

Designing for Ecological Services

Ecological Functions

How do you design producing landscapes to perform ecological functions?

Ecological Services

- Water quality functions
- Hydrologic functions
- Habitat functions

Use these tools

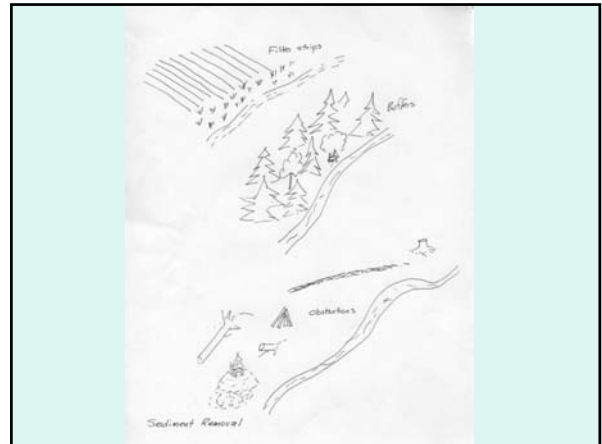
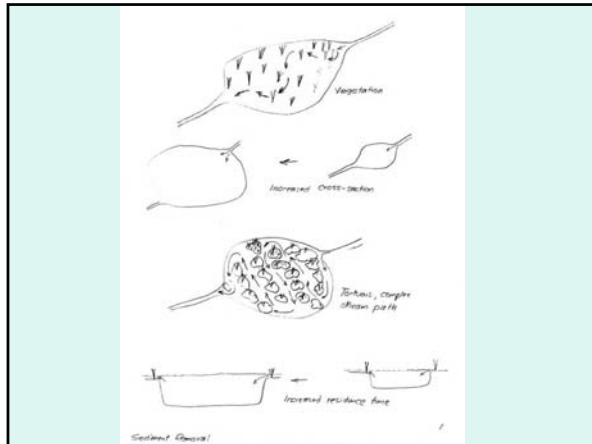
- Vegetation
- Shaping the land
- Modifying or using hydrology
- Landscape ecology
- Engineering
- Location
- Organic material
- Structures

Ecological Services

- Water quality functions
 - Sediment removal
 - Nutrient removal

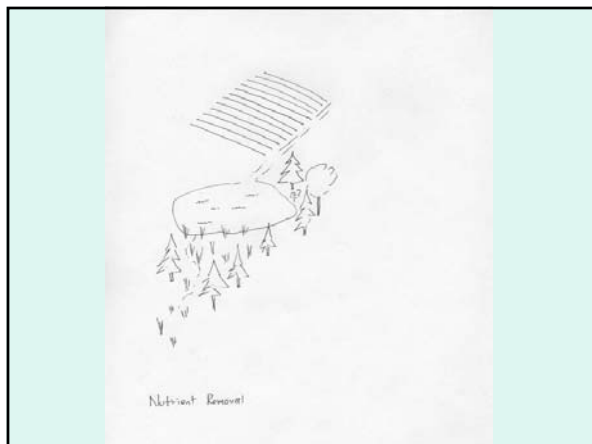
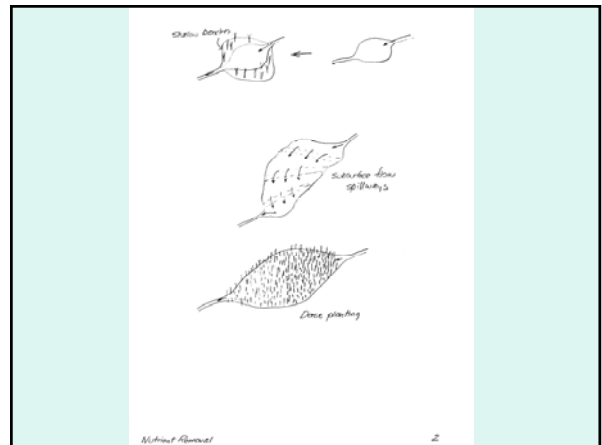
Sediment removal

- Slow down water



Nutrient removal

- Denitrification
- Leaching of nitrates
- Nitrogen uptake
- Phosphorus removal (soil contact)

