

Data Analysis Examples from the Huron River Watershed



For the MiCorps Volunteer Stream Monitoring Program

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Huron River Watershed Council



Huron
River
Watershed
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Protecting the river since 1965

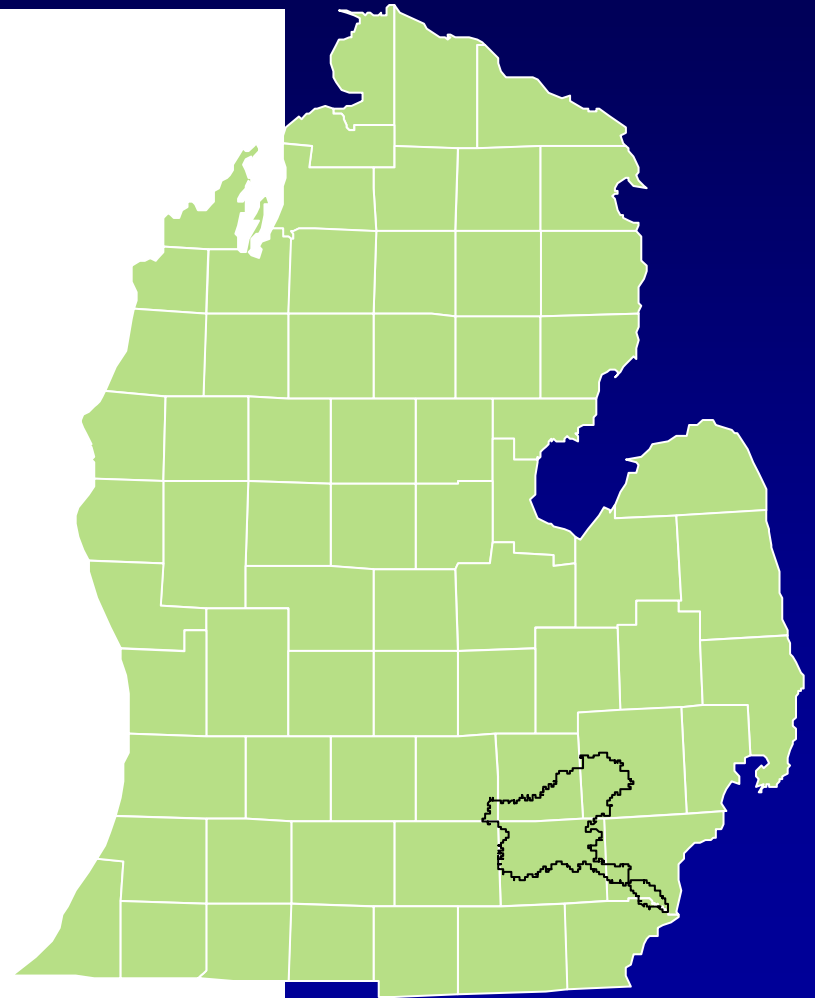
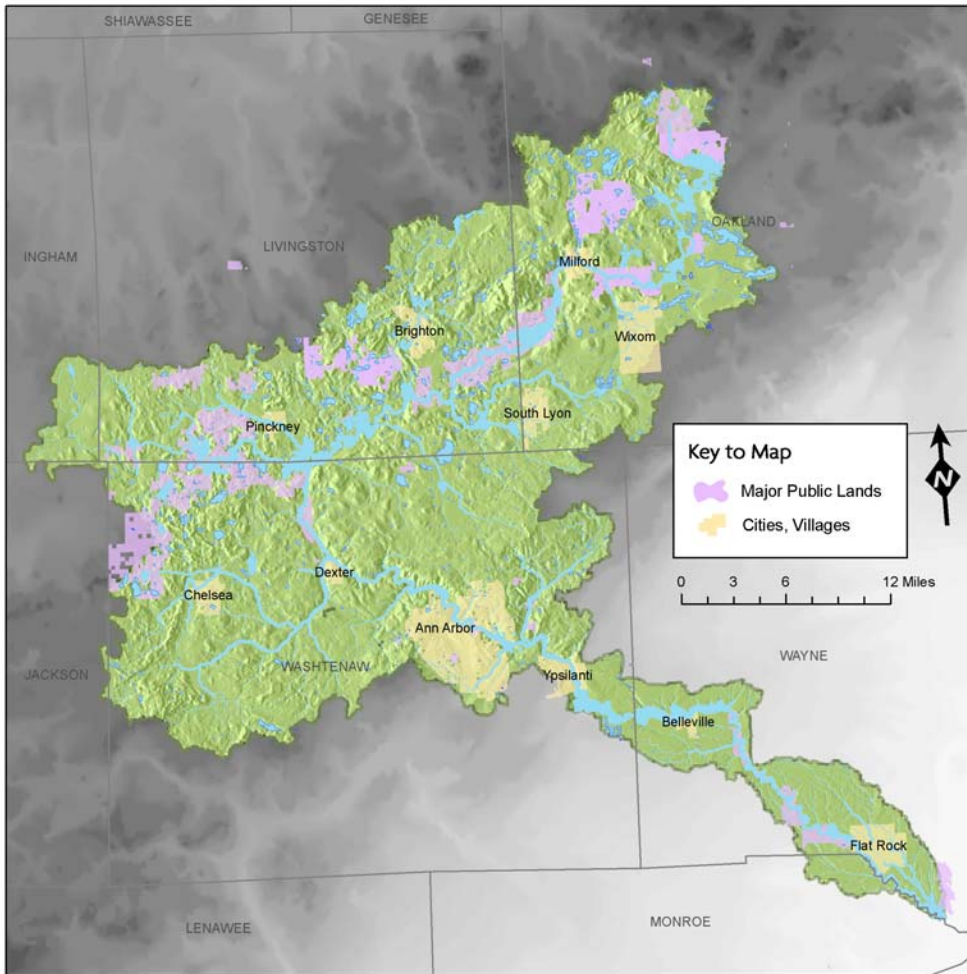
Presentation Goals and Outline

- Demonstrate ways in which you can analyze and display your stream macroinvertebrate data.

