



EDUCATION

B.S., Ecology, The Evergreen State College, 1993
Graduate Coursework, Salmon Ecology, The Evergreen State College, 1999
Graduate Coursework, Soils Geomorphology, Portland State University, 2008

PROFESSIONAL REGISTRATIONS & MEMBERSHIPS

Certified Professional Wetland Scientist, Society of Wetland Scientists
Society of Wetland Scientists, Pacific Northwest Chapter

EXPERIENCE

Principal, Cascade Environmental Group, LLC, Portland, Oregon, August 2010 – Present
Senior Wetland Ecologist, ICF/Jones & Stokes, Portland, Oregon, July 2005 – August 2010
Senior Wetland Ecologist, Washington State Department of Transportation, Olympia, Washington, April 1995 – July 2005
Biologist, Bureau of Land Management, Lander, Wyoming, April 1994 – November 1994

QUALIFICATIONS

Mr. Brent Haddaway, PWS is a Principal with Cascade Environmental Group, LLC, and has worked for over 20 years as a wetland scientist and project manager in the Pacific Northwest. Brent performs and manages wetland delineations, functions assessments, wetland restoration and mitigation projects, restoration implementation oversight, wetland permitting, and compliance monitoring. These projects require applying wetland science methods under high degrees of scrutiny, developing analytical tools and interpreting environmental policy as needed to assess project specific conditions, managing budgets and staff, and effectively communicating with a wide range of stakeholders including private land owners and individuals working in industrial, governmental, and non-profit sectors.

Over his career, Brent has delineated sites with a wide range of land alterations. Brent has managed linear wetland delineation projects extending over 50 miles in length and study areas exceeding 7,000 acres. Brent was selected by the US Army Corps of Engineers to instruct wetland delineation trainings for WSDOT and local government staff, and has provided senior review of consultant delineation work while employed at WSDOT. He also has extensive experience in aquatic resource mitigation, including mitigation banking, stream mitigation, and developing out-of-kind mitigation plans. Brent is a partner in the Garret Creek Mitigation Bank in Molalla, Oregon, managing all aspects of bank operations, and participating in DSL forums on mitigation policy as a member of the mitigation banking community.

Brent was a technical committee member for the development of the *Wetland Rating System for Washington State* (WA Dept of Ecology, 2004) and the *Wetland Functions Assessment Method for Washington State* (WA Dept of Ecology, 1999), was a contributing author of the *Wetland Characterization Tool for Linear Projects* (WSDOT), is experienced with *Oregon Wetland Assessment Protocol* (DSL), and has developed project-specific wetland functions assessment protocols. He has managed research projects assessing wetland mitigation performance criteria for the EPA to determine appropriate benchmarks for tree and shrub growth rates, and for the Federal Highway Administration to determine appropriate performance standards for invasive species cover.

Brent's mitigation experience extends beyond wetlands, working on mitigation projects related to Natural Resource Damage Assessment (NRDA), Bonneville Power Administration's "Survival Benefit Unit" crediting, and specific habitat types for both public and private clients. He has worked with numerous ecological crediting systems and ecological models, analyzed ecosystem market for capital investors, and tracks emerging ecological crediting systems that are in various stages of development. Brent regularly manages multidisciplinary teams for projects involving impact assessment and mitigation or ecological restoration. Brent coordinates technical experts and manages budgets in excess of \$500,000. Brent typically oversees regulatory processes, manages budgets and timelines, coordinates design elements, designs monitoring protocols, and guides site management directly. He also assists with identifying perpetual protection mechanisms and developing stewardship plans.

