Alluvial Fans in King County

Inconvenient features of a dynamic landscape

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Key Partner:
King Conservation District
Presentation Outline

- Alluvial fans – the nature of the problem
- Snoqualmie Valley examples
- Progress to date
- Short-term and long-term goals
- Q&A
Death Valley Alluvial Fan
Baffin Island Alluvial Fans
Local Scale and Context

- **BIG fans with cities/towns on top of them**
  - Fall City, Carnation, North Bend

- **Tributary fans in agricultural waterways**
  - ADAP setting

- **Tributary fans in other land use types**
  - Rural residential, roads

- **Fans that don’t bother anyone**
  - Forested areas, undeveloped lands
The Challenge

- Dynamic environment with high ecological value
- Landowners with existing development unable to manage sediment in a timely, cost-effective way
- Current policies & regulations won’t prevent future development on fans
- Complex regulations, many agencies
Ecological role

- **Small streams**: Transition between low-gradient floodplain channels and steeper headwater areas.

- May be **only available spawning area** due to:
  - Downstream stream channelization for drainage
  - Upstream loss of complexity, altered hydrology, or gradient

- Possibly high, localized invertebrate production???
Snoqualmie Example:
Merged Fans @ Tuck Creek

Middle Ditch Fan

Tuck Creek Fan
Snoqualmie Example: Wallace Fan

culvert

W. Snoqualmie Valley Rd.
“Wallace” Fan = High Ground
Wallace: Ladder built in 70’s overwhelmed by sediment
Wallace: Flooded pasture
Coho in a cornfield
Unruly Fan Behavior

- The sediment will keep coming
- The water will find a way through the fan
- Water flows downhill
- Dynamic environment
- Can be episodic or steady

Confine stream channel
Upstream Contributors

- Upstream land use, actions, natural conditions may make things worse
  - Stormwater discharge (e.g., Wallace)
  - Natural beaver dam failure (e.g., Fong Cha)
  - Intentional beaver dam breach (e.g., probably Adair Creek 2010)
  - Forestry and other land-clearing activity
  - But these are not the cause of the underlying problem....
Wallace: Upstream Ravine Erosion
Fong Cha

~11 acre pond

20-40,000 CY (est.)
Snoqualmie Example: Albro
Albro: Wet pasture
Albro: Pilot project “bridge”
Albro solution: Give more land
Regulatory Challenges

• Confusing & conflicting code language

- **21A.06.825 Ordinary high water mark.** Ordinary high water mark: the mark found by examining the bed and banks of a stream, lake, pond or tidal water...In braided channels and alluvial fans, the ordinary high water mark or line of mean high water include the entire water or stream feature. (Ord. 15051 § 82, 2004: Ord. 10870 §)

- **205, 1993).21A.06.680 Landslide hazard area.** ....... E. An area located on an alluvial fan, presently or potentially subject to inundation by debris flows or deposition of stream-transported sediments.
Work to Date

• Comprehensive Plan updates 2008
  – Defined alluvial fans and described problem
  – Calls for “... pilot or demonstration projects and multi-agency collaboration to develop a new suite of allowed practices...”. Strategies “... should protect habitat, reduce threats to public safety, and recognize current land use practices”

• Zapel technical study (funded by Snoqualmie Watershed Forum)
  – Defined technical information requirements to assess alluvial fans
  – Described potential engineering solutions
Work to Date: Albro Project

• Developed pilot solution
  - Restore channel capacity; Give the channel more land; reduces maintenance frequency and habitat disruption

• Analyzed permitting hurdles
  - Multiple permits from multiple agencies
  - WDFW, Army Corps, King County
  - Some permits duplicative and very expensive

• Few landowners can adequately manage fans under current requirements
Short-term Goals

- **Address regulatory low-hanging fruit**
  - Work with DDES, KC Stormwater, KC Rivers to address definitions, thresholds and information requirements.

- Work with KCD to determine level of assistance that can be provided under current framework

- Continue mapping of fans (with KCD)

- Initiate multi-agency discussions to discuss permit streamlining & BMPs
  - KC DDES, KC Roads, KC Rivers, WDFW, KCD
Long-term goals

- Develop programmatic approach that is predictable, cost-effective.
- Develop new KC Code language to address alluvial fans specifically.
- Prevent upstream land uses from exacerbating problem.
  - Regulatory changes re land clearing, stormwater management. Education.
Questions?