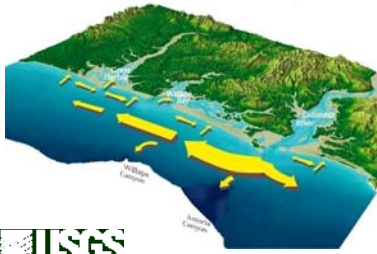


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Presentation 01/04/06 at UAA Coastal Erosion workshop

An Introduction to Coastal Sediment Budgets

Columbia River Sediment Dispersal



Talk Outline

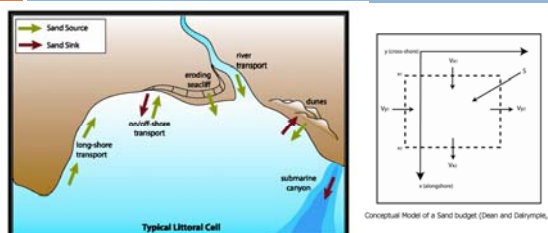
1. Basic Principles
2. Sediment sources
3. Sediment sinks
4. Case Examples

*Dr. Peter Ruggiero is now at Oregon State University, Corvallis

USGS

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Application of Conservation of Mass to Littoral Sediments



Typical Littoral Cell

Conceptual Model of a Sand Budget (Dean and Dalrymple, 2002)

$$\Delta V_s = V_{x1} - V_{x2} + V_{y1} - V_{y2} + S$$

Modified from Komar 1998

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The Budget of Littoral Sediments

Credit	Debit	Balance
Longshore transport into area	Longshore transport out of area	Beach deposition or erosion
River transport	Wind transport out	
Sea cliff erosion	Offshore transport	
Onshore transport	Deposition in submarine canyons	
Biogenous deposition	Solution and abrasion	
Hydrogenous deposition	Mining	
Wind transport onto beach		
Beach nourishment		

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Littoral Cells

LITTORAL CELLS

summer waves from the NW

winter waves from the SW

headland

bay

Inman and Chamberlain, 1960

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Sediment Sources

Sediment Sources

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Path of sand particles

Longshore current

Longshore transport

Rivers

Bluff erosion

Cross-shore transport

Beach Nourishment

Net movement of sand grains

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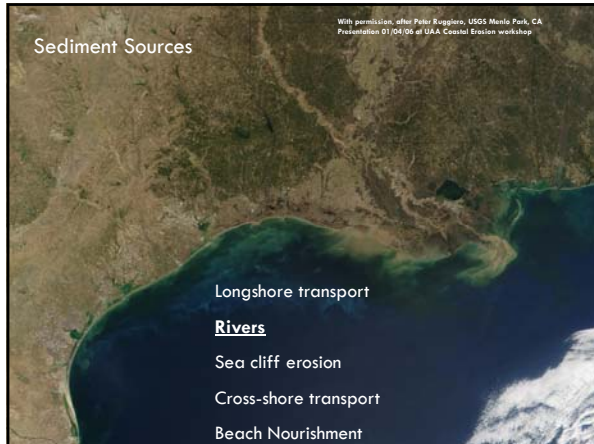
Groins impounding net longshore sediment transport

Groins impounding net longshore sediment transport

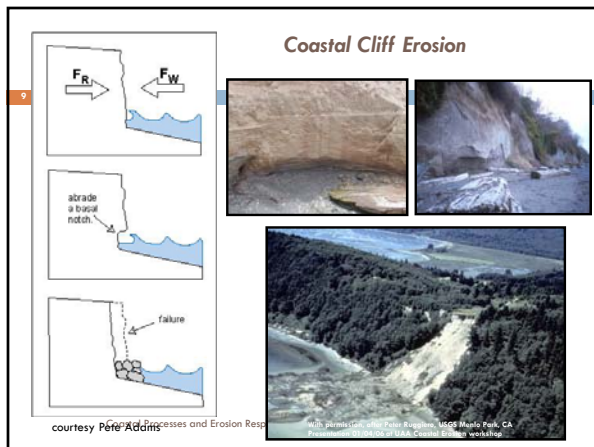
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Sediment Sinks

Loss to submarine canyons

Wind transport to dune fields

Offshore transport

Beach mining



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Sandy beach and dune

11



Loss to submarine canyons

Wind transport to dune fields

Offshore transport

Beach mining

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Sediment Sinks

Loss to submarine canyons

Wind transport to dune fields

Offshore transport

Beach mining




Figure 3.5: Back beach sand mining operation in Marina


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19 Anthropogenic Influences on Sediment Supply & Sediment Budget

- > 200 dams in Columbia River basin
- Increases in grazing, logging, irrigation
- Channel dredging
- Construction of pile dikes
- Construction of jetties

Columbia River Basin Dams



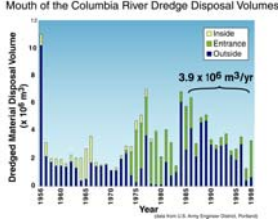
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20 Anthropogenic Influences on Sediment Supply & Sediment Budget

- > 200 dams in Columbia River basin
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Mouth of the Columbia River Dredge Disposal Volumes




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21 Anthropogenic Influences on Sediment Supply & Sediment Budget

- > 200 dams in Columbia River basin
- Increases in grazing, logging, irrigation
- Channel dredging
- Construction of pile dikes
- Construction of jetties



15- South Jetty - Experimental asphalt bound jetty head - Paving asphalt mix on south slope - September, 1936.

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