

**God made dirt, so dirt don't hurt....**  
***except for my dam removal budget***



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# Overview

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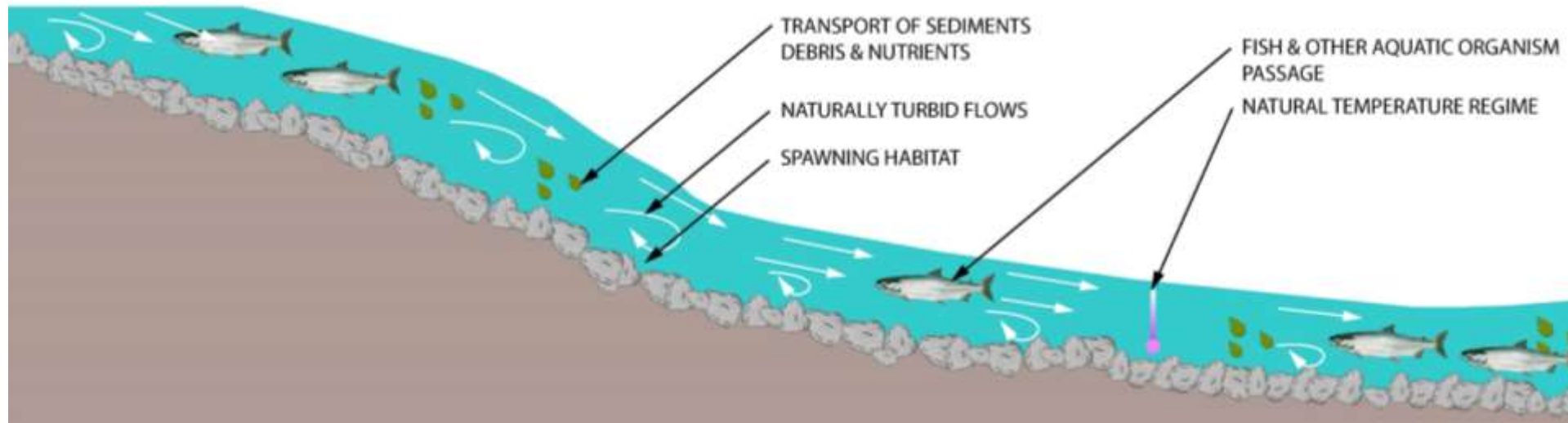
- What is the problem?
  - Dam's capture sediment
  - What happens when the dam is gone?
- How do we address?
  - Analysis (volume, characterization, impacts)
  - Design approaches
- What guidance is there?

