



Using Biological Data to Measure
and Communicate Restoration
Success in a Dam Removal Project
in Redby, MN

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MAY 4, 2016



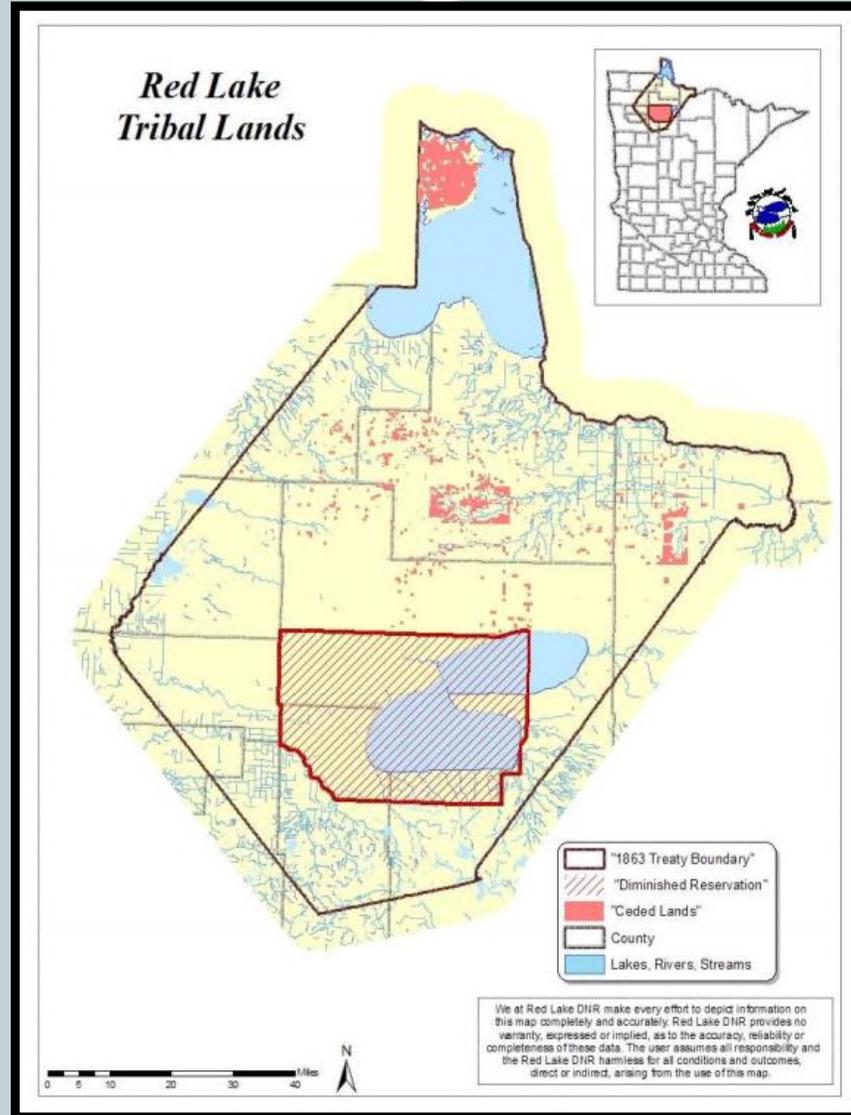
Outline



- Brief project history
- Measuring success
 - Biological
 - ✦ Mussels
 - ✦ Fish
 - ✦ Invertebrates
 - Geomorphological
- Questions

