



Dianna Pope Natural Area

Site Conservation Plan

2017 – 2022

Version 3.0

East Multnomah
Soil and Water Conservation District

3/18/19



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Cover Photo: North Fork of Johnson Creek in the Dianna Pope Natural Area, Chelsea White-Brainard, EMSWCD

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Foreword

On November 18, 2014, the Dianna Pope Natural Area (DPNA) was designated in recognition of Dianna Pope’s 32 years of service on the East Multnomah Soil and Water Conservation District (EMSWCD) Board. A formal ribbon cutting and dedication ceremony was held as a part of EMSWCD’s Annual Meeting on September 27, 2015. A plaque and benches were installed and a western hemlock tree was planted by Dianna Pope in a commemorative area.



Dianna Pope

Dianna Pope began her service on the EMSWCD’s Board as an Associate Director in 1982. Elected as a full Director in 1984, Dianna was re-elected every four years through 2010. After 32 years of service to EMSWCD, Dianna stepped down in December 2014 from her Board Director Position. Residing in Corbett, Oregon, Dianna represented residents of the EMSWCD’s Zone 3, which comprises all of Multnomah County lying east of the Sandy River. During her 32-year tenure at the EMSWCD, Dianna served as Board Chair, Treasurer, and Secretary as well as on numerous EMSWCD committees.

Dianna’s service with EMSWCD began long before EMSWCD had a tax base, so in the early years she, along with other Board Directors and Associate Directors, took on most of the day-to-day work of EMSWCD. Her time with EMSWCD focused on working with local people to achieve consensus on natural resource issues, ensuring that all viewpoints were considered. Dianna served as a consummate “bridge” between citizens whose economic welfare depended on natural resources and those citizens whose interests were principally environmental protection. Dianna’s leadership at EMSWCD supported and helped realize many monumental achievements, including the establishment of three local watershed councils, urban conservation programming (such as a very popular Rain Garden Program), and EMSWCD’s tax base. Dianna helped foster EMSWCD through a dramatic evolution after the tax base was established.



Dianna Pope Commemorative Plaque

In 2019, EMSWCD’s 20 full time staff work out of a restored, historic home in north Portland and have an annual operating and capital budget of approximately \$14 million. Dianna’s recent work has helped expand efforts to raise awareness of and reduce water pollution in urban and rural areas.



Dianna Pope (center) planting a Western Hemlock tree at the Dianna Pope Natural Area ribbon cutting ceremony in September 2015.



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Executive Summary

This is the third version of the Dianna Pope Natural Area Site Conservation Plan, an update to the original plan approved by the East Multnomah Soil and Water Conservation District (EMSWCD) Board of Directors on August 7, 2017. In 2012, EMSWCD purchased approximately 58 acres of property along Orient Drive east of Gresham, Oregon. Approximately 43.5 acres of the property were used to establish EMSWCD's Headwaters Farm and the Headwaters Incubator Program. On the remainder of the property, which includes approximately 14.5 acres along 0.41 miles on both sides of the North Fork of Johnson Creek, vegetation restoration was initiated to restore the area to a more natural condition. These 14.5 acres eventually became the Dianna Pope Natural Area (DPNA).

Before purchase by EMSWCD, most of the land within and surrounding the DPNA had been in nursery production for over four decades. A thin band of sparse trees, many ornamental, surrounded the creek and farming operations occurred within an average of 20 feet from the creek. Weeds, grasses, dumped materials, and nursery operations filled the gaps between the trees in this riparian band. The riparian area in the western part of the property was the most intact with large trees and native shrubs to an average width of 100 feet on each side of the creek.

After EMSWCD purchased the property, but prior to the site formally being established as the DPNA (2012 - 2014), the riparian area was enrolled in EMSWCD's StreamCare Program. The goal of the StreamCare Program is to establish more native, riparian vegetation along streams that are water quality limited according to the Oregon Department of Environmental Quality's 303(d) list, which serves to meet the requirements of the U.S. Environmental Protection Agency's Clean Water Act. Riparian vegetation provides increased shade, thereby preventing solar heating of the stream.

In the summer and fall of 2012, site preparation was completed on all but a little less than one-acre on the east side of the site, which was still in nursery stock at the time. Initial planting occurred in the prepared area in the winter of 2012/2013. A small amount of replanting occurred throughout this area in the years since, but the main management action has been regular maintenance, primarily consisting of weed treatments to reduce competition with installed plants. The section on the east side of the DPNA that was not planted in conjunction with the original planting was planted in February 2016. Additional planting around removed or replaced stream crossings, decommissioned roads, and where a buildings were removed, was conducted in February 2017. As of 2019, the entire DPNA, besides existing roads and directly around the Headwaters Farm office, have been planted.

Currently, the DPNA exhibits varying levels of riparian vegetation and condition. A combination of mature forest and trees, a young hardwood forest block that has grown naturally since restoration began, and extensive young plantings installed into areas dominated by non-native grasses and forbs can be found throughout the DPNA. Mature forest types are both mixed coniferous/deciduous riparian forest and bands of scrub-shrub wetland forest (mostly willow) adjacent to the creek banks. The majority of the trees installed in the original planting are currently around ten to 20 feet in height with a diameter breast height (DBH) of around two to four inches with installed willows reaching 20 to 25 feet in height with a DBH of two to four inches. A total of 110 plant species have been observed within the DPNA (62 native species). A formal plant inventory has been conducted excluding the identification of many of the grasses and a few of the ornamental trees found in the DPNA. New species observed will be added to this plan at each annual updating. No threatened or endangered plant species are known to, or likely, occur in the DPNA.



The primary goal for the DPNA is to establish and enhance a mixed coniferous/deciduous riparian forest community. Long term, desired future conditions include a diverse mix of native trees and shrubs, a rich, native, herbaceous layer, five to fifteen snags per acre, plentiful large, downed wood, and continuous canopy cover with little to no gaps. These complex features found in a mature riparian forest community take centuries to be realized, but current species and densities planted in the DPNA appear to be adequate to reach these desired future conditions.

Barring major disturbance, management actions moving forward will consist of infill planting as needed plus weed treatments in an effort to allow the installed trees and shrubs to become *free to grow*. *Free to grow* means that the installed plants have reached a height where they will no longer be outcompeted by undesired plants. However, because the DPNA is owned by EMSWCD, functions as a demonstration site for riparian vegetation restoration, and is adjacent to Headwaters Farm, weed control is planned to continue beyond the *free to grow* stage for parts of the DPNA for both aesthetic purposes and to prevent weed introduction into farm fields. Replanting will occur as needed in response to disturbance and/or changing site conditions.

As of January 2019, a total of 79 birds, mammals, amphibians, fish, and reptiles had been observed in the DPNA (75 native species). Two years of monthly wildlife surveys have been completed and monthly wildlife surveys will continue. A report of the findings and recommendations from the first two years of surveys can be found as an appendix to this plan. Newly observed species will be added to this plan at each annual updating.

As the DPNA is nested within Headwaters Farm, many constructed elements such as roads, stream crossings, and a structure occur within the DPNA. Much of this infrastructure is managed by the Headwaters Farm Program Manager. No additional farm infrastructure is expected to be installed within the DPNA. In addition, opportunities to reduce the impact of, or remove, the Headwaters Farm office and septic system will be pursued whenever possible.

Although the DPNA is not closed to public use, as of January 2019 it is not being managed to encourage use by humans or pets, except for the Dianna Pope Commemorative Area and at the interpretive sign. Other than the commemorative area, public viewing of the DPNA from roads and boundaries is the suggested method for interacting with the DPNA.

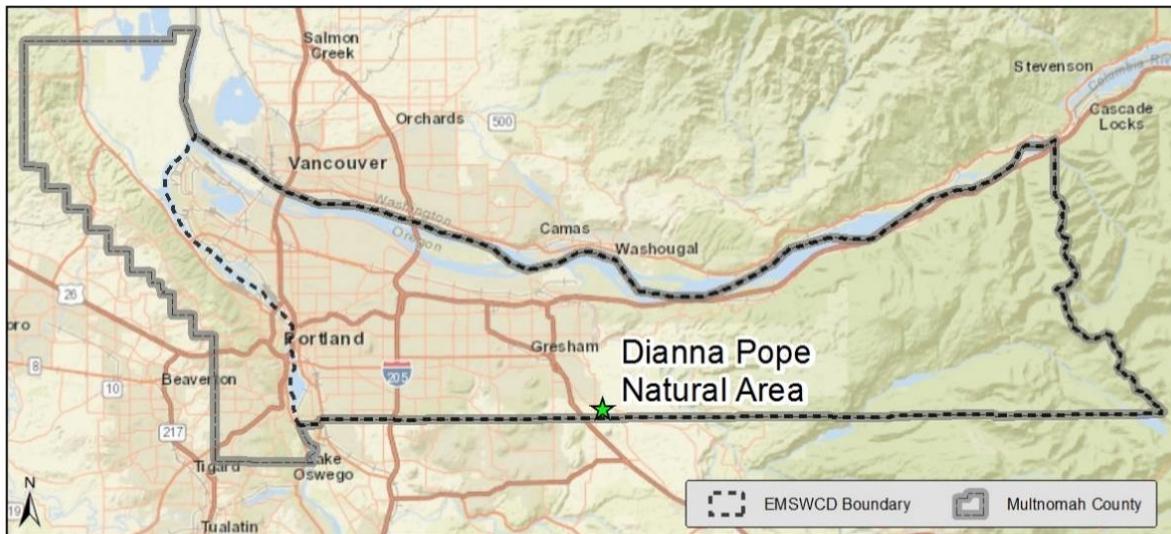
A cursory review and update of this plan will be conducted in January of each year to account for an improved understanding of the DPNA and to keep the plan current. A comprehensive review and update will be completed every five years by the end of June which coincides with the end of EMSWCD's fiscal year (July through June of each year). EMSWCD will budget and plan for on-site management of the DPNA on a fiscal year basis. Budgetary planning will take place in February through March while annual work planning will take place in May through June. Reporting of accomplishments will occur on a quarterly basis in October, January, April, and at the end of the fiscal year, after June.



1.0 Introduction

This is the third version of the Dianna Pope Natural Area (DPNA) Site Conservation Plan, an update to the original plan approved by the East Multnomah Soil and Water Conservation District (EMSWCD) Board of Directors on August 7, 2017. In 2012, EMSWCD purchased approximately 58 acres of property along Orient Drive east of Gresham, Oregon. Approximately 43.5 acres of the property were used to establish EMSWCD's Headwaters Farm and the Headwaters Incubator Program¹. On the remainder of the property, which includes approximately 14.5 acres along 0.41 miles on both sides of the North Fork of Johnson Creek, vegetation restoration was begun to restore the area to a more natural condition. These 14.5 acres eventually became the DPNA (see Figure 1). An approximately 0.15 acre riparian easement was granted to EMSWCD by an adjacent landowner coincident with EMSWCD's purchase of the property (see Section 7.7). While not technically within the DPNA, the easement lands are managed in conjunction with the lands owned outright by EMSWCD and are included in this plan.

Figure 1: Dianna Pope Natural Area Location



Protection and management of the DPNA directly supports EMSWCD strategic and programmatic goals. The creation and maintenance of the DPNA supports two of the five 2012-2017 broad strategic goals:

- Protect and improve water quality and quantity; and
- Protect and improve natural habitats.

The management of the DPNA also supports Goal 2 of the Rural Water Quality Program:

- Achieve a 25% improvement in water quality in upper Johnson Creek.

