

Vernal Pool Information Network
February 22, 2017
Site Visit to the ODOT's
Vernal Pool Conservation Bank
Summary

Attendees: Sam Friedman, U. S. Fish and Wildlife Service (Service); Craig Tuss, Rogue Valley Council of Governments (RVCOG); Paul Benton, Oregon Department of Transportation (ODOT); Doug Kendig, Keith Perchemlides, The Nature Conservancy (TNC); Evan Barrientos, TNC; Craig Harper, Medford Water Commission; Karen Hussey, Southern Oregon Land Conservancy.

Objective of meeting and visit: The objective of the visit is to get an update from ODOT and TNC staff regarding the continuing vernal pool habitat restoration effort at the Oregon Department of Transportation's (ODOT) Vernal Pool Mitigation and Conservation Bank (Bank).

Background:

ODOT purchased the 80-acre, former pear orchard in 2007. A review of historical aerial photos show this area was undisturbed until the early 1950's when some of the area was "leveled". Leveling was probably accomplished by earthmoving equipment leveling the mounds and filling in the pools. The parcel has a draw or swale transiting the parcel southeast to northwest.

The parcel of oak savannah, prairie and vernal pools is compensatory mitigation for loss of vernal pool wetlands within Jackson, Josephine and Douglas counties of Oregon. The parcel is adjacent to a 145-acre land parcel owned by The Nature Conservancy. ODOT manages the site to achieve ecological-performance based mitigation credits. The two parcels combine to create nearly 225 acres for the largest intact oak savannah ecosystem in southern Oregon. In the fall of 2014, ODOT purchased an adjacent 114 acre parcel due to future mitigation needs in the VPMCB's service area. This brings the total TNC/ODOT area to almost 340 acres.

The Bank is permanently protected land managed for endangered, threatened, and other at-risk species. Ownership of the property has been transferred to TNC to ensure long-term ecological stewardship. The property had been grazed through 2007 when purchased by ODOT. The parcel has vernal pool and oak woodland/savanna habitat as well as a swale/draw that runs through the middle of the parcel from east to west.

Restoration actions since 2008 include:

- Targeted vegetation management to remove specific non-native invasives from the area (e.g. yellow star thistle, curly dock, Himalayan blackberry).
- Thinning of oak savanna and woodland to restore open stand conditions.
- The piping of an irrigation canal through a portion of the property and subsequent restoration of ~50 vernal pools affected by the canal.
- Mowing of a portion of the area adjacent to the swale for weed control.
- Seeding of ESA-listed *Lomatium* and *Limnanthes* in selected vernal pool areas.
- Inoculation of pools with ESA-listed *Branchinecta lynchi* by soil transfer.

ODOT monitors the area as part of the banking instrument requirements. Results of monitoring determine credit release as well as compliance with compensatory mitigation obligations.

ODOT and TNC are collaborating on adaptive vernal pool, oak, and prairie restoration on the Bank using innovative tools and methods. In interrelated projects, they are: using thinning, prescribed fire, and

Vernal Pool Information Network, December 20, 2016 Site Visit Summary

seeding to restore open oak woodland, savanna, and native grassland communities; re-introducing rare and listed species through sowing and soil-inoculum transfer; increasing seed of native and listed species through grow-out of wild-harvested stock; and using LiDAR topographic data (vintage 2009 and 2015), historic aerial photos (vintage 1939), and soil-pit sampling to guide earth-moving topographic/hydrologic restoration.

This work is funded by wetland mitigation and seeks to fulfill ODOT's obligation to offset transportation system impacts while meeting TNC objectives for strategic habitat conservation and the Service's recovery goals for vernal pool ecosystems. An interagency team from the Service, Oregon Department of State Lands (DSL) and Army Corps of Engineers (Corps) provides review. Monitoring shows positive initial results from restoration: return of hydrologic and wetland habitat function, increases in native species cover and diversity, and successful establishment of two federally endangered plants, Cook's desert parsley (*Lomatium cookii*) and large-flowered wooly meadowfoam (*Limnanthes pumila* ssp. *grandiflora*), and a threatened invertebrate, the vernal pool fairy shrimp (*Branchinecta lynchi*).