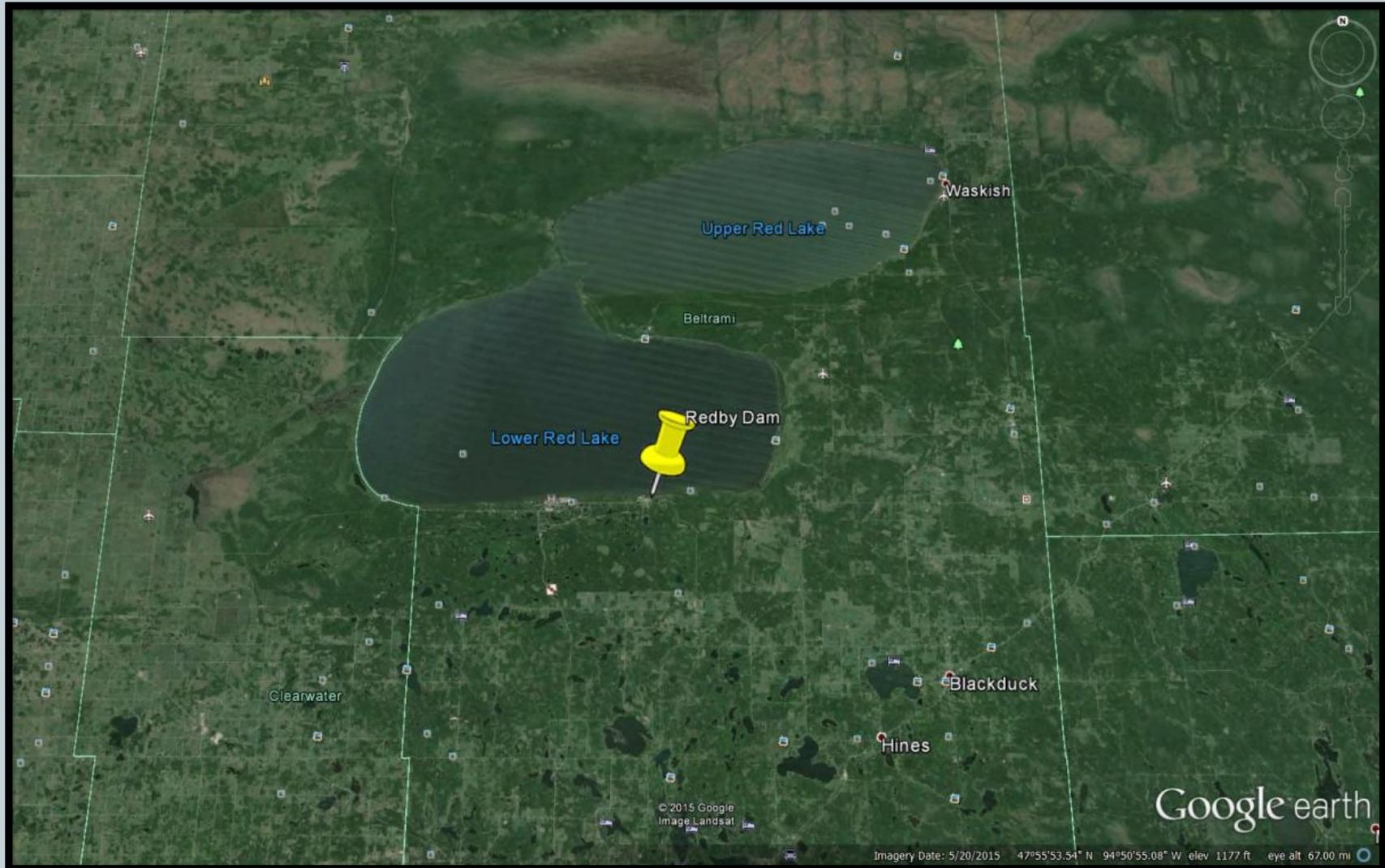


Location



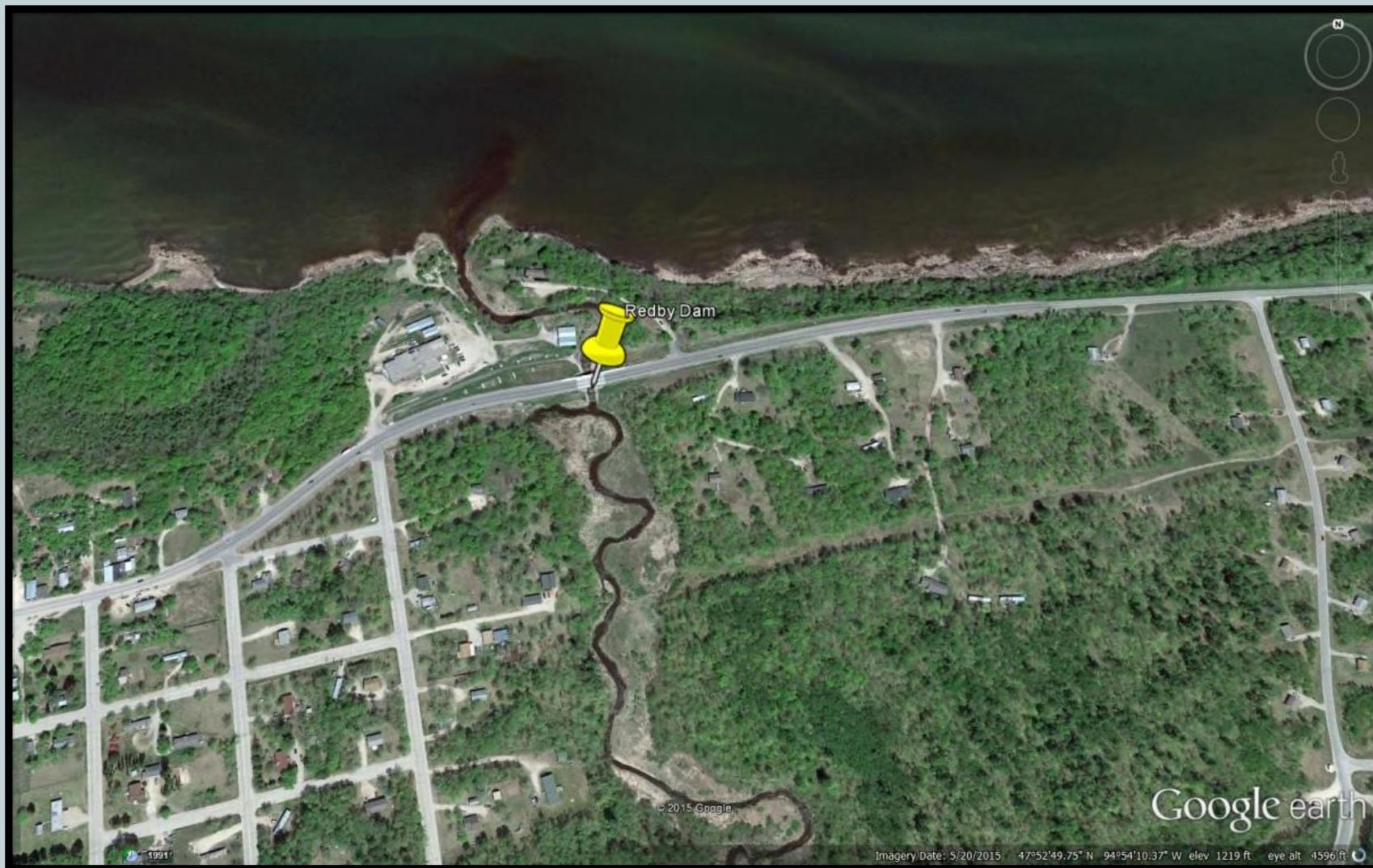


Location





Location





Project History



- MN DOT road project
- Dam removal opportunity
 - ✦ Water quality
 - ✦ Fish Passage
 - ✦ Dam Safety
- Partners, partners, partners
 - ✦ MN DOT, US EPA, MN DNR, NRCS, Red Lake Forestry, Roads, Planning, Wildlife, Fisheries, and more.



