second logger was retrieved on 4 November 2015.

Table 1. Sampling dates, locations, and other details for Oneida traps deployed at the Spring Park Natural Area, 2015.

Date	Net Number	Channel Location	UTM E	UTM N	Nights Fished	Depth (m)
3 Feb	1	North end	527743	5031420	1	1.4
3 Feb	2	South end	527733	5031297	1	1.1
4 Feb	1	North end	527743	5031420	1	1.3
4 Feb	2	South end	527733	5031297	1	0.9
6 May	1	Closed end	527711	5031290	1	0.8
6 May	2	South end	527757	5031422	2	1.2
23 Jun	1	Center	527741	5031355	1	0.6
4 Nov	1	North end	527743	5031355	2	0.6
4 Nov	2	South end	527733	5031297	2	0.9

Results and Discussion

Fish and Amphibian Collection

We collected 332 fish from at least 19 species (several were not identifiable to species) (Table 2). Native fishes comprised 60.8% of the total catch, with threespine stickleback (n = 122), largescale sucker (n = 32), and peamouth (n = 21) dominating the catch. Bluegill (n = 65), banded killifish (n = 22) and pumpkinseed (n = 17) were the most common non-native species captured. Species richness (S) was considerably lower in summer (S = 3) and autumn (S = 7) than winter (S = 13) and spring (S = 11).

Included among the notable individuals captured was a single Chinook salmon fry (38 mm FL) and three subyearling (52-68 mm FL) coho salmon captured in May, establishing that the site is used by ESA-listed fish species, at least to some extent. One of the four juvenile salmonids was large enough to PIT tag. The 68-mm FL coho salmon was captured on 6 May 2015, tagged (tag code 3DD.0077735CDB), and released. As of 8 January 2016 it had not been detected at any interrogation sites in the region.

We also captured a number of potential predators of juvenile salmon, including smallmouth bass and northern pikeminnow. Juvenile salmon are not a major diet component for northern pikeminnow <250 mm FL (Vigg et al. 1991), so the individuals we captured at the SPNA, averaging 71 mm FL, are not of particular concern. Smallmouth bass smaller than 250 mm FL generally consume the most salmonids, with predation decreasing among larger bass (Fritts and Pearsons 2006). Thus, one of the smallmouth bass we captured (231 mm FL) was likely a salmon predator, where the larger individual (>300 mm) was not.

Other aquatic biota captured included American bullfrogs, Siberian prawns, and the native signal crayfish (Table 3). American bullfrogs are listed among the “100 of the world’s worst invasive alien species” (Lowe et al. 2004), although we only captured tadpoles in the Oneida traps.

Siberian prawns were first discovered in the Pacific Northwest in 1995 (Emmett et al. 2002). Those authors described a number of individual collections from the Columbia and Willamette rivers ranging from 1-37 individuals from 1995 to 2002 and suggested that the species could have adverse impacts if it became abundant; for example, by preying on native crustaceans also consumed by juvenile salmonids. We captured only 11 individuals during our first three sampling events (winter, spring, summer), but over 1,500 in autumn. Without additional studies available on the ecology and habits of Siberian prawns in the region (we found none), the implications of our single large catch are difficult to assess.

Table 2. Number and length range (mm; fork length) of fish collected with Oneida traps at the Spring Park Natural Area by species and season, 2015. FL = fork length.

Species	Winter	Spring	Summer	Autumn	Length Range
Unknown lamprey	0	0	1	0	na
Chinook salmon	1	0	0	0	38
Coho salmon	0	4	0	0	52-68
Banded killifish[1]	0	0	0	22	47-88
Chiselmouth	0	2	0	4	41-55
Golden shiner[1]	5	1	0	0	100-135
Goldfish[1]	1	0	0	0	173
Northern pikeminnow	3	0	0	0	30-153
Peamouth	19	2	0	0	124-153
Redside shiner	6	0	0	0	36-70
Unknown cyprinid	1	2	0	0	29-35
Largescale sucker	3	1	0	28	49-282
Brown bullhead[1]	0	0	4	0	203-252
Threespine stickleback	95	20	0	7	43-61
Bluegill[1]	2	6	0	57	32-127
Black crappie[1]	2	1	0	2	63-180
Pumpkinseed[1]	0	11	4	2	46-146
Smallmouth bass[1]	1	1	0	0	231-300+
Unknown sunfish[1]	2	0	0	0	23-30
Yellow perch[1]	5	0	0	0	81-135
Reticulate sculpin	2	2	0	0	99-134

[1] Introduced species

Table 3. Number of other (non-fish) aquatic biota collected with Oneida traps at the Spring Park Natural Area by species and season, 2015.