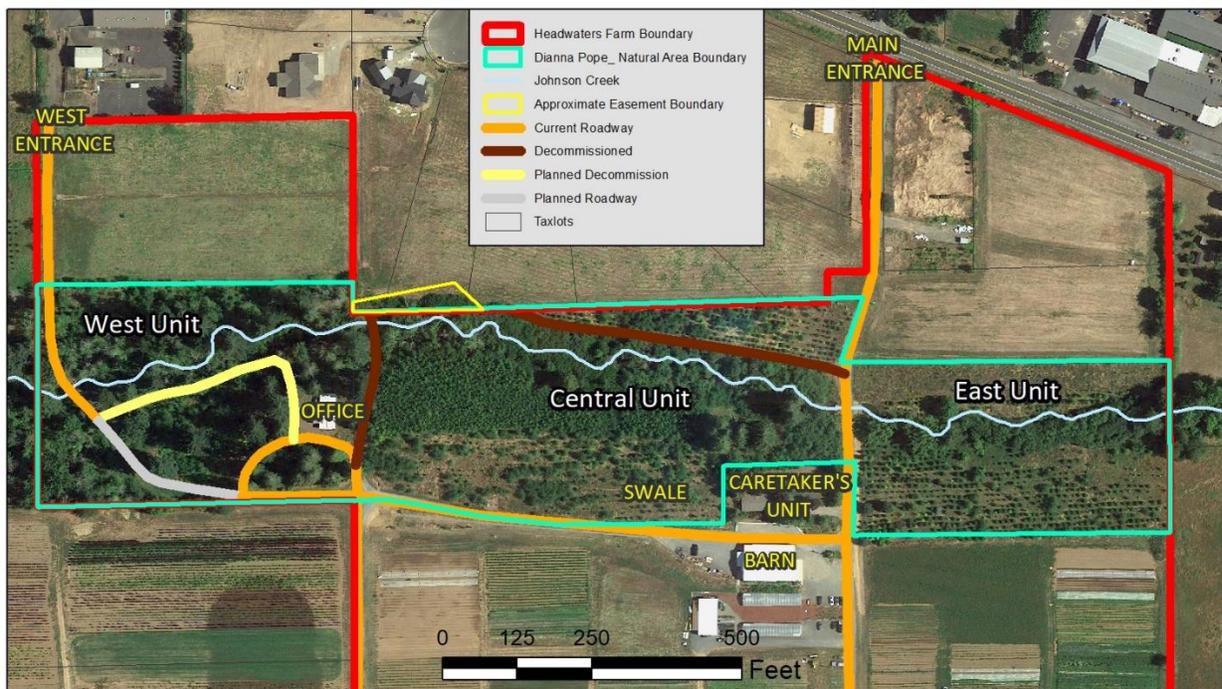
¹ To learn more about the Headwaters Incubator Program visit: <http://emswcd.org/farm-incubator/>.



2.0 Management Authority and Responsibility

The authority to buy, own, and manage land for conservation purposes is granted to EMSWCD under Oregon Revised Statutes 271.005 to 271.540, Use of Public Lands; Easements Public Lands General Provisions. Most actions in the DPNA will be carried out or overseen by the DPNA Manager, who will be a staff member from EMSWCD. All actions occurring in the DPNA that are not directly carried out or overseen by the DPNA Manager must approved by the DPNA Manager. As the DPNA is nested within Headwaters Farm, the many constructed elements, such as roads and structures, that occur may be managed directly by other EMSWCD staff. A complete list of the management actions identified in this plan is given in Appendix 1. For management purposes, the DPNA is divided into three administrative units; west, central, and east, separated by the decommissioned middle access road and the main entrance road (see Figure 2).

Figure 2: Map of Dianna Pope Natural Area



3.0 Soils

According to the United States Department of Agriculture's National Resource Conservation Service's (NRCS's) National Cooperative Soil Survey, 72% of the underlying soils within the DPNA are mapped as Wollent silt loam and 28% are mapped as Powell silt loam, 3 to 8 percent slopes². Wollent silt loam is classified by NRCS as a hydric soil but not highly erodible. Powell silt loam is not a hydric soil but is classified as highly erodible land. Powell silt loam is known to have a shallow fragipan soil horizon. A fragipan is a subsurface soil layer that restricts water flow. Poor drainage in areas with a fragipan soil horizon could have implications for vegetation types, stormwater management, and drainage within the DPNA.

² Available online at: <http://websoilsurvey.sc.egov.usda.gov/>, accessed 3/7/2017.



4.0 North Fork of Johnson Creek

The North Fork of Johnson Creek runs west through the middle of the DPNA for 0.41 miles (see Figure 2). EMSWCD owns the bed of the creek while the water resource itself is managed in the public trust by the state. The North Fork of Johnson Creek, in its entirety, is approximately 6.5 miles long.

4.1 Creek Structure and Obstructions

A site visit report by an NRCS hydraulic engineer dated October 2, 2012³ spoke to the lack of channel complexity prior to restoration of the area: “Overall, the channel is lacking in complexity. This means it is generally uniform in shape, has little sinuosity, and lacks in desirable riparian vegetation. A review of aerial photos indicates the channel alignment has not been altered significantly over time. Blackberry and reed canary grass are present at multiple locations along the channel. Removal of invasive species and heavily planting the riparian area with native species will greatly improve overall channel condition”.

As of January 2019, the structure and complexity of the creek is especially dynamic as all stream crossings were removed, regraded, and retrofitted in summer 2016 and because of the arrival of beaver in September 2017. The North Fork of Johnson Creek, as it runs through the DPNA, is currently a combination of low gradient, single channel, meandering stream and a series of beaver ponds increasing in their coverage. The creek is incised for portions of its distance through the East and West Units, though not completely disconnected from its floodplain, except possibly in the lower West Unit. This incision is quickly lessening as beavers continue building new dams and raising the water level significantly, reconnecting the channel to its floodplain (see Figure 3). Channel braiding previously seen in the Central Unit created by live willows growing in the channel has mostly been transformed into a series of beaver ponds found throughout the entire unit (see Figure 4). It is likely that beaver dams will increase in the DPNA and the structure of the creek will continue to change.

³ Report on file at EMSWCD.



Figure 3: Previously Incised Stream Segment in East Unit Prior to Beaver Dams (left) and Current Stream Levels (right) with Beaver Presence



Figure 4: Pond Impounded Behind Beaver Dam in Central Unit





Both stream crossings within the DPNA are 100% passable by fish. Prior to September 2016 three stream crossings existed within the DPNA, all partial barriers to migrating fish. In September 2016, a project to retrofit stream crossings within the DPNA was undertaken to address these passage barriers at the crossings and make all crossings completely passable to fish. At this time, the culvert at the main entrance road (previously classified as 33% passable) was replaced with a larger culvert and the culvert at the west entrance road (previously classified as 66% passable) was replaced with a bridge. A culvert that conveyed the creek below a decommissioned road that roughly led from the easement to the office (previously classified as 66% passable) was completely removed.

The NRCS's Stream Visual Assessment Protocol (SVAP) Version 2 was completed within the DPNA by two NRCS staff in coordination with the DPNA Manger in December of 2018. According to NRCS, "SVAP is a national protocol carried out that provides an initial evaluation of the overall condition of wadeable streams, their riparian zones, and their instream habitats. SVAP is a preliminary qualitative assessment tool to evaluate features that affect overall stream conditions at the property level. The tool assesses visually apparent physical, chemical, and biological features within a specified reach of a stream corridor. A synthesis of information gathered during the preliminary assessment and field assessment portions of the protocol can be used to provide general guidance to landowners on how watershed features and practices they employ are reflected in the quality of their stream ecosystems."

The DPNA received an overall score of 7.8 out of 10 in the SVAP⁴ Recommendations for further actions included, "Overall the stream is in on an upward trend, helped along by the beaver activity in the Central unit. The East and West units are still incised and somewhat lacking in habitat complexity, but I would not recommend structural habitat actions. At the current time beaver activity is assisting in reconnecting the floodplain with the stream channel and improving habitat features. Continuation of invasive species management and monitoring riparian planting health in relation to beaver activities is likely to allow the stream health to continue on an upward trajectory." It was also noted that, "both the East & West units would score relatively lower if evaluated separately, and could benefit from improvements- however, allowing the recent beaver activity to continue is likely to address this into the future."

4.2 Water Quality

In 1998, the Oregon Department of Environmental Quality (DEQ) added Johnson Creek to the list of waterbodies on its 303(d) list. A waterbody that is water quality limited for certain parameters is placed on this list under section 303(d) of the federal Clean Water Act. Johnson Creek is listed as water quality limited for bacteria, summer temperature, and toxics (DDT and dieldrin). In 2002, DEQ added PCBs (polychlorinated biphenyls) and PAHs (polycyclic aromatic hydrocarbons) to the 303(d) for Johnson Creek. The listing includes the entire stream from the mouth to the headwaters.

According to the Johnson Creek Watershed Council's Johnson Creek Water Quality 2009 to 2014 report "High water temperature is a widespread problem within the watershed and may be the most significant limitation on aquatic communities." The riparian vegetation restoration being conducted within the DPNA is primarily aimed at shading the stream and lowering the temperature of the creek as it flows through the DPNA.

⁴ SVAP2 Element Scoring Matrix on file at EMSWCD.



4.3 Water Quality and Quantity Monitoring and Research

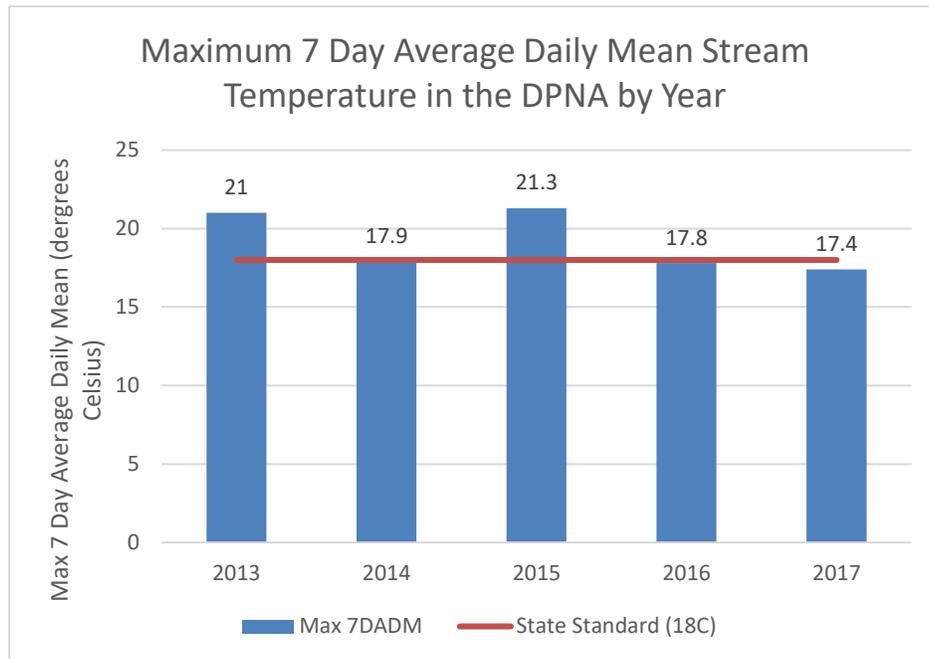
EMSWCD conducts monthly water quality monitoring within the rural areas of the Johnson Creek Watershed. One monthly monitoring and collection site is in the West Unit of the DPNA. Physical measurements collected include temperature, pH, conductivity, turbidity, and total dissolved solids. Samples are also collected and analyzed by a laboratory for E. coli, nitrate-nitrogen, total suspended solids, and total phosphorous. EMSWCD deploys a continuous water temperature data logger in the creek at this sampling location annually from April through October. The data collected is compiled with continuous temperature data collected throughout the entire watershed by EMSWCD partners. The five years of data collected have revealed that water temperatures within the DPNA are relatively low when compared with temperatures found throughout the watershed.

The temperature standard set forth by the Oregon Department of Environmental Quality for a stream identified as having salmon and trout rearing and migration is (not to exceed) 18 degrees Celsius (64.4 degrees Fahrenheit) measured as a seven-day average daily maximum (7DADM) temperature. The 7DADM temperature is a calculation of the average of the daily maximum temperatures from seven consecutive days made on a rolling basis. Although salmon or trout have not been found within the North Fork of Johnson Creek, the standard applies to the North Fork of Johnson Creek since both fish types are found in the main stem of Johnson Creek.

In 2013, the first year that summer temperature data was collected within the DPNA, the maximum 7DADM temperature recorded was 21 degrees Celsius (see Figure 5) and the temperature of the creek exceeded the temperature standard (18 degrees Celsius) on 28 days that year. Out of the 44 sites monitored throughout the watershed, this ranked as the 12th lowest for days of exceedance. In 2014, the maximum 7DADM temperature recorded was 17.9 degrees Celsius with zero days of exceedance. This was one of only six sites out of 39 monitored that year that did not exceed the standard. In 2015, a year with an extremely hot summer, the maximum 7DADM temperature recorded was 21.3 degrees Celsius with 48 days of exceedance, ranking sixth lowest out of 19 sites monitored for days of exceedance. Temperature data from summer 2016 and 2017 show zero days of exceedance with a maximum 7DADM of 17.8 degrees Celsius in 2016 and 17.4 in 2017. This was the only site in Johnson Creek of the 23 monitored that did not exceed the standard in 2017. Summer temperature data was not collected in 2018 due to improper setup of the data logger.



