Comparing Professional and Volunteer Stream Assessment Data: Implications for Watershed Management

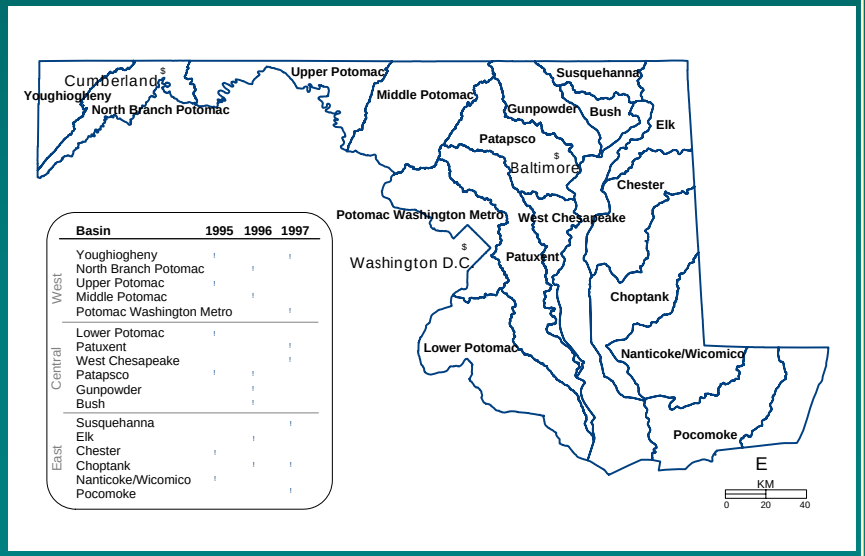
Dan Boward and Chris Millard
Maryland Department of Natural Resources
Monitoring and Non-Tidal Assessment Division
Annapolis, Maryland

Rita Bruckler
Maryland Department of the Environment
Technical and Regulatory Services Administration
Baltimore, Maryland

The Maryland Stream Waders...

Volunteer Branch of the Maryland Biological Stream Survey (MBSS)

- Encourage local action
- Support grassroots efforts (e.g, non-profit and watershed groups)
- Educate and involve the public
- Fill data gaps



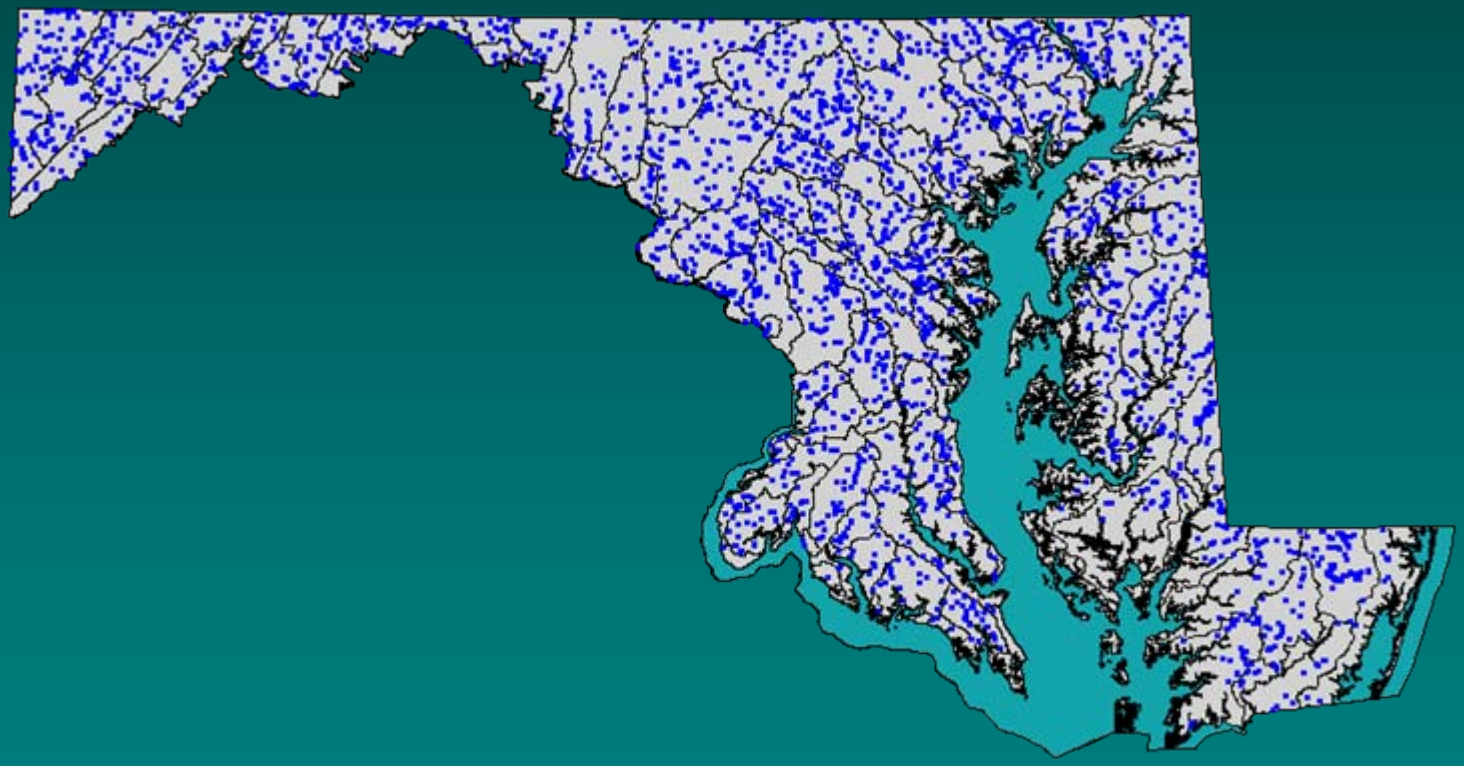
	Basin	1995	1996	1997
West	Youghiogheny			
	North Branch Potomac			
	Upper Potomac			
	Middle Potomac			
	Potomac Washington Metro			
Central	Lower Potomac			
	Patuxent			
	West Chesapeake			
	Patapsco			
	Gunpowder			
	Bush			
East	Susquehanna			
	Elk			
	Chester			
	Choptank			
	Nanticoke/Wicomico			
	Pocomoke			

MBSS sampling at each site consists of…

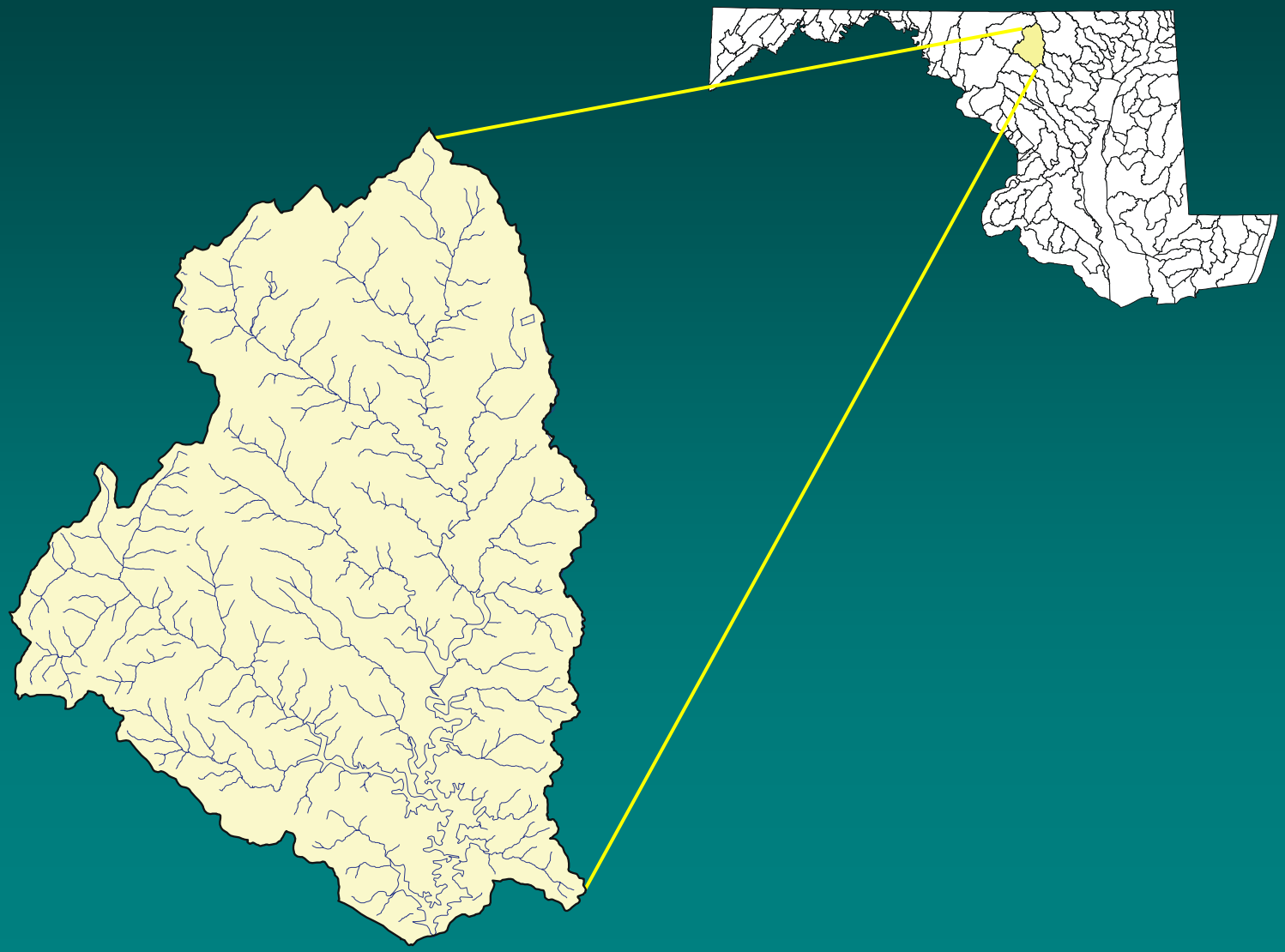
- Fish
- Benthic Macroinvertebrates
- Amphibians and Reptiles

