

Writing Performance Standards for Wetland Mitigation

WSDOT Updated 08/23/17

Performance standards are critical components of any wetland mitigation report. These performance criteria describe measurable attributes that can be used to evaluate success in meeting the goals and objectives of a compensatory mitigation project (Ossinger 1999, Streever 1999). Performance standards describe a desired state, threshold value, amount of change, or trend to be achieved for a particular population or habitat characteristic. In some cases, these performance criteria may set limits on the extent of undesirable change (Elzinga *et al.* 2001).

Performance standards serve two distinct purposes. Performance standards are used to guide site management activities during the monitoring period and serve as benchmarks measured during the final year of monitoring that are used to help evaluate compliance with regulatory requirements.

To be effective, performance standards must be measurable, meaningful, and achievable (MacDonald *et al.* 1991). A direct connection must also be evident between these performance standards and the goals and objectives of the mitigation project. Six elements are required for complete and clearly written standards (Elzinga *et al.* 2001).

1. **Species or habitat indicator:** identifies what will be monitored
2. **Location:** mitigation site or planting zone
3. **Attribute:** aspect of the species or habitat indicator (e.g., size, density, cover)
4. **Action:** the verb of your objective
5. **Quantity or status:** measurable status or degree of change for the attribute
6. **Timeframe:** the time needed for management to prove itself

If one or more of these six elements is undocumented or unclear in the mitigation report or permit, clarification should be requested from authors of the report.

Example

Goal: To provide wildlife habitat at the Lost Creek wetland mitigation site.

Objective: Wildlife habitat functions will be improved by establishing native woody cover in the scrub-shrub wetland at the Lost Creek mitigation site.

Performance Standard: After five years (2022) [*timeframe*], cover [*attribute*] of native woody species [*species or habitat indicator*] will be [*action*] at least 50 percent [*quantity*] in the scrub-shrub wetland of the Lost Creek mitigation site [*location*].

Suggested Performance Standards

Variability in site design and conditions make it challenging to establish a uniform set of performance standards. **For this reason, numerical targets in the following sample performance standards are starting points only and mitigation site context must be considered.** To make sure performance criteria are meaningful and achievable for a mitigation project, site-specific targets should be based on the following:

- details of the planting plan (e.g., patterns of plant distribution, planting density, and species mix),
- environmental characteristics of the mitigation site,
- landscape position and condition of surrounding habitats,
- area land use activities and anticipated level of disturbance,
- consideration of type(s) of project impacts,
- goals and objectives of the mitigation plan, and
- lessons learned from other mitigation or restoration projects in the area.

The following suggested performance criteria incorporate the six elements of a complete and clearly written performance standard.

Wetland Hydrology

USER NOTE: If your site is wetland enhancement or preservation only, hydrology and delineation standards are not needed. If your site has a combination of several mitigation types including wetland enhancement and wetland preservation, include all intended wetland mitigation types in the hydrology and delineation standards. If the preserve is not adjacent to wetland establishment (graded areas), consider omitting the preserve from the performance standards.

Performance Standard (Years 1-9) or (Years 1, 3, 5, and 7)

Within all intended wetland areas (*establishment/re-establishment/enhancement*), the soil will be saturated, or a water table will be present, within 12 inches of the soil surface for at least 30 consecutive days during the growing season in years when rainfall meets or exceeds the 30-year precipitation average.

Performance Standard (Mid-term and Final year of monitoring)

The wetland boundary (established/re-established/enhanced/preserved) will be delineated using currently approved methods by the US Army Corps of Engineers and the Washington Department of Ecology. The designated establishment and enhancement (*establishment/re-establishment/enhancement/preservation*) areas combined at the Lost Creek mitigation site will contain at least 2.70 acres of wetland.

