



Sediment budgets and hydrology of Goat Canyon, Tijuana Towards impact assessment and mitigation

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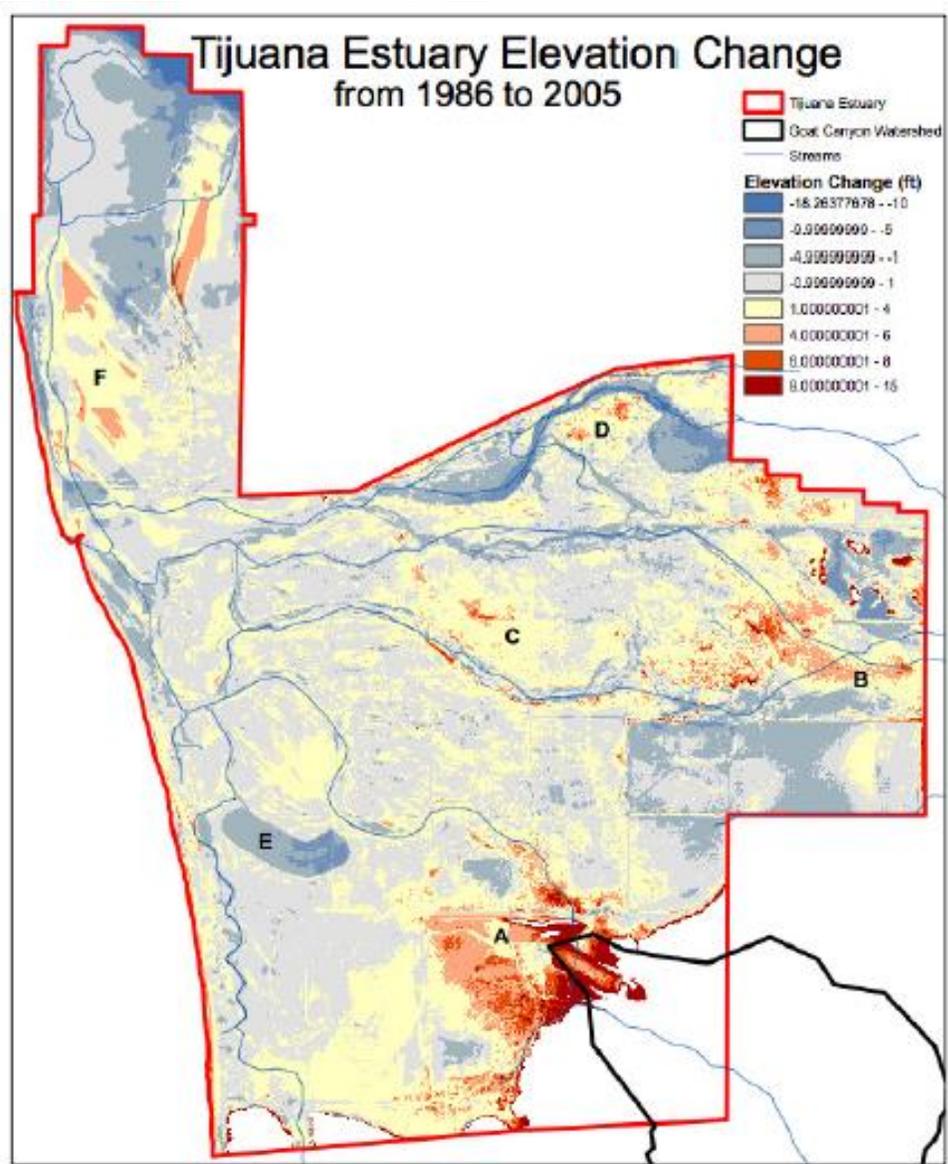


Figure 1. Depth of sediment aggradation and erosion from 1986 to 2005 in the Tijuana Estuary. A) Goat Canyon B) TJ River C) Floodplain D) Deforested E) Restoration F) Northern



Research Questions

1. Where are the hotspot areas that are producing the most sediment in the Goat Canyon watershed?

2. What would be the impact of different land use changes and BMPs on sediment and stormflow?

- Continued urbanization
- Road paving (already happening—should it be encouraged?)
- Channelization
- Sediment retention basins

