Columbia River Ecosystem Classification—Overview

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“...a hierarchical ecosystem classification that integrates saline and tidal freshwater reaches of estuaries in order to characterize the ecosystems of large flood plain rivers that are strongly influenced by riverine and estuarine hydrology.”
Resulting in six-level mapping of 230 km of Columbia River channel and floodplain in a manner that relates channel and floodplain features to formative processes.
1. Ecosystem Province
2. Ecoregion
3. Hydrogeomorphic Reach (geologic env.)
4. Ecosystem Complex (process domains)
5. Geomorphic Catena (landform patches)
6. Primary Cover Class (surface cover)
Mapping chiefly by Charlie Cannon and Mary Ramirez
3. Hydrogeomorphic Reach (geotectonic env.)
--tectonic and geologic events and processes of the last few thousand to several million years

4. Ecosystem Complex (process domain)
--processes and events of the last few hundred to thousands of years

5. Geomorphic Catena (landform)
--processes and events of the last few decades to hundreds of years

6. Primary Cover Class (surface cover)
--current vegetative conditions
Aquatic: 
Mainly rule-based on basis of bathymetry

Terrestrial (and Anthropogenic): Interpretative on basis of topography, soils, geology, and aerial photography
Prairie Channel
(Upper) Surge plain

Secondary Channel

Floodplain

200 Meters
Anthropogenic features
A basis for monitoring

- A census of current conditions
- A process-based framework for sampling and analysis
A basis for analysis
Cluster dendrogram for ‘Wetland’ polygons (samples)

- A total of 1730 Wetland samples were analyzed for their proportional composition of land cover classes.
- Hierarchical clustering separates samples into statistically distinct groups (solid black lines) through the ‘Similarity Profile’ permutation test (SIMPROF).

**Group average**

Transform: Square root
Resemblance: S17 Bray Curtis similarity
Subcatena -- coherent groupings of catenae (landforms) and cover types
1. Ecosystem Province
2. Ecoregion
3. Hydrogeomorphic Reach (geologic env.)
4. Ecosystem Complex (process domains)
5. Geomorphic Catena (landform patches)
6. Primary Cover Class (surface cover)
7. Subcatena (landform-cover groupings)
8. Fish Catena (habitat units)
9. ??

Level II and III Ecoregions, after Bailey and Omernik
Better understand alterations

- Historical analysis
- Direct findings
Relate places to processes

- ...relic processes or events
  
  \textit{volcanism, landslides}

- ...historical processes
  
  \textit{large floods, channel migration}

- ...ongoing processes
  
  \textit{smaller floods, sed. loads, dredging, diking}

- ...changes in process regime
  
  \textit{flow, sediment, sea level}
Status

- Mapping in review (available Summer, 2012)
- Summary report; 2013
- Many future options...