No Net Loss of Ecological Function

1) What is Ecological Function?

Functioning natural systems are required to sustain biological communities. Biological communities are made up of specific habitat types with plants and animals associated with each specific habitat type. Plants and animals depend on certain physical conditions and ecological processes for their survival. Physical conditions include the depth of water, the soil type and the temperature of water. Ecological processes include water flows and movement, nutrient recycling, sediment movement and predator-prey ('food chain') relationships. The physical conditions and the ecological processes are all part of a functioning ecological system and together they make up ecological function.

Ecological functions are the building blocks of habitat types on which species depend. A change or disruption to the ecological function including physical habitat has proven to result in a change or loss in the habitat type. This change or loss in habitat type has proven to result in loss of species that depend on these specific habitat types.

2) What is No Net Loss of Ecological Function?

The basic concept behind no net loss of ecological function is that any loss of ecological function caused by an action must be offset by an equivalent gain in ecological function. A loss of ecological function is the removal or disruption of an ecological process that produces a certain physical condition or the loss or damage to a physical condition.

For example, one ecological process is sediment movement. Sediment movement occurs when sediment from bluffs and hillsides adjacent to the shoreline is deposited into the nearshore environment through landslides and erosion. This ecological process provides the material that forms nearshore habitat, which is important to many marine species including eel grass and salmon. When bulkheads are built along shoreline these bulkheads prevent this ecological process from occurring therefore this is a loss of ecological process.

A loss of ecological function can also occur when a physical condition such as vegetation along the shoreline is removed or when nearshore habitat is altered through the construction of a pier or other structures over this habitat.

3) How is No Net Loss of Ecological Function Measured?

Using the examples in #2, loss of ecological function of the sediment process can be indirectly measured by calculating the area of the bulkhead structure. Loss of ecological

function of the physical conditions can be measured by calculating the area of vegetation that is removed or the area of nearshore habitat that is covered by the pier structure.

4) How is No Net Loss of Ecological Function Achieved?

The way to achieve no net loss of ecological function is to mitigate the loss through one or a combination of the following:
(A) Avoiding the impact altogether by not taking a certain action or parts of an action that causes the loss of ecological function;
(B) Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts; (this includes using best management practices to reduce or eliminate the impacts during construction and normal operation/use of a site).
(C) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
(D) Reducing or eliminating the impact over time by preservation and maintenance operations;
(E) Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; (Using the examples in #2, this would include planting vegetation in an area the same size as the area where the vegetation is removed in a comparable shoreline location and removing an overwater structure that is equivalent in size to the new overwater structure constructed.)
(F) Monitoring the impact and the compensation projects and taking appropriate corrective measures.

In order for mitigation to be successful a method to measure the impacts and the mitigation are needed. Seattle has developed a tool for this purpose. Information about this tool is found at:
http://www.seattle.gov/DPD/Planning/Shoreline_Alternative_Mitigation_Plan/Overview/