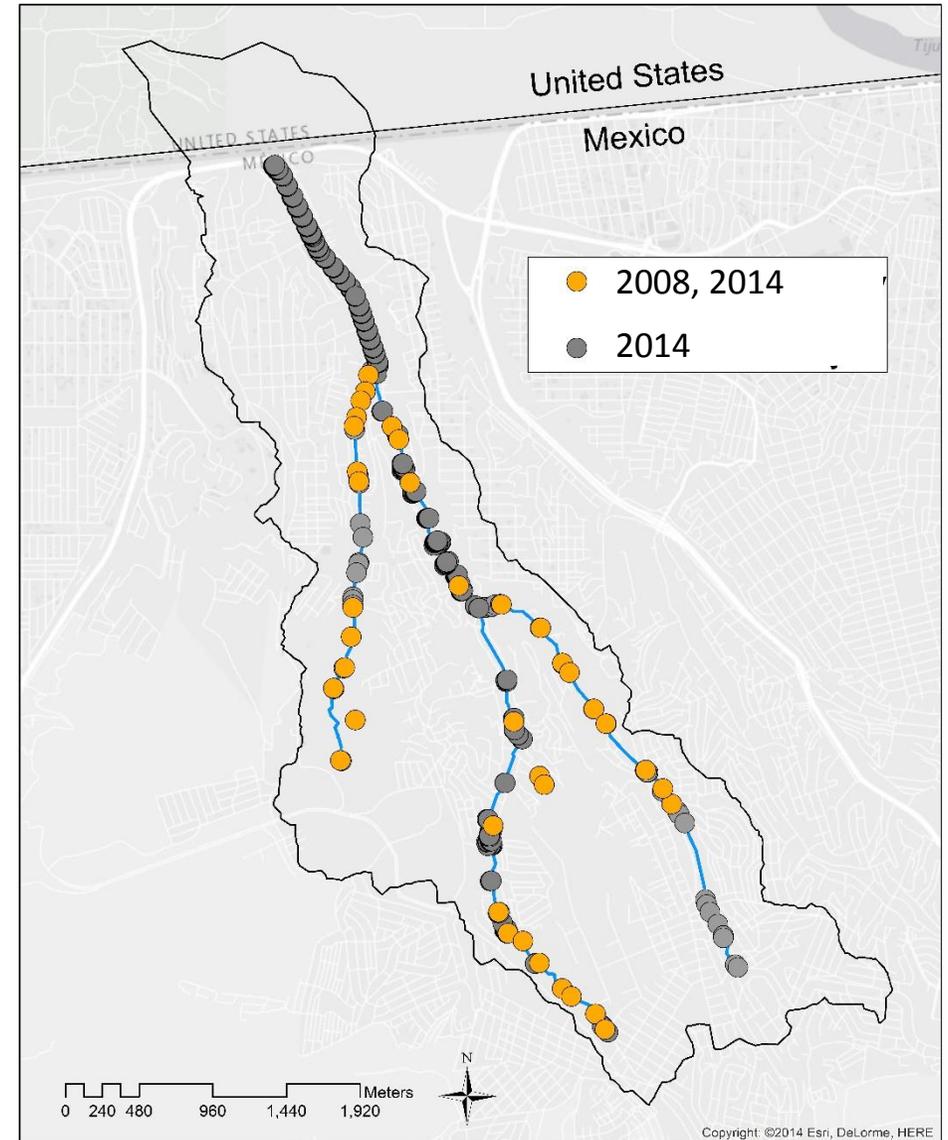
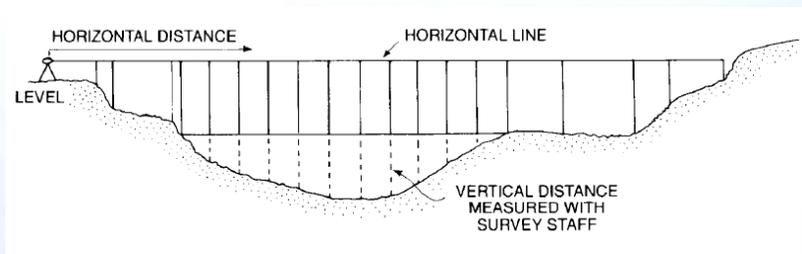
Strategy

- Measure stream discharge and sediment yield during storms
- Characterize channel stability and erosional severity
- Map gullies and monitor channel erosion after storms
 - Field surveys with camera, topographic measurements
- Model stormflow and sediment yield under different land uses

