

Monitoring Environmental Stressors and Existing and Potential Designated Uses of Hardies Creek, Galesville, Wisconsin

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A stylized silhouette of a mountain range in shades of teal, located at the bottom right of the slide.

Students' Title

What's Up with Hardies Creek?



Presentation Objectives

Identify what, if any, environmental stressors are limiting brook trout populations in Hardies Creek

Determine if those environmental stressors are truly impairing the natural condition of Hardies Creek



Presentation Objectives

Demonstrate that H.S. teachers & students can effectively collaborate with DNR monitoring.



Hardies Creek

- ◆ Located in Western Wisconsin Driftless area
- ◆ Deeply entrenched from historical farming practices
- ◆ Rural watershed
- ◆ 8.0 km long
3.5 meters wide
14 cm ave. depth



Hardies Creek

- ◆ Existing Designated Use
 - 3.0 km Class III Cold Water Stream
 - 5.0 km Warm Water Forage Fish
- ◆ Potential Use
 - 8.0 Class II Cold Water Stream
- ◆ Listed as a 303d Impaired Water



Monitoring Sites

Four sites on Hardies Creek



Designated Use = Fish

- ◆ Index of Biological Integrity (IBI)
- ◆ 1971 – 9 brook trout
- ◆ 1988 – 1 brook trout
- ◆ 2002 – 2 brook trout
- ◆ 2004 – 1 brook trout

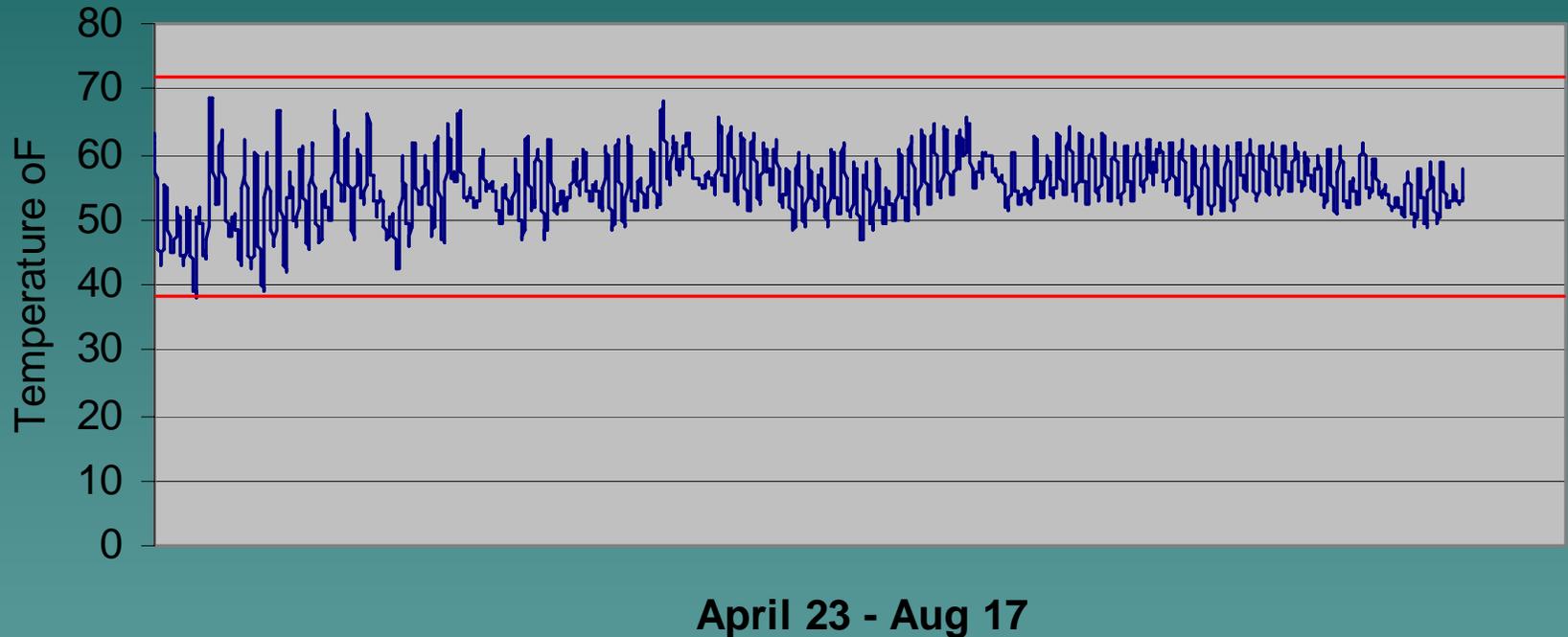


Evaluating Environmental Stressors

- ◆ Temperature ?
- ◆ Historical Impacts ?
- ◆ Water Quality ?
- ◆ Habitat ?



