King County
Scientific Framework for
Shoreline Analysis

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Technical Committee:

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2006 Shoreline Analysis

- Ecology grant received to **characterize physical, chemical and biological conditions** of major shorelines.

- Evaluating **1,350 miles of major shorelines** in unincorporated King County.
Goal of analysis: A comprehensive “understanding of current and potential ecological functions” (173.26.186)

Step 1: “Identify and assemble the most current, accurate, and complete scientific information available” (173.26.201)

Step 2: “Prepare a characterization of shoreline ecosystems and their associated ecological functions” (173.26.201)
3 types of shorelines evaluated:

- Marine (Vashon)
- Riverine $\geq 20\text{ cfs}$
- Lacustrine $\geq 20\text{ acres}$
• Base scoring on estimating process integrity as a proxy for function;

• Score pixels within jurisdiction boundaries for attributes using specific GIS layers, with the goal of aggregating values;

• Increase weight of some scores relative to others, based on perceived importance to processes and importance to functions.
Processes to be analyzed:

<table>
<thead>
<tr>
<th>Individual Processes</th>
<th>Process Group</th>
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<tbody>
<tr>
<td>Hydrologic cycle</td>
<td>Hydrology</td>
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<tr>
<td>Wave energy</td>
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<tr>
<td>Tidal regime</td>
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<tr>
<td>Large woody debris</td>
<td>Physical and Geomorphic</td>
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<td>Sediment</td>
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<td>Light energy</td>
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<tr>
<td>Phosphorus/Toxins</td>
<td>Water quality</td>
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<td>Nitrogen</td>
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<td>Pathogens</td>
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Analytical steps to process evaluation:

- Process Components
- Major Natural Controls
- Key areas of landscape
- Change to process in key area
- Cause of change
- Indicators of change

Evaluation and Scoring

• Available information variable for the different shoreline types;
• ~13 different scores: 1 per process, 1 for each aggregate of similar processes, 1 total score;
• Weight scores at both the process and at the group levels for each shoreline type;
• Generate statistics on results at a landscape scale.
Shoreline Ecological Characterization Model

EVALUATE EXISTING SHORELINE USE
- land use
- transportation
- utilities
- historic resources

NITROGEN
- Examples of Associated Sources and Allocations:
  - Agricultural land use
  - Residential land use
  - Outfalls
  - Channelized streams
  - Channelized depressional wetlands
  - Filled depressional wetlands

PHOSPHORUS/TOXINS

PATHOGENS

LARGE WOODY DEBRIS

SEDIMENT

LIGHT ENERGY

HYDROLOGIC CYCLE

WAVE ENERGY

TIDAL REGIME

WEIGHTED SCORING BASED ON GEOMORPHIC CONTEXT

GEOCHEMICAL
(WATER QUALITY)
- Phosphorus
- Nitrogen
- Pathogens

PHYSICAL GEOMORPHIC
- LWD
- Sediment Transport
- Light Energy

HYDROLOGY
- Hydrologic cycle
- Tidal regime
- Wave energy

OVERALL CHARACTERIZATION SCORE

DEVELOP GOALS FOR FUTURE SHORELINE MANAGEMENT

GROUPS OF RELATED PROCESSES

INDIVIDUAL PROCESS

EVALUATE EXISTING PUBLIC ACCESS CONDITIONS
Next Steps:

- Compare findings to biological data (locations of known habitat functions and high quality vegetation) and relevant studies to evaluate efficacy of model.

- Examine data to find the causes for anomalies and isolated scores within larger groups of similarly scored pixels.