
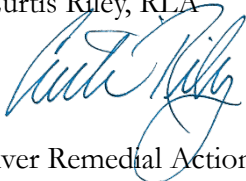




TECHNICAL MEMORANDUM

To: Jim Carsner, U.S. Army Corps of Engineers Date: November 20, 2017
From: Phil Wiescher, PhD, and Curtis Riley, RLA Project: NWS-2013-875
 
RE: Port of Ridgefield Lake River Remedial Action (NWS-2013-875) Year 2 (2017) Vegetation Monitoring

On behalf of the Port of Ridgefield, Maul Foster & Alongi, Inc. (MFA) has prepared this Year 2 (2017) vegetation monitoring report consistent with the Lake River Riparian Enhancement Plan (LRRE) (MFA, 2014). The LRRE is to be implemented in accordance with the U.S. Army Corps of Engineers (COE) Nationwide Permit 38 (NWS-2013-875), issued for the Lake River remedial action in Ridgefield, Washington. The remedial action addressed historical contamination of sediment in Lake River adjacent to Millers' Landing, site of the former Pacific Wood Treating Co. (PWT) facility (see Figure 1). PWT filed for bankruptcy and abandoned the site in 1993. The remedial action was required by the Washington State Department of Ecology for protection of human health and the environment and included precision dredging of contaminated sediment; placement of clean sand to contain residual contamination; bank stabilization elements, including placement of turf reinforcement mat and fish mix rounded rock; and removal of in-water and shoreline debris. To stabilize the bank, predominantly nonnative and some native vegetation was removed along the shoreline. The remediation work and restoration plantings implemented to improve the physical characteristics of the riverbank and establish a native plant community were substantively completed in spring 2015.

Institutional controls and an associated environmental covenant are not required for Lake River. However, characterization of current sediment conditions adjacent to the riverbank will be required before any activities resulting in significant sediment disturbance, such as in-water construction or dredging, are initiated.

Lake River is an 11-mile-long side channel of the Columbia River and lies in the lower Columbia River west of Ridgefield, Washington, near the confluence of the Columbia and Lewis rivers. As described in the LRRE, shoreline vegetation in 2014, before the remediation work, consisted predominantly of nonnative California false indigo, reed canary grass, Himalayan blackberry, weeds (e.g., Queen Anne's lace), and low-growing groundcover. Native vegetation was limited, generally isolated, and surrounded by nonnative vegetation. Natives present included Oregon ash, cottonwood species, and willow species.

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Approximately 148 lineal feet of native shrubs and trees along the approximately 1,800-foot-long shoreline was removed as part of the bank stabilization work and required compensatory mitigation. Three planting groves with native shrubs and trees, spanning a total of approximately 500 lineal feet, were installed on the shoreline in 2015 to meet the required compensation (2:1 mitigation ratio based on lineal feet) for unavoidable impacts to aquatic resources. In addition, the open areas between the groves were planted with native grasses. The total native plant area extends the length of the shoreline, covering approximately 2.7 acres. Plantings were installed as documented in the Lake River construction completion report (MFA, 2017).

Monitoring of the planting-grove vegetation is to be conducted annually for five years (until 2020). Year 1 (2016) mitigation monitoring was conducted in summer 2016, with results provided in the November 2016 monitoring report submitted to the COE (MFA, 2016). In brief, the 2016 report concluded that much of the planted woody vegetation had browned or perished, likely because of insufficient water during summer 2016, and the associated performance standard had not been met. Limited invasive-species encroachment had occurred, and the associated performance standard had been met. Based on these results, replacement plantings in all three groves, as well as ongoing manual control measures for invasive species, were recommended. To optimize plant establishment, the landscape contractor recommended fall/winter plantings in 2017, which are currently being coordinated.

The Year 2 (2017) mitigation monitoring results provided below reflect conditions prior to the replacement plantings and helped inform the selection of species (including quantities) for the replacement plantings.

