

Jackson-Frazier Wetland  
Phase 1: Long Term Habitat Restoration Project



*Increase and preserve the diversity, functions, and values within the high priority Jackson-Frazier Wetland conservation area*

## [Acknowledgements](#)

The protection of Jackson-Frazier for future generations to experience the rare native wetland habitat in the Willamette Valley, is due in large part to Dr. Bob Frenkel. Bob passed away on February 20<sup>th</sup>, 2017. His obituary in the Corvallis Gazette-Times captures exactly how important he was in the conservation of Jackson-Frazier Wetland:

“His fight to protect the Jackson-Frazier Wetland north of Corvallis in Benton County was a notable achievement. The county honored Bob by dedicating the wetland’s boardwalk — which Bob planned, raised money for and even helped build — as the “Bob Frenkel Boardwalk” in 2005.”

The Division of State Lands, in response to prior landowner impacts to the wetland, funded development of a comprehensive documentation of the wetland and alterations that occurred. 31 years after the study, this report was vital for informing project objectives and emphasizes the importance for solid records that can be helpful decades after their completion.

The Jackson-Frazier Wetland Advisory Committee members, including Bob and many other local and regional conservation and environmental professionals and advocates, led to the development of the management plan that helps guide work to this day. All of their work, and supporting university research efforts guided project work.

Phase 1 Technical Team members provided diverse experience and perspective on restoration of wetland resources. Their volunteer support through the meeting discussions and review of project report work to achieve the project vision and goals is much appreciated.

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## Technical Team

The Benton County Natural Areas & Parks Department (NAPD) Advisory Board and Board of Commissioners, approved the formation of the Jackson-Frazier Wetland Technical Team in January 2017. The technical team members were selected by NAPD natural resources coordinator with input provided by the project consultant and department director. Technical team members were selected based on their professional experience with: wetland restoration, management of parks/open space (including land adjacent to Jackson-Frazier), and their availability to provide their support during the Phase 1 project period.

Technical Team members were tasked with providing the following support:

- Share experience and, where possible, resources to support current and future work phases;
- Review and provide guidance on the project scope of work including vision, goals, objectives;
- Review and provide input on work completed by county staff and project consultant leading to large scale wetland restoration at Jackson-Frazier wetland.

**Table 1.** Technical Team Members (Phase 1)

Name	Organization	Current Position
Adam Stebbins	Benton County Natural Areas & Parks	Natural Resources Coordinator
Jared Jebousek	United States Fish & Wildlife, Partners for Fish and Wildlife Program	Fish & Wildlife Biologist
Jeff Baker	Greenbelt Land Trust	Stewardship Manager
Jude Geist	City of Corvallis Parks and Recreation	Parks Operations Supervisor
Ray Fiori	RTF Consulting	Wetland Consultant
Donna Schmitz	Benton Soil & Water Conservation District	Resource Conservationist
Mary Santelmann	Oregon State (Ex Officio Review of Final Report)	OSU Water Resources Program Director, wetlands scientist

## Project Background

Over the past 25 years, the Jackson-Frazier Wetland has been owned by Benton County and managed by Benton County Natural Areas & Parks. During the last quarter century, the original mission of this highly popular natural area has endured:

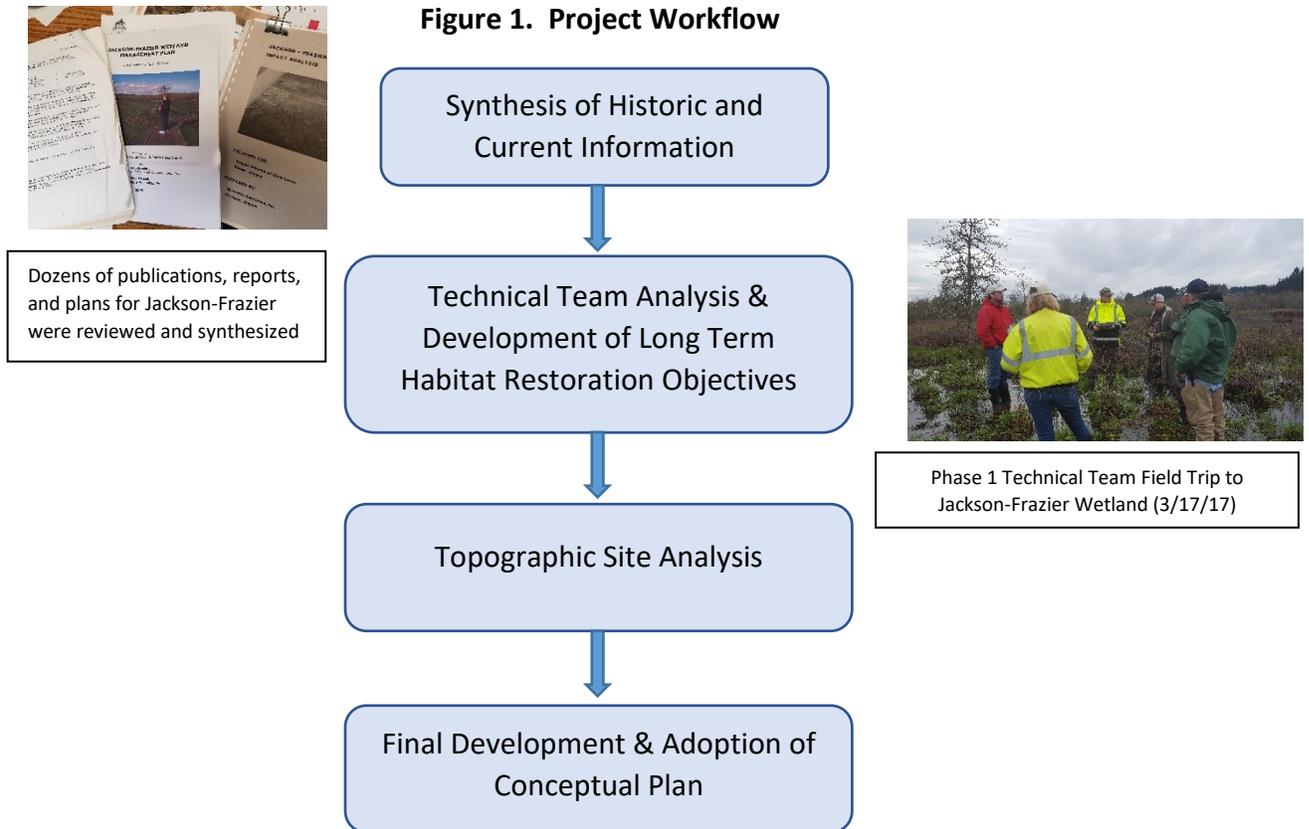
*The wetland will serve as a model for natural area protection, restoration, and management, including research, application of different management implementation, experimentation, and monitoring* (Jackson Frazier Wetland Management Plan Refinement, 2005).

Many major accomplishments have occurred to fulfill the Jackson-Frazier Wetland mission, including:

- Providing permanent protection of the resource;
- Leading and supporting plant and animal surveys;
- Enhancing native species including several rare species;
- Designating priority conservation areas and associated restoration techniques;
- Completing routine monitoring to inform adaptive management approaches.

Starting in 2015, Benton County Natural Areas & Parks staff began discussions with the volunteer-citizen advisory board on the historic landscape level impacts proposed for restoration work. The Benton County Natural Areas & Parks Board, in addition to the Board of Commissioners were provided public presentations by parks staff that summarized current site limitations and a proposed process for addressing these issues with the goal of significant increases in wetland functions and values (see **Appendix A** for Project Approval Presentation). Unanimous support was given by each board member, and parks staff began implementation of Phase 1 of the Jackson-Frazier Long Term Habitat Restoration Plan.

Phase 1 focuses on key habitat information developed and collected at Jackson-Frazier Wetland starting in 1986 until the present. The wealth of information developed through university research, agency investigations, county management, and other sources, provides many details on site characteristics to inform conceptual plan development. In addition, a Technical Team was called together and facilitated by the Benton County Natural Resources Coordinator to provide a substantial and diverse amount of professional experience regarding wetland management and restoration. Figure 1 shows the Phase 1 project workflow process, leading to the development of a conceptual plan for major restoration of the wetland



After Phase 1 project completion, staff and partners will begin implementation of the conceptual plan leading to large scale habitat work within the priority wetland restoration area (Phase 2).

