Jun 20th, 3:45 PM - 4:00 PM

Dam Removal I: Comparing Sediment Contamination, Regulatory Responses, and Sediment Management Approaches among Dam Removal Projects in the Northeastern U.S.

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COMPARING SEDIMENT CONTAMINATION, REGULATORY RESPONSES, AND SEDIMENT MANAGEMENT APPROACHES AMONG DAM REMOVAL PROJECTS IN THE NORTHEASTERN US.

Fish Passage 2016

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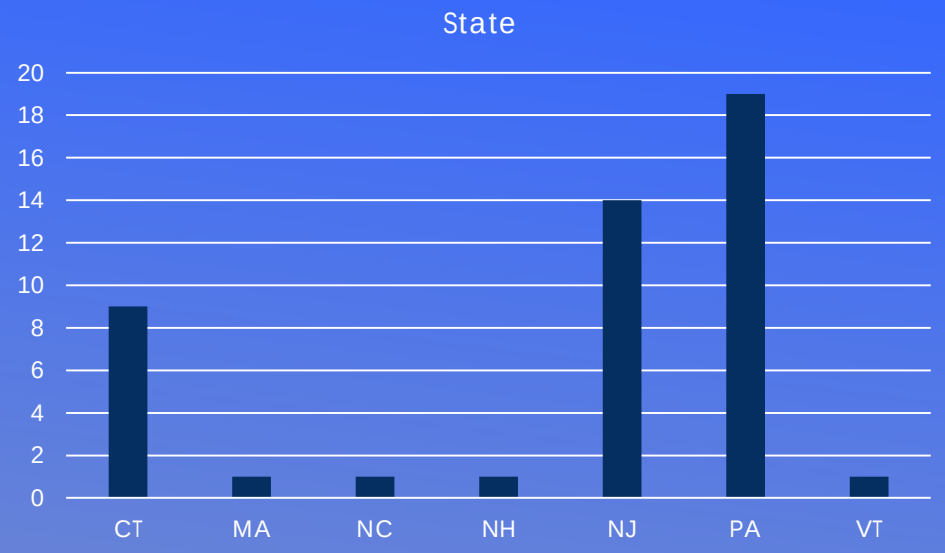
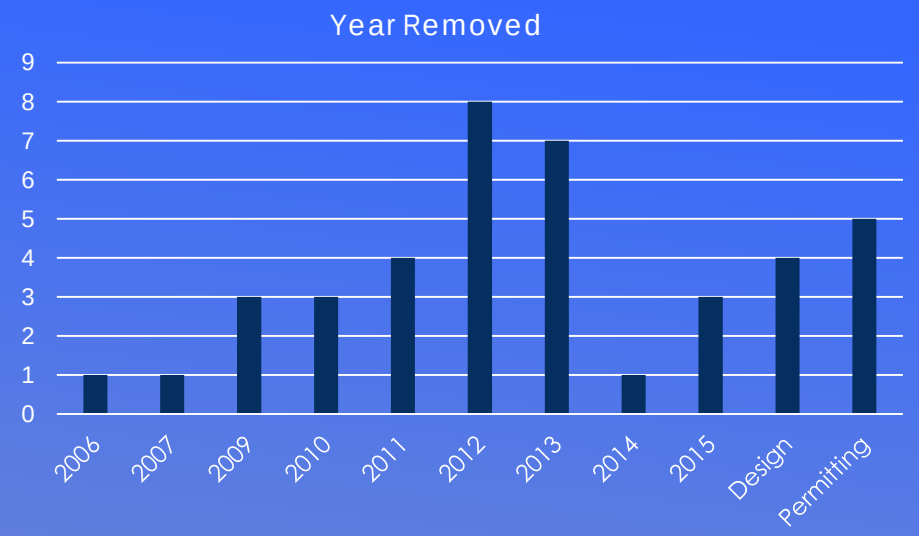
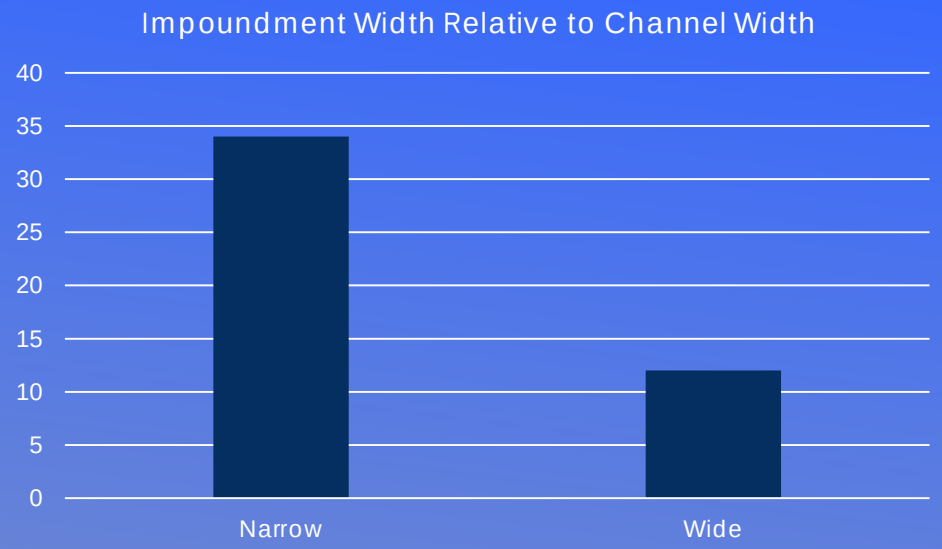
- Look back over 40+ dam removals
- Pattern of findings
- Yet varied outcomes
- Compare / contrast projects
  - Impoundment types
  - Sediment accumulation
  - Sediment contamination