SITE MANAGEMENT ACTIVITIES

Paul Brothers, Inc. (PBI), of Boring, Oregon, performed the restoration and planting of the shoreline. Plantings were completed in May 2015 and have been maintained as documented in the Lake River completion report (MFA, 2017). MFA gave verbal notice of substantial completion to PBI at a site inspection in October 2015.¹

MFA conducted initial site inspections (September 2015), which included walking the project site; noting the condition of landscaping, weed infestations, and plant damage; and documenting site conditions. In October 2015, PBI removed the irrigation system. Following the 2016 site monitoring, MFA provided the 2016 monitoring report to PBI, informing them that replacement plantings and some invasive-species control would be necessary to meet performance standards. PBI recommended conducting fall/winter 2017 replacement plantings to optimize plant establishment. MFA conducted the Year 2 monitoring described in this report in September 2017. The results in this report were provided to PBI to provide up-to-date planting requirements (e.g., number of plants needed) and to refine species selection for the site (i.e., identify species that appear to be most tolerant of site

¹ This does not include PBI's ongoing maintenance requirements as part of the contract, which includes maintaining all planted areas through October 2018 in order to meet performance standards identified in the contract documents.

conditions and that had shown establishment success). The Year 2 (2017) mitigation monitoring results provided below reflect conditions prior to the replacement plantings.

PERFORMANCE STANDARDS

The following performance standards for the mitigation area are taken from the LRRE:

Performance Standard 1. *During all monitoring periods, non-native, invasive plant species will not exceed 20 percent aerial cover in the planting areas.*

This performance standard for Year 2 is evaluated below.

Performance Standard 2. *Fish mix rounded rock material (7-inch median) will cover 100% of the riverbank from the toe of the slope to a minimum elevation between +11 feet and +14 NGVD. Turf reinforcement mat (TRM) will be in place from the fish mix extent to the top of the bank (approximately +22 NGVD).*

This performance standard has been met. Documentation is provided in the Lake River completion report (MFA, 2017) and is not further evaluated below.

Performance Standard 3.1: *Planted, native tree and shrub species will achieve 100 percent survival during the first and second years after the site is planted. If dead plantings are replaced, the performance standard will be met.*

This performance standard for Year 2 is evaluated below.

Performance Standard 3.2. *During the third through fifth years after planting, native tree and shrub species will achieve 80 percent survival. If dead plantings are replaced, the performance standard will be met.*

Alternatively:

Performance Standard 3.2. *Native tree and shrub species will provide 15 percent aerial cover in the third year and 25 percent aerial cover in the fifth year in the planting areas.*

This performance standard does not apply to this monitoring event.

COMPLIANCE MONITORING METHODOLOGY

The planting areas were inspected on September 29, 2017. The goal of the monitoring inspection was to determine the survival rate of the installed plant material and the extent of nonnative invasive plant encroachment, and to inform maintenance and plant replacement tasks that are required in order to meet the performance standards. The monitoring was performed by MFA ecologists consistent with the methodology and locations described in the 2016 monitoring report (MFA, 2016) and included:

- Establishing the identity and percent survival of native vegetation, using a point-line method; monitoring points at fixed intervals (approximately 5 feet) along three sampling transects spanning each planting grove were evaluated (see Figure 2). Data were recorded for plants

within 1 foot of the sampling units. Percent survival for each planting grove (Groves 1, 2, and 3) was determined based on the number of times a live species was observed at a sampling unit divided by the total number of times that species was observed.

- Establishing the areal percent cover of native and invasive vegetation, using the point-line method described above. Native percent cover for each planting grove was determined based on the number of times native vegetation was present at a sampling unit divided by the total number of sampling units within a grove. Invasive percent cover was determined in the same way.
- Taking photographs at representative photodocumentation points established in 2016 to compare plant vigor and growth between monitoring inspections. Three photodocumentation points for each planting grove (total of nine) were identified, as shown in Figure 2.
- Counting the total number of living/well-established shrubs and trees in each grove to assess the number of replacement plants needed to match the number of plants initially installed in 2015. Typical species identified as well-established were also noted to help inform plant species selection for the 2017 replacement plantings.

RESULTS

This is the second year of monitoring. Monitoring focused on plant identification and cover to provide management (e.g., plant replacement) recommendations and to evaluate the performance standards. Data are provided in the attached table and are discussed below with respect to the relevant performance standards presented above.