Native Herbaceous Species in the Wetland

USER NOTE: Emergent vegetation is usually a component of a larger, diverse mitigation site. Emergent standards below are generally designed for a defined emergent, herbaceous planting zone without an overlapping woody canopy. If the emergent area applies to an emergent layer in a woody/herbaceous community, only woody species standards should be proposed. Cover can vary depending on levels of expected recruitment and surrounding habitats. If the mitigation site is emergent only (typically in estuarine locations), 5 or 7 years of monitoring may be sufficient.

Herbaceous species richness standards: when a minimum number of native species is required, a species must occupy at least 1 square meter (10.8 square feet) within the evaluation area in order to be counted. Different patches of the same species may be combined to meet the minimum area threshold.

Performance Standard (Year-1)

At least 5 native herbaceous species will be present in the emergent plant communities.

USER NOTE: The number of required species in the emergent plant communities should be based on the number of species planted within this zone.

Performance Standard (Year-3)

Cover of native wetland herbaceous plant species (planted and volunteer) will be at least 45 percent in the emergent communities.

At least 5 native herbaceous species will be present in the emergent plant communities.

USER NOTE: If you are proposing only 5 or 7 years for your emergent monitoring, use the year-10 targets from the table below as your final targets and gradually increase your targets leading up to your final year.

Native Herbaceous Cover Standards in the Wetland		
Year of Monitoring	Western Washington	Eastern Washington
Year-3	45 percent	10 percent
Year-5	60 percent	25 percent
Year-7	70 percent	40 percent
Year-10	80 percent	50 percent

Trees and Shrubs in the Wetland

Performance Standard (Year-1) (Same for Western and Eastern WA)

Native trees and shrubs combined (planted and volunteer) will maintain an average density of at least 4 plants per 100 square feet in the scrub-shrub and forested communities.

At least 2 species of native trees and 4 species of native shrubs will be present in the forested and scrub-shrub areas. (*1 tree and 2 shrubs in Eastern WA- remember to consider landscape context*).

USER NOTE: If the survival data is needed for contract compliance, please keep that separate from the regulatory compliance monitoring performance standards. The HQ Wetland Monitoring Team can still collect survival information for the contract plant warranty counts if needed.

Performance Standard (Year-3) (Same for Western and Eastern WA)

Native trees and shrubs combined (planted and volunteer) will maintain an average density of at least 4 plants per 100 square feet in the scrub-shrub and forested communities.

At least 2 species of native trees and 4 species of native shrubs will be present in the forested and scrub-shrub areas. (*1 tree and 2 shrubs in Eastern WA- remember to consider landscape context*).

or

Cover of native wetland trees and shrubs combined (planted and volunteer) will be at least 20 percent (*10 percent – Eastern WA*) in the combined scrub-shrub and forested communities.

At least 2 species of native trees and 4 species of native shrubs will be present in the forested and scrub-shrub areas (*1 tree and 2 shrubs in Eastern WA- remember to consider landscape context*).

Performance Standard (Year-5)

Cover of native wetland trees and shrubs combined (planted and volunteer) will be at least 35 percent (*25 percent in Eastern WA*) in the combined scrub-shrub and forested communities.

At least 2 species of native trees and 4 species of native shrubs will each provide at least 5 percent relative cover in the forested and scrub-shrub areas. (*1 tree and 2 shrubs in Eastern WA- remember to consider landscape context*).

The cover targets increase each sampling year, however the species richness or diversity targets remain the same.

Tree and Shrub Cover Standards in the Wetland		
Year of Monitoring	Western Washington	Eastern Washington
Year-3	20 percent	10 percent
Year-5	35 percent	25 percent
Year-7	50 percent	40 percent
Year-10	70 percent	50 percent

Trees and Shrubs in the Upland Buffer

Performance Standard (Year 1)

Native trees and shrubs combined (planted and volunteer) will maintain an average density of at least 4 plants per 100 square feet in the upland buffer communities.

At least 2 species of native trees and 4 species of native shrubs will be present in the upland buffer areas. (*1 tree and 2 shrubs in Eastern WA- remember to consider landscape context*).