Prescribed burn: ODOT contracted with Greyback Forestry to complete a 143-acre prescribed burn through oak and prairie habitat. Burn objectives were to remove accumulations of grass and oak leaf litter, kill invasive grasses and their seed, and prepare a seedbed for follow-up sowing of native grasses and forbs. Greyback completed construction of a full-perimeter fire line and 50-foot wide blackline burn on the unit's southern boundary, but a spring burn was cancelled due to high-risk weather conditions. A burn was completed in the fall of 2014.

Vernal pool restoration: In 2011-2012, ODOT, TNC and consultant Cam Patterson worked together to complete topographic restoration of approximately 11 acres of mounded vernal pool landscape on the Bank. Prior leveling and construction of an active irrigation ditch through the area caused heavily impacted hydrology and loss of vernal pool habitat and function. Restoration goals were to restore the extent, connectivity, and hydrologic function of impacted vernal pools, and pipe the irrigation ditch; the project also provided an opportunity to restore native herbaceous cover. ODOT, TNC, and Patterson carefully planned and implemented the restoration using analysis of high-resolution LiDAR topography, detailed site-interpretation, intact areas as reference, and interpretation of soils to guide the removal of fill soil from vernal pool basins and re-shaping of upland mounds. ODOT engineers designed a buried siphoning pipe to transport irrigation water across the property below the restored habitat; a special blend of concrete was developed to repair the breached duripan essential to vernal pool hydrology. Earth-moving work was completed by Houshour Construction and ODOT equipment operators working closely with the restoration planners. Following re-contouring, the entire area was sown with habitat-specific native seed mixes, special plots were sown with *Lomatium cookii* seed, and *Branchinecta lynchi* egg-containing soil inoculum was transferred into pools with no prior detections.

Oak restoration: From 2010-2011 TNC and ODOT worked with Black Oak Restoration to complete 50 acres of thinning treatment in overly-dense oak woodland and savanna, primarily Oregon white oak (*Quercus garryana*). Historically, fire thinned-out seedlings and maintained open stand structures where oak trees developed large open grown forms valuable to wildlife. Fire exclusion has allowed for in-fill of young oaks, creating dense stands and increasing competitive stress on larger legacy trees that can lower fire-resilience and survival. Increased evapotranspiration in denser oak stands may negatively impact vernal pool hydrology and habitat by shortening inundation periods and filling pools with excess oak litter. Thinning treatments targeted small-diameter oak in-fill and retained all large trees, reducing trees per acre by approximately 60 percent but only lowering canopy cover by about 15 percent.

Recent Vernal Pool Restoration/Monitoring Activities:

Vernal Pool Habitat Restoration: In the fall of 2015, ODOT and TNC restored 165 vernal pool basins across over 25 acres on the VPMCB. During this restoration, fill-removal and re-contouring of mound and pool topography dramatically changed the landscape, including the number, size, and shape of vernal pool basins. Overall, restoration resulted in fewer, larger, and more interconnected pools. We re-mapped vernal pool basins within the restored area using post-restoration bare-earth LiDAR topography and revised our selection of sample pools.

Soil inoculum is taken from occupied pools prior to restoration tasks and relocated to restored pools. A prescribed burn was conducted in 2016 on acreage within the Bank expansion area.

Monitoring

Fairy Shrimp: From 2008 to 2016, nine consecutive years (two years of baseline and seven years of performance monitoring) of survey were completed. These surveys have established baseline fairy shrimp presence and distribution datasets and maps, and, starting in 2012, track the species' response to active restoration. Use of LiDAR to map and quantify vernal pool basins creates comprehensive, accurate, and unbiased maps of fairy shrimp habitat that are updated following each round of topographic restoration. The area-based occupancy rate is a more ecologically meaningful, comparable, and stable measure than count-based percent occupancy.

The topographic/hydrologic restoration completed from 2011-2015 (105 acres) on the Bank has clearly been successful in increasing fairy shrimp occupancy. In the 2011-2012 restoration area these results have sustained and even increased for five years with cumulative occupancy up by more than 60% (by both count and area) post-restoration compared to pre-restoration. Nearly all new fairy shrimp occurrences on the Bank since 2012 have been in restored basins. Cumulative fairy shrimp occupancy in the restored basins is now actually higher than in the otherwise comparable high-functioning and relatively intact non-restored sections of the Bank. High levels of fairy shrimp occupancy in restored pools have maintained site-level performance despite apparently stagnant to declining occupancy across the rest of the Bank. Further, the abundance/density of fairy shrimp populations in occupied restored basins is far higher than in non-restored occupied pools. Overall, fairy shrimp occupancy has increased from 42 percent (baseline) to 87 percent post restoration, by area (Figure 1 and 2).