Downstream





Upstream Reservoir





Reservoir





Reservoir After





Reservoir After





Downstream Before





Downstream After





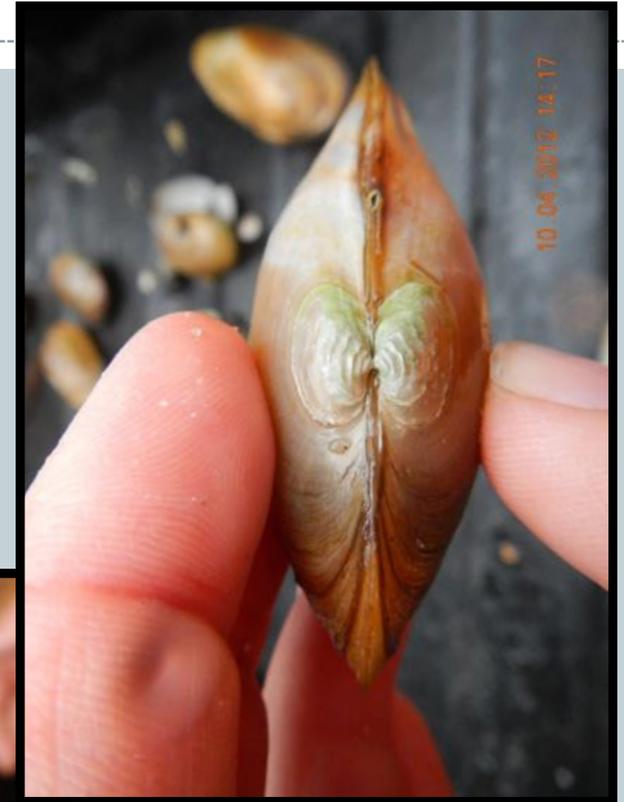
Biological Assessment



- Collect baseline data
- Expectations
- Goals
 - Ecology
 - Reportable changes; To whom?
 - Short term/long term
- Don't kill all the biology during restoration