- Physical Habitat
- Water Chemistry
- Land Use

Maryland Biological Stream Survey Sites, 1995 – 2004

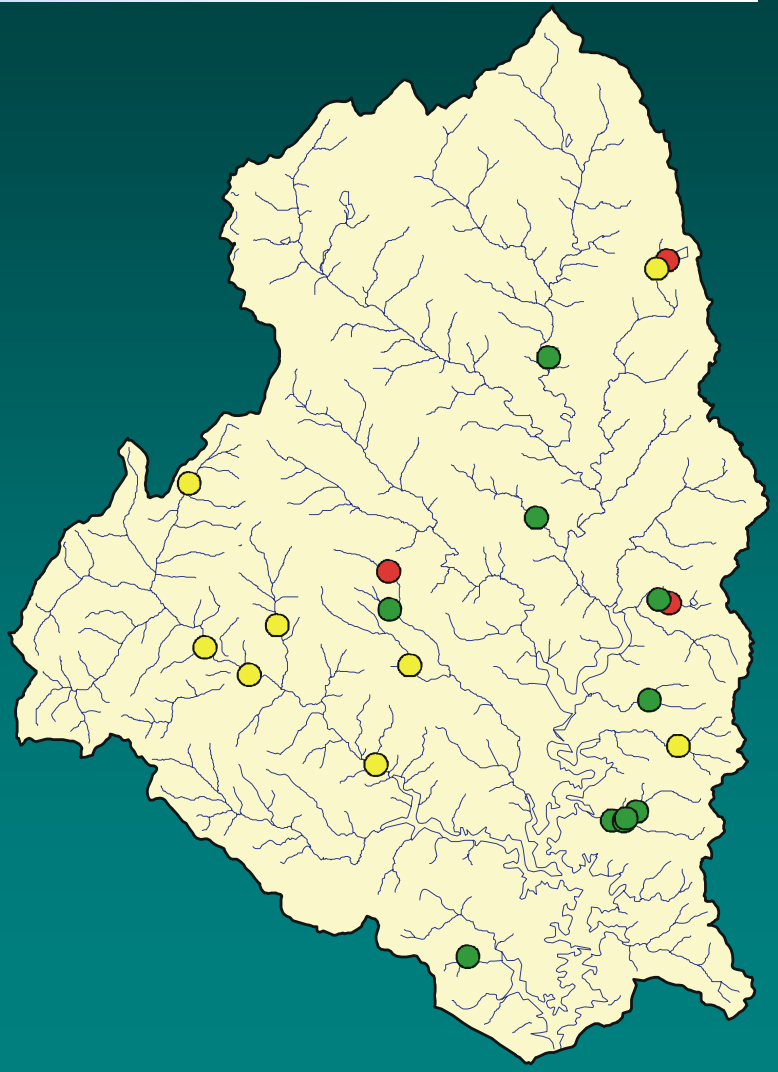


Liberty Watershed, 2000



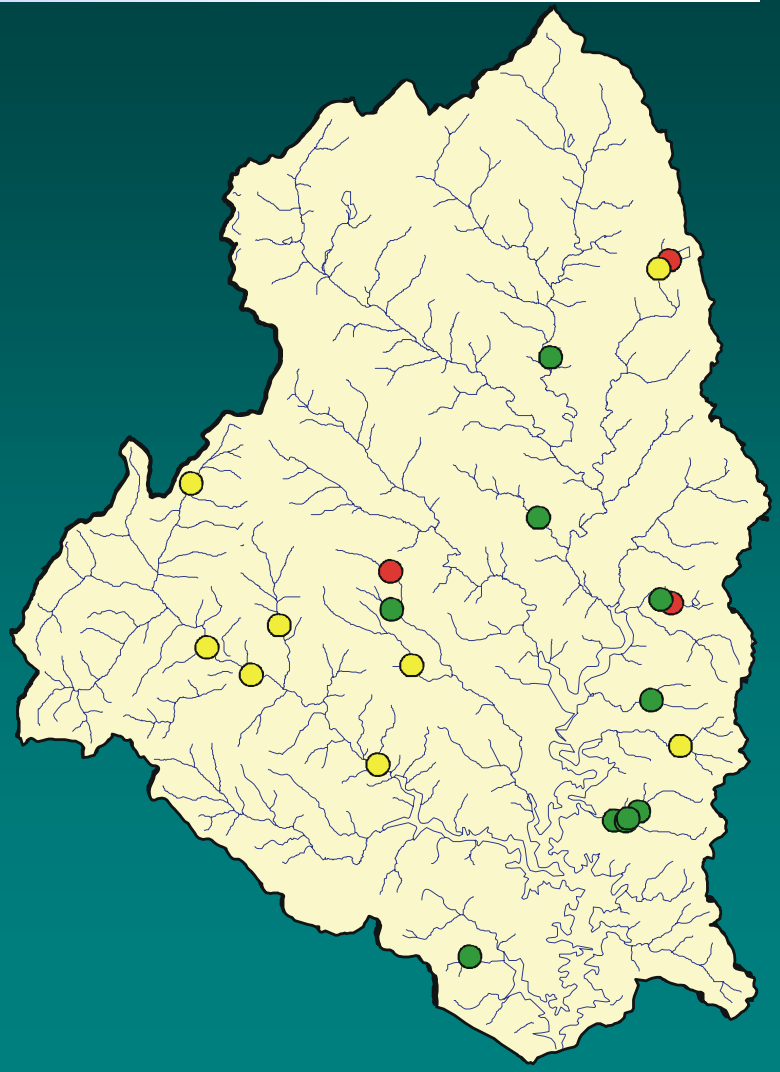
Liberty Watershed, 2000

- 21 MBSS sites



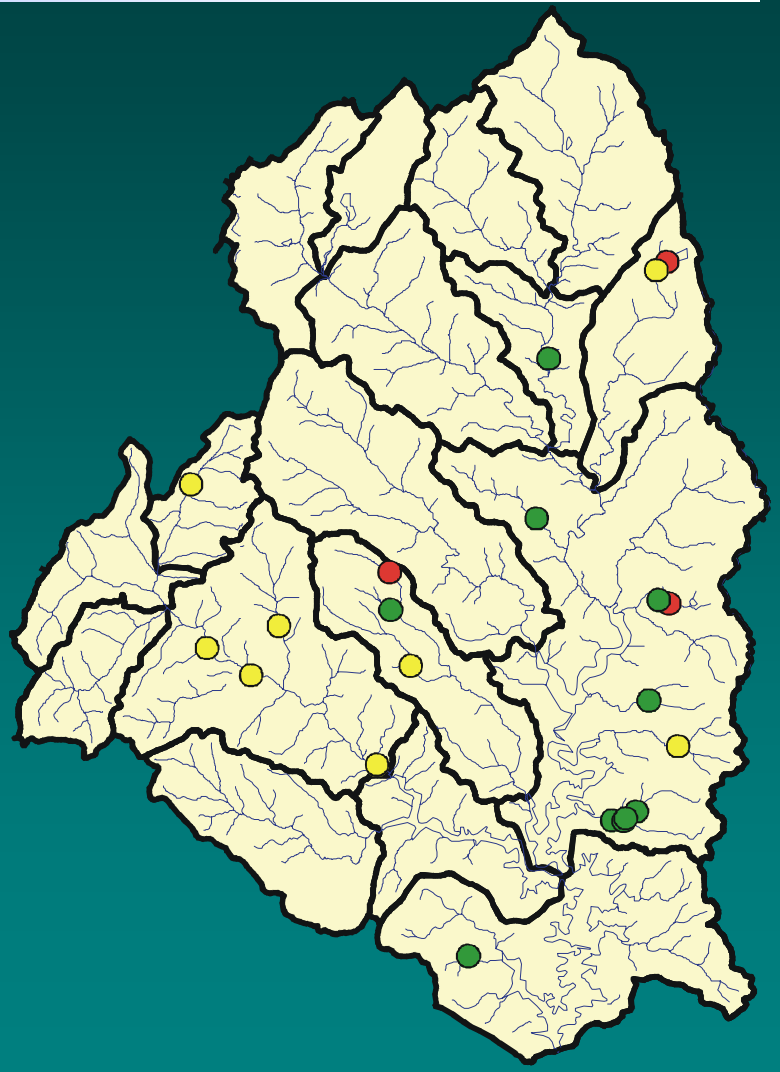
Liberty Watershed, 2000

- 21 MBSS sites
- 17 (12-digit) sub-watershed



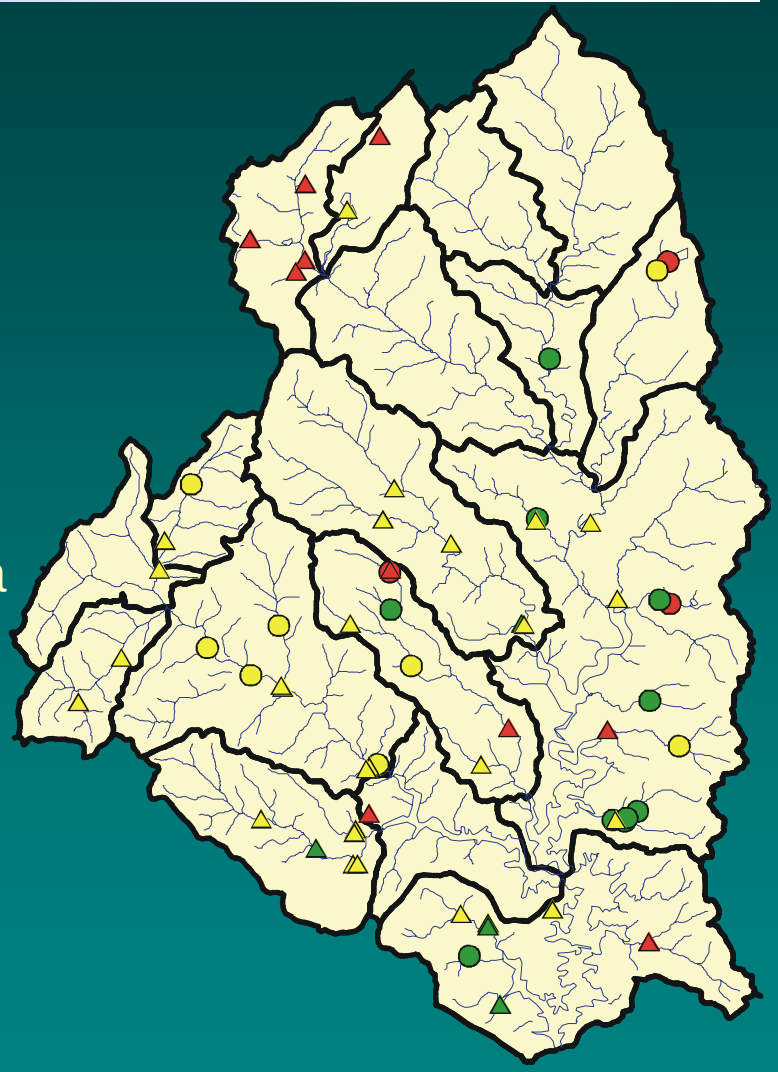
Liberty Watershed, 2000

- 21 MBSS sites
- 17 (12-digit) sub-watershed
- 10 sub-watersheds have no sites



Liberty Watershed, 2000

- 21 MBSS sites
- 17 (12-digit) subwatershed
- 10 subwatersheds have no sites
- Add 40 Stream Waders sites
  - Only 3 sub-watersheds have no data



MBSS site

Stream Waders site

How do they Compare?

	MBSS	Stream Waders
Design	Random	Targeted
