SAGELAND COLLABORATIVE

SCIENCE IN SERVICE OF WILDLIFE AND WILDLANDS

MEMORANDUM

To: Chris Cline, U.S. Fish & Wildlife Service
From: Rose Smith, Sageland Collaborative
RE: Jordan River Bird Refuge RSRA Training Event & Stream Condition Results

Introduction

This project had a dual purpose- to evaluate the condition of the Big Bend project area along the Jordan River while also providing a riparian habitat assessment training opportunity for local practitioners and members of the Jordan River Technical Advisory Committee. The Jordan River is listed as impaired for TDS, *e. coli*, elevated temperature, and selenium. Goals of the broader restoration project include improving the riparian habitat for migratory birds and mitigating water the site's contribution to local water quality problems. Restoration activities include reintroducing native vegetation such as cottonwood trees, diverse shrubs and mid-canopy woody plants, and herbaceous plants, re-grading banks to reduce erosion, and re-shaping the river-floodplain system to encourage over-bank flooding on-site and increase transient storage of water during high flow. The channel reshaping activities combined with re-vegetation are expected to reduce TDS loading by falling sediment and reduce water temperature through channel shading and transient storage in floodplain soils. Monitoring this site during the restoration process is a priority to document restorative changes. *Due to safety concerns in 2021 and site access issues in 2022, we were not able to complete a RSRA survey at Big Bend, however we provide data from a partial survey completed in 2021 below.*

Restoration projects require collaboration among many stakeholders, many of whom do not share the same degree of ecological knowledge. Educating partners and members of the public about the importance of riparian ecosystems is a key goal of the Big Bend project. To this end, we organized a training event for project partners to learn about stream & riparian ecology and monitoring methods on September 20, 2022.

Methods

The RSRA protocol was developed as a tool to efficiently assess the condition of a stream. The RSRA uses qualitative and quantitative data to generate a score for water quality, hydro-geomorphology, fish and aquatic habitat, riparian vegetation, and terrestrial wildlife habitat. The protocol includes 25 metrics which are summarized by category and converted to a score that ranges from "1", representing highly impacted and non-functional conditions, to "5", representing a healthy and completely functional system.

Due to site access issues mentioned above, we conducted our RSRA training event at an established restoration site approximately 1 mile upstream—the Jordan River Migratory Bird Refuge. A significant tributary, Willow Creek, flows parallel to the Jordan for several hundred meters before entering the main stem.

Results

We had five individuals join us for the training event, representing two municipalities and two federal agencies. We received positive feedback from all participants, and the event was a pleasant networking experience and knowledge-sharing experience.

The RSRA survey results for Willow Creek (9/20/2022) are summarized in Table 1. Briefly, the overall score for Willow Creek was 3.0. Two indicators (Cobble embeddedness and diversity of aquatic invertebrates) were not measured because the stream channel was dominated by silt, and there were no cobbles present to measure or observe invertebrates. The water quality score was 4.5 out of 5 because the channel was heavily shaded and there was little to no filamentous algae present. Notably, the channel was shaded by invasive *Phragmites australis* (i.e. Phragmites or Common Reed). The hydro-geomorphology score was 3.6 out of 5, and the lowest indicators within this category were floodplain connection (the channel was incised relative to the floodplain) and hydraulic habitat diversity. The Fish & aquatic habitat score was 2.25 out of 5 due to an absence of riffle-pool distributions, low under-bank cover, and lack of large woody debris. The riparian vegetation score was 2.85, owing to low or no different life stages of native shrubs and trees, and a high percentage of non-native herbaceous plan cover (Phragmites). Finally, the Terrestrial Wildlife Habitat score was 2 out of 5 due to absence of shrubs, mid-canopy, and upper canopy woody vegetation.

It is worth noting that this scoring system is set relative to a multi-level riparian forest canopy, similar to what would be expected along the Jordan River. The Jordan River Bird Refuge site is currently a wet meadow stream complex dominated by invasive Phragmites and does have some beaver activity. This site likely historically represented a mix of wet meadow and cottonwood- willow forest patches. While the scoring in Table 1 represents the idealized Riparian Forest, the individual components provide useful information about the status of the stream-riparian area regardless. Site photos for representative points at Willow Creek demonstrate the relative lack of woody vegetation and domination of the herbaceous layer by Phragmites (Figures 1-2). Survey participants did observe a patch of Alkalai Bulrush (*Bolboschoenus maritimus)*, not pictured.