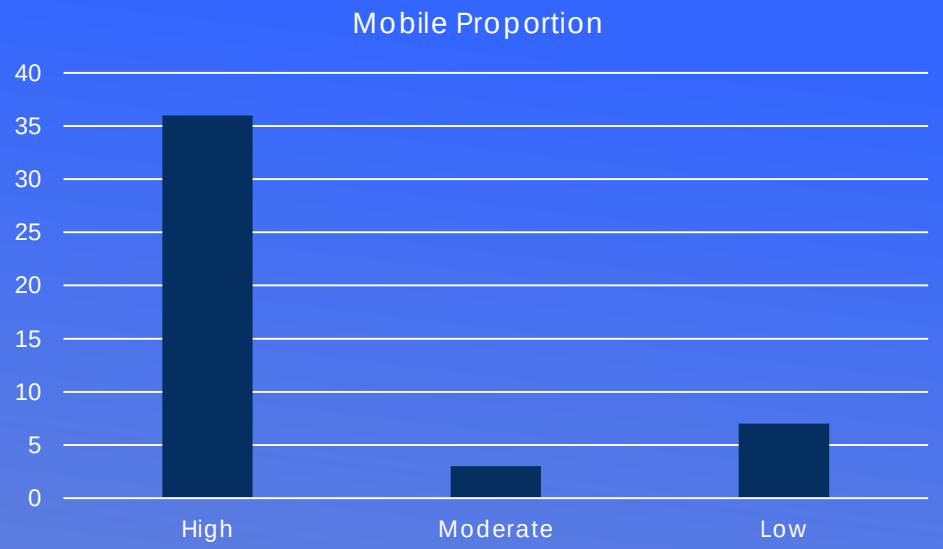
- Examine some projects in detail
  - Regulatory response
  - Sediment management approach

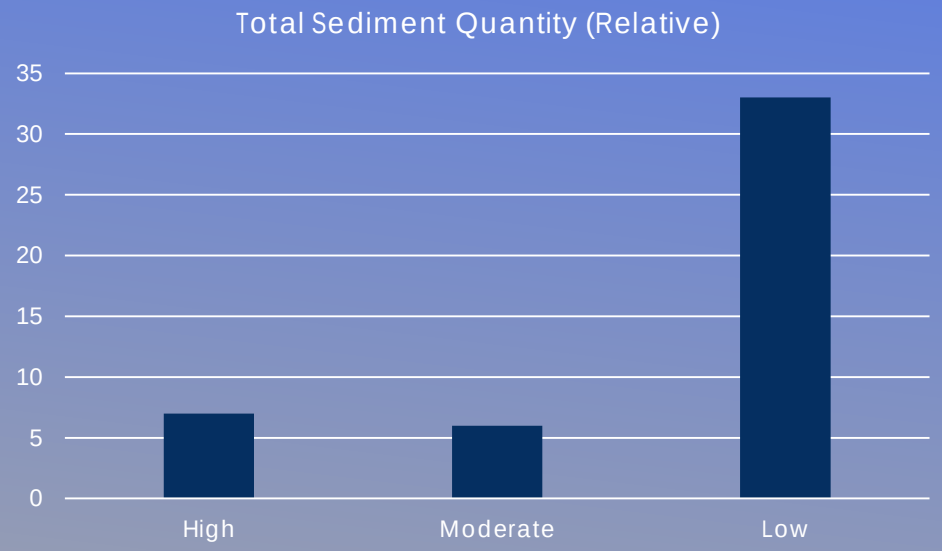
- My hopes:
  - Improve project prioritization, site assessment, and design processes
  - More predictable / consistent regulatory process

