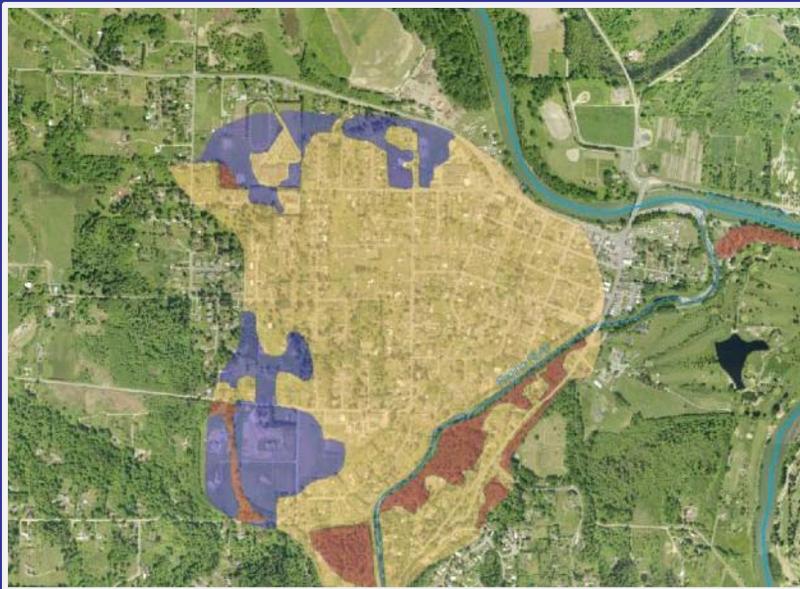

Alluvial Fans in King County

Inconvenient features of a dynamic landscape



Project team:

Claire Dyckman, KC Agriculture

Elizabeth Weldin, KC Agriculture

Brian Sleight, KC Stormwater

Janne Kaje, Snoqualmie Watershed Forum &
KC Regional Partnerships Unit

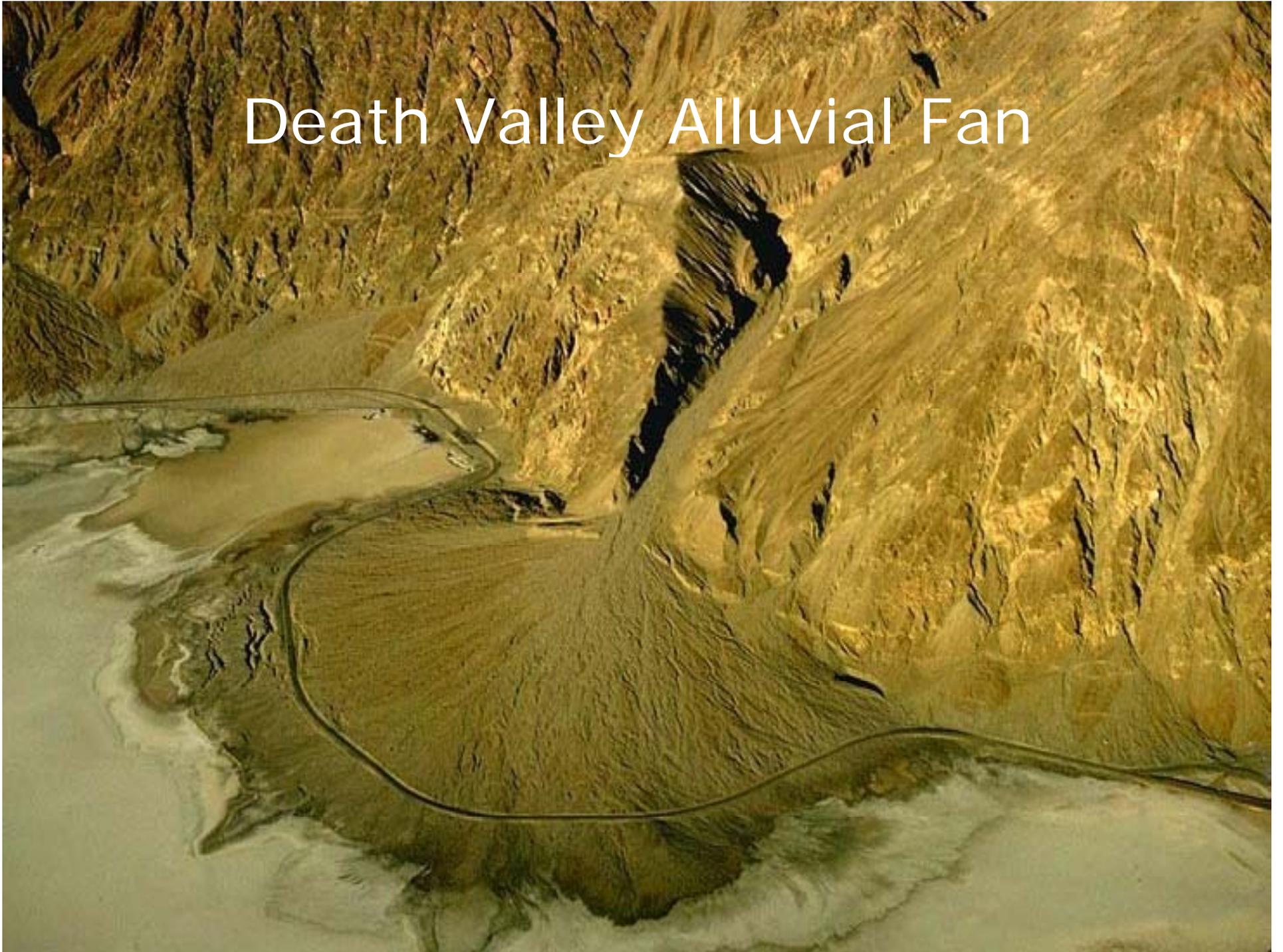
Key Partner:

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

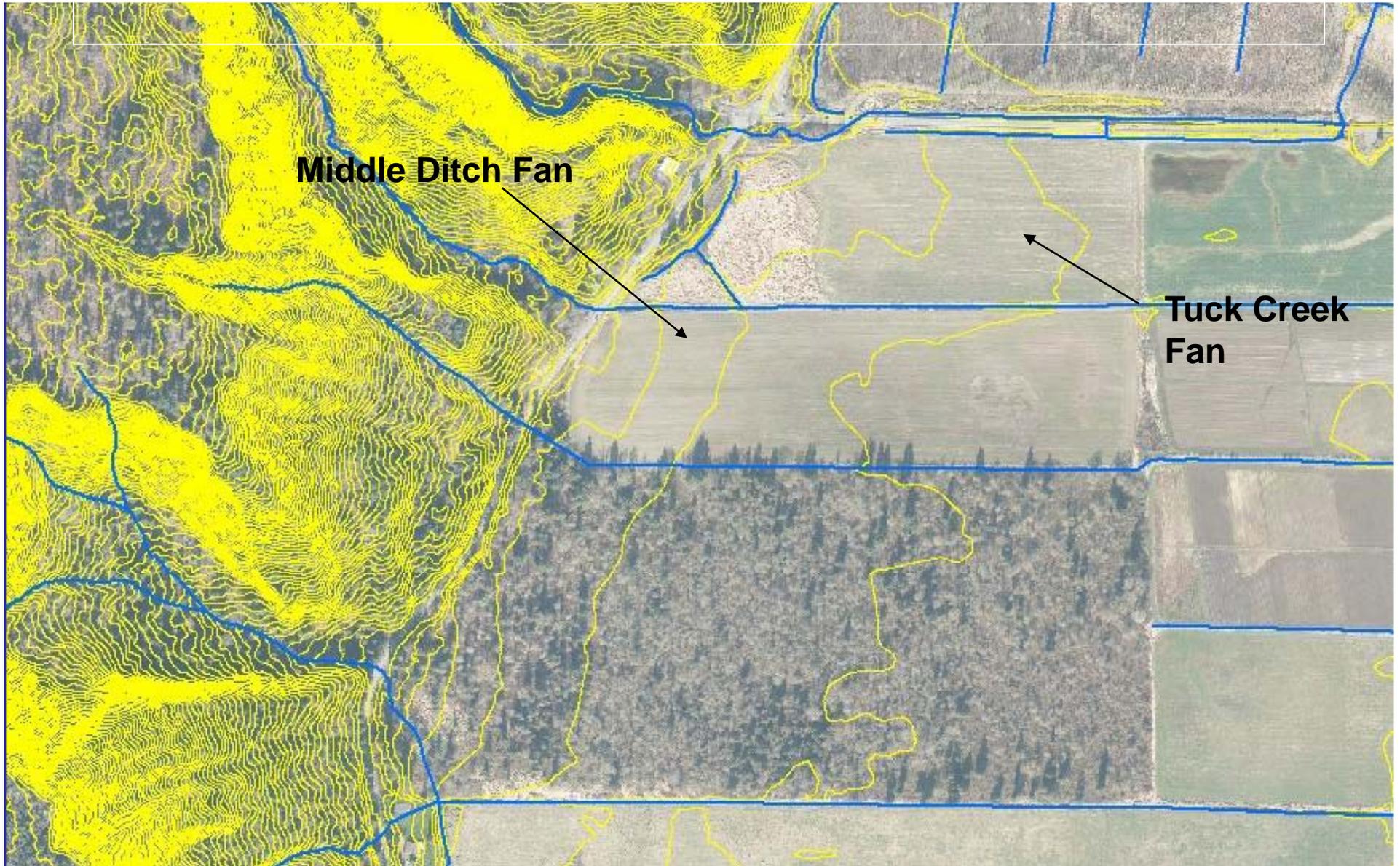
The Challenge

- 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

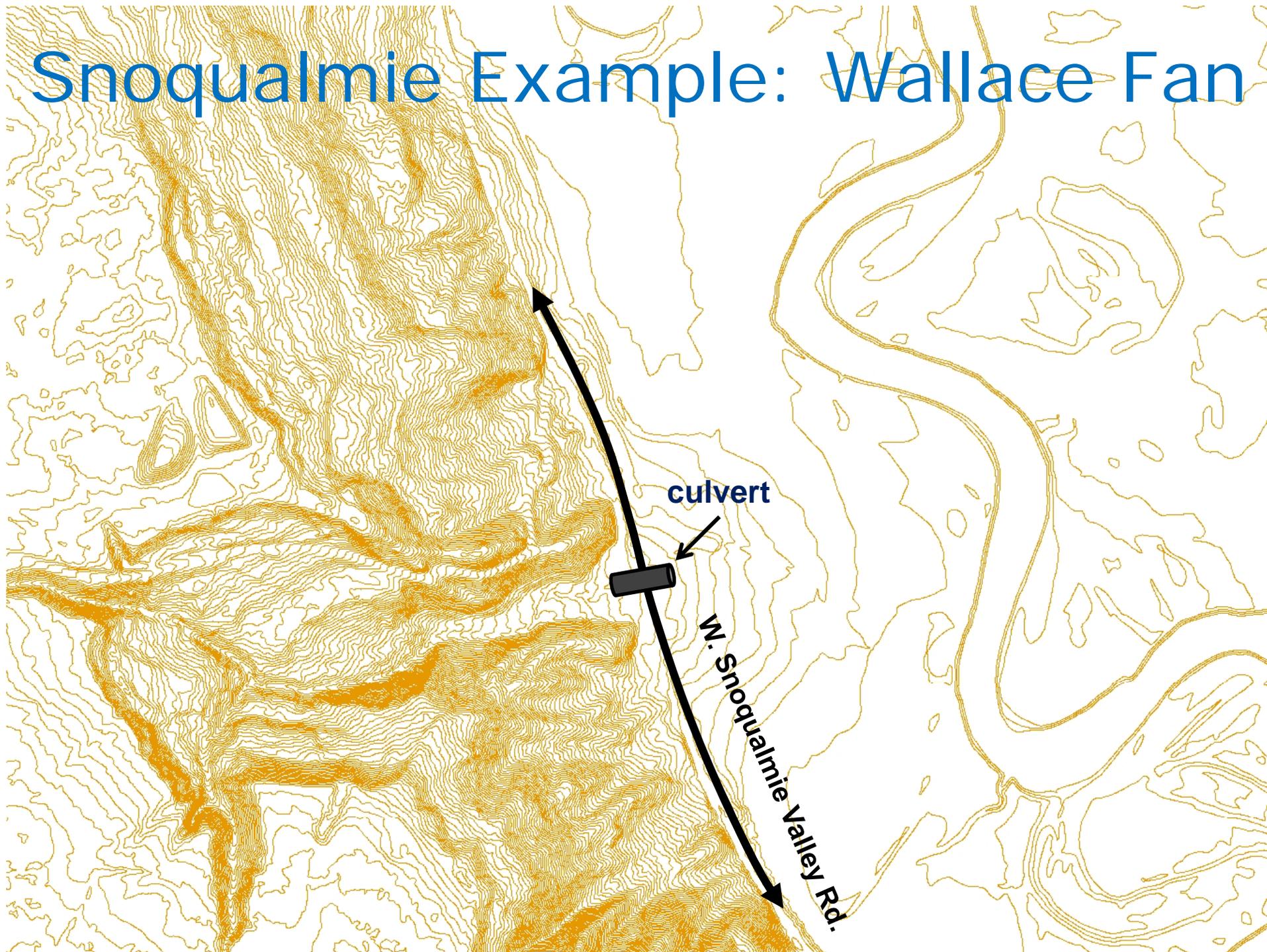
Ecological role

