G473 Environmental Geology
Aggregate Mining Issues in Oregon

I. Introduction

A. What is "aggregate mining"
1. aggregate = loose, unconsolidated construction materials
a. sand, gravel
2. Aggregate Use
a. Building / Construction
(1) Road Gravel
(2) Asphalt
(3) Concrete
(4) Materials Processing / Chemical Processing
(a) e.g. Limestone used in steel making
3. Land Use Issues
a. High population = high landuse
(1) >population, >aggregate requirements
4. Aggregate Sources
a. Loose, Natural Sediment
(1) River Sand / gravel
(2) Beach Sand / gravel
(3) Glacial sand/gravel
(4) "soils" (colluvium)
b. Consolidated Bedrock
(1) Rock Quarries
(a) Mining
(b) Crushing
(c) Grinding
(d) Trucking
(2) Rock Types
(a) Limestone
(b) Granite
(c) Basalt

II. General Environmental Issues
A. Ground Water Disturbance
1. Mine De-Watering Operations
2. Impact on Local Groundwater Gradients / Flow
3. Impact on Local Groundwater Supply
4. Impace on Local Groundwater Quality / Chemical Degradation
B. Surface Water Disturbance
1. Leaching / Chemical Reaction with Mine Refuse / Spoil
2. Surface Water Discharges
a. Chemical Degradation
(1) Acidification
(2) Heavy Metals Contamination
(3) Alkaline Discharge
b. Surface Discharge - Diminishment of Supply

C. Fugitive Dust / Atmospheric Pollution
D. Deforestation
E. Ground Disturbance

III. Floodplain Aggregate Mining in Oregon
A. Aggregate Need in Western Oregon
1. Increasing Population
a. Majority of State Population west of Cascades
(1) Willamette Valley = Ground Zero
2. Building / Construction
3. Road Construction / Maintenance
B. Ready-Made Aggregate Source
1. Fluvial Sediments (sand and gravel)
2. e.g. Willamette River Valley
a. Aggregate Source
b. Close Proximity to Population Center
C. Quarry Types
1. Upland Quarries
a. Bedrock Excavation
b. Fluvial Terrace Gravels / Sand
(1) Above Limits of 100-yr Floodplain Zone
2. In-Stream Mining
a. Channel Zone
b. 2-yr Floodplain Zone
(1) Prime Riparian Habitat
(2) Wetland Habitat
3. Off-Channel Mining
a. 2-yr to 100-yr Floodplain zone
D. Mine Techniques
1. In Stream Mining
a. Excavation / Dredging
(1) Sedimentation Problems / Turbidity
(2) Severe Habitat Impacts
2. Off Channel Mining
a. De-watering necessary
b. Diking Mechanisms
(1) flood control

E. Impacts of Mining
1. Habitat Loss
a. Wetlands disturbance
b. Salmon Habitat
2. Hydrologic Impacts
a. Fluvial System Response to Mining
(1) Decrease "floodplain storage"
b. Complex response of channel system

F. Environmental Issues / Engineering Concerns
    1. Reclamation
        a. Habitat Restoration
        b. Land Reclamation
            (1) Bank Erosion
        c. Hydrologic Reclamation
        d. Wetlands Reclamation