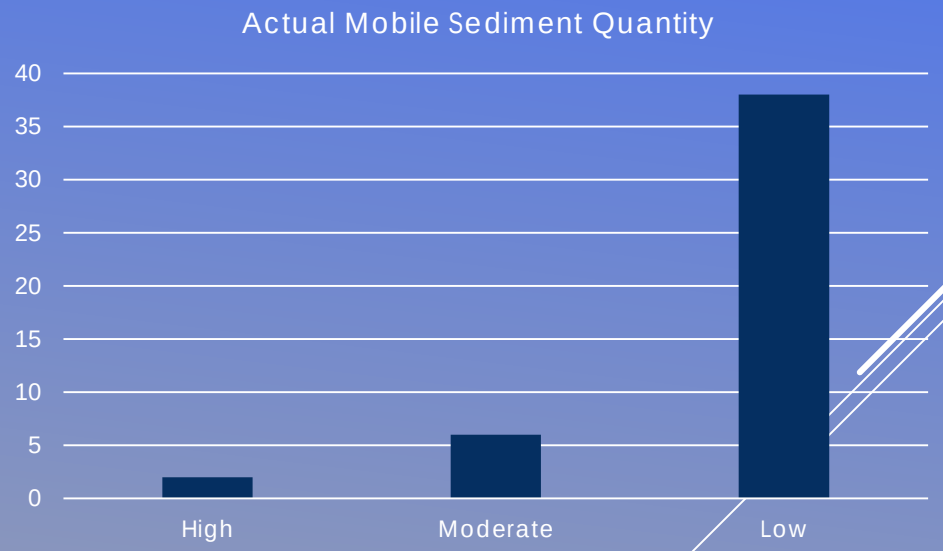

State
20
18
16
14
12
10
8
6
4
2
0
CT
MA
NC
NH
NJ
PA
VT

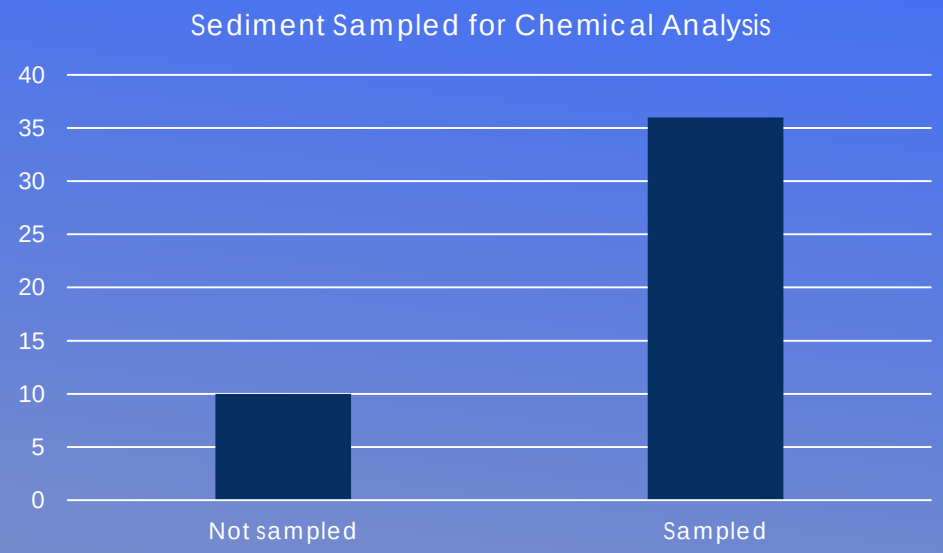

Year Removed
9
8
7
6
5
4
3
2
1
0
2006
2007
2009
2010
2011
2012
2013
2014
2015
Design
Permitting