Figure 5: Graph of Maximum Seven Day Average Daily Mean Stream Temperature by Year



A United States Geological Survey (USGS) staff plate is located within the creek in the East Unit of the DPNA. The plate allows for on-site determination of stream depth and is recorded at the time of monthly EMSWCD conducted water quality sampling. The median stream depth recorded since installation in September 2013 through September 2017, when beaver arrived in the DPNA and raised the water height unpredictably, was 3.90 feet. The minimum height recorded in this period was 3.52 feet and the maximum reading was 4.90 feet. The median stream depth recorded to date since beaver arrived (October 2017 to December 2018) is 4.84 feet, with a minimum reading of 4.60 feet and a maximum reading of 5.52 feet. In periods of extreme rainfall, the creek has been observed at levels much higher than this although these observations did not fall on days of water quality sampling and the creek height was not recorded.

An instrument installed to record gage height, which was used to develop a stage-discharge relationship of streamflow in cubic feet per second (cfs) at fifteen-minute intervals, was installed at the location of the staff plate by USGS from October 2015 to November 2018. As of January 2019, preliminary data are available from October 2015 through September 2017 when beaver arrived in the area and began to affect the stage-discharge relationship. The median recorded streamflow from this period is 0.33 cfs, with a minimum reading of 0.01 cfs, and a maximum reading of 39 cfs.

Many of the higher streamflow data from this instrument, including this maximum value, are estimated due to uncertainty in the stage-discharge relationship above 20 cfs. As these data are preliminary, they are subject to change based on internal USGS review process. A new stage-discharge relationship would need to be developed before any data collected since beaver activity began can be reported or validated. This report will be updated with validated data as available. EMSWCD encourages approved scientific research within the DPNA related to riparian systems, water quality, and hydrology. Further instruments and/or equipment may be installed pending approval by the DPNA Manager.



5.0 Plant Communities

5.1 Initial Conditions

Historic vegetation maps based on interpretation of public land survey records of the federal government's General Land Office classify the entire DPNA as, "*Mesic mixed conifer forest with mostly deciduous understory. May include Douglas fir, western hemlock, red cedar, grand fir, big leaf maple, yew, dogwood, white oak, red alder.*" All of these species, with the exception of yew, have been planted in the DPNA.

Before purchase by EMSWCD, most of the land within and surrounding the DPNA had been in nursery production for over four decades. Within what is now the DPNA, a thin band of sparse trees, many ornamental, surrounded the creek and farming operations occurred within an average of 20 feet from the creek. Weeds, grasses, dumped materials, and nursery operations filled the gaps between the trees in this riparian band. The riparian area in the West Unit was the most intact with large trees and native shrubs to an average width of 100 feet on each side of the creek. Common trees found in the DPNA prior to plant installation by EMSWCD, excluding nursery stock, included Douglas fir, western red cedar, red alder, black cottonwood, pacific willow, and Sitka willow (a list of tree and shrub species observed in the DPNA can be found in Appendix 2).

Between 2012 and 2014, prior to formally being established as the DPNA, the area was enrolled in EMSWCD's StreamCare Program. The goal of the StreamCare Program is to establish more native, riparian vegetation along streams that are water quality limited according to the Oregon Department of Environmental Quality's 303(d) list, which serves to meet the requirements of the U.S. Environmental Protection Agency's Clean Water Act⁵. Riparian vegetation provides increased shade, thereby preventing solar heating of the stream.

In the summer and fall of 2012, site preparation of all but a little less than one acre in the East Unit that was still in nursery stock at the time was conducted (see Figures 6 and 7). Initial planting occurred in the prepared area in the winter of 2012/2013. A small amount of replanting has occurred throughout this area in the years since, but the main management action has been regular maintenance, primarily consisting of weed treatments to reduce competition with installed plants. The section in the East Unit that was not planted in conjunction with the original planting, was planted in February 2016. Planting around removed or replaced stream crossings, decommissioned roads (including in the easement), and where buildings were removed in the West Unit, was conducted in February 2017. As of 2019, the entire DPNA, besides existing roads and directly around the Headwaters Farm office, have been planted. The StreamCare project area was reduced slightly in size to 14.3 acres in the fall of 2014 to allow for construction of a farm road between the barn and the office.

⁵ To learn more about the StreamCare Program visit: <http://emswcd.org/on-your-land/streamcare/>.



Figure 6: 2012, Prior to Site Preparation for Planting



Figure 7: 2012, Following Site Preparation





5.2 Current Conditions

This section describes the conditions of plant communities within the DPNA as of January 2019. Each of the three units within the DPNA exhibit different levels of riparian vegetation and condition. A combination of mature forest and trees, a young hardwood forest block that has grown naturally since restoration began, and extensive young plantings installed into areas dominated by non-native grasses and forbs can be found throughout the DPNA (see Figures 8-11). Mature forest types are both mixed coniferous/deciduous riparian forest and bands of scrub-shrub wetland forest (mostly willow) adjacent to the creek banks. The majority of the trees installed in the original planting are currently around ten to 20 feet in height with a diameter breast height (DBH) of around two to four inches with installed willows reaching 20 to 25 feet in height with a DBH of two to four inches.

A total of 110 plant species have been observed within the DPNA (62 native species, a list of plant species observed can be found in Appendix 2). A formal plant inventory has been conducted with the exclusion of the identification of many of the grasses and a few of the ornamental trees found in the DPNA before restoration. New species observed will be added to Appendix 2 at each annual updating. No threatened or endangered plant species are known to, or likely, occur in the DPNA.

The vegetation in the West Unit is relatively intact. Excluding areas of prior human disturbance, mostly towards the upland portions on each side of the creek (i.e., current and prior roadways, yards, cleared areas, and mowed areas), this unit exhibits high ecosystem function and value. There are many mature, native trees such as Douglas fir, western red cedar, big leaf maple, and red alder that make up a nearly complete canopy cover to within approximately 100 feet of the creek on both sides (see background Figure 9). The understory in this forested area is comprised of a variety of native shrubs including salmonberry, elderberry, vine maple, beaked hazelnut, and red-osier dogwood. There are also some large areas dominated exclusively by dense shrubs in the southern part of this unit. The creek is well shaded in this unit with the exception of the areas that were disturbed when the stream crossings were retrofitted or removed. EMSWCD has controlled the small populations of invasive weeds that were previously dispersed throughout this unit and conducted infill plantings as well as plantings outside of the existing forested area. Dominant ground cover species in the forested area include trailing blackberry and fringecup. In areas lacking canopy cover and comprised of plantings installed by EMSWCD, native and non-native annual forbs and non-native grasses are the dominant ground cover in areas with well drained soils, while creeping buttercup is the dominant ground cover in areas with poor draining soils.

The vegetation in the Central Unit is in a much poorer condition, however, tree canopy is increasing rapidly. This is mainly due to an extremely dense stand of black cottonwood and red alder that has naturally grown on the south side of the creek in an area that was used for potted plant production before EMSWCD owned the property. A few, mature Douglas fir and western red cedar are found on the east end of this unit and dense vegetation, primarily willow, exists in a band along the creek ranging from 15 to 30 feet from each bank. The dense cottonwood, alder, and willow currently cover nearly forty percent of this unit with young but rapidly increasing canopy cover. The black cottonwood and red alder in this unit are reaching around 20 to 30 feet in height with an average DBH between two to five inches. Besides the areas where beavers have cleared the willows or the willows have been killed from flooding, the creek has become well shaded in this unit. EMSWCD has controlled invasive weeds in this unit and planted appropriate riparian species as needed. Plant communities installed include mixed coniferous/deciduous riparian forest, and scrub shrub wetland forest depending on soil, moisture, and light conditions. The ground cover is primarily composed of non-native grasses and forbs.



Figure 8: Photo of Dianna Pope Natural Area from Near the Eastern Boundary (2018)



Note lack of existing canopy cover in East Unit in foreground and increasing canopy cover moving towards the mature, coniferous trees in background denoting the West Unit.

Figure 9: Current Conditions in Central and West Unit (2018)



Central Unit in Foreground, West Unit in background, denoted by mature conifers.



Figure 10: Current Conditions in Central and West Unit (2018)



Central Unit in foreground denoted by young plantings, snags, and willows, West Unit in center back of photo, denoted by dense, mature conifers.

The vegetation in the East Unit is the most degraded. There are very few mature trees in this unit and nearly the entire unit is dominated by young plantings installed by EMSWCD. EMSWCD has controlled invasive weeds in this unit and planted appropriate riparian species throughout. Plant communities installed include mixed coniferous/deciduous riparian forest and scrub shrub wetland forest comprised predominately of dense willow planted between ten and 25 feet from the banks (see Figure 11). These willows are now preventing sunlight from reaching the creek along the entire unit with the exception of the area near the main entrance road that was disturbed when the culvert was replaced in 2016. The ground cover where the plantings have been installed is primarily composed of non-native grasses and forbs. A native ground cover mix was also installed to prevent erosion and further weed recruitment after large amounts of Canada thistle were controlled during the initial site preparation of this unit (see Appendix 2 for details). Compared to other units of the DPNA, this unit will make the greatest transition to mature riparian forest and represents the largest potential for increase in ecosystem function.



Figure 11: Current Conditions in East Unit (2018)



5.3 Desired Future Conditions

The primary goal for the DPNA is to establish and enhance a mixed coniferous/deciduous riparian forest community. Long term, desired future conditions include a diverse mix of native trees and shrubs, a rich, native, herbaceous layer, five to fifteen snags per acre, plentiful large, downed wood, and continuous canopy cover with little to no gaps. These complex features found in a mature riparian forest community take centuries to be realized, but current species and densities planted in the DPNA appear to be adequate to reach these desired future conditions.

5.4 Management Actions

5.4.1 Riparian Plant Establishment

Barring major disturbance, management actions moving forward will consist of as needed infill planting plus weed treatments in an effort to allow the installed trees and shrubs to become free to grow. *Free to grow* means that the installed plants have reached a height where they will no longer be outcompeted by undesired plants. Based on current experience from the StreamCare Program, this is achieved in as little as five years from initial site preparation, but can take longer depending on site conditions and wildlife present. Site preparation began in summer 2012 in most of what is now the DPNA and in these areas the trees and shrubs have reached free to grow status. If the DPNA were a typical StreamCare site, all but the approximately one acre area in the East Unit that was planted in 2016 would have been deemed free to grow and graduated from the program in summer 2017. Because the DPNA is owned by EMSWCD, functions as a demonstration site for riparian vegetation restoration, and is adjacent to Headwaters Farm, weed control is planned to continue beyond the free to grow stage in most of the DPNA for both aesthetic purposes and to prevent weed introduction into farm fields. Replanting will also occur as needed in response to disturbance and/or changing site conditions.



In 2017, management was ceased in two sections of two units where the trees were deemed free to grow in order to observe firsthand how sites mature when graduated from the StreamCare program. The two sections are the area north of the creek in the West Unit and the area south of the creek in the East Unit. The area in the West Unit was originally dominated by reed canary grass, has poorly drained soils, and has been planted with plants that can tolerate wet soils such as Oregon ash and Douglas spiraea. The area in the East Unit, outside of a band right along the creek, was originally dominated by blackberry, is well drained, and has been planted with species that can tolerate drier conditions such as Douglas fir and big leaf maple. Ceasing management in these two areas with differing soil conditions, hydrology, weed pressure, and installed plant communities should provide valuable insight into how StreamCare sites mature after graduation. Since ceasing management in these two sections some clumps of blackberry have begun to grow and a few have begun to climb trees and become large. However, it appears that the trees are free to grow and will continue outgrowing the blackberry. These areas will continue to be monitored.

Many non-invasive, ornamental trees that occurred along the riparian area when the property was purchased by EMSWCD remain. These trees will remain in order to shade the creek and prevent soil erosion. If these trees interfere in the establishment of native trees and shrubs, they may be killed. If they are killed, they will likely not be cut down but instead girdled and left as snags.

5.4.2 Thinning of Vegetation

Based on current understanding, as of January 2019, the trees in the DPNA will be allowed to self-thin. Observation of several areas of very dense conifers where branches will soon be overlapping spurred investigation into the needs for thinning in the DPNA and other EMSWCD StreamCare sites. EMSWCD consulted with forestry experts and tours focused on midterm management of densely stocked riparian plantings were attended. Based on information from these experts and tours, it is our understanding that given the climate of the DPNA, allowing the trees to self-thin should not cause forest health issues. However, in the densely stocked areas, taller and thinner trees will be produced with less or no understory during the decades long process of self-thinning. Thinning is also not planned for the extremely dense stand of cottonwood and alder that exists on the south side of the Central Unit, which is already beginning to self-thin.

Visual monitoring as well as periodic stand inventories will be conducted as needed to monitor forest health. Thinning of vegetation could be implemented in the DPNA if needed to support canopy diversity or forest stand and/or understory health. It is our understanding that Oregon Forest Plan rules do not apply to thinning of vegetation in non-commercial, riparian restoration projects. County rules governing thinning of vegetation near streams will be explored if thinning in the DPNA is deemed necessary.