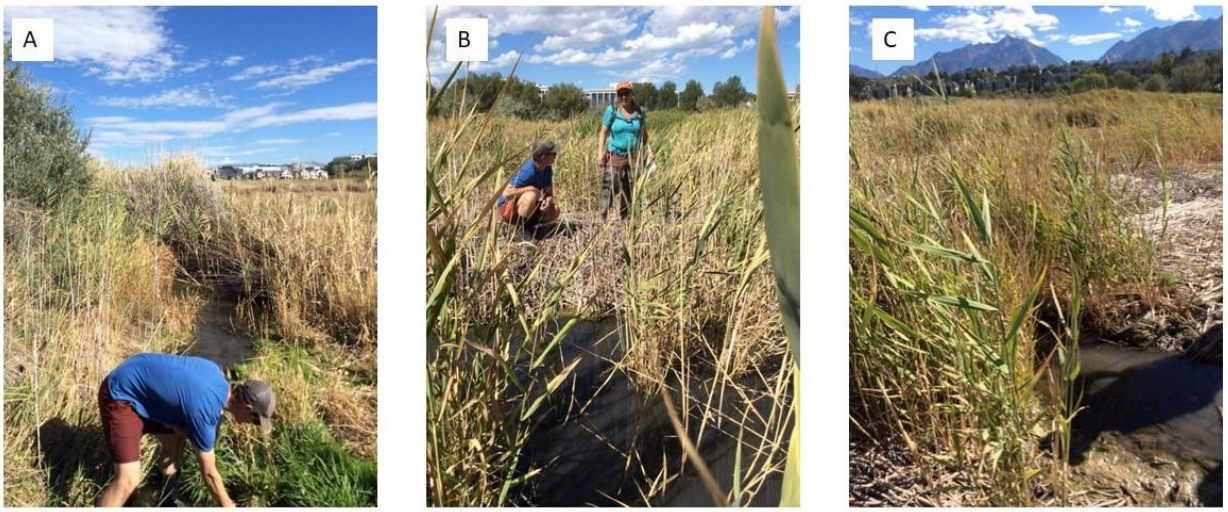

Figure 1. (Above) Photos of the three representative sites for the 9/20/2022 RSRA survey of Willow Creek.

Figure 2. Photo of the bottom of the Willow Creek transect, looking southward across a large beaver complex dominating flow of Willow Creek.

Table 1. Results of the stream condition survey for Willow Creek on 9/20/2022.

Indicator	Score
1 - Algal Growth	5
2 - Channel Shading	4
Water Quality Score	4.5
3 - Floodplain connection	2
4 - Vertical bank stability	5
5 - Hydraulic habitat diversity	2
6 - Riparian area soil integrity	4
7 - Beaver activity	5
Hydrogeomorphology Score	3.6
8 - Riffle-Pool distribution	1
9 – Under-bank cover	2
10 - Cobble embeddedness	N/A
11 - Diversity of aquatic invertebrates	N/A
12 - Large woody debris	2
13 - Overbank cover	4
Fish/Aquatic Habitat Score	2.25
14 - Plant cover and structural diversity	2
15 - Dominant shrub demography	1
16 - Dominant tree demography	1
17 - Non-native herb. plant cover	1
18 - Non-native woody plant cover	5
19 - Mammalian herbivory	5
20 - Mammalian browsing	5
Riparian vegetation Score	2.85
21 - Riparian shrub patch density	1
22 - Riparian mid-canopy patch density	1
23 - Riparian upper canopy patch density	1
24 - Fluvial Habitat Diversity	5
Terrestrial Wildlife Habitat Score	2
Overall Survey Score	3.0

The partial Big Bend survey was conducted on July 8, 2021. Results are summarized in Table 2, and site photos are shown in Figure 3. As seen in the table, several indicators are missing, but each of the 5 categories are represented by existing measurements to some degree. The water quality indicator score had low points due to the lack of channel shading (2 out of 5 pts). The Hydro-geomorphology score was 3.25 with a notable lack of beaver activity and extremely incised banks. The Fish & Aquatic Habitat score was 3.5, averaged from two indicators (cobble embeddedness and aquatic invertebrate diversity). The Riparian Vegetation score (2.5 out of 5) lost points due to the dominance of non-native herbaceous and woody vegetation. The Terrestrial Vegetation score was 2.75 with points lost for low density of upper canopy trees. Over time, restoration activities including structural additions to the channel and re-vegetating the riparian zone will likely improve the overall habitat and RSRA score of this site.

Figure 3. Photos of representative sites 1,2, and 3 (A, B, C respectively) as well as the upstream extent of the survey reach (D). Panel D provides perspective on the degree of channel entrenchment relative to the historic floodplain. Riprap stabilizing the bank is part of ongoing restoration activities. Russian Olive and large patches of Phragmites dominate the riparian plant community, although some cottonwood, willow and native herbaceous plants are present as well.

Table 2. Partial RSRA survey results for Big Bend (July 8, 2021). Survey was paused due to safety issues. Indicators from the 200m transect section of the RSRA protocol are marked "NA", and not included in averages reported below.

Indicator	Score
1 - Algal Growth	N/A
2 - Channel Shading	2
Water Quality Score	2
3 - Floodplain connection	1
4 - Vertical bank stability	N/A
5 - Hydraulic habitat diversity	5
6 - Riparian area soil integrity	5
7 - Beaver activity	2
Hydrogeomorphology Score	3.25
8 - Riffle-Pool distribution	N/A
9 – Under-bank cover	N/A
10 - Cobble embeddedness	2
11 - Diversity of aquatic invertebrates	5
12 - Large woody debris	N/A
13 - Overbank cover	N/A
Fish/Aquatic Habitat Score	3.5
14 - Plant cover and structural diversity	N/A
15 - Dominant shrub demography	4
16 - Dominant tree demography	4
17 - Non-native herb. plant cover	1
18 - Non-native woody plant cover	1
19 - Mammalian herbivory	N/A
20 - Mammalian browsing	N/A
Riparian vegetation Score	2.5
21 - Riparian shrub patch density	3
22 - Riparian mid-canopy patch density	3
23 - Riparian upper canopy patch density	2
24 - Fluvial Habitat Diversity	3
Terrestrial Wildlife Habitat Score	2.75
Overall Survey Score	2.8

Table 3. Budget compared to what was spent on the project.

Task	Description	In-kind	Budget	Spent
RSRA Survey & Training event	Planning event, recruiting participants, carrying out RSRA training and preparation of data & report.	$432.00	$752.00	$1,128.00
RSRA survey of Big Bend site	Site visit for two interns plus travel and reporting.	$240.00		
Costs	Survey supplies & lunch for five participants.		$500.00	$100.00
TOTAL		$672.00	$1,252.00	$1,228.00