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Amphibian corridor: a frog and salamander habitat restoration project.

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Summary

The construction of a frog and salamander corridor aims to promote amphibian conservation in several ways. By providing specific habitat features, including a shallow ditch to collect moisture, woody debris as shelter and a food source, and vegetative cover, the corridor is built to support local amphibian populations around Shoveler's Pond in the Union Bay Natural Area (UBNA), a restored landfill on the University of Washington campus. The placement of the corridor between Shoveler's Pond and a nearby forested creek creates a landscape linkage for amphibians dispersing from breeding locations to terrestrial habitat. Because the corridor is placed in a public area alongside a trail, the potential for educational outreach is high. Many visitors have learned about amphibian life history and habitat needs while passing by the site during construction, and hopefully they will continue to consider amphibians their own urban areas. The corridor also opens the area to further amphibian research at Shoveler's Pond and UBNA. The restoration aspect of the corridor construction presented many challenges, such as finding volunteer labor, choosing the appropriate vegetation for site and soil conditions and pipe installation depth. Assessing and solving these problems incorporated leadership and project management skills learned throughout the Master of Environmental Horticulture program.

A wildlife corridor as small as the one described here is not recommended in existing natural areas that are threatened by urbanization. This corridor improves existing conditions for amphibians in an already urban environment, demonstrates the use of specific habitat features within a restoration project, and sets the basis for future amphibian studies and egg mass searches within the Union Bay Natural Area. Given the opportunity with an appropriate environment, amphibians have the capacity to quickly colonize small, urban ponds . An urbanized environment does not need to be an amphibian wasteland. Restoration projects that incorporate specific habitat features for amphibians will create habitat for these vital wetland inhabitants and a variety of other flora and fauna that persist within the same ecosystem.

What is the issue?

Globally, amphibian populations are reported to have declined; recent studies in the United States have found that declines are more severe than previously documented. Amphibians are sensitive to many factors that could impact viability, such as pollution and climate change, though most biologists consider habitat destruction the leading cause of population decline. In addition to habitat destruction, research has found many examples of negative correlation between urbanization and species richness, species presence and species abundance, as well as a negative relationship with intact community structure.

The Union Bay Natural Area, in which this study was conducted, is a restored landfill. It is in the center of a dense urban area, with limited connections to other natural vegetation associations. One of the wetlands in the Union Bay Natural Area is Shoveler's Pond, an ephemeral wetland fed by rainwater, and lacking any direct connections with other wetlands. An amphibian egg mass inventory of Shoveler's Pond found eggs of only one species, likely a long-toed salamander. Since there are at least four common amphibians in Seattle urban wetlands (Pacific tree-frog, red-legged frog, long-toed salamander and Northwestern salamander), and since there are wetlands near Shoveler's Ponds that are both larger and have better connectivity than it does, habitat improvement and the creation of a corridor seemed to present a good prospect for increasing amphibian access.

How was the project conducted?

The initial step was to conduct a literature search to determine the current state of knowledge about amphibians in general, and about local populations and expected species. In addition, there is a great deal of literature available about landscape ecology, fragmentation, and connectivity. Connectivity is an interesting term, because it is a highly valued trait in landscapes. There is little agreement, however, about what actually constitutes a connected landscape. Corridors are thought to provide routes that facilitate connectivity, but studies show that only certain kinds of corridors work for certain kinds of species. Amphibians have unique requirements, so corridors that they will use must be matched to their needs.

Shoveler's Pond is a vernal pool that contains water during the wet northwest winters. In order to assess the use of the pond by amphibians, an egg-mass survey was conducted when the pond was flooded. A number of other one-time and ongoing surveys have been carried out in the Seattle area, providing good background information about what species might be expected to be found.

Shoveler's pond was selected for construction of an amphibian corridor for several reasons. It is a vegetated pond (egg masses attach to submerged plant material) with a shallow slope, and has no fish that might prey upon amphibians. It is also within fifty meters of a stream and a much larger wetland complex.

The construction was done with the assistance of volunteers and students from University of Washington classes, and information from the scientific literature on amphibians was used to provide guidance for the inclusion of specific features in the design.

What are the major elements of this project?

The configuration that was selected for the corridor is a shallow trench, about three meters wide and thirty centimeters deep, set within a vegetated strip that is 10 meters wide. The trench was constructed by hand, using volunteer labor. Native woody and herbaceous native plants were installed in this buffer; it will likely widen as the vegetation establishes. Woody debris was added to the lower area along the bottom of the trench, and wood-chip mulch was used to cover the site and improve moisture retention. Amphibians are often found under decaying wood, so woody species are used with the expectation that they will contribute woody debris.

There is a gravel trail that intersects the route of the corridor, so a pipe was used to allow amphibians to pass beneath the traffic on the trail. A 1' diameter cast iron pipe, 11' long was used, primarily because emergency vehicles also may use the trail and the pipe must support this weight. The pipe slopes so that it is free-draining. Rock and debris were placed in the bottom of the pipe to provide a natural substrate.

The construction of the amphibian corridor has created the opportunity to create outreach or public education opportunities. Several undergraduate classes participated in the digging and the planting in the corridor, so their students now have knowledge of the project and some experience about how the project was carried out. Since the corridor crosses a trail, a sign explaining the project and its underlying concept was erected on the trail and there was considerable interaction with trail users while construction and planting was occurring.

Finally, the installation of the corridor will allow ongoing research into the level of use of the pond by amphibians. Regular winter surveys of amphibian egg-masses will provide a database for evaluating the current improvements and potential future ones.