5.4.3 Downed Wood and Snag Management

Downed wood and snags will increase as the area matures and both are integral parts of the desired future condition of the DPNA. Both features are used by wildlife for nesting and food resources. Downed wood will not be removed from the DPNA. The DPNA Manager will be consulted if downed wood from the DPNA is obstructing, impacting, or damaging roads, farm fields, or structures. Only those parts of downed wood extending beyond the DPNA will be removed, except as described below. Due to structures existing in and near the DPNA, diseased or dying trees that threaten structures may need to be removed if the risk to safety or property is deemed high. The DPNA Manager will be consulted when a tree is threatening a structure in or adjacent to the DPNA. Trees will be removed when deemed necessary.



5.4.4 Wetland Delineation

A wetland delineation has not been conducted within the DPNA. A basic wetland reconnaissance along the path of a planned roadway within the West Unit (see Figure 2) was conducted in Fiscal Year 2015-2016. Wetland Determination Data Forms were completed for two sampling points along the roadway and wetland conditions were found at one of the sampling points. The road was not installed at that time. A wetland delineation in the area of this roadway will be conducted when permitting for the construction of this road commences if required by permitting agencies. This is likely to occur in Fiscal Year 2018-2019.

5.4.5 Monitoring

Visual monitoring of plants and site conditions will be conducted quarterly. Actions, such as replanting or erosion control efforts, will be taken as needed.

6.0 Wildlife

As of January 2019, a total of 79 birds, mammals, amphibians, fish, and reptiles have been observed in the DPNA (75 native species, a list of species observed can be found in Appendix 2). Two years of monthly wildlife surveys have been completed and monthly wildlife surveys are planned to continue in conjunction with water quality sampling in 2019. A report of the findings and recommendations from the first two year of surveys can be found in Appendix 3. Newly observed species will be added to this plan at each annual updating and an annual report from the wildlife surveys will be included in the appendix. Two motion activated wildlife cameras are installed in the Central Unit. Wildlife in the DPNA will not be actively managed for the foreseeable future.

Three species listed as sensitive by the Oregon Department of Fish and Wildlife occur in the DPNA. These include the northern red-legged frog, pileated woodpecker, and willow fly catcher. Each of these species are addressed below.

6.1 Fish

Four species of fish, all native, have been recorded within the DPNA. A fish survey conducted by Multnomah County in September 2011 found no salmonid species in the North Fork of Johnson Creek, including within the DPNA. Native reticulated sculpin, speckled dace, and unknown cottids were observed in the DPNA. Fish salvage operations conducted within the DPNA in summer 2016 as a component of stream crossing retrofits revealed large numbers of speckled dace, redbside shiner, and sculpin. A one time fish survey in 2017 also found redbside shiner (See Appendix 3).

An effort by the City of Portland to survey for fish presence in Johnson Creek using environmental DNA (eDNA) methods was conducted in 2018 and included a sampling site within the DPNA. eDNA uses lab analyses to examine for DNA specific to certain species. Water samples were analyzed for presence of Chinook and coho salmon, steelhead, and lamprey DNA. DNA markers for these species were not present in the samples collected in the DPNA. eDNA may be an inexpensive method to sample for salmonids in the future with the DPNA. Partners are exploring continuing this work in Johnson Creek and these efforts will be followed.



Both stream crossings within the DPNA are completely passable by fish (see Section 4.1) but impassible culverts downstream prevent migrating fish from accessing the DPNA. A culvert near the mouth of the North Fork of Johnson Creek owned by the City of Portland that was previously classified as a partial barrier to fish migration was replaced in summer 2017 and another culvert that was classified as a partial barrier had baffles added to make it passable at all but the highest flows in 2018. Two culverts just upstream of these two but downstream of the DPNA by about 3.5 stream miles, one owned by the Oregon Department of Transportation and the other owned by Multnomah County, are classified as complete barriers and block migrating fish from the entire North Fork of Johnson Creek above them. Efforts are underway between EMSWCD, the Johnson Creek Watershed Council, Multnomah County, and the Oregon Department of Transportation to retrofit and/or replace these two culverts, presumably in the next few years, which would allow salmonids access to the DPNA.

When all major fish barriers are replaced downstream of the DPNA, spot surveys for spawning and juvenile salmonids will be conducted. Spawning habitat appears to be very limited within the DPNA but juveniles may enter the area, especially given that the North Fork of Johnson Creek has relatively cool summer water temperatures when compared to the watershed at large. Other future fish investigations led by partners in upper Johnson Creek will also be supported in an effort to see if salmonids are utilizing the DPNA.

6.2 Mammals

Ten mammals have been observed in the DPNA. Coyotes are the most regularly observed mammal in the DPNA. Columbian black-tailed deer have been observed in photos captured by motion activated trail cameras and their browse and hoof prints have been noted. Beaver are seen, especially in motion activated trail cameras and their presence in the forms of dams and dens has been increasing steadily in the DPNA since their arrival in 2017. Raccoons, brush rabbits, vagrant shrews, a fox squirrel, and a house cat have also been observed. All observed mammals are native with the exception of the house cat.

6.2.1 North American Beaver

Beaver will be called out discretely in this section because their presence and activities can greatly alter the hydrology, existing vegetation, vegetative capacity, and vegetation structure of a site. Beaver activity was first observed in the DPNA in September 2017. Beavers have a positive impact on streams by slowing stream flows, reconnecting channels with their floodplains, recharging groundwater, and increasing summer base flows. The pools associated with their dams also provide ideal habitat for juvenile salmonid rearing. Beaver have a need for wood to build dams and they harvest trees and branches from riparian forests in order to fill this need. Beaver can clear large areas of vegetation quickly, and their dams can seasonally or permanently flood areas that were previously well drained, changing the vegetative capacity of that area. Because of these large scale changes associated with beaver presence on a site, vegetation restoration efforts, such as that underway in the DPNA, can be challenging when beaver are present.

Upon arrival in the DPNA, beaver quickly began building dams in the Central Unit of the DPNA and harvesting trees and branches from both the Central and East Units. A den was also constructed in the Central Unit on the edge of one of the ponds. As of January 2019, all of the Central Unit and increasing portions of the East and West Units are now a series of beaver dams and ponds. Low lying areas mostly dominated by willow have been flooded and incorporated into these ponds (see Figure 4). Much of the willow and other plants that were flooded are now dying or have died, allowing sunlight to reach the creek. It is likely that more dams will be built throughout the DPNA. If salmonids migrate into the North



Fork of Johnson Creek and into the DPNA following downstream culvert retrofits, these pools could provide excellent rearing habitat for juveniles, especially given the cool stream temperatures found in the DPNA.

As of January 2019, it appears that the installed vegetation will be able to withstand harvesting by beavers and still mature into a forest as described in the Desired Future Conditions (see Section 5.3). This is because vegetation restoration began five years before beaver arrived, the trees and shrubs were installed densely, and the near bank areas are very dense with willow, cottonwood, and red osier dogwood which can easily re-sprout when browsed. Site conditions and vegetation will be monitored moving forward. Additional plantings may take place to address loss due to beaver feeding and/or changes in vegetative capacity within the DPNA if needed. Fencing and protection of trees may also be necessary.

The increased water levels in the East Unit as a result of beaver dams are greatly decreasing the channel incision found in this unit (see Figure 3). This increase in water level will likely result in aggradation of the streambed. This may have implications for the culvert at the main entrance road and this will be monitored over time.

6.3 Birds

As of January 2019, 61 species of birds (58 native species) have been observed within the DPNA. An owl box was installed in the Central Unit in January 2012 in an attempt to control rodent populations and reduce herbivory on installed plantings but has not yet hosted a resident.

Willow flycatchers, a state listed sensitive species, occur within the DPNA. Willow flycatchers are dependent upon dense, continuous, shrubby, riparian habitat, especially willows, and conservation actions for this species include improving and/or increasing this type of habitat. This type of habitat has been greatly increased and enhanced within the DPNA as over 2750 willows and associated shrub-scrub wetland species such as red osier dogwood and Douglas spiraea have been planted into areas previously dominated by invasive reed canary grass. This has created a continuous band of shrubby, willow dominated vegetation beginning at the eastern boundary of the DPNA and extending for about 0.33 miles of stream, or a little over 80% of the stream length within the DPNA (see Figure 12). This band extends around 10-25 feet from both banks along this length.



Figure 12: Example of Dense Willow Band Found Along Majority of Stream Length



Pileated woodpeckers, another state listed sensitive species, occur within the DPNA as well. According to the Oregon Department of Fish and Wildlife’s Oregon Conservation Strategy, conservation actions for Pileated Woodpeckers include maintaining and creating large-diameter hollow trees, snags, and logs. These habitat features are all stated components in the desired future conditions of the DPNA.

6.4 Pollinators

Pollinator conservation is a large focus on Headwaters Farm outside of the DPNA boundaries. EMSWCD has partnered with The Xerces Society to create pollinator meadows on the farm. Additional pollinator meadows and hedgerows have also been and will continue to be installed by EMSWCD staff. Although many of the plants installed in the DPNA provide pollinator forage, the main pollinator components within the DPNA are brush and dirt piles comprised of bulldozed nursery stock located on the edges of the DPNA (see Figure 13). These piles provide critical nesting habitat for native pollinators lacking in most “clean” farm systems. These piles also provide refugia for other insects, birds, mammals, and amphibians. Quail have been observed regularly using the piles for cover.



Figure 13: Debris Piles for Pollinator Nesting





6.4 Reptiles and Amphibians

Northern red-legged frogs and pacific tree frogs are regularly observed within the DPNA. Oregon Ensatina salamanders have also been observed as well as unidentified garter snakes. Northern red-legged frogs are listed as sensitive by the Oregon Department of Fish and Wildlife and are federally listed as a species of concern. As this species prefers forested, slow moving streams with associated upland forests for all life stages, the DPNA will provide increasing habitat for the northern red-legged frog as it transforms towards the desired future conditions. Potentially complicating this is the fact that salmonids prey on northern red-legged frogs and their egg masses. Hence, the arrival of salmonids could threaten the viability of northern red-legged frog populations within the DPNA.

6.5 Future Wildlife Habitat Improvements

Wildlife enhancements moving forward will be passive. Continual wildlife habitat improvements will occur as the area transitions toward the desired future conditions. Those wildlife species associated with Pacific Northwest, forested, riparian areas will increase as native plantings mature and as forest composition and structure become more diverse over the next few centuries. As the densities of snags and downed wood increase, wildlife species richness and diversity will continue to change and improve. Because the DPNA will contain areas of forest dominated by dense conifers, dense scrubby vegetation, and dense shrubs, and will always consist of considerable amounts of edge habitat, wildlife species associated with these habitats will be present as well. Wildlife survey efforts may inform future wildlife habitat improvement opportunities.

7.0 Infrastructure

As the Dianna Pope Natural Area is nested within Headwaters Farm, many constructed elements such as roads, stream crossings, and a structure occur within the DPNA. Much of this infrastructure is managed by the Headwaters Farm Program Manager. No additional farm infrastructure is expected to be installed within the DPNA. In addition, opportunities to reduce the impact of, or remove, existing infrastructure will be pursued. Specifics relating to each infrastructure item within the DPNA follow.

7.1 Buildings

A manufactured home that is operated as the Headwaters Farm office currently exists in the DPNA in the West Unit (see Figure 2). The office has an associated well and septic system that are also located within the DPNA. This building will be operated and maintained by the Headwaters Farm Program Manager in coordination with the DPNA Manager. A barn, garage, pole building, and metal shed were removed from the West Unit of the DPNA in January 2017 and the areas formerly occupied by these buildings were planted in February 2017. All new farm buildings will be sited outside the DPNA. It is desired that all structures within the DPNA would eventually be removed, but the status and location of the office will be determined through the Headwaters Farm planning process. While not technically within the DPNA, a caretaker's residence is located within 200-feet of the creek on the southeast side of the Central Unit. Within the next year, staff will evaluate opportunities to remove this structure and restore this area.

7.2 Septic Systems

The septic system for the office is located within the DPNA and is situated within 100 feet of the creek. The septic system for the caretaker's unit is outside of but directly adjacent to the DPNA. The decommissioning of one or both of these septic systems is included in the *Potential Development Options* section of the Headwaters Farm Plan.