Outline:

1. Basic Reports
2. Simple trends
3. Connecting Habitat with Insects
 - Covariance Structure Analysis
 - Regional Normalization Model

Huron River Watershed





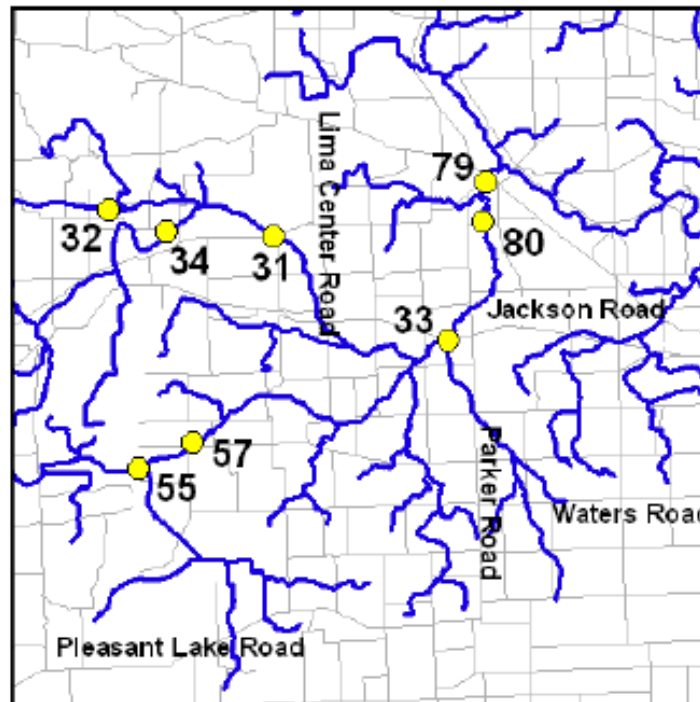
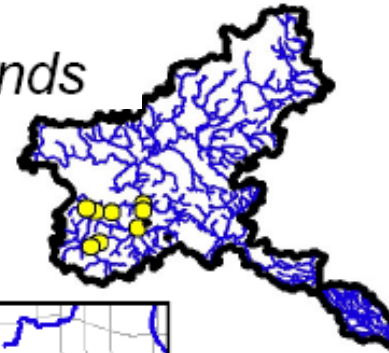
Adopt-a-Stream

Macroinvertebrate Monitoring Results

- Online pdf's.

*April 2008 Data
and Long Term Trends*

Mill Creek Watershed



April 2008- Mill Creek Watershed

Site #	Location	Insects	EPT	Sensitive	5 year trend
31	Mill Creek: Fletcher Road (April 2007)	10	6	1	Stable
32	Mill Creek: Ivey Road	11*	6	2	↓
33	Mill Creek: Jackson Road	15*	8	2	↑
57	Mill Creek: Klinger Road (Sept. 2006)	8	2	0	Stable
34	Mill Creek: Letts Cr at M-52	15	4	1	Stable
55	Mill Creek: Manchester Road	10	4	1	Stable
80	Mill Creek: Shield Road	16*	7*	3	↑
79	Mill Creek: Warrior Park (Sept 2007)	14	7	2	Stable

Key:

- Counts refer to the number of families caught.
- EPT: Ephemeroptera-Plecoptera-Tricoptera (Mayflies-Stoneflies-Caddisflies)
- Shaded box was not sampled in this past River-Roundup but most recent sampling date is given.
- * = statistically significant trends (↓: decreasing; ↑: increasing) over the past 5 years at the 10% level.
- n/a= not available due to incomplete data.
- NEW: site has recently been introduced and has too few samples to detect trend.

Long-term Trends- Mill Creek Watershed

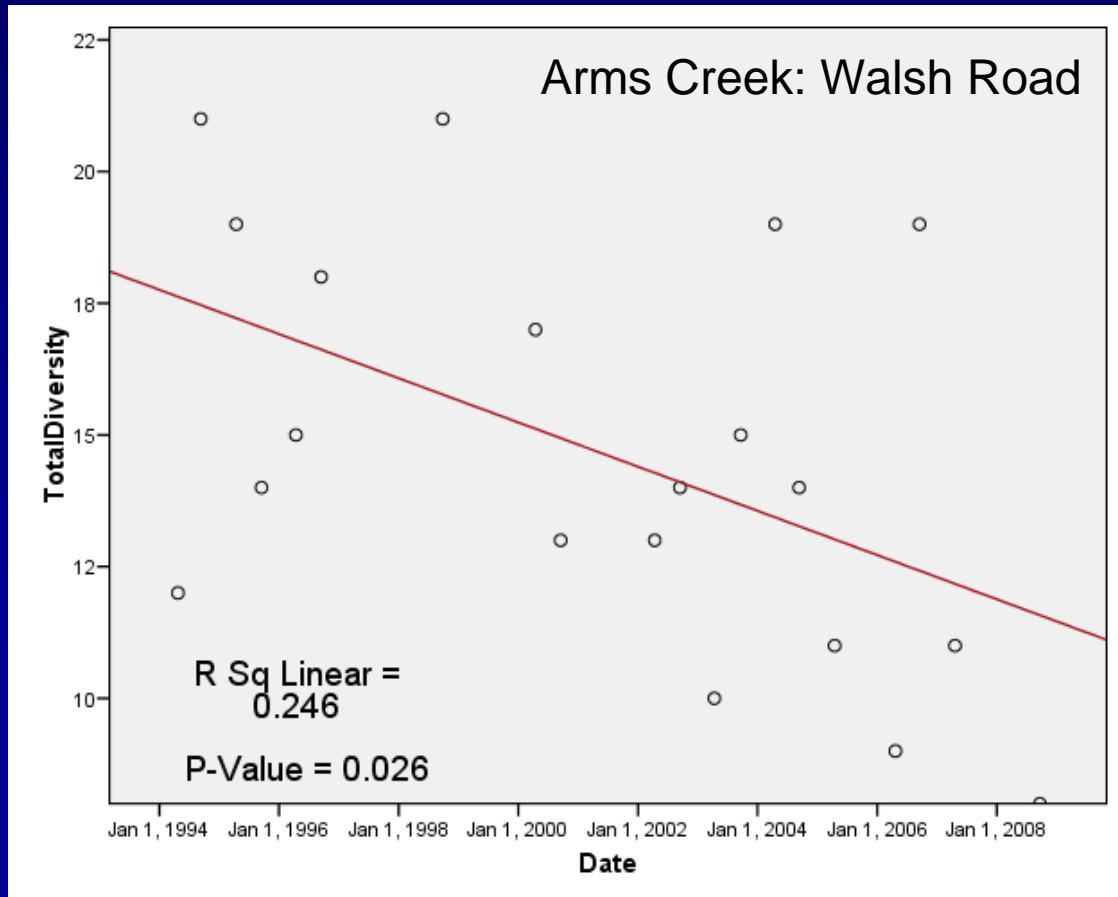
Site #	Location	Length (years)	Insects	EPT	Sensitive
31	Mill Creek: Fletcher Road	14	Stable	Stable	Stable
32	Mill Creek: Ivey Road	14	Stable	Stable	Stable
33	Mill Creek: Jackson Road	12	Stable	Stable	Stable
57	Mill Creek: Klinger Road	7	↓ 14 (1994) 8 (2006)	Stable	Stable
34	Mill Creek: Letts Cr at M-52	15	Stable	Stable	Stable
55	Mill Creek: Manchester Road	15	↑ 9 (1993) 20 (2006)	Stable	Stable
80	Mill Creek: Shield Road	5	Stable	Stable	Stable
79	Mill Creek: Warrior Park	4	Stable	Stable	Stable