# What's the problem?

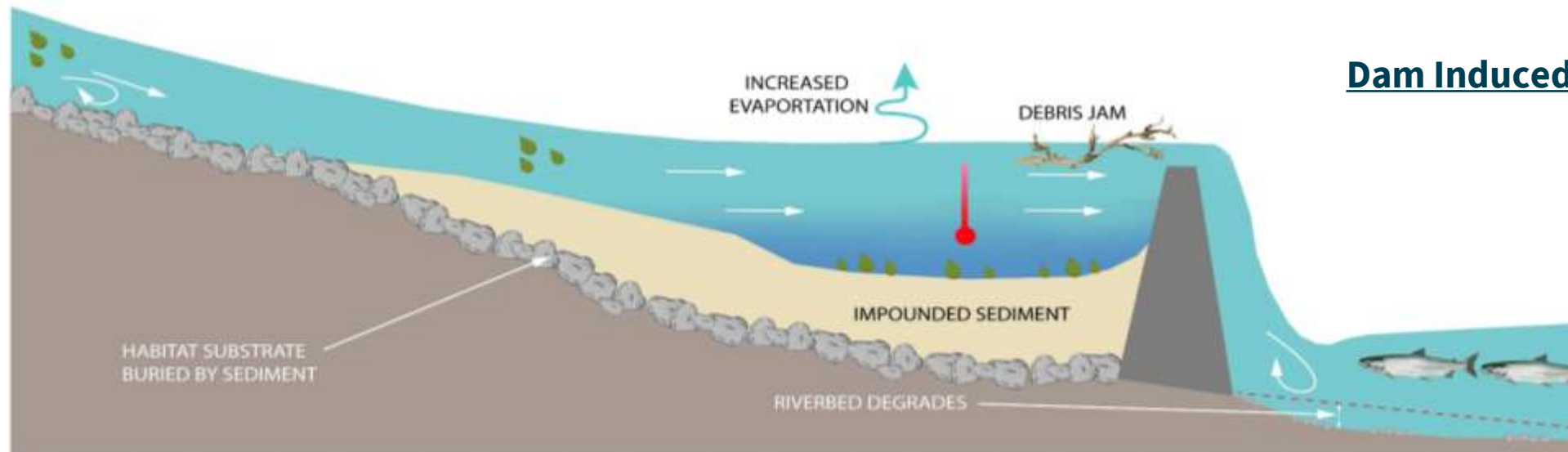


# Dams Capture Sediment

## River Process

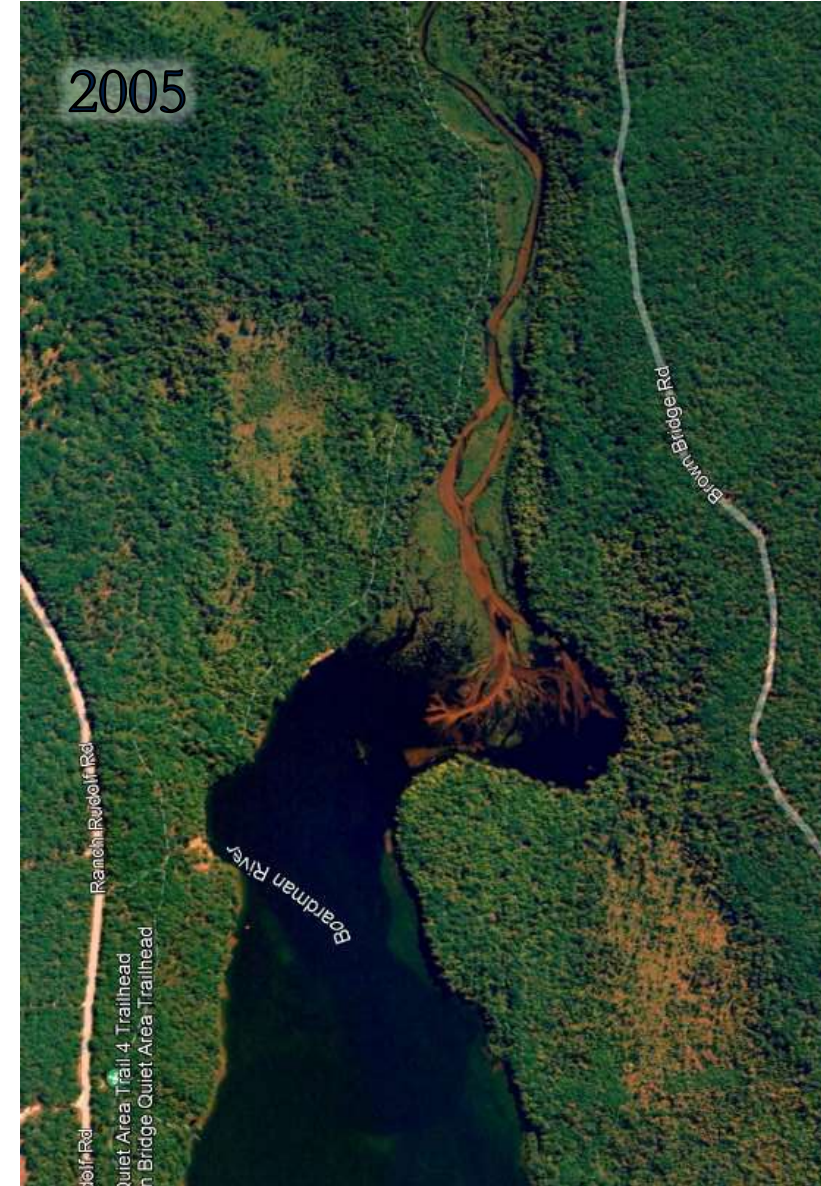


## Dam Induced Disruption





# Dams Capture Sediment





# Dams Capture Sediment

2014



2017



2019





# Dams Capture Sediment

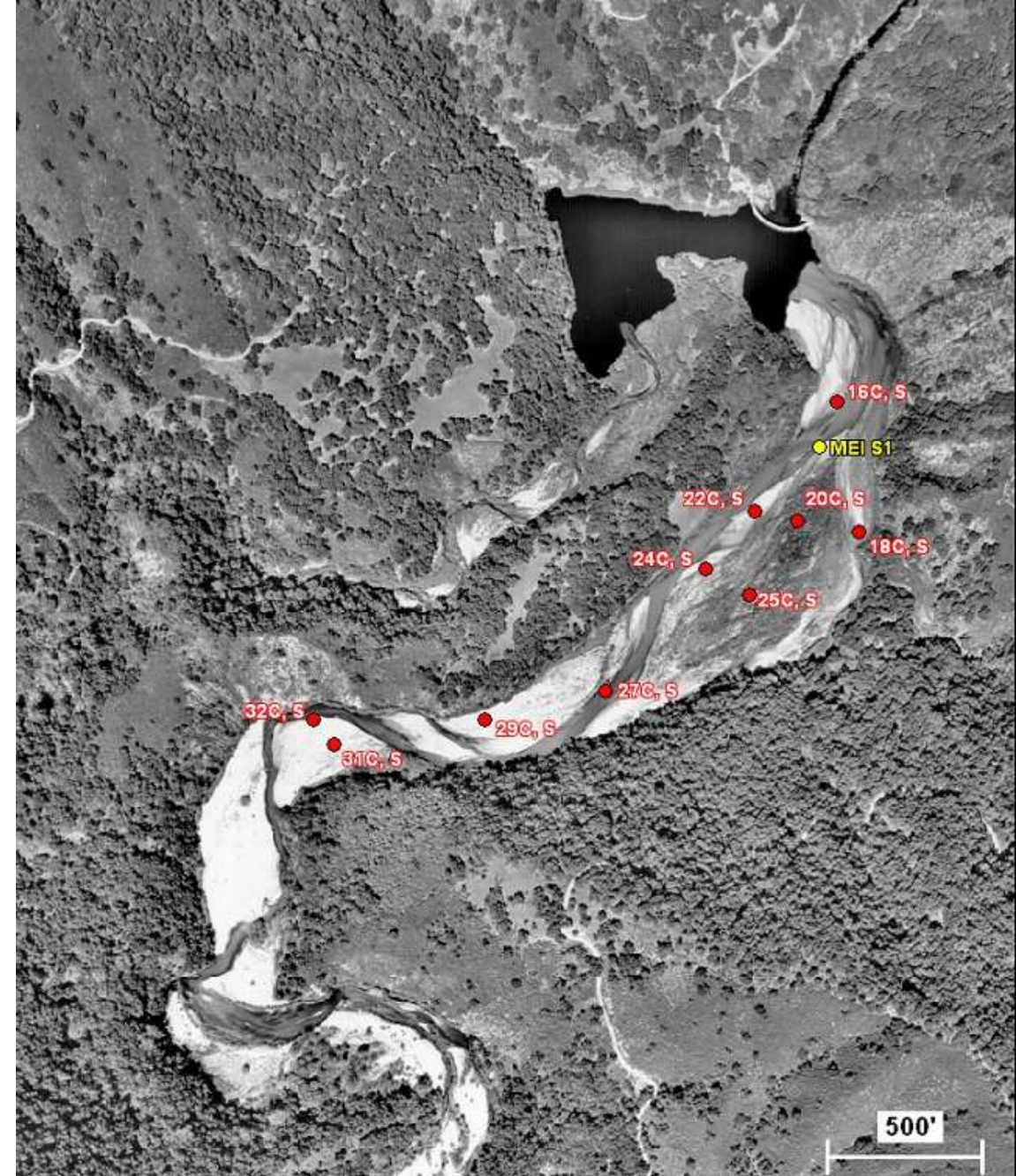
## But not all dams capture the same amount

Factors in sediment capture (USSD Guidelines for Dam Decommissioning Projects)

- Relative Reservoir Capacity
- Reservoir Operations
- Relative Reservoir Width

When evaluating ongoing sediment storage should also consider:

