

Chapter 8. Mitigation Goals, Objectives, and Performance Criteria

The proposed natural resource mitigation site and roadside restoration required by the CRGNSA Consistency Review will be monitored for 10 years to demonstrate that the intended goals and objectives are met. Goals describe the overall intent of mitigation efforts, and objectives describe individual components of the mitigation site in detail. Performance measures and performance standards describe specific on-site characteristics that indicate a function is being provided. Performance measures are used to guide management of the mitigation site. Performance standards are used to evaluate compliance with regulatory permits in the final year of monitoring. Contingency plans describe what actions can be taken to correct site deficiencies.

WSDOT uses the adaptive management process to improve mitigation and restoration success. Adaptive management involves learning from monitoring and implementing management activities, such as implementing parts of the site management or contingency plans. Information from monitoring is used to direct subsequent site management activities. As part of the adaptive management process, mid-course corrections may necessitate a change in vision for the site if nature takes its course and things turn out differently than planned. A change in vision may require renegotiation with regulators for a new set of performance standards.

8.1 Goals

The goal of the proposed compensatory mitigation is to ensure that no functional loss of specific natural resource systems due to project construction including Oregon White Oak woodlands, wetlands and wetland buffers, and riparian buffers. The three off-site natural resource mitigation areas and on-site restoration areas are expected to provide the following function:

- Preserve significant Oregon White Oak woodland habitat
- Restore and increase the aerial extent and associated function of Oregon White Oak woodland in the project vicinity
- Ensure no net loss of acreage or function of wetland and riparian resources and associated species
- Provide opportunity for nutrient and sediment removal
- Restore and improve general habitat functions

As vegetation matures, the roadside restoration areas are expected to provide the following functions:

- Permanent slope stabilization
- Erosion protection
- Water quality protection
- Soil structure improvement
- Sensitive area buffering and habitat improvement

- Reduction in non-native noxious and nuisance vegetation
- Corridor continuity
- Blending the project area with the surrounding natural landscape (visually subordinate)
- Scenic resource protection

8.2 Objectives

The following list of objectives describes the proposed mitigation at the various natural resource mitigation sites and within the project limits:

1. Create 1+ acres of new wetland at the Homestead Lake mitigation site
2. Enhance 3.0 acres of acres of wetland and riparian buffer at the Homestead Lake mitigation site
3. Permanently protect approximately 3.1 acres of Oregon White Oak habitat at the Wind Mountain oak preservation site
4. Establish 13.5 acres of Oregon White Oak woodland at the Cleveland oak mitigation area and on-site restoration areas
5. Enhance 1.1 acre of mature Oregon White Oak woodland at the Homestead Lake mitigation site
6. Promote the development of native plant communities by limiting the growth and spread of noxious and nuisance vegetation, including Himalayan Blackberry and Reed Canarygrass
7. Restore important roadside functions and provide scenic mitigation within the project limits by promoting the development of dense native plant communities

8.3 Performance Criteria

The performance standards described below provide benchmarks for measuring achievement of the goals and objectives of the mitigation site. Mitigation activities are intended to meet these performance standards within a specified time frame. The performance standards are based on function characteristics described in *Method for Assessing Wetland Functions* (Hruby et al. 1999). These function-based performance standards measure structural attributes that provide a reasonable indication of wetland functions. Methods to monitor each performance standard are described in general terms. Monitoring of mitigation success standards begins immediately following initial planting with the collection of baseline data and initial (year 1) survival standards.

Objective 1: Create at least 1.0 acres of new wetland at the Homestead Lake mitigation site. 0.45 acres of the newly created wetland will be used as mitigation for this project, and the remainder will apply to future WSDOT projects within the Western Columbia River Gorge watershed.