Key:

- n/a= not available due to 5 or less years of data
- Length: number of years Adopt-a-Stream has been sampling this site
- Statistically significant trends (at the 10% level) over the years given are marked with arrows (↓: decreasing; ↑: increasing)
- Numbers given next to the arrows represent single data points; they give a flavor of the amount of change that has occurred over time.

Detecting Significant Trends using simple linear regression

- Independent variable: Date
- Dependent variable: MiCorp Score, Insect family count, etc.



Connecting Habitat and Insects: Data Types

Biological

of Insect families
of EPT* families
of Sensitive families
of Winter Stoneflies

*Note:

Ephemeroptera (Mayflies)

Plecoptera (Stoneflies)

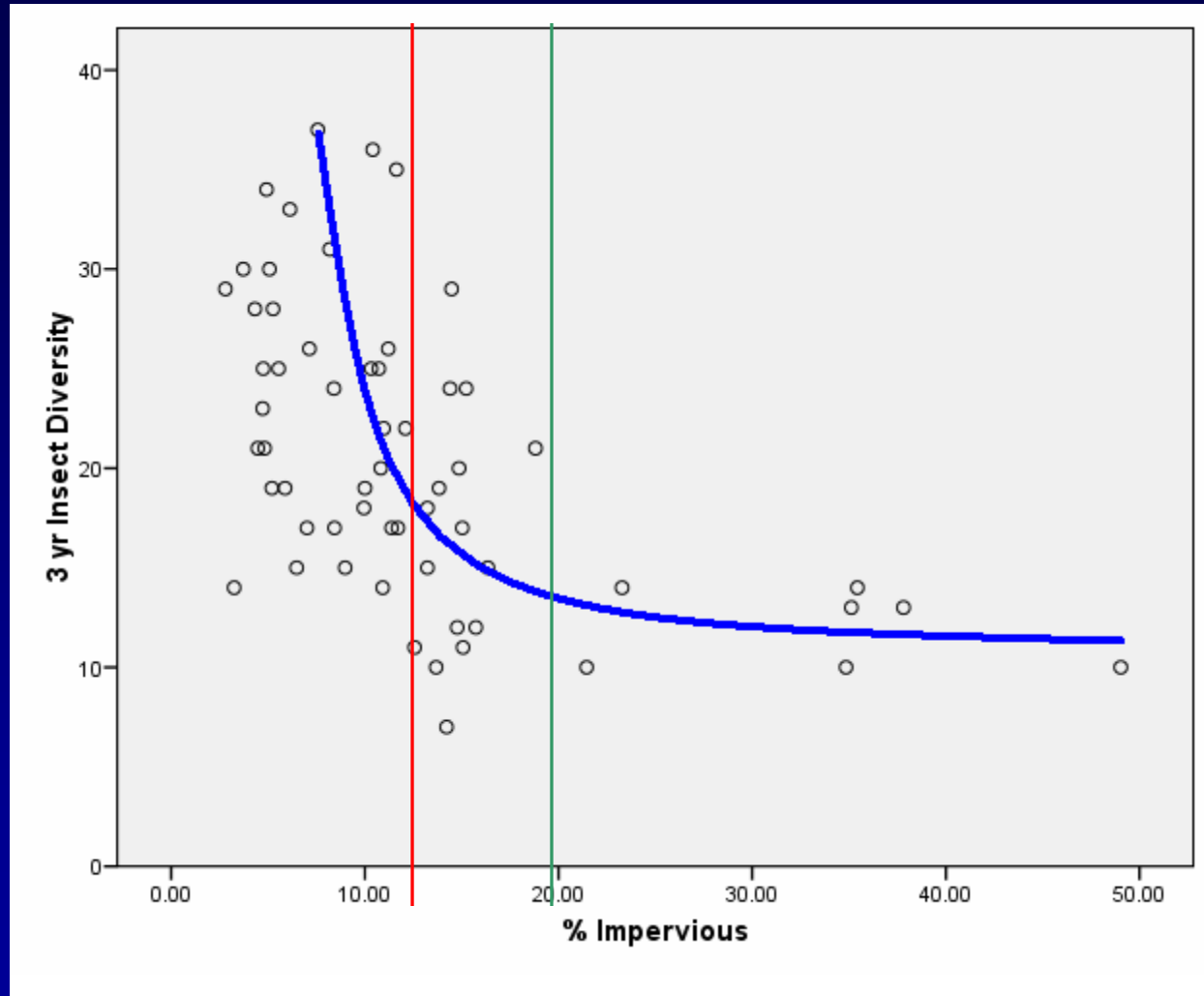
Trichoptera (Caddisflies)