7.3 Roads, Culverts, Bridges, and Parking

Two stream crossings and several roads currently exist within the DPNA. Roadways within the DPNA will be managed by the Headwaters Farm Program Manager in coordination with the DPNA Manager. Road maintenance will be the primary activity concerning roads within the DPNA. This maintenance will include grading, rocking, mowing of bordering vegetation, and the trimming of overhanging branches. Vegetation within a distance of five feet from the edge of roadways will be managed by the Headwaters Farm Program Manager. This vegetation may be mowed and/or brushed to provide a clear roadway. Branches overhanging roads may be trimmed back to a distance of five feet from the road edge. Parking around existing structures is currently defined by areas left unplanted and typically rocked. These parking areas will be managed by the Headwaters Farm Program Manager in coordination with the DPNA Manager.

7.4 Stormwater Management

A swale that manages runoff from the Headwaters Farm barn and nearby farm roadways is located within the DPNA (see Figure 2). Although NRCS soil mapping is approximate, the swale was constructed in an area mapped as having soils exhibiting a fragipan layer (see Section 3.0 above). Drainage in the swale has been extremely slow, with ponding water through the entire fall, winter, and early spring, although evidence of overflowing has not been seen in recent years.

Two surface water drainage systems run through the DPNA, draining large portions of stormwater from Headwaters Farm into the North Fork of Johnson Creek. One, a ditch, follows the main entrance road and another, draining an outlet basin located outside of the DPNA, runs east of the office along the path of the decommissioned middle road. Both of these drainage systems were retrofitted in 2018 to allow them to better convey stormwater and prevent sediment from entering the North Fork of Johnson Creek.

Stormwater from the development directly north of the Central Unit of the DPNA (see Figure 2) also drains into the easement and the DPNA through a concentrated channel. Bioengineering practices, consisting of willow fascines, were utilized in 2016 within the easement and the DPNA to stabilize this channel, reduce the speed of the flow, and reduce sediment transport to the North Fork of Johnson Creek. Drainage and stormwater changes on Headwater Farm resulting from future development of infrastructure may necessitate further analysis and retrofitting of the stormwater features described above.

7.5 Utility Lines

A total of six utility lines are known to cross the DPNA:

- An underground water line that serves an inholding property located within Headwaters Farm (inholding property) enters and leaves the DPNA along the east property line, crossing under the creek.
- An underground water line that feeds the barn, propagation house, and caretaker unit enters and leaves the DPNA along the main entrance road, crossing the creek above the culvert.
- Power lines cross the DPNA along the main entrance road to serve the inholding property, caretaker unit, barn, and propagation house.
- A telecommunications line that serves the inholding property and caretaker unit is buried along the main entrance road and crosses the creek above the culvert before rising to the power lines that follow the main entrance road.



Power lines follow the path of the decommissioned middle road and stream crossing to serve the office (running roughly from the easement to the office). These power lines terminate in the DPNA just north of the office.

A telecommunications line that serves the office is attached to the underside of the bridge that crosses the creek along the west access road. The line is then likely buried along the current road as it travels from the bridge to the office.

Utilities will be mapped by Land Legacy staff in Fiscal Year 2019-2020 and a map will be added to this plan when available.

7.7 Boundary Management, Fencing, and Signage

The south boundaries of the Central and East Unit abut EMSWCD property. Similarly, the north boundaries of the West Unit and East Unit abut EMSWCD property. These boundaries require little direct protection from encroachment. The north side of the Central Unit abuts private property that is currently being developed for residential housing and is not fenced. The south boundary of the West Unit abuts a working nursery and is fenced. The east and west boundaries of the DPNA also abut private properties. The eastern boundary is fenced south of the creek. North of the creek, this boundary is defined by a hedgerow of blackberry. The western boundary is unfenced but is defined on the north side of Johnson Creek by a straightened creek channel that flows along the property line. EMSWCD does not currently own any fencing along the boundaries of the DPNA.

All boundaries were marked with EMSWCD/DPNA boundary signs in January 2018 and will be maintained annually thereafter. Boundary signs were installed at a distance of 50-60 feet along the entire boundary of the DPNA and easement. Up to two permanent entryway signs denoting the DPNA are planned for design and installation in the DPNA by Fiscal Year 2018-2019. One sign is expected to be posted along the main entrance road as you enter the DPNA from Oxbow Drive and the other is expected to be placed west of the caretaker unit, visible from the Headwaters Farm barn, which is the main gathering point on the farm. DPNA signage will have consistent branding with Headwaters Farm signage.

An interpretive sign was installed in the West Unit of the DPNA adjacent to the main entrance road in 2018 (see Figure 14). The sign was designed and drawn by EMSWCD staff. An approximately 70 square foot gravel pad is being developed for people to gather around the interpretive sign and will be completed by Fiscal Year 2019/2020. Organized tours led by EMSWCD staff regularly stop on the road adjacent to the area of the interpretive sign to discuss the DPNA. The area around the interpretive sign will allow a place for attendees of tours to gather off of the road, hence not blocking traffic on the road. The area will be at grade with the main entrance road and the boundaries of the area will be framed with wood to contain the gravel.

Figure 14: Interpretive Sign



Located on the north side of the Central Unit, an approximately 0.15-acre riparian easement was granted to EMSWCD when the Headwaters Farm property was originally purchased. This easement encompasses a short stretch of land approximately 50 feet from the north bank of the creek on three adjacent properties (see Figure 2)⁶. The easement was originally located on one property but that property has since been divided for development. A legal survey to define the boundaries of the easement was conducted in 2016 and the boundaries were marked with EMSWCD/DPNA boundary signs in conjunction with the rest of the DPNA. As described earlier in this document, the entire easement has been planted. The DPNA Manager will contact the landowners (the conveyors of the easement) in person at least once per year to ensure there is a consistent understanding by both parties of the terms of the easement and that the landowner is aware of the activities that EMSWCD has conducted on the easement area during the previous year.

8.0 Public Use, Access, and Enforcement

Although the DPNA is not closed to public use, as of January 2019 it is not managed to encourage use by humans or pets, except for the Dianna Pope Commemorative Area (see Section 8.1 below). Other than the commemorative area and the pad surrounding the interpretive sign (see section 7.7), public viewing of the DPNA from roads and boundaries is the suggested method for interacting with the DPNA. The possibility of purposeful public recreational access (such as trails and internal signage) within the DPNA will be assessed and potentially installed when: 1) plant communities become better established and able to withstand some limited amount of impact associated with public use and access; 2) uncontrolled access from the public road can be accommodated in a manner that protects adjacent private landowners and other EMSWCD land; and 3) when public safety concerns can be addressed associated with Headwaters Farm. Staff-led tours or school visits to the DPNA may occur pending approval by the DPNA Manager.

⁶ Easement is on file at EMSWCD.



In addition to the above general limitations on public use and access, the following activities are prohibited within the DPNA⁷:

- Dumping of any kind;
- Releasing/planting, removal, killing, or injuring of any plant/wood, plant/wood material, animal, and animal part;
- Use of the area by livestock and pets;
- Construction or destruction of any infrastructure; and
- Driving of vehicles or machinery except on existing roads as approved by EMSWCD.

In the case of emergency, 911 should be called immediately. For infractions not witnessed, the DPNA Manager shall be notified. The DPNA Manager will investigate infractions and the Multnomah County Sheriff will be notified by the DPNA Manager when appropriate.

8.1 Dianna Pope Commemorative Area

A small wayside, on the south side of the Central Unit was constructed within the DPNA shortly after its designation. The wayside includes two logs that serve as benches and a plaque describing the reasons for designation of the DPNA as well as some information about Dianna Pope's service to EMSWCD (see Foreword). This area is approximately 400 square feet and is defined by a bed of mulch and the lack of trees and shrubs (see Figure 15). A western hemlock tree was planted adjacent to the plaque area by Dianna Pope at the ribbon cutting ceremony for the dedication of DPNA. In coordination with the DPNA Manager, the Headwaters Farm Program Manager will apply mulch to this area as needed to prevent bare ground and suppress weed growth as well as care for the western hemlock.

8.2 Outreach

Outreach to adjacent and nearby landowners will be planned for and initiated in 2019 in coordination with Headwaters Farm staff. Outreach will inform neighbors about EMSWCD, the DPNA, and Headwaters Farm.

⁷ Exceptions to this list must be given explicitly by the DPNA Manager.



Figure 15: Dianna Pope Commemorative Area



9.0 Future Planning and Reporting

A cursory review and update of this plan will be conducted in January of each year to account for an improved understanding of the DPNA and to keep the plan current. A comprehensive review and update will be completed every five years by the end of June which coincides with the end of EMSWCD's fiscal year (July through June of each year). EMSWCD will budget and plan for on-site management of the DPNA on a fiscal year basis. Budgetary planning will take place in February through May while annual work planning will take place in May through June. Reporting of accomplishments will occur on a quarterly basis in October, January, April, and at the end of the fiscal year, after June.



Appendix 1: Management Actions, Timing, and Costs

Table 1.1: Management Actions and Timing

Activity	Annual Recurring Costs	One Time and Short Term Costs	Frequency	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Water Quality Monitoring	<1% FTE*		Monthly	X	X	X	X	X	X	X	X	X	X	X	X
Visual Monitoring	<1 FTE#		Quarterly or as needed	X	X	X	X	X	X	X	X	X	X	X	X
Wildlife Surveys		~3%FTE, ~\$150 Materials	Monthly	X	X	X	X	X	X	X	X	X	X	X	X
Plant Inventory		<1% FTE#	Monthly ending in fiscal year 2017-2018	Completed 2018	X	X	X	X	X	X	X	X	X	X	X
Miscellaneous Site Visits and Operations	<1% FTE		As needed	X	X	X	X	X	X	X	X	X	X	X	X
Continuous Summer Temperature Monitoring	<1%%FTE*		Annually	X	X	X	X						X	X	X
Plant Maintenance	~1%FTE, ~\$3000 Contracted Costs/Materials		Annually until trees are free to grow		X	X						X		X	X



Activity	Annual Recurring Costs	One Time and Short Term Costs	Frequency	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Infill Planting	~1%FTE, ~\$1000 Contracted Costs/Materials		Annually as needed								X	X			
Apply mulch to Dianna Pope Commemorative Area	<1% FTE		As needed			X									
Annual Plan Review and Updating	<1% FTE		Annually							X					
Easement Owner Contact	<1% FTE		Annually					X							
Design, Materials, and Installation of Boundary Signs		~1% FTE, ~\$3000 Materials	One time							Completed 2018					
Design, Materials, and Installation of Sign(s) Denoting DPNA		~1% FTE, ~\$4000 Materials	One time												X
Design, Materials, and Installation of Interpretive Sign		~1% FTE, ~\$700 Materials	One time					Completed 2018							
Stormwater Management Retrofitting		<1% FTE^	One time		Completed 2018										



Activity	Annual Recurring Costs	One Time and Short Term Costs	Frequency	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Pad Development Surrounding Interpretive Sign		~1% FTE*, \$500												2019	
Outreach to Neighbors and Nearby Landowners	~2% FTE		Annual							2020					
West Road Realignment and Associated Permitting		<1% FTE^	One time	2019											
Fish Inventory		~1%FTE	One time										2021		
Five Year Plan Review and Updating		<1% FTE	One time												2022
Current Fiscal Year Budget	~8% FTE & \$4000 Contracted Costs/Materials	~11%FTE & \$4,650 Materials													

*=This FTE will be a part of a separate budget not related to managing the DPNA
 #=This will be conducted when DPNA Manager is out with crew conducting other tasks
 ^=This FTE represents only the FTE that the DPNA Manager will spend on this effort. This management action that will be a part of a separate budget not related to management of the DPNA



Table 1.2: FTE and Costs Summary by Fiscal Year

FY2017-2018 FTE and costs	FY2018-2019 FTE and costs	FY2019-2020 FTE and costs	FY2020-2021 FTE and costs	FY2021-2022 FTE and costs
~10% FTE & ~\$10,850	~6% FTE & ~\$8500	~5% FTE & ~\$4000	~5% FTE & ~\$4000	~5% FTE & ~\$4000



Appendix 2: Observed Species List

As of January 2019, these species have been observed or have been installed within the Dianna Pope Natural Area. This species list will be updated when that report is available.