Vegetation sampling: Vegetation monitoring consists of randomly distributed 0.25 meter² quadrates, stratified by oak, prairie uplands and oak, or pools. A sample size of 15 quadrates for each upland stratum and 20 quadrates for each pool strata is used. This provides a total of 70 quadrate samples annually. Sample locations are not permanent, as new sample location are selected annually. Due to the performance criteria of the Bank, performance strata are spatially distinct with a full set of unique samples in each. Effectiveness strata can overlap performance strata and performance samples falling within effectiveness strata can serve as effectiveness samples. Field monitoring is conducted during the peak phenology period (usually mid-April through late May).

Vegetation monitoring results for 2016:

- 69.4 percent relative native cover in vernal pools. This is the highest value recorded to date, but does not meet the performance standard of 70 percent.
- 32.78 percent relative native herbaceous cover in uplands. This meets the performance standard for the first time.

Vernal Pool Information Network, December 20, 2016 Site Visit Summary

- 11.12 percent relative invasive cover in vernal pools. This is the lowest recorded and below the performance standard for the first time.
- 0 percent medusahead cover in uplands. This is one year after the highest recorded coverage.
- 20,000 estimated Large –Flowered Wholly meadowfoam plants. This exceeds the performance standard for meadowfoam occurrence.
- 328 flowering Lomatium cookie, exceeding the performance standard.

Recommendations:

- The high level of sustained new fairy shrimp occupancy in restored pools contrasts with the low occupancy elsewhere on the Bank (even following soil inoculum transfer) and indicates a need to expand the scope of active restoration or management of altered soils and vegetation – work that ODOT and TNC are currently taking on. On the Bank sites, ODOT and TNC are collaborating to put into action multiple recommendations for preserving and restoring fairy shrimp habitat and populations, many originally described in the Draft Management Plan for the VPMCB (ODOT and TNC 2009), specifically: Restoring vernal pool topography where alterations have degraded vernal pool hydrology and function; controlling invasive weeds in vernal pool habitats; reintroduction or augmentation of native vernal pool and upland mound vegetation; thinning of small-diameter oak and shrub in-fill to restore historic open stand structure; prescribed burning to remove grass thatch and oak litter accumulations, control invasive grasses, and assist in recovery of native vegetation; and re-introduction of fairy shrimp to unoccupied pools following restoration or vegetation treatments, through transfer of cyst-containing soil inoculum.
- Continued implementation and monitoring of these projects will directly benefit fairy shrimp recovery on these ODOT mitigation sites, and can have a much larger-scale positive impact by developing and demonstrating successful methods for habitat and species restoration. Where successful, restoration and conservation management work should be expanded, both on and off these mitigation tracts.
- Documenting implementation and costs as well as ecological methods and outcomes will be important to planning and future work. Where successful methods are not clear, monitoring and experimental design are recommended to better understand the species and habitat, define restoration and management goals, and identify/test effective approaches.

Future VPIN Site Visits

In August 2016, the Service provided funding (\$7,200) to RVCOG to convene several more VPIN site visits. RVCOG also has applied for education and outreach funding (\$2,500) from the Jackson Soil and Water Conservation District to augment the Service funding for the site visits. This funding, along with in-kind staff time from RVCOG (\$500) and TNC (\$600) will allow the VPIN to continue site visits and landowner outreach into the fall of 2016. Due to the increased interest in native pollinators, RVCOG will add this topic to future VPIN discussions.

- Table Rocks (BLM): late spring 2016
- Native pollinator session Spring 2017
- The ODOT VPMCB in fall 2017. This visit would focus on the planned summer 2017 vernal pool restoration activities by ODOT.

Vernal Pool Information Network, December 20, 2016 Site Visit Summary



Paul Benton of ODOT discussing restoration of pools associated with the oak woodland portion of the Bank. Photo taken by Karen Hussey of SOLC.