Temperature



- ◆ Temperature adequate to support cold water trout fisheries

Evaluating Environmental Stressors

- ◆ Temperature ✓
- ◆ Historical Impacts ?
- ◆ Water Quality ?
- ◆ Habitat ?



Historical Impacts

- ◆ 1988
 - Historical stocking of trout
 - Intensive cattle grazing and cropping
 - Field surveys note “manure floating down the stream”



Historical Impacts

◆ Assessment

- Cooperative project with local sports club
- 2003 Stocked fingerlings 1,000 feral brook trout
- Students fin clipped adipose fin
- Monitored survival and recruitment



Historical Impacts

◆ Results

- 2004 found 22 young of year brook trout in headwaters of Hardies Creek
- 2005 found 2 adult brook trout and no young of year in the headwaters



Historical Impacts

◆ Conclusion

- Brook trout can reproduced
- Adult brook trout carry-over from year to year limiting



Evaluating Environmental Stressors

- ◆ Temperature ✓
- ◆ Historical Impacts ✓
- ◆ Water Quality ?
- ◆ Habitat ?



Water Quality



- ◆ Students analyzed water quality in the field

Water Quality



- ◆ And collected samples for analysis by Wisconsin State Lab

Water Quality

Factor	Result	Index Value
DO (%)	85	16.2
Fecal	407	4.6
pH	8.15	8.9
BOD	1.63	9.7
▲ Temp	0.7	9.1
Phosphorus	0.232	4.6
Nitrates	0.612	8.4
Turbidity	4.11	6.9
Solids	325	3.9
	Score	75.2 (Good)

National Sanitation Foundation WQ Index,

Water Quality

- ◆ Aquatic insects indicated very good to excellent water quality
- ◆ Biotic Index
 - 2.382 (Excellent)
 - 3.882 (Very Good)

*Analyzed at UW-Stevens Point



Evaluating Environmental Stressors



- ◆ Temperature ✓
- ◆ Historical Impacts ✓
- ◆ Water Quality ✓
- ◆ Habitat ?

Fish Habitat

- ◆ Students collected fish habitat data according to DNR standard protocols



Fish Habitat

- ◆ 100 meter long station
- ◆ 12 transects
- ◆ 4 Points
 - Stream width
 - Water depth
 - Depth of loose sediment
 - Embeddedness
 - % Bottom substrate type
 - %Algae/Macrophytes
 - Adult fish cover
 - Length of bank erosion
 - Riparian land cover



Fish Habitat

	Score	Rating
Hardies @ Black R	55	Good
Hardies @ Hwy 54	55	Good
Hardies @ Hwy DD	43	Fair
Hardies @ Van Riper	40	Fair

Simonson, et al. 1994. Guidelines for Evaluating Fish Habitat in Wisconsin Streams USDA Forest Service General Technical Report NC-164

