Shoreline Project Review

Project Review Protocol

Individual permit review is based on three primary considerations:

- the need for shoreline management created by the existing or intended upland use;
- the risks created by shoreline and upland management alternatives; and
- the goal of preserving or enhancing ecosystem services that provide public benefits.

Individual permit reviews begin from the assumption that the intended use represents an informed local decision about the consequences of development options for the shoreline reach and local watershed. From this basis, project review is intended to identify preferred management alternatives that:

1. allow the use permitted by zoning
   This step involves elimination of shoreline management alternatives that would prohibit intended use of the site. It does not, however, avoid consideration of altered site planning or reduced intensity of use that may lessen risk and/or minimize impacts to ecosystem services.
2. reduce on-site risks to both use and ecosystem services
   This involves preserving and/or enhancing the riparian buffer to the maximum extent possible consistent with the intended use. It also involves consideration of the long-term impacts of the site design for water quality, habitat, and sediment stabilization in the riparian and littoral zones.
3. reduce off-site risks to existing uses and ecosystem services
   This step seeks to ensure that the on-site shoreline management alternatives do not increase risks on adjacent properties for existing uses. This includes consideration of increased erosion potential, decreased sediment supply, and increased risk to existing defensive structures. This assessment also considers the impacts of alternative management strategies on the ecosystem services (particularly water quality and habitat) currently provided by adjacent properties.
4. maximize the potential for the site to continue to provide ecosystem services that benefit the public
   Within the constraints of the foregoing considerations, the management alternatives that provide the greatest potential for sustained ecosystem services on-site will be identified as the preferred strategy.

To accomplish this we employ several models:

An **erosion vulnerability model** is used to classify shoreline reaches according to the probability that the intertidal and riparian features will persist in the face of natural events. This model assesses the potential for shoreline retreat due to erosion and/or inundation, and the potential for shoreline features, such as marshes and forested buffers, to persist. This model is used to assess the need for shoreline management to support the intended site use.

The erosion vulnerability model is based on the probability that site conditions will permit significant wave energies to strike the shore. This assessment is based on an integration of: fetch (unobstructed distance over open water), nearshore bathymetry (the slope of the bottom next to the shoreline), orientation (predominate direction the shoreline reach faces), and the existing erosion protection on site whether natural (marsh, reef, sand bar), or anthropogenic (bulkhead or other revetment). The assessment characterizes the shoreline segments as being at high, medium, or low risk for continuing shoreline erosion. As such, the assessment evaluates the relative need for managing a shoreline based on natural processes.

A **site development impact model** is used to characterize the potential for a realized site plan to impact:

- littoral zone water quality through alteration of storm/groundwater flows and quality;
- riparian and littoral habitat services through alteration of land use/land cover; and
- riparian and intertidal sediment stability through alteration of storm water flows.

This model is used to identify alternative site development plans that can minimize impacts to a site's long-term capacity to provide ecosystem services with public benefits.

The model is based on existing site conditions. The location and type of existing structures on the site is considered in light of the erosion vulnerability assessment. This determines if there is an obvious need for shoreline management. In the case of new development, the site plan is considered to determine if risk is being unnecessarily created in locating structures. Potential impacts to ecosystem services are evaluated by considering existing riparian and intertidal vegetation, and current bank condition (stable, eroding, undercut). Alternative development strategies are indicated based on: reduction in long-term risk to structures; preservation/enhancement of vegetative cover; preservation/enhancement of contact between vegetation and runoff/shallow groundwater flows; and minimization of any disruption of connections between riparian, intertidal and subaqueous environments.

A **management strategy impact model** is used to characterize the potential for any particular shoreline management plan to affect conditions in adjacent properties. This model considers the potential of management alternatives to increase erosion on adjacent properties, diminish beneficial sediment transport, diminish the effectiveness of adjacent existing shoreline management efforts, increase flooding potential on adjacent properties, or create some other detrimental off-site impacts.

The model is based on existing management strategies on adjacent properties. If adjacent shorelines are unmanaged, then the preferred management strategy will be one that does not reflect energy or significantly alter sediment transport pathways. If adjacent shorelines have defensive structures, then preferred strategies will be ones that allow structures along the entire reach to work together effectively. This may result in avoidable short-term impacts to ecosystem services on the subject property in the interest of sustained performance of existing management strategies on adjacent properties.

Ecosystem service models are used to evaluate the potential that a site has for providing beneficial water quality, habitat, and sediment stabilization services to the local system. The models are based on the combination of physical and biological features that create and sustain capacity to deliver these services. As such, the models provide guidance for the maintenance and/or creation of desirable physical and biological features in shoreline systems.