Paul Benton of ODOT discussing vernal pool restoration. Behind Paul is a restored mound area with a dead oak and several oak seedlings planted in late 2016. Photo taken by Karen Hussey of SOLC.

Vernal Pool Information Network, December 20, 2016 Site Visit Summary



Keith Perchemlides of TNC discussing vernal pool fairy shrimp sampling at the Bank. Photo taken by Karen Hussey of SOLC.



Sam Friedman of the Service discussing a future vernal pool restoration area with Paul Benton of ODOT. Photo taken by Karen Hussey of SOLC.



View of restored vernal pool habitat at the Bank. Photo taken by Karen Hussey of SOLC.

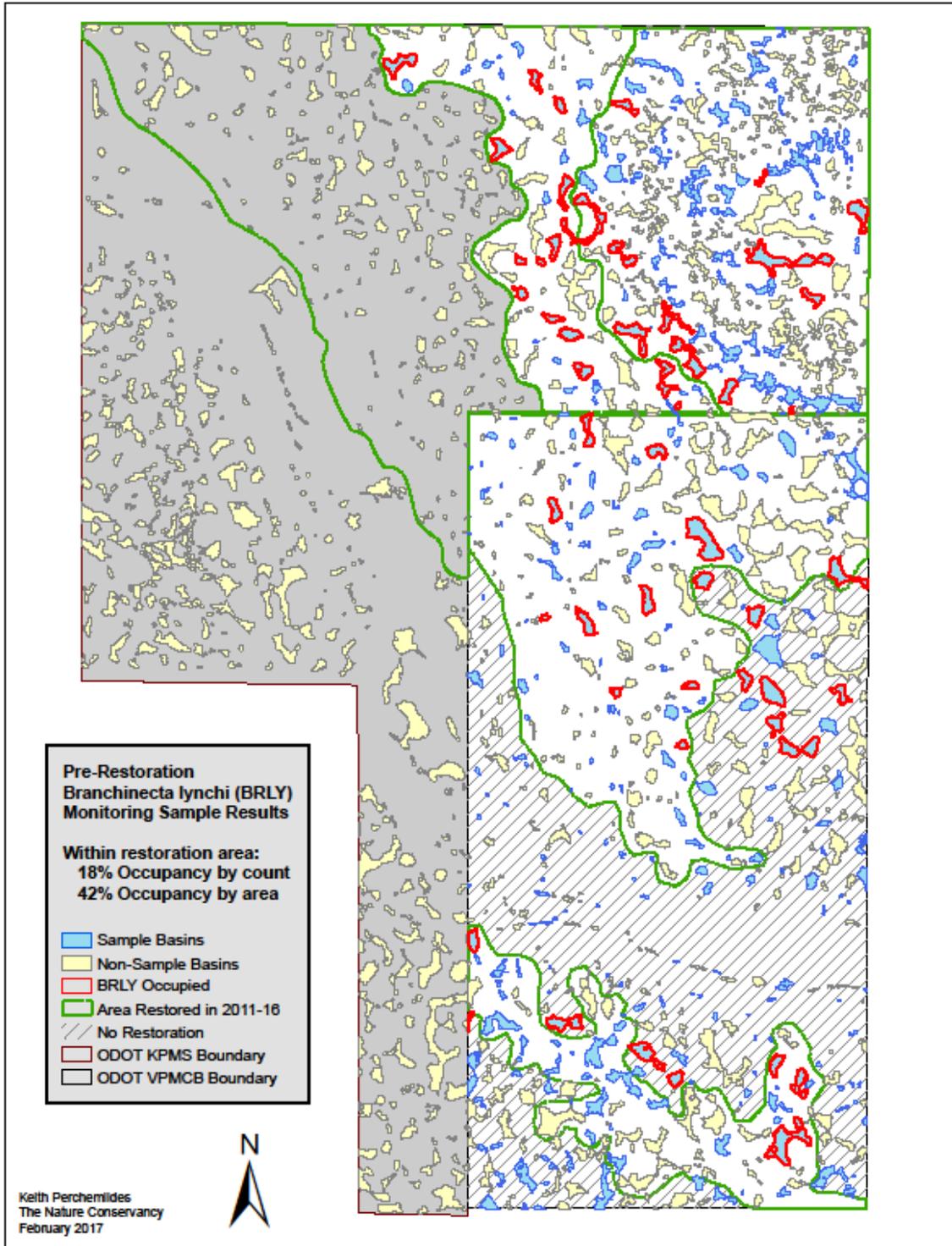


Figure 1.