Physical

Not a comprehensive list

- Land cover/use
- % watershed Impervious surface
- Stream bottom composition
- Riparian vegetation/width
- DEQ Habitat Index

Effect of Impervious Surface

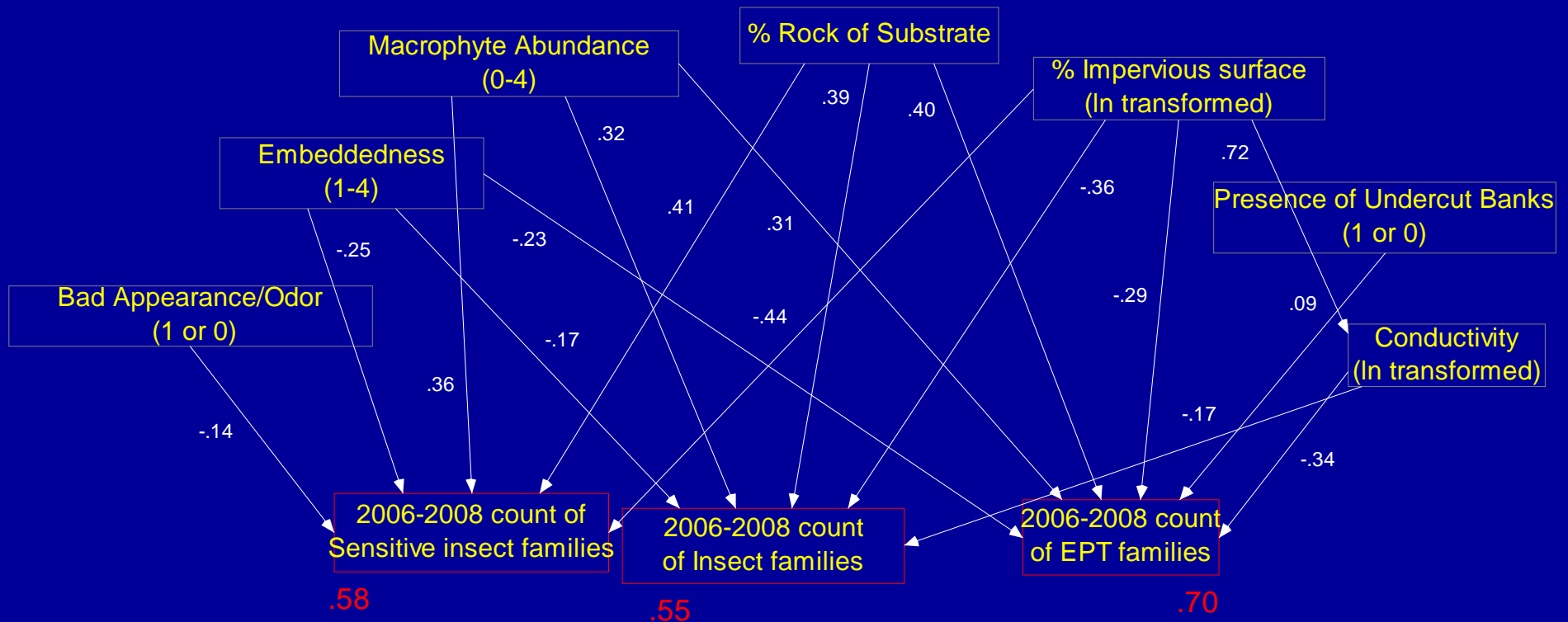


Connecting Habitat and Insects

Connecting Habitat and Insects

- Regression drawbacks – correlation between habitat variables.
- Covariance structure analysis: corrects for correlations

Covariance Structure Analysis



Importance of Land Use

When % impervious surface increases by 10%:

	Family Count	Percentage
Insect families decrease:	3	15%
EPT families decrease:	1	22%
Sensitive families decrease:	1	33%



**The Plymouth Rd- Green Road intersection is in the
Miller's Creek: Baxter Road Watershed**

Importance of Land Use

% Impervious Surface

Huron River at White Lake Road. 8%

Very slight effect on sensitive families

Honey Creek at Wagner Road 6%

Very slight effect on sensitive families

Millers Creek at Baxter Road 51%

Lose 5 EPT families, 5 sensitive families, and 15 total families

Apples and Oranges?