### Project Vision

The Technical Team developed guidance on the desired future state of the Jackson-Frazier Wetland priority habitat area (see Management Background). The following vision statement was adopted by the Technical Team to guide and inspire work:

*Increase and preserve the diversity, functions, and values within the high priority Jackson-Frazier Wetland conservation area*

In order to accomplish the project vision, a phased approach starting with the Phase 1 conceptual plan development and adoption. Phase 2 will be the implementation of all Phase 1

goals and objectives, focused on large scale alteration of the wetland landscape to improve and preserve wetland features.

### Site Description

The Jackson-Frazier Wetland Management Plan (updated 2005), and the Benton County Habitat Conservation Plan (2010) provide extensive natural resources information for the site. Key site characteristics that directly support restoration plan development are summarized to provide reference for understanding Phase 1 plan goals and objectives.

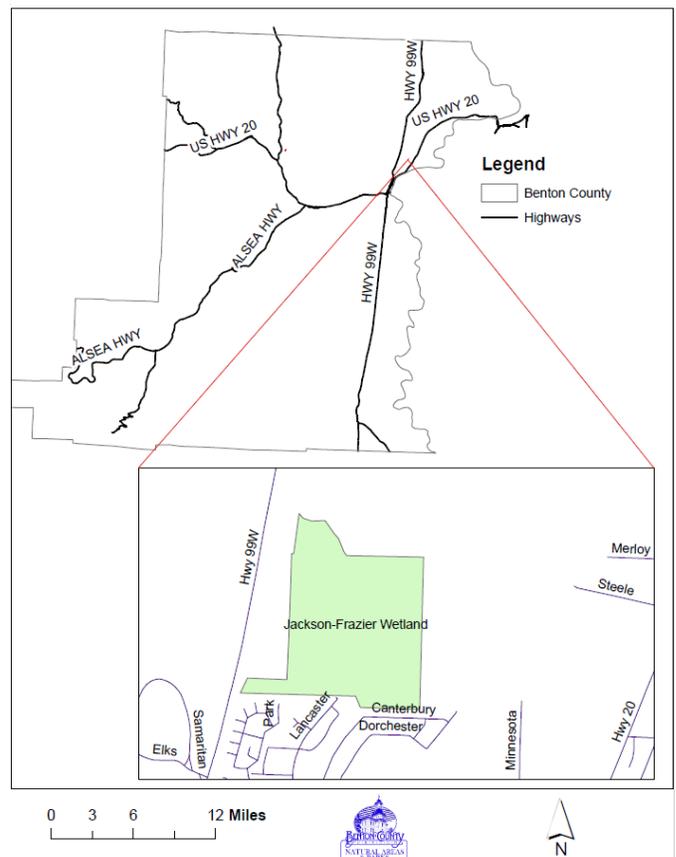
### Location

Jackson-Frazier Wetland is located northeast of Corvallis, immediately outside the Corvallis Urban Growth Boundary at the north end of Lancaster Street (Figure 2). The natural area managed by the County now encompasses 144.5 acres. Of this, 131.68 acres are wetland and approximately 14 acres are upland (non-wetland) that were farmed until county ownership (previously owned by Starker Forests).

### Hydrology

Analysis of 1936-2014 aerial photography, shows a fine pattern of drainage furrows and a recently excavated ditch connecting with Stewart Slough that drains the wetland to the southeast. Prior to this major ditching, the wetland drained northeasterly into Frazier Creek Ditch (Scientific Resources, 1986). Both Stewart Slough and Frazier Creek Ditch flow into the Willamette River (Map 2). Historically, the wetland contained no human made ponds although two shallow depressions were excavated as duck ponds during the 1930s and 1950s. In 1985, wetland drainage was deliberately, although superficially, altered by the landowner, this damage was later assessed by Scientific Resources, Inc. (see Management Background). The confluence of Jackson and Frazier Creeks is north and west of the County-owned wetland, located in the northeast part of Owens Farm west of Highway 99W. Discharge into and out of the wetland was measured by Buffkin (1985) from November 1983 to February 1984 as part of the Impact Study authorized by DSL after site impacts occurred (see Site impacts). Buffkin observed up to 180 CFS inflow and up to 95 CFS outflow, and determined that minimal water retention in the wetland during saturated conditions (Scientific Resources, 1986Historic and

**Figure 2. Site Location**



current drainages are visible on LiDAR derived 'bare earth' imagery showing the site landform (see Figure 7).

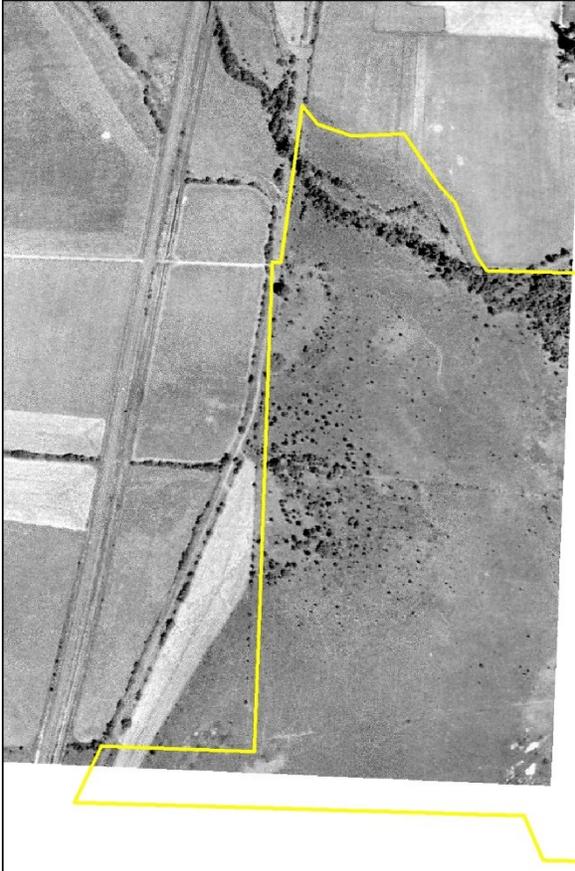
**Figures 3-6. Jackson-Frazier Aerial Imagery 1936-2014**