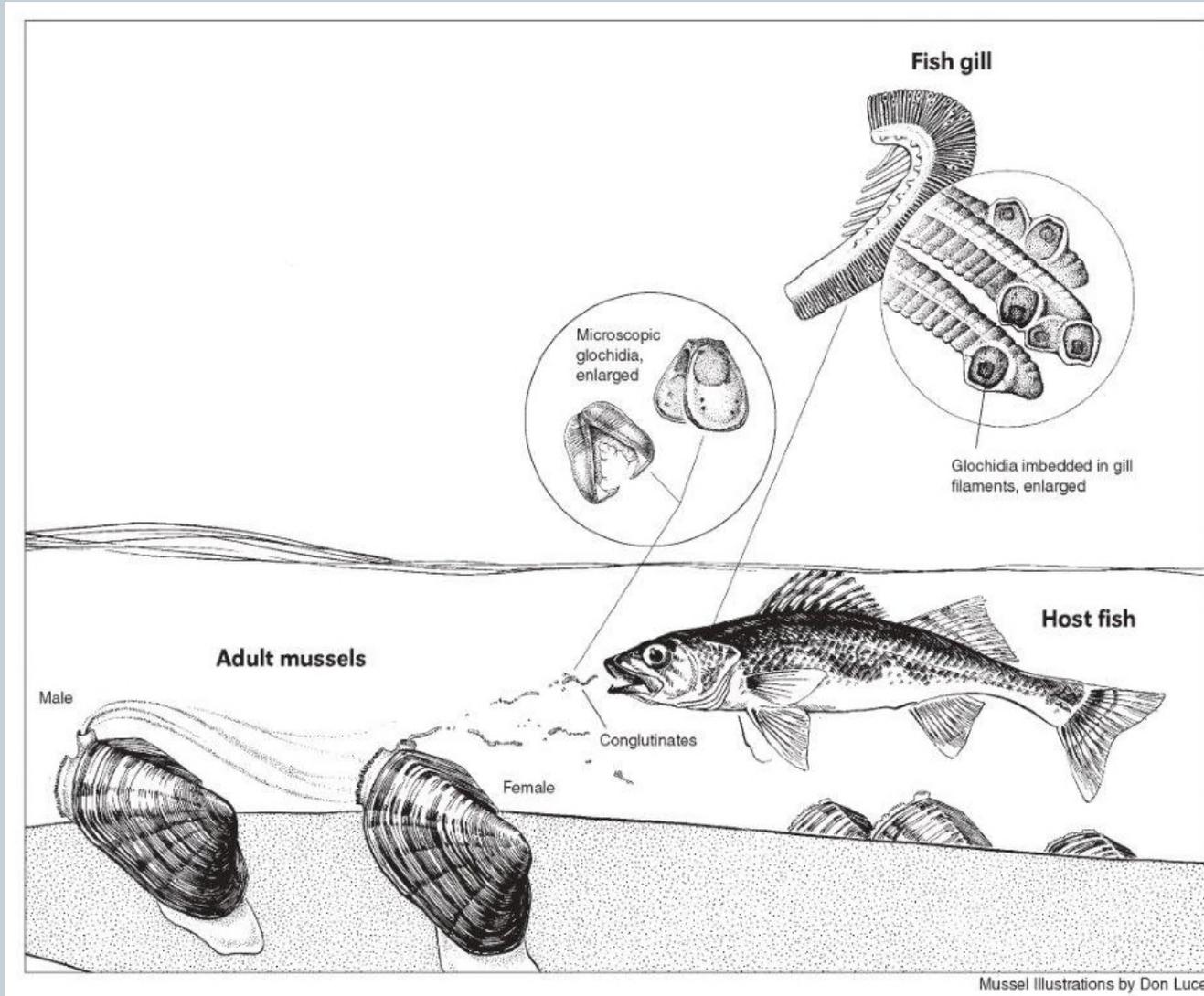


Biological: Mussels





Biological: Mussels





Biological: Mussels



Image by Bernard Sietman



Biological: Mussels



- **Above Dam**

- Creek Heelsplitter
- Giant Floater
- Fat Mucket
- Plain Pocketbook

- **Below Dam**

- Pink Heelsplitter
- White Heelsplitter
- Giant Floater
- Fat Mucket
- Wabash Pigtoe



Biological: Mussels



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Biological: Mussels



- Above Dam

- Creek Heelsplitter
- Giant Floater
- Fat Mucket
- Plain Pocketbook
- 14 total mussels (4 sites)
- CPUE 0.04
 - ✦ Lowest on Reservation

- Below Dam

- Pink Heelsplitter
- White Heelsplitter
- Giant Floater
- Fat Mucket
- Wabash Pigtoe
- 274 total mussels (1 site)
- CPUE 9.13



Pink Heelsplitter





Save the Biology!