- Relative Reservoir Sediment Volume





# What Happens When the Dam is Gone?



*Lake Kathleen (photo courtesy of Patrick Ertel, MDNR)*



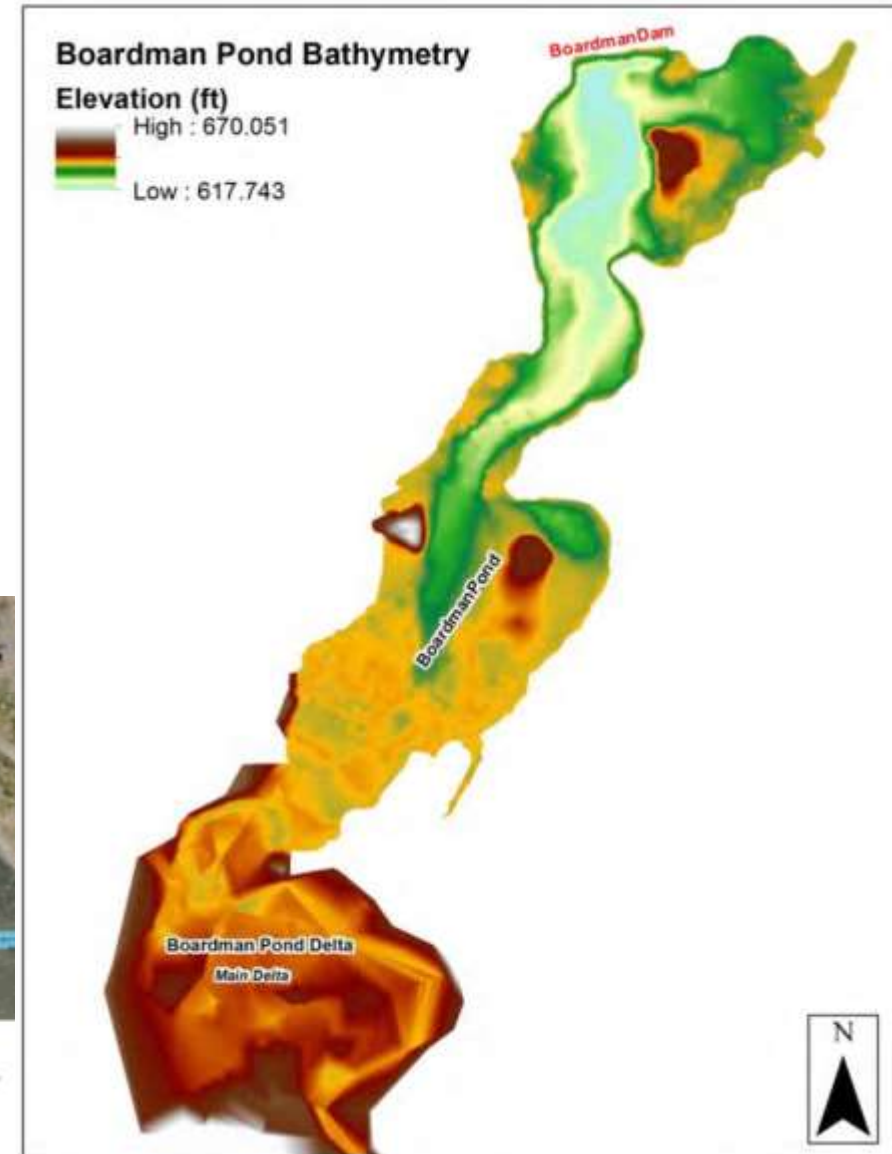
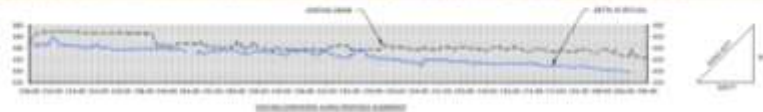
*The remains of the Glines Dam on the Elwha River. Photo: Alan Sandarcock (CC BY 2.0)*