Scale	70 mi^2 watershed	8 mi^2 sub-watershed
Fish	Yes	No
Water Chemistry	Yes	No
Physical Habitat	Yes	Depth and Width
Benthic Macroinvertebrates	Spring; D net; multihabitat; 20 ft^2; lab subsample and ID	Spring; D net; multihabitat; 20 ft^2; lab subsample and ID
Taxonomy	Genus	Family
Land Use/Land Cover	Delineate upstream	1 km radius circle

Stream Waders Training

- Classroom review of protocols
- Field session practice
- Includes lots of professionals and “repeat customers”

Questions

- How comparable are Stream Waders and MBSS data (IBIs) at different scales?

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  - How do family and genus IBIs computed from the same site/taxa dataset compare?

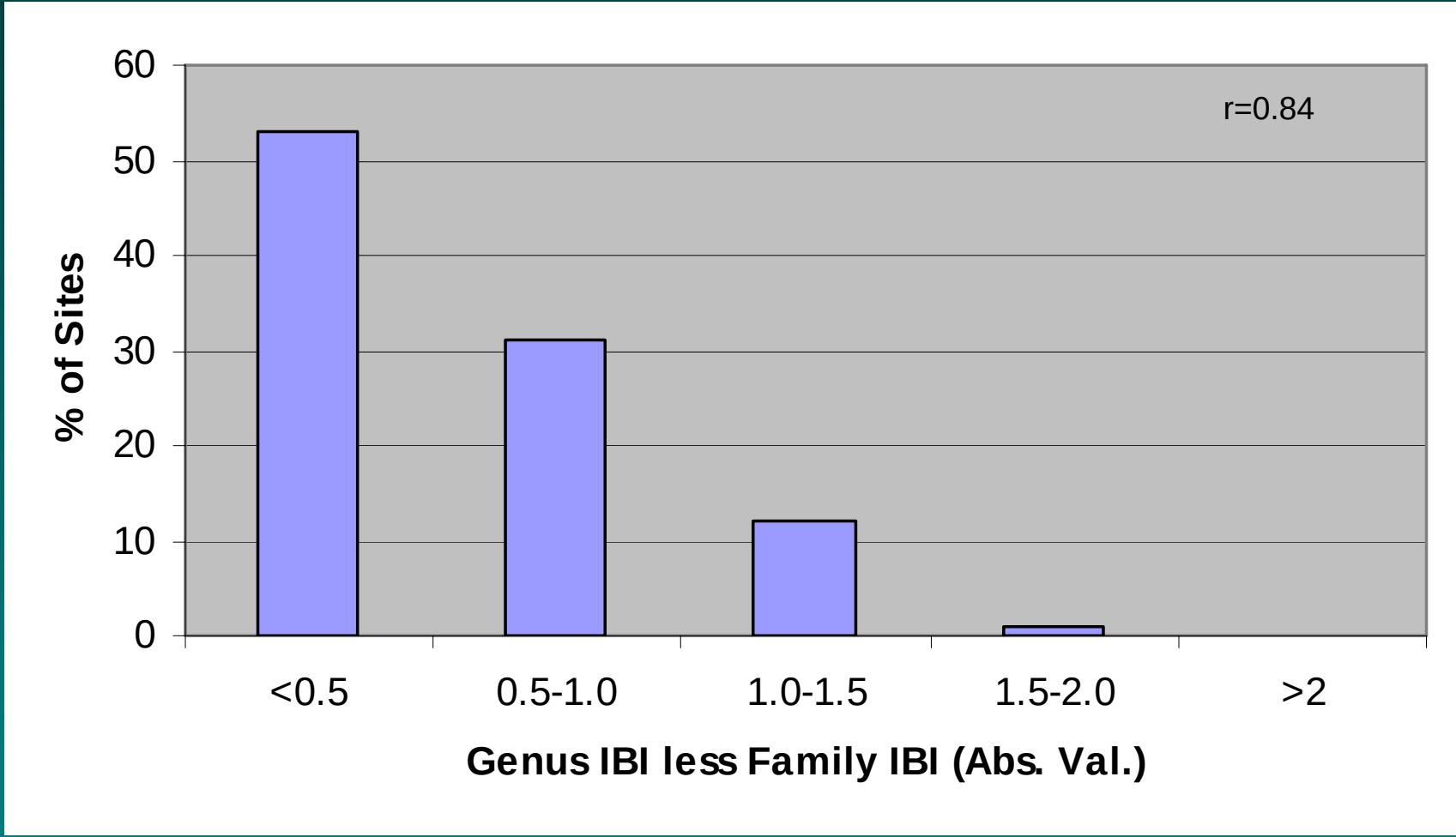
  - What are differences in the two sets of IBIs by sample year?