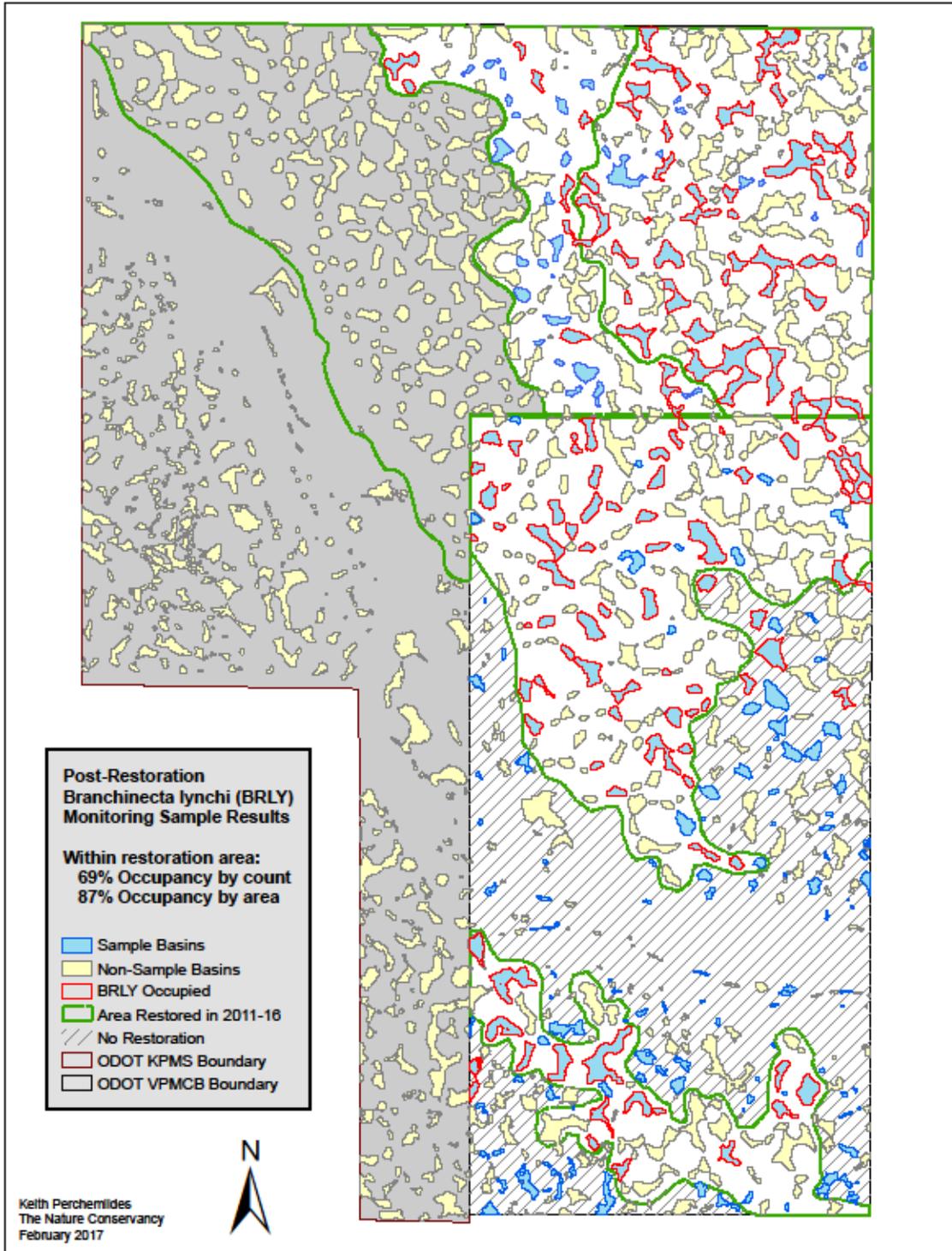


Figure 2.