<i>Performance Standards</i>	<i>Monitoring Methods</i>
<p>IA. Interim Performance Measure Wetlands will be delineated at monitoring year 5 to assess the development of estimated wetland conditions and the development of Cowardin vegetation classes.</p>	<p>Conduct wetland delineation using current USACE methodology, the Washington State Wetland Delineation Manual (WDOE, 1997), and applicable supplements at year 5. Conduct visual acreage assessments of Cowardin vegetation classes.</p>
<p>IB. Success Standard (final year of monitoring) At monitoring year 10, the wetland area will be delineated to demonstrate that the mitigation site contains at least 1.0 acres of total wetland in compliance with the estimated acreages of Objective 1. <u>0.45 acres of the newly created wetland will be used as mitigation for this project, and the remainder will apply to future WSDOT projects within the Western Columbia River Gorge watershed.</u> Visual acreage estimates of the various Cowardin vegetation classes will be conducted to document the aerial extent of various Cowardin vegetation classes.</p>	<p>Conduct wetland delineation using current methods at year 10 to provide documentation of wetland acreage and make visual observations of Cowardin vegetation classes.</p>

Contingency: If surveyed wetland acreages fall short of the estimated acreages of Objective 1 in any year, WSDOT will consult the various resource agencies for the development of appropriate adaptive management or remedial procedures.

Objective 2: Enhance approximately 3 acres of degraded wetland and riparian buffer at the Homestead Lake mitigation site.

<i>Performance Standards</i>	<i>Monitoring Methods</i>
<p>2A. Success Standard (final year of monitoring) At monitoring year 10, the enhanced wetland buffer and riparian areas will be surveyed to demonstrate that the site contains at least 3 acres enhanced wetland and riparian buffer.</p>	<p>As-built plans documenting that the mitigation sites have been planted according to the planting plan will be submitted within year 1.</p>

Contingency: If surveyed wetland buffer and riparian acreages or fall short of the estimated acreages of Objective 2 in any year, WSDOT will consult the various resource agencies for the development of appropriate adaptive management or remedial procedures.

Objective 3: Provide suitable hydrology for the creation of at least 1.0 acres of wetland at the Homestead Lake mitigation site.

<i>Performance Standards</i>	<i>Monitoring Methods</i>
<p>3A. Interim Performance Measure <i>The soils will be saturated to the surface, or standing water will be present 12 inches or less below the surface for at least 10% of the growing season (growing season as defined in the Soil Survey of Skamania County, WA., USDA, 1972) in years when rainfall meets or exceeds the 30-year precipitation average.</i></p>	<p><i>Conduct field reviews of wetland hydrology including visual observations, photographs, and/or documentation of primary hydrologic indicators (using current delineation methods) during years with formal monitoring. Install a series of shallow groundwater monitoring devices to provide continuous data (hydrographs) of groundwater and surface water conditions at selected locations in the mitigation site.</i></p>
<p>3B. Success Standard (final year of monitoring) <i>At monitoring year 10, the wetland will be delineated using current methods and visual documentation provided to assure that the site contains a minimum of 1.0 acres of total wetland.</i></p>	<p><i>Conduct wetland delineation using current USACE methodology, the Washington State Wetland Delineation Manual (WDOE, 1997), and applicable supplements at year 10 to provide documentation of wetland acreage and hydrology.</i></p>

Contingency: If surveyed wetland acreages fall short of the estimated acreages of Objective 3 in any year, WSDOT will consult the various resource agencies for the development of appropriate adaptive management or remedial procedures.

Objective 4: Develop site topography to create at least 1.0 acres of wetland at the Homestead Lake mitigation site.

<i>Performance Standards</i>	<i>Monitoring Methods</i>
<p>4A. Success Standard <i>The site will be graded consistent with the conceptual grading plan (Appendix E), to support the development of at least 1.0 acres of wetland.</i></p>	<p><i>As-built grading plans and photographic documentation will be submitted within year 1. As-built grading plans will also include the location of habitat structures, photo documentation points, and monitoring wells.</i></p>

Objective 5: Provide wetland and riparian function by creating emergent wetland, the enhancement of riparian and wetland buffer areas, and the enhancement of Oregon White Oak woodland at the Homestead Lake mitigation site by promoting the development of dense native plant communities.