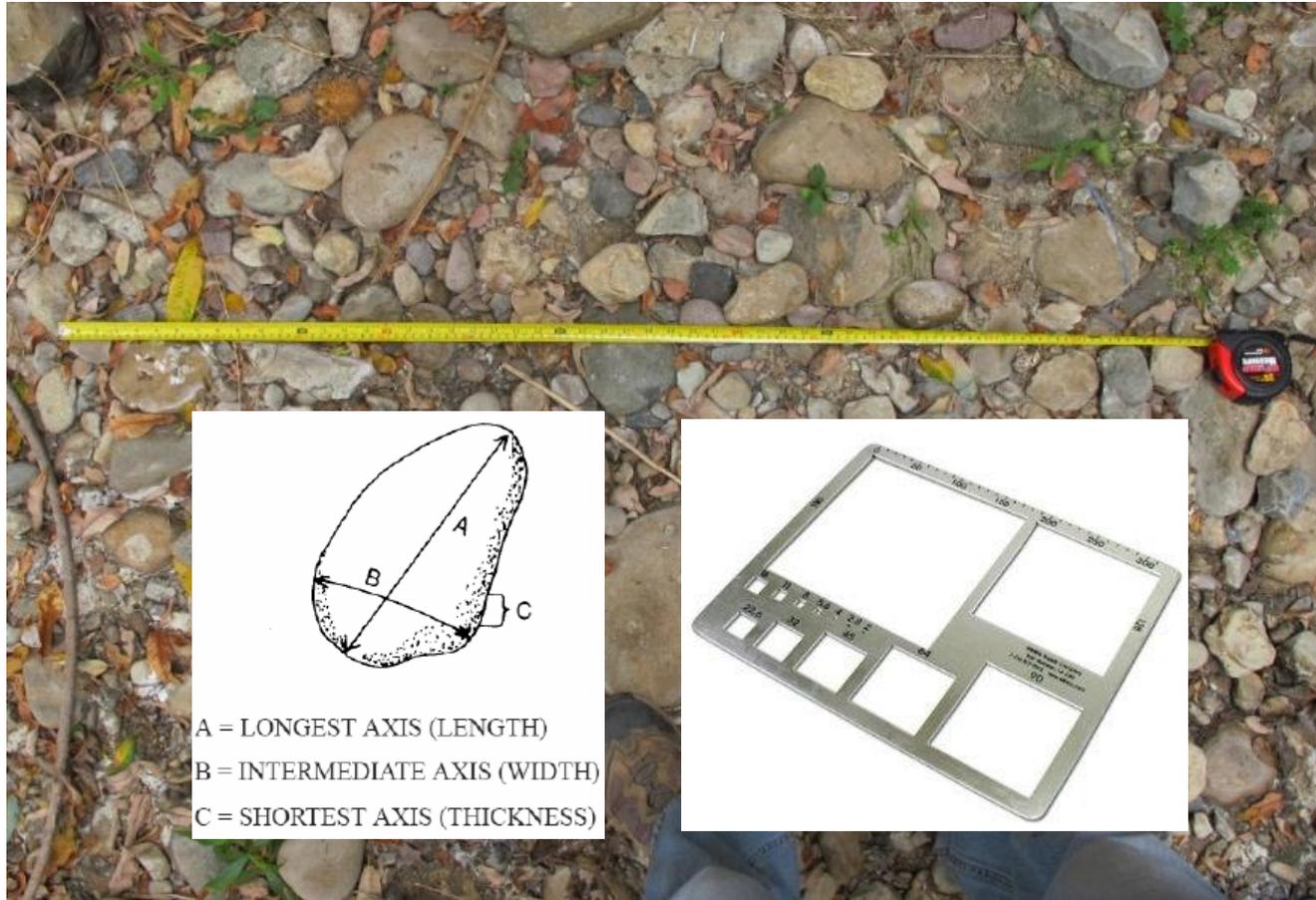
Field Survey

Channel Profiles:

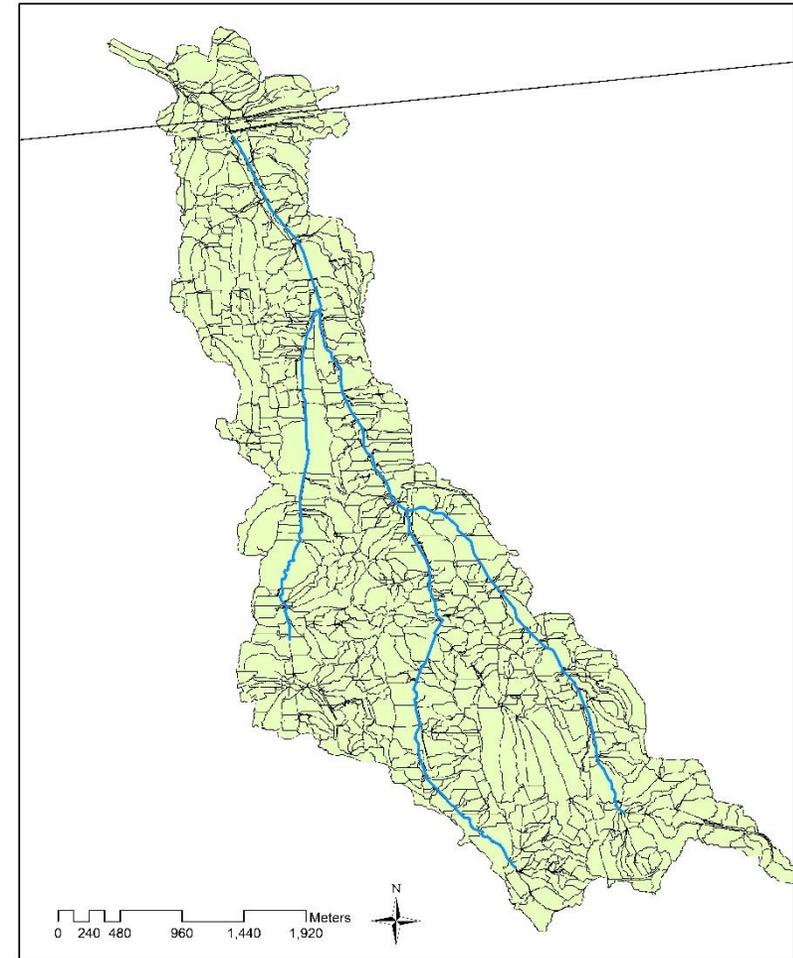
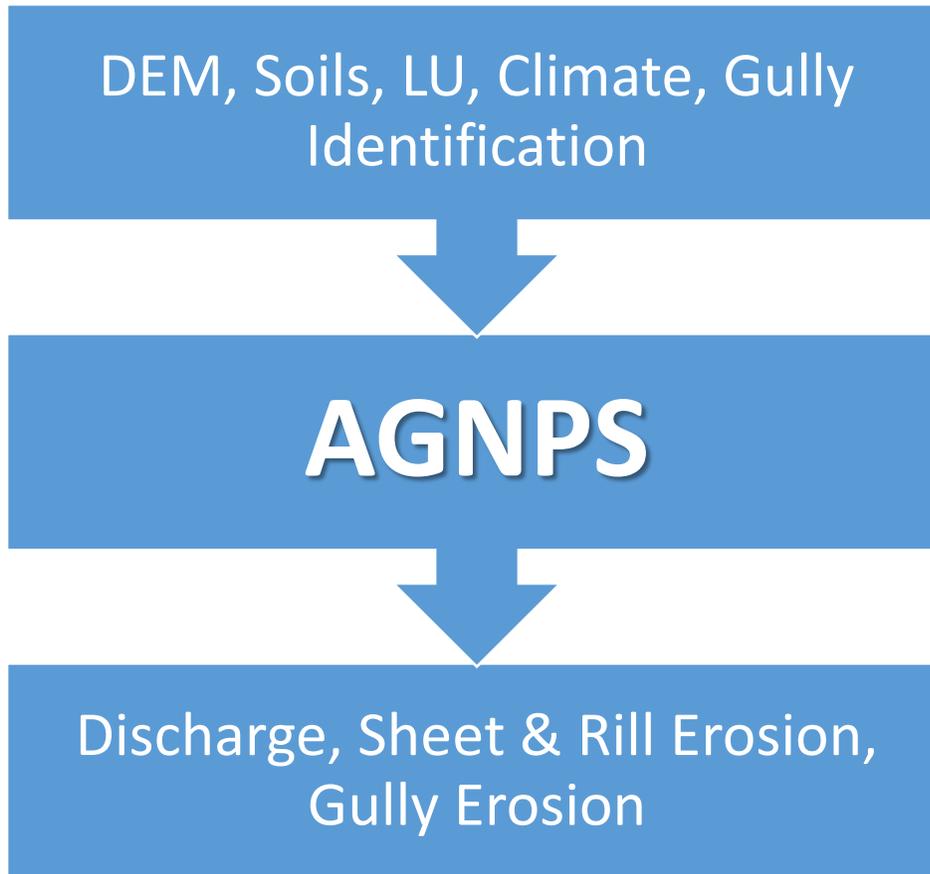
- **38** locations resurveyed from 2008
- **100** additional locations in 2014