- 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



Snoqualmie Example: Wallace Fan





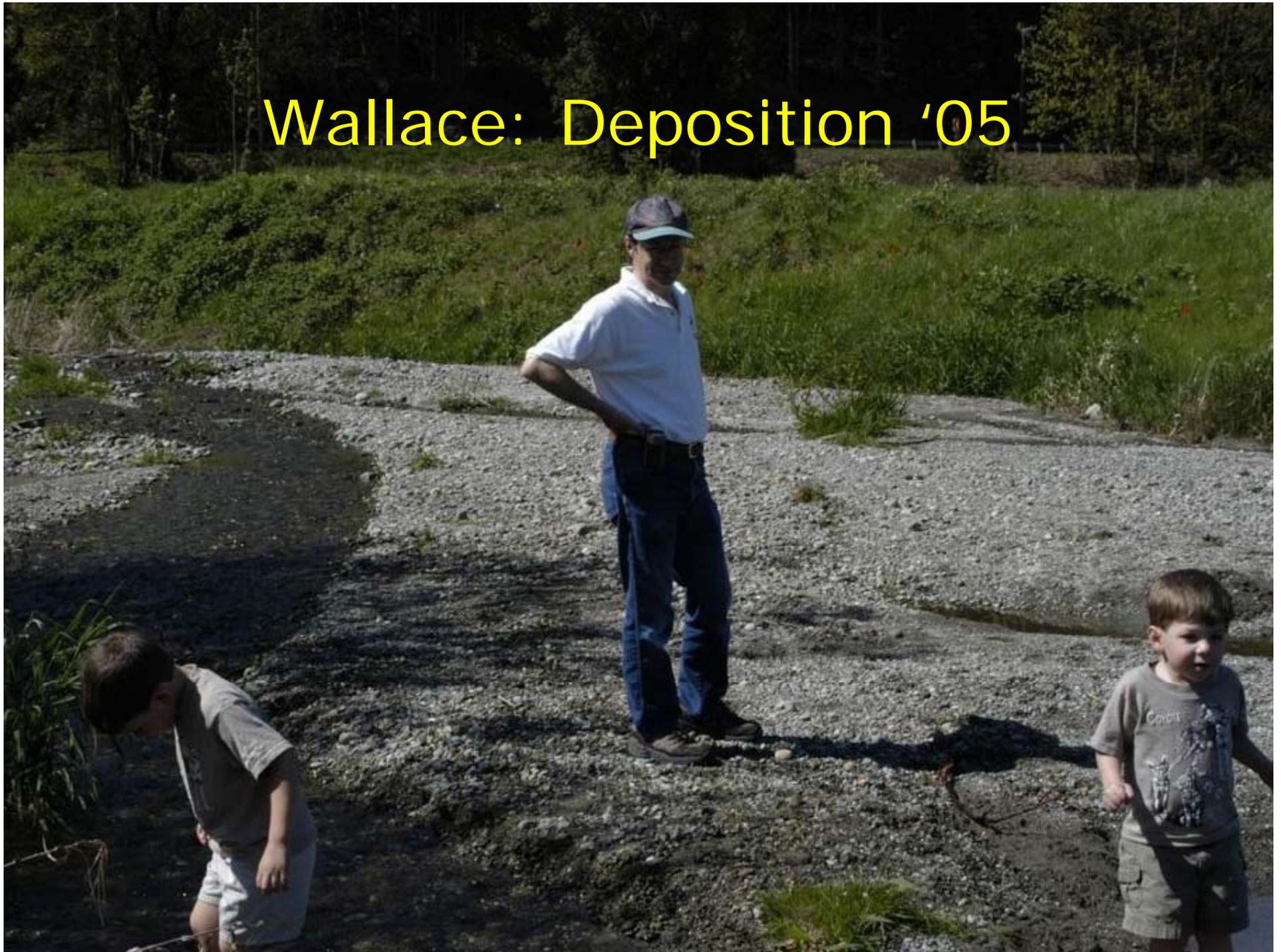
“Wallace” Fan = High Ground



Wallace: Ladder built in 70's
overwhelmed by sediment



Wallace: Deposition '05