# How do we address the problem?

## *Analysis*

# Analysis Phase – Sediment Volume





# Analysis Phase – Sediment Characterization



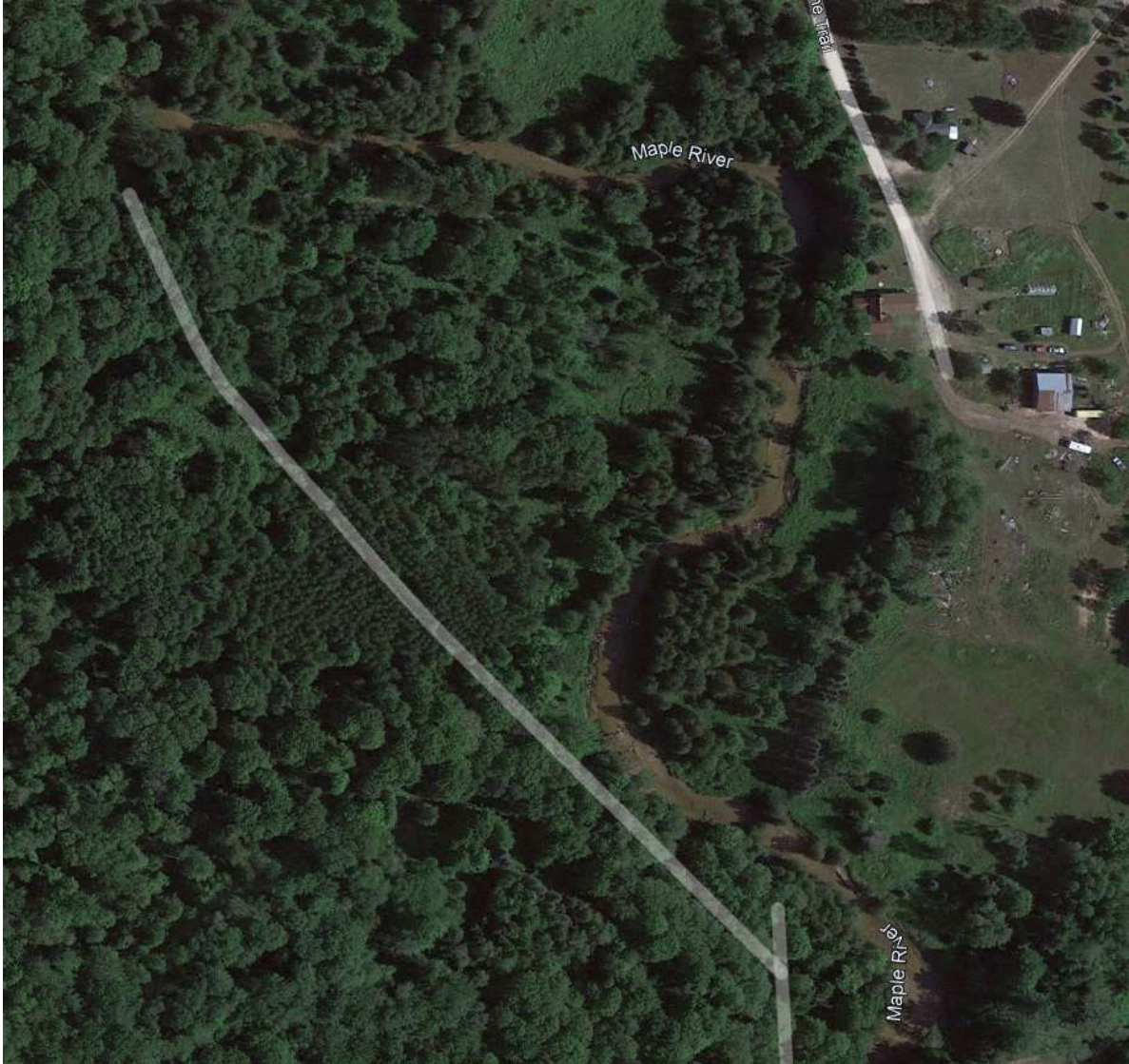


# Analysis Phase – Sediment Impact



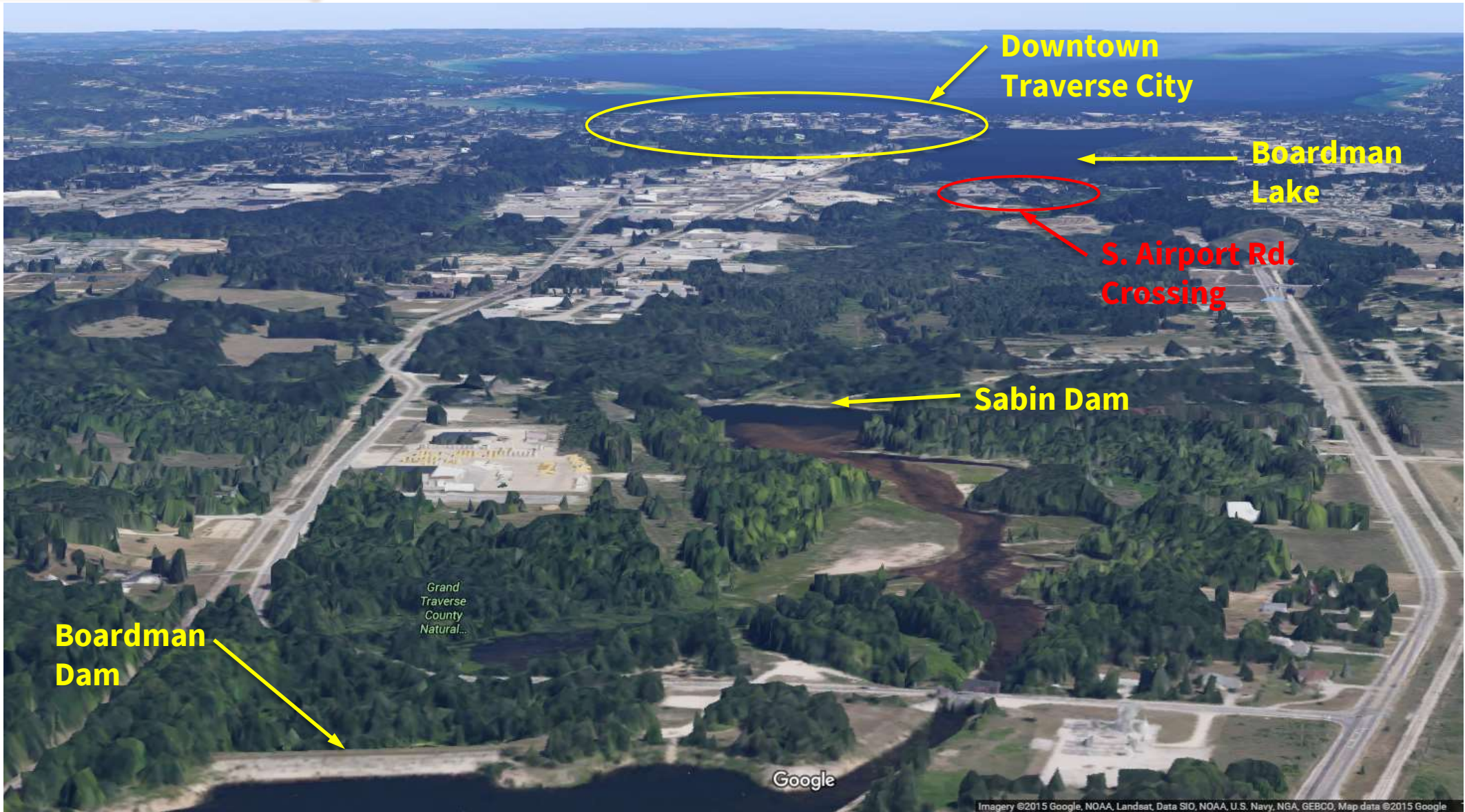


# Analysis Phase – Sediment Impact





# Analysis Phase – Sediment Impact





# Analysis Phase – Sediment Impact





# Analysis Phase – Sediment Impact

*Photos courtesy of City of Niles*





# How do we address the problem?

## *Design Approach*

# Design Approaches – Let It Go!



*Condit Dam breached with dynamite on Oct. 26, 2011 (Andy Mazer, Oregon Public Broadcasting)*



# Design Approaches – Let It Go!



*Sediment mobilizing out of Condit Dam impoundment (Andy Mazer, Oregon Public Broadcasting)*