SELECTED PROJECTS

Wapato Valley Conservation and Mitigation Bank – Plas Newydd Conservation Farm, LLC, Clark County, Washington

Project Manager and Wetland Ecologist. Brent served as the project manager for wetland delineation and functions assessment of the over 800-acre study area that is being developed as a wetland and conservation bank. Delineation required evaluation of wetland and upland characteristics across levee-protected and floodplain areas along the Columbia and Lewis Rivers, where river flows fluctuate



significantly during the year, and across multiple years. The entire property is underlain by hydric soils due to the hydrologic regime present on site before the development of the Columbia River Hydropower System, and vegetation on site includes both pasture and native floodplain species with broad tolerances for hydrologic regimes. Soil saturation could not be observed during fieldwork, requiring additional information to be considered. Brent reviewed hydrologic studies of nearby restoration projects and determined river stage data could be used as a reliable surrogate for soil saturation conditions; the study used a series of piezometers to establish connectivity of river stage and soil saturation for the restoration project with similar geomorphic conditions. To establish reasonable hydrology indicators, Brent reviewed river stage data for 15-years to establish "typical" growing season saturation levels. Soil pits were augured in low-elevation test areas where soil saturation could be directly compared to river stage to confirm reliability of river stage as a wetland hydrology indicator. Overall, stage data correlated with presence of hydrophytic vegetation, supporting the wetland delineation.

Shoalwater Bay Mitigation Bank – Shoalwater Bay Indian Tribe, Tokeland, Washington

Project Manager. Brent is leading the development of the Shoalwater Bay Mitigation Bank, which will restore approximately 300 acres of estuary habitat through levee-breaching and other enhancement actions. Brent first completed a feasibility study in 2015 to identify project constraints, develop preliminary cost estimates, credit yield estimates and collect mitigation need information within the proposed service area, and develop a complete project timeline from concept through completion of compliance monitoring. Currently, Brent is leading the Cascade team in defining the project footprint including conducting outreach with non-tribal entities affected by the proposed levee breach. Specifically, Cascade is working with WSDOT on alternatives for highway protection mechanisms for a section of SR 105 currently protected by the levee. After the project footprint and highway protection alternatives are solidified, Cascade will formally engage the Interagency Review Team and WSDOT.

Rinearson Natural Area Restoration Project – City of Gladstone, Gladstone, Oregon

Wetland Ecologist. Brent serves as the lead wetland ecologist on this Natural Resource Damage Assessment mitigation project. Brent oversaw baseline ecology and wetland studies, evaluated project credit generation, and worked with design engineers to consider cost benefit of design decision, balancing credit generation against construction costs. Brent led agency presentations related to credit generation, performance standards, and monitoring frameworks.

Dahl Beach Mitigation Project – Port of Portland, Portland, Oregon

Project Manager and Wetland Ecologist. Cascade supported the Port of Portland in developing a mitigation project for impacts to the Willamette River shoreline (Active Channel Margin) stemming from an early action environmental cleanup project conducted at the Port's T4 Facility. The cleanup action included placement of riprap along the shoreline, which required mitigation under the federal clean water act. Cascade assisted the Port in identifying a mitigation project within the City of Gladstone, and assisted the Port in negotiating an agreement with the city for restoration to occur at the site. The project footprint was adjusted twice to accommodate concerns of user groups; Cascade supported the Port throughout the iterations in consultation with Gladstone City Council and with permitting agencies. The project includes restoration of two riverbank areas at the Clackamas and Willamette River confluence, including developing detailed grading plans, planting plans, and designing two large wood structures. Brent managed the Cascade team and several specialist sub consultants in developing the mitigation plan, project design to bid-ready plans, and complete federal, state, and local permit applications. The project received full approvals for the mitigation plan and construction permitting, and construction was completed in fall 2016; active compliance monitoring begins in summer 2017.

Flyway Wetland Complex Mitigation Bank Feasibility Study - Portland Bureau of Environmental Services, Portland Oregon

Project Manager and Wetland Ecologist. Brent served as the project manager and lead wetland ecologist on this feasibility study, contracted through Cascade's on-call contract with the City of Portland's Bureau of Environmental Services. The study examined several properties in Northeast Portland owned by the Bureau, some purchased in cooperation with Metro and Portland Parks and Recreation, for the potential to be developed as a mitigation bank. The properties total approximately 50 acres of primarily degraded wetlands that could be enhanced to meet Bureau missions of improving flood storage, water quality, and habitat, while also providing mitigation in an underserved area. The study examined the functional benefits of wetland enhancement, and project financials such as estimating mitigation credit yield, credit value, project costs, and the relative timing of project costs and potential revenue. The Bureau is examining mitigation banking as a potential pathway to fund habitat restoration at the site as well as to improve overall mitigation effectiveness.