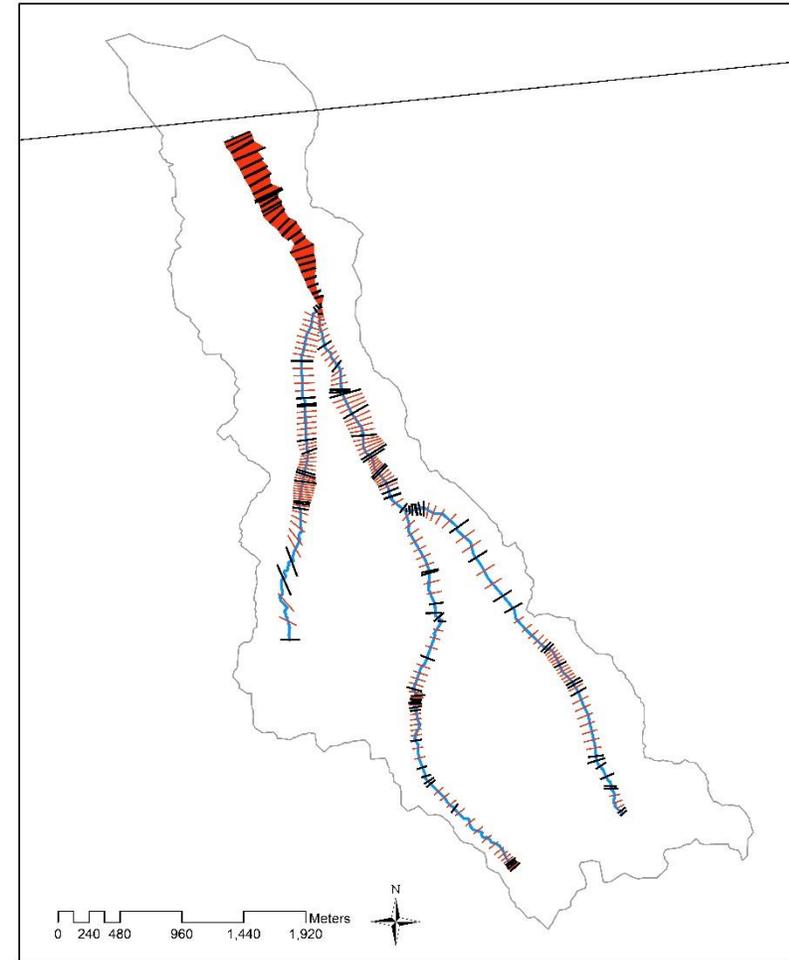
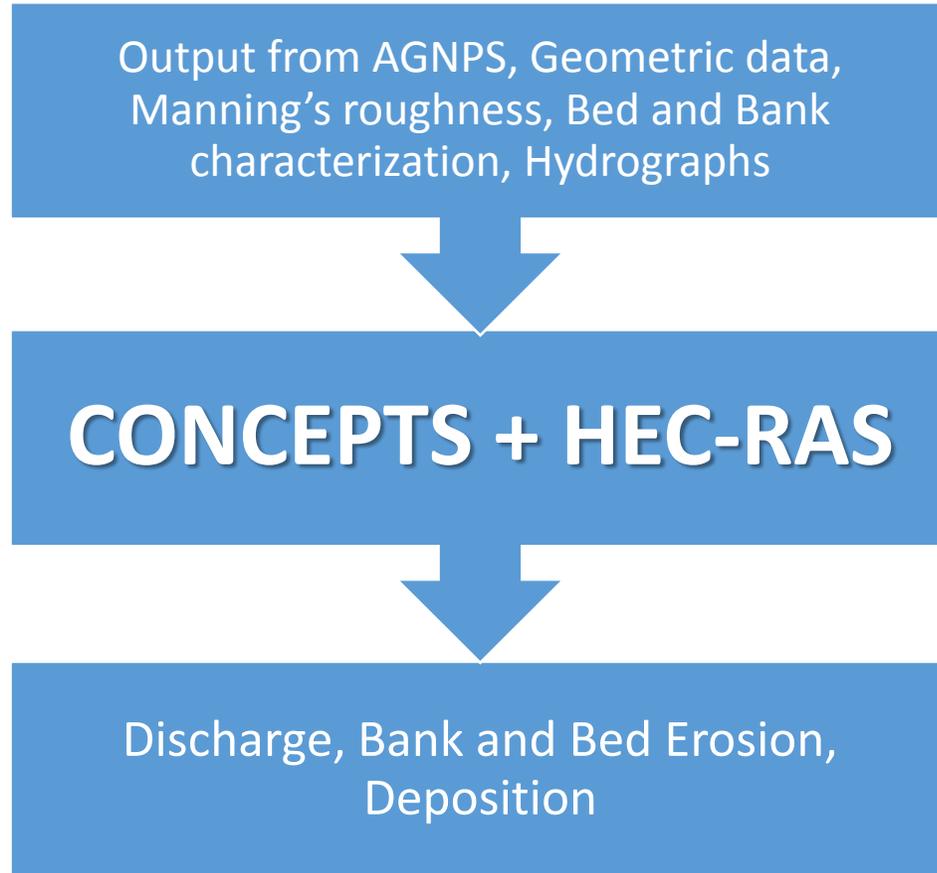
Bed and Bank Characterization