**Figure 3. 1936 Aerial Imagery**

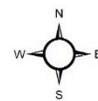


**Figure 4. 1944 Aerial Imagery**

# Jackson-Frazier Wetland 1944



0 500 1,000 2,000 Feet



5/17/2017  
Map by Greenbelt Land Trust

Figure 5. 1954 Aerial Imagery

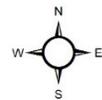


**Figure 6.** 1969 Aerial Imagery

# Jackson-Frazier Wetland 1969



0 500 1,000 2,000 Feet

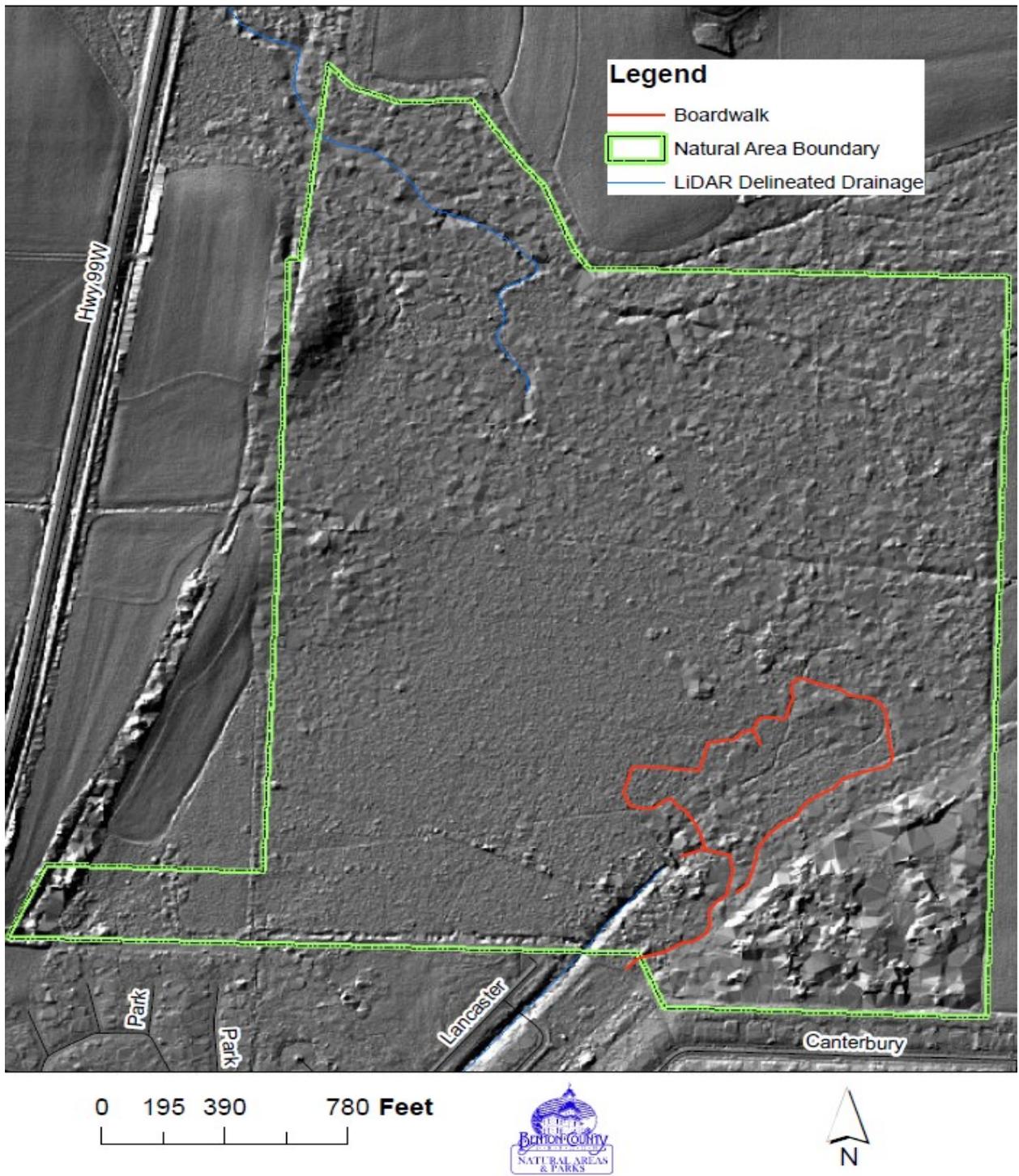


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Map by Greenbelt Land Trust

Figure 7. 2015 Aerial Imagery



**Figure 7.** Jackson-Frazier Wetland Surface Reinforced Drainage & Bare Earth (2013 LIDAR)

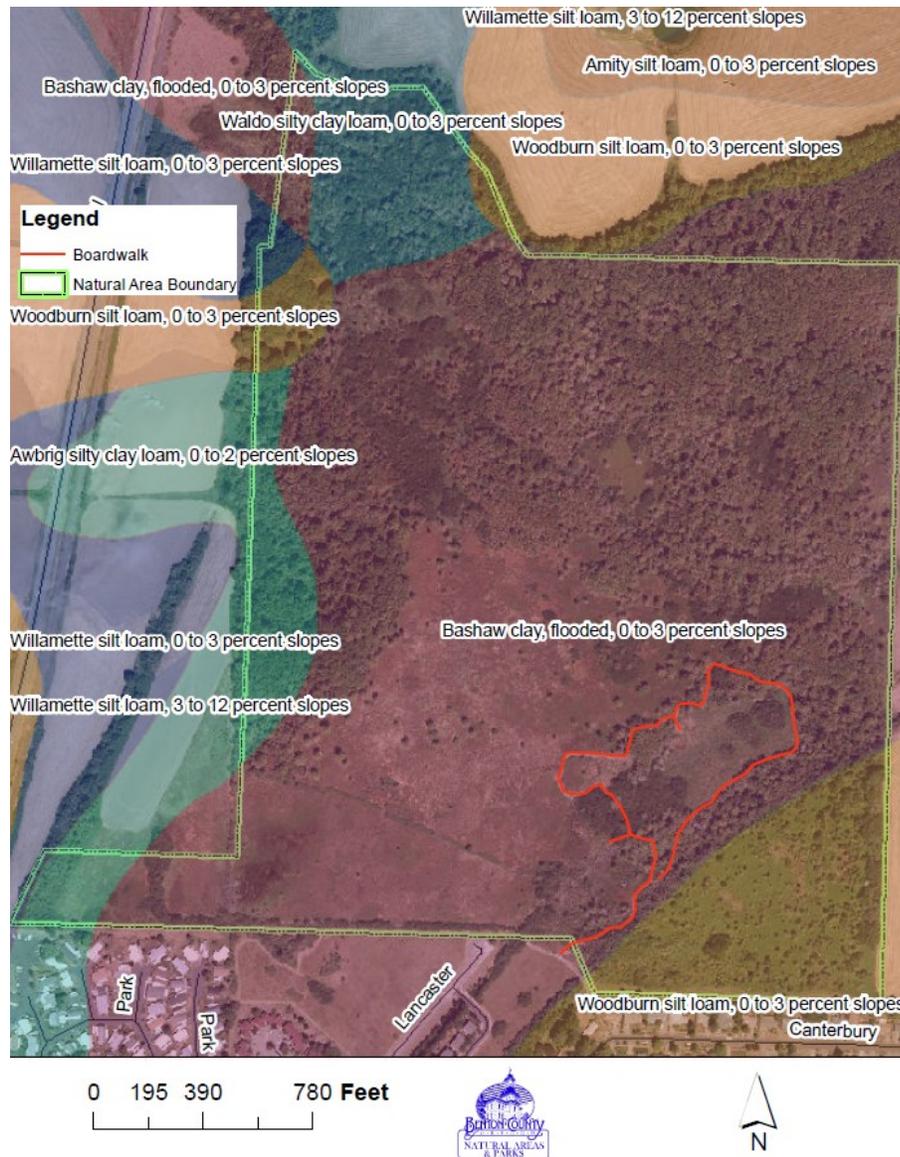


### Soils

The Benton County Area Soil Survey (Knezevich, 1975, revised 2000) identifies four major soil series in the wetland area: Waldo silty clay loam (Wa–47%), Bashaw clay (Bc–37%), Dayton silt loam (Da–5%), , and Woodburn silt loam (WoA–10%)The first three are hydric soils developed under a deficit of soil oxygen, conducive to high quality wetland habitat and the Woodburn soil

is an upland soil. Bashaw clay and Waldo silty clay are the most prominent, and the Waldo soil is found primarily in association with inflowing streams and tall ash trees that are thriving within the forested wetland habitat areas (Scientific Resources, 1986; NRCS).

**Figure 8.** Jackson-Frazier Soils Map (source: NRCS)



### Wetland Types

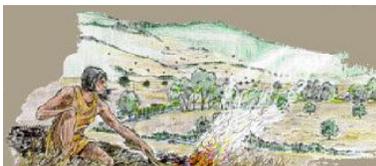
The National Wetland Inventory maps wetland types employing the Cowardin classification based on hydrology, substrate, and vegetation (Cowardin et al. 1979). There are four Cowardin wetland types in the Jackson-Frazier wetland: PEMC Palustrine Emergent Seasonally Flooded; PEMF Palustrine Emergent Semi-permanently Flooded; PSSC Palustrine Shrub/Scrub Seasonally Flooded; and PFOC Palustrine Forested Seasonally Flooded. The wetland was delineated as a

jurisdictional wetland in 1986 (Scientific Resources Inc. 1986). There are several habitat types that closely align with the wetland management areas, adopted as part of the Benton County Habitat Conservation Plan (see Management Background).

