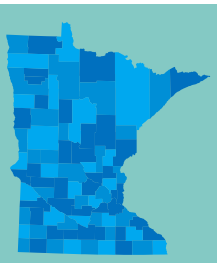
Rivers

March 2018

Minnesota's 2015 Rivers and Streams Probabilistic Survey Results

MINNESOTA POLLUTION CONTROL AGENCY



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This report is available in alternative formats upon request, and online at www.pca.state.mn.us.

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Contents

Executive summary

Stream probabilistic surveys have been used by the Minnesota Pollution Control Agency (MPCA) since 1996. Survey designs were originally developed by the U.S. Environmental Protection Agency's (EPA) Environmental Monitoring and Assessment Program and are now supported through the EPA National Aquatic Resource Survey. Originally, sites were selected and sampled by watershed basins, or hydrologic unit code (HUC) level 6. In 2010, the MPCA began surveying streams using an Omernik ecoregion level II framework. The level II ecoregions, as seen in Figure 1, roughly divide the state into three regions: a northern region known as the Mixed Wood Shield (MWS); a central region known as the Mixed Wood Plains (MWP); and a southern region called the Temperate Prairies (TP). The survey design was used again in 2015, with an added feature of 50% replacement of sites from the 2010 survey. These replacement sites were added to increase the ability to detect temporal trends in future surveys. Though the design of the survey was developed by the EPA, the sampling protocols and indicators were developed by the MPCA to address the unique habitats and stream conditions found in Minnesota.

This report characterizes the condition of rivers and streams in Minnesota utilizing the two most recent datasets collected in 2010 and 2015. River conditions were analyzed using biological, habitat, landuse, and chemical metrics.

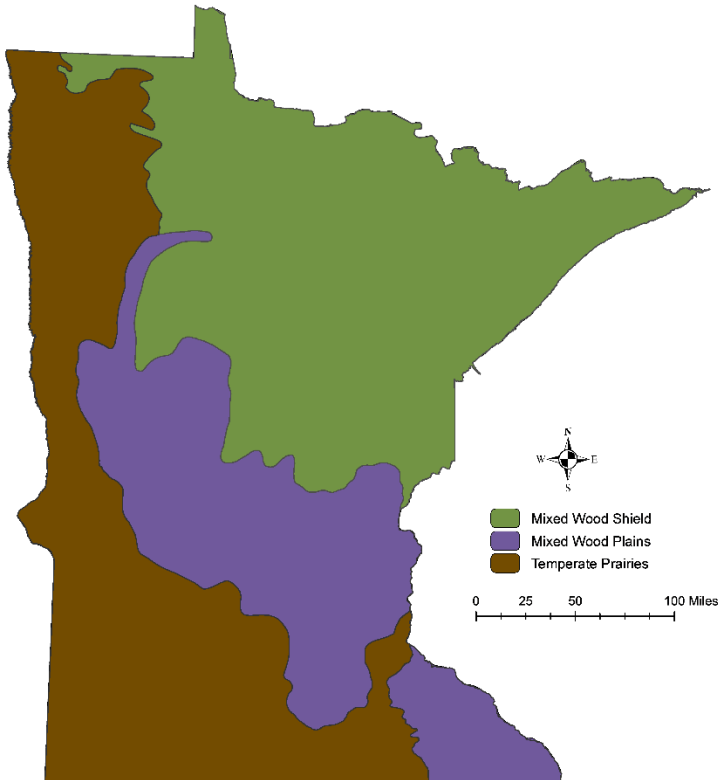

Figure 1. Level II Ecoregions of Minnesota.

Methods

Site selection

Potential site locations are selected using the National Hydrography Dataset (NHDplus) line work and a method of generalized random-tessellation stratification (GRTS) (Stevens & Olsen, 2004). All lines in NHDplus are assigned a code that indicates channel type (e.g. natural, canal, ditch, pipeline, etc.). For these surveys, channels coded for pipelines and coastlines were excluded; all other channel types were included. Randomly selected sites are generated on the appropriate NHDplus linework using the GRTS.

Sites are visited sequentially off the list of generated locations, until the desired number of samples are reached. A sufficient number of overdraw sites are provided in anticipation that not all the sites on the list will prove to be sampleable. For a site to be considered sampleable, it first must be "target", meaning it must be on a defined channel with water present in greater than 50% of the reach.

Figure 2 depicts the general locations of target sites from the 2010 and 2015 surveys. Commonly, sites are considered "non-target" due to discrepancies between NHDplus linework and the true channel location. Often the linework will be drawn through wetlands where there are no true stream channels or channel has been moved far from its original path.

Not all target sites are sampleable. Some common reasons why targeted sites cannot be sampled are landowner permission denial, the site is inaccessible, or it is unsafe to sample because of geological features such as waterfalls. Non-target and non-sampleable sites are replaced with the next available site on the potential site list until the number of sampled sites reaches a designated sample number.

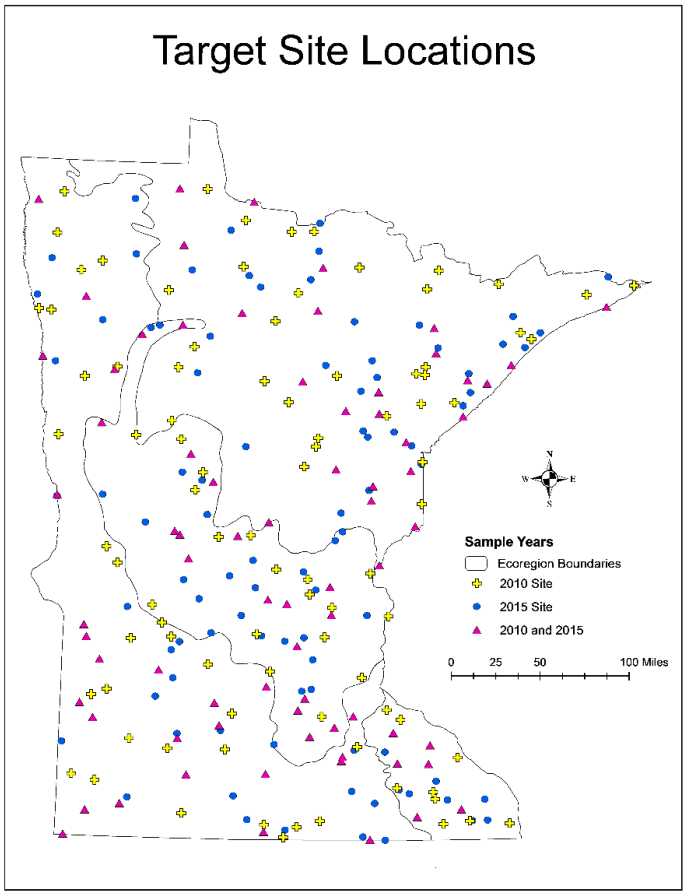

Figure 2. Target site locations in Minnesota from the 2010 and 2015 surveys.

Sampling protocol

Data collection includes fish and aquatic macroinvertebrate community monitoring samples, habitat observations, and water chemistry. Fish were sampled using electrofishing techniques that are dependent on stream width and depth, varying from backpack electrofishing in headwater streams to boom shocking in large rivers. Macroinvertebrates were collected with a D-frame dipnet using a multi-habitat collection approach. Quantitative habitat data was collected using a transect-based approach with the use of tape measures and measurement rods (Simonson et al., 1994). Further habitat information was gathered using a qualitative evaluation developed by the MPCA - the Minnesota Stream Habitat Assessment (MSHA) that can be found at http://www.pca.state.mn.us/index.php/view-document.html?gid=6088 (Minnesota Pollution Control Agency, March 2007). Stream water chemistry was characterized with hand held meters following the manufacturer's recommendations for sampling and calibration. One-time water chemistry grab samples were collected and analyzed for phosphorus and Total Suspended Solids (TSS) in the lab. Because water chemistry sampling is a one-time grab sample in these surveys, the data alone is not sufficient for use in performing Clean Water Act waterbody assessments. However, when the entire dataset is evaluated and compared to the current standards/acceptable levels for each parameter, a snapshot of baseline water chemistry conditions (i.e. basin level and ecoregions) can be obtained. Further information and all standard operating procedures for these components can be found on the biological monitoring section of the MPCA website at: http://www.pca.state.mn.us/index.php/water/water-monitoring-and-reporting/biological-monitoring/biological-monitoring-of-water-in-minnesota.html (Minnesota Pollution Control Agency, July 2013).

Threshold establishment

To interpret the results of these surveys, thresholds for each of the sampling parameters were based on MPCA standards and criteria. Individual water chemistry values for each parameter should not be considered a formal assessment of any particular site. In aggregation, the results do provide an understanding of the overall condition of the entire population of rivers and streams.

Index of biological integrity

Fish Index of Biotic Integrity (IBI) (MPCA-2, 2013) and macroinvertebrate IBI (MPCA-3, 2013) scores were calculated for each site and compared to biological thresholds designed to protect aquatic life. The Minnesota IBI framework for fish and invertebrates classifies streams into nine classes based on stream size, region, temperature and gradient (Table 1). Impairment thresholds (MPCA-1, 2013) were used to distinguish sites that support aquatic life from those that are potentially impaired for aquatic life use. In addition to the waterbody classification distinctions, tiered uses based on each stream's potential to support biological communities were used following the Tiered Aquatic Life Use (TALU) concepts described by the EPA (EPA, 2005). In the TALU framework, streams can be categorized as "modified" if they have limited habitat due to legal channelization or creation of the stream.

Table 1. Fish and invertebrate IBI thresholds, general thresholds are applied to natural streams; modified thresholds are only applied when streams are ditched or channelized.

Class #	Class Name	Exceptional	General	Modified
Fish criteria				
1	Southern Rivers	71	49	NA
2	Southern Streams	66	50	35
3	Southern Headwaters	74	55	33
4	Northern Rivers	67	38	NA
5	Northern Streams	61	47	35
6	Northern Headwaters	68	42	23
7	Low Gradient Streams	70	42	15
10	Southern Coldwater	82	50	NA
11	Northern Coldwater	60	35	NA
Macroinvertebrate criteria				
1	Northern Forest Rivers	77	49	NA
2	Prairie Forest Rivers	63	31	NA
3	Northern Forest Streams RR	82	53	NA
4	Northern Forest Streams GP	76	51	37
5	Southern Streams RR	62	37	24
6	Southern Forest Streams GP	66	43	30
7	Prairie Streams GP	69	41	22
8	Northern Coldwater	52	32	NA
9	Southern Coldwater	72	43	NA

Water chemistry

To analyses TSS and phosphorus, we used Minnesota's aquatic life and river eutrophication regional standards. The focus of this survey is to look at baseline conditions and not to make impairment assessments. Standards were used to generalize the TSS and phosphorus concentrations as Good or

Poor. If the concentration was less than or equal to the standard, the site received a good rating and poor if it was below. The values in Table 2 are from Minn. R. 7050.0222 subp 2 and 4.

Table 2. River Phosphorus and TSS standard values

River Nutrient Regions	Phosphorus (mg/L)	TSS (mg/L)
Northern	0.05	15
Central	0.1	30
Southern	0.15	65
2A Coldwater	---	10

Habitat

Land use percentages were calculated with Geographic Information System land use and watershed area layers. Sinuosity and gradient were calculated using available topographic layers and areal imagery. Qualitative habitat data were collected and scored according to procedures in the Minnesota Pollution Control Agency's MSHA methods (http://www.pca.state.mn.us/index.php/view-document.html?gid=6088). Good, Fair, or Poor thresholds for the qualitative habitat assessment were developed by examining the MSHA scores at three levels of disturbance, least mid and most disturbed. Disturbance levels were quantified using a watershed disturbance index known as the Human Disturbance Score (HDS) developed by the MPCA (Minnesota Pollution Control Agency July 19, 2013). Over 1,700 sites across the state were used to set the criteria. MSHA values above the median of least disturbed sites were considered Good, MSHA values below the median for most disturbed sites were considered Poor, and values falling in between these thresholds were considered Fair (**Error! Reference source not found.**). The thresholds for Good is equal to or greater than 66, Fair is between 66 and 45, and Poor is less than or equal to 45.

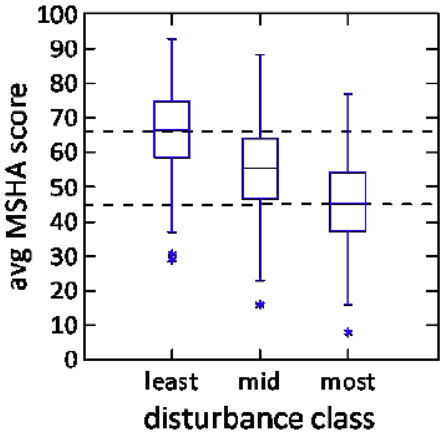

Figure 3. Box plot of MSHA scores.

Statistical methods

The statistical software "R" (R Development Core Team, 2008) and analysis package "spsurvey" (Kincaid, 2012) were used to determine the percentages of stream miles for both categorical and continuous variables. Change analysis was conducted to calculate the difference between the 2010 and 2015 survey. Using confidence intervals and standard deviation both Z-tests and cumulative distribution functions tests were applied to check for significant differences.

Results

Results from the two surveys were compared using EPA recommended change analysis method in the R package spsurvey. Z-tests were used to check for significant differences between the 2010 and 2015 surveys.

Figure 4 through Figure 6 show general characteristics of the sites and surveys. Figure 6 shows the proportion of sites sampled within stream orders (grouped into 1st, 2nd, 3rd, and 4th order and larger). Similar to the stream order percentages, the percentages of stream miles represented in each ecoregion in Figure 4 have similar distributions for both years. This is expected given the weights calculated for each site are based on stream order and ecoregion. Figure 5 suggests there are fewer ditched streams in the 2015 survey. Significant decreases in estimated number of channelized stream miles were observed between 2010 and 2015 statewide and in the MWS.