Kingdom/Class	Count	Scientific Name	Common Name	Observer
Amphibians	1.001	<i>Ensatina eschscholtzii oregonensis</i>	Oregon Ensatina salamander	JW
	1.002	<i>Pseudacris regilla</i>	Pacific tree frog	JW
	1.003	<i>Rana aurora</i>	Northern red-legged frog	JD
Birds	2.001	<i>Accipiter cooperii</i>	Cooper's hawk	JW
	2.002	<i>Agelaius phoeniceus</i>	Red-winged blackbird	JW
	2.003	<i>Aix sponsa</i>	Wood duck	JW
	2.004	<i>Anas platyrhynchos</i>	Mallard	JW
	2.005	<i>Aphelocoma californica</i>	California scrub jay	JW
	2.006	<i>Ardea herodias</i>	Great blue heron	JW
	2.007	<i>Bombycilla cedrorum</i>	Cedar waxwing	JW
	2.008	<i>Buteo jamaicensis</i>	Red-tailed hawk	JW
	2.009	<i>Callipepla californica</i>	California quail	JW
	2.010	<i>Calypte anna</i>	Anna's hummingbird	JW
	2.011	<i>Cardellina pusilla</i>	Wilson's warbler	JW
	2.012	<i>Cathartes aura</i>	Turkey vulture	JW
	2.013	<i>Certhia americana</i>	Brown creeper	JW
	2.014	<i>Chaetura vauxi</i>	Vaux's swift	JW
	2.015	<i>Charadrius vociferus</i>	Killdeer	JW
	2.016	<i>Circus cyaneus</i>	Northern harrier	JW
	2.017	<i>Colaptes auratus</i>	Northern flicker	JW
	2.018	<i>Columba livia</i>	Rock dove*	JW
	2.019	<i>Contopus sordidulus</i>	Western wood pewee	JW
	2.020	<i>Corvus brachyrhynchos</i>	American crow	JW
	2.021	<i>Cyanocitta stelleri</i>	Steller's Jay	JW
	2.022	<i>Dryocopus pileatus</i>	Pileated woodpecker	JW
	2.023	<i>Empidonax traillii</i>	Willow flycatcher	JW
	2.024	<i>Falco sparverius</i>	American kestrel	JW
	2.025	<i>Geothlypis trichas</i>	Common yellowthroat	JW
	2.026	<i>Haemorhous mexicanus</i>	House finch	JW
	2.027	<i>Hirundo rustica</i>	Barn swallow	JW
	2.028	<i>Ixoreus naevius</i>	Varied thrush	JW
	2.029	<i>Junco hyemalis</i>	Dark-eyed juncos	JW
	2.030	<i>Lophodytes cucullatus</i>	Hooded merganser	JW
	2.031	<i>Megaceryle alcyon</i>	Belted Kingfisher	JW
	2.032	<i>Melospiza melodia</i>	Song sparrow	JW
	2.033	<i>Molothrus ater</i>	Brown-headed cowbird	JW
	2.034	<i>Passerella iliaca</i>	Fox sparrow	JW



Kingdom/Class	Count	Scientific Name	Common Name	Observer
	2.035	<i>Passerina amoena</i>	Lazuli bunting	JW
	2.036	<i>Pheucticus melanocephalus</i>	Black-headed grosbeak	JW
	2.037	<i>Picoides pubescens</i>	Downy woodpecker	JW
	2.038	<i>Picoides villosus</i>	Hairy woodpecker	JW
	2.039	<i>Pipilo maculatus</i>	Spotted towhee	JW
	2.040	<i>Poecile atricapillus</i>	Black-capped chickadee	JW
	2.041	<i>Poecile rufescens</i>	Chestnut-backed chickadee	JW
	2.042	<i>Psaltriparus minimus</i>	American bushtit	JW
	2.043	<i>Regulus calendula</i>	Ruby-crowned kinglet	JW
	2.044	<i>Regulus satrapa</i>	Golden-crowned kinglets	JW
	2.045	<i>Setophaga coronata</i>	Yellow-rumped warbler	JW
	2.046	<i>Setophaga nigrescens</i>	Black-throated gray warbler	JW
	2.047	<i>Setophaga petechia</i>	Yellow warbler	JW
	2.048	<i>Sitta canadensis</i>	Red-breasted nuthatch	JW
	2.049	<i>Sitta carolinensis</i>	White-breasted nuthatch	JW
	2.050	<i>Sphyrapicus ruber</i>	Red-breasted sapsucker	JW
	2.051	<i>Spinus pinus</i>	Pine siskin	JW
	2.052	<i>Spinus psaltria</i>	Lesser goldfinch	JW
	2.053	<i>Spinus tristis</i>	American goldfinch	JW
	2.054	<i>Streptopelia decaocto</i>	Eurasian collared dove*	JW
	2.055	<i>Sturnus vulgaris</i>	European starling*	JW
	2.056	<i>Tachycineta bicolor</i>	Tree swallow	JW
	2.057	<i>Thyromanes bewickii</i>	Bewick's wren	JW
	2.058	<i>Turdus migratorius</i>	American robin	JW
	2.059	<i>Vermivora celata</i>	Orange-crowned warbler	JW
	2.060	<i>Zenaida macroura</i>	Mourning dove	JW
	2.061	<i>Zonotrichia leucophrys</i>	White-crowned sparrow	JW
Fish	2.062	<i>Cottus perplexus</i>	Reticulated sculpin	JD
	3.002	<i>Cottus sp.</i>	Unknown sculpin	RI
	3.003	<i>Rhinichthys osculus</i>	Speckled dace	JD
	3.004	<i>Richardsonius balteatus</i>	Redside shiner	JW
Mammals	4.001	<i>Canis latrans</i>	Coyote	RS
	4.002	<i>Castor canadensis</i>	American Beaver	JW
	4.003	<i>Felis catus</i>	House cat*	JW
	4.004	<i>Mephitis mephitis</i>	Striped skunk	RS
	4.005	<i>Odocoileus hemionus</i>	Black tailed deer	LN
	4.006	<i>Odocoileus hemionus columbianus</i>	Columbian black-tailed deer	LN
	4.007	<i>Procyon lotor</i>	Racoon	RS
	4.008	<i>Sciurus niger</i>	Fox squirrel	JW
	4.009	<i>Sorex vagrans</i>	Vagrant shrew	JW
	4.010	<i>Sylvilagus spp</i>	Cottontail spp.	JW



Kingdom/Class	Count	Scientific Name	Common Name	Observer
Reptiles	5.001	<i>Thamnophis spp.</i>	Garter snakes	LN
Plants	6.001	<i>Abies grandis</i>	Grand fir	LN
	6.002	<i>Acer circinatum</i>	Vine maple	LN
	6.003	<i>Acer macrophyllum</i>	Big leaf maple	LN
	6.004	<i>Acer palmatum</i>	Japanese maple*	LN
	6.005	<i>Achillea millefolium</i>	Yarrow ⁺	LN
	6.006	<i>Alnus rhombifolia</i>	White alder	LN
	6.007	<i>Alnus rubra</i>	Red alder	LN
	6.008	<i>Alopecurus pratensis</i>	Meadow Foxtail	LN
	6.009	<i>Amelanchier alnifolia</i>	Serviceberry	LN
	6.010	<i>Athyrium filix-femina</i>	Lady fern	LN
	6.011	<i>Berberis sp.</i>	Barberry*	LN
	6.012	<i>Betula sp.</i>	Birch*	LN
	6.013	<i>Blechnum spicant</i>	Deer fern	LN
	6.014	<i>Brassica rapa</i>	Common Mustard*	LN
	6.015	<i>Bromus carinatus</i>	California brome ⁺	LN
	6.016	<i>Carex obnupta</i>	slough sedge	LN
	6.017	<i>Centaureum erythraea</i>	European centaury*	LN
	6.018	<i>Chamaenerion angustifolium</i>	Fireweed	LN
	6.019	<i>Circaea lutetiana</i>	Enchanted Nighshade	LN
	6.020	<i>Cirsium arvense</i>	Canada thistle*	LN
	6.021	<i>Cirsium vulgare</i>	Bull thistle*	LN
	6.022	<i>Claytonia sibirica</i>	Siberian Miners Lettuce	LN
	6.023	<i>Clerodendrum trichotomum</i>	Peanut Butter Tree*	LN
	6.024	<i>Conyza canadensis</i>	Horseweed	LN
	6.025	<i>Cornus sericea</i>	Red osier dogwood	LN
	6.026	<i>Cornus sp.</i>	Ornamental flowering dogwood*	LN
	6.027	<i>Corylus cornuta</i>	Beaked hazelnut	LN
	6.028	<i>Cyperus esculentus</i>	Yellow nutsedge*	LN
	6.029	<i>Dactylis glomerata</i>	Orchard Grass*	LN
	6.030	<i>Daucus carota</i>	Queen Anne's lace*	LN
	6.031	<i>Elymus glaucus</i>	Blue wild rye ⁺	LN
	6.032	<i>Epilobium ciliatum</i>	Northern willowherb	LN
	6.033	<i>Equisetum arvense</i>	Horsetail	LN
	6.034	<i>Erigeron annuus</i>	Annual fleabane*	LN
	6.035	<i>Festuca roemerii</i>	Roemer's fescue ⁺	LN
	6.036	<i>Ficaria verna</i>	Lesser celandine*	CA
	6.037	<i>Foxglove digitalis</i>	Foxglove*	LN
	6.038	<i>Fraxinus latifolia</i>	Oregon ash	LN
	6.039	<i>Galium aparine</i>	Cleavers	LN
	6.040	<i>Geranium dissectum</i>	Cutleaf geranium*	LN



Kingdom/Class	Count	Scientific Name	Common Name	Observer
	6.041	<i>Geranium lucidum</i>	Shining geranium*	LN
	6.042	<i>Geranium molle</i>	Dovefoot Geranium*	LN
	6.043	<i>Geranium robertianum</i>	Herb Robert*	LN
	6.044	<i>Geum macrophyllum</i>	Large leaf avens	LN
	6.045	<i>Gilia capitata</i>	Globe gilia ⁺	LN
	6.046	<i>Hedera helix</i>	English ivy*	LN
	6.047	<i>Holodiscus discolor</i>	Oceanspray	LN
	6.048	<i>Hordeum bracyantherum</i>	Meadow barley ⁺	LN
	6.049	<i>Hyacinthoides sp.</i>	Blue bells*	LN
	6.050	<i>Hypericum calycinum</i>	St John's wort*	LN
	6.051	<i>Ilex aquifolium</i>	English holly*	LN
	6.052	<i>Lactuca serriola</i>	Prickly lettuce*	LN
	6.053	<i>Lamium purpureum</i>	Dead Nettle	LN
	6.054	<i>Lapsana communis</i>	Nipplewort*	LN
	6.055	<i>Leucanthemum vulgare</i>	Oxeye Daisy*	LN
	6.056	<i>Lonicera involucrata</i>	Black twinberry	LN
	6.057	<i>Lonicera sp.</i>	Ornamental honeysuckle*	LN
	6.058	<i>Lotus corniculatus</i>	Birdsfoot trefoil*	LN
	6.059	<i>Ludwigia palustris</i>	Water Purslane	LN
	6.060	<i>Lysichiton americanus</i>	Skunk cabbage	LN
	6.061	<i>Mahonia aquifolia</i>	Oregon grape	LN
	6.062	<i>Mahonia nervosa</i>	Low Oregon grape	LN
	6.063	<i>Malus fusca</i>	Pacific crabapple	LN
	6.064	<i>Mentha sp.</i>	Mint*	LN
	6.065	<i>Narcissus sp.</i>	Daffodil*	LN
	6.066	<i>Osmeronia cerasiformis</i>	Indian plum	LN
	6.067	<i>Parentucellia viscosa</i>	Yellow Glandweed*	LN
	6.068	<i>Phalaris arundinacea</i>	Reed canary grass*	LN
	6.069	<i>Physocarpus capitatus</i>	Pacific ninebark	LN
	6.070	<i>Picea pungens</i>	Colorado blue spuce*	LN
	6.071	<i>Pinus ponderosa</i>	Ponderosa pine	LN
	6.072	<i>Plantago lanceolata</i>	Plantain*	LN
	6.073	<i>Polystichum munitum</i>	Sword fern	LN
	6.074	<i>Populus trichocarpa</i>	Black cottonwood	LN
	6.075	<i>Prunella vulgaris</i>	Heal-all ⁺	LN
	6.076	<i>Prunus avium</i>	Wild Cherry*	LN
	6.077	<i>Prunus emarginata</i>	Bitter cherry	LN
	6.078	<i>Psuedo-tsuga menziesii</i>	Douglas fir	LN
	6.079	<i>Quercus garryana</i>	Oregon white oak	LN
	6.080	<i>Ranunculus repens</i>	Creeping buttercup*	LN
	6.081	<i>Rhamnus pershiana</i>	Cascara	LN
	6.082	<i>Rhododendron spp.</i>	Ornamental Rhododendron*	LN