Figure 9. Jackson-Frazier Cowardin Wetland Classifications



### Site History



In the 1830s, the 'Jackson-Frazier tract' was part of a vast wet prairie maintained by frequent Native American burning by the Kalapuya Tribe, which occupied the central Willamette Valley,

subsisted mainly on plant foods including tarweed and grass seeds as well as camas and onion bulbs, foods favored by periodic burning (Boyd, 1986). Through several early settlement

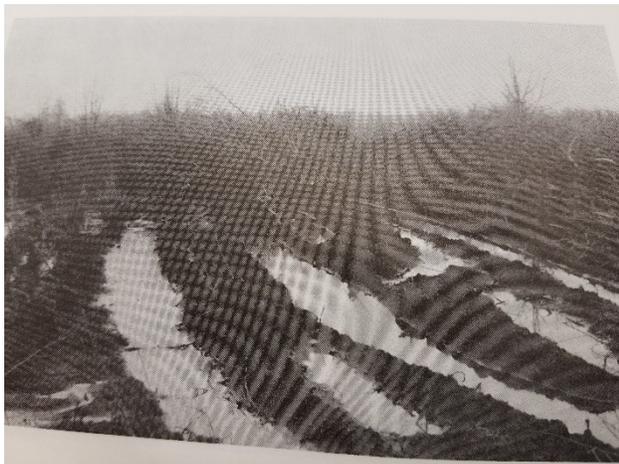
Interpretive sign at Jackson-Frazier, showing Kalapuya burning of prairie habitat

ownerships, the wetland was never planted or intensively farmed because of poorly drained, heavy soils; nonetheless, the area was harvested for “rough” native hay and heavily

grazed until the early 1960s (Management Plan, 2005). Waterfowl were hunted in the parcel and two shallow duck ponds created in the 1930s (Management Plan, 1992). In the 1960s, Jackson-Frazier wetland ownership passed to a speculative owner, grazing stopped, and the owner unsuccessfully petitioned the County to zone the property for industrial use. Initially the land was zoned Urban Residential (UR -1), rezoned in 1974 to Urban Residential (UR-3), rezoned again for Exclusive Farm Use (EFU) in 1979, and removed from the City planning area because of revised population projections (Benton County Ordinance 91-0083). By the late 1970s, the County Comprehensive Plan was under preparation.



Grazing occurred until from settlement until the 1960s, reducing encroachment of shrubs and trees into the wet prairie habitat



Detail of northwest corner of wetland, scraped by previous property owner in 1985 (Scientific Resources Inc. 1986)

Wetland ownership passed to the Marshall Land Company in June 1984. In November 1985, the owner cleared the property by scraping approximately 13 acres and developed/deepened several ditches without appropriate permits from the County, state, or federal government. After an impact analysis was conducted for the Division of State Lands (DSL) (Scientific Resources Inc. 1986), the DSL served the owner with a Restoration Order. Sometime after 1986, the principal owner moved away from the area without paying

property taxes; however, Benton County was still required, under LCDC order, to protect the Goal 5 resource and the “segmented” County Comprehensive Plan remained in non-compliance. Finally on October

22, 1990, Benton County foreclosed on the wetland owner for failure to pay taxes and Benton County assumed title. County Community Development Department then revised the ESEE analysis and rezoned 131 acres as Open Space, and placed the entire delineated 147-acre wetland in a Wetland Overlay Zone in February 1991. These steps completed the LCDC obligation to protect the wetland and fulfilled Oregon’s land use program requirements (Management Plan, 2005).

## Management Background

### Major Site Alterations

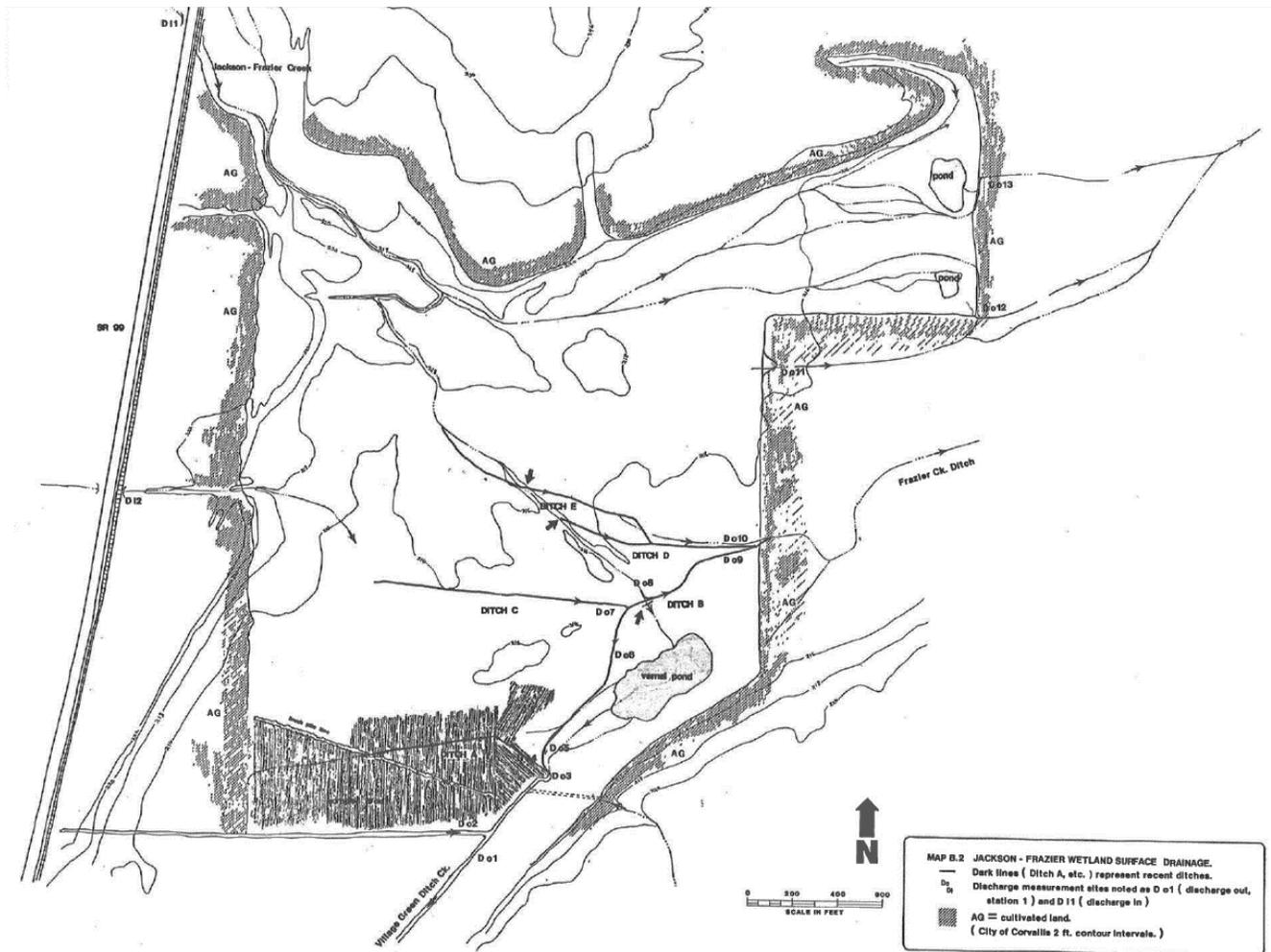
Prior to the 1920s, the wetland drained northeast by what has become known as Frazier Creek Ditch. Originally, there was no well-developed drainage to the south. That changed in the 1930s when a major ditch connecting southward to Stewart Slough was excavated, providing the wetland with the two major drainages existing today (see Figure 7). Grazing occurred after settlement, providing disturbance that reduced shrub and tree encroachment into the priority wetland restoration area/emergent wetland habitat (Management Plan, 2005). The City of Corvallis developed the East-West ditch on the southern property boundary to allow for increased drainage of Highway 99. There are no major documented alterations to the wetland property as it currently exists, until 1985.