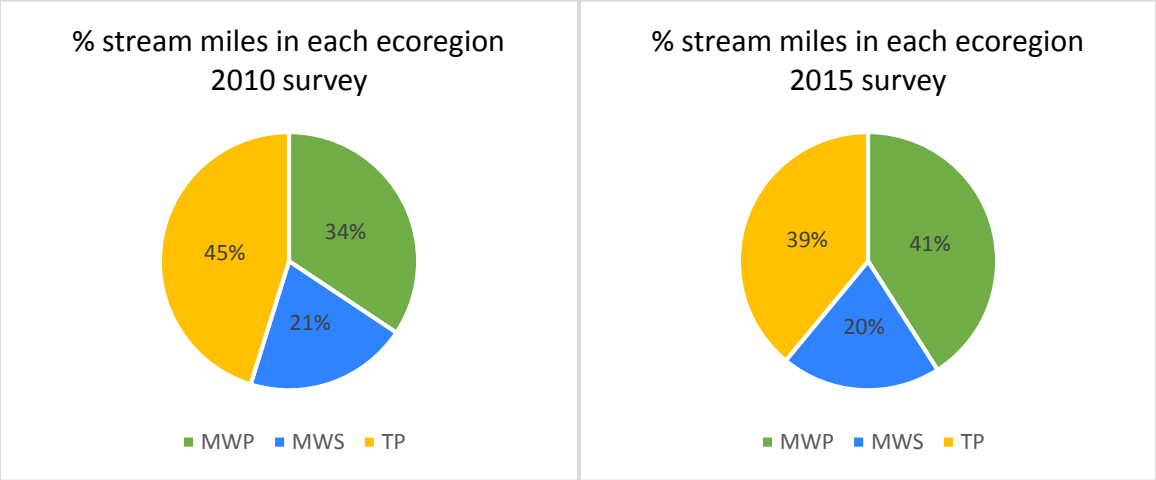

Figure 4. Stream miles percentages represented across the state by ecoregion between the 2010 and 2015 surveys.

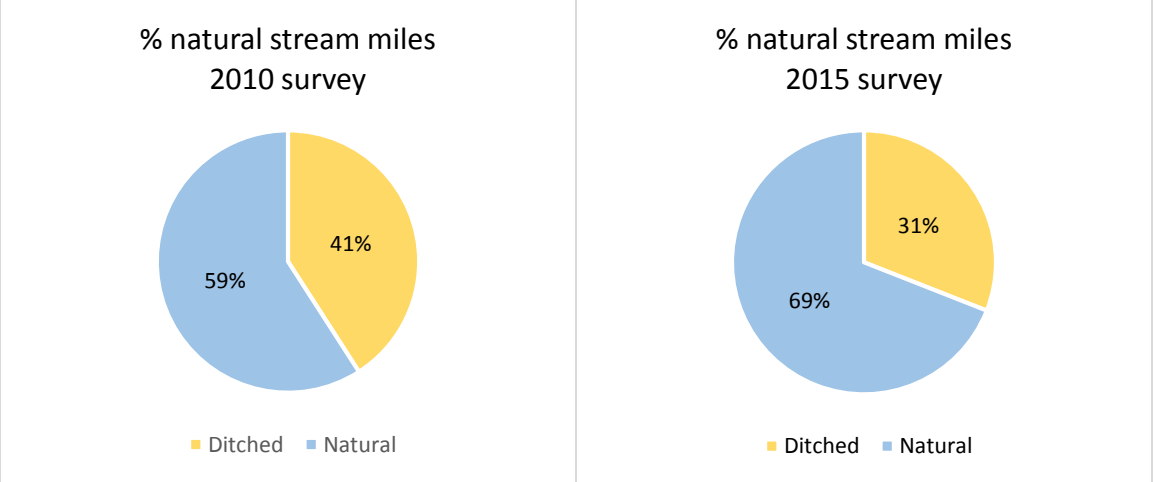

Figure 5. Percentage of natural and ditched stream miles represented in both the 2010 and 2015 survey.

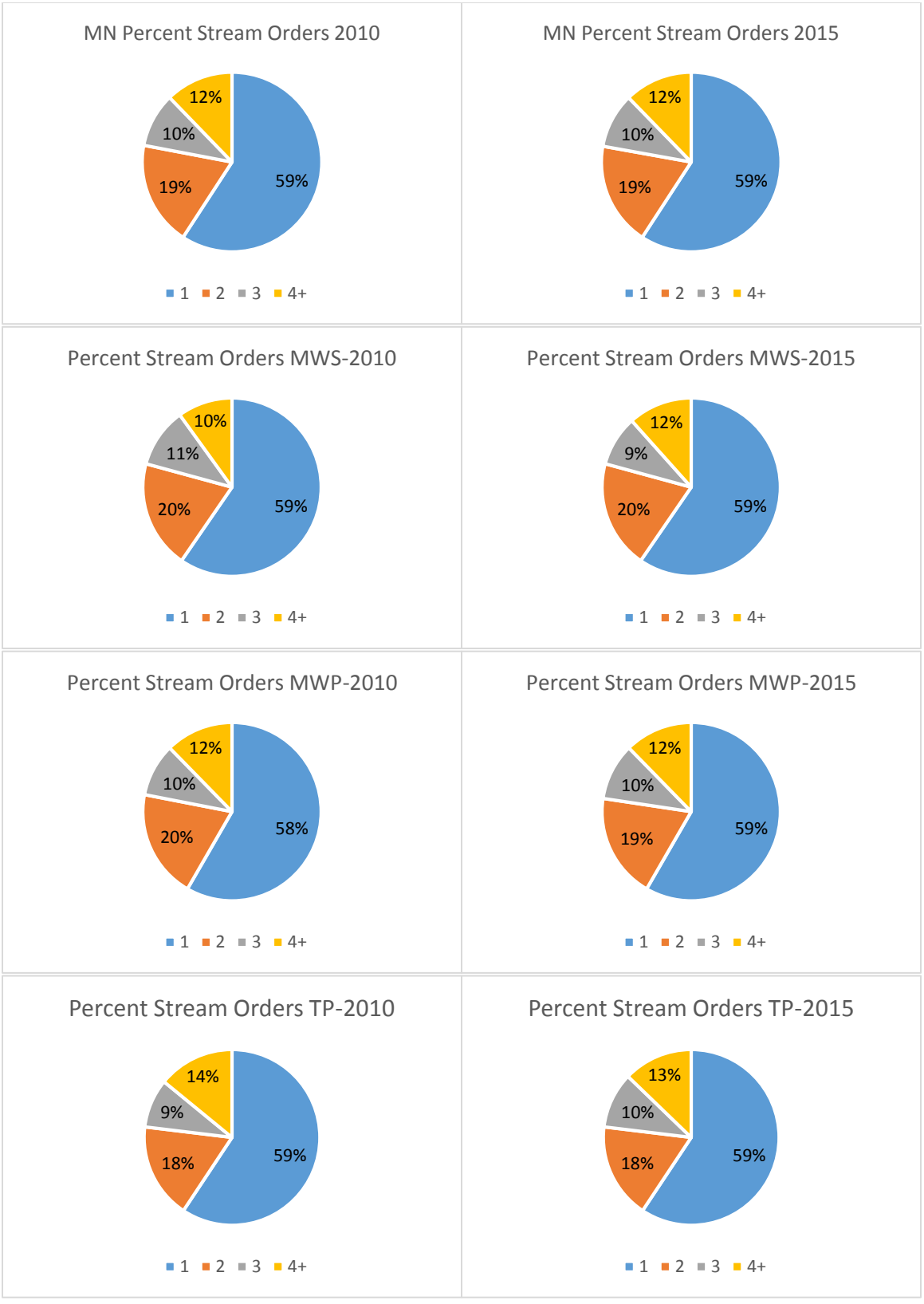

Figure 6. Extrapolated percentage of stream miles in each stream order group and in each ecoregion represented by both the 2010 and 2015 surveys when analyzed with the 2015 weights.

The MSHA scores integrate stream habitat variables, such as substrate types and riparian conditions, into a single score. Generally the better the habitat for fish and aquatic macroinvertebrates, the higher the MSHA score. For example, sites with many substrate types and a high degree of channel heterogeneity (riffle, run, pool), score better than sites with more homogenous features.

Figure 7 compares the mean MSHA scores between the surveys and regions. When tested for significant differences, the MWS and statewide estimates came back with significantly fewer stream miles with a Good rating (Figure 8).

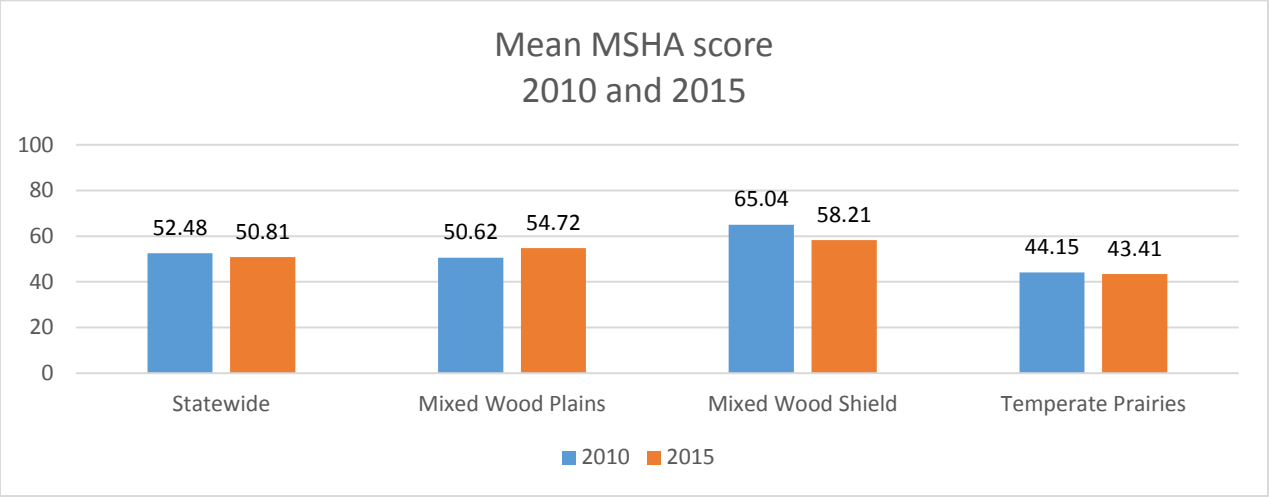

Figure 7. Mean MSHA scores for each region in the 2010 and 2015 surveys.

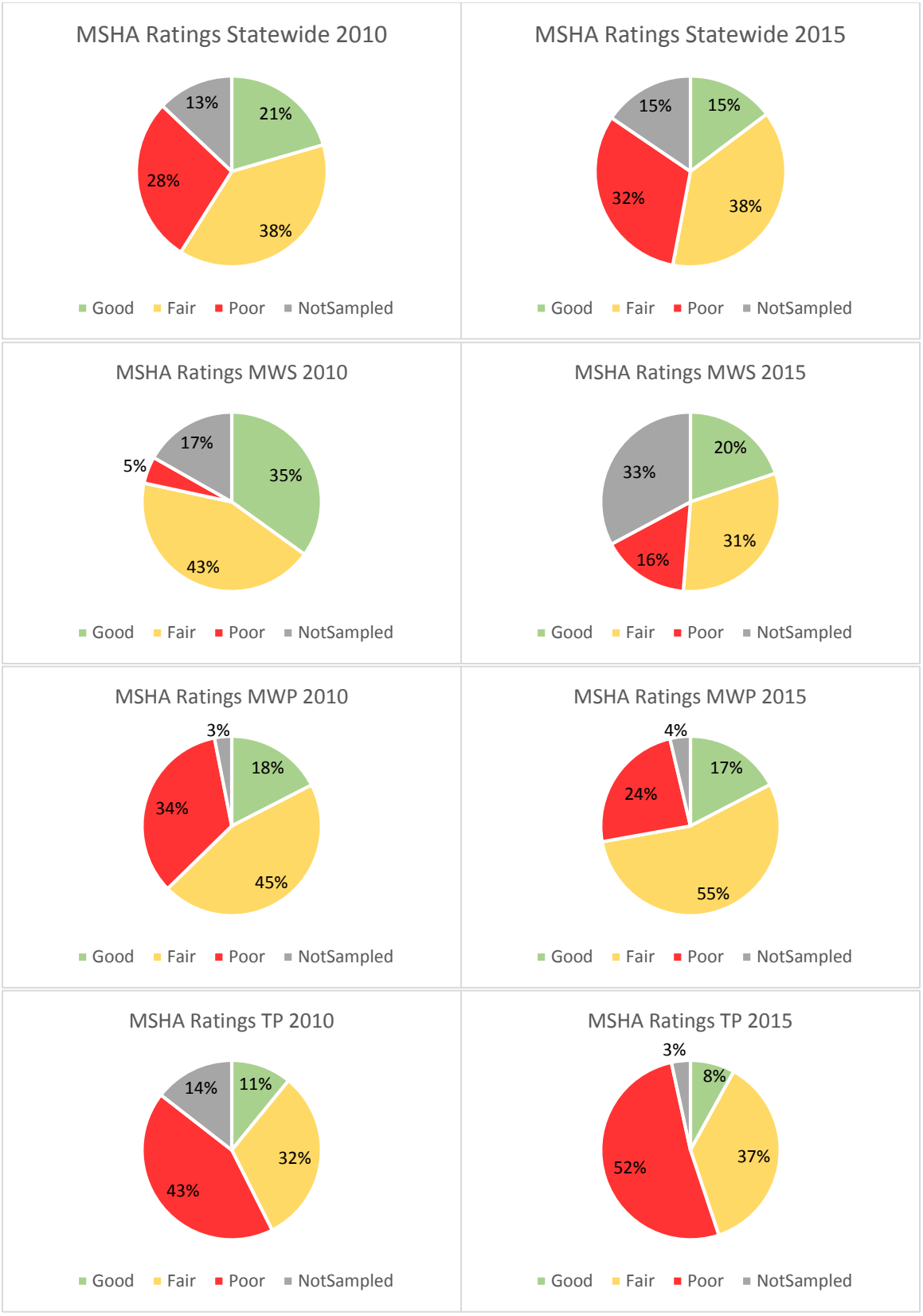

Figure 8. Percentage of stream miles with MSHA habitat ratings from Good to Poor.

Total suspended solids originate from sediments being uplifted and moved within the channel, from overland flow, and from bank instability sloughing and mass sediment wasting.

Figure 9 shows a large change in the mean TSS values for the TP region, though not significant when tested. Where there was a significant difference in the TP region is in the Good and Poor ratings. The 2015 survey saw a higher percentage of poorly rated streams and fewer good (Figure 11). This pattern followed into the statewide estimates where there were there were significantly fewer good rated streams as well.

Phosphorus levels provide an indication of the amount of nutrients that are entering into the stream system. There was little significant change between the 2010 and 2015 surveys as seen in Figure 10 and Figure 12. Significant change seen with a reduction in mean concentration, lower percentages of poor rated streams, and more sites not sampled in the MWS region. The poor and not sampled differences flowed over into the statewide estimates, which also tested significantly different.