<i>Performance Standards</i>	<i>Monitoring Methods</i>
<p>5A Success Standard <i>The Homestead Lake mitigation site will be planted in accordance with the conceptual</i></p>	<p><i>As-built plans documenting that the Homestead Lake mitigation site has been planted according to the planting plan will be submitted within year 1.</i></p>

<p><i>planting plans contained in Appendix D.</i></p>	
<p>5B Success Standard <i>At monitoring year 1, there will be a minimum survival rate of 90% in all areas identified on the Revegetation Concept as Emergent, Wetland and Riparian Buffer Enhancement, and Oak Woodland Enhancement.</i></p>	<p><i>Conduct major plant assessment of contract-installed vegetation (plant counts based on as-built plans).</i></p>
<p>5C Success Standard <i>At monitoring year 3, there will be a minimum density of native emergent species and native woody vegetation (planted and volunteer trees, shrubs, and emergents) in Wetland and Riparian Buffer, and Oak Woodland Enhancement areas as follows:</i></p> <p><u><i>Native Woody Species (planted and volunteer trees and shrubs)</i></u></p> <ul style="list-style-type: none"> • <i>minimum density of 4,000 living native woody species per acre within the native woody species areas (Wetland and Riparian Buffer, and Oak Woodland Enhancement areas).</i> • <i>at least 6 species of native trees and/or shrubs will be present within the native woody species areas (Wetland and Riparian Buffer, and Oak Woodland Enhancement areas).</i> <p><u><i>Native Emergent Species (planted and volunteer herbaceous species)</i></u></p> <ul style="list-style-type: none"> • <i>minimum of 40% aerial cover of native facultative wet and wetter species within the emergent zone.</i> 	<p><i>Use current monitoring protocols (see Monitoring Plan) to determine density (number of living trees, shrubs, and emergents per acre) and species diversity in Wetland and Riparian Buffer, and Oak Woodland Enhancement areas.</i></p>
<p>5D. Success Standard <i>At monitoring year 5 and 7, minimum cover of native emergent species and native woody vegetation (planted and volunteer trees, shrubs, and emergents) in Wetland and Riparian Buffer, and Oak Woodland Enhancement areas as follows:</i></p> <p><u><i>Monitoring Year 5</i></u></p> <p><u><i>Native Woody Species (planted and volunteer trees and shrubs)</i></u></p> <ul style="list-style-type: none"> • <i>minimum of 35% cover of native woody vegetation (planted and volunteer) within the native woody species areas (Wetland and Riparian Buffer, and Oak Woodland Enhancement areas).</i> • <i>at least 5 species of native trees and/or shrubs will be present within the native woody species areas (Wetland and Riparian Buffer,</i> 	<p><i>Use current monitoring protocols (see Monitoring Plan) to determine minimum cover (number of living trees, shrubs, and emergents per acre) and species diversity in Wetland and Riparian Buffer, and Oak Woodland Enhancement areas.</i></p>

<p><i>and Oak Woodland Enhancement areas).</i></p> <p><u>Native Emergent Species</u> (planted and volunteer herbaceous species)</p> <ul style="list-style-type: none"> • Minimum of 50% aerial cover of native facultative wet and wetter species within the emergent zone. <p><u>Monitoring Year 7</u></p> <p><u>Native Woody Species</u> (planted and volunteer trees and shrubs)</p> <ul style="list-style-type: none"> • minimum of 50% cover of native woody vegetation (planted and volunteer) within the native woody species areas (Wetland and Riparian Buffer, and Oak Woodland Enhancement areas). • at least 5 species of native trees and/or shrubs will be present within the native woody species areas (Wetland and Riparian Buffer, and Oak Woodland Enhancement areas). <p><u>Native Emergent Species</u> (planted and volunteer herbaceous species)</p> <ul style="list-style-type: none"> • Minimum of 60% aerial cover of native facultative wet and wetter species within the emergent zone. 	
<p>5E. Success Standard (final year monitoring) At monitoring year 10, there will be a minimum cover of native vegetation (planted and volunteer) in (planted and volunteer trees, shrubs, and emergents) in Wetland and Riparian Buffer, and Oak Woodland Enhancement areas as follows:</p> <p><u>Native Woody Species</u> (planted and volunteer trees and shrubs) within the native woody species areas (Wetland and Riparian Buffer, and Oak Woodland Enhancement areas).</p> <ul style="list-style-type: none"> • minimum of 70% cover of native woody vegetation (planted and volunteer trees and shrubs) within the native woody species areas (Wetland and Riparian Buffer, and Oak Woodland Enhancement areas). • at least 4 species of native trees and/or shrubs will be present within the native woody species areas (Wetland and Riparian Buffer, and Oak Woodland Enhancement areas). <p><u>Native Emergent Species</u> (planted and volunteer herbaceous species)</p> <ul style="list-style-type: none"> • Minimum of 70% aerial cover of native facultative wet and wetter species within the emergent zone. 	<p>Use current monitoring protocols (see Monitoring Plan) to determine minimum cover (number of living trees, shrubs, and emergents per acre) and species diversity in Wetland and Riparian Buffer, and Oak Woodland Enhancement areas.</p>