1954 aerial imagery of Jackson-Frazier Wetland area showing ditch system and southeast drainage patterns that were developed starting in the 1930's

In 1985, the current property owner used heavy equipment (likely Dozer similar to Caterpillar Model D8) (Scientific Resources, 1986), to create extensive impacts within the current open wet prairie habitat. Division of State Lands funded Scientific Resources to complete a thorough study of the site after the impacts occurred, providing detailed documentation of impacts from clearing, ditching, and grading of southern portion of the site. It also described and mapped the Jackson-Frazier Wetland drainage system and delineated the wetland in accordance with Division of State Lands standards. The majority of the documented impacts occurred within the lower portion of the priority restoration area and resulted in preventing surface water from flowing into a 'vernal pond' in the southeast portion of the park by up to half, combined with increased dewatering of soils. These alterations have continued to contribute to the loss of the palustrine emergent/depressional wetland features and increased transition to upland and shrub dominated wetland habitat as duration of soil saturation is reduced. Flow monitoring was completed at locations where ditches were recently excavated by the prior property owner (see Figure 10. Surface Drainage after 1986 Wetland Impacts). Consultant work determined that the three east-west ditches created (Ditch C, D, and E) interrupt, channeled, and dispersed southerly surface flow, accelerating the movement of water out of the wetland (Scientific Resources, 1986 pg. 8). The ditches and scraping also resulted in the dewatering of the 'vernal pond' (i.e. emergent wetland) area historically present and providing diverse habitat values for wildlife.

**Figure 10.** Surface Drainage after 1986 Wetland Impacts (Scientific Resources, 1986)



**Figure 11.** Aerial image captured after prior owner site impacts (Scientific Resources, 1985)



**Figure 12.** Berm created by prior property owner overgrown with rose (2015)



**Figure 13.** Rut and furrow system created by prior property owner- present condition (March, 2017)



Four (4) major ditches were documented to occur during these major site alterations, to increase draining of historic 'vernal pond'. The majority of these major ditches still exist on the site, with 'Ditch B' (see Figure 10) providing the majority of flow conveyance offsite. In addition to documenting site impacts, the study also provides inflow and outflow data for Jackson-Frazier Creek, Frazier Ditch, and Village Green Ditch (currently known as Village Green Creek).

In summary, the major alterations to the wetland by the prior property owner that remain to the current day include:

1. Ditch system that increases surface water runoff from site, leading to reduced floodwater storage and reduced soil saturation during growing season;
2. Approximately  $\frac{1}{4}$  mile earthen berm that spans the lower section of the main wetland prairie conservation area, significantly altering wetland hydrology;
3. 'Rut and furrow' system within the wetland prairie conservation area from past earthwork;
4. Increasing amount of highly invasive Reed Canary Grass due to limited disturbance and site impacts that threaten the native vegetation diversity of the wetland.

#### [Benton County Management](#)

In 1990, after major impacts to the site transpired, acquisition of the Jackson-Frazier Wetland property by Benton County occurred through foreclosure proceedings. Rezoning of the property to Open Space was completed by Benton County Development Department, to fulfill protection of the property as a 'Goal 5 Significant Resource' under the Benton County Comprehensive plan. Benton County Parks gained support of the Benton County Commissioners and Parks Advisory Board to develop a management plan as required as part of the Open Space zoning designation. In 1992, the Benton County Board of Commissioners established the Jackson-Frazier Wetland Advisory Task Force with the primary purpose of developing a management plan for the now designated Jackson-Frazier Wetland.

The 1992 management plan (updated in 2005) developed habitat management units (see Figure 14), using an 'integrated management option' with prioritized actions for implementing the management plan as follows:

- Public Use,
- Wetland Prairie,
- Upland, and
- Mixed Wetland Forest-Shrub.

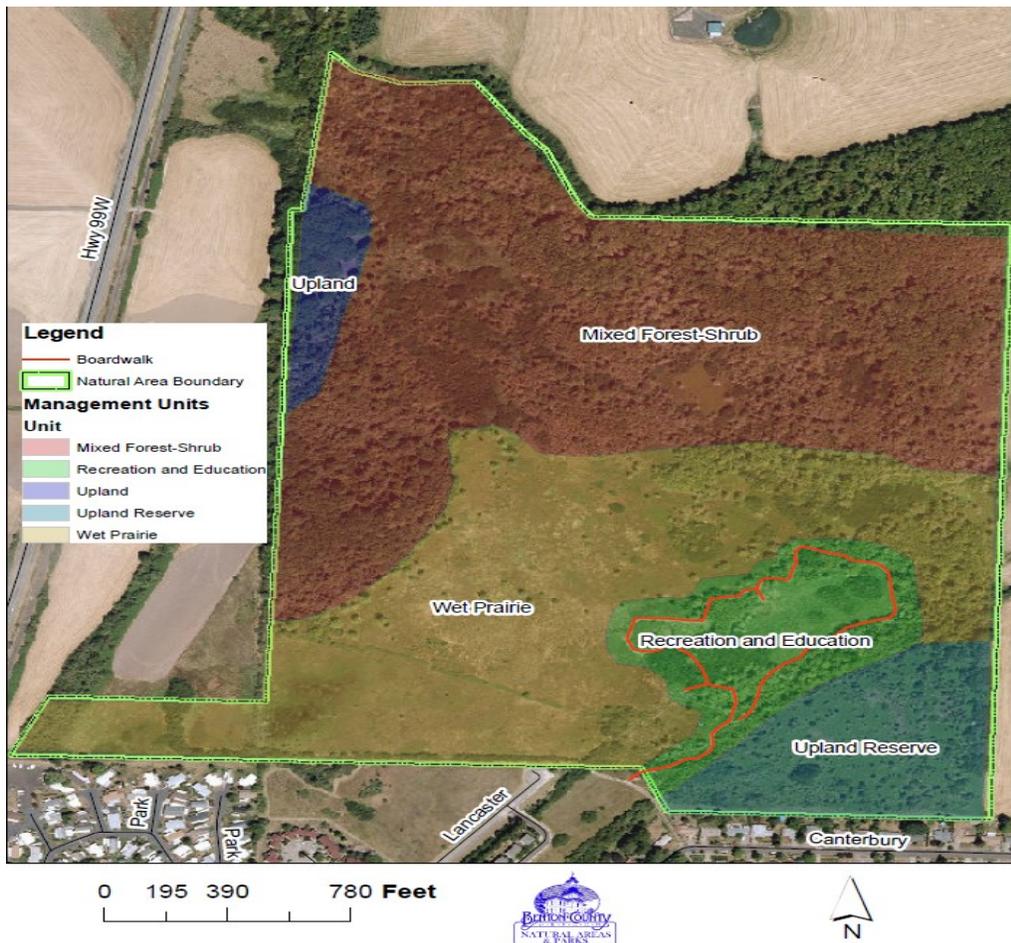
Criteria for priority work includes degree of public use, resource sensitivity, difficulty of implementing action, and probability of success (JF Management Plan, 2005 update). The major management policy goal of Restoration placed priority on: "Where technically and economically feasible, restore damaged or degraded wetland resources to an historically documented state prevailing at Euro-American settlement time using the least intrusive methods available and serving as a model project" (pg. 34, JF Management Plan 2005 update).

Many of the 1992 management plan recommendations have been implemented, including:

- Construction of boardwalk and interpretive/educational signage,
- Mowing and removal of shrub and trees from prairie habitat,
- Control of invasive species, and
- Controlled burning

In 2004 Benton County entered into an agreement with the U.S. Fish and Wildlife Service to participate in the Oregon Partners for Fish and Wildlife Program. This agreement covered a 10-year period with the purpose of restoring wetland resources in Jackson-Frazier Wetland (U.S. Fish and Wildlife Service, 2003). It is important to note that no landscape scale restoration work to address the major site alterations from the prior property owner, has occurred since adoption of the management plan.

**Figure 14.** Jackson-Frazier Wetland Management Plan- Habitat Management Units



### Habitat Conservation Plan

The Benton County Prairie Species Habitat Conservation Plan (HCP) was initiated to bring Benton County's activities on its own lands into compliance with the Federal and State Endangered Species Acts (HCP 2010, pg. i). The HCP was adopted in 2010, with implementation starting in 2011 for designated 'Prairie Conservation Areas'. A Conservation Measure under the HCP is the designation of over 500 acres of Prairie Conservation Areas: lands within the County to be managed specifically for prairie and covered species conservation, and where habitat restoration activities may occur (HCP 2010, pg. 35). During 2011 baseline data on vegetation (native, threatened/endangered, invasive) was collected. effectiveness monitoring to determine vegetation trends was completed in 2014 as required under the HCP. Several trends for rare vegetation were documented as part of the monitoring as shown in Figure 15. Woody species encroachment within Priority restoration area (Wetland Prairie Conservation Area) resulted in a 62% decrease in open wetland area. In addition, invasive Reed Canary Grass, primarily within the northern portion of the priority wetland restoration area has increased more than 30%.. The priority restoration area (see Long Term Restoration), wetland prairie management unit (JF Management Plan, 2005), and the Prairie Conservation Area overlap as a

priority area for implementing restoration actions. After grading work is completed, effectiveness monitoring (every 3 years) and additional required monitoring under the HCP will occur to provide long term data to evaluate trends of restoration work.