Stream Characteristics



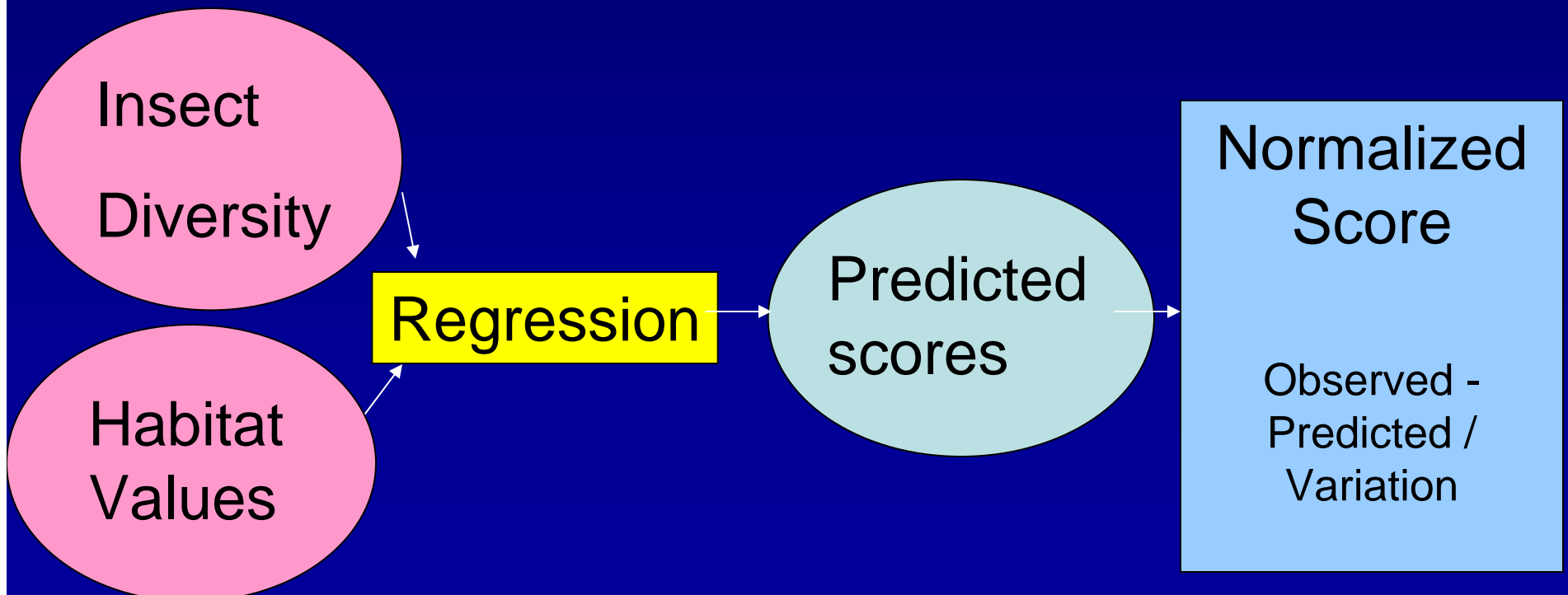
Vs.



Regional normalization model

1. Multiple regression equation
2. Predict what the stream would have... if it was undisturbed.
3. Divide by the standard deviation of the regression equation to scale each score

(See publications from Wiley, Riseng, and Zorn)



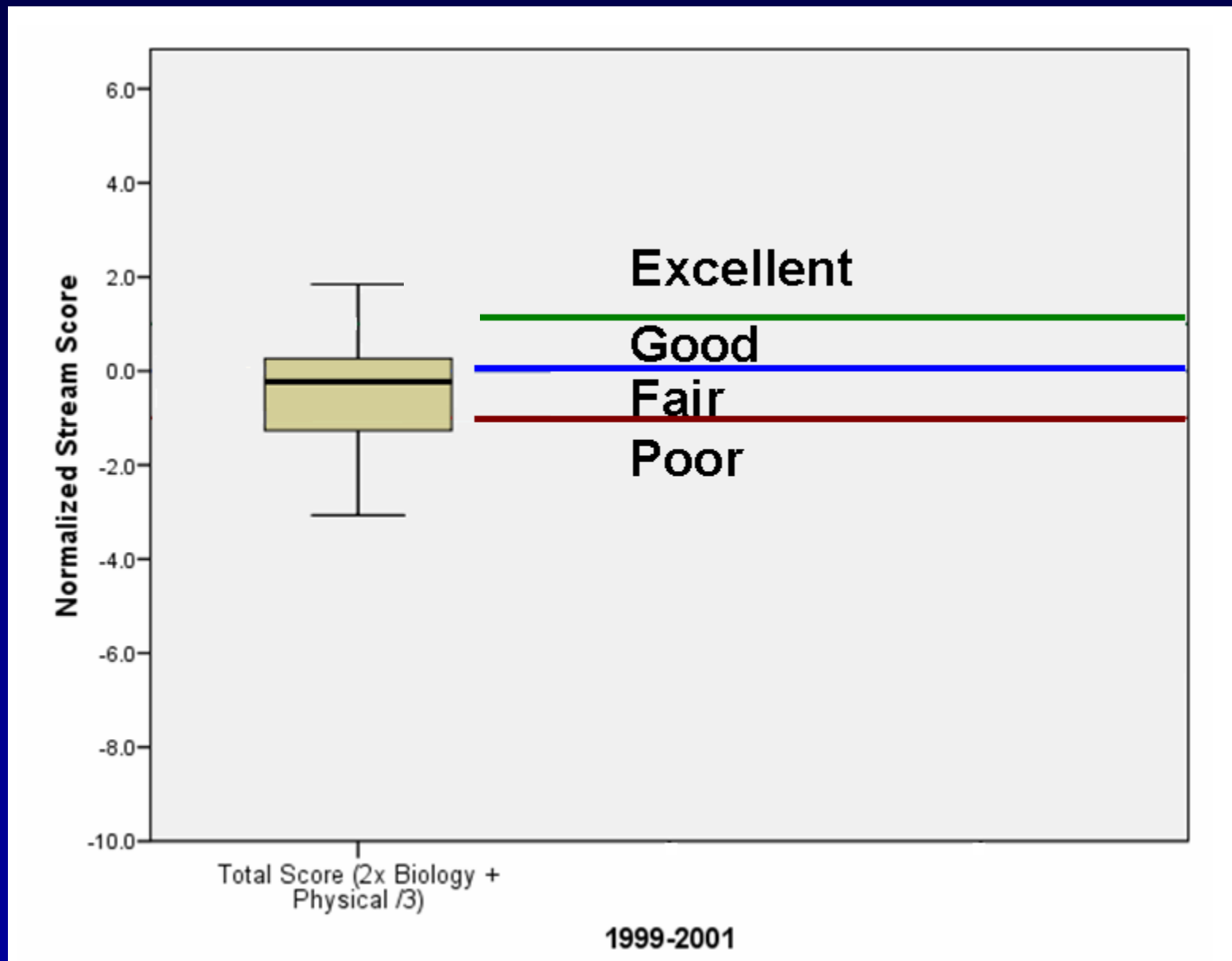
What do the scores mean?