Performance Standard (Year 3)

Native trees and shrubs combined (planted and volunteer) will maintain an average density of at least 4 plants per 100 square feet in the upland buffer communities.

Or

Cover of native wetland trees and shrubs combined (planted and volunteer) will be at least 20 percent (*10 percent – Eastern WA*) in the combined scrub-shrub and forested communities.

At least 2 species of native trees and 4 species of native shrubs will be present in the upland buffer areas. (*1 tree and 2 shrubs in Eastern WA- remember to consider landscape context*).

Performance Standard (Year-5)

Cover of native plant species (planted and volunteer) will be at least 35 percent (*25 percent in Eastern WA*) in the upland buffer.

At least 2 species of native trees and 4 species of native shrubs will each provide at least 5 percent relative cover in the upland buffer areas. (*1 tree and 2 shrubs in Eastern WA- remember to consider landscape context*).

The cover targets increase each sampling year, however the species richness or diversity targets remain the same.

Tree and Shrub Cover Standards in the Buffer		
Year of Monitoring	Western Washington	Eastern Washington
Year-3	15 percent	10 percent
Year-5	25 percent	20 percent
Year-7	35 percent	30 percent
Year-10	50 percent	40 percent

Invasive Species

Performance Measure (All years)

Washington State-listed or county-listed Class A weeds, Japanese knotweed, and purple loosestrife observed in any area of the mitigation site must be eradicated. (Eradicating weeds means getting rid of the plants altogether, including plant roots). All occurrences shall be immediately reported to the site manager and an eradication program will be initiated within 30 days of the report.

The following Class B or Class C weeds have been designated for control by the State or XXX County Noxious Weed Control Board. If any of the following species are found on the site during the monitoring period, occurrences shall be immediately reported to the site manager and control measures ([as defined by the Washington State Noxious Weed Control Board](#)) will be initiated within 30 days of the report:

USER NOTE: List applicable Class B or Class C weeds that have been designated for control here

Non-designate Class B and Class C Noxious weeds or other species of concern will include less than 20% cover in all intended wetland zones.

Non-designate Class B and Class C Noxious weeds or other species of concern will include less than 20% cover in the buffer zones.

USER NOTE: List specific weeds of concern (whether they are noxious or not) for the wetland and buffer areas if they pose a threat to the successful establishment of native vegetation or are a known species of concern in the surrounding area.

Wildlife Habitat

Establishing meaningful and achievable performance standards for wildlife can be difficult. Changes we observe in wildlife communities may have more to do with activities off site and beyond our control, than changes that actually occur on our mitigation sites. How would we know for sure?

Frequently, attributes of the vegetative community (e.g., woody cover) are used as a surrogate for direct observations of wildlife. In this case, wildlife observations recorded from the site can be used to support and complement findings from vegetation surveys.

Snags, large woody debris, and brush or rock piles are often installed to improve wildlife habitat features on wetland mitigation sites. A simple count of habitat structures may be all that is necessary to document installation according to plan.

Wildlife observations can be used to supplement these data and document wildlife use of habitat structures. The following provides an example performance standard.

Performance Standard (Habitat structures) (Year-1)

Wildlife habitat structures including _____ snags and _____ large woody debris piles will be present at the Lost Creek mitigation site.

Glossary

Adaptive management – Adaptive management is the process of linking ecological management within a learning framework (Elzinga *et al.* 2001). Adaptive management is a process applied to a mitigation site to improve its outcome.

Cover –Cover is the percent of ground surface covered by vegetation of a particular species (or suite of species) when viewed from above (Elzinga *et al.* 2001). Cover is expressed as a percentage. Estimates exclude overlapping cover of individual plants; therefore, values for cover cannot be greater than 100 percent (Appendix A).

Cumulative Cover – Cumulative cover is the sum of cover estimates for all individuals in the target plant population. Cumulative cover may exceed 100 percent due to canopy layering (Appendix A).