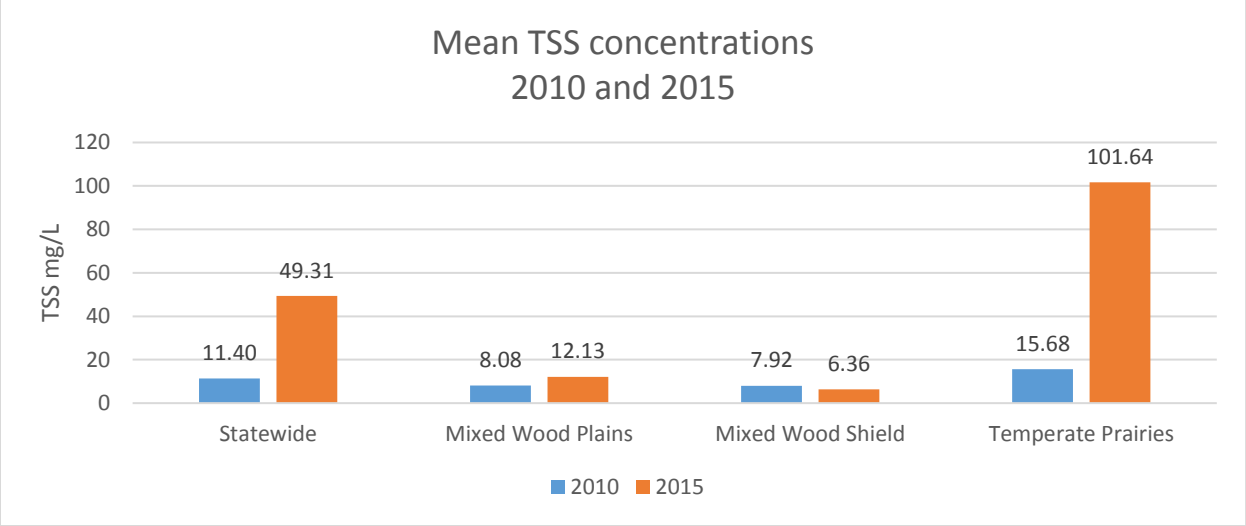

Figure 9. Mean TSS concentrations in 2010 and 2015 surveys.

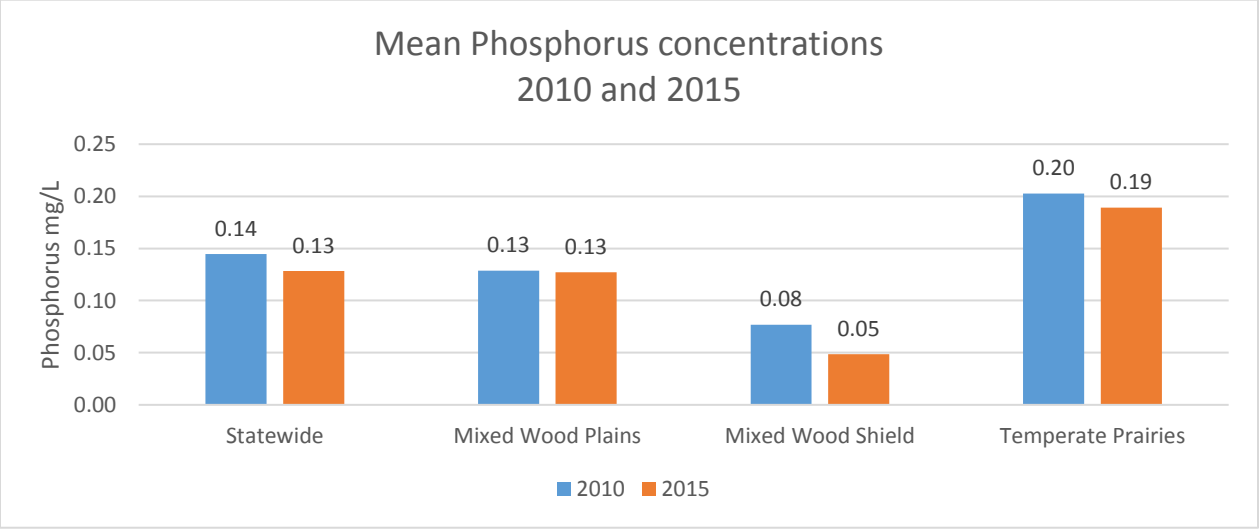

Figure 10. Mean phosphorus concentrations in 2010 and 2015 surveys.

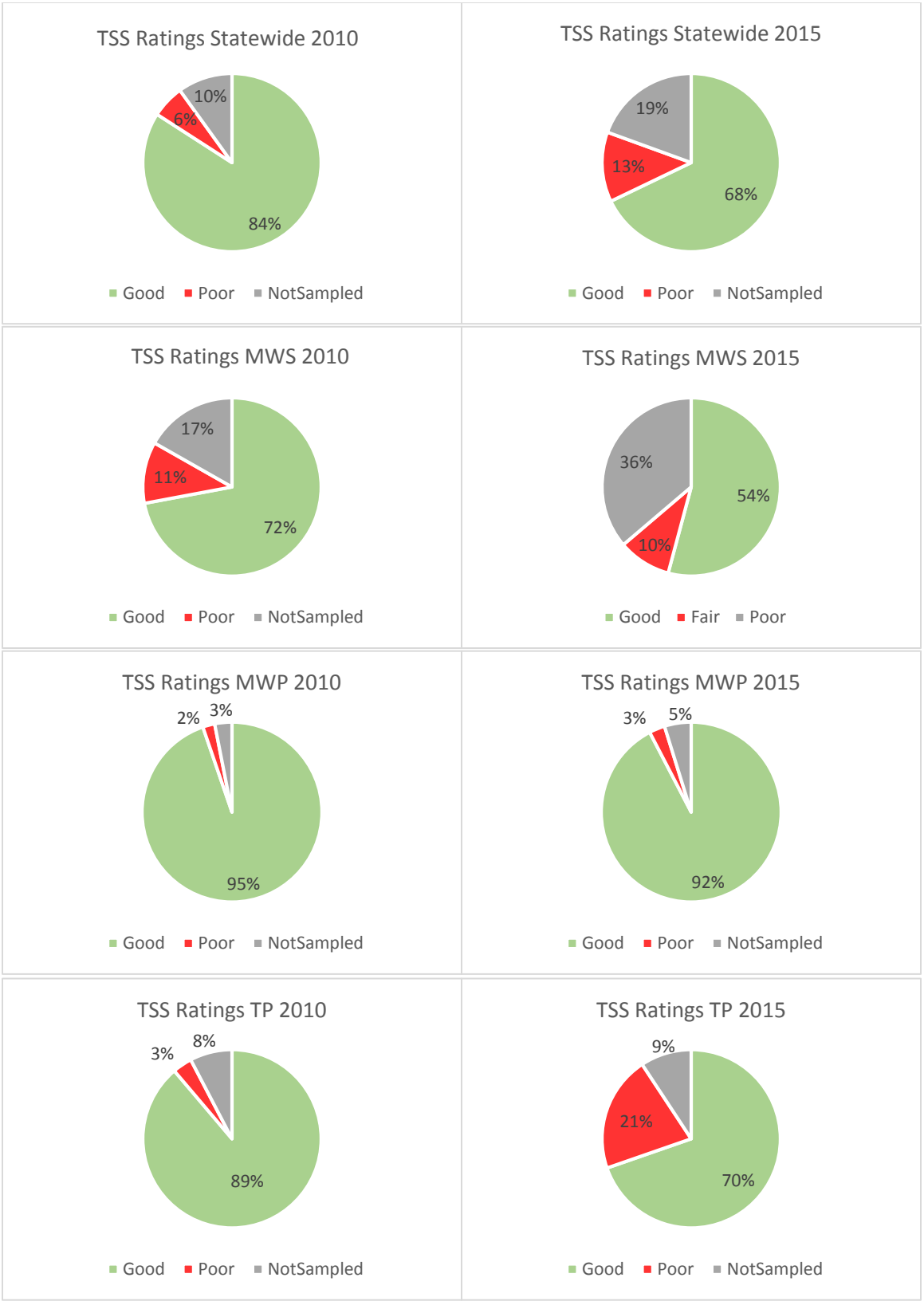

Figure 11. Percentage of stream miles with TSS ratings from Good to Poor.

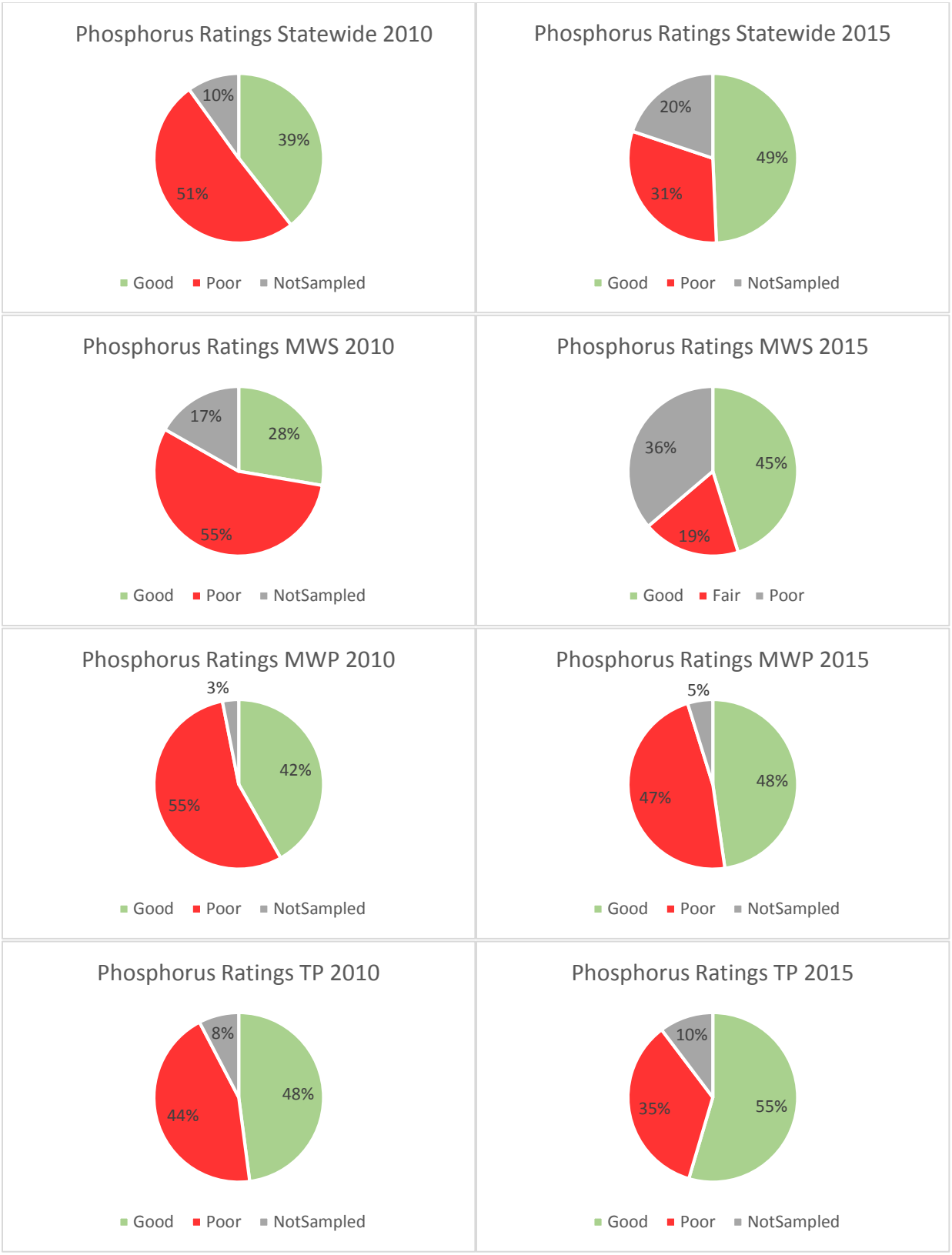

Figure 12. Percentage of stream miles with phosphorus ratings from Good to Poor.

In Figure 13 and Figure 14, the mean fish and macroinvertebrate IBI scores are generally higher in 2015 than 2010. The fish estimates (Figure 15) had lower not passing estimates and higher not assessable estimates in all regions except the MWS, where there was no change. The TP region was the only region that saw a significant rise in percentage of streams passing fish IBI thresholds. Macroinvertebrates were more consistent between the surveys, but did see estimates both statewide and in the MWS region rise in the percentage of stream miles that would be target but not sampleable.

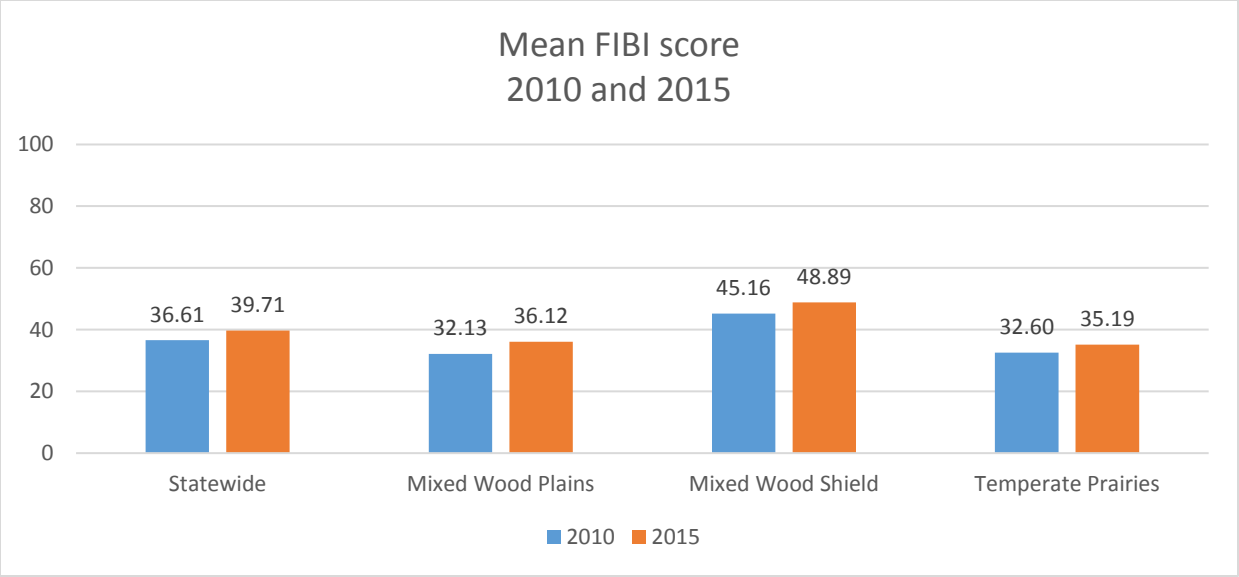

Figure 13. Mean fish IBI scores between 2010 and 2015 statewide and in each ecoregion.