**Figure 15.** Habitat Conservation Plan Monitoring Trends for Jackson-Frazier Wetland (2010-2014) Threatened/Endangered Species (ESA listed)

Site	Kincaid's lupine (Leaf Area in m <sup>2</sup> )			Bradshaw's lomatium (No. of plants)			Nelson's checkermallow (No. of plants)		
	2011	2014	Change	2011	2014	Change	2011	2014	Change
Jackson-Frazier Wetland	1.1 m <sup>2</sup>	0.5 m <sup>2</sup>	-0.6 m <sup>2</sup> (-54.5%)	213	66	-147 (-69.0%)	224	212	-12 (-5.4%)

### Long Term Restoration

Phase 1 planning is focused on developing and implementing restoration work, which results in lasting restoration of priority wetland resources.

### Goals

The following goals are based on the Project Vision developed and approved by the Technical Team for the priority wetland in order of restoration priority:

1. Restore wetland hydrology through surface contouring, upland feature reduction, and increased soil saturation
2. Restore vegetation diversity through woody plant reduction, invasive weed control, and native vegetation seeding.
3. Increase environmental education and outreach opportunities through habitat restoration demonstration areas, educational signage, and volunteer group stewardship work.

### Restoration Plan Objectives

The following are proposed restoration concepts developed by the project leads with review and input provided by the technical team. Project leads spent several months reviewing historical information, completing field visits, and discussing ideas for long term wetland restoration with the technical team and other regional wetland professionals. Concepts are categorized under hydrology, vegetation, and environmental education and outreach as follows:

#### **Hydrology:**

- 1) Remove previously constructed berm from restoration area (Figure 15).

- a) Berm is currently effecting flow patterns across the site and should be completely removed.
- b) Depending on disposal location, killing existing vegetation would be advantageous prior to removal.
- c) Once removed to match adjacent topography, disking will help break up compaction.
- 2) Grade areas of previous disturbance to eliminate rut/furrow system and disable surface ditching (Figure 15).
  - a) Rutting created from berm construction and surface ditching as documented in DSL violation report has altered the hydroperiod and created difficult conditions for management actions such as mowing.
  - b) Disking these areas will restore the natural hydrology, decrease woody species encroachment, and create a seed bed to increase diversity with additional planting. If disking is deemed prohibitive due to cost or risk of vegetation diversity impacts, it may be feasible to selectively fill the rut areas with berm soil.
  - c) Finished contours with subtle undulations will create varying hydrology to support greater species diversity, and aid with long term management.
- 3) Create depressional wetlands, focusing efforts in Reed canary grass dominated areas (Figure 15).
  - a) Creation of several depressional wetlands with maximum depths of 10"-18" would increase habitat complexity with an extended hydroperiod for amphibian/waterbird production, and diversify vegetation from adjacent hydrologic regimes.
  - b) Removing material and placing it in nearby upland areas could increase flood storage and delay functions.
  - c) Redistributing material within the restoration area to create hydrology ranging from inundation to increased surface saturation during the early growing season could increase vegetative diversity with greater pollinator support.

**Vegetation:**

- 1) Eliminate reed canary grass and other non-native invasive species.
  - a) Control of established, perennial non-native invasive species such as reed canary grass should be initiated the year prior to any grading work.
  - b) Challenges include: controlling vegetation height in late spring to allow adequate re-growth for late summer treatment, as well as herbicide application with sufficient spray volume and minimal tracking of vegetation.
  - c) Flash grazing with sheep could be utilized in late spring for controlling vegetation height, which could also be incorporated into the long-term management plan if applicable however it is likely cost prohibitive and deemed incompatible with public use.
  - d) Utilizing low ground pressure skid steer mowers is also a viable option. Mowing would need to be accomplished such to effectively chop up and distribute organic matter.
- 2) Decrease woody vegetation.

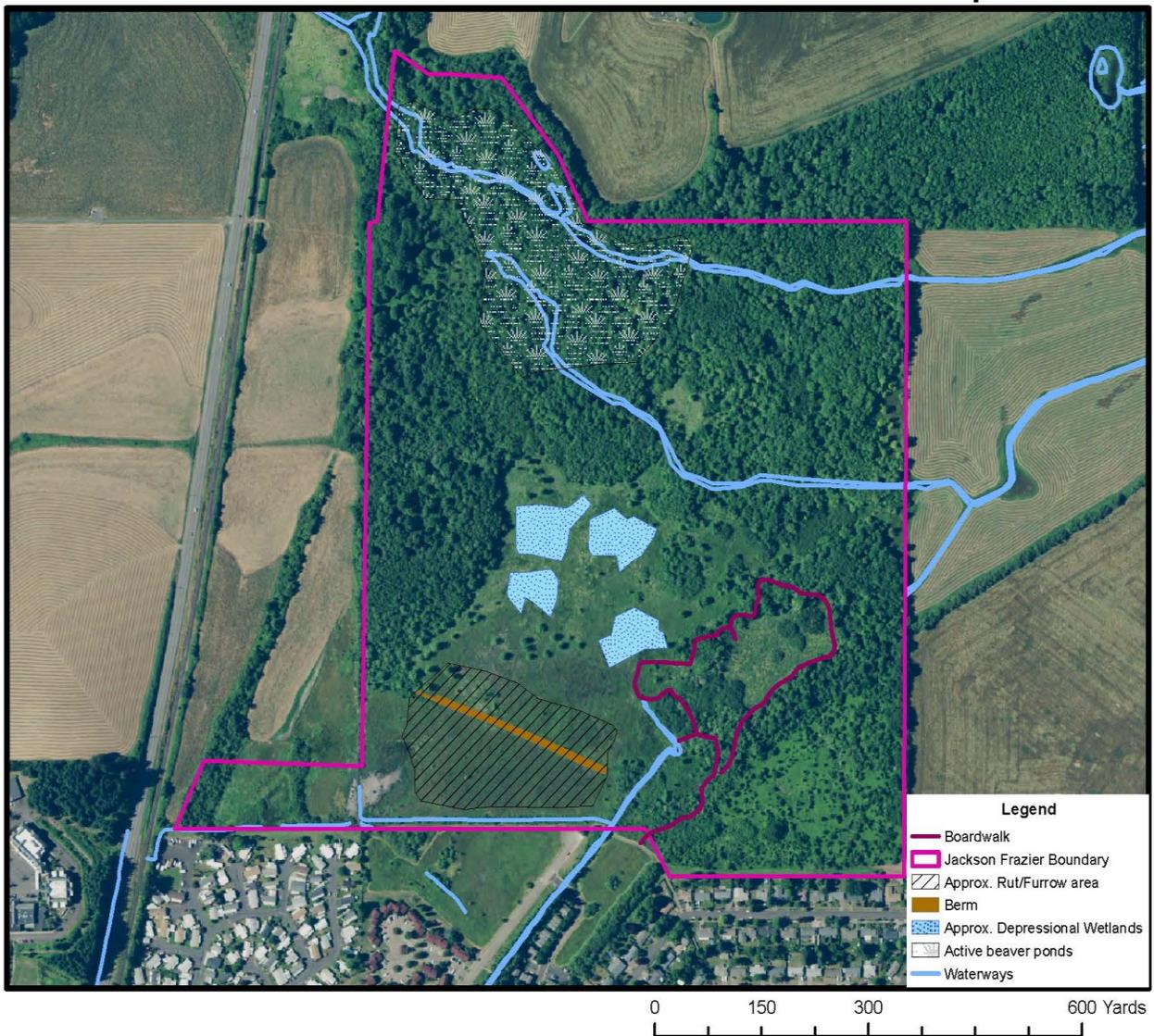
- a) Woody vegetation has continued to encroach into the restoration area since active management/ disturbance regime ceased, with a slight set back in ~2004 from mowing.
  - b) Trees over 4" DBH will need to be removed by hand, excavator, or sheering and can be utilized to increase habitat complexity in areas without active management in the near term.
  - c) If its deemed advantageous to retain some larger trees, at least the obviously female Ash trees should be removed to limit seed dispersal.
  - d) Smaller trees and shrubs can be selectively treated in the fall the year prior to full scale restoration work. As with red canary grass, early implementation will be key for successful control and vegetation height will need to be manage to allow sufficient regrowth for herbicide application.
- 3) Increase diversity.
- a) Once above mentioned work is completed pending team consensus, diversity can be incorporated with native seed and a modified version of no-till planting.
  - b) Early plant lists can be utilized to document what species were present and cross referenced the species that our commercially available. Native species that are currently abundant should be omitted from future planting, except in any excavated areas.
  - c) The key to long term restoration and sustainability will be adequate funding for a minimum of 2 growing seasons following planting for spot control work to allow natives to fully establish (ideally 3-4 growing seasons).
  - d) Also, some level of long term funding will be necessary to keep noxious weeds and woody vegetation at tolerable levels.