Biology: Fish and Invertebrates

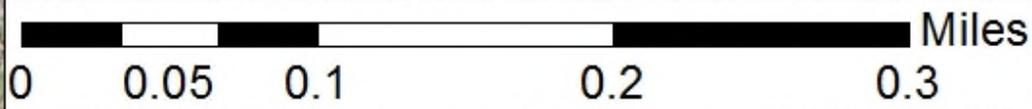


- Biological data collected 0.75 miles upstream from former dam
 - Fish for 3 years prior to removal
 - Inverts for 4 years



MUDR-I

MUDR-M





Biological: Fish

- Before Removal (2011, 2012, and 2013)
 - Creek Chub
 - Blacknose Dace
 - Blackside Darter
 - Johnny Darter
 - White Sucker
 - Largemouth Bass



Biological: Fish



- **After Removal (2014 and 2015)**

- Creek Chub
- Burbot (Eelpout)
- Blacknose Dace
- Blackside Darter
- Johnny Darter
- White Sucker
- Common Shiner
- Pumpkinseed
- Freshwater Drum
- Walleye

- Northern Pike
- Brassy Minnow
- Hornyhead Chub
- Blacknose Shiner
- Fathead Minnow
- Brown Bullhead
- Black Crappie
- Iowa Darter
- Yellow Perch
- Shorthead Redhorse
- Bluegill



Biological: Fish



- After Removal (2014 and 2015)

- Creek Chub
- **Burbot (Eelpout)**
- Blacknose Dace
- Blackside Darter
- Johnny Darter
- White Sucker
- Common Shiner
- Pumpkinseed
- **Freshwater Drum**
- **Walleye**

- Northern Pike
- Brassy Minnow
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- Shorthead Redhorse
- Bluegill



Freshwater Drum (Sheephead)





Walleye





Burbot (Eelpout)