In general and as observed in August 2016, much of the planted woody vegetation has browned or perished, likely because of insufficient watering. During a site inspection conducted in May 2016, most plants appeared to be healthy and establishing. Replacement plantings are therefore being coordinated with the contractor, as described below. As noted in August 2016, limited invasive-species encroachment was observed. This was generally due to isolated occurrences of reed canary grass or common weeds such as Queen Anne's lace, and the native grasses planted are well-established and dense. A photo array showing the 2017 site conditions and photodocumentation points is attached.

CONCLUSIONS AND RECOMMENDATIONS

Performance Standard 1. *During all monitoring periods, non-native, invasive plant species will not exceed 20 percent aerial cover in the planting areas.*

The aerial cover for Groves 2 (20 percent) and 3 (13 percent) increased (in 2016 they were 3 and 10 percent, respectively) but does not exceed 20 percent for invasive species. In Grove 1, aerial cover increased from 27 percent in 2016 to 53 percent, primarily due to the spread of Queen Anne's lace. The average cover for all areas surveyed is 29 percent, exceeding the performance standard. The higher-percent invasive cover in Grove 1 is due primarily to the presence of small, isolated patches of reed canary grass and Queen Anne's lace. The grass likely encroached from the Ridgefield National

Wildlife Refuge immediately north, where reed canary grass is widespread and present in monodominant stands. The reed canary grass stands are occasionally mowed by the U.S. Fish and Wildlife Service (USFWS), and many acres of trees (which may help limit spread of the grass) were recently planted by USFWS in the same area. However, existing USFWS budgets and staffing levels typically do not allow for robust reed canary grass treatments (e.g., removal of the rhizome systems) to fully control regrowth and dispersal (USFWS, 2010).

To meet performance standards, reed canary grass and other invasive plant and root mass will be removed from the planting groves as part of the replacement planting efforts scheduled December 2017 through January 2018.

Performance Standard 3.1: *Planted, native tree and shrub species will achieve 100 percent survival during the first and second years after the site is planted. If dead plantings are replaced, the performance standard will be met.*

Survival for native woody vegetation Groves 1 (42 percent), 2 (70 percent), and 3 (48 percent) is well below 100 percent, but Groves 2 and 3 increased (in 2016 they were 55 and 23 percent, respectively). This is because some plants scored as dead or dying during August 2016 showed leaf regeneration during the 2017 monitoring event and appear to be persisting. Willows, and to a lesser extent Douglas spiraea (*Spiraea douglasii*), roses, and some snowberry, are performing better than other species such as dogwood, twinberry, and planted trees. Native grasses are well-established in the planting groves and, based on site observations, are also well-established in the areas between planting groves. As indicated above, it is likely that the woody plants deteriorated because of insufficient watering by the landscape contractor.

Replacement plantings will be installed in all three planting groves this winter (December 2017 through January 2018) as part of the maintenance contract with PBI. While conducting the annual monitoring, MFA observed a greater survival rate with specific plant varieties. The information collected along with the coordinated efforts with local native nurseries led to MFA's selection of hardy native upland plants to meet the site's conditions. The proposed plant list for replanting includes the following species: bald hip rose (*Rosa gymnocarpa*), Nootka rose (*Rosa nutkana*), Indian plum (*Oemleria cerasiformis*), salmonberry (*Rubus spectabilis*), thimbleberry (*Rubus parviflorus*), Douglas spiraea, Pacific crab apple (*Malus fusca*), willow species (*Salix spp.*), serviceberry (*Amelanchier alnifolia*), shore pine (*Pinus contorta*), and bigleaf maple (*Acer macrophyllum*). As bare root and seedling plants become available from nurseries in December 2017, PBI will immediately proceed with replanting as directed by MFA to meet the performance standards per the contract.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

REFERENCES

MFA. 2014. Revised Lake River riparian enhancement plan addendum to the Joint Aquatic Resources Permit Application, NWS-2013-875. Maul Foster & Alongi, Inc. January 17.

MFA. 2016. Port of Ridgefield Lake River remedial action (NWS-2013-875) Year 1 (2016) vegetation monitoring. Maul Foster & Alongi, Inc. November 11.

MFA. 2017. Lake River construction completion report, Lake River remedial action, former Pacific Wood Treating Co. site. Maul Foster & Alongi, Inc. April 13.

USFWS. 2010. Ridgefield National Wildlife Refuge comprehensive conservation plan. U.S. Fish and Wildlife Service. September.

ATTACHMENTS

Table

Figures

Photographs