Invasive species – An invasive species is a plant that interferes with management objectives on a specific site at a specific point in time (Whitson 2001). For monitoring purposes, invasive species include those plants listed on the County Noxious Weed List and other species that may impede site development.

Management (site management activity) – A site management activity is an operation carried out to remedy a specific situation (e.g., weed control, replanting).

Relative cover – Relative cover of a plant species (or suite of species) is the proportion of the target species coverage compared to that of all species in the plant community combined (Brower *et al.* 1998). The sum of the relative cover estimates for all species from the plant community will equal 100 percent (Appendix A).

Literature Cited

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MacDonald, L. H., A. W. Smart, and R. C. Wissmar. 1991. Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. U.S. Environmental Protection Agency, Water Division, Seattle, WA. EPA/910/9-91-001.

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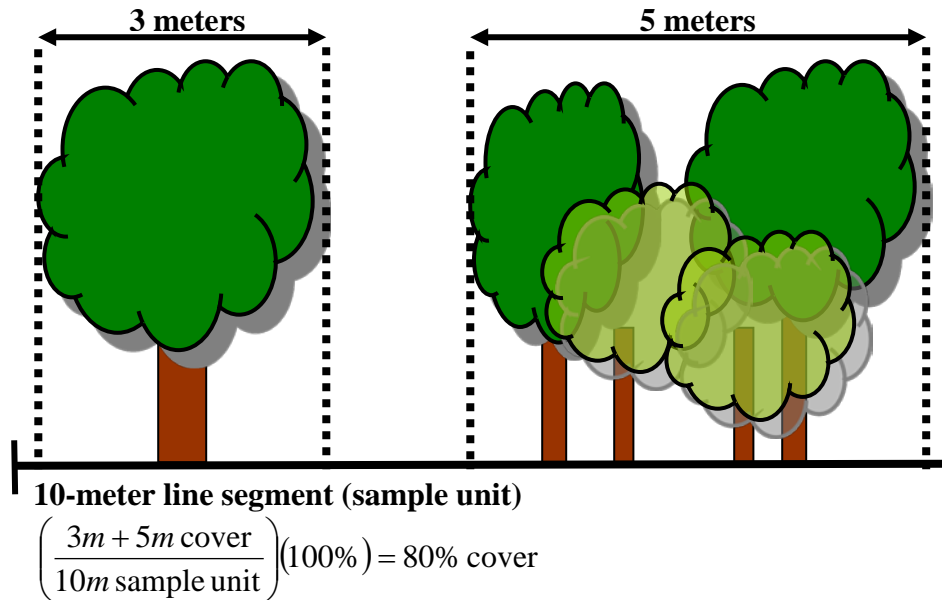
Whitson, T. D. (editor). 2001. Weeds of the west, 9th edition. The Western Society of Weed Science, Grand Teton Lithography, Jackson, WY.