  - How do the two programs rate stream sites?

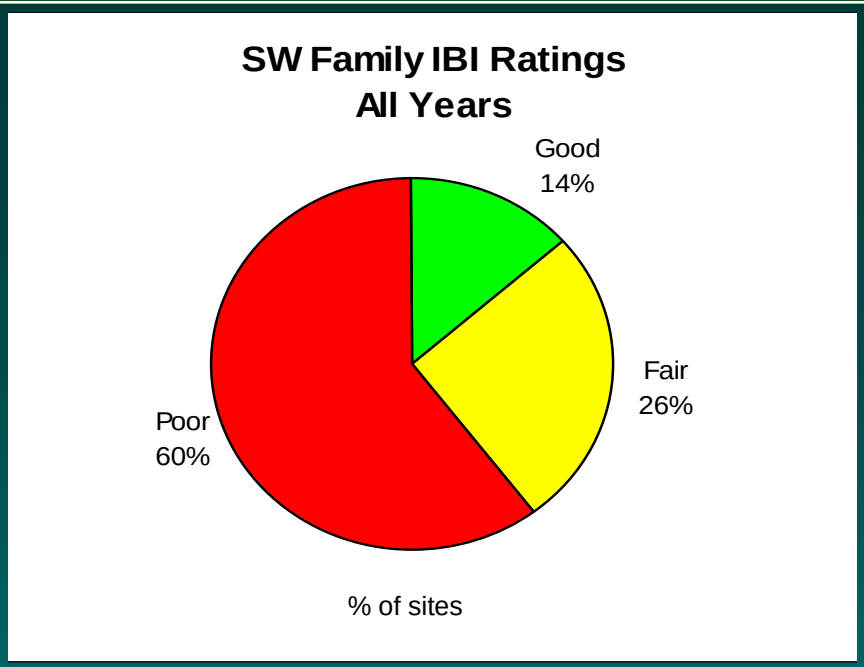
Statewide

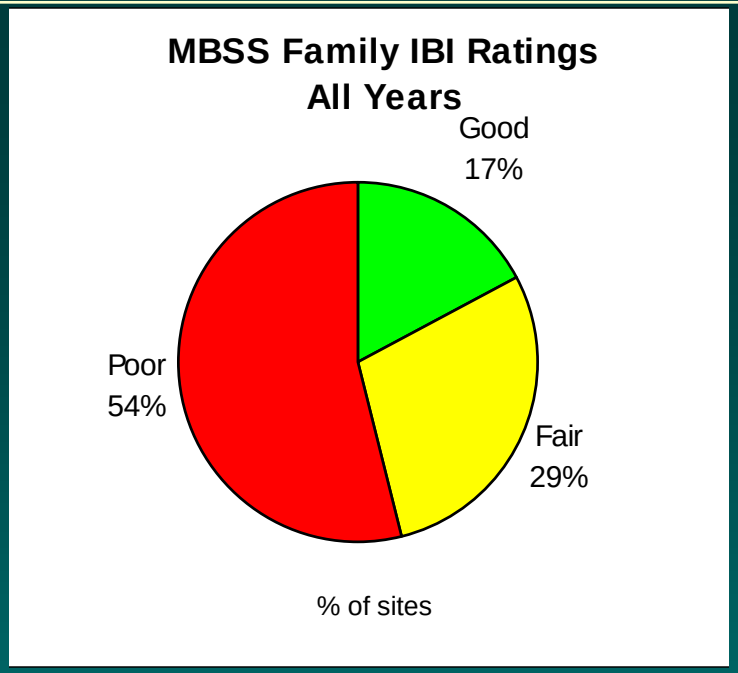
- Stream Waders – 2755 sites
- MBSS – 1336 sites