### **Environmental Education & Outreach**

- 1) Construct at least one depressional wetland within proximity to boardwalk.
  - a) The potential location is illustrated on the attached map, and will greatly increase viewing opportunities with additional habitat diversity.
- 2) Increase plant diversity along boardwalk.
  - a) Currently the woody component along the boardwalk is dominated by native species, but the herbaceous layer is mostly reed canary grass.
  - b) With limited equipment access, canary grass control will be more challenging and likely take an additional growing season to control over the general restoration area.
  - c) Once noxious weeds are under control, additional diversity can be incorporated with plugs in close proximity to the boardwalk and seed in the larger open areas with similar species composition to the restoration area.
  - d) This could be an excellent opportunity for local volunteer groups to plant and manage, with professional crews utilized to control persistent species such as reed canary grass which cannot be effectively hand pulled.
- 3) Control woody vegetation in strategic locations to demonstrate various wetland communities.

- a) Currently there are several representative areas of forested wetland and scrub/shrub wetland along the boardwalk.
- b) With the addition of native wet prairie and emergent marsh components mentioned above, this area could have excellent educational value, illustrating the dominant Willamette Valley wetland types and species composition.
- c) Some level of management will need to address woody growth close to the boardwalk and to allow viewing of other areas.

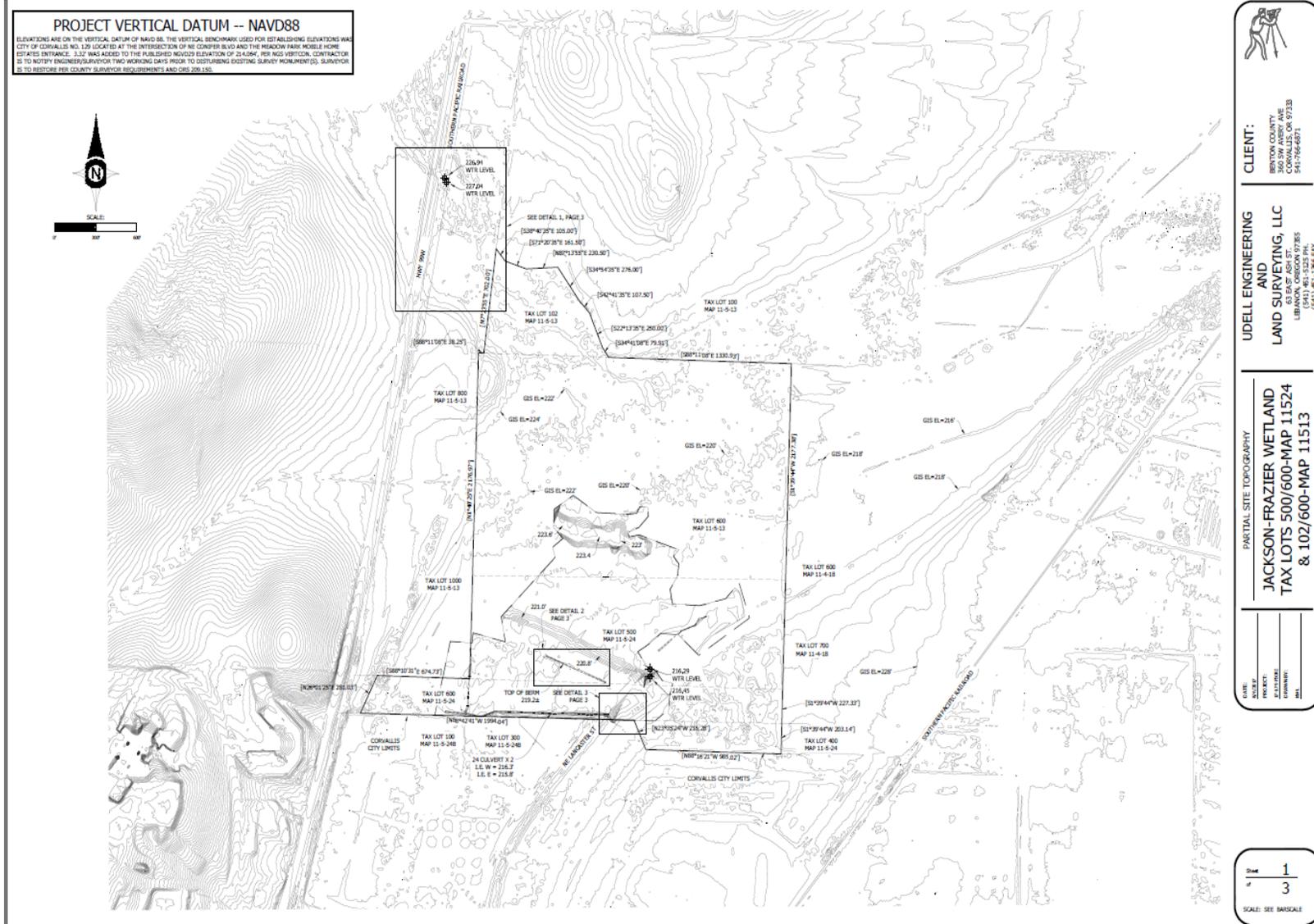
## Jackson Frazier Enhancement Concepts



## Topographic Site Analysis

During July 2017, a topographic survey of Jackson-Frazier wetland to inform current and future management within the priority restoration area was completed. The detailed topographic survey provides 6 inch contour lines in restoration work areas, to help inform grading specifications for habitat restoration. In conjunction with engineered project design drawings it also provides assurance that implementation of restoration objectives will not adversely impact the resource or adjacent landowners. In addition, the analysis supports other identified goals such as the City of Corvallis Stormwater Master Plan (2007, Chapter 8) goal to develop flow monitoring information to accurately model the response of the wetland and discharging streams during storm events.

Figure X. Topographic Site Analysis Map





## Permitting Evaluation

Implementation of proposed restoration objectives will trigger several County, State, and Federal permitting requirements that fall within the following permitting categories:

- 1) Endangered Species Act: Bradshaw's Lomatium (*Lomatium bradshawii*) listed as federally endangered, and Nelson's Checker-Mallow (*Sidalcea nelsoniana*) listed as federally threatened exist within the proposed restoration work areas. Prior to construction work occurring, approval from US Fish & Wildlife Service (USFWS) for temporary/potential impacts to the species and post-work restoration are required to be addressed. There are opportunities to partner with USFWS Partners Program staff to evaluate and resolve any regulatory issues, and utilizing the existing Benton County Prairie Species Habitat Conservation Plan and authorized Incidental Take Permit. Currently, Benton County and USFWS have a 'Partners Agreement' (Oregon Partners for Fish & Wildlife Program) that is in force until 2023 and includes partnership support to complete the proposed restoration activities. In addition, compliance with any Endangered Species Act rules are likely to be achieved through the partners agreement (see
- 2) Floodplain Development Permit: Development in the floodplain – even if the work does not require a regular building permit or land use approval, will require a Benton County permit. The permit will need to be obtained from Benton County Community Development, contingent upon the approval that the proposed work will result in no net rise of floodwater during flood events. Documentation may require that Base Flood Elevation be developed in the location of the proposed activities, however topographic analysis will provide adequate information given that only excavation of material will occur.
- 3) Wetland Ecosystem Restoration Permit: Oregon Department of State Lands provides for a General Authorization for Wetland Ecosystem Restoration (OAR 141-089-0800 through 141-089-0815), which significantly reduces the permitting process. Documentation that the project will meet restoration criteria with clearly documented construction methods, that demonstrate how the proposed project will repair or return natural or historic functions.