Contingency: If the monitoring reports indicate insufficient establishment and/or plant survival, those areas not meeting current-year standard(s) will be replanted to bring them in compliance with the failing current-year standard(s).

Objective 6: Restore or establish at least 13.5 acres of Oregon White Oak Woodland at the Cleveland oak mitigation site (12 acres) and on-site restoration areas (1.5 acres). Restore Oregon White Oak woodland function and provide visual mitigation within the project limits by promoting the development of dense native plant communities.

<i>Performance Standards</i>	<i>Monitoring Methods</i>
<p>6A Success Standard The impacted portions of the project corridor and Cleveland oak woodland mitigation site will be revegetated in accordance with the CRGNSA Consistence Review, Soil Preparation/Planting Plans, and final PS&E documents.</p>	<p><i>As-built plans documenting that the restoration areas have been planted according to the planting plan will be submitted within year 1.</i></p>
<p>6B Success Standard At monitoring year 1, there will be a minimum survival rate of 90% in planted areas.</p>	<p><i>Conduct major plant assessment of contract-installed vegetation (plant counts based on as-built plans).</i></p>
<p>6C Success Standard At monitoring year 3, 5, and 7, there will be a minimum density of native woody trees and/or shrubs as follows:</p> <ul style="list-style-type: none"> • <i>minimum density of 200 living native trees per acre in planted areas.</i> • <i>minimum density of 4,000 living native shrubs per acre when included in planting areas.</i> 	<p><i>Use current monitoring protocols (see Monitoring Plan) to determine density (number of living trees and shrubs per acre).</i></p>
<p>6D. Success Standard (final year monitoring) At monitoring year 10, there will be a minimum density of native woody trees and/or shrubs as follows:</p> <ul style="list-style-type: none"> • <i>minimum density of 175 living native trees per acre in planted areas.</i> • <i>minimum density of 3,500 living native shrubs per acre when included in planting areas.</i> 	<p><i>Use current monitoring protocols (see Monitoring Plan) to determine density (number of living trees and shrubs per acre).</i></p>

Contingency: If the monitoring reports indicate insufficient establishment and/or plant survival, those areas not meeting current-year standard(s) will be replanted to bring them in compliance with the failing current-year standard(s).

Objective 7: Promote the development of native wetland, riparian, and Oregon White Oak woodland plant communities by limiting the growth and spread of noxious and nuisance vegetation, including Reed Canarygrass.