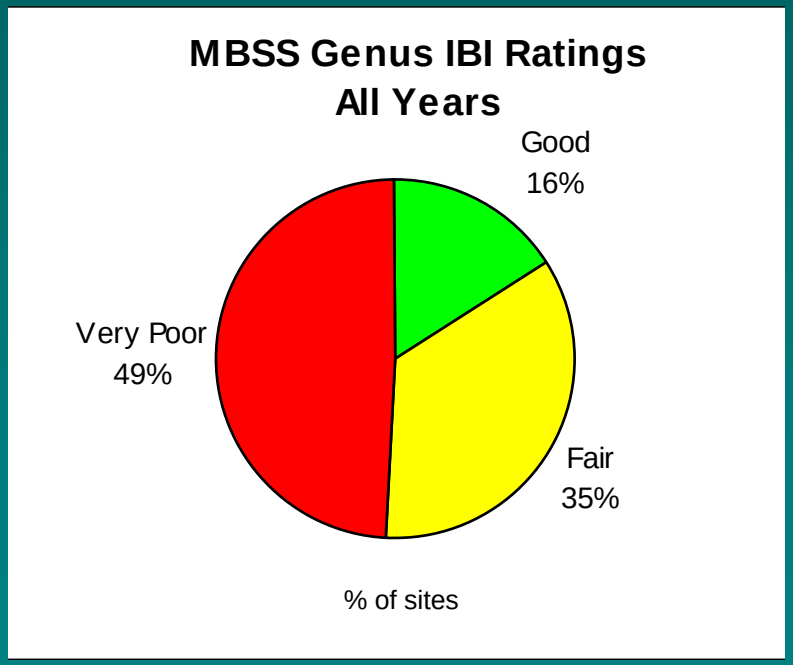
MBSS Genus and Family IBI
Same Samples



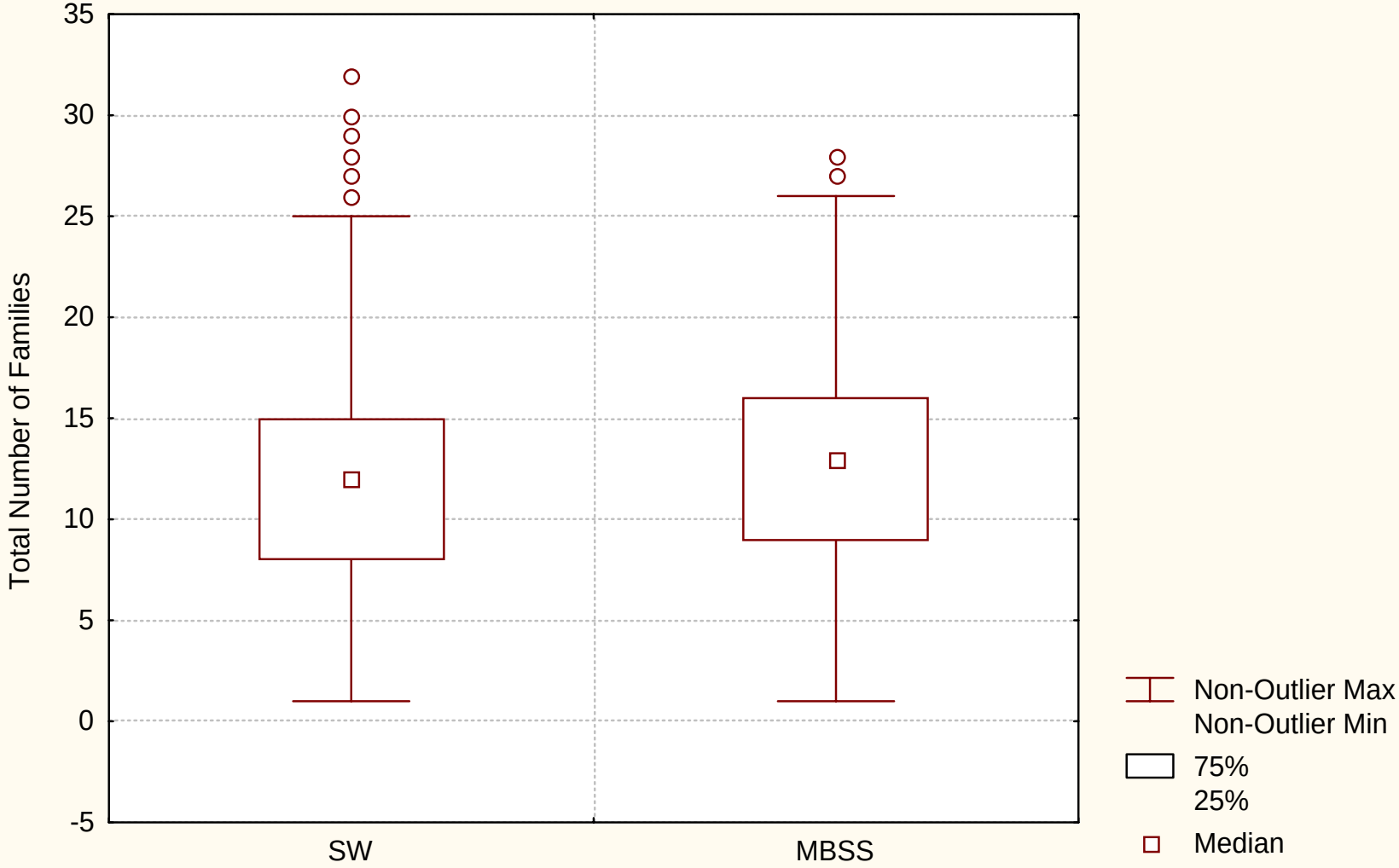
Mean difference in Genus IBI less Family IBI = 0.12


SW Family IBI Ratings
All Years
Good
14%
Fair
26%
Poor
60%
% of sites

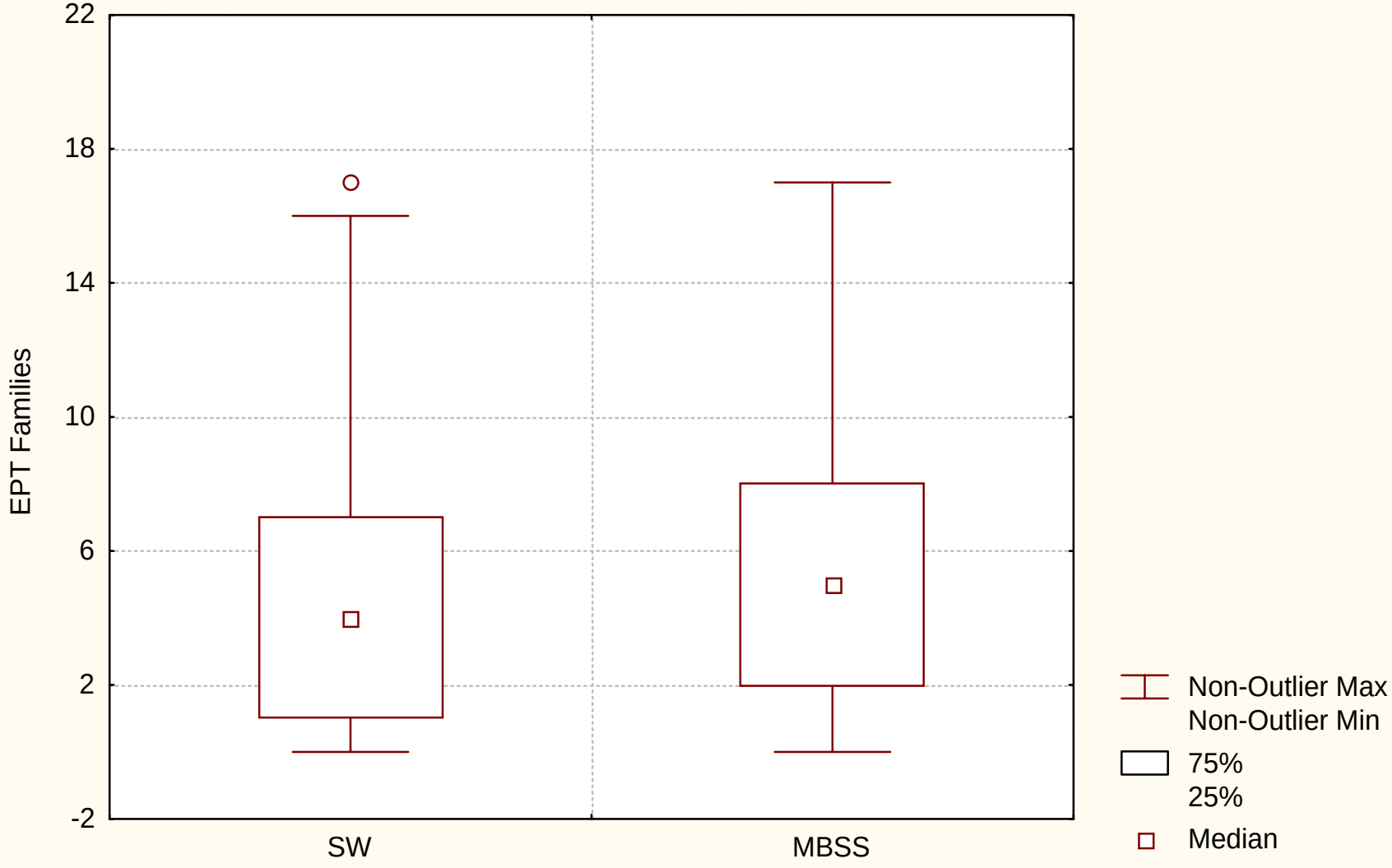

MBSS Family IBI Ratings
All Years
Good
17%
Poor
54%
Fair
29%
% of sites


MBSS Genus IBI Ratings
All Years
Good
16%
Very Poor
49%
Fair
35%
% of sites

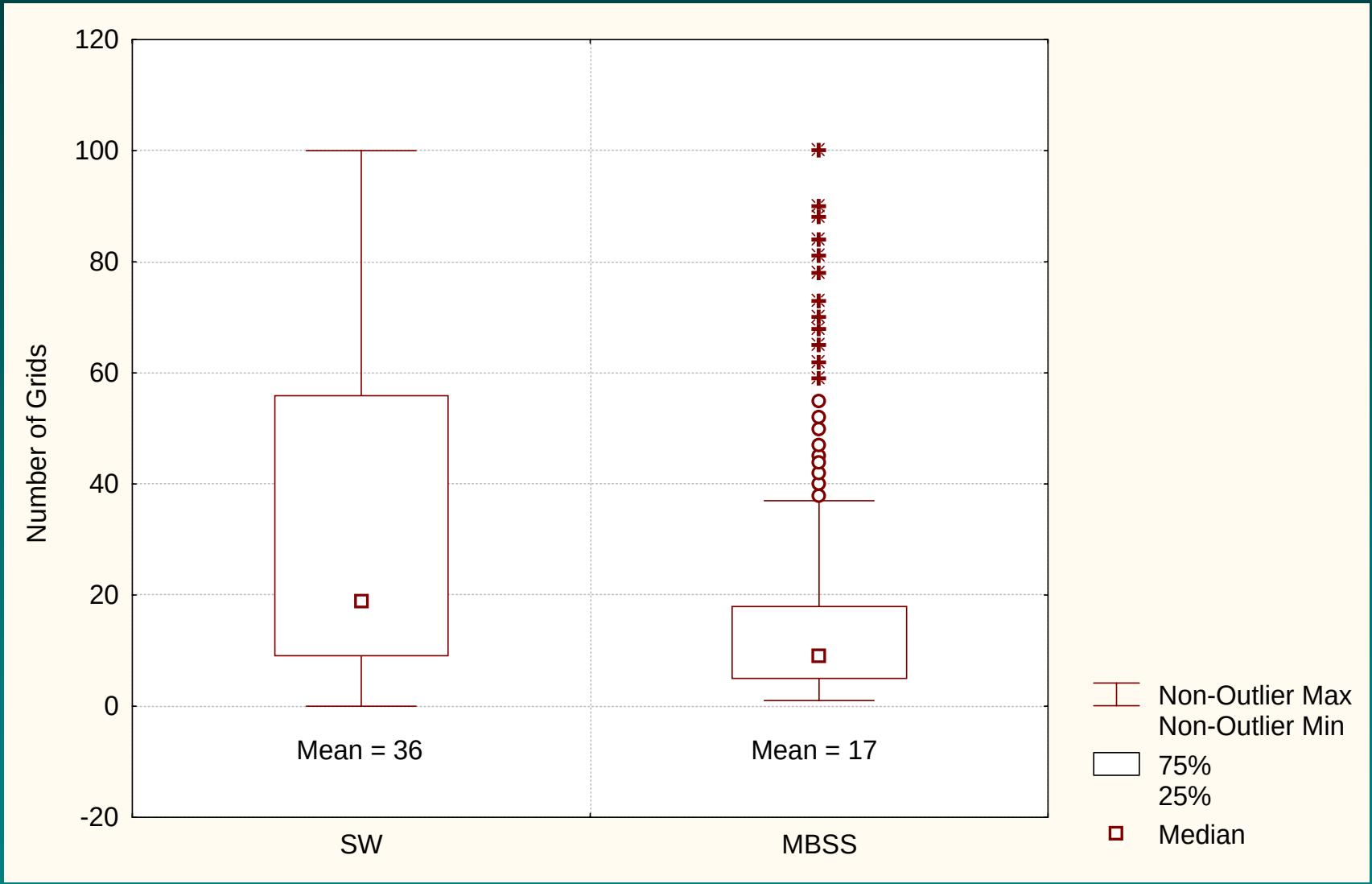
Stream Waders and MBSS
Statewide – Number of Families per Sample