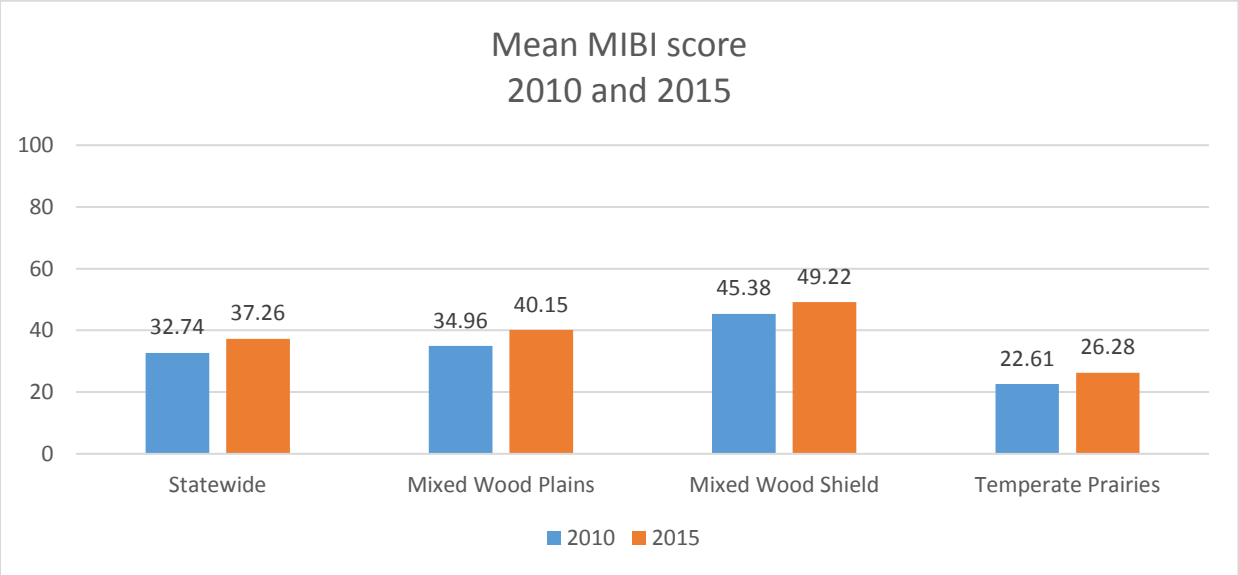

Figure 14. Mean macroinvertebrate IBI scores between 2010 and 2015 statewide and in each ecoregion.

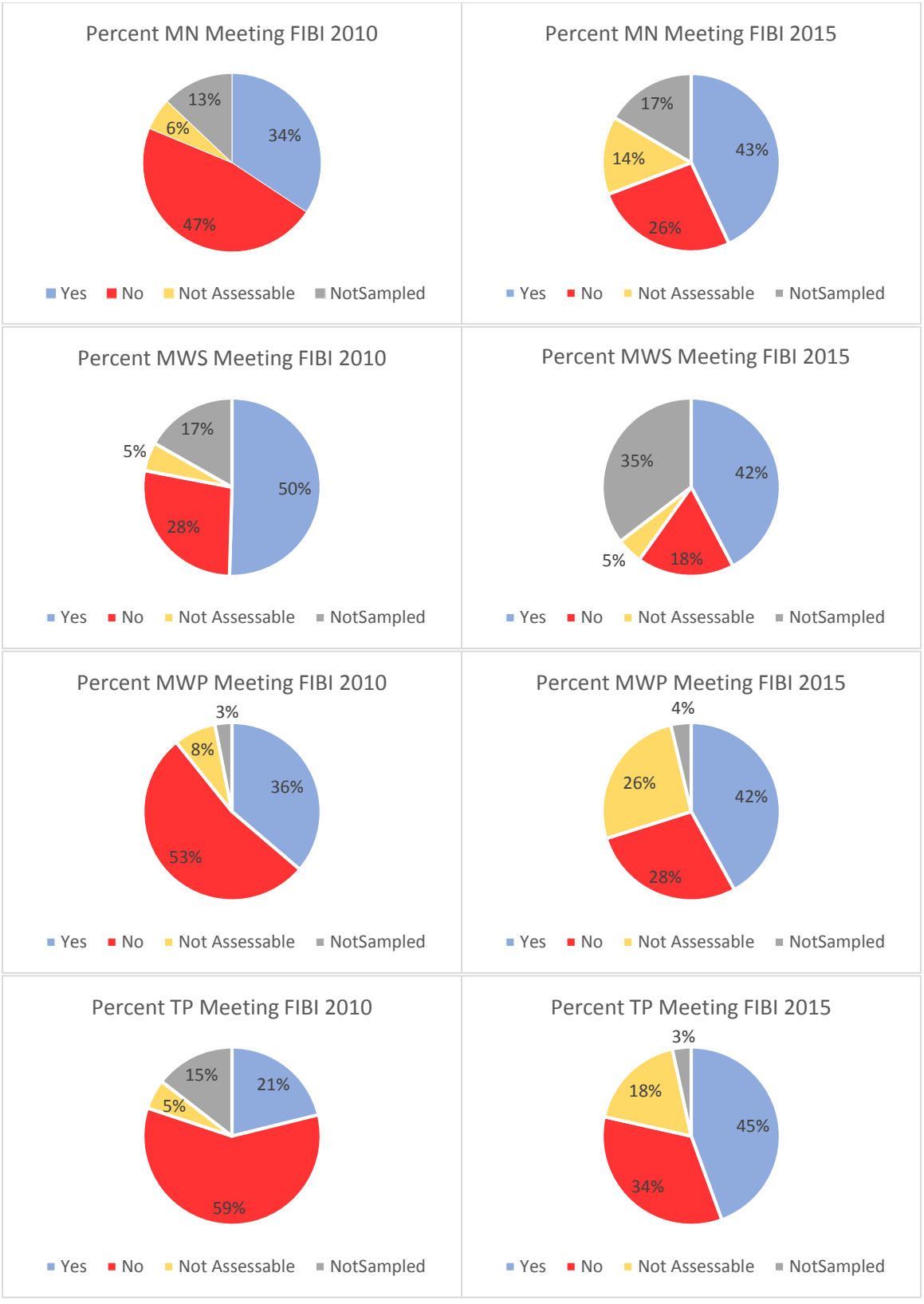

Figure 15. Estimated percentage of streams that passed the fish IBI threshold statewide and in each ecoregion.

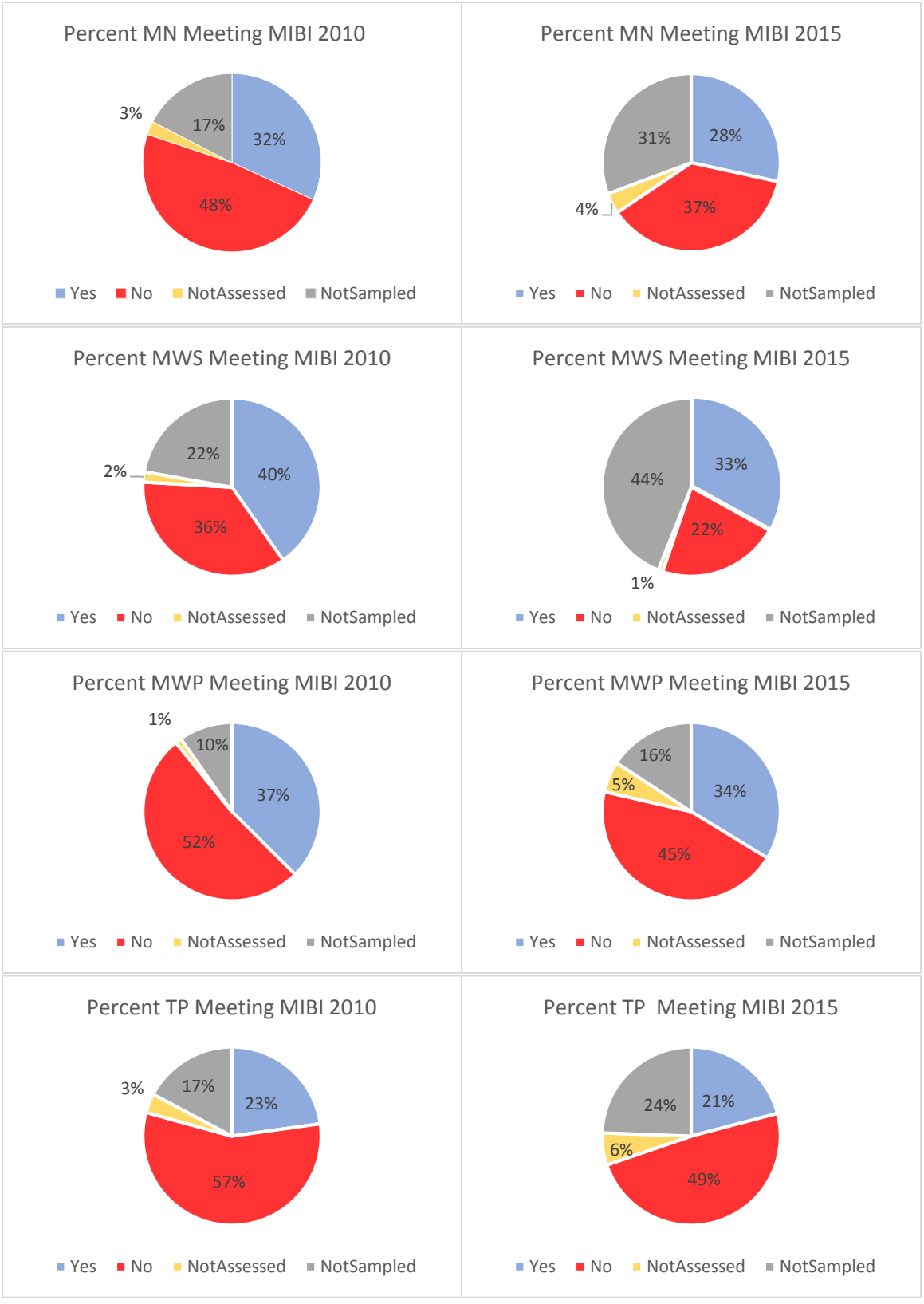

Figure 16. Estimated percentage of streams that passed the fish IBI threshold statewide and in each ecoregion.

Conclusion

Even though there were some significant differences between the surveys, it is too soon to tell if these differences are signs of trends. The year 2010 was a wetter year than 2015, making some of the smaller ditches target that might have been too dry in 2015 to consider target. In addition to differences in weather, consideration should be given for variability between surveys. The 2015 survey year was the first one where stream repeats were added from the previous survey. This will eventually add additional confidence in trend detection, but might contribute to some differences between the 2015 survey and the original in 2010.

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Appendix 1. Variable abbreviations and explanations

For a completed data set for these variables, go to: \\X1600\vol1\Databases\Water_Quality\Biological_Monitoring\Streams\Projects\Lueck\EMAP\Report Data Table.xlsx

Table Name	Explanation
FieldNum	Site field number assigned by MPCA
siteID	Site ID provided by EPA
DrainSqM	Drainage area in square miles for each site
WBName	Water body name
Latitude	Latitude in Decimal Degrees (NAD-83)
Longitude	Longitude in Dedmai Degrees (NAD-83)
ER2Name	Ecogregion level 2 names
Strahler	Strahler stream order (1-6)
Class	Stream class (Coldwater, Warmwater, Class 7)
Site Status	Site Status - Target Site, Non-Target Site, Land Owner Permission Denied, Physically inaccessible
Disturbed Percent	Percent disturbed land use in the watershed
AgPercent	Percent agriculture in the watershed
RangePercent	Percent rangeland in the watershed
UrbanPercent	Percent urban in the watershed
ForestPercent	Percent forest in the watershed
WetlandPercent	Percent wetland in the watershed
ImpervPercent	Percent impervious surface in the watershed
AgRiparianPercent	Percent agriculture within stream riparian of the site (30 meters)
DitchPercent	Percent of ditched streams in watershed
PctAgLT100M	Percent agriculture within 100 meters of streams in the watershed
PctForestLT100M	Percent forest within 100 meters of streams in the watershed
PctDisturbedLT100M	Percent disturbed within 100 meters of streams in the watershed
RoadXDensity	Number of Road Crossings per Stream Kilometer
PctDistLU	Percent Disturbed Land Use Within 100 Meters of Stream Bank
ChanCon	Channel condition either NA = Natural OC = Channelized
MDepth	Mean Stream Depth (cm)
MThalDepth	Mean Stream Thalweg Depth (cm)
MWidth	Mean Stream Width (m)
Gradient	Gradient (m/km)
Sinuosity	Sinuosity (Total Length/Straight-Line Length)
numstreamftsper100	Number of Stream Features per 100 Meters
PctRiffle	Percent Riffle
PctPool	Percent Pool
PctRun	Percent Run
WD Ratio	Width to Depth Ratio
NumSubTypes	Number of Substrate Types

Table Name	Explanation
PctFines	Percent Fine Substrates (i.e. Smaller Than Gravel)
MDepthFine	Mean Depth of Fines (cm)
Pct Embed	Percent Substrate Embeddedness
PctRock	Percent Coarse Substrates (i.e. Gravel or Larger)
PctBoulder	Percent Boulder
CVDepth	Coefficient of Variation of Depth
PctCover	Percent Stream Cover
PctOverVeg	Percent Overhanging Vegetation
PctEmerMac	Percent Emergent Macrophytes
PctSubMac	Percent Submergent Macrophytes
PctWoody	Percent Woody Debris
PctUnderCut	Percent Undercut Bank
MBankEros	Mean Bank Erosion (m)
MSHA	Score Based on MPCA's Stream Habitat Assessment (MSHA)
MSHA_Rating	Ratings based examining the distribution of MSHA scores across
HDS	Human Disturbance Score
TOC	Total organic carbon
DOC	Dissolved organic carbon
TempH2O	Water temperature (°C) during fish sample
pH	pH
DO	Dissolved Oxygen (mg/L)
Phos	Total Phosphorus (mg/L)
Nitrogen	Nitrite/Nitrate (mg/L)
T_Ammonia	Total Ammonia (mg/L)
Conduct	Conductivity (µmhos/cm)
TSS	Total Suspended Solids (mg/L)
TSS Rating	Good= < 15 mg/L, Fair= 15- 65mg/L, Poor= > 65 mg/L
Nitrogen Rating	Warm water value 49 mg/L, Cold water 2A 3,1 mg/L
Phosphorus Rating	Good <0,055 mg/L, Fair 0.055-0,150 mg/L, Poor >0,158 mg/L
Fish Visit	Date that Fish, Habitat, and Water Chemistry Sampling Was Conducted (mm/dd/yyyy)
FishIBI	Fish IBI (0-100)
MeetsFishThreshold	Yes or No, Based on thresholds established for each fish class
Count of Taxa	Number of Fish Taxa
Sensitive	Number of Intolerant Fish Taxa
Hdw	Number of Headwater Fish Taxa
Minnow	Number of Minnow Taxa
Darter	Number of Darter Taxa
Insect	Number of Invertivore Fish Taxa
BenInsect	Number of Benthic Invertivore Fish Taxa
Omnivore	Number of Omnivore Fish Taxa
GameFishTaxa	Number of Game Fish Taxa
NumPerMeter-Tolerant	Number of Fish per Meter without Tolerant Fish Taxa