<i>Performance Standards</i>	<i>Monitoring Methods</i>
<p>7A. Performance Standard</p> <p><i>Conduct a pre-construction survey of the existing extent of invasive vegetation at the Homestead Lake and Cleveland mitigation sites including Reed Canarygrass, Blackberry Species, and Japanese Knotweed, to establish a baseline for invasive species monitoring and management at years 1, 3, 5, 7, and 10.</i></p>	<p><i>Provide photographic and map (GPS or notations on plan sheets) documentation of existing stands of Reed Canarygrass, Blackberry species, and Japanese Knotweed.</i></p>
<p>7B. Performance Standard</p> <p><i>At monitoring years 1, 3, 5, 7, and 10, Invasive Species will be managed as follows:</i></p> <p><i>The aerial extent of Blackberry Species and Class B (WA Dept of Agriculture and Skamania County Weed Board) noxious weeds will not exceed 15% in the <u>combined</u> scrub shrub, buffer, and riparian planting areas, exclusive to each mitigation site (ie – invasive species totals at both sites shall not be added together to create a single % cover for reporting purposes).</i></p> <p><i><u>Class A Noxious weeds, Japanese Knotweed, Purple Loosetrife – all areas</u></i></p> <p><i>If/when detected, Class A Noxious Weeds (WA Dept. of Agriculture and Skamania County), Japanese Knotweed, and Purple Loosetrife shall be treated so that the species do not exist on the site. These species shall not be included in the 15% cover allowed for invasive species.</i></p> <p><i><u>Reed Canarygrass</u></i></p> <p><i>At monitoring years 1, 3, 5, and 7, the aerial extent of Reed Canarygrass at each mitigation site shall not exceed 25% total cover in the wetland creation or buffer enhancement areas.</i></p> <p><i>In monitoring year 10 (final year of monitoring), Reed Canarygrass will exist as an understory component that does not out compete the dominant native tree and shrub species or exceed 30% total aerial cover.</i></p>	<p><i>Observe and map (notations on plan sheets) locations of Reed Canarygrass, Blackberry Species, and Japanese Knotweed as part of annual vegetation surveys using current monitoring techniques. For larger stands, GPS measurements of stand perimeters will be provided to measure the extent of change over time. Observations will form the basis of on-going site management and integrated vegetation management activities.</i></p>

Contingency: Implement a long-term integrated vegetation management plan to maintain the aerial extent of invasive species at or below the established thresholds. Weed management activities may be conducted in all monitoring years.

8.4 Monitoring

WSDOT staff will monitor the mitigation sites and roadside restoration areas for 10 years after initial installation. The monitoring objective for the mitigation areas is to achieve the prescribed standards unless WSDOT, in consultation with the regulatory agencies, establish replacement standards based on circumstances and conditions observed at the mitigation site. If all performance standards are achieved in less than 10 years, WSDOT may terminate monitoring with approval of the review agencies. A quantitative monitoring plan will be developed and implemented (beginning in the first growing season following project acceptance -1 year following initial installation) that addresses the standards listed in this plan. The site will be monitored in years 1, 3, 5, 7, and 10 by the WSDOT Mitigation Monitoring Program to evaluate compliance with performance standards, formal monitoring. In formal monitoring years, years 1, 3, 5, 7, and 10, reports of the formal monitoring will be prepared and submitted to the Corps of Engineers, Ecology, Skamania County, and the Columbia River Gorge National Scenic Area. Additional monitoring will occur in intervening non-report years in order to inform and guide site development activities, informal monitoring. Successful mitigation will be measured by attainment of the performance standards described in the mitigation plan.

The Mitigation Monitoring Program uses objective-based monitoring to document the condition of WSDOT's mitigation sites. Monitoring protocols are selected based on objectives specified in the mitigation plan, and evaluation of current site conditions. Quantitative data collection techniques presently in use are based on standard ecological and biostatistical methods described in Bonham (1989), Elzinga et al. (1998), Krebs (1999), Zar (1999), and other sources. The monitoring program's current monitoring methods include the key concepts of objective-based monitoring, adaptive management, and statistical rigor. Quantitative monitoring methods employed involve sample size analyses and may include the point-line, point-frame, quadrat, and line-intercept methods as defined by the works cited above.

Formal and informal monitoring of the mitigation site will occur over the 10-year monitoring period. Table 6 lists the monitoring schedule for the mitigation sites. Successful mitigation will be measured by attainment of the performance standards described in this mitigation plan document. Monitoring and establishment/contingency activities will cease as soon as all success standards have been attained.

Table 6. Monitoring Schedule.

<i>Monitoring Year</i>	<i>Type of Monitoring</i>	
	<i>Formal</i>	<i>Informal</i>
1	Yes	quarterly site visits
2	No	quarterly site visits
3	Yes	quarterly site visits
4	No	quarterly site visits
5	Yes	quarterly site visits
7	Yes	quarterly site visits
10	Yes	quarterly site visits

Table 7. Monitoring report recipients.