Stream Waders and MBSS
Statewide – Number of EPT Families per Sample



Number of Grids
100 Organism Subsample

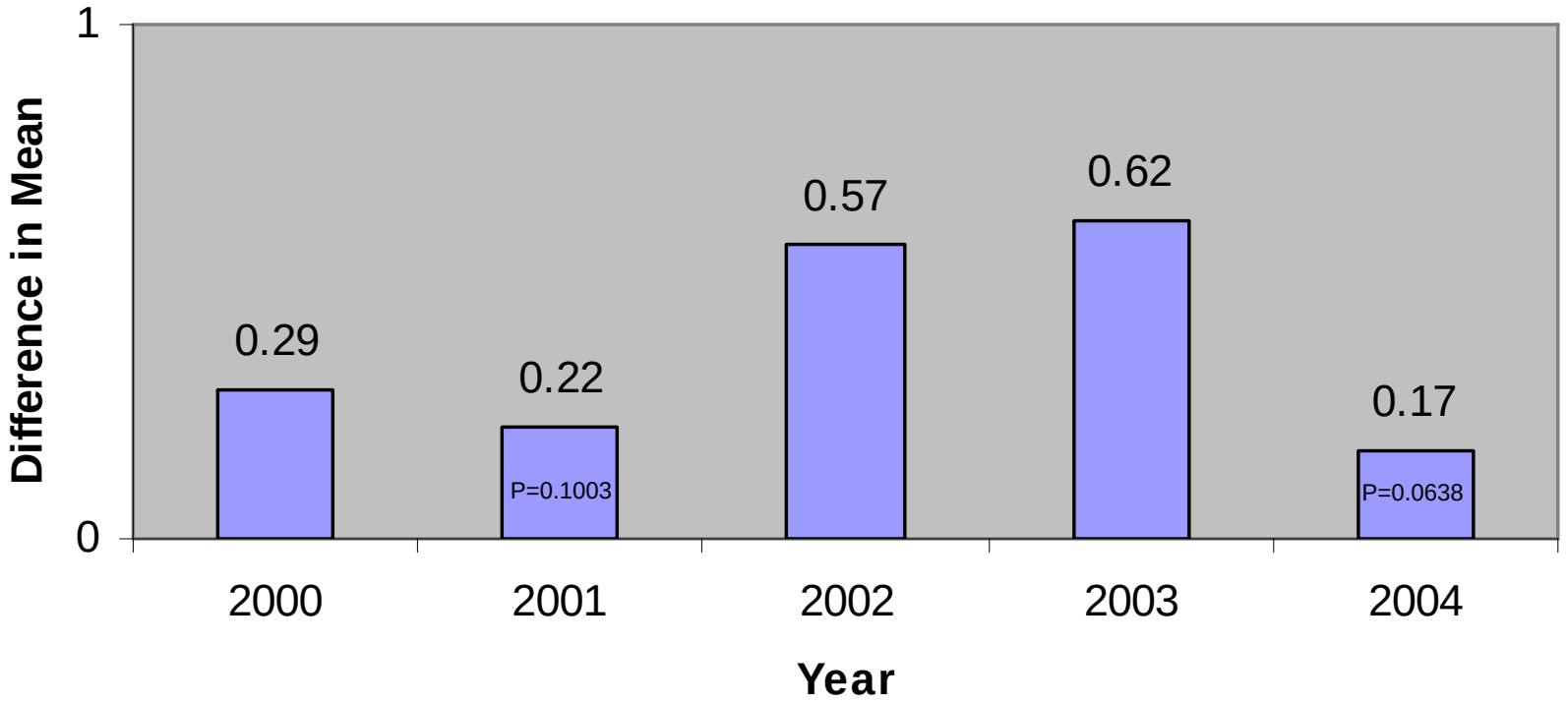


Watershed

- Stream Waders - mean = 26.6; range = 1 - 116
- MBSS - mean = 9.2; range = 1 - 41

**124/137 watershed sampled by both programs

Watershed
MBSS-genus IBI less Stream Waders IBI



Watershed

124 Watersheds; all years combined

MBSS-Genus mean IBI	Stream Waders mean IBI: Degraded	Stream Waders mean IBI: Not Degraded
Degraded	71%	29%
Not Degraded	22%	78%

73% agreement on degraded/not degraded

Sub-watershed

- Stream Waders - mean = 4.1; range = 1 - 26
- MBSS - mean = 2.2; range = 1 - 31

**380 sub-watersheds sampled by both programs

Sub-watershed

374 sub-watersheds; all years combined

MBSS-Genus mean IBI	Stream Waders mean IBI		MBSS-Family mean IBI	
	Degraded	Not Degraded	Degraded	Not Degraded
Degraded	70%	23%	82%	14%
Not Degraded	30%	77%	18%	86%
	72% agreement on degraded/not degraded		84% agreement on degraded/not degraded	

Stream Reach

- 452 sites with at least one site from each program
- 16 reaches with two sites from each program