Kingdom/Class	Count	Scientific Name	Common Name	Observer
	6.083	<i>Ribes sanguineum</i>	Red flowering currant	LN
	6.084	<i>Rorippa curvisiliqua</i>	Yellowcress	LN
	6.085	<i>Rubus armeniacus</i>	Armenian blackberry*	LN
	6.086	<i>Rubus laciniatus</i>	Evergreen blackberry*	LN
	6.087	<i>Rubus parviflorus</i>	Thimbleberry	LN
	6.088	<i>Rubus spectabilis</i>	Salmonberry	LN
	6.089	<i>Rubus ursinis</i>	Trailing blackberry	LN
	6.090	<i>Rumex obtusifolius</i>	Broadleaf dock*	LN
	6.091	<i>Rumex spp.</i>	Docks	LN
	6.092	<i>Salix lucida</i>	Pacific willow	LN
	6.093	<i>Salix scouleriana</i>	Scouler's willow	LN
	6.094	<i>Salix sitchensis</i>	Sitka willow	LN
	6.095	<i>Sambucus cerulea</i>	Blue elderberry	LN
	6.096	<i>Sambucus racemosa</i>	Red elderberry	LN
	6.097	<i>Secale cereale</i>	Cereal Rye*	LN
	6.098	<i>Senecio jacobaea</i>	Tansy ragwort*	LN
	6.099	<i>Sonchus sp.</i>	Sow thistle*	LN
	6.100	<i>Spiraea douglasii</i>	Douglas spiraea	LN
	6.101	<i>Symphoricarpos albus</i>	Snowberry	LN
	6.102	<i>Taraxacum officinale</i>	Dandelion*	LN
	6.103	<i>Thuja plicata</i>	Western red cedar	LN
	6.104	<i>Thuja sp.</i>	Arborvitae*	LN
	6.105	<i>Trifolium pratense</i>	Red clover*	LN
	6.106	<i>Trifolium repens</i>	White Clover	LN
	6.107	<i>Tritonia sp.</i>	Crocoshmia*	LN
	6.108	<i>Tsuga heterophylla</i>	Western hemlock	LN
	6.109	<i>Urtica dioica</i>	Stinging nettle	LN
	6.110	<i>Vicia sativa</i>	Common vetch*	LN

*=non-native

+ =component of native mix installed by EMSWCD after large areas of Canada thistle were initially controlled

Key to Observers

- CA=Chris Aldassy, EMSWCD
- JD=Julie DiLeone, EMSWCD
- JW=Jon Wagner, EMSWCD
- LN=Lucas Nipp, EMSWCD
- RS=Rowan Steele, EMSWCD
- RI=Roy Iwai, Multnomah County



Appendix 3: Dianna Pope Natural Area Wildlife Survey – Year Two Report



East Multnomah Soil and Water Conservation District
Dianna Pope Natural Area Wildlife Survey – Year Two Report
Jon Wagner
3/12/2019

Introduction

This report is a documentation of two years of wildlife surveys within the Dianna Pope Natural Area (DPNA). In November 2016, East Multnomah Soil and Water Conservation District (EMSWCD) staff began conducting monthly wildlife surveys to create a list of vertebrates utilizing the DPNA during the early stages of site restoration. The wildlife list generated from these surveys is meant to inform the Diana Pope Natural Area Site Conservation Plan to: current species occurrence within the DPNA, species distribution between the three management units, and changes in species occurrence throughout the year. The wildlife list is a living document that grows as new species are identified and it is meant track changes of wildlife occurrence as the vegetation planted in the DPNA matures and changes in the restoration process. The list may also direct site management techniques and strategies depending on sensitive species occurrence and habitat needs. The species list found in the Plan will be updated with the species from this living document at planned annual updating each January. Ongoing monthly wildlife surveys will be necessary to track changes in species occurrence and account for other sensitive species that may already exist but have not yet been identified in the surveys. After the completion of annual surveys in October, 2019, EMSWCD staff will assess the need and resources for continuing a fourth year of surveys in the DPNA.

Methods

Wildlife surveys are conducted monthly in conjunction with monthly water quality sampling in the North Fork of Johnson Creek within the DPNA. Surveys are approximately one hour and entail walking a loop through the entire DPNA with binoculars, listing all species that are seen or heard.

Pit traps and drift fences were installed for three days in April 2017 to sample for rodents, amphibians and reptiles. One site in each of the management units was selected for a total of three trap locations. Sites were selected based on habitat variables that predicted the greatest chance for catching the most species. Site selection variables included: proximity to refugia such as brush piles, water, rodent trails and food. Each drift fence was constructed with 12" x 10' aluminum flashing, with wooden lath stakes for support. Four pit trap buckets were dug into the ground at each fence, two on either side of the



fence and at each end of the fence. Buckets were checked morning and night from April 18, 2017-April 20, 2017.

With help from Oregon Department of Fish and Wildlife staff, fish were sampled in the pool on either side of the main entrance road culvert on April 18, 2017. Three passes were made with a seine and fish were identified. This was an isolated sampling to investigate the presence of Tui chub in the creek. Tui chub were not present in this sampling effort. Comprehensive fish surveys will be conducted in the DPNA section of the North Fork of Johnson Creek after downstream fish barriers are removed to allow more species of fish to access the site (see Section 6.1 of the Diana Pope Natural Area Site Conservation Plan).

Four amphibian refugia sites were created in November 2017 with plywood salvaged from a storage shed in the Central Unit. Sites were selected in the best amphibian habitat, with two refugia sampling locations in the West Unit and two in the Central Unit. No reptile or amphibian habitat of enough quality was discovered in the East Unit to establish a refugia sampling site. Staff will create three new refugia sampling sites in the East Unit in December 2018 to increase sampling consistency. Refugia sites consist of a piece of plywood laid on the ground for amphibians take refuge under. Each of these sites are checked monthly, as part of the wildlife surveys, and species seen under the plywood are noted in the survey.

The DPNA is broken into three management units to capture differences in habitat type and management needs. Each of the three units includes both sides of riparian habitat surrounding the North Fork of Johnson Creek and they are separated by the recently decommissioned middle access road and the main entrance road. See the Diana Pope Natural Area Site Conservation Plan for current conditions and management strategies for each management unit. Species occurrence is listed separately for each of the DPNA management units. Species are listed according to the date identified and management unit they occurred within. Observer is recorded for each species and first observations are marked so that species may be added to the DPNA species list.

Results

The 24 monthly wildlife surveys from November 15, 2016 to October 16, 2018 identified 70 vertebrate species within the DPNA, including: 58 birds, 7 mammals, 3 amphibians, 1 reptile, and 1 fish species (See Figure 1). The West Unit had the highest bird diversity with 46 species, followed by the Central Unit with 45 species, and the East Unit with 31 species (see Figure 2). Three native mammal species were found in each of the units, and a nonnative domestic cat and fox squirrel were listed in the Central and East units. Three amphibian species (red-legged frog, pacific tree frog and *Ensatina* salamander) have been documented in the West and Central units. All *Ensatina* salamanders were discovered under refugia boards. Two amphibian species (red-legged frogs and pacific tree frogs) have been documented in the East Unit. One reptile species (northwestern garter snake) has been documented East Unit. The 2018 June and August surveys yielded the most species of birds (26), with several spring/summer migrants (See Figure 3). The drift fence/pit trap surveys produced a total of three vagrant shrews, one in each unit. All shrews were found in the morning sampling and all were deceased. No other species were collected in these surveys.



Three state listed sensitive species have been documented in these surveys: pileated woodpecker, willow flycatcher, and red-legged frog. One pileated woodpecker was seen pecking on a large snag in the Central Unit in April. Willow flycatchers were seen and heard in the summer months in willow/edge habitat within the East and West Units. Red-legged frogs were regularly seen and heard in the East and Central Units and red-legged frog egg masses were documented in the Central Unit pool west of the main access road culvert. For the complete DPNA species list, including all vetted wildlife reports in the DPNA, see Appendix 2: Observed Species List in the Diana Pope Natural Area Site Conservation Plan.