The amount of deviation away from predicted score

Score	Description	Category
+2	Extremely above predicted	
+1	Considerably above predicted	> 1 Excellent >0 Good
0	Predicted score	<0 Fair
-1	Considerably below predicted	<-1 Poor
-2	Extremely below predicted	

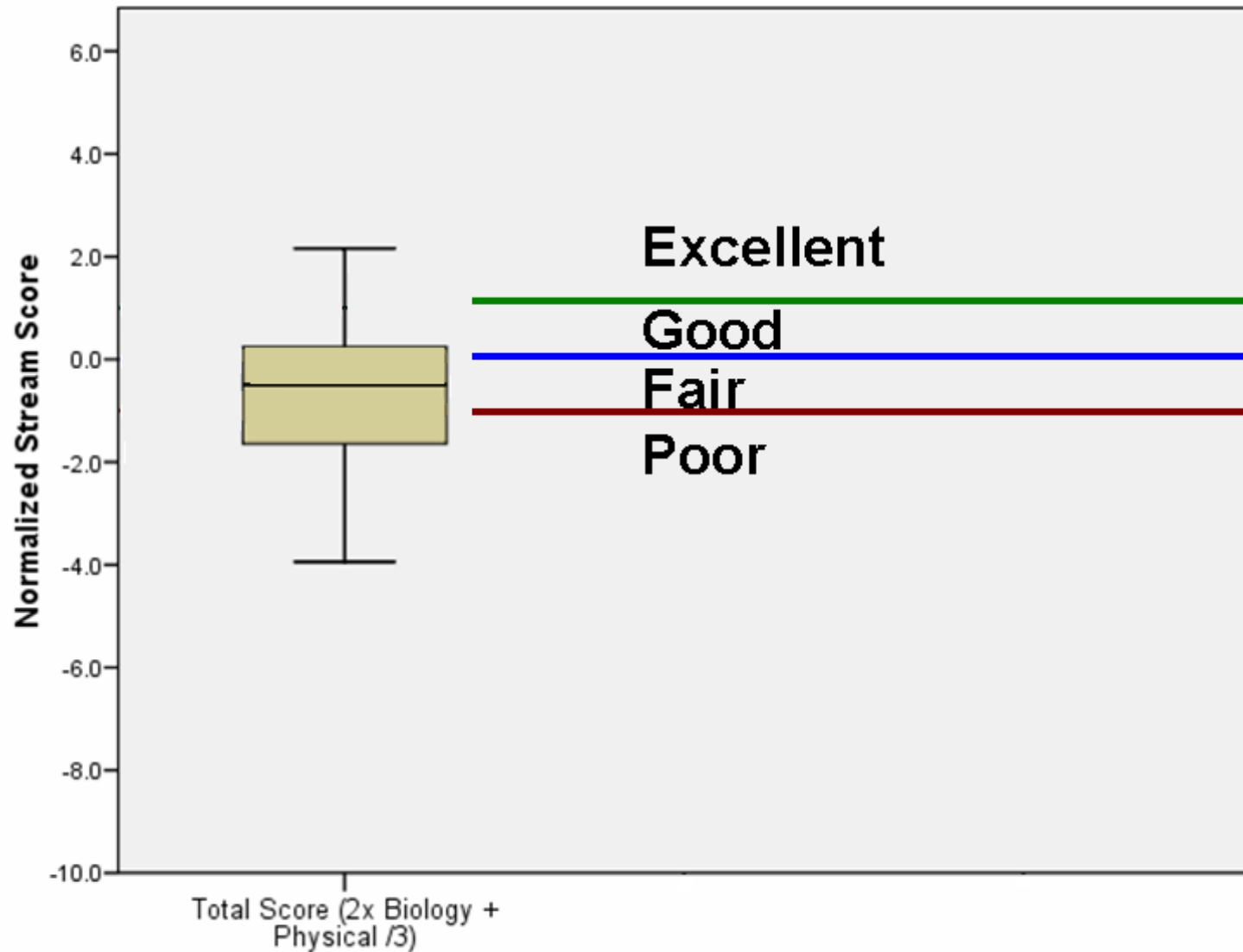
1999-2001

27 sites



2006-2008

54 sites