Impoundment Width Relative to Channel Width
40
35
30
25
20
15
10
5
0
Narrow
Wide


Mobile Proportion
40
35
30
25
20
15
10
5
0
High
Moderate
Low


Total Sediment Quantity (Relative)
35
30
25
20
15
10
5
0
High
Moderate
Low


Actual Mobile Sediment Quantity
40
35
30
25
20
15
10
5
0
High
Moderate
Low



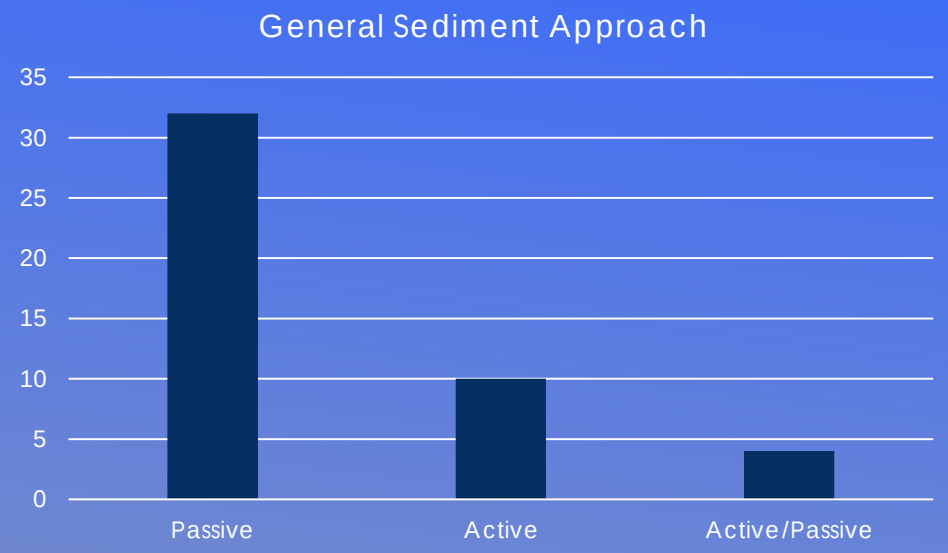
- Grain size
- Organic Content
- Volatiles
- Cyanide
- Chromium
- PCBs
- Pesticides
- Herbicides
- Hydrocarbons
- Metals
- PAHs

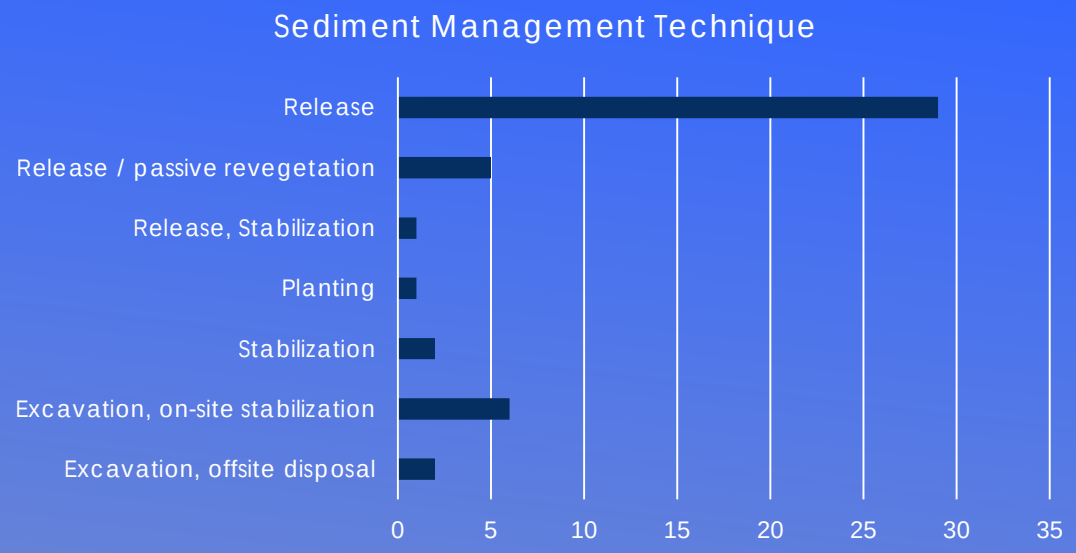
- PAHs
  - **Benzo[b]fluoranthene**
  - Benzo[a]anthracene
  - **Benzo[a]pyrene**
  - Chrysene
  - Dibenz[a,h]anthracene
  - Fluoranthene
  - Phenanthrene
  - Pyrene