Table Name	Explanation
DomTwoPct	Percent of Individual Fish that are of the dominant two taxa
TolPct	Percent of Individual Fish that are Tolerant Taxa
FishDELTPct	Percent of Individual Fish with DELT Anomalies
PiscivorePct	Percent of individual fish that are Piscivores
SLithopPct	Percent of Individual Fish that are Simple Lithophltic Spawners
Invert Visit	Inverts Date That Macroinvertebrate Sampling Was Conducted (mm/dd/yyyy)
MIBI	Macro invertebrate IBI (0-100)
MeetslnvertThreshold	Yes or No, Based on thresholds established for each invert class
TaxaCount	Number of Macro invertebrate Taxa
Tolerant	Number of Tolerant Macro invertebrate Taxa
VeryTolerant	Number of Very Tolerant Macro invertebrate Taxa
EPT	Number of Ephemeroptera/Plecoptera/Tricoptera Taxa
Ephemeroptera	Number of Ephemeroptera Taxa
Plecoptera	Number of Plecoptera Taxa
Tricoptera	Number of Tricoptera Taxa
Chironomidae Ch	Number of Chironomidae Taxa
TaxaCountAllChir	Number of Macro Invertebrate Tax a—All Chironomidae Taxa included
IntolerantCh	Number of Intolerant Macroinvertebrate Taxa-All Chironomidae Taxa included
PredatorCh	Number of Predator Macroinvertebrate Taxa-All Chironomidae Taxa included
ClingerCh	Number of clinger Macroinvertebrate Taxa-All Chironomidae Taxa Included
ScraperCh	Number of Scraper Macroinvertebrate Taxa-All Chironomidae Taxa Included
Collector-filtererCh	Number of Collector-Filterer Macroinvertebrate Taxa-All Chironomidae Taxa Included
CoIlector-gathererCh	Number of collector-Gatherer Macroinvertebrate Taxa-AII Chironomidae Taxa included
TanytarslniCh	Number of Tanytarsini Macroinvertebrate Taxa-All Chironomidae Taxa included
LongLivedCh	Number of Long-lived Macroinvertebrate Taxa-All Chironomidae Taxa included
InvertTolerantPct	Percent of Individual Macro Invertebrates That Are Tolerant Taxa
VeryTolerant Pct	Percent of Individual Macro Invertebrates That Are Very Tolerant Taxa
EPT Pct	Percent of Individual Macro In vertebrates That Are Ephemeroptera/ Plecoptera/ Tricoptera
EphemeropteraPct	Percent of Individual Macroinvertebrates That Are Ephemeroptera
PlecopteraPct	Percent of Individual Macroinvertebrates That Are Plecoptera
TricopteraPct	Percent of Individual Macroinvertebrates That Are Tricoptera
ChironomidaeChPct	Percent of Individual Macroinvertebrates That Are Chironomidae
AmphipodaPct	Percent of Individual Macro Invertebrates That Are Am phi pod a
PredatorPct	Percent of Individual Macroinvertebrates That Are Predators
ScraperPct	Percent of Individual Macroinvertebrates That Are Scrapers
Collector-filtererPct	Percent of Individual Macroinvertebrates That Are Collector-Filterers
Collector_gathererPct	Percent of Individual Macroinvertebrates That Are Collector-Gatherers
MeetsBothlBI	Meeting both Fish and Invert thresholds - Yes, No, or Not Assessed
IBIBoth	Meets both, Fish only, Invert only, or Not assessed
oversamp	Oversample
division	division

Table Name	Explanation
Intended#	Intended number of samples (Nest1)
nest1_wt	original draw weights
Basin	Major Basin site is in
WeightCat	Weight category with ecoregion, basin, and stream order 1,2,3, 4+
final_wgt	Final weights used to extrapolate estimates

Appendix 2. Change analysis categorical

Subpopulation	Indicator	Category	DiffEst.P	StdError.P	LCB95Pct.P	UCB95Pct.P	DiffEst.U	StdError.U	LCB95Pct.U	UCB95Pct.U	P--->	Z	Prob Z < 0	Prob Z ≠
Statewide	Site_Status	Non-Target	-1.64086	6.157935	-13.7102	10.42847	-2006.08	9844.608	-21301.2	17288.99		-0.26646	0.394942	0.789883
Statewide	Site_Status	Target	1.91E-09	6.145395	-12.0448	12.04475	2.10E-06	6844.493	-13415	13414.96		3.12E-10	0.5	1
Statewide	Site_Status	Target-Permission denied	-2.89712	2.524513	-7.84508	2.050831	-3541.97	3145.632	-9707.3	2623.353		-1.1476	0.125567	0.251135
Statewide	Site_Status	Target- Inaccessible	4.537983	2.521878	-0.40481	9.480772	5548.055	3163.619	-652.525	11748.64		1.799446	0.964026	0.071948
Mixed Wood Plains	Site_Status	Non-Target	-0.33502	10.17035	-20.2685	19.59851	-96.3821	4312.74	-8549.2	8356.433		-0.03294	0.486861	0.973722
Mixed Wood Plains	Site_Status	Target	-4.10E-09	9.918546	-19.44	19.43999	-3.00E-07	2229.878	-4370.48	4370.48		-4.1E-10	0.5	1
Mixed Wood Plains	Site_Status	Target-Permission denied	0.335016	2.353708	-4.27817	4.9482	96.38213	674.1929	-1225.01	1417.776		0.142335	0.556592	0.886815
Mixed Wood Shield	Site_Status	Non-Target	-13.923	9.090322	-31.7397	3.893724	-5893.45	4686.015	-15077.9	3290.969		-1.53163	0.062807	0.125615
Mixed Wood Shield	Site_Status	Target	7.27E-09	9.875353	-19.3553	19.35534	1.00E-06	3620.026	-7095.12	7095.122		7.36E-10	0.5	1
Mixed Wood Shield	Site_Status	Target-Permission denied	1.797556	4.626267	-7.26976	10.86487	760.8865	2015.025	-3188.49	4710.264		0.388554	0.651197	0.697606
Mixed Wood Shield	Site_Status	Target- Inaccessible	12.12542	7.059569	-1.71108	25.96193	5132.565	3220.913	-1180.31	11445.44		1.717587	0.957064	0.085872
Temperate Prairies	Site_Status	Non-Target	7.786877	10.9028	-13.5822	29.15598	3983.75	7404.125	-10528.1	18495.57		0.714209	0.762451	0.475098
Temperate Prairies	Site_Status	Target	5.78E-10	10.78259	-21.1335	21.13348	1.40E-06	5386.17	-10556.7	10556.7		5.36E-11	0.5	1
Temperate Prairies	Site_Status	Target-Permission denied	-8.59902	4.293469	-17.0141	-0.18397	-4399.24	2285.905	-8879.53	81.05124		-2.00281	0.022599	0.045197
Temperate Prairies	Site_Status	Target- Inaccessible	NA	NA	NA	NA	NA	NA	NA	NA		#VALUE!	#VALUE!	#VALUE!
Statewide	Sogroup	1	-1.59E-09	4.382418	-8.58938	8.589381	-2.20E-06	11084.72	-21725.6	21725.65		-3.6E-10	0.5	1
Statewide	Sogroup	2	-0.16166	2.96852	-5.97986	5.656529	-197.647	2860.122	-5803.38	5408.089		-0.05446	0.478285	0.956569
Statewide	Sogroup	3	0.12421	1.495605	-2.80712	3.055543	151.8574	1508.543	-2804.83	3108.547		0.08305	0.533094	0.933812
Statewide	Sogroup	4Plus	0.037453	1.821472	-3.53257	3.607473	45.78991	1983.903	-3842.59	3934.169		0.020562	0.508203	0.983595
Mixed Wood Plains	Sogroup	1	2.54E-09	8.161471	-15.9962	15.99619	1.70E-06	4539.648	-8897.55	8897.547		3.12E-10	0.5	1
Mixed Wood Plains	Sogroup	2	-0.687	5.450486	-11.3698	9.995752	-197.647	1265.817	-2678.6	2283.309		-0.12604	0.449848	0.899697
Mixed Wood Plains	Sogroup	3	0.687004	2.527192	-4.2662	5.640209	197.6473	575.2335	-929.79	1325.084		0.271845	0.607129	0.785741
Mixed Wood Plains	Sogroup	4Plus	-1.57E-11	2.936684	-5.7558	5.755795	2.00E-07	640.5697	-1255.49	1255.493		-5.3E-12	0.5	1
Mixed Wood Shield	Sogroup	1	-5.95E-09	7.122111	-13.9591	13.95908	-4.90E-06	5822.857	-11412.6	11412.59		-8.3E-10	0.5	1
Mixed Wood Shield	Sogroup	2	2.33E-09	4.891035	-9.58625	9.586252	2.00E-07	1689.077	-3310.53	3310.53		4.76E-10	0.5	1
Mixed Wood Shield	Sogroup	3	-1.66288	2.950884	-7.4465	4.120751	-703.878	1024.9	-2712.65	1304.889		-0.56352	0.286541	0.573082
Mixed Wood Shield	Sogroup	4Plus	1.662876	2.630095	-3.49202	6.817768	703.8782	1043	-1340.37	2748.121		0.63225	0.736388	0.527224
Temperate Prairies	Sogroup	1	-2.49E-10	7.423612	-14.55	14.55001	1.00E-06	8397.501	-16458.8	16458.8		-3.4E-11	0.5	1
Temperate Prairies	Sogroup	2	-2.02E-09	5.179573	-10.1518	10.15178	-7.00E-07	2154.321	-4222.39	4222.391		-3.9E-10	0.5	1
Temperate Prairies	Sogroup	3	1.286339	2.252278	-3.12805	5.700723	658.0883	995.5833	-1293.22	2609.396		0.571128	0.716043	0.567913
Temperate Prairies	Sogroup	4Plus	-1.28634	3.563408	-8.27049	5.697812	-658.088	1557.994	-3711.7	2395.524		-0.36099	0.359055	0.71811
Statewide	ReconResult	Non-sampleable	1.640858	3.477671	-5.17525	8.456968	2006.083	4407.374	-6632.21	10644.38		0.471827	0.681475	0.63705
Statewide	ReconResult	NonTarget	-1.64086	6.157935	-13.7102	10.42847	-2006.08	9844.608	-21301.2	17288.99		-0.26646	0.394942	0.789883
Statewide	ReconResult	Sampleable	0.405682	6.136912	-11.6224	12.43381	495.9794	6848.151	-12926.1	13918.11		0.066105	0.526353	0.947294
Statewide	ReconResult	sampleable	NA	NA	NA	NA	NA	NA	NA	NA		#VALUE!	#VALUE!	#VALUE!
Mixed Wood Plains	ReconResult	Non-sampleable	0.335016	2.353708	-4.27817	4.9482	96.38213	674.1929	-1225.01	1417.776		0.142335	0.556592	0.886815
Mixed Wood Plains	ReconResult	NonTarget	-0.33502	10.17035	-20.2685	19.59851	-96.3821	4312.74	-8549.2	8356.433		-0.03294	0.486861	0.973722
Mixed Wood Plains	ReconResult	Sampleable	-4.10E-09	9.918546	-19.44	19.43999	-3.00E-07	2229.878	-4370.48	4370.48		-4.1E-10	0.5	1