Wallace: Channel Degeneration



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

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



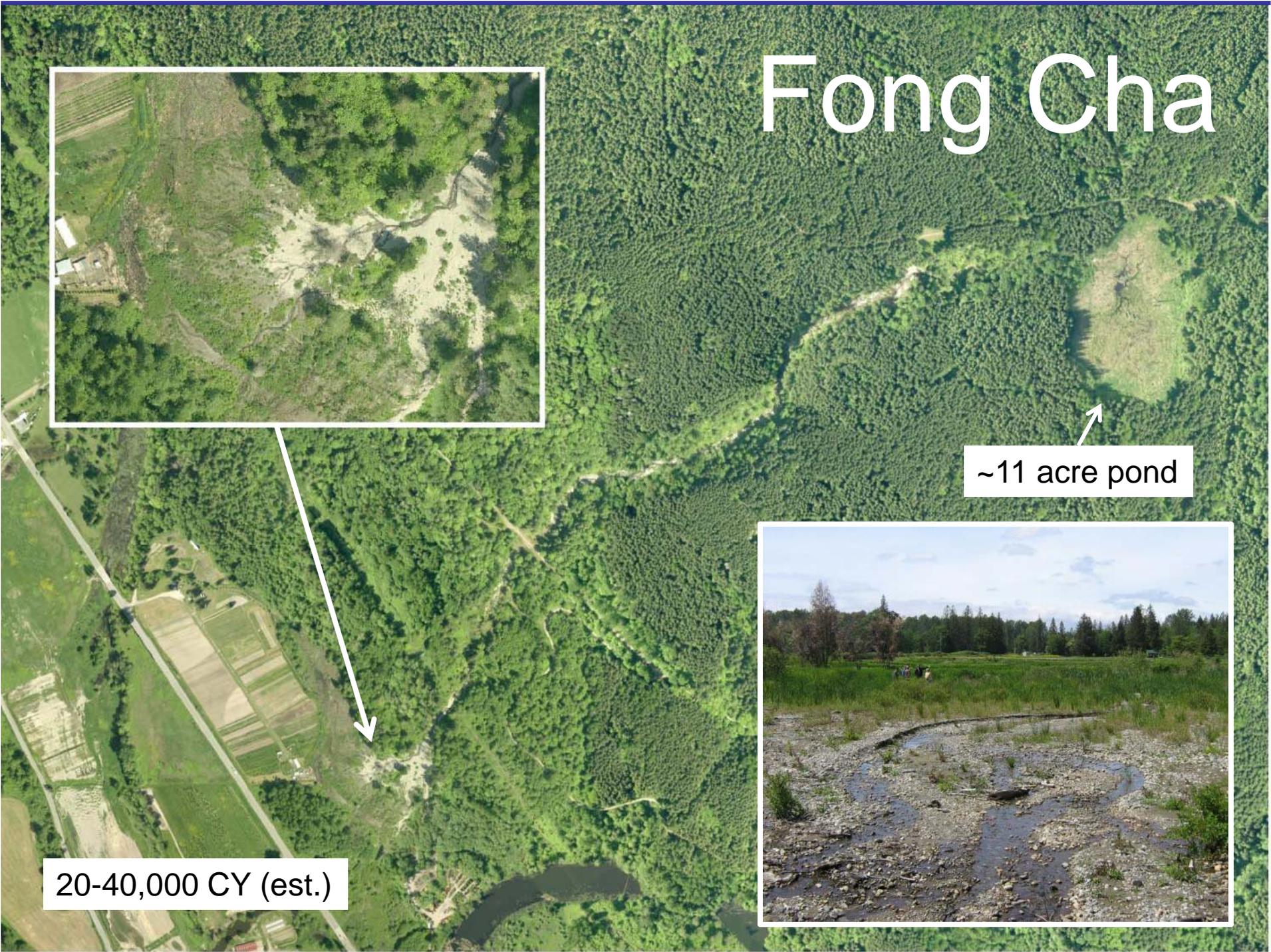
Fong Cha



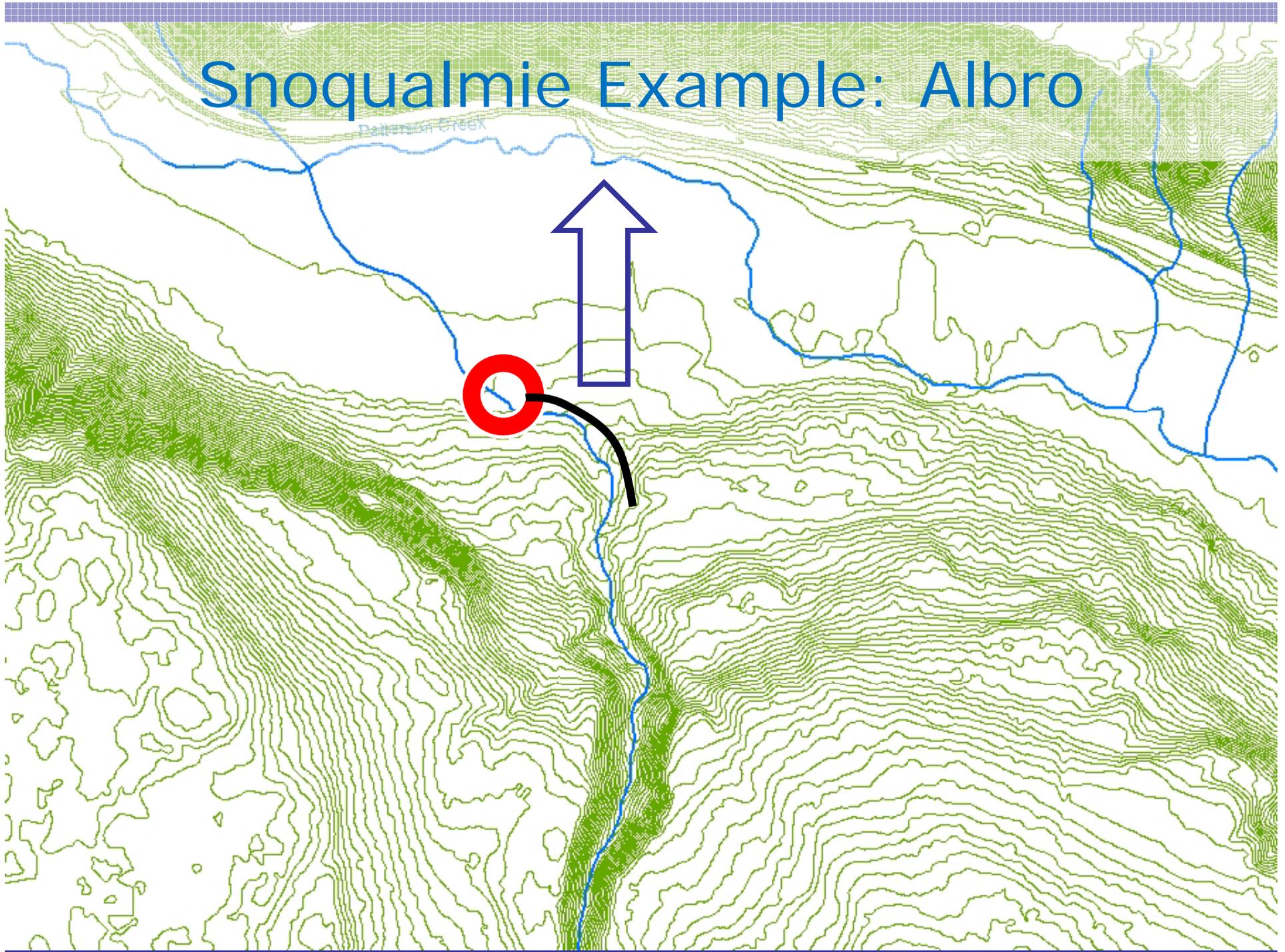
~11 acre pond



20-40,000 CY (est.)



Snoqualmie Example: Albro





Snoqualmie Example: Albro

Albro: Diverted stream



Albro: Wet pasture



Albro: Pilot project "bridge"



10.14.2008 11:08

Albro solution: Give more land



10.14.2008 10:09

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.
- Address habitat concerns & landowner needs. Start with pilot projects. Monitor & evaluate.
- 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?