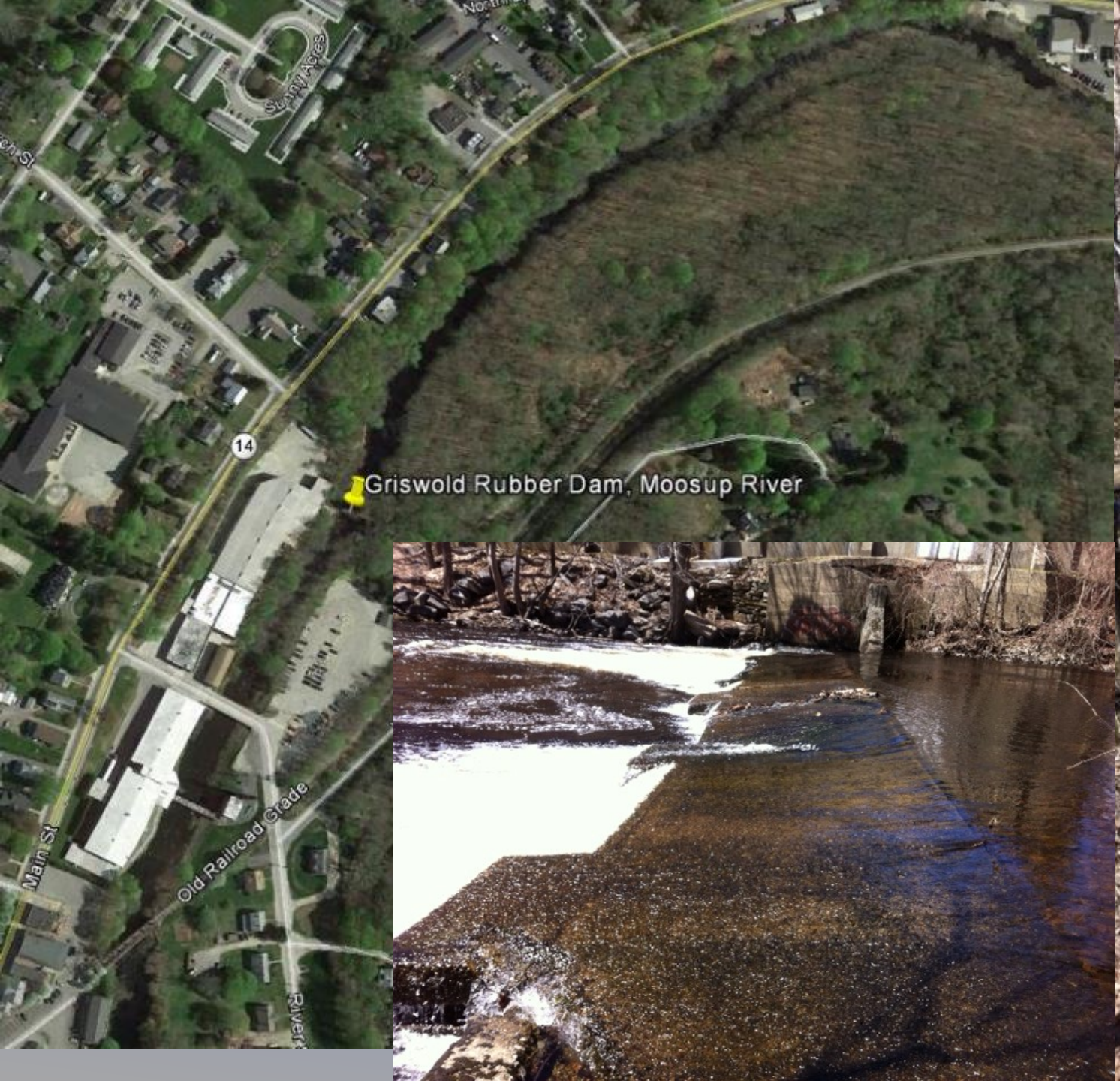
- Detected at most project sites
- Exceedances of ecological screening levels were common
- Downstream & Upstream detections also common
  - Need similar depositional setting to get similar grains size (apples to apples)
  - Not always possible
- Two with human health criteria more protective (lower) than ecological criteria

- Ecological Screening Criteria
- Sediment Quality Guidelines
- Consensus-based
  - Averages of multiple kinds of studies on:
    - various organisms,
    - various types of exposures,
    - various adverse effects
- Screening
  - Intentionally conservative

- MacDonald D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Arch. Environ. Contam. Toxicol. 39:20-31.
- NJDEP ESC
- NOAA Sediment Quality Quick Reference Tables
- Tiered:
  - Threshold Effects
  - Probable Effects
- Some are so low, labs have difficulty detecting