View3

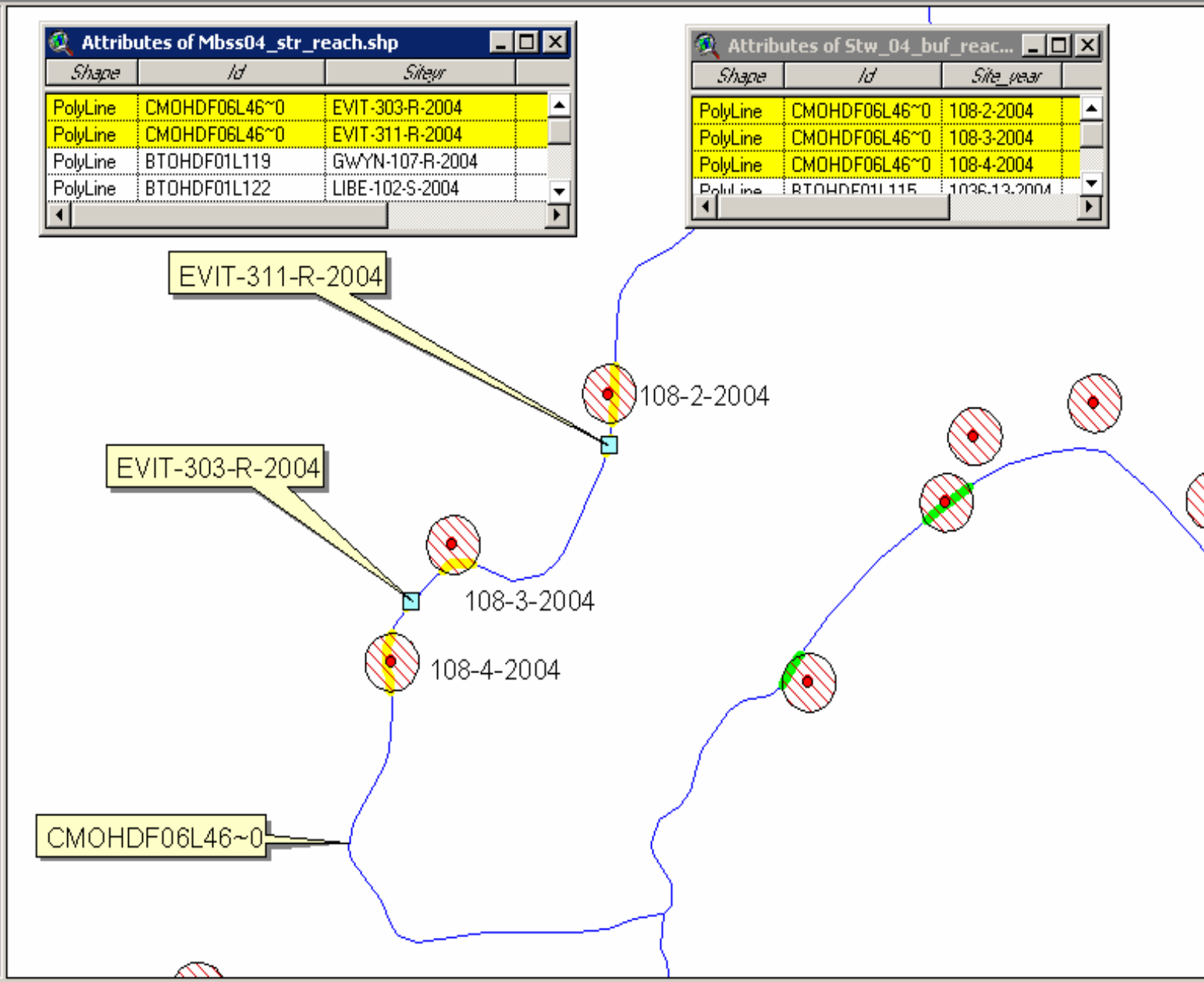
- Md8digt_lines.shp
- Stw04coors.shp
- Buff12.shp
- Mbss_r2_ne_year.txt
- Buff11.shp
- Stw_04_buf_reachid.sh
- Mbss04_str_reach.shp
- Sp83m.tif
- Sit94r1r2.shp
  - DEG
  - REF
- Sp83m.tif
- Identi15.shp
- Identi14.shp
- Mbss100c.shp

Attributes of Mbss04_str_reach.shp

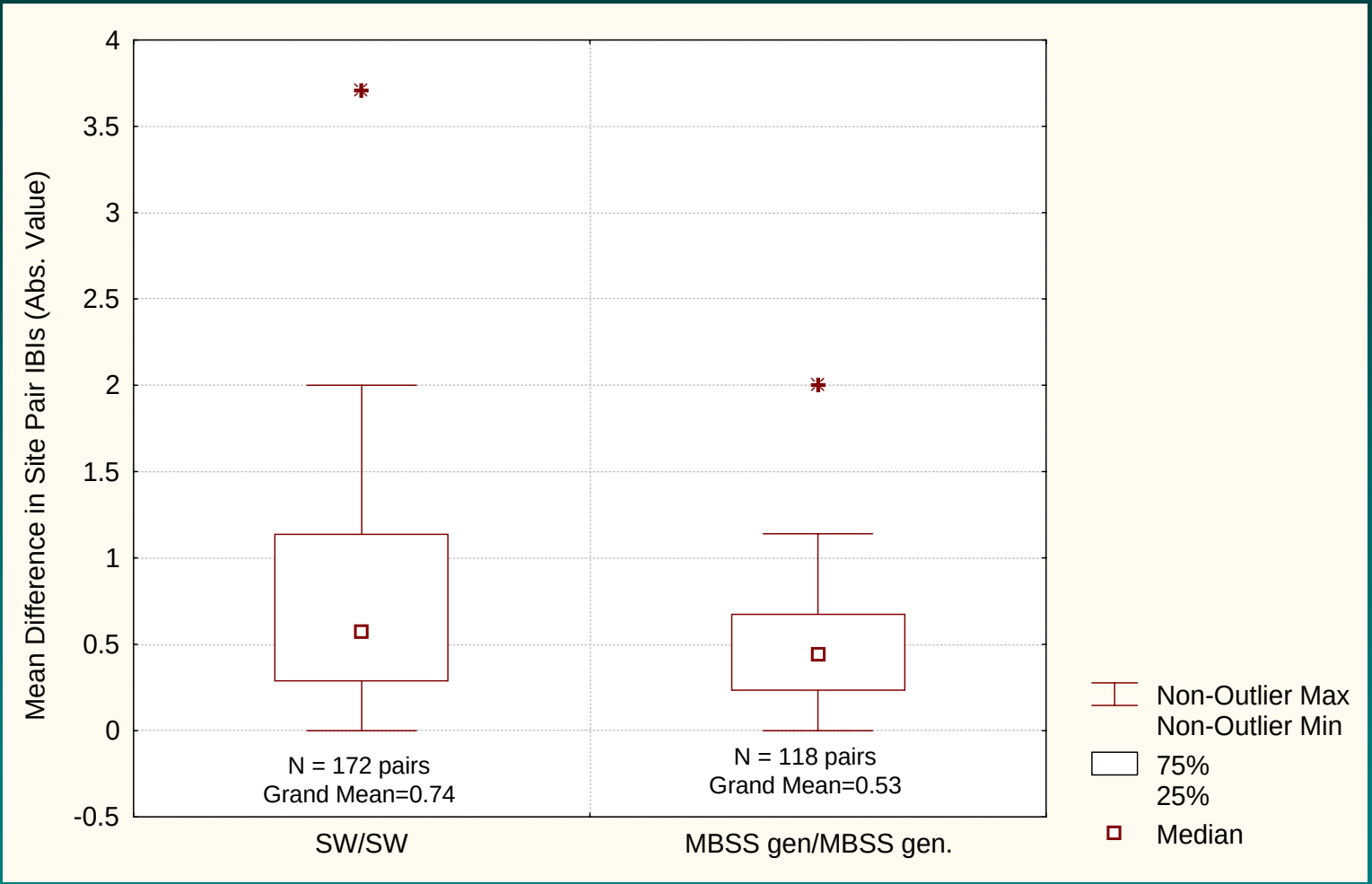
Shape	Id	Siteyr
PolyLine	CMOHDF06L46~0	EVIT-303-R-2004
PolyLine	CMOHDF06L46~0	EVIT-311-R-2004
PolyLine	BTOHDF01L119	GWYN-107-R-2004
PolyLine	BTOHDF01L122	LIBE-102-S-2004

Attributes of Stw_04_buf_reac...