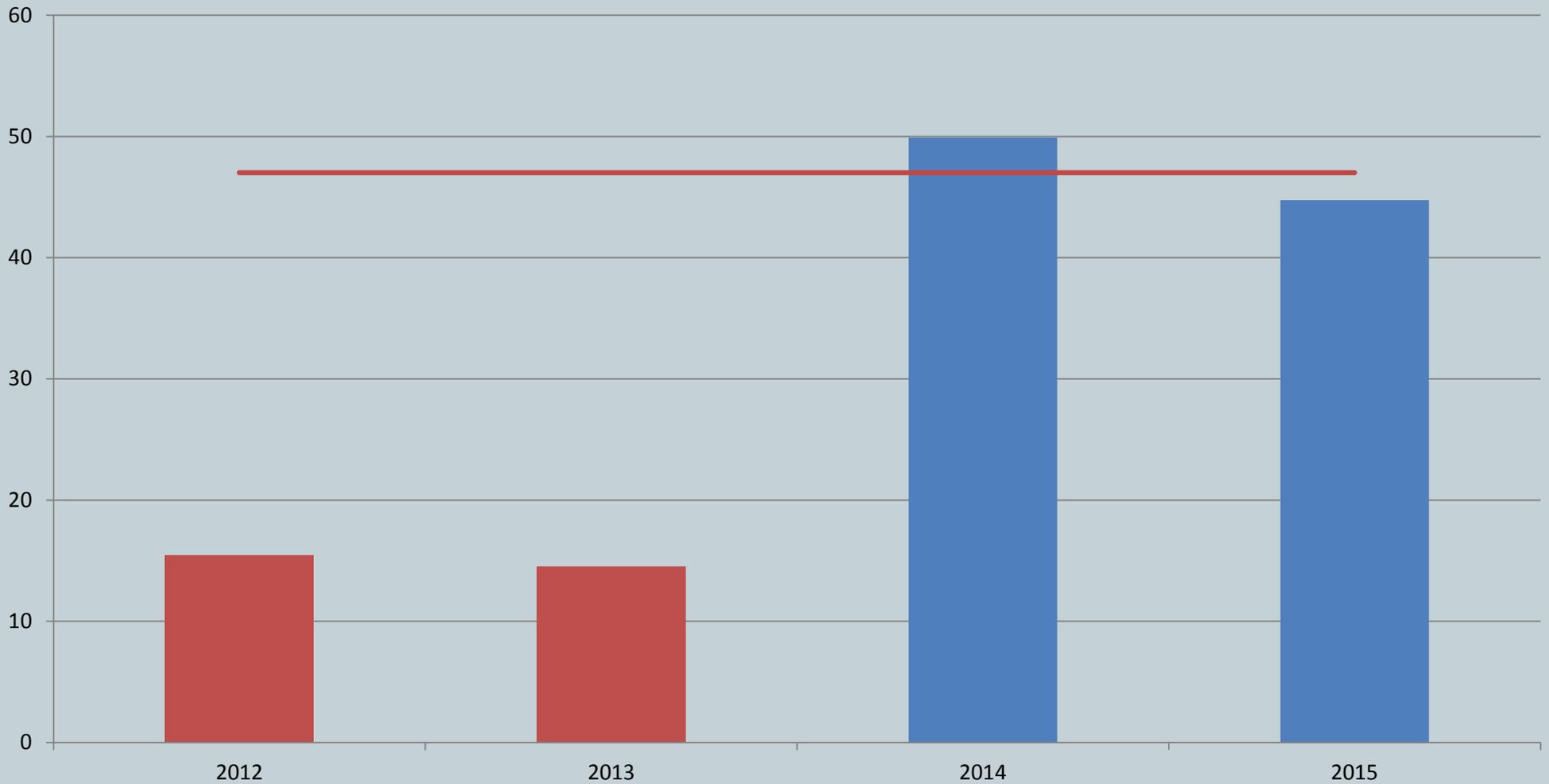


Biological: Fish



Fish Results - F-IBI

Pre-dam
Post-dam

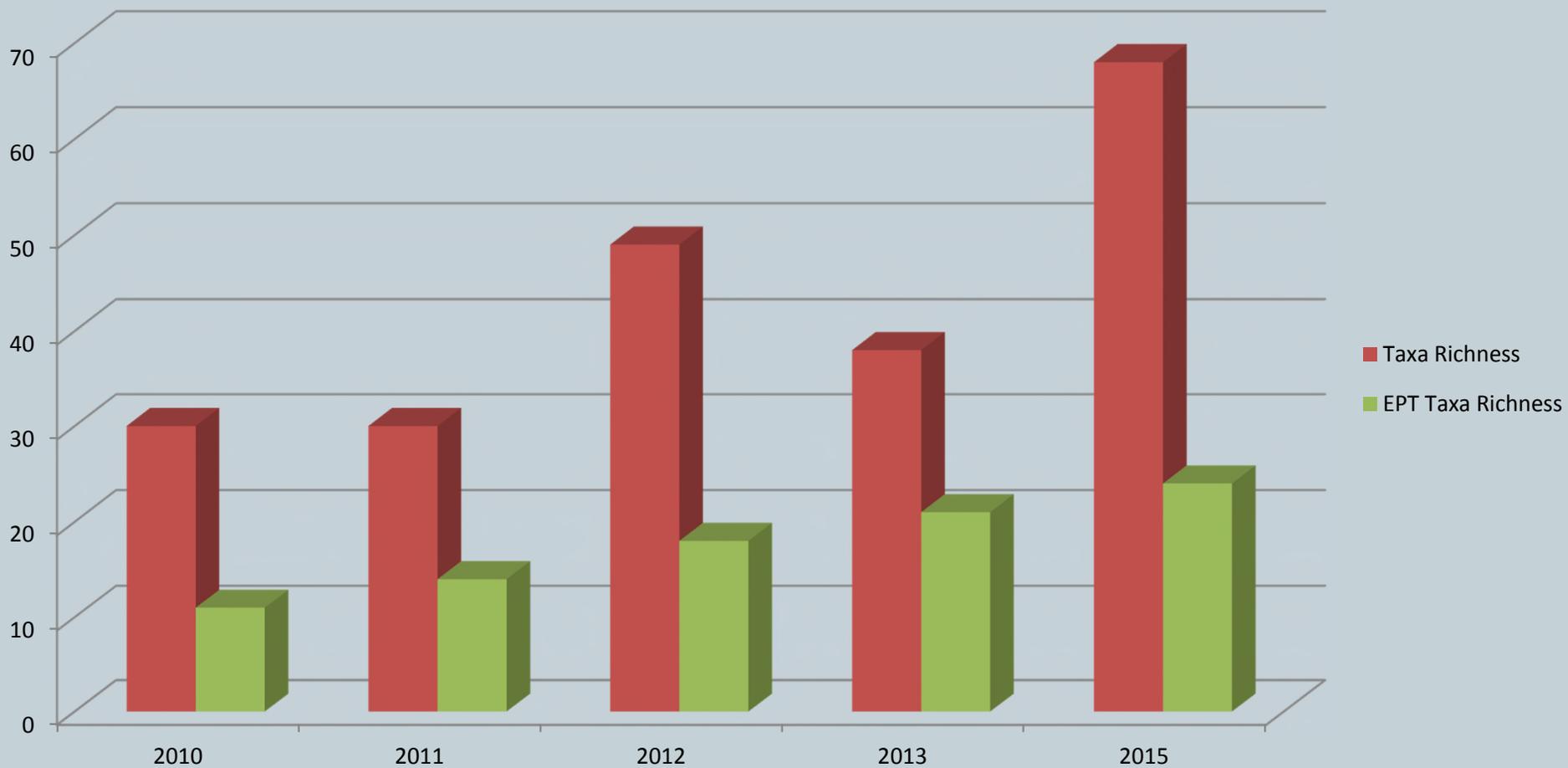




Biological: Inverts



Invertebrate Results

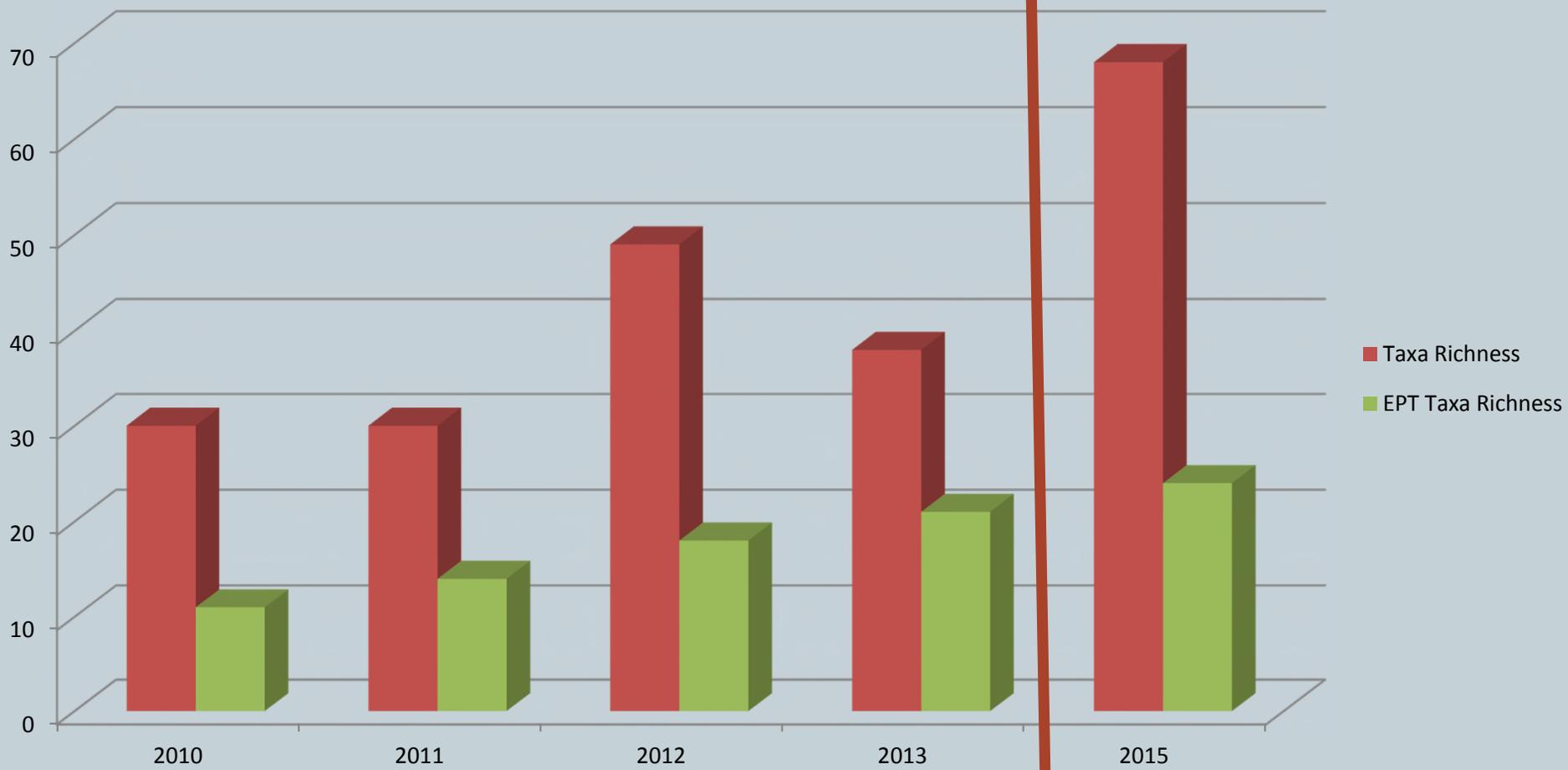




Biological: Inverts