Species	Winter	Spring	Summer	Autumn
American bullfrog[1, 2]	4	0	13	1
Signal crayfish	1	15	5	8
Siberian prawn[1]	5	3	3	>1,500

[1] Introduced species
[2] Tadpoles only

Temperature

During the period the loggers were deployed, the median average daily water temperature at the SPNA site was 17.8° C; the median minimum daily temperature was 16.9° C and the median maximum was 19.3° C (Figure 1). Minimum and maximum hourly temperatures were 9.1° C (on 10 March at 0700 - 0900) and 29.2° C (on 26 June at 1600). To ensure the maximum readings were correct (i.e., the site was not dewatered), we retrieved ambient air temperature data for Milwaukie, Oregon (www.accuweather.com) over periods in question and compared these to our readings. In all cases the reported air temperatures were higher than the recorded water temperatures, so we concluded the units were submerged. For example, on 26 June the maximum air temperature was 35.0° C compared to SPNA unit reading of 29.2° C.
In general, water exceeding 20.0° C is considered to severely impair salmonids (PNWSHIWG 1998; McElhany 2003, 2006). The average daily temperature at the SPNA site exceeded this threshold on 96 of the 241 days the loggers were deployed.

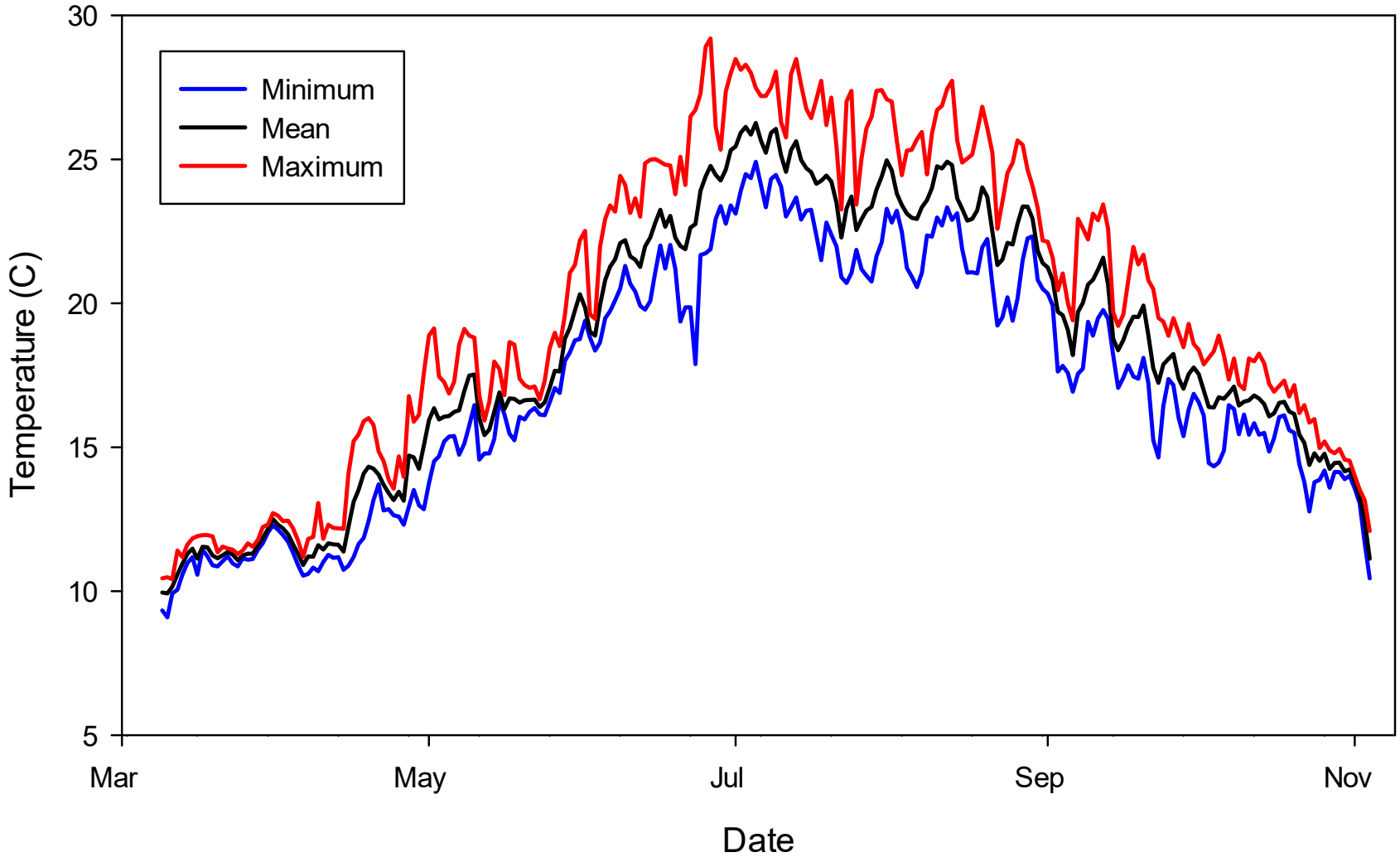

Figure 1. Minimum, mean, and maximum average daily water temperature at the Spring Park Natural Area, 9 March to 4 November, 2015.

Plans for 2016-2018

We have proposed repeating our seasonal sampling and temperature monitoring as described in this report in 2016-17 and 2017-18 (July-June). We will follow that with a completion report that more fully describes the fish and amphibian community and compares community assemblages among years. It may be possible, at least anecdotally, to relate habitat improvements to changes in the aquatic community. We will also continue to monitor the movements and fate of any juvenile salmonids we tag at the site.

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