Phase 2 Timeline

<b>Jackson Frazier Restoration Tasks Phase 2- General Timeline</b>			
Year 1 (2018)			
<b>Activity</b>	<b>Est. Date of Completion</b>	<b>Notes</b>	<b>Proposed Funding Sources</b>
Monitor plant community and hydrology	March-July	Spring hydrology for future planting plan, native species inventory, and to identify the most problematic non-native species	Benton County/OWEB/USFWS Partners Program
Mowing	July-August	Selectively mow woody species, and Reed canary grass targeted for treatment. Mow fairly tall to reduce overall height, but allow significant regrowth for treatment.	
Site Preparation	August-September	Reed canary Grass treatment, Broadcast approved broad-spectrum Herbicide in dense stands, spot treat isolated patches, and inaccessible areas for broadcast treatment.	
Site Preparation	August-September	Woody vegetation treatment, Broadcast approved broadleaf specific Herbicide, spot treat inaccessible areas	
Year 2 (2019)			
<b>Activity</b>	<b>Est. Date of Completion</b>	<b>Notes</b>	<b>Proposed Funding Sources</b>
Monitor seed bank response and hydrology	March-July	Early spring hydrology assessment to develop future planting plan, seed bank response and treatment effectiveness.	Benton County/OWEB/USFWS Partners Program/NAWCA
Site Preparation	June-July	Broadcast approved broad-spectrum Herbicide	
Mowing	July-August	Likely the majority of the site to reduce biomass, especially in grading areas. Allow 2 weeks after herbicide treatment.	
Tree removal	July-August	Removal of selected trees too large to mow, cut flush with ground surface, stump treatment would be advantageous to prevent re-growth	
Grading	July-September	Complete all grading/ground disturbance including berm removal, as soon as conditions allow	
Site Preparation	September	Broadcast approved broad-spectrum Herbicide, this is just a place holder and not likely needed, but could be advantageous if we get significant early rainfall followed by a long dry period.	
Custom no-till seeding	October	We will ideally plant after 2"-3" of rain to get a final response from the non-native seed Bank	
Broadcast approved broad-spectrum Herbicide	6-10 days after seeding	This is one of the most important treatments, timing will depend on seed mix and germination conditions	
Monitor native seed germination	October-December	Early surveillance is essential for diagnosing environmental and biological issues	

Phase 2 Timeline- continued

Year 3 (2020)			
Activity	Est. Date of Completion	Notes	Proposed Funding Sources
Monitor native plant establishment	February-October	Ensure native plants are establishing well, evaluate non-native species for treatment	Benton County/OWEB/USFWS Partners Program/NAWCA
Spot Spray	May-September	Target non-native species competing with native seedling recruitment, very important while native species are establishing. Ideally budget to cover the site 3-4 times throughout the growing season. applications starting early as possible to avoid non-target vegetation	
Broadcast approved selective Herbicides	May-September	This will ultimately be determined by planting mixes, problematic species, and density of non-natives. There is both grass and broadleaf specific options where non-native cover exceeds 25% (i.e. not effectively spot sprayed)	
Site Preparation	May-September	Treat bordering areas missed by broadcast treatment for non-native species, can be combined with spot spray work.	
Broadcast Native seed Mix	September-October	This would target the open areas within the boardwalk area with heavy canary grass, following year 2 treatment. Can also be used in areas of poor establishment, or heavy weed control in main prairie.	
Year 4 (2021)			
Activity	Est. Date of Completion	Notes	Proposed Funding Sources
Monitor native plant establishment	February-October	ensure native plants are establishing well, evaluate non-native species for treatment	Benton County/OWEB/USFWS Partners Program/NAWCA
Plug Planting	February-April	This would be targeted within the boardwalk area and potentially a volunteer project. Timing will be based on site conditions, but will need completed while we are still receiving significant rainfall	
Spot Spray	May-September	Target non-native species that threaten long term sustainability; important while native species are fully establishing. Ideally budget to cover the site 3 times throughout the growing season with applications starting early as possible to avoid non-target vegetation damage.	
Broadcast approved selective Herbicides	May-September	This will ultimately be determined by planting mixes, problematic species, and density of non-natives. There is both grass and broadleaf specific options where non-native cover exceeds 25% (i.e. not effectively spot sprayed)	
Boardwalk weed control	May-October	This could be a volunteer activity with hand work around the plug plantings, or spot spraying depending on level of intrerst. Reed canary grass should be spot treated for best control.	
Mowing	August-September	Not likely needed, but may want access trails, or to stimulate grass growth n some areas	

Phase 2 Timeline- continued

Year 5, Long term Maintenance (2022 and beyond)			Proposed Funding Sources
Activity	Est. Date of Completion	Notes	
Monitor non-native invasives	May-September	Evaluate non-native species and woody encroachment for treatment by site manager	Benton County/OWEB/USFWS Partners Program/NAWCA
Boardwalk weed control	May-October	This could be a volunteer activity with hand work around the plug plantings, or spot spraying depending on level of intrerst. Reed canary grass and Black berries should be spot treated for best control.	
Spot Spray	June-July	Target non-native species that threaten long term sustainability, just one-time through the site targeting areas identified by site manager	
Boardwalk weed control	May-October	This could be a volunteer activity with hand work around the plug plantings, or spot spraying depending on level of intrerst. Reed canary grass should be spot treated for best control.	
Broadcast approved selective Herbicides	July-October	Not likely needed, but something to keep in the management toolbox.	
Mowing	August-September	Not likely needed, but may want access trails, encourage shorebird utilization, target areas of woody encroachment, or various other management options.	



## Long term Management

Vegetation management will be the primary on-going task at the site after initial project implementation. Native vegetation should be dominant at the site. Invasive species presence and levels should not threaten conservation values. Any Oregon Department of Agriculture listed Noxious Weeds should be controlled.

Controlling encroachment by non -native invasive species can be done in a variety of ways including physical control such as hand pulling and mowing. Chemical control will include primarily spot herbicide application by hand. In the event of a major invasive weed take over, broadcast spraying of individual areas could be used. Another method for the enhancement of native plant communities and control of invasive species that may be considered is prescribed fire. Any use of fire would comply with the current air quality and land use regulations or restrictions. Native/non-native trees and shrubs may need to be controlled to maintain open prairie.

The preferred method of control will be through physical means. However, in the event that control through physical means is not meeting long-term objectives, prescribed fire and herbicides would be the next considered control options.

Each year during the annual review by project staff, an evaluation of the effectiveness of any methods or techniques used that year should be made along with a determination to see if there are new species or problems that require special attention. At that time a review of the literature and new techniques or herbicides should be done, to determine the best approach for the following year.

Ultimately, an adaptive management strategy will be used. Such a strategy reassesses priorities for management on a yearly basis, using the following steps;

- Re-order target species based on the likely effects to both target and non-target species.
- Implement the plans and monitor the results of control actions.
- Evaluate the effectiveness of the methods in light of overall site goals, and use this information to modify and improve control methods.

**Appendix A.** Project Approval Presentation

Jackson-Frazier Wetland  
Phase 1: Long Term Habitat  
Enhancement  
Overview



## Legacy Habitat Impacts

Jackson-Frazier Wetland contains several landscape features that severely limit the habitat quality across the majority of the park. These major issues for long term habitat quality from prior owners include:

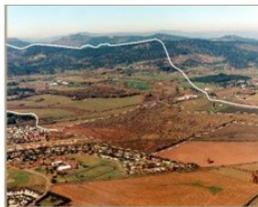
- Ditch system that increases surface water runoff velocity from site, leading to reduced floodwater storage and reduced soil saturation during growing season;
- Approximately ¼ mile berm that spans the entire lower section of the main wetland prairie;
- Trenching across the majority of the open wetland area;

1986 Historic Impacts that continue to be an issue in the park



## Future Issues, Project Need

- Good-Samaritan/City Development in upper watershed
- Floodwater storage
- Invasive species control
- Education



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