

Developing Off Channel Aquatic and Terrestrial Habitat on the Lower Willamette River: a Case Study on the Stephens Creek Confluence Habitat Enhancement Project

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ABSTRACT:

Vigil-Agrimis Inc (VAI) provided the City of Portland Bureau of Environmental Services (BES) with design services for an aquatic and riparian habitat enhancement project. The project was located at the confluence of Stephens Creek and the Willamette River in Southwest Portland and was constructed in 2008. Similar to many urban stream systems, channel incision caused by altered hydrology and limited sediment availability in Lower Willamette River tributaries has led to reduced and degraded off channel habitat. The Stephens Creek confluence provided an excellent site for off channel habitat restoration.

Enhancement elements included:

- Removal of an abandoned Combined Sewer Overflow (CSO) pipe that runs parallel to Stephens Creek,
- Stabilization of banks through soil lifts and riparian plantings,
- Regrading a remnant channel to increase tidal inundation of the floodplain, and
- Addition of complex wood habitat features along Stephens Creek and the surrounding banks of the Willamette River.

This presentation compares historic restoration solutions to those implemented by the design team. For example, instead of wood habitat features being cabled or anchored, the team designed the wood habitat features to be “naturally” stabilized without the use of cables or anchors. The design also included floodplain enhancement, hydraulic analysis, and associated design elements.

This restoration design provided important benefits including:

- Improved floodplain function by reconnection of the channel to its historic floodplain,
- Improved aquatic habitat from the placement of woody elements and log jams, and
- Improved streambank and terrestrial habitat conditions through the reestablishment of native vegetation.

Construction was completed in the fall of 2008 at a construction cost of approximately \$480,000.

The design team learned many lessons throughout the design, construction, and post implementation monitoring of this project that will benefit future projects. Some of these lessons dealt with the challenges of:

- Describing natural structures on design drawings,
- Designing and constructing "naturally" stabilized wood structures in the sandy soils of the lower Willamette floodplain,
- Constructing and inspecting structures comprised of natural elements of varying dimensions.
- Responding to storm events during construction,
- Designing project elements to be field fit, and
- Assessing functionality of enhancement elements several years after construction.

The project team successfully met all of these challenges. Stream and habitat enhancement projects within urban watersheds will continue to challenge municipalities, designers, regulators, and construction teams around the Pacific Northwest. This presentation shares these lessons learned to benefit designers with similar projects in the future.

The design team has documented historic, construction, and post implementation conditions. This case study illustrates important lessons learned from this challenging project.