Fish Habitat

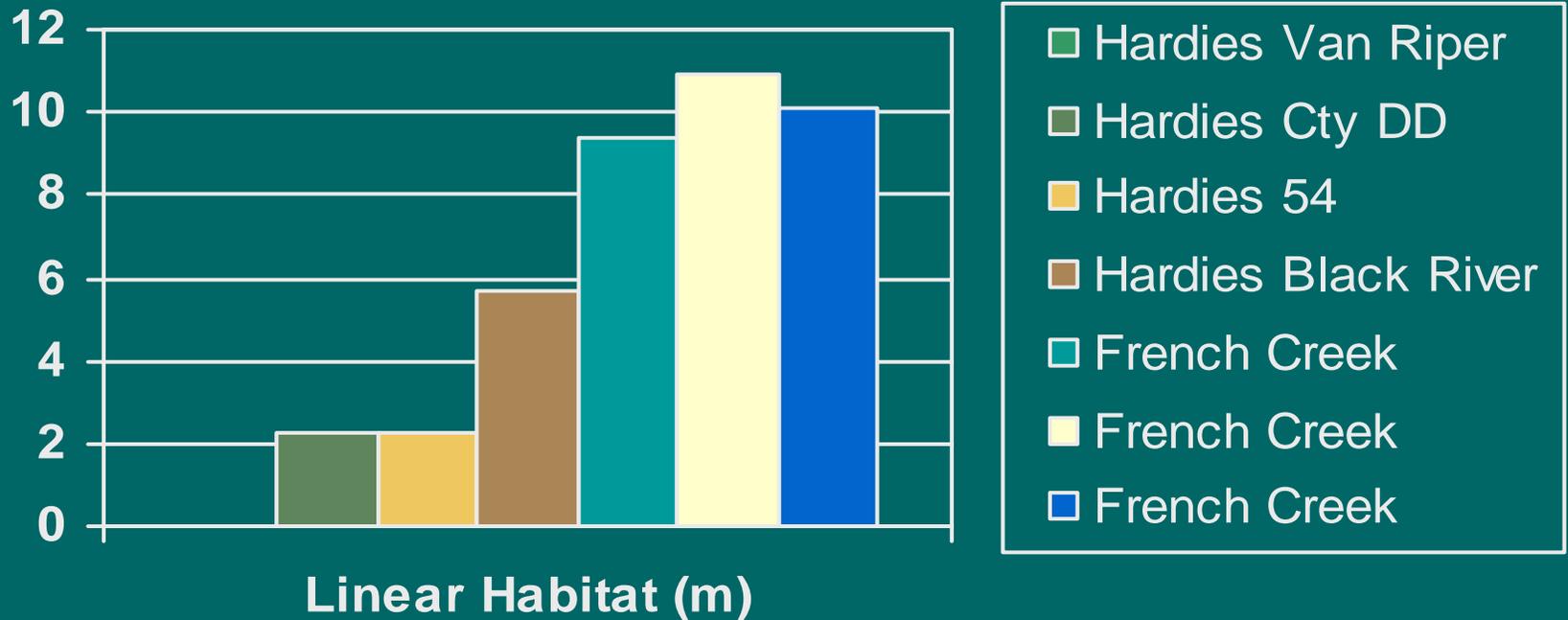
Closer look adult trout habitat

- ◆ Boulder
- ◆ Emergent Plants
- ◆ Overhanging Plants
- ◆ Submerged Plants
- ◆ Undercut Banks
- ◆ Woody Debris



Fish Habitat

- ◆ Substantially less adult trout habitat than reference



Fish Habitat

Closer look bottom composition

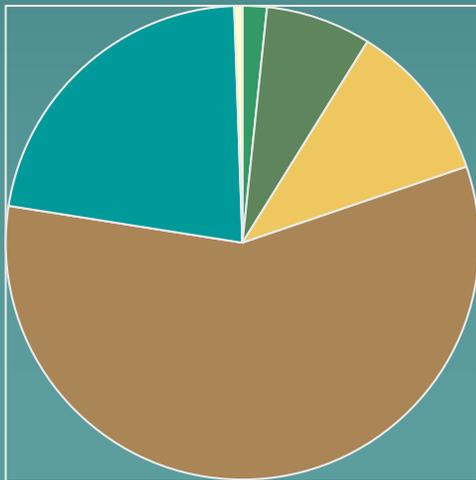
- ◆ Boulder
- ◆ Rubble
- ◆ Gravel
- ◆ Sand
- ◆ Silt
- ◆ Clay



Fish Habitat

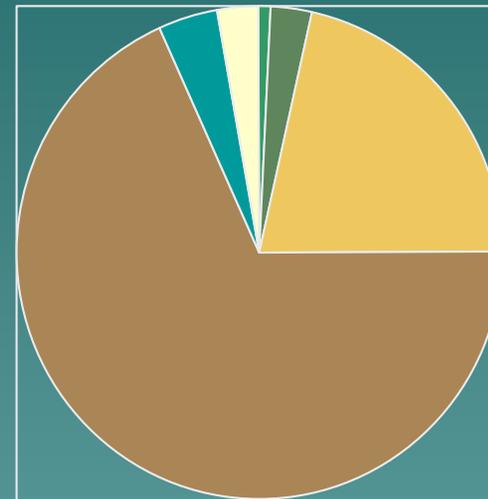
- ◆ More silt
- ◆ More rubble
- ◆ Less sand
- ◆ Less gravel