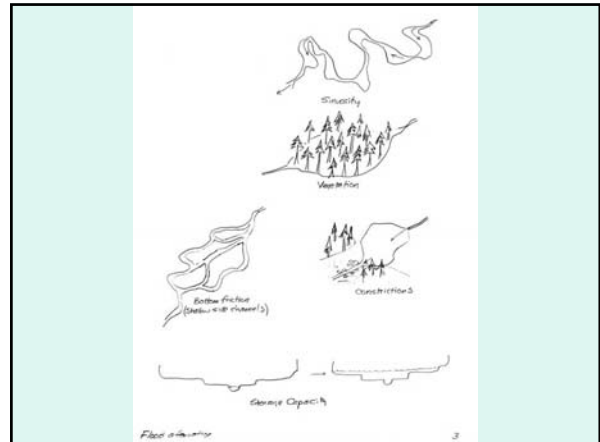


Ecological Services

- Hydrologic functions
 - Flood flow abatement
 - Erosion control
 - Ground water recharge
 - Base flow maintenance

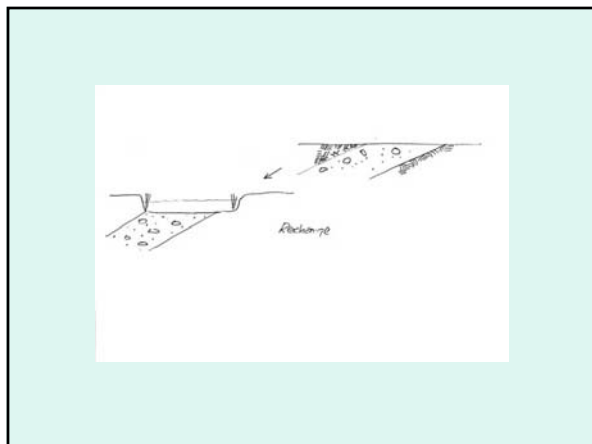
Flood-flow attenuation

- Friction
- Increased path length
- Storage capacity



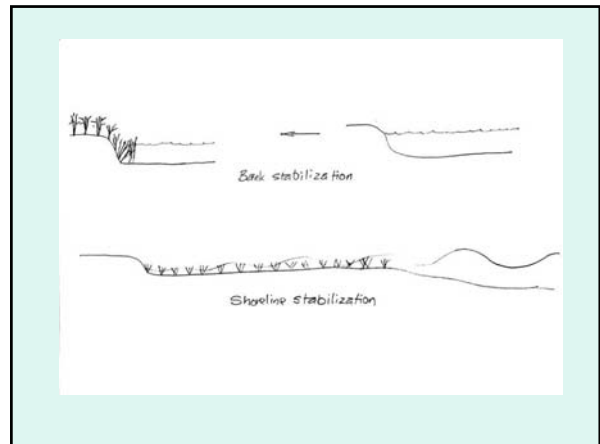
Recharge

- Permeable layer
- Water source
- Adequate head



Bank stabilization and erosion control

- Energy-absorbing vegetation
- Fast growing vegetation (clonal)
- Fibrous root systems
- Shallow water (friction)
- Minimal fetch

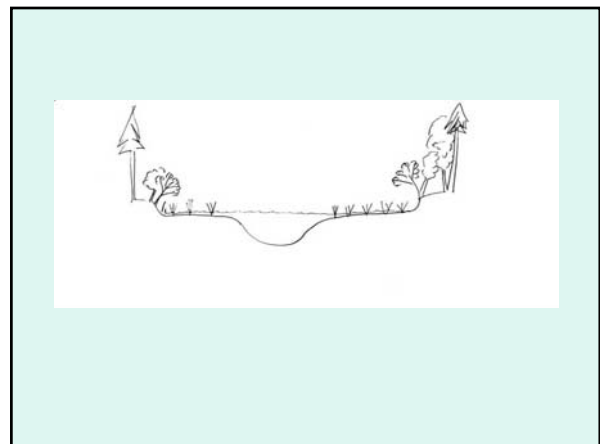


Ecological Services

- Habitat functions
 - Specific habitats
 - Primary production

Primary production

- Wetlands and nearby uplands contribute organic material to aquatic systems
- Shallow-water shores with adequate sun are very productive
- Water-associated systems are often quite "leaky"
- Productive terrestrial systems may either have large standing biomass or high turnover rates.
- In some ecosystems, low production is normal.





Habitat

- Wetlands have high β -diversity
- Maximize shallow water, minimize deep water.
- Constructed features and in-stream features work.
- In Terrestrial systems, structural complexity often provides high habitat value.
- Congruence of aquatic and terrestrial systems creates high habitat value.

