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

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Outline

• Brief project history
• Measuring success
  ▪ Biological
    ■ Mussels
    ■ Fish
    ■ Invertebrates
  ▪ Geomorphological
• Questions
Location
Project History

- MN DOT road project
- Dam removal opportunity
  - Water quality
  - Fish Passage
  - Dam Safety
- Partners, partners, partners
Downstream
Upstream Reservoir
Reservoir
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

- **Above Dam**
  - Creek Heelsplitter
  - Giant Floater
  - Fat Mucket
  - Plain Pocketbook

- **Below Dam**
  - Pink Heelsplitter
  - White Heelsplitter
  - Giant Floater
  - Fat Mucket
  - Wabash Pigtoe
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
- 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
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Freshwater Drum (Sheephead)
Walleye
Burbot (Eelpout)
Biological: Fish

Fish Results - F-IBI

- Pre-dam
- Post-dam

Year 2012: Pre-dam (15), Post-dam (10)
Year 2013: Pre-dam (12), Post-dam (12)
Year 2014: Pre-dam (1), Post-dam (50)
Year 2015: Pre-dam (0), Post-dam (45)
Biological: Inverts

Invertebrate Results

Taxa Richness
EPT Taxa Richness

2010 2011 2012 2013 2015
0 10 20 30 40 50 60 70
Biological: Inverts

Invertebrate Results

- Taxa Richness
- EPT Taxa Richness


Graph showing the trend of invertebrate results from 2010 to 2015.
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