Subpopulation	Indicator	Category	DiffEst.P	StdError.P	LCB95Pct.P	UCB95Pct.P	DiffEst.U	StdError.U	LCB95Pct.U	UCB95Pct.U	P--->	Z	Prob Z < 0	Prob Z ≠
Mixed Wood Shield	ReconResult	Non-sampleable	13.92298	7.875453	-1.51262	29.35858	5893.451	3736.191	-1429.35	13216.25		1.767896	0.961461	0.077078
Mixed Wood Shield	ReconResult	NonTarget	-13.923	9.090322	-31.7397	3.893724	-5893.45	4686.015	-15077.9	3290.969		-1.53163	0.062807	0.125615
Mixed Wood Shield	ReconResult	Sampleable	1.171726	9.843126	-18.1204	20.4639	495.9794	3626.936	-6612.69	7604.644		0.11904	0.547378	0.905244
Mixed Wood Shield	ReconResult	sampleable	NA	NA	NA	NA	NA	NA	NA	NA		#VALUE!	#VALUE!	#VALUE!
Temperate Prairies	ReconResult	Non-sampleable	-7.78688	4.358126	-16.3286	0.754893	-3983.75	2313.767	-8518.65	551.1502		-1.78675	0.036989	0.073978
Temperate Prairies	ReconResult	NonTarget	7.786877	10.9028	-13.5822	29.15598	3983.75	7404.125	-10528.1	18495.57		0.714209	0.762451	0.475098
Temperate Prairies	ReconResult	Sampleable	5.78E-10	10.78259	-21.1335	21.13348	1.40E-06	5386.17	-10556.7	10556.7		5.36E-11	0.5	1
Statewide	Chan	Ditched	-9.92788	4.967152	-19.6633	-0.19245	-7018.58	4625.082	-16083.6	2046.419		-1.99871	0.02282	0.04564
Statewide	Chan	Natural	9.927885	4.967152	0.192446	19.66332	9024.66	4702.106	-191.299	18240.62		1.998708	0.97718	0.04564
Mixed Wood Plains	Chan	Ditched	-11.9185	9.729604	-30.9881	7.151203	-1845.68	1934.348	-5636.94	1945.569		-1.22497	0.110293	0.220587
Mixed Wood Plains	Chan	Natural	11.91847	9.729604	-7.1512	30.98815	1942.065	1364.622	-732.546	4616.676		1.22497	0.889707	0.220587
Mixed Wood Shield	Chan	Ditched	-11.9652	4.872194	-21.5145	-2.41588	-2852.03	1411.962	-5619.43	-84.6393		-2.45581	0.007028	0.014057
Mixed Wood Shield	Chan	Natural	11.9652	4.872194	2.415879	21.51453	8745.485	3755.525	1384.791	16106.18		2.455814	0.992972	0.014057
Temperate Prairies	Chan	Ditched	-0.12211	7.520738	-14.8625	14.61827	-2320.86	3618.912	-9413.8	4772.077		-0.01624	0.493523	0.987046
Temperate Prairies	Chan	Natural	0.122105	7.520738	-14.6183	14.86248	-1662.89	2663.318	-6882.9	3557.117		0.016236	0.506477	0.987046
Statewide	MSHA_Rating	Fair	-0.24553	5.795789	-11.6051	11.11401	578.0676	4621.023	-8478.97	9635.107		-0.04236	0.483104	0.966209
Statewide	MSHA_Rating	Good	-5.75644	2.869564	-11.3807	-0.1322	-4133.95	2022.742	-8098.45	-169.451		-2.00603	0.022426	0.044853
Statewide	MSHA_Rating	NotSampled	2.56363	5.252002	-7.7301	12.85737	2283.777	4431.307	-6401.43	10968.98		0.488124	0.687269	0.625462
Statewide	MSHA_Rating	Poor	3.438345	5.271759	-6.89411	13.7708	3278.191	4524.017	-5588.72	12145.1		0.65222	0.74287	0.514259
Mixed Wood Plains	MSHA_Rating	Fair	9.573409	10.11125	-10.2443	29.3911	1560.463	1732.867	-1835.89	4956.82		0.946808	0.828132	0.343737
Mixed Wood Plains	MSHA_Rating	Good	-0.07728	6.053555	-11.942	11.78747	4.578183	906.8509	-1772.82	1781.973		-0.01277	0.494907	0.989814
Mixed Wood Plains	MSHA_Rating	NotSampled	0.589495	4.001429	-7.25316	8.432152	96.38213	639.2324	-1156.49	1349.255		0.147321	0.558561	0.882879
Mixed Wood Plains	MSHA_Rating	Poor	-10.0856	8.391381	-26.5324	6.361183	-1565.04	1627.424	-4754.73	1624.651		-1.2019	0.114701	0.229401
Mixed Wood Shield	MSHA_Rating	Fair	-11.9963	8.800838	-29.2457	5.252993	-1318.45	2695.085	-6600.72	3963.818		-1.36309	0.086427	0.172854
Mixed Wood Shield	MSHA_Rating	Good	-15.0887	5.547652	-25.9619	-4.2155	-2818.24	1404.671	-5571.34	-65.133		-2.71983	0.003266	0.006531
Mixed Wood Shield	MSHA_Rating	NotSampled	16.03105	10.00355	-3.57555	35.63765	6171.145	3699.069	-1078.9	13421.19		1.602536	0.945481	0.109037
Mixed Wood Shield	MSHA_Rating	Poor	11.05397	6.21648	-1.1301	23.23805	3858.997	2094.71	-246.559	7964.552		1.778173	0.962312	0.075375
Temperate Prairies	MSHA_Rating	Fair	5.187778	10.29636	-14.9927	25.36828	336.057	3496.8	-6517.54	7189.658		0.503846	0.692815	0.61437
Temperate Prairies	MSHA_Rating	Good	-2.87718	2.928075	-8.6161	2.861741	-1320.29	1017.192	-3313.95	673.368		-0.98262	0.162898	0.325795
Temperate Prairies	MSHA_Rating	NotSampled	-11.0657	6.25808	-23.3313	1.199889	-3983.75	2353.117	-8595.77	628.274		-1.76823	0.038511	0.077023
Temperate Prairies	MSHA_Rating	Poor	8.755124	9.942376	-10.7316	28.24182	984.2355	3401.246	-5682.08	7650.555		0.880587	0.810729	0.378542
Statewide	PhosRule	Good	9.896761	5.858157	-1.58502	21.37854	9456.471	4816.182	16.92739	18896.02		1.689398	0.954428	0.091143
Statewide	PhosRule	NotSampled	9.920894	4.975044	0.169986	19.6718	8222.818	4143.936	100.8524	16344.78		1.994132	0.976931	0.046138
Statewide	PhosRule	Poor	-19.8177	5.88708	-31.3561	-8.27919	-13432.1	5153.791	-23533.4	-3330.88		-3.3663	0.000381	0.000762
Mixed Wood Plains	PhosRule	Good	5.957863	9.45752	-12.5785	24.49426	984.2472	1481.822	-1920.07	3888.566		0.62996	0.73564	0.528721
Mixed Wood Plains	PhosRule	NotSampled	1.707974	4.111029	-6.3495	9.765444	273.6002	657.3435	-1014.77	1561.97		0.415461	0.661098	0.677804
Mixed Wood Plains	PhosRule	Poor	-7.66584	9.791106	-26.8561	11.52438	-1161.47	1987.837	-5057.55	2734.624		-0.78294	0.216832	0.433663
Mixed Wood Shield	PhosRule	Good	17.49224	9.513234	-1.15335	36.13784	7285.496	2931.724	1539.423	13031.57		1.838727	0.967022	0.065955
Mixed Wood Shield	PhosRule	NotSampled	19.44213	9.739311	0.35343	38.53083	7273.796	3604.786	208.5448	14339.05		1.996253	0.977047	0.045906
Mixed Wood Shield	PhosRule	Poor	-36.9344	8.674852	-53.9368	-19.932	-8665.84	2709.608	-13976.6	-3355.11		-4.25764	1.03E-05	2.07E-05
Temperate Prairies	PhosRule	Good	6.637727	11.32357	-15.5561	28.83151	1186.728	4119.29	-6886.93	9260.388		0.586187	0.721125	0.55775
Temperate Prairies	PhosRule	NotSampled	2.655301	6.4486	-9.98372	15.29433	675.4219	2027.471	-3298.35	4649.192		0.411764	0.659744	0.680512

Subpopulation	Indicator	Category	DiffEst.P	StdError.P	LCB95Pct.P	UCB95Pct.P	DiffEst.U	StdError.U	LCB95Pct.U	UCB95Pct.U	P--->	Z	Prob Z < 0	Prob Z ≠
Temperate Prairies	PhosRule	Poor	-9.29303	11.4251	-31.6858	13.09975	-3604.82	4136.047	-11711.3	4501.685		-0.81339	0.207998	0.415996
Statewide	TSSRule	Good	-16.2337	5.642037	-27.2919	-5.17552	-9192.7	5434.809	-19844.7	1459.326		-2.87728	0.002006	0.004011
Statewide	TSSRule	NotSampled	9.520314	4.964428	-0.20979	19.25041	7907.836	4135.218	-197.043	16012.71		1.917706	0.972426	0.055148
Statewide	TSSRule	Poor	6.713393	4.012954	-1.15185	14.57864	5532.034	3359.238	-1051.95	12116.02		1.672931	0.95283	0.094341
Mixed Wood Plains	TSSRule	Good	-2.3883	4.518966	-11.2453	6.468714	-287.093	2080.535	-4364.87	3790.681		-0.52851	0.298574	0.597149
Mixed Wood Plains	TSSRule	NotSampled	1.707974	4.111029	-6.3495	9.765444	273.6002	657.3435	-1014.77	1561.97		0.415461	0.661098	0.677804
Mixed Wood Plains	TSSRule	Poor	0.680323	1.842694	-2.93129	4.291937	109.8749	280.9015	-440.682	660.4318		0.3692	0.644011	0.711979
Mixed Wood Shield	TSSRule	Good	-17.8862	10.15961	-37.7987	2.026249	-1535.48	3074.967	-7562.3	4491.346		-1.76052	0.03916	0.078319
Mixed Wood Shield	TSSRule	NotSampled	19.44213	9.739311	0.35343	38.53083	7273.796	3604.786	208.5448	14339.05		1.996253	0.977047	0.045906
Mixed Wood Shield	TSSRule	Poor	-1.5559	5.637397	-12.605	9.493191	155.134	1753.452	-3281.57	3591.836		-0.276	0.391275	0.78255
Temperate Prairies	TSSRule	Good	-19.115	9.570893	-37.8736	-0.35635	-7370.13	4137.979	-15480.4	740.1579		-1.9972	0.022902	0.045804
Temperate Prairies	TSSRule	NotSampled	1.62127	6.36562	-10.8551	14.09766	360.4395	2008.292	-3575.74	4296.619		0.254692	0.600519	0.798961
Temperate Prairies	TSSRule	Poor	17.49369	8.294647	1.236477	33.7509	5267.025	2896.689	-410.381	10944.43		2.109033	0.982529	0.034942
Statewide	SecchiTubeR	Good	-5.62844	4.422716	-14.2968	3.039925	-4304.75	5340.352	-14771.7	6162.144		-1.27262	0.101576	0.203153
Statewide	SecchiTubeR	Poor	-4.29191	1.716436	-7.65606	-0.92775	-2882.69	1146.363	-5129.52	-635.857		-2.50048	0.006201	0.012403
Statewide	SecchiTubeR	NotSampled	NA	NA	NA	NA	NA	NA	NA	NA		#VALUE!	#VALUE!	#VALUE!
Mixed Wood Plains	SecchiTubeR	Good	-5.41355	4.813306	-14.8475	4.020353	-826.183	2026.095	-4797.26	3144.89		-1.12471	0.130357	0.260714
Mixed Wood Plains	SecchiTubeR	Poor	-0.17329	1.222298	-2.56895	2.222369	-26.4467	181.9502	-383.063	330.1691		-0.14178	0.443629	0.887257
Mixed Wood Plains	SecchiTubeR	NotSampled	NA	NA	NA	NA	NA	NA	NA	NA		#VALUE!	#VALUE!	#VALUE!
Mixed Wood Shield	SecchiTubeR	Good	3.928396	5.063847	-5.99656	13.85335	616.6246	2982.229	-5228.44	6461.686		0.775773	0.781058	0.437883
Mixed Wood Shield	SecchiTubeR	Poor	-12.5958	4.352761	-21.127	-4.06451	-2772.87	1002.515	-4737.76	-807.975		-2.89374	0.001903	0.003807
Mixed Wood Shield	SecchiTubeR	NotSampled	NA	NA	NA	NA	NA	NA	NA	NA		#VALUE!	#VALUE!	#VALUE!
Temperate Prairies	SecchiTubeR	Good	-12.8323	9.234516	-30.9316	5.266989	-4095.2	4566.215	-13044.8	4854.422		-1.3896	0.082324	0.164649
Temperate Prairies	SecchiTubeR	Poor	-0.26209	1.791165	-3.77271	3.248526	-83.373	522.2647	-1106.99	940.247		-0.14633	0.441832	0.883665
Temperate Prairies	SecchiTubeR	NotSampled	NA	NA	NA	NA	NA	NA	NA	NA		#VALUE!	#VALUE!	#VALUE!
Statewide	MeetsFishThreshold	No	-20.7863	5.248719	-31.0736	-10.499	-15470.9	4820.01	-24918	-6023.87		-3.96027	3.74E-05	7.49E-05
Statewide	MeetsFishThreshold	Not Assessable	8.433656	3.129337	2.300268	14.56704	6775.67	2430.783	2011.423	11539.92		2.695029	0.996481	0.007038
Statewide	MeetsFishThreshold	NotSampled	3.61382	5.205614	-6.589	13.81664	3112.998	4393.308	-5497.73	11723.72		0.694216	0.756227	0.487547
Statewide	MeetsFishThreshold	Yes	8.738867	5.187654	-1.42875	18.90648	7588.334	4240.319	-722.539	15899.21		1.684551	0.953962	0.092075
Mixed Wood Plains	MeetsFishThreshold	No	-24.8211	8.679267	-41.8321	-7.81001	-3881.72	1628.523	-7073.56	-689.873		-2.85981	0.002119	0.004239
Mixed Wood Plains	MeetsFishThreshold	Not Assessable	18.50353	7.970648	2.881347	34.12571	2939.209	1435.893	124.9102	5753.507		2.321459	0.989869	0.020262
Mixed Wood Plains	MeetsFishThreshold	NotSampled	0.589495	4.001429	-7.25316	8.432152	96.38213	639.2324	-1156.49	1349.255		0.147321	0.558561	0.882879
Mixed Wood Plains	MeetsFishThreshold	Yes	5.72804	8.054533	-10.0586	21.51464	942.5098	1099.831	-1213.12	3098.138		0.711157	0.761507	0.476987
Mixed Wood Shield	MeetsFishThreshold	No	-9.92178	7.374208	-24.375	4.531403	-1583.61	2280.54	-6053.38	2886.171		-1.34547	0.089237	0.178473
Mixed Wood Shield	MeetsFishThreshold	Not Assessable	-0.48995	3.840252	-8.01671	7.0368	149.1088	1127.718	-2061.18	2359.396		-0.12758	0.449239	0.898478
Mixed Wood Shield	MeetsFishThreshold	NotSampled	18.59627	9.844372	-0.69835	37.89088	7000.366	3643.549	-140.86	14141.59		1.889025	0.970556	0.058888
Mixed Wood Shield	MeetsFishThreshold	Yes	-8.18453	9.213677	-26.243	9.873944	327.5834	2741.681	-5046.01	5701.18		-0.8883	0.187189	0.374378
Temperate Prairies	MeetsFishThreshold	No	-24.8692	9.190428	-42.8821	-6.85632	-10005.6	4013.549	-17872	-2139.18		-2.70599	0.003405	0.00681
Temperate Prairies	MeetsFishThreshold	Not Assessable	12.67611	5.428784	2.035892	23.31633	3687.352	1662.429	429.0516	6945.652		2.334982	0.990228	0.019544
Temperate Prairies	MeetsFishThreshold	NotSampled	-11.0657	6.25808	-23.3313	1.199889	-3983.75	2353.117	-8595.77	628.274		-1.76823	0.038511	0.077023
Temperate Prairies	MeetsFishThreshold	Yes	23.25884	8.595482	6.412003	40.10567	6318.241	3314.96	-178.961	12815.44		2.705938	0.996594	0.006811
Statewide	MeetsInvertThreshold	No	-11.211	5.945813	-22.8646	0.442548	-7882.05	5426.518	-18517.8	2753.735		-1.88553	0.029679	0.059358