Garret Creek Mitigation Bank - Garret Creek Mitigation Bank, LLC, Molalla, Oregon

Project Manager and Wetland Ecologist. Brent served as project manager and wetland scientist for developing this project near Molalla, Oregon, which was constructed in 2008 and completed its compliance monitoring period in 2013. The project included delineating actively farmed areas where natural vegetation had been removed and too late in the growing season to directly observe wetland hydrology (mid May). Brent proposed case-specific wetland hydrology indicators by comparing observed site conditions with precipitation



and stream gauge data for the delineation year compared with 30 year averages. The approach required exhaustive documentation, but was approved by the Department of State Lands and the Corps of Engineers. The Garret Creek mitigation bank is the only mitigation bank in the Pacific Northwest with CWA Section 404/401-approved stream credits. He performed all delineation and functional assessment studies and authored all mitigation bank instrument documents; the bank project was approved in 11 months following prospectus submittal.

Chehalis Basin Mitigation Bank - Womble Carlyle Ecology Innovations, LLC, Lewis County, Washington

Project Manager. Brent served as the project manager for this project, which was approved in April 2013 as the first umbrella (multi-site) bank in Washington State. The project encompasses two separate sites, totaling over 380 acres. Brent has managed all wetland technical studies for this project including developing a functions assessment protocol that adapts the Department of Ecology's *Wetland Functions Assessment Method* into a semi-quantitative approach to measure functional benefits of proposed mitigation actions; this site-specific methodology has been approved by both the Department of Ecology and the Corps of Engineers. Wetland restoration design included differing design approaches for each of the sites: floodplain enhancements to established forested wetland and emergent swales, and re-meandering of Coal Creek near its confluence with Salzer Creek. The creek re-meander includes a transition of meander radii as the gradient decreases and occurs in an urban setting with substantial infrastructure.

Rinearson Slough Property Acquisition and Salmon Habitat Restoration Feasibility Study - Cowlitz Indian Tribe, Rainier, Oregon

Project Manager and Wetland Ecologist. Brent managed the study of the feasibility of salmon habitat restoration for 4 project alternatives within a 610-acre study area in Rainier, Oregon. The feasibility study considered various acquisition and restoration opportunities, each requiring levee breaching and appropriate infrastructure protection considerations. The alternatives considered ranged from 195 to 610 acres in size and included various setback levee configurations, varying levels of habitat benefits, and a range of infrastructure considerations. For each alternative, costs were identified for quantifiable project cost elements such as levee construction, habitat restoration, and design and permitting costs. Additionally, public infrastructure considerations such as affected roads or utilities were described and correlated to specific alternatives where relevant.

Yoncalla Creek Mitigation Bank – North Douglas Betterment, Yoncalla, Oregon

Project Manager and Wetland Ecologist. Brent manages and serves as lead wetland scientist for the proposed bank project to serve the Mid Umpqua Basin. Oregon Department of State Lands had established an In-Lieu Fee program for the watershed and has collected sufficient funds to implement a state-sponsored mitigation bank, but had not been able to find an appropriate mitigation site. Cascade worked with the Elk Creek Watershed Council to identify the property, and have engaged DSL to develop a bank site that can receive the In-Lieu Fee funding in the form of credit sales. The mitigation project focuses around removing relic log storage ponds in the floodplain of Yoncalla Creek and restoring riverine wetland floodplain.

Hogan Ranch Site Feasibility – RestorCap, Scappoose, Oregon

Project Manager. Brent is managing this feasibility study for an ecosystem investment company to identify potential projects that could support multiple ecological markets on the 267-acre Hogan Ranch property in Scappoose, Oregon. The property is in an ideal location for ecosystem markets and includes degraded habitat that could be restored. Various site constraints, including legal, regulatory, and financial are being considered to determine the potential for ecosystem market projects to be developed on the property. Clean Water Act/State Removal Fill mitigation, Natural Resource Damage Assessment, and BPA Salmonid Survivability Benefit Unit mitigation options are being considered.