Hillslope Model



Channel Model



Hotspots of Erosion: Gullies

80% of roads unpaved
Gullies filled after each storm

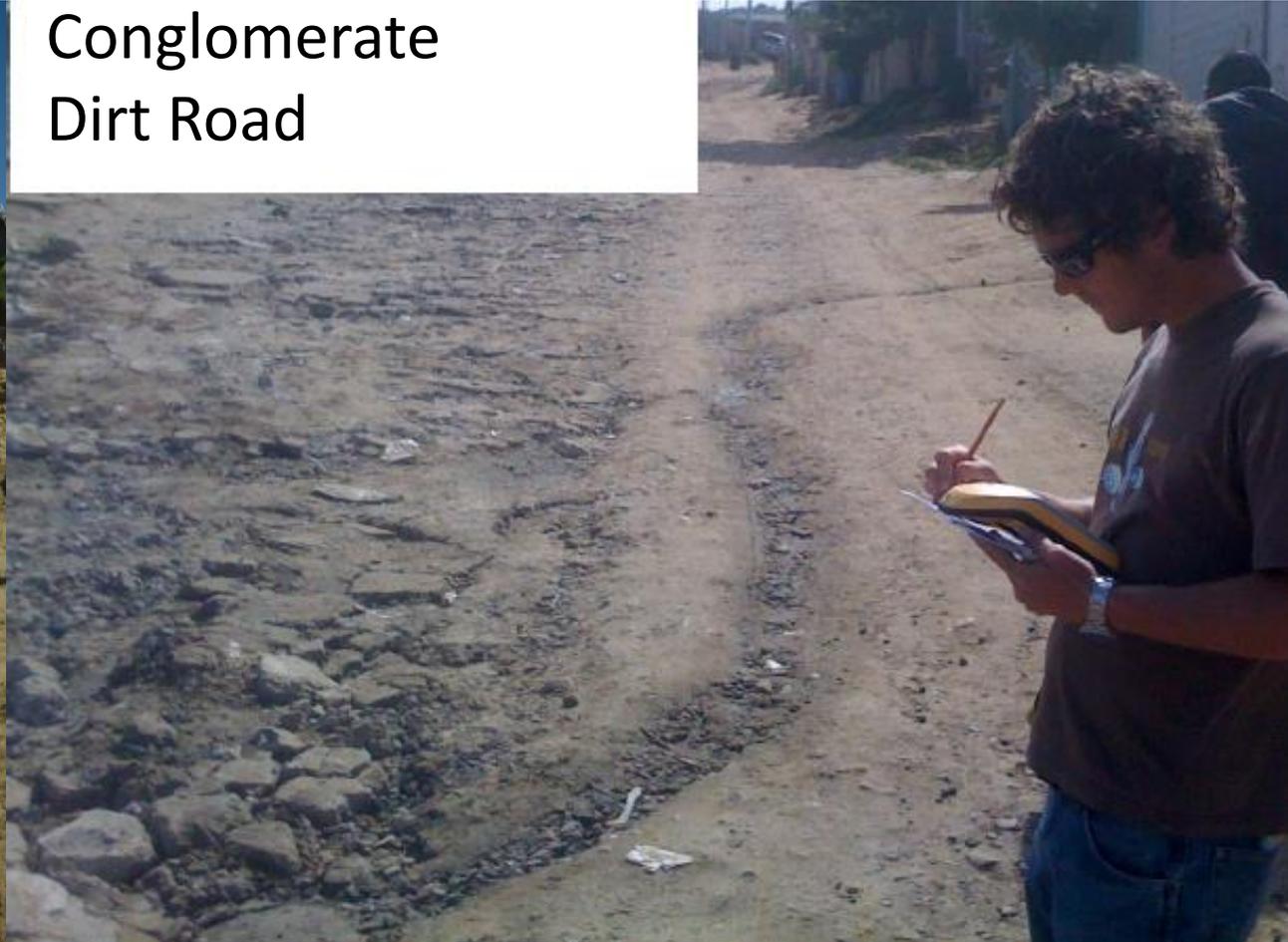


Differences due to Geology

Sandstone
Dirt Road



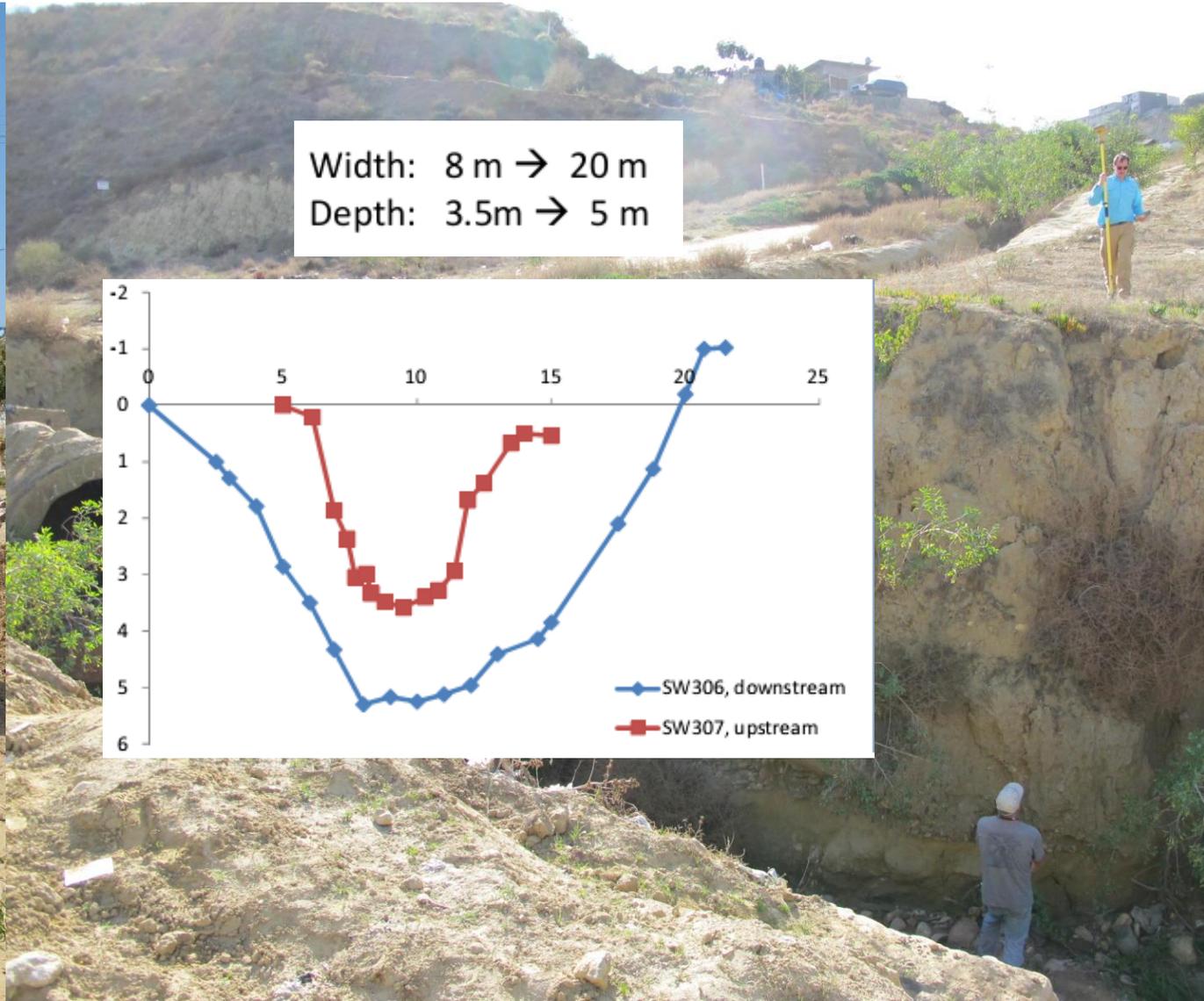