Subpopulation	Indicator	Category	DiffEst.P	StdError.P	LCB95Pct.P	UCB95Pct.P	DiffEst.U	StdError.U	LCB95Pct.U	UCB95Pct.U	P--->	Z	Prob Z < 0	Prob Z ≠
Statewide	MeetsInvertThreshold	Not Sampled	13.28327	5.672301	2.165763	24.40078	10837.49	5262.034	524.0974	21150.89		2.341778	0.990404	0.019192
Statewide	MeetsInvertThreshold	NotAssessed	1.289808	1.231491	-1.12387	3.703485	1067.549	957.4468	-809.012	2944.11		1.047355	0.852532	0.294936
Statewide	MeetsInvertThreshold	Yes	-3.36205	4.578037	-12.3348	5.610742	-2016.91	3235.912	-8359.18	4325.356		-0.73439	0.231357	0.462714
Mixed Wood Plains	MeetsInvertThreshold	No	-6.7755	9.253609	-24.9122	11.36124	-1023.73	1777.498	-4507.56	2460.101		-0.7322	0.232023	0.464046
Mixed Wood Plains	MeetsInvertThreshold	Not Sampled	6.040975	5.828517	-5.38271	17.46466	966.5553	989.4632	-972.757	2905.868		1.036451	0.850004	0.299992
Mixed Wood Plains	MeetsInvertThreshold	NotAssessed	4.477334	4.462532	-4.26907	13.22374	710.4984	733.7849	-727.694	2148.69		1.003317	0.842146	0.315708
Mixed Wood Plains	MeetsInvertThreshold	Yes	-3.74281	8.015194	-19.4523	11.96668	-556.941	1145.296	-2801.68	1687.798		-0.46696	0.320263	0.640525
Mixed Wood Shield	MeetsInvertThreshold	No	-13.4727	9.813612	-32.707	5.761657	-2254.06	3206.846	-8539.36	4031.247		-1.37286	0.084899	0.169797
Mixed Wood Shield	MeetsInvertThreshold	Not Sampled	21.75316	10.44796	1.275535	42.23078	8340.587	4021.635	458.3278	16222.85		2.082049	0.981331	0.037338
Mixed Wood Shield	MeetsInvertThreshold	NotAssessed	-1.03056	1.789502	-4.53792	2.476797	-222.549	489.9541	-1182.84	737.7432		-0.57589	0.282344	0.564687
Mixed Wood Shield	MeetsInvertThreshold	Yes	-7.24993	7.912742	-22.7586	8.258762	29.4684	2105.867	-4097.96	4156.892		-0.91623	0.179772	0.359544
Temperate Prairies	MeetsInvertThreshold	No	-7.64283	10.1006	-27.4396	12.15398	-4604.26	3859.116	-12168	2959.469		-0.75667	0.224624	0.449247
Temperate Prairies	MeetsInvertThreshold	Not Sampled	7.199068	9.969634	-12.3411	26.73919	1530.351	3672.125	-5666.88	8727.584		0.7221	0.764883	0.470233
Temperate Prairies	MeetsInvertThreshold	NotAssessed	2.333245	1.551734	-0.7081	5.374587	579.5998	499.7858	-399.962	1559.162		1.503638	0.933663	0.132675
Temperate Prairies	MeetsInvertThreshold	Yes	-1.88948	6.704808	-15.0307	11.2517	-1489.44	2177.811	-5757.87	2778.989		-0.28181	0.389045	0.778089

Appendix 3. Continuous data z-test

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Statewide	timefish	Mean	217.7314	135.3194	-47.4897	482.9525		1.609018	0.946194	0.107612
Mixed Wood Plains	timefish	Mean	334.345	226.8497	-110.272	778.9623		1.473861	0.929741	0.140519
Mixed Wood Shield	timefish	Mean	338.0954	334.5758	-317.661	993.8519		1.01052	0.843877	0.312246
Temperate Prairies	timefish	Mean	92.16039	150.4055	-202.629	386.9498		0.612746	0.729978	0.540044
Statewide	DistFish	Mean	6.079181	12.81242	-19.0327	31.19107		0.474476	0.68242	0.635161
Mixed Wood Plains	DistFish	Mean	18.69311	25.68085	-31.6404	69.02665		0.727901	0.766663	0.466674
Mixed Wood Shield	DistFish	Mean	3.916045	26.2887	-47.6089	55.44095		0.148963	0.559209	0.881583
Temperate Prairies	DistFish	Mean	1.560761	16.87338	-31.5104	34.63197		0.092498	0.536849	0.926302
Statewide	MDepth	Mean	-5.47468	2.628848	-10.6271	-0.32223		-2.08254	0.018647	0.037293
Mixed Wood Plains	MDepth	Mean	-9.17098	5.079749	-19.1271	0.785143		-1.8054	0.035506	0.071012
Mixed Wood Shield	MDepth	Mean	-0.81024	4.536897	-9.7024	8.081911		-0.17859	0.42913	0.85826
Temperate Prairies	MDepth	Mean	-6.88117	3.812863	-14.3542	0.591905		-1.80472	0.035559	0.071118
Statewide	MThalDepth	Mean	-8.64325	3.837143	-16.1639	-1.12259		-2.25252	0.012145	0.024289
Mixed Wood Plains	MThalDepth	Mean	-12.6308	7.105504	-26.5573	1.295754		-1.7776	0.037734	0.075469
Mixed Wood Shield	MThalDepth	Mean	-4.65894	6.783677	-17.9547	8.636823		-0.68679	0.246109	0.492217
Temperate Prairies	MThalDepth	Mean	-9.54113	5.390356	-20.106	1.023769		-1.77004	0.03836	0.076721
Statewide	MWidth	Mean	-0.17629	0.672087	-1.49356	1.140975		-0.26231	0.396543	0.793086
Mixed Wood Plains	MWidth	Mean	-0.79334	1.183021	-3.11202	1.525335		-0.67061	0.251235	0.50247
Mixed Wood Shield	MWidth	Mean	0.223913	1.299782	-2.32361	2.771438		0.17227	0.568387	0.863225
Temperate Prairies	MWidth	Mean	-0.1752	1.017565	-2.16959	1.819194		-0.17217	0.431651	0.863302
Statewide	Gradient	Mean	0.204152	0.402744	-0.58521	0.993517		0.506903	0.693889	0.612223
Mixed Wood Plains	Gradient	Mean	0.179747	1.404229	-2.57249	2.931985		0.128004	0.550927	0.898146

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Mixed Wood Shield	Gradient	Mean	0.234976	0.511157	-0.76687	1.236826		0.459695	0.677132	0.645736
Temperate Prairies	Gradient	Mean	0.193878	0.290233	-0.37497	0.762725		0.668006	0.747935	0.50413
Statewide	Sinuosity	Mean	0.037897	0.039056	-0.03865	0.114445		0.970338	0.834061	0.331878
Mixed Wood Plains	Sinuosity	Mean	0.066358	0.07846	-0.08742	0.220137		0.845757	0.801156	0.397688
Mixed Wood Shield	Sinuosity	Mean	-0.0728	0.0596	-0.18961	0.044015		-1.22145	0.110958	0.221915
Temperate Prairies	Sinuosity	Mean	0.105168	0.065344	-0.0229	0.23324		1.609462	0.946242	0.107515
Statewide	numstreamftsper100	Mean	-0.17373	0.598422	-1.34662	0.999156		-0.29031	0.385788	0.771576
Mixed Wood Plains	numstreamftsper100	Mean	2.709488	0.995098	0.759132	4.659844		2.722836	0.996764	0.006472
Mixed Wood Shield	numstreamftsper100	Mean	-1.88476	1.120407	-4.08072	0.311195		-1.68221	0.046264	0.092528
Temperate Prairies	numstreamftsper100	Mean	-0.32936	0.715447	-1.73161	1.072895		-0.46035	0.322633	0.645265
Statewide	PctRiffle	Mean	0.304088	1.70399	-3.03567	3.643848		0.178457	0.570818	0.858364
Mixed Wood Plains	PctRiffle	Mean	5.85618	2.880053	0.21138	11.50098		2.033358	0.978992	0.042016
Mixed Wood Shield	PctRiffle	Mean	-1.54491	3.518379	-8.44081	5.350982		-0.4391	0.330295	0.66059
Temperate Prairies	PctRiffle	Mean	-0.92069	2.262249	-5.35462	3.513233		-0.40698	0.342011	0.684022
Statewide	PctPool	Mean	-1.04676	1.597054	-4.17693	2.083403		-0.65543	0.256094	0.512188
Mixed Wood Plains	PctPool	Mean	3.300372	2.48467	-1.56949	8.170236		1.328294	0.907959	0.184081
Mixed Wood Shield	PctPool	Mean	-7.08174	2.720599	-12.414	-1.74947		-2.60301	0.00462	0.009241
Temperate Prairies	PctPool	Mean	0.966773	2.528881	-3.98974	5.923288		0.382293	0.648878	0.702244
Statewide	PctRun	Mean	4.463473	2.671756	-0.77307	9.700019		1.670614	0.952601	0.094798
Mixed Wood Plains	PctRun	Mean	-2.24157	5.845259	-13.6981	9.214929		-0.38348	0.35068	0.70136
Mixed Wood Shield	PctRun	Mean	11.57367	3.670133	4.380343	18.767		3.153475	0.999193	0.001613
Temperate Prairies	PctRun	Mean	2.723896	4.057973	-5.22959	10.67738		0.671245	0.748968	0.502064
Statewide	WDRatio	Mean	1.931751	0.780919	0.401178	3.462324		2.47369	0.993314	0.013373
Mixed Wood Plains	WDRatio	Mean	3.082396	1.67568	-0.20188	6.366668		1.83949	0.967078	0.065843
Mixed Wood Shield	WDRatio	Mean	1.230867	1.589731	-1.88495	4.346683		0.774261	0.780612	0.438776
Temperate Prairies	WDRatio	Mean	1.887881	1.117868	-0.3031	4.078862		1.688824	0.954373	0.091253
Statewide	NumSubTypes	Mean	0.022433	0.23478	-0.43773	0.482594		0.095551	0.538061	0.923877
Mixed Wood Plains	NumSubTypes	Mean	0.687521	0.347705	0.006031	1.369011		1.977309	0.975997	0.048007
Mixed Wood Shield	NumSubTypes	Mean	0.166446	0.39425	-0.60627	0.939161		0.422183	0.663554	0.672892
Temperate Prairies	NumSubTypes	Mean	-0.36667	0.339732	-1.03253	0.299194		-1.07929	0.14023	0.280459
Statewide	PctFines	Mean	-3.64052	3.728504	-10.9483	3.667215		-0.9764	0.164433	0.328865
Mixed Wood Plains	PctFines	Mean	-10.3945	7.44599	-24.9883	4.199409		-1.39598	0.08136	0.16272
Mixed Wood Shield	PctFines	Mean	-1.16495	6.889704	-14.6685	12.33862		-0.16909	0.432865	0.865729
Temperate Prairies	PctFines	Mean	-2.30761	5.09871	-12.3009	7.685676		-0.45259	0.325423	0.650846
Statewide	MDepthFine	Mean	-0.20758	1.054267	-2.27391	1.85874		-0.1969	0.421953	0.843906
Mixed Wood Plains	MDepthFine	Mean	-2.2839	1.379926	-4.9885	0.420709		-1.65509	0.048954	0.097907
Mixed Wood Shield	MDepthFine	Mean	-1.24672	1.864145	-4.90038	2.406933		-0.66879	0.251814	0.503629
Temperate Prairies	MDepthFine	Mean	1.357282	1.703893	-1.98229	4.696851		0.796577	0.787152	0.425697
Statewide	PctEmbed	Mean	-3.24222	5.952949	-14.9098	8.425349		-0.54464	0.293	0.586001
Mixed Wood Plains	PctEmbed	Mean	2.87353	8.846101	-14.4645	20.21157		0.324836	0.627347	0.745305
Mixed Wood Shield	PctEmbed	Mean	-6.27563	6.997284	-19.9901	7.438795		-0.89687	0.184895	0.36979
Temperate Prairies	PctEmbed	Mean	-4.07567	9.666804	-23.0223	14.87092		-0.42161	0.336653	0.673306

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Statewide	PctRock	Mean	3.238601	3.709466	-4.03182	10.50902		0.873064	0.808686	0.382628
Mixed Wood Plains	PctRock	Mean	7.162525	6.771832	-6.11002	20.43507		1.057694	0.854902	0.290195
Mixed Wood Shield	PctRock	Mean	0.567141	6.964247	-13.0825	14.21681		0.081436	0.532452	0.935095
Temperate Prairies	PctRock	Mean	3.290587	5.289476	-7.0766	13.65777		0.622101	0.733062	0.533876
Statewide	PctBoulder	Mean	0.312822	0.813481	-1.28157	1.907215		0.384547	0.649713	0.700573
Mixed Wood Plains	PctBoulder	Mean	0.383525	0.433987	-0.46707	1.234123		0.883726	0.811578	0.376844
Mixed Wood Shield	PctBoulder	Mean	0.512485	2.595904	-4.57539	5.600363		0.197421	0.578251	0.843498
Temperate Prairies	PctBoulder	Mean	0.090796	0.46836	-0.82717	1.008765		0.193859	0.576857	0.846286
Statewide	CVDepth	Mean	1.283018	2.8117	-4.22781	6.793849		0.456314	0.675918	0.648164
Mixed Wood Plains	CVDepth	Mean	12.09885	5.288347	1.73388	22.46382		2.287832	0.988926	0.022147
Mixed Wood Shield	CVDepth	Mean	-5.43502	3.46381	-12.224	1.353924		-1.56909	0.058314	0.116628
Temperate Prairies	CVDepth	Mean	0.833535	4.922538	-8.81446	10.48153		0.16933	0.567232	0.865537
Statewide	PctCover	Mean	-17.0348	4.548295	-25.9493	-8.1203		-3.74531	9.01E-05	0.00018
Mixed Wood Plains	PctCover	Mean	-11.3691	8.650689	-28.3242	5.585928		-1.31424	0.094382	0.188764
Mixed Wood Shield	PctCover	Mean	-11.2773	7.873303	-26.7087	4.154108		-1.43234	0.076023	0.152045
Temperate Prairies	PctCover	Mean	-23.4565	7.368193	-37.8979	-9.01507		-3.18348	0.000728	0.001455
Statewide	PctOverVeg	Mean	-9.61994	3.337762	-16.1618	-3.07805		-2.88215	0.001975	0.00395
Mixed Wood Plains	PctOverVeg	Mean	-10.6531	5.81636	-22.053	0.746745		-1.83158	0.033507	0.067014
Mixed Wood Shield	PctOverVeg	Mean	-3.73806	1.101553	-5.89707	-1.57906		-3.39345	0.000345	0.00069
Temperate Prairies	PctOverVeg	Mean	-13.0224	6.126626	-25.0303	-1.01439		-2.12553	0.016771	0.033542
Statewide	PctEmerMac	Mean	-4.75699	2.081573	-8.8368	-0.67718		-2.28529	0.011148	0.022296
Mixed Wood Plains	PctEmerMac	Mean	-2.76074	2.66405	-7.98218	2.460704		-1.03629	0.150033	0.300065
Mixed Wood Shield	PctEmerMac	Mean	-4.34001	2.569122	-9.3754	0.695377		-1.6893	0.045581	0.091163
Temperate Prairies	PctEmerMac	Mean	-5.9438	3.869609	-13.5281	1.640495		-1.53602	0.062267	0.124533
Statewide	PctSubMac	Mean	-4.48258	3.558326	-11.4568	2.491616		-1.25974	0.103881	0.207762
Mixed Wood Plains	PctSubMac	Mean	0.819728	5.103378	-9.18271	10.82217		0.160625	0.563805	0.872389
Mixed Wood Shield	PctSubMac	Mean	0.223883	6.460505	-12.4385	12.88624		0.034654	0.513822	0.972356
Temperate Prairies	PctSubMac	Mean	-9.92927	5.764731	-21.2279	1.369392		-1.72242	0.042497	0.084994
Statewide	PctWoody	Mean	0.006124	1.054577	-2.06081	2.073057		0.005807	0.502317	0.995366
Mixed Wood Plains	PctWoody	Mean	0.534367	2.008624	-3.40246	4.471198		0.266036	0.604894	0.790211
Mixed Wood Shield	PctWoody	Mean	-2.97838	2.230076	-7.34925	1.39249		-1.33555	0.090848	0.181696
Temperate Prairies	PctWoody	Mean	1.722753	1.242205	-0.71192	4.157431		1.386851	0.917256	0.165487
Statewide	PctUnderCut	Mean	-0.43209	0.24983	-0.92175	0.057569		-1.72953	0.041857	0.083714
Mixed Wood Plains	PctUnderCut	Mean	0.3031	0.249233	-0.18539	0.791588		1.21613	0.888032	0.223936
Mixed Wood Shield	PctUnderCut	Mean	-1.0332	0.58398	-2.17778	0.111376		-1.76925	0.038426	0.076853
Temperate Prairies	PctUnderCut	Mean	-0.36943	0.340695	-1.03718	0.298321		-1.08434	0.139107	0.278214
Statewide	MBankEros	Mean	0.116388	0.033712	0.050314	0.182462		3.452435	0.999722	0.000556
Mixed Wood Plains	MBankEros	Mean	0.040785	0.020496	0.000615	0.080956		1.989963	0.976703	0.046595
Mixed Wood Shield	MBankEros	Mean	0.084578	0.034774	0.016422	0.152734		2.432196	0.992496	0.015008
Temperate Prairies	MBankEros	Mean	0.169919	0.071387	0.030004	0.309835		2.380258	0.99135	0.017301
Statewide	MSHA	Mean	-1.67128	1.950053	-5.49331	2.150752		-0.85704	0.19571	0.391421
Mixed Wood Plains	MSHA	Mean	4.101595	2.786651	-1.36014	9.563331		1.471872	0.929472	0.141055