2006-2008

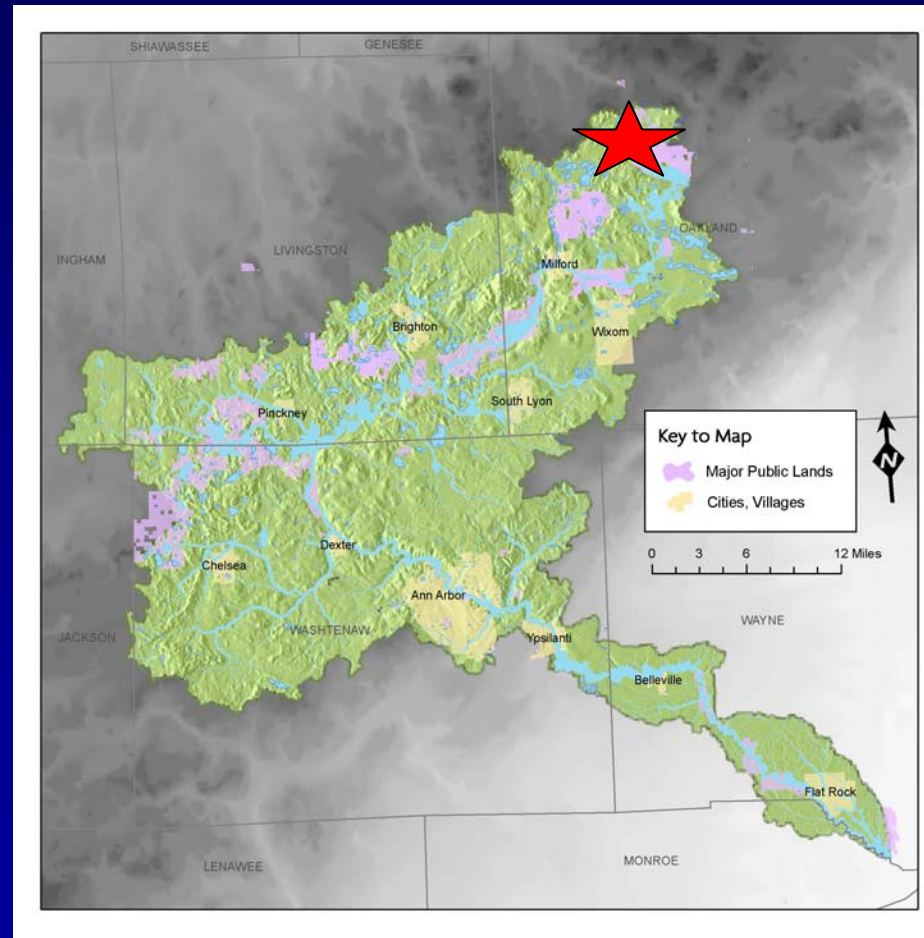
Huron's Gems

Rating: Beyond Excellent



Huron River: White Lake Road

22 Insect Families found from 2006-2008 (averaged across 4 samples)



Expected: 11 families

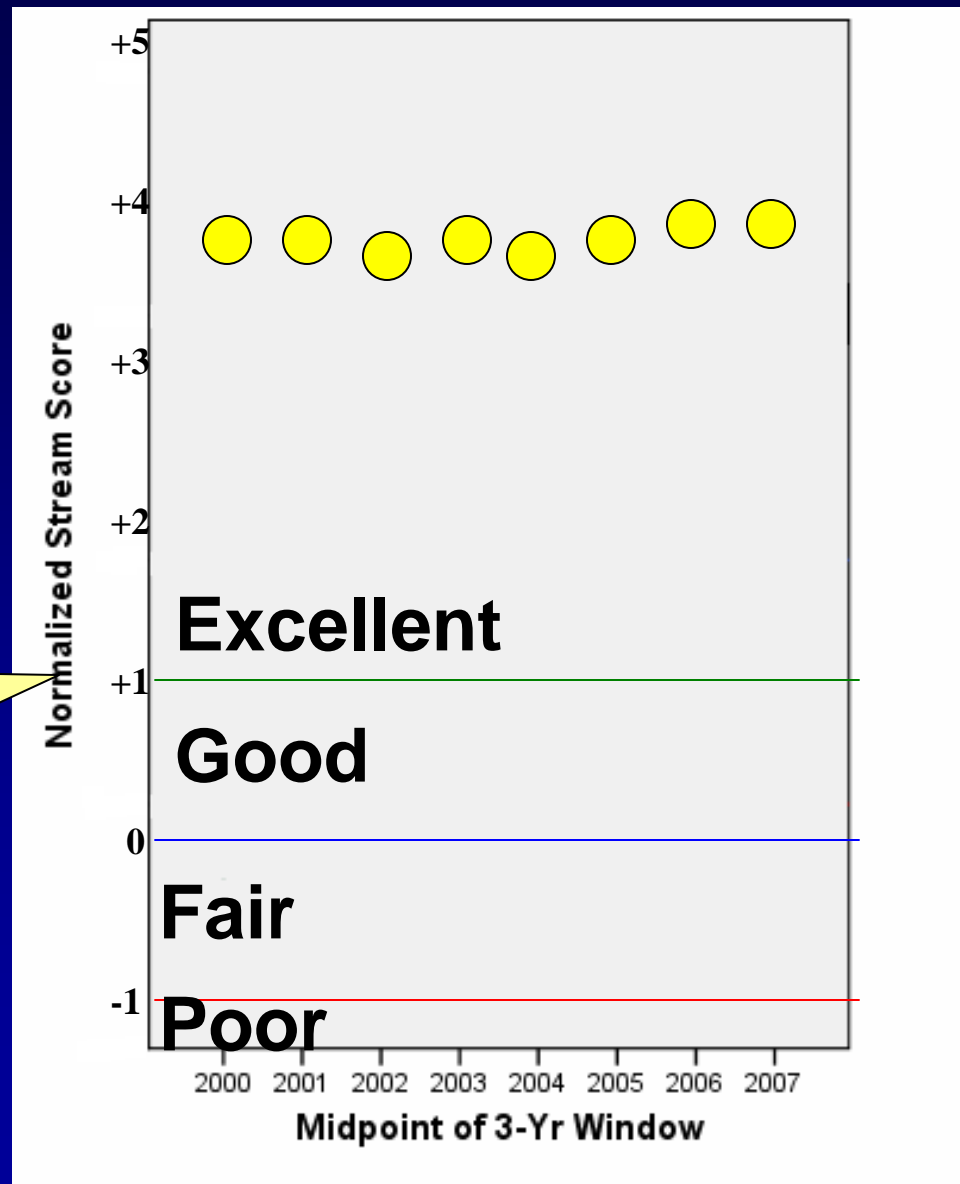
Huron's Gems



Rating: Beyond
Excellent

Huron River: White
Lake Road

Best site
award!!!