Figure 1: Species surveyed 11/15/2016 – 10/16/2018

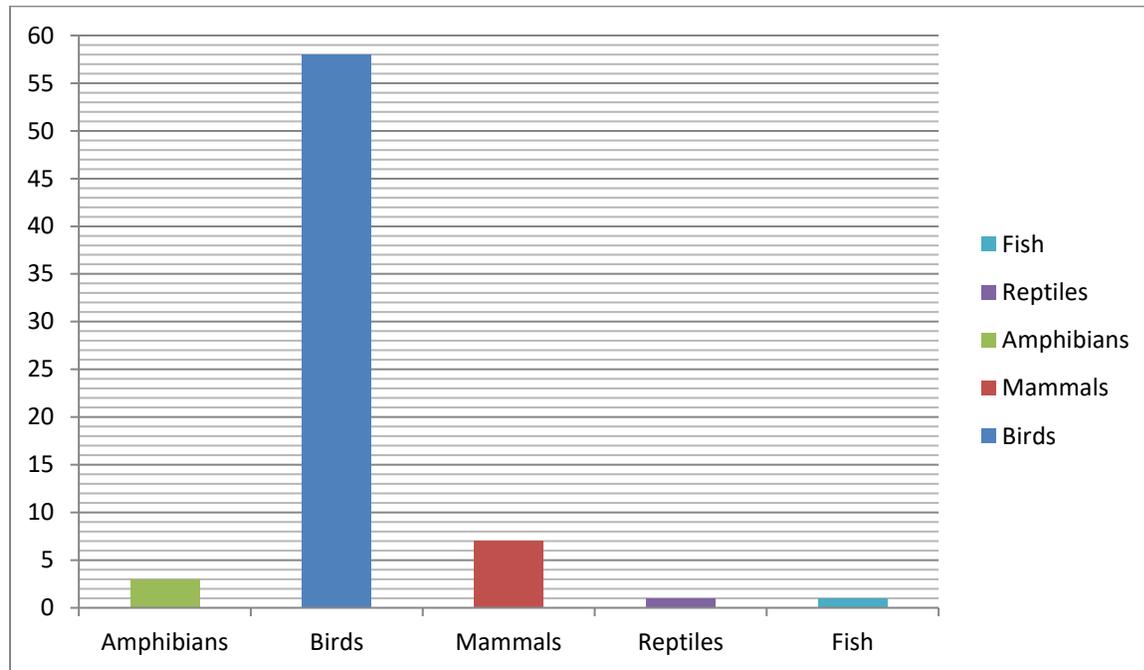




Figure 2: Unit species occurrence 11/15/2016 - 10/16/2018

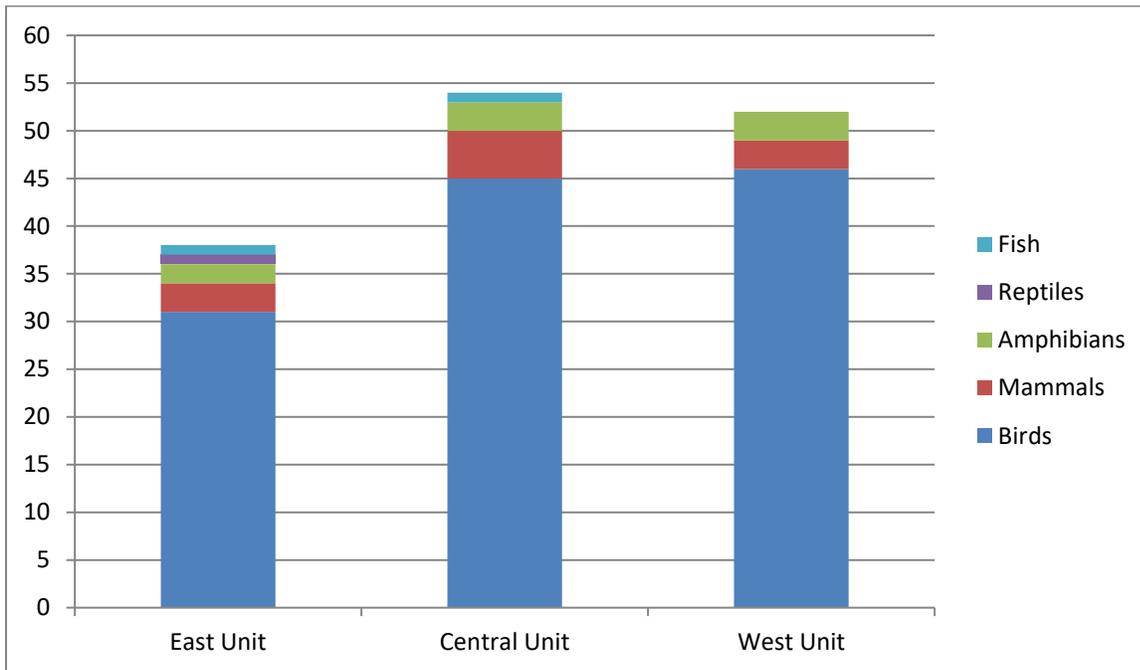
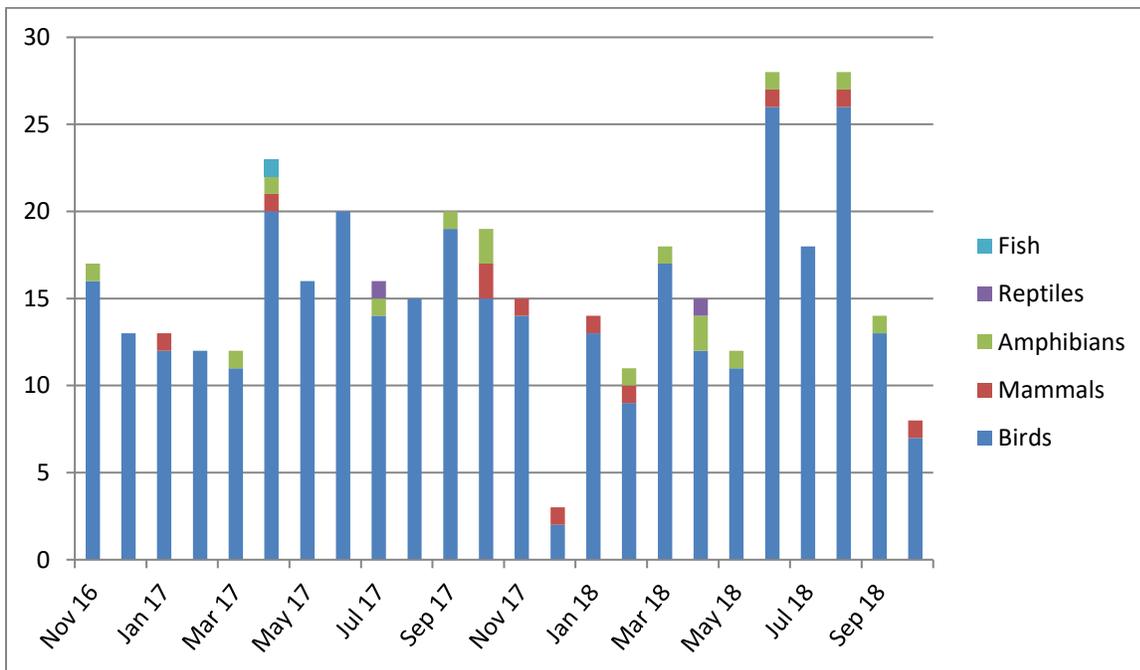


Figure 3: Monthly species occurrence





Discussion

After two years of wildlife surveys in the DPNA, there is strong evidence that wildlife species occurrence is directly connected to habitat type. Many wildlife species have specific habitat needs for vegetation species, size, structure, mixture and density. Each of the three units within the DPNA exhibit different levels of riparian vegetation and condition, creating different combinations of habitat types for wildlife.

The Central Unit had the greatest wildlife diversity of the three units and it has the greatest habitat diversity of all the units, with dense willow riparian zones, edge and open grass, large trees and snags, and several large beaver ponds built in the last year. The past year's beaver activity has opened the dense willow canopy in multiple locations and created large pools suitable for new waterfowl species. In 2018, new species such as: Hooded mergansers, wood ducks and belted kingfishers have all been using these ponds. The only sighting of a pileated woodpecker in the surveys occurred in the Central Unit in a large alder snag. The few large alder snags and conifers in the Central Unit also support the only brown creeper, red-breasted nuthatch and red-breasted sapsucker sightings outside of the West Unit and provide perches for multiple raptor species, including: Cooper's hawk, red-tailed hawk and kestrel. The Central Unit has large sections of open grassy areas mixed with young tree and shrubs that support song sparrows and white crowned sparrows. The only killdeer sighting in the surveys occurred in grassy areas in the Central Unit. Killdeer and other grassland-specific species will likely disappear from the DPNA when trees and shrubs grow and fill the area. Pacific tree frogs and red-legged frogs reproduce in the stream and ephemeral pools in this unit and they are regularly seen and heard. *Ensatina* salamanders live in the areas with down woody debris and thick leaf matter.

The West Unit had the second greatest diversity of species and it possesses the second most diverse habitat types. The large conifers in the West Unit and mixed understory layer supported bird species that were not observed in the other units, including: fox sparrow and varied thrush. These birds require contiguous large tree habitat that does not yet occur in the other units. Native seral habitat is also present in the West Unit, including large patches of native shrubs such as elderberry, salmonberry, snowberry and willow. Native birds that require this edge and seral habitat were also present, such as: willow flycatcher, white-crowned sparrow, Wilson's warbler, Western wood pewee, yellow-rumped warbler and American kestrel. Both Pacific tree frogs and red-legged frogs have been observed in this unit but are less common than in the other units, which may be related to the lack of breeding pools. *Ensatina* salamanders were seen more often in this unit than the Central Unit, likely because of the greater amount of downed wood and leaf habitat.

The East Unit has the least vegetative diversity and had the least diversity of wildlife species. The wildlife species unique to the East Unit are all edge, shrub, and grassland specific species, including: common yellowthroat, lesser goldfinch, and northwestern garter snake. Most of the willow flycatcher and orange-crowned warbler sightings were in the dense willow/edge habitat in the East Unit. The only black-throated gray warbler siting was in willow/edge habitat. Red-legged frogs were regularly seen and heard in the East Unit and they breed in the pool by the main entrance culvert. As the conifers and shrubs grow in the East Unit, it will be valuable to identify if the occurrence of state sensitive red-legged frogs and willow flycatchers increase or decrease (See section 6 of the Diana Pope Natural Area Site



Conservation Plan for specific habitat needs of these species). Also, beaver have begun to build dams in this unit and if they continue to open the canopy and build ponds animal species mixtures will likely change.

Future surveys

Diversity of native wildlife in the DPNA is a welcome byproduct of restoration efforts but diversity alone is not likely to guide site management. Occurrence of sensitive, threatened and endangered species may impact the trajectory of restoration work. Therefore, identifying sensitive species and their habitat needs within the DPNA should be the focus of wildlife surveys moving forward.

Monthly wildlife surveys have primarily been focused on bird species in the first two years because birds are the most diverse wildlife class within the DPNA, with the most sensitive species. Birds are easily identified by sight and sound, making comprehensive bird surveys quick and low impact relative to other wildlife surveys. Monthly wildlife surveys focused on birds will continue to be valuable because a large number of state and federally sensitive bird species could use the habitat in DPNA, but have not yet been documented. Sensitive bird species that could use the DPNA for habitat include: acorn woodpecker, chipping sparrow, northern goshawk, western bluebird, slender-billed white breasted nuthatch, common nighthawk, grasshopper sparrow, short-eared owl, purple martin, olive-side flycatcher, Oregon vesper sparrow, western meadow lark and yellow-breasted chat. Neotropical migratory birds are in decline across the United States, primarily due to habitat loss, and though many of these species are not currently listed as sensitive or threatened they soon will be if trends continue. As the habitat within the DPNA grows and changes, creating a greater mixture of food sources and nesting sites, many of these neotropical migrants will utilize the DPNA for summer habitat. It will be important to identify these species so that their habitat needs can be addressed in site restoration.

Frogs are surveyed by sight and sound. Red-legged frogs and pacific tree frogs are the only native anurans likely to inhabit the DPNA and they are easily spotted and identified in the monthly wildlife survey format. Non-native bullfrogs have not yet been identified within the DPNA and they are easily identified by sight and sound if they move into the DPNA. It will be important to document if state sensitive red-legged frogs and their egg masses change in number and location as habitat is altered with restoration work. Instream pools created by beavers will likely enhance the quality of reproductive habitat for red-legged frogs and more woody debris will create frog refugia and prey habitat. Removal of downstream fish barriers in the North Fork of Johnson Creek will allow large predatory fish, such as salmon and trout, to move into red-legged frog breeding habitat, possibly threatening the viability of the habitat for red-legged frogs.

To date, refugia surveys have only yielded red-legged frogs and *Ensatina* salamanders but it is likely that these refugia boards will gather mores species the longer they remain in place. Two other species of native salamanders have been discovered by EMSWCD staff in a farm field and a water utility box in habitat contiguous to the DPNA (northwestern salamander and long-toed salamander) and it is likely that these and other species also occur in the riparian habitat within the DPNA. More refugia sites need to be established in each of the units to increase the likelihood of discovering other amphibian species.



Western painted turtles and Western pond turtles are the only state listed sensitive reptiles that could naturally occur in the DPNA, specifically using the North Fork of Johnson Creek for habitat. It is unlikely that turtles will migrate upstream and inhabit such a small waterway, but habitat alteration from beavers is creating instream pools and deep runs that are more suitable for these species. Also, open canopy and instream woody debris from beaver activity creates habitat essential for these turtle species. The removal of downstream fish barriers will also increase the likelihood that turtles will migrate upstream into these areas. Monitoring for turtles as habitat, stream morphology and downstream barriers change will be important if we wish to document and strategize for sensitive species.

Fish are perhaps the most crucial wildlife class to survey in the future because several threatened and endangered salmonids, including: Chinook salmon, Coho salmon, and steelhead could migrate into the DPNA when downstream fish barriers in the North Fork of Johnson Creek are removed (see Section 6.1 of the Diana Pope Natural Area Site Conservation Plan). Salmon smolts may swim upstream into the cooler headwaters of the North Fork of Johnson Creek once contiguous stream access is created. Stream alteration by beaver will likely increase habitat value for salmonids, creating deeper pools and runs and instream debris for prey habitat and cover. It will be important to track if/when these species utilize the habitat within the DPNA and to strategize restoration work that maximizes habitat value for these threatened and endangered species.

The only listed sensitive mammal species that could occur within the DPNA are a few species of bats. Bat surveys are very involved and time consuming, requiring multiple nights of mist net surveys after dusk in the summer months. Sensitive bats may use large trees and snags with rough bark and large cavities for summer roosts but it would difficult to track this relationship and it may be just as likely that these species would use human structures for roosts. Occurrence of sensitive bats would likely not alter restoration efforts except on the occasion when the Headwaters Farm office is removed because bats could be roosting within it. It would be best to tear down the Headwaters Farm office in the winter months after bats have migrated south. Other mammal surveys are conducted in conjunction with the monthly bird and amphibian surveys. Pit trap samples that primarily target rodents were only conducted once in the first year of surveys. Pit traps will no longer be used because they are not likely to collect sensitive species and they must be regularly checked, or trapped animals die.

Conclusion

The two years of wildlife surveys within the DPNA have revealed a strong connection between species occurrence and habitat type, with three state listed sensitive species utilizing different habitats within the DPNA. There will likely be other sensitive bird species that move in and inhabit the DPNA as vegetation matures and habitat changes and it will be important to account for these species and their habitat needs as they arrive. Two state listed sensitive salamander species could already occur within the DPNA but they have yet to be discovered with refugia surveys. Increasing the number of refugia sites will not add much cost or effort but will help to determine if these sensitive salamanders inhabit the DPNA. The removal of downstream fish barriers and habitat alteration by beavers will make the North Fork of Johnson Creek accessible and more valuable for multiple species of threatened and endangered



fish and two species of state sensitive turtles. It will be crucial to track these changes if and when they occur.

Monthly surveys will continue in conjunction with monthly water quality sampling on Johnson Creek and will account for 2 to 3 hours of staff time per month. Each annual compilation of monthly surveys can be compared to the next to see the transition of the species use of the habitat. Weathered pieces of plywood at Headwaters Farm will be collected and placed strategically at six more locations in the DPNA to survey for salamanders on a monthly basis. Fish surveys, prior to downstream barrier removal, will be conducted opportunistically in conjunction with partner groups who are sampling fish within the watershed. Following downstream fish barrier removal and alteration, we will work systematically with partner organizations to perform comprehensive fish surveys in the creek within the DPNA.

Wildlife Reports will be written and updated in November or December, following the completion of the annual sample, to inform the DPNA plan of the most accurate wildlife representation. Smaller updates or stories synthesized from the monthly surveys may be used for outreach purposes.

These surveys and reports are not only useful in determining our impact on habitat within the DPNA, but findings could also be extrapolated to other StreamCare sites. The DPNA is the model StreamCare site with its own conservation plan that informs work both within it and other StreamCare sites. A multiyear wildlife inventory will show how species move in and colonize riparian restoration sites throughout the transformation process. These surveys will provide a more complete story of the ecological impact of StreamCare restoration. EMSWCD can communicate this story to StreamCare property owners and the public.