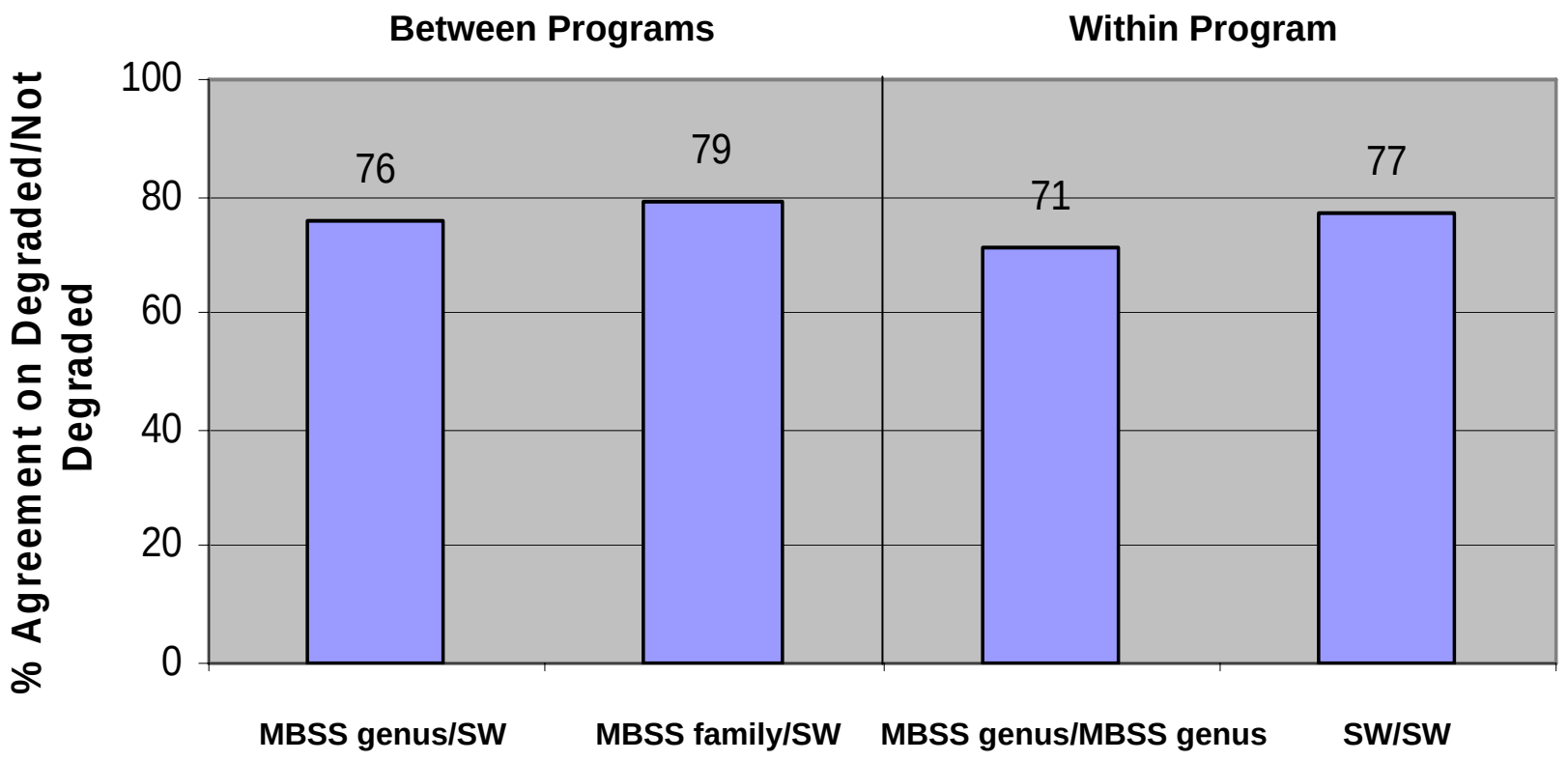
Shape	Id	Site_year
PolyLine	CMOHDF06L46~0	108-2-2004
PolyLine	CMOHDF06L46~0	108-3-2004
PolyLine	CMOHDF06L46~0	108-4-2004
PolyLine	BTOHDF01L115	1036-13-2004



Stream Reaches
Within Program Site Pairs



Stream Reaches
Agreement on Degraded/Not Degraded

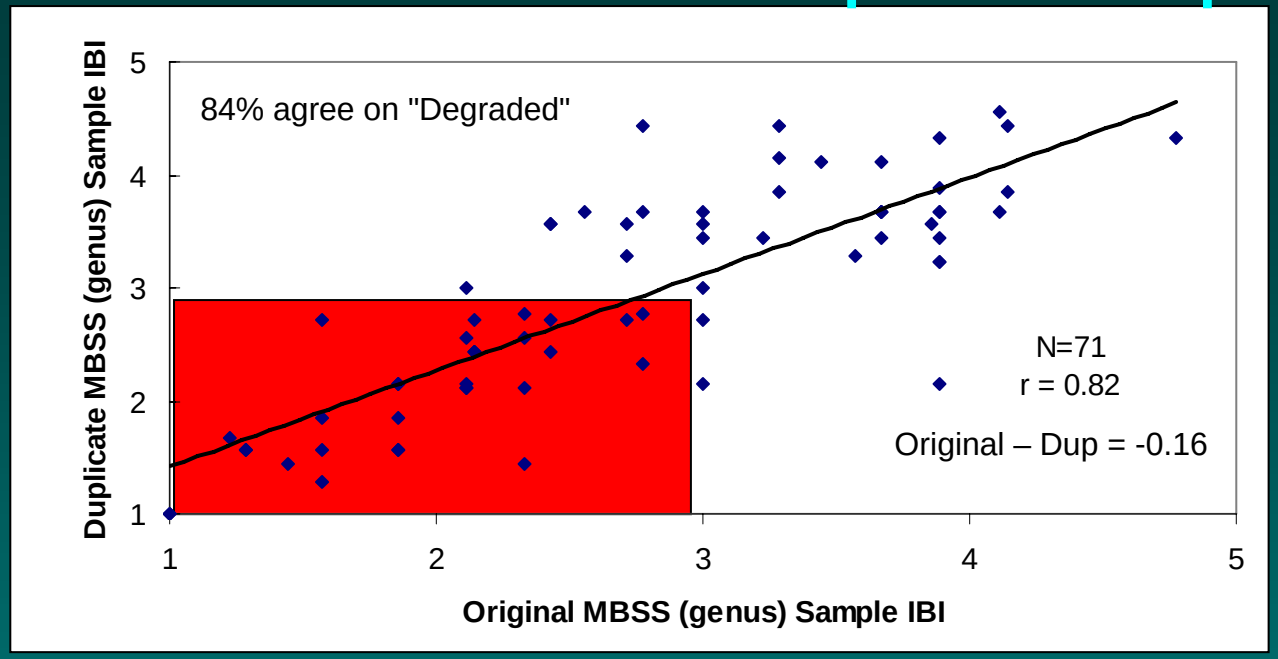


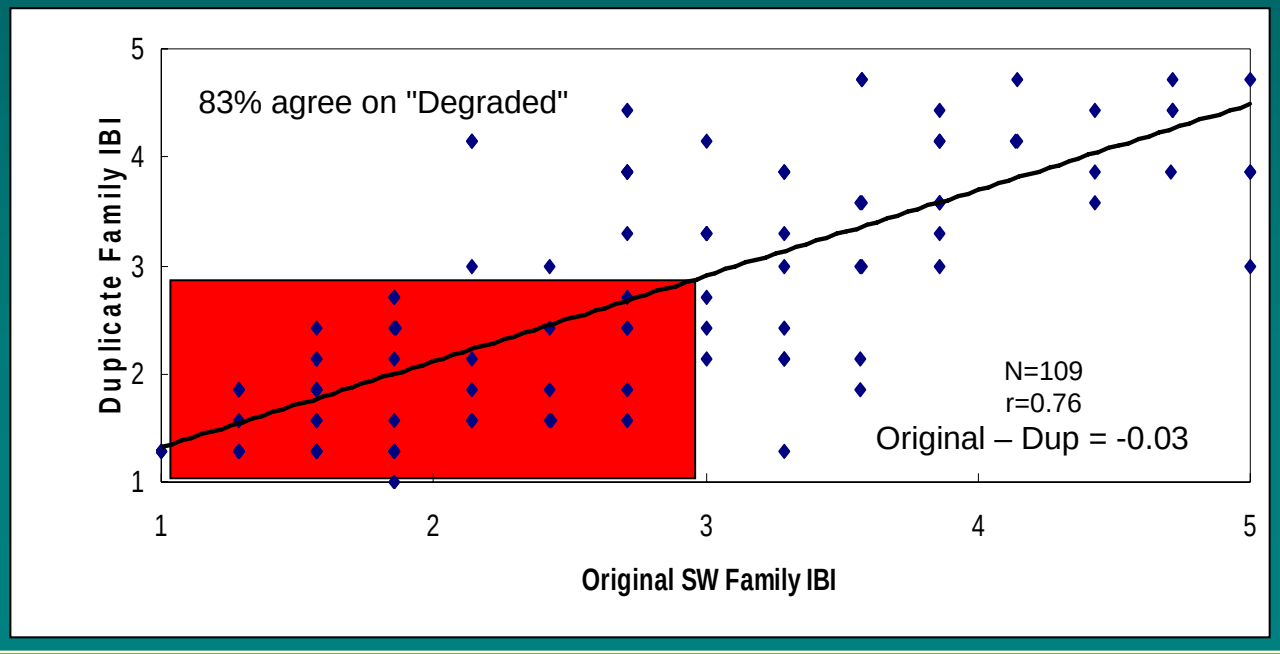
Duplicate Samples

- Stream Waders – 109 pairs
- MBSS – 71 pairs

LAUREL BROOK RD

MBSS and Stream Waders Duplicate Samples





Conclusions

- Stream Waders and MBSS data are comparable, especially at smaller scales.
- Family IBIs tend to rate sites as more degraded than genus IBIs.
- Stream Waders data should be used to support those collected by MBSS in watershed assessments.
- Next steps….
  - Examine causes for differences
    - D.E.: MBSS - CP = 87%
      NCP = 88%
      SW - CP = 71%
      - NCP = 88%
  - Do this all over again with revised IBIs!