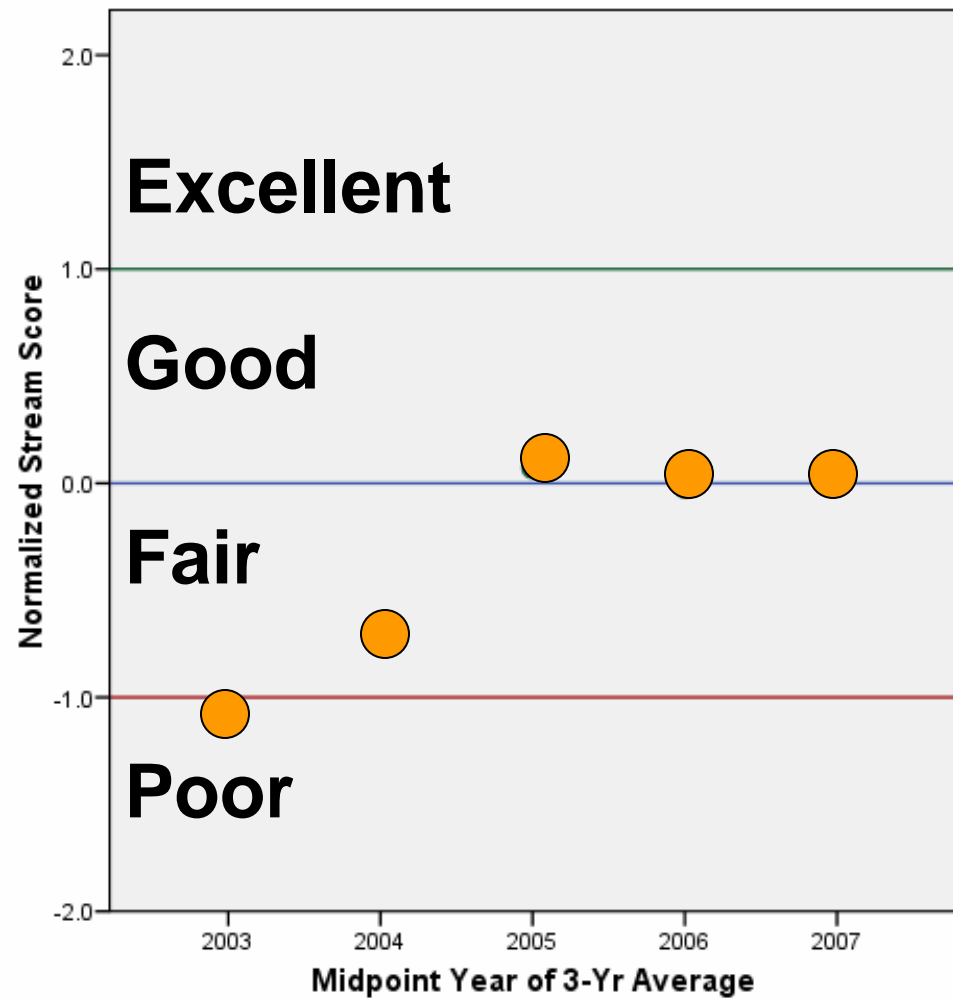
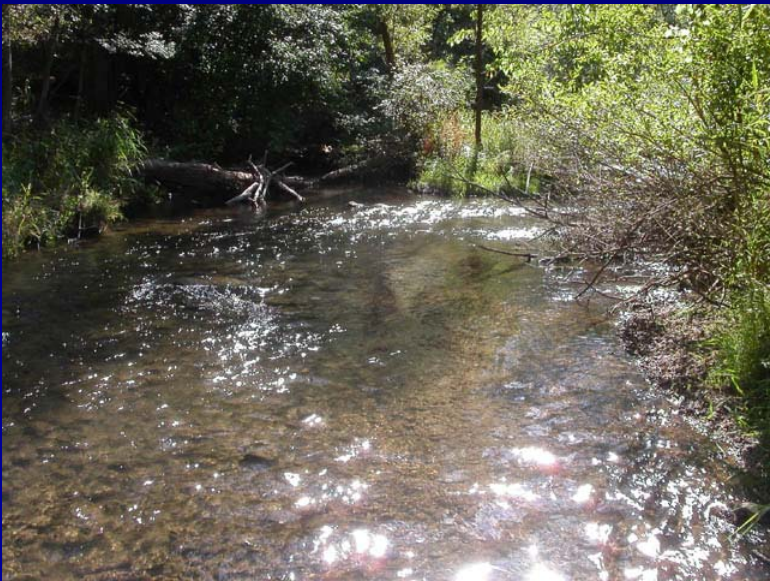
Huron's Gems



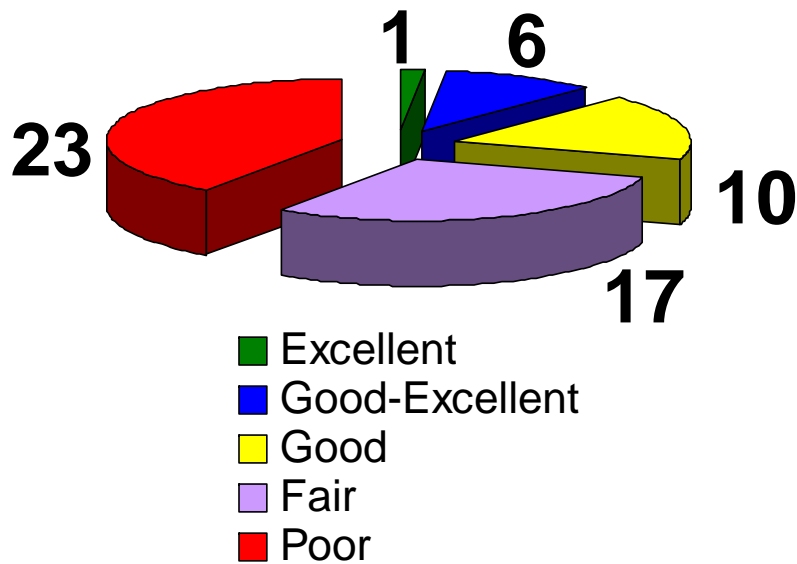
Rating: Poor → Good

Honey Creek: Wagner Road

Most improved award



Summary



Condition:

- Below expectations: **70%**
- Meet or exceed expectations: **30%**

Stability:

- Degrading- **4** sites
- Improving- **6** sites
- Stable- **47** sites

Sites: 57

19 sites are too new to judge and aren't in this analysis

Conclusions

1. Basic Reports
2. Simple trends
3. Connecting Habitat with Insects
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 - Regional Normalization Model

