Restoring Native Vegetation on Coastal Bluffs in Puget Sound – An Overview

INTRODUCTION

Much of Puget Sound's uplands and shorelands are comprised of and underlain by glacial and interglacial deposits of sand, gravel, silt and clay; which have been compacted, transported, and deposited by repeated glaciations. The most recent of these (about 15,000 years ago), together with fluvial and coastal processes, formed the present landscape. Except for the northern end of Whidbey Island and the rocky islands of the northern sound where bedrock is exposed, the predominant shoreline is characterized by steep, erodable bluffs with narrow beaches.

Primary plant succession began after the glaciers receded and developed into the climax community that greeted early explorers and sustained indigenous native people; only remnants of those forests still remain.

FACTORS AFFECTING SLOPE STABILITY

Geologic, topographic, climatic, seismic, slope, aspect, wind and watershed characteristics, along with coastal processes, are the primary abiotic factors that determine general slope stability and the potential type, rate, and severity of erosion experienced at any specific site.

Human influences were minimal until the late 1800's, when large-scale logging of old-growth timber began. Subsequent clearing, grading, farming, surface water modifications, road building, increased incidence of fire associated with logging, introduction of non-native plants and animals, and coastal modifications associated with commerce and navigation had a dramatic effect on the near-shore environment. Original forested plant communities, which had helped to maintain slopes beyond their angle-of-repose and protected surface soil from erosion, were mostly gone or seriously disrupted by the early 20th century. Resultant increased surface erosion and slope failures were generally ignored. A new balance between land and water occurred and plant succession resumed, resulting in the second growth forests currently being logged.

Concurrently with recent logging; increased development, especially of shorelands, is occurring. Due to higher human density and increased property values, recent episodes of slope failures and erosion are no longer ignored. However, as a result of past human influences, slopes are more unstable than in the past, soil erosion is accelerated, and remnant native plant communities are unable to naturally re-colonize disturbed sites.

Newly exposed glacial materials are often different from and inferior to soils that previously developed along with original mature plant communities. They are relatively infertile, less cohesive, inferior in their water-holding capacity, and more erodable.

MANAGEMENT PRIORITIES/ RE-VEGETATION OPPORTUNITIES

Well-vegetated, relatively stable slopes should be preserved and enhanced as necessary. Marginally stable slopes with early-or-mid-successional vegetation should be pro-actively restored before they degrade further. Areas experiencing recent surface erosion and shallow mass-soil wasting should be evaluated and stabilized immediately to reduce invasion of undesirable species and establish effective vegetation. Development and capital investments in areas subject to deep-seated instability should be avoided. Upland management and development in rural, erosion-prone areas, especially clearing and hydrologic modifications, should be prudently conducted to mitigate or reduce cumulative impacts that could increase erosion hazards.

RE-VEGETATION OR RESTORATION?

The objectives of re-vegetation are to stabilize slopes and reduce surface erosion. The objectives of restoration include the above but additionally aim to re-create a vegetative cover resembling that previously occurring (or one that is best adapted to existing site conditions), provide fish and wildlife habitat, and improve aesthetics. They are quite different and should not be confused. Re-vegetation is a necessary precourser to restoration.

RE-VEGETATION CONSIDERATIONS

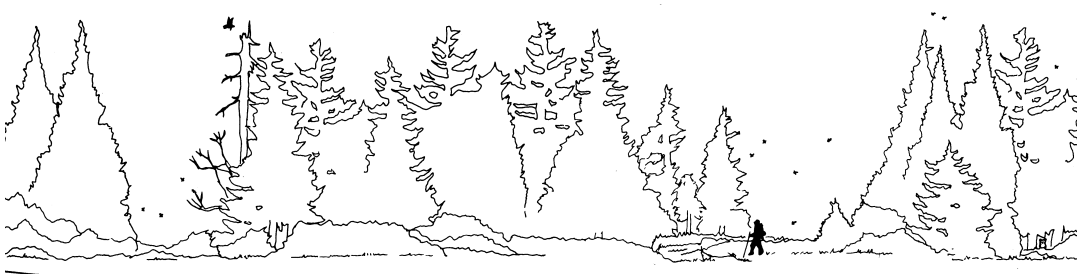
Re-vegetation cannot be successfully accomplished on sites undergoing severe active erosion, where hydrological processes are extreme, on vertical bluff faces, in areas of deep-seated geologic activity, lower banks subject to high-energy wave attack, or in the presence of widespread, highly invasive, non-native species such as English Ivy. Careful assessment and evaluation of highly problematic sites and mitigation of limiting factors, where possible, is imperative if re-vegetation and eventual restoration efforts are to succeed.

In some cases a biotechnical approach to stabilization and revegetation must be employed, utilizing structural and/or geo-textile materials to provide immediate erosion abatement and allow plant materials time to become established.

RE-VEGETATION OUTLINE

1. Planning Elements [determine value of existing vegetation; identify ecological niches and micro-sites; evaluate and mitigate environmental constraints; determine species; design planting plan; select propagules; determine planting period; secure planting stock].
2. Site Preparation [remove undesirable species; grade over-steepened areas; salvage desirable species; prune existing desirable trees and other vegetation].
3. Operational considerations [mark planting sites (species, spacing, etc.); install irrigation as required; fertilize as required; animal damage control as required; use field-grown stock].
4. Maintenance and monitoring [inspect plantings and ancillary materials periodically throughout first year; replace unsuccessful plantings; control competing vegetation; gage overall success; assess degree of natural colonization of desirable vegetation; keep notes; photo-document development].

Note: Establishment of plantings will take 2-3 years. It can take up to 15 years for shrubby vegetation to develop sufficiently to effectively control erosion and resist shallow mass-soil movement, even longer for trees.



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