Conglomerate
Dirt Road



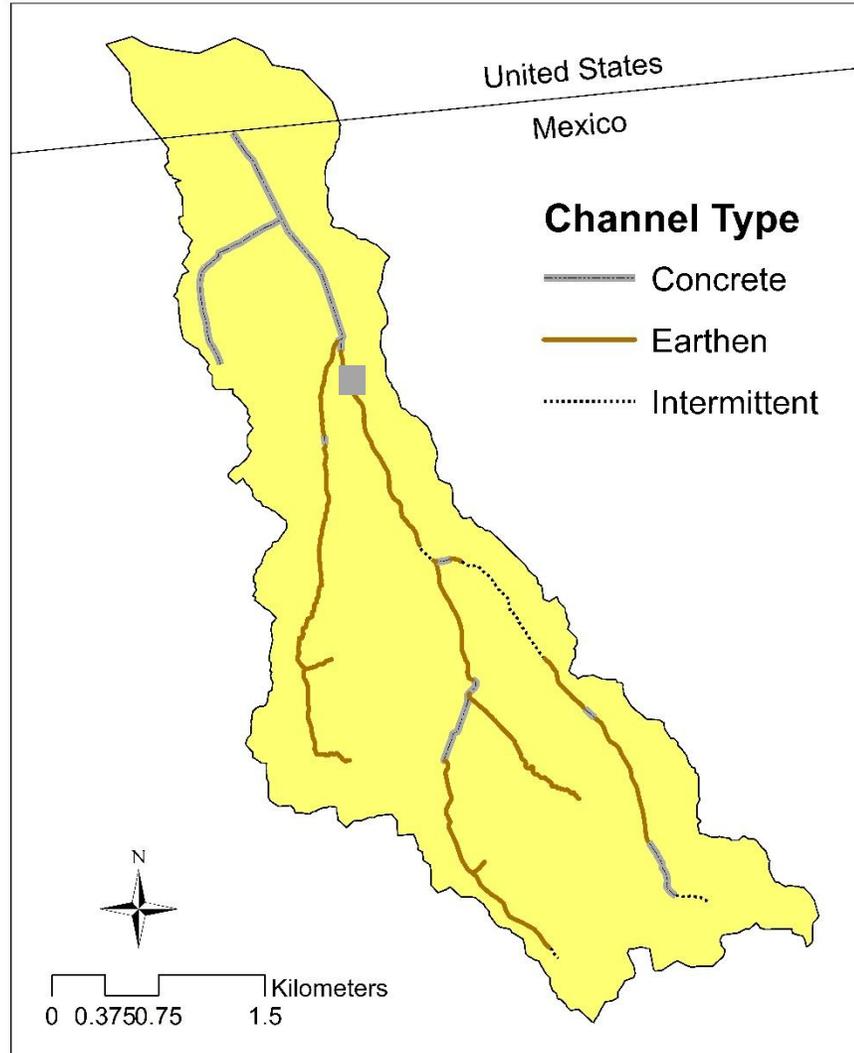
Channel Erosion



Hotspots of Erosion: Channel Hardpoints



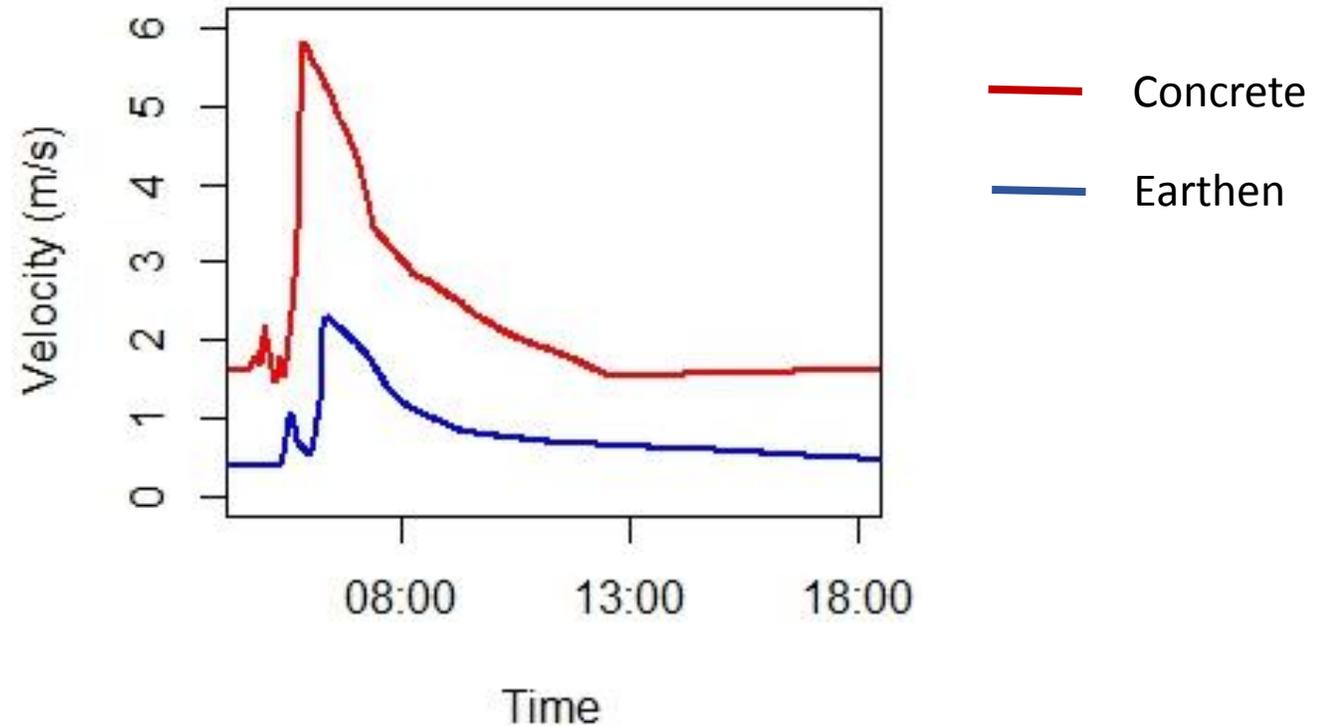
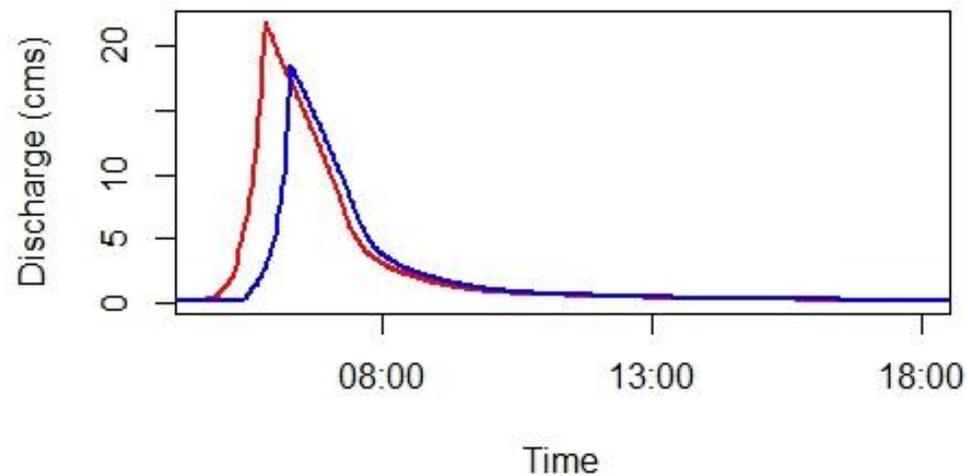
What is the impact of channelizing the whole main channel?



Impact Scenarios in CONCEPTS

Example storm 40% of bankfull (change in roughness):

- Peak velocities increase by 3x
- Peak flows increase by 20%
- Time to peak ~30 min quicker



