



WATER-SCIENCE SAMPLER

2012 Summer Interns' Program
Three Lakes Association



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Elements of the Sampler

1. Macroinvertebrate Assessment of Shanty, Cold, and Finch Creeks
2. Stormwater Flow Assessment of Shanty Creek
3. Aquatic Plant Survey of Lakes Bellaire, Clam, and Torch
4. Fish Population Survey in Shanty Creek
5. Clam River Plume Assessment
6. Observations of Fish Shelter Project
7. Public Awareness and Education

Macroinvertebrate Study

- Small Aquatic Organisms (e.g insect larvae)
- Indicators Of Water Quality
- Vary In Tolerance To Water Conditions
- Studies Resulted In Numerical Ratings
- Reveals Water Quality Trends



Stream Quality Scores from Macroinvertebrate Counts

	Shanty Creek	Cold Creek	Finch Creek
Spring 2012	Fair 25	Fair 28.3	Poor 12.2
Fall 2011	Fair 20.3	Poor 13.2	Fair 24
Spring 2011	Fair 22	Good 30	Fair 20

* 0-18 Poor 19-33 Fair 34-48 Good MiCorps Scoring Scale

STORMWATER ASSESSMENT OF SHANTY CREEK

- Document Shanty Creek Flow During Storm Events
- Compare Stormwater Flow, Shanty Creek and Cold Creek



Stormwater Assessment

- Development is affecting erosion and sedimentation accumulation build up in Grass River
- Development
 - ✓ Housing and Condos
 - ✓ Golf Courses
 - ✓ Ski Slopes
 - ✓ Impervious Surfaces



Conclusion:

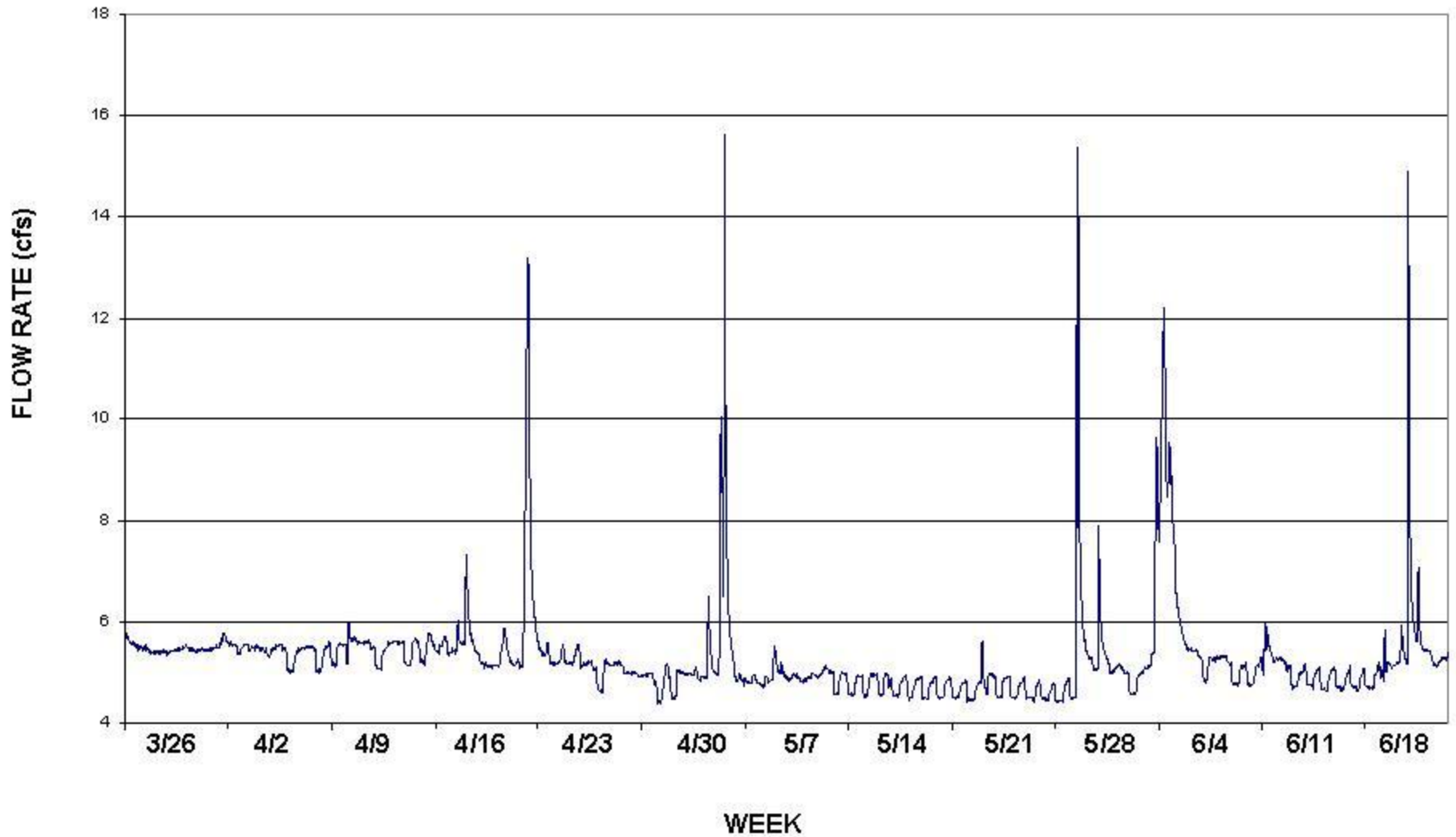
Ratio between normal flow and a storm event:

Shanty Creek 2.7x Cold Creek 1.9x.

Excess stormwater is contributing to greater erosion.

SHANTY CREEK AT M-88 CULVERT

FLOW RATE 3/26/2012 THRU 6/21/2012



AQUATIC PLANT SURVEY OF BELLAIRE, CLAM, AND TORCH LAKES

- Goal: locate colonies of Eurasian water milfoil (EWM)
- Prescreen aerial photos for aquatic plant beds
 - Revisit previous known sites w/ EWM

Method: Visit sites and use rake method, identify and map.



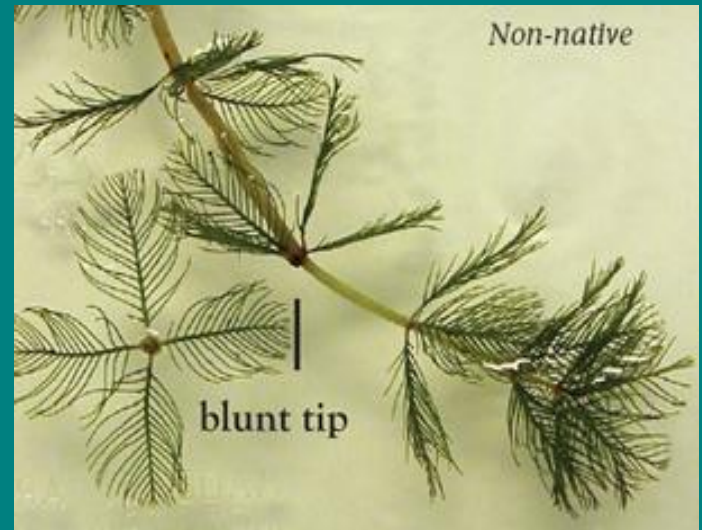
Aquatic Plants

Findings:

12 species Lake Bellaire

11 species in Clam Lake

9 species in Torch Lake



Eurasian (invasive) water-milfoil found at Butch's Marina (Clam), Alden Harbor (Torch) and between Stony and Lone Tree Points (Torch).

Electrofishing

- Goal: to collect fish data up and downstream from a small dam
- Three locations on Shanty Creek electrofished July 2012



Electrofishing

- Four species found:
 - brook trout
 - rainbow trout
 - brown trout
 - mottled sculpin
- Data indicates small dam may be acting as a barrier to fish movement



Clam River Plume Assessment

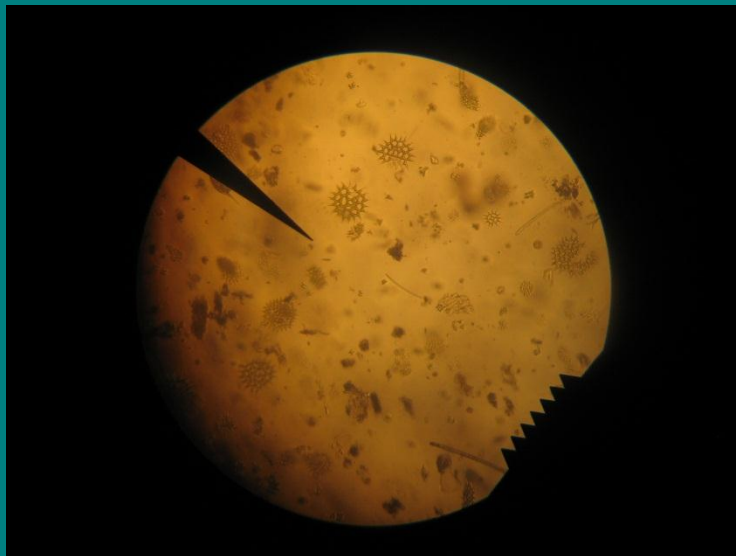
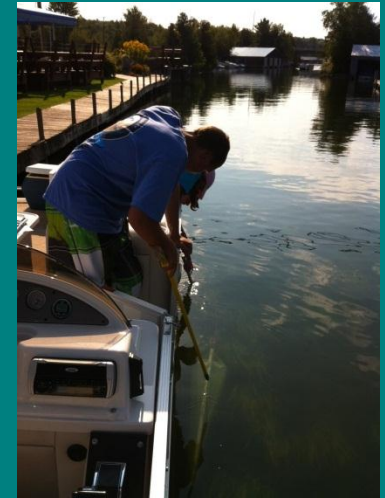
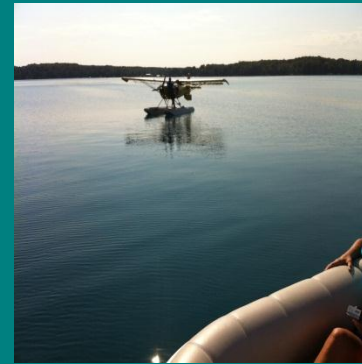
- Characterizing the greenish brown color of Clam River
- Water Quality Parameters:



Chlorophyll A	Dry Weight Phytoplankton	Dissolved Organic Carbon	Total Phosphorus	Nitrogen
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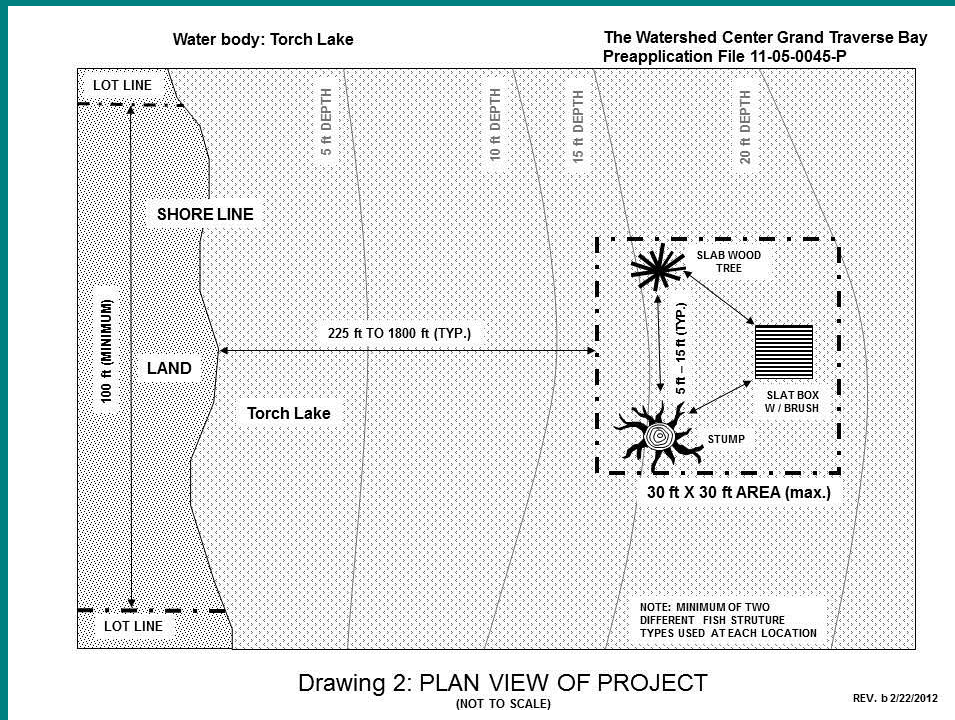
Clam River Plume

- Study led to a better understanding of the organic matter and algae that compose the plume.



Fish Shelters

- MDEQ permitted 82 sites
- 19 sites installed so far
- Three shelters per site



A COLLABORATIVE PROJECT BY THE FOLLOWING ORGANIZATIONS:



Fish Shelters

Deployed In Five Lakes:

1. Elk - Six
2. Torch - Three
3. Clam - Three
4. Intermediate - Four
5. Bellaire - Three



Crate Shelter



Split Log Shelter

Public Awareness

- Antrim County Fair
- “Got Fish?”
Alden Depot 6/19
- “AC Underground”
Alden Depot 8/14
- Facebook
- Newspaper
- Website
- E-letters



Conclusions

- Fish Shelters are working
- Aquatic Plants have been mapped within the 3 lakes
- Shocking – fish would get bigger if dam removed
- Macroinvertebrae – Continue monitoring
- Plume – many things contribute
- Stormwater Flow – development contributes to erosion and sedimentation with opportunities for improvements
- Public Education is paramount. Multi media is necessary to reach all generations

Thinking of our Future



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