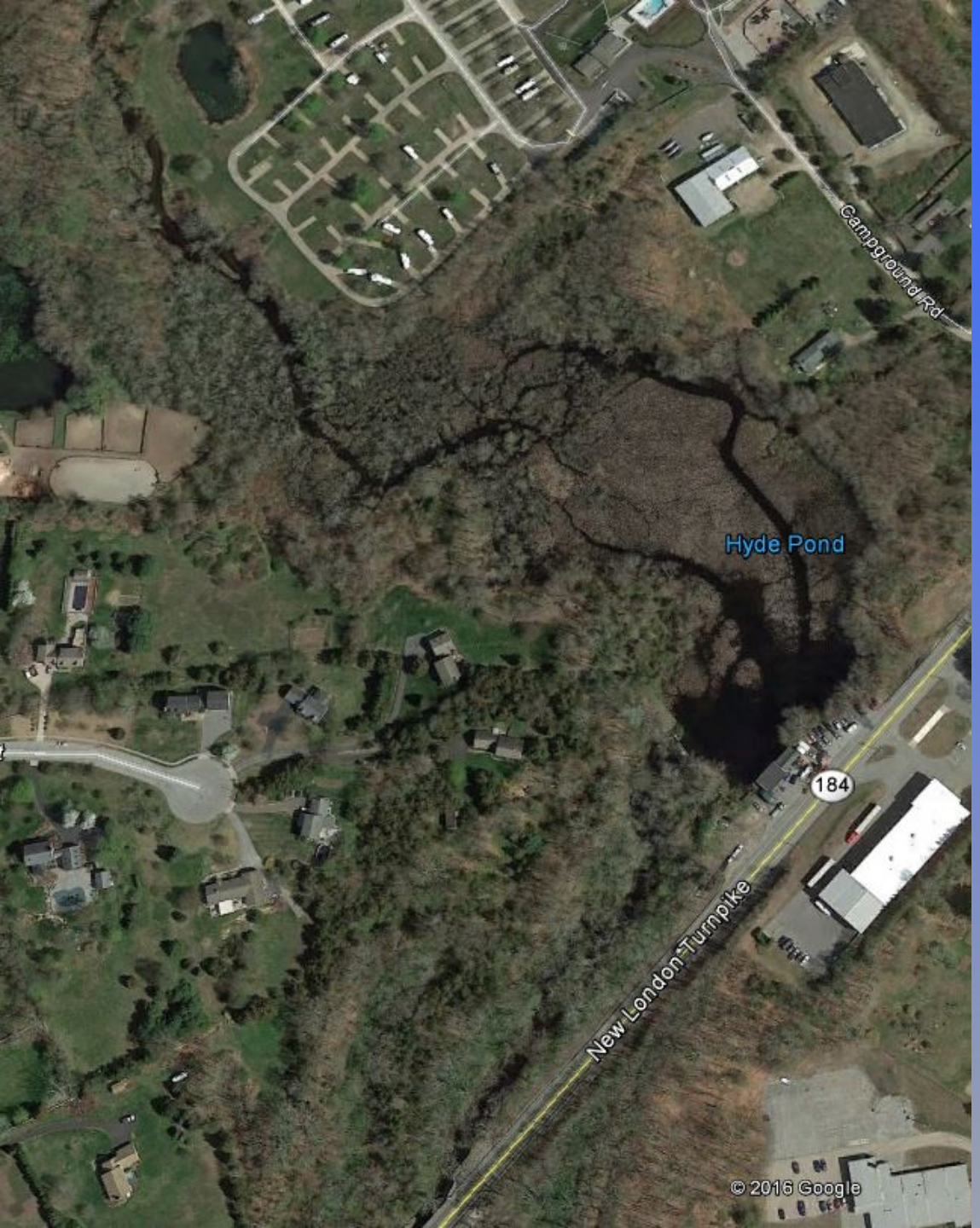

General Sediment Approach
35
30
25
20
15
10
5
0
Passive
Active
Active/Passive


Sediment Management Technique
Release
Release / passive revegetation
Release, Stabilization
Planting
Stabilization
Excavation, on-site stabilization
Excavation, offsite disposal
0
5
10
15
20
25
30
35


Griswold Rubber Dam, Moosup River
14
Main St
Old Railroad Grade


Olsen Dam - Tannery Brook - Boscawen, NH
N Water St
Morse Rd


Olsen Dam - Tannery Bro


Campground Rd
Hyde Pond
184
New London Turnpike
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