Impact Scenarios

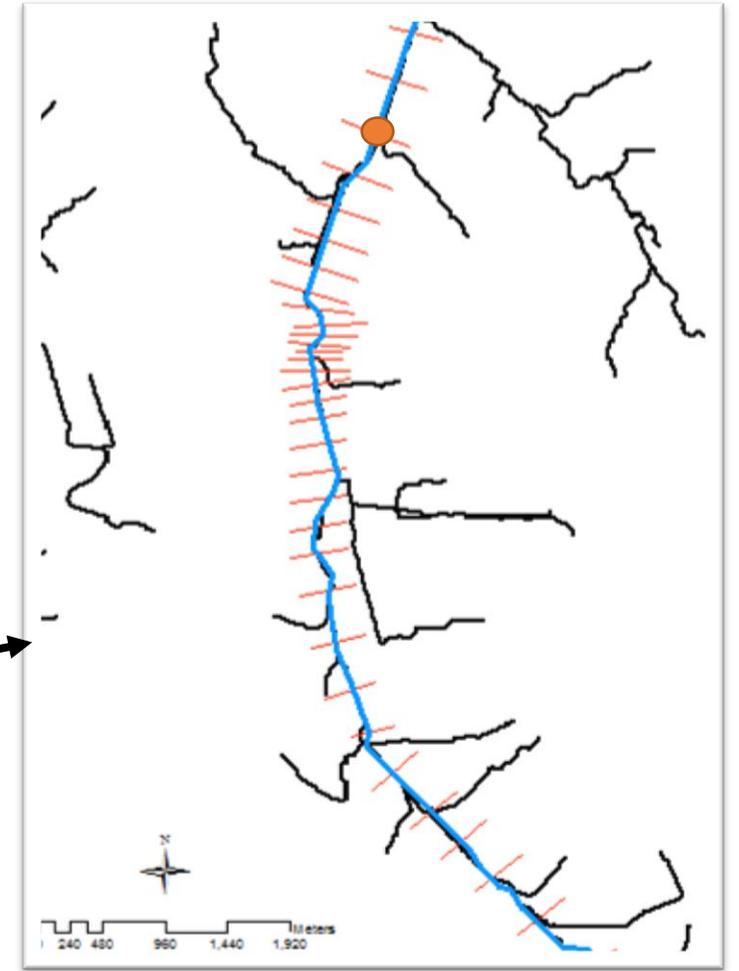
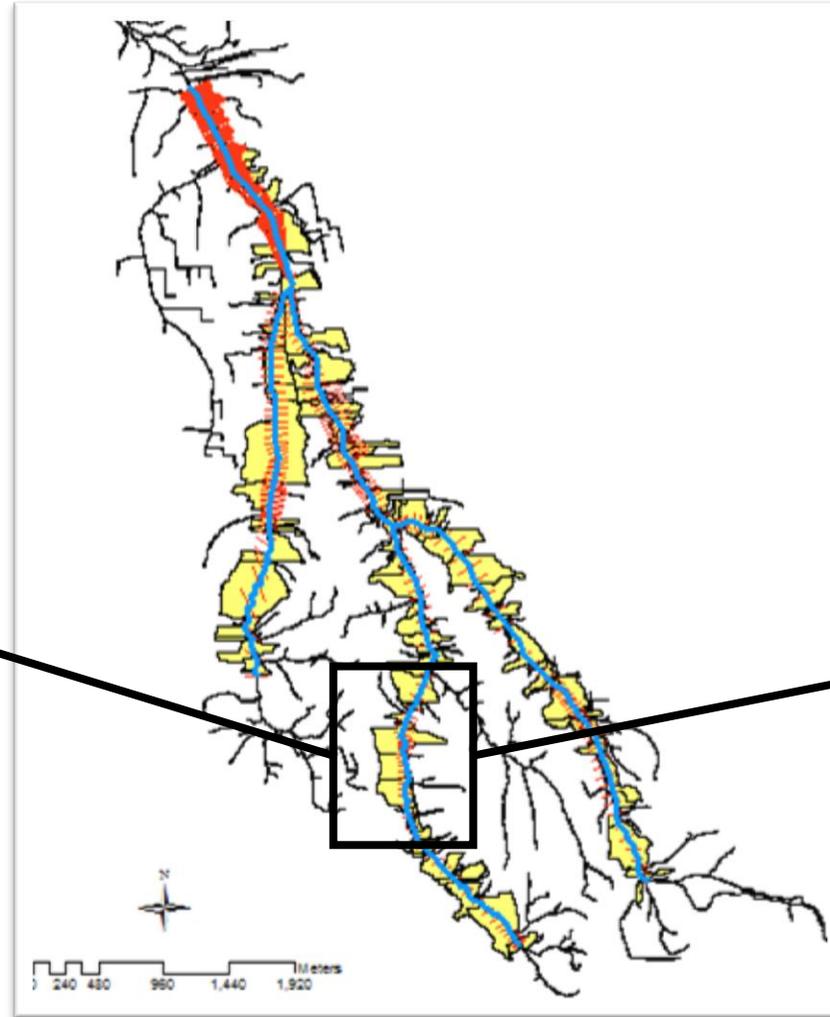
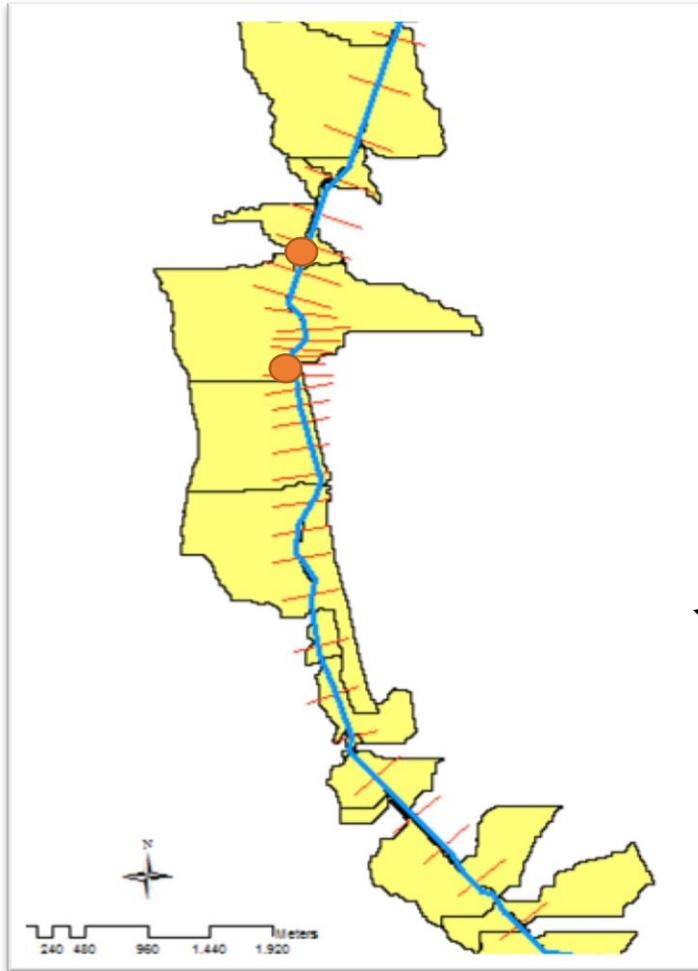
- Future scenarios will include land use changes and BMPs



Questions?



Linking AGNPS and CONCEPTS



Channel erosion