# Design Approaches – Active Removal





# Design Approaches – Store-in-Place



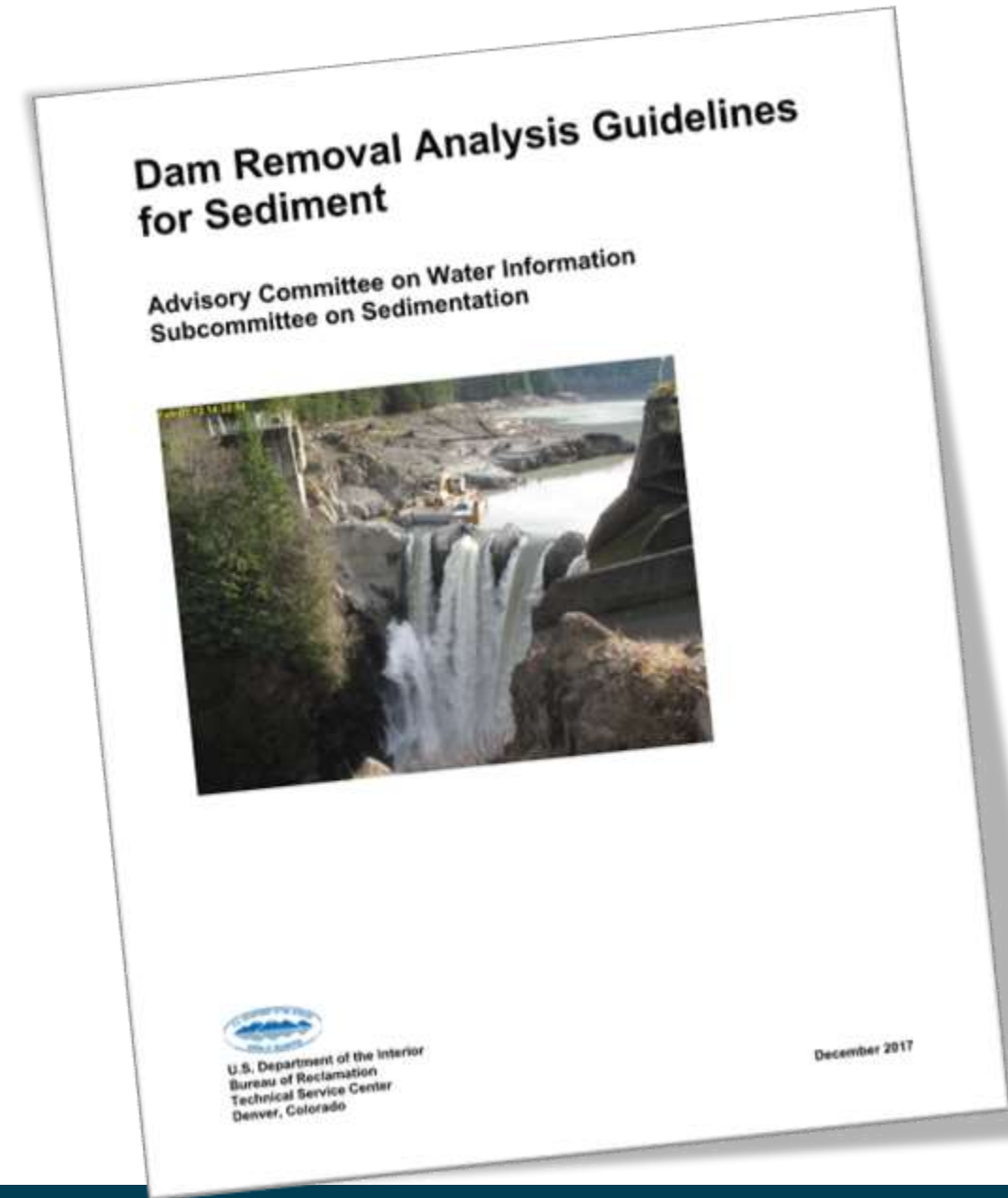
# What guidance is out there?





# Guidance Documents

- USBR – Dam Removal Analysis Guidelines for Sediment
- USSD – Guidelines for Dam Decommissioning Projects
- USDA – National Engineering Handbook – Sedimentation
  
- Several States have developed guidance documents:
  - North Carolina
  - South Carolina
  - Georgia
  - New Hampshire
  - And more
  
- Several conservation organizations have developed guidance as well:
  - American Rivers and Trout Unlimited: Exploring Dam Removal – A Decision-Making Guide





**For more information contact:**

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**or come see us at our booth!**