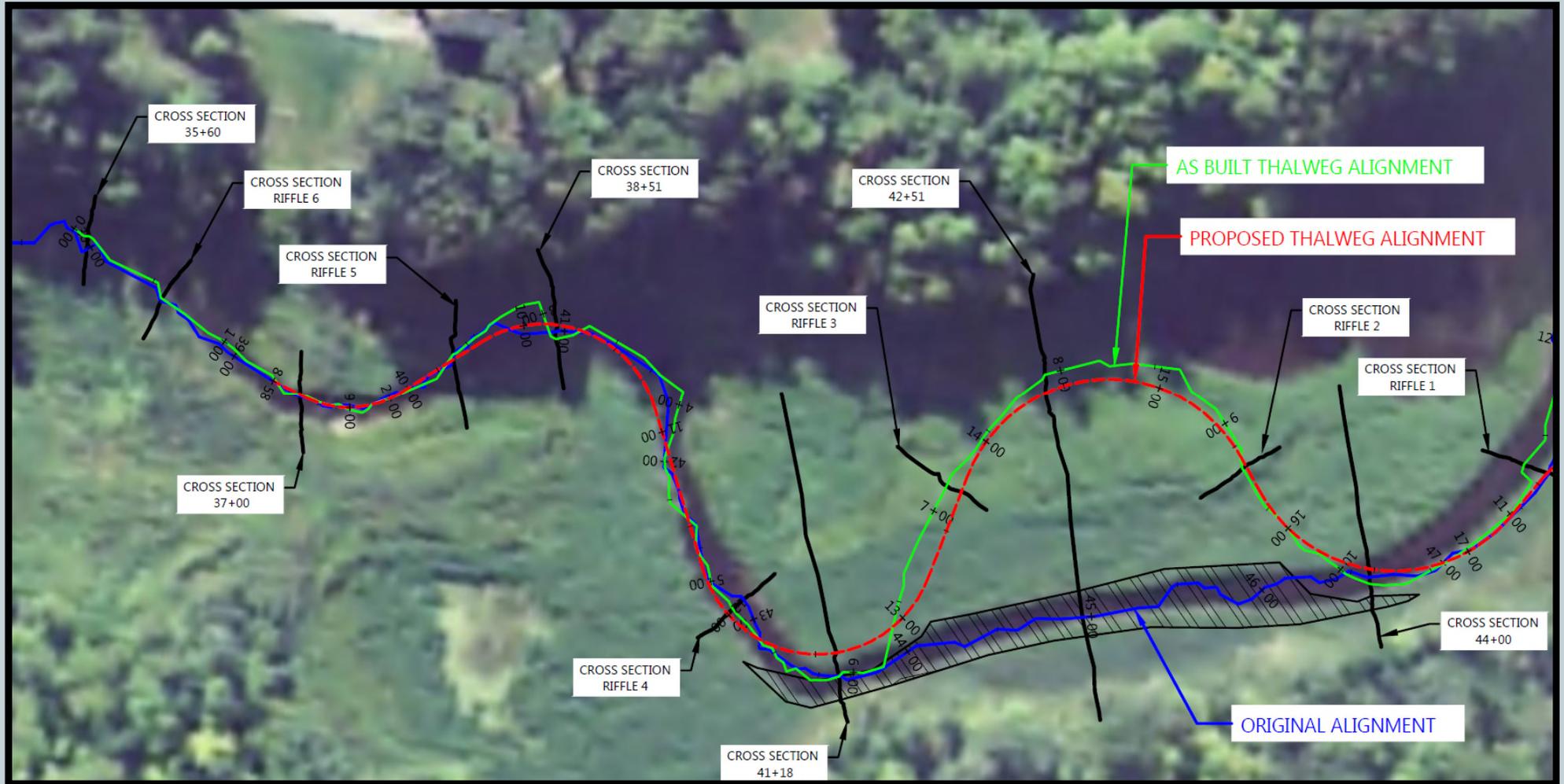


Invertebrate Results





Geomorphological





Success?



- **Mussels – unknown – long term**
 - Host species present!
- **Fish – from 6 species to 20 species**
 - F-IBI scores improving
- **Inverts – increased taxa richness**
- **Geomorphological – Bank stability is good**
 - Long term profile work not completed
 - 3 springs have passed with no washouts



Questions?



MAY THE
FOURTH
BE WITH YOU

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