Appendix A

Vegetative Cover Definitions and Illustrations

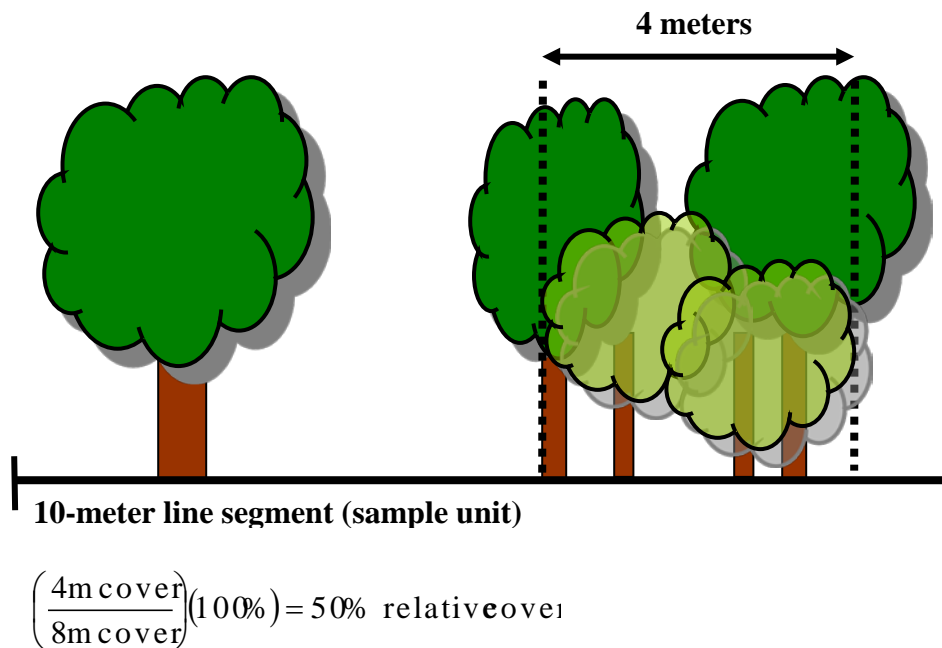
Cover

Cover is the percent of ground surface covered by vegetation of a particular species (or suite of species) when viewed from above. Cover cannot be greater than 100 percent.



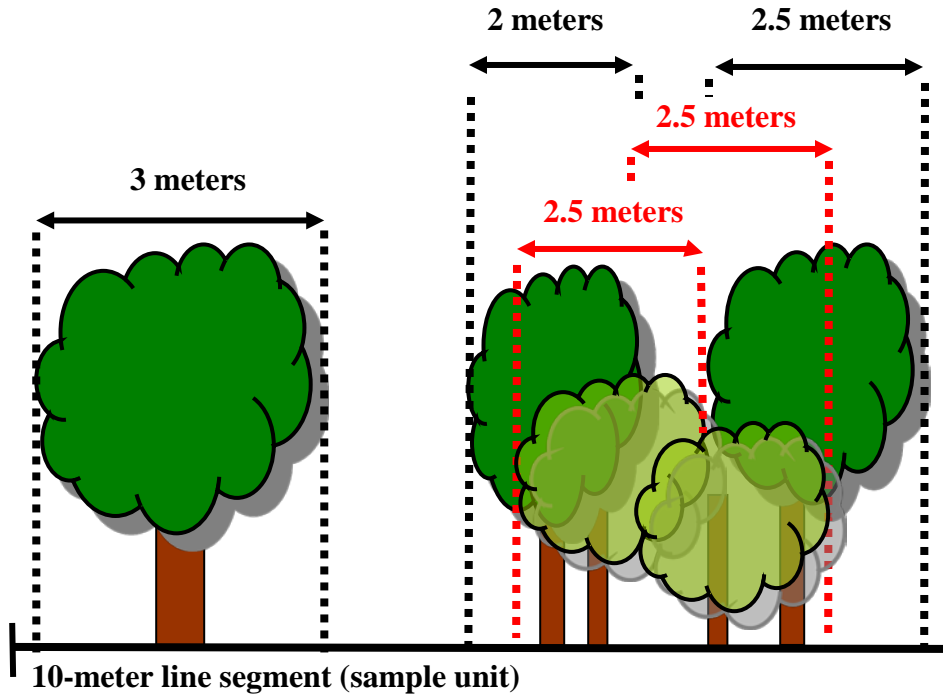
Relative Cover

Relative cover of a plant (or suite of species) is the proportion of the target species coverage compared to that of all species in the plant community combined.



Cumulative Cover

Cumulative cover is the sum of cover estimates for all individuals in the target plant population. Cumulative cover may exceed 100 percent due to canopy layering.



$$\left(\frac{3\text{m} + 2\text{m} + 2.5\text{m} + 2.5\text{m} + 2.5\text{m cover}}{10\text{m sample unit}} \right) (100\%) = 125\% \text{ cumulative cover}$$