Permitting Agency or Organization	Contact Name and Address
U.S. Army Corps of Engineers	Sandra Manning (206) 764-6911
Department of Ecology	Kerry Carroll (360) 407-7503
Skamania County	Jessica Davenport (509) 427-3900
USFS-CRGNSA	Daniel Harkenrider (541) 308-1716
WDFW	Anne Friesz (360) 906-6764

WSDOT has established a comprehensive set of monitoring methods that are based primarily on Elzinga *et al.* (1998). The actual methods used to monitor each site are documented in annual monitoring reports prepared by WSDOT's Wetland Assessment and Monitoring Program, which is based in the Environmental Services Office in Olympia, Washington. Some variation of the methods occurs as techniques are improved, or standards change.

8.5 Contingency Plan

WSDOT anticipates the mitigation goals will be accomplished with the construction and installation of the mitigation design as shown on the grading and planting plans. Contingency actions, however, may be needed to correct unforeseen problems. Contingency revisions typically require coordination with the permitting agencies.

As necessary, contingency measures (such as adaptive management options or revisions to performance criteria with permitting agency agreement) will be implemented to meet performance measures and performance standards. The following describes potential situations that may occur and the potential contingencies that might be implemented to correct the problem. Because not all site conditions can be anticipated, the contingencies discussed below do not represent an exhaustive list of potential problems or remedies.

8.5.1. Hydrology

Hydrologic problems occurring on a mitigation site are typically the result of either insufficient water or excessive water. Insufficient water can occur seasonally during drought conditions or can be a long-term problem. Long-term problems can be the result of altered surface water flows on- or off-site for surface water driven wetlands. For groundwater driven mitigation sites, typical long-term hydrologic problems that result in either excessive or insufficient hydrology can occur from a design based on insufficient groundwater data, the establishment of incorrect final grade elevations, or an unperceived soil condition that alters groundwater flows. Hydrologic contingency measures will be implemented based on observed conditions or monitoring data. Steps to address insufficient or excessive hydrology are:

- Clearly identify the source of the problem.
- Consult with the mitigation design team, including members of Biology, Landscape Architecture, and Hydrology, and the resource agencies to determine an appropriate course of action.
- Adjust elevations or install water management structures to achieve appropriate hydrologic conditions.

8.5.2. Vegetation

Problems related to vegetation include plant mortality, and poor growth resulting in low plant cover. These problems could be the result of insufficient site management, particularly watering in the first few growing seasons, animal browse, competition from invasive species, incorrect plant selection, altered site conditions, and vandalism. Contingencies for plant mortality and poor plant cover may include:

- Plant replacement – Additional planting may be required to meet plant survival and plant cover requirements. Plant species will be evaluated in relation to site conditions to determine if plant substitutions will be required.
- Weed control – Control of non-native invasive species may be required to meet survival and plant cover requirements. Weed control methods could include mechanical or hand control, mulching, or herbicide application.
- Herbivore control – If plant survival or vegetation cover standards are not met because of animal browse, the wildlife responsible will be identified and appropriate control measures will be attempted. This could include plant protection, fence installation, or the use of repellents.
- Vandalism – To prevent vegetation disturbance from vandalism, fence installation and sensitive area signage may be installed.
- Review and revise performance criteria with permitting agency agreement.

8.5.3. Wildlife Structures

Wildlife structures will be installed during construction activities, and will be monitored to verify presence/absence. A contingency for wildlife structures is to:

- Replace or repair missing or damaged structures – If habitat structures become vandalized, are missing, or are functionally damaged, they will be repaired or replaced as feasible.

8.6 Site Management and Establishment

WSDOT will manage the Homestead Lake and Cleveland Oak Woodland mitigation sites and roadside restoration areas annually for 10 years following initial project acceptance. Site management and establishment activities will include plant replacement, vegetation management (including noxious weed control) and may include mulching, fertilizing, supplemental watering, maintenance of access control (fences and gates), repairing damage from vandals, correcting erosion or sedimentation problems, or litter pickup. Suppression and control of these invasive plants will require careful site preparation and active site management. While complete elimination of reed canarygrass and Himalayan blackberry from the mitigation sites may not be possible, they should be managed sufficiently to ensure survival of the native planted species until they can effectively compete.