

Soil and Water Issues

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1

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2

Soil, water and forestry

- Flooding, landslides, erosion and sediment transport occur as natural geomorphic processes.
- All streams flood at times, and all steep slopes are susceptible to mass movement.

3



4

- Photo of recent flooding in Port Alberni
(Photo not available for distribution)

5

Trees and forests affect water

- Forest canopy intercepts rain and snow
- Trees transpire, moving water from ground to air
- Trees regulate temperature through shading
- Tree roots add strength to soil

6

Changes in forest cover can affect natural processes

- Climate change, logging, beetle kill, forest fires can change forest cover
- This can increase number of landslides, change frequency of flooding, increase soil erosion
- Goal is to minimize unwanted impacts of forestry through effective management
- Cost effective – prevention better than rehabilitation

7



8



9

Forestry and Streamflow

- Trees intercept precipitation, and transpire soil moisture
- Removal of trees means more water reaches the ground and less goes back to the atmosphere
- Other effects
- Net effect for our climate is increased streamflow

10

Forests and streamflow (continued)

- Lots of ongoing research on this topic
- Difficult statistics
- Water Survey of Canada gauge network measures streamflow in some sites at some times
- Every watershed has a different response based on size, steepness, forested area, etc.

11



12



Forests and streamflow (cont.)

- Hydrological recovery as trees regrow – depends on size of tree and regrowth of canopy cover
- Changes to streamflow are a cumulative effect.
- Effects of changes in forest cover greatest on smallest floods, minimal on largest floods
- Generally higher summer low flows

14

Forests and streamflow (cont.)

- Watershed level process generally requires watershed-level study and management
- CWAP/IWAP process since 1995 in BC
- Cost/scale of assessment process
- Goals for forest management – identify potential impacts and manage harvest rate/harvested area

15

Forestry and Groundwater

- Aquifers provide natural water quality protection
- Reduced transpiration and increased precipitation mean higher groundwater levels
- Some shallow surface groundwater can be affected by roads

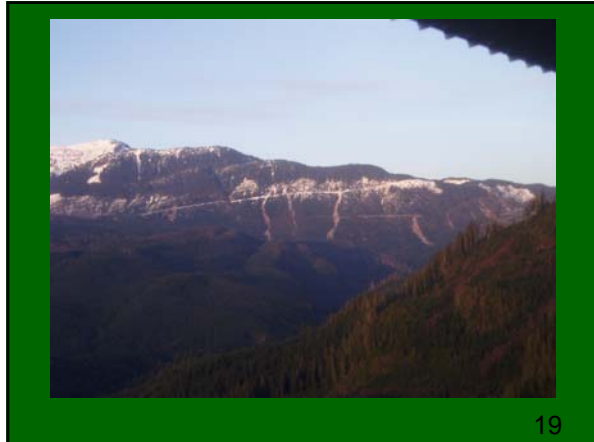
16



Landslides

- Landslides are large, episodic sediment transport events.
- Steep, wet slopes most susceptible to slides
- Removal of forest canopy causes wetter slopes and temporarily reduces root reinforcement
- Forest roads can also cause slides (engineering)

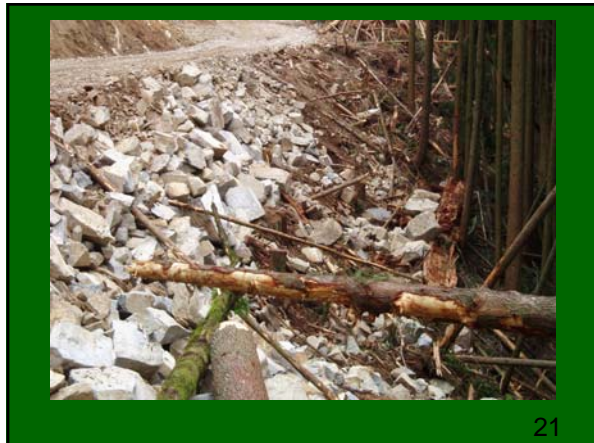
18



Landslides and forest management

- Maintain landslide rate at natural level and avoid landslides from forest roads
- Best time to prevent landslides is before they occur
- Identify unstable terrain, log appropriately and choose appropriate engineering methods
- FPC and FRPA working to reduce forest-related landslides

20



Soil erosion and sedimentation

- Landslides vs. soil erosion as sources of sediment
- Bare ground required as sediment source
- Roads much more important than cutblocks as sediment sources
- All streams transport sediment, but changes in sediment supply change amount of sediment transported

22



Erosion control and sediment management

- Management goal: minimize sediment production by controlling erosion
- Management practices can be very effective if properly implemented
- Sources of human erosion other than forestry – manage through community process

25



26

Other water quality factors

- Pathogens (beaver fever etc.) – animals transport
- Contaminants – avoid introduction
- Herbicide/fertilizer application – manage with respect to downstream use
- Access control – grow ops/trash dumping/bush parties etc.

27

Conclusions

- Water quantity and timing of flows – cumulative effect, manage at watershed level
- Water quality – related to sediment supply. Manage sed. supply by reducing landsliding and erosion
- Know what works, choose appropriate processes, monitor and improve performance.

28

Questions?

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29