Assessing dam removals on a shoestring: Using Underwater Photos to Complement Bug data

Musconetcong Watershed Association
Nancy Roberts-Lawler
Beth Styler Barry
The Musconetcong is Wild & Scenic!
Finesville is one mile upstream of the Delaware
Finesville Dam
Why monitor the Finesville dam removal?

• MWA uses data to
  – track progress of project
  – Learn more about dams and restorations
  – Provide information to public

• Other uses
  – Share information with others
  – Only 5% dam removals have ecological data

• Budget is always limited!
Finesville Sampling Sites

Site 1
Site 2
Site 3
Site 4
Site 5

Dam
What parameters did MWA monitor?

- River Watcher Volunteers
  - Visual/Habitat assessment
  - Macroinvertebrate Assessment
  - Dissolved Oxygen (kits)
  - Temperature
  - Physical parameters
  - Turbidity
  - Photos (documentation)

- WWN partners (NJDEP VM)
  - Continuous Dissolved Oxygen, Temperature, Conductivity
Timing

• Macroinvertebrates sampling
  – September 2009
  – April 2010
  – October 2011 (VM)
  – April 2012

• Photographs of stream bottom
  – August 2011
  – November 2011 (pre-removal)

• January-April 2012 (post removal)
  – Monthly

• Dam removal November 11, 2011
Biological Assessment using NJIS and RBP at Finesville September 2009

- Site #1 Habitat Sub Op NI
- Site #2 Habitat Marginal NI
- Site #3 Habitat Marginal No sample
- Site #4 Habitat Marginal NI
- Site #5 Habitat Sub Op NI
Biological Assessment using HGMI and supplemented with VM field collection + ID at Finesville April 2010

Site #1 Excellent, Excellent
Site #3 Poor, Poor
Site #4 Excellent, Good
Site #5 Good, Good
Biological Assessment HGMI and RBP after Finesville Post Dam Removal

Site #1 Habitat sub op, Excellent

Site #3 Habitat Marginal, Excellent

Site #4 Habitat Sub optimal, Excellent

Site #5 Habitat Suboptimal Good
%EPT Lab & VM

% EPT at Finesville Dam Sites

0% EPT in Fall 2011 VM sample!
How could we track changes to the impounded area?

- RBP Habitat is for wadeable streams
- No biological assessment available for non-wadeable conditions in NJ
- Area hard to get into
  - Banks are vertical
  - Water 5-9 feet deep
Tracking changes by taking underwater photos with digital camera

Good quality waterproof digital cameras are now inexpensive

Weighted metric measuring device to standardize photographic method
Locations of Underwater Photographs
Pre and Post Removal

Site #1

Site #3

Site #4

Site #5

50 feet

200 feet

100 feet
Site #1 11.04.2012
Pre removal
Site#1 Post removal - No effect
Upper Site#3
Upper part of Site#3 post removal
Site#3 post removal
100 feet upstream post dam removal
February 2012
100 feet August 2011
100 feet March 2012
50 feet upstream of dam (post removal)
50 feet pre removal
50 feet pre removal
50 feet March 2012
Site#4 pre removal
Site#4 March 2012
Site#4 post removal April
Site #5
Site#5 pre removal
Site#5 5 months post removal
Conclusions at 5 months post removal

- **Upstream and downstream sites:**
  - No change in macroinvertebrate populations
  - Photos show no change in amount of sediment at sites

- **Impoundment:**
  - Improvement in macroinvertebrate populations in lower water areas
  - Photos show decrease in amount of sediment
Challenges

• Timing
  – Weather
  – Dam removal target date moving

• Methodology
  – Didn’t do enough side by sides with VM and lab samples
  – Need better way to standardize location of photographs
Thanks to

*Equipment Loans, Technical Advice, Monitoring assistance*
- EPA Region 2
- NJDEP Watershed Watch Network
- Allen Barlow (Conserve Wildlife)
- Katherine Axt (NJDEP WWN)
- Americorps (Chris Trainor, Liz Fulton and Lauren Smith)
- Ralston Bartholomew, Warren County Community College
- DRBC
- EcoAnalysts, Inc
- Keira Luckhardt of Underwater Recovery
- River Watcher volunteers!

*Funding*
- Watershed Institute
- Leavens Foundation
- NJDEP Watershed Watch Network
...And the MWA River Watchers

Rally Bartholomew
Susan Bernardo
Gerry Bowers
Ellen Cushing
Scott Guillemin
Chuck Gullage
Sonoko Fagans
Charlie Fineran
Charlie Furst
CJ Koop
Tom Koven
Karl Oboda
Don Proefrock
Tom Reed
Lisa Rodriguez
Stu Shafran
Joe Srsich
Dillon George
Dave Uporsky
Mark Wagner
Contact Information

• Beth Styler Barry
  beth@musconetcong.org

• Nancy Roberts-Lawler
  nancy@musconetcong.org

Musconetcong Watershed Association
PO Box 113, Asbury, NJ 08802
908-537-7060