Hardies Creek



■ Boulder
■ Rubble
■ Gravel
■ Sand
■ Silt
■ Clay

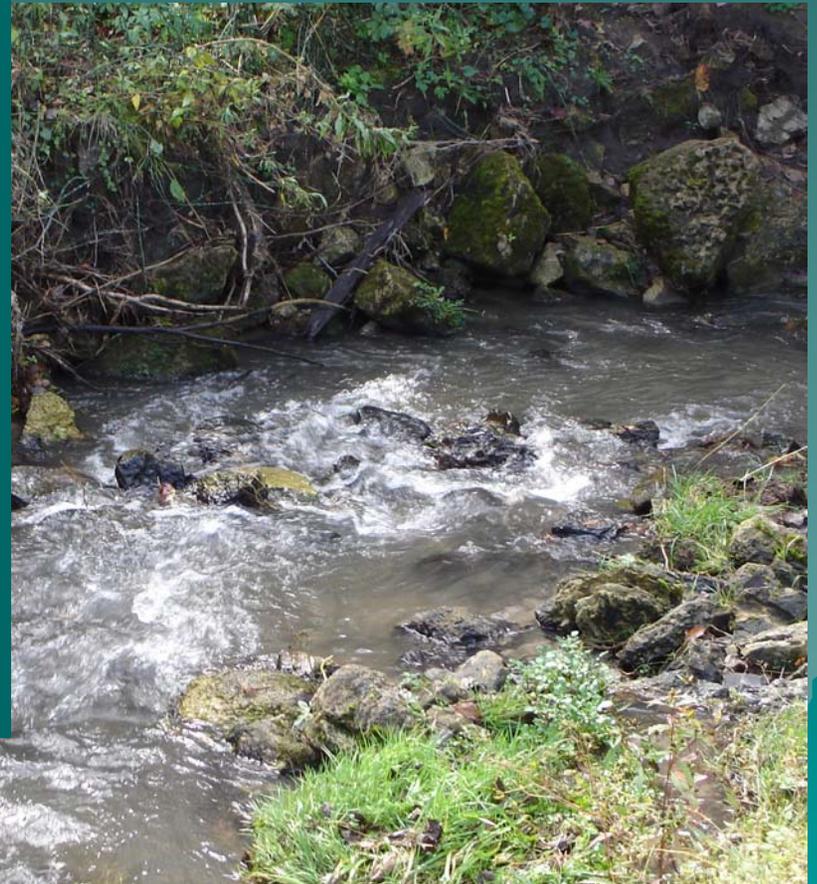
Reference Creek



■ Boulder
■ Rubble
■ Gravel
■ Sand
■ Silt
■ Clay

Evaluating Environmental Stressors

- ◆ Temperature ✓
- ◆ Historical Impacts ✓
- ◆ Water Quality ✓
- ◆ Habitat ?
 - Too Shallow
 - Too Silty
 - Not Enough Gravel



Impaired or Naturally Limiting?

- ◆ Contact DNR's Central Office Expert:
Friar Mike Miller from Flossme, WI
- ◆ "Well, if I were you, I'd go trout fishing."



Other Stressors

- ◆ Extreme Flows
- ◆ Food Resources
 - Forage fish (sparse)
 - Macroinvertebrates (sparse)





Back



Forward



Stop



Refresh



Home



Search



Favorites



Media



History



Address http://www.getschools.k12.wi.us/hs/staff/jonjohnson/Final%20Webpage/EV5%20Whole%20Mainpage.html



G-E-T Environmental Science



Check out our research and Conclusions:

[Habitat](#)

[Macroinvertebrate](#)

[Fish](#)

[Water Chemistry](#)

Project Description

Gale-Etrick-Trempealeau High School students, through a Local Water Quality Grant, coordinated with the Wisconsin Department of Resources and conducted surveys for habitat, water chemistry, macroinvertebrates, and fish on Hardies Creek, which is currently on the 303(d) Federal List of Impaired Waters. Using GIS modeling of the stream in question and two other streams for comparison, students created a database of their research data to ultimately determine the cause(s) of why Hardies Creek is not meeting it's potential as a stream. The culminating project involved students completing a plan of action for Hardies Creek to restore or enhance water quality. All research data and written reports will be shared with local interest groups and the Wisconsin Department of Natural Resources.



Internet

Start



2 Microsoft ...

Microsoft Pow...

Untitled Doc...

Desktop



8:34 AM

Summary

- Students were helpful in supplementing DNR monitoring efforts
- Appears that habitat may be the environmental stressor affecting the fish community
- Next step: TMDL for sediment/silt reduction



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WDNR and GET School District