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Mixed Wood Shield	MSHA	Mean	-6.82935	2.629663	-11.9834	-1.67531		-2.59705	0.004701	0.009403
Temperate Prairies	MSHA	Mean	-0.74954	3.180421	-6.98305	5.48397		-0.23567	0.406843	0.813686
Statewide	HDS	Mean	2.51218	1.959827	-1.32901	6.353371		1.281838	0.90005	0.1999
Mixed Wood Plains	HDS	Mean	2.228503	2.78527	-3.23053	7.687532		0.800103	0.788174	0.423651
Mixed Wood Shield	HDS	Mean	-0.94318	2.115405	-5.0893	3.202932		-0.44586	0.327847	0.655695
Temperate Prairies	HDS	Mean	5.708921	2.13014	1.533923	9.883919		2.680068	0.99632	0.007361
Statewide	TempH2O	Mean	-0.55124	0.499274	-1.5298	0.427317		-1.10409	0.134778	0.269555
Mixed Wood Plains	TempH2O	Mean	-0.03472	0.751275	-1.50719	1.437753		-0.04621	0.481571	0.963141
Mixed Wood Shield	TempH2O	Mean	-1.79161	0.87586	-3.50827	-0.07496		-2.04555	0.020401	0.040801
Temperate Prairies	TempH2O	Mean	0.100393	0.774656	-1.4179	1.618691		0.129597	0.551557	0.896885
Statewide	pH	Mean	0.042257	0.107588	-0.16861	0.253125		0.392767	0.652754	0.694492
Mixed Wood Plains	pH	Mean	0.160737	0.113048	-0.06083	0.382308		1.421845	0.922464	0.155071
Mixed Wood Shield	pH	Mean	-0.34474	0.21452	-0.76519	0.075714		-1.60702	0.054025	0.10805
Temperate Prairies	pH	Mean	0.267934	0.184292	-0.09327	0.62914		1.453852	0.927006	0.145987
Statewide	DO	Mean	0.647838	0.552258	-0.43457	1.730244		1.173072	0.879616	0.240767
Mixed Wood Plains	DO	Mean	0.832579	0.652055	-0.44543	2.110583		1.276854	0.899173	0.201654
Mixed Wood Shield	DO	Mean	0.869841	0.665897	-0.43529	2.174975		1.306271	0.90427	0.19146
Temperate Prairies	DO	Mean	0.390807	1.110884	-1.78648	2.568099		0.351798	0.637505	0.72499
Statewide	Phos	Mean	-0.01632	0.032411	-0.07984	0.047204		-0.50354	0.307291	0.614581
Mixed Wood Plains	Phos	Mean	-0.00162	0.019886	-0.0406	0.037356		-0.08149	0.467527	0.935054
Mixed Wood Shield	Phos	Mean	-0.02842	0.012654	-0.05322	-0.00362		-2.24588	0.012356	0.024712
Temperate Prairies	Phos	Mean	-0.01368	0.069349	-0.1496	0.122242		-0.19725	0.421817	0.843635
Statewide	Nitrogen	Mean	1.000259	1.039117	-1.03637	3.036891		0.962605	0.832127	0.335746
Mixed Wood Plains	Nitrogen	Mean	1.162719	0.752724	-0.31259	2.638031		1.544683	0.938788	0.122423
Mixed Wood Shield	Nitrogen	Mean	0.02391	0.022023	-0.01925	0.067075		1.085709	0.861196	0.277608
Temperate Prairies	Nitrogen	Mean	1.769431	2.290691	-2.72024	6.259103		0.772444	0.780074	0.439851
Statewide	NH4	Mean	-0.04046	0.026624	-0.09264	0.011719		-1.5198	0.06428	0.12856
Mixed Wood Plains	NH4	Mean	-0.05246	0.005345	-0.06293	-0.04198		-9.81489	4.86E-23	9.71E-23
Mixed Wood Shield	NH4	Mean	-0.08837	0.007368	-0.10282	-0.07393		-11.9941	1.91E-33	3.81E-33
Temperate Prairies	NH4	Mean	0.003167	0.058093	-0.11069	0.117027		0.054509	0.521735	0.95653
Statewide	Conduct	Mean	48.49945	53.85882	-57.0619	154.0608		0.900492	0.816071	0.367858
Mixed Wood Plains	Conduct	Mean	129.3843	106.8532	-80.0441	338.8127		1.21086	0.887025	0.225949
Mixed Wood Shield	Conduct	Mean	-26.3482	26.5506	-78.3864	25.69006		-0.99238	0.160507	0.321014
Temperate Prairies	Conduct	Mean	61.74859	88.20442	-111.129	234.6261		0.700062	0.758056	0.483888
Statewide	TSS	Mean	37.90317	28.53046	-18.0155	93.82185		1.328516	0.907996	0.184008
Mixed Wood Plains	TSS	Mean	4.049039	2.865217	-1.56668	9.664762		1.41317	0.921197	0.157606
Mixed Wood Shield	TSS	Mean	-1.56732	2.375534	-6.22328	3.08864		-0.65978	0.254699	0.509398
Temperate Prairies	TSS	Mean	85.95716	61.94246	-35.4478	207.3622		1.387694	0.917385	0.16523
Statewide	SecchiTube	Mean	3.656947	3.194984	-2.60511	9.919		1.14459	0.87381	0.252379
Mixed Wood Plains	SecchiTube	Mean	-1.54413	4.041283	-9.4649	6.376642		-0.38209	0.351198	0.702396
Mixed Wood Shield	SecchiTube	Mean	4.881188	5.31748	-5.54088	15.30326		0.917951	0.820678	0.358644
Temperate Prairies	SecchiTube	Mean	5.255195	5.736422	-5.98799	16.49838		0.91611	0.820195	0.359609

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Statewide	FishIBI	Mean	3.096798	3.173189	-3.12254	9.316135		0.975926	0.835449	0.329101
Mixed Wood Plains	FishIBI	Mean	3.996502	5.618565	-7.01568	15.00869		0.711303	0.761552	0.476897
Mixed Wood Shield	FishIBI	Mean	3.726713	6.348338	-8.7158	16.16923		0.587038	0.721411	0.557178
Temperate Prairies	FishIBI	Mean	2.595023	4.600062	-6.42093	11.61098		0.564128	0.713666	0.572667
Statewide	CountofTaxa	Mean	0.139689	0.674751	-1.1828	1.462176		0.207023	0.582004	0.835992
Mixed Wood Plains	CountofTaxa	Mean	0.176355	1.555094	-2.87157	3.224283		0.113405	0.545145	0.90971
Mixed Wood Shield	CountofTaxa	Mean	0.615248	1.066692	-1.47543	2.705926		0.576781	0.717956	0.564088
Temperate Prairies	CountofTaxa	Mean	-0.23752	1.078292	-2.35093	1.875898		-0.22027	0.41283	0.825661
Statewide	Sensitive	Mean	0.156594	0.212922	-0.26072	0.573913		0.735455	0.768969	0.462063
Mixed Wood Plains	Sensitive	Mean	-0.1464	0.496759	-1.12003	0.827226		-0.29472	0.384105	0.76821
Mixed Wood Shield	Sensitive	Mean	0.308366	0.414815	-0.50466	1.121388		0.743382	0.771375	0.45725
Temperate Prairies	Sensitive	Mean	0.251822	0.236729	-0.21216	0.715803		1.063755	0.85628	0.28744
Statewide	Hdw	Mean	0.044751	0.158447	-0.2658	0.355301		0.282435	0.611195	0.77761
Mixed Wood Plains	Hdw	Mean	-0.08438	0.20494	-0.48605	0.317297		-0.41172	0.340273	0.680546
Mixed Wood Shield	Hdw	Mean	0.357132	0.390968	-0.40915	1.123416		0.913455	0.819498	0.361003
Temperate Prairies	Hdw	Mean	-0.09614	0.172514	-0.43426	0.241983		-0.55728	0.288668	0.577336
Statewide	Minnow	Mean	0.180243	0.330903	-0.46832	0.828802		0.5447	0.70702	0.58596
Mixed Wood Plains	Minnow	Mean	0.162495	0.64886	-1.10925	1.434237		0.250432	0.598873	0.802253
Mixed Wood Shield	Minnow	Mean	0.115509	0.534699	-0.93248	1.1635		0.216026	0.585516	0.828967
Temperate Prairies	Minnow	Mean	0.208724	0.572233	-0.91283	1.330279		0.364753	0.642352	0.715296
Statewide	Darter	Mean	0.064218	0.1024	-0.13648	0.264918		0.627124	0.734711	0.530578
Mixed Wood Plains	Darter	Mean	-0.03819	0.220793	-0.47094	0.394552		-0.17298	0.431332	0.862664
Mixed Wood Shield	Darter	Mean	0.023197	0.166389	-0.30292	0.349312		0.139413	0.555438	0.889124
Temperate Prairies	Darter	Mean	0.140434	0.170733	-0.1942	0.475063		0.822536	0.794614	0.410772
Statewide	Insect	Mean	0.109026	0.328482	-0.53479	0.75284		0.331909	0.630021	0.739958
Mixed Wood Plains	Insect	Mean	-0.43022	0.787262	-1.97322	1.112788		-0.54647	0.29237	0.584741
Mixed Wood Shield	Insect	Mean	0.150195	0.515831	-0.86082	1.161206		0.291171	0.61454	0.770921
Temperate Prairies	Insect	Mean	0.360993	0.512624	-0.64373	1.365718		0.704205	0.759348	0.481305
Statewide	BenInsect	Mean	0.369789	0.211258	-0.04427	0.783847		1.750412	0.959976	0.080047
Mixed Wood Plains	BenInsect	Mean	-0.11236	0.497886	-1.0882	0.86348		-0.22567	0.410728	0.821457
Mixed Wood Shield	BenInsect	Mean	0.562466	0.345061	-0.11384	1.238772		1.630049	0.948454	0.103091
Temperate Prairies	BenInsect	Mean	0.473825	0.329858	-0.17269	1.120335		1.436449	0.924563	0.150875
Statewide	Omnivore	Mean	-0.16703	0.113126	-0.38875	0.054692		-1.4765	0.069905	0.13981
Mixed Wood Plains	Omnivore	Mean	0.025824	0.214879	-0.39533	0.44698		0.120181	0.54783	0.90434
Mixed Wood Shield	Omnivore	Mean	0.062794	0.172886	-0.27606	0.401644		0.363209	0.641776	0.716448
Temperate Prairies	Omnivore	Mean	-0.45184	0.209844	-0.86313	-0.04056		-2.15323	0.01565	0.0313
Statewide	GameFishTaxa	Mean	-0.0011	0.187866	-0.36931	0.367111		-0.00585	0.497665	0.995331
Mixed Wood Plains	GameFishTaxa	Mean	0.406333	0.435258	-0.44676	1.259424		0.933545	0.824731	0.350539
Mixed Wood Shield	GameFishTaxa	Mean	0.082205	0.294071	-0.49416	0.658573		0.27954	0.610085	0.77983
Temperate Prairies	GameFishTaxa	Mean	-0.27053	0.28291	-0.82502	0.283967		-0.95623	0.169479	0.338957
Statewide	NumPerMeter	Mean	0.799413	0.131676	0.541333	1.057493		6.071065	1	1.27E-09
Mixed Wood Plains	NumPerMeter	Mean	0.590794	0.166927	0.263624	0.917965		3.539239	0.999799	0.000401

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Mixed Wood Shield	NumPerMeter	Mean	0.391477	0.168768	0.060697	0.722256		2.319611	0.989819	0.020362
Temperate Prairies	NumPerMeter	Mean	1.189889	0.279972	0.641155	1.738624		4.250032	0.999989	2.14E-05
Statewide	DomTwoPct	Mean	-4.75033	3.562359	-11.7324	2.231761		-1.33348	0.091187	0.182374
Mixed Wood Plains	DomTwoPct	Mean	-1.7893	7.980587	-17.431	13.85236		-0.22421	0.411298	0.822596
Mixed Wood Shield	DomTwoPct	Mean	-0.95464	4.463722	-9.70338	7.794092		-0.21387	0.415325	0.830651
Temperate Prairies	DomTwoPct	Mean	-8.80497	5.337875	-19.267	1.657075		-1.64953	0.04952	0.09904
Statewide	TolPct	Mean	-10.3448	4.332733	-18.8368	-1.85284		-2.3876	0.008479	0.016959
Mixed Wood Plains	TolPct	Mean	-10.94	9.135085	-28.8444	6.96446		-1.19758	0.115541	0.231081
Mixed Wood Shield	TolPct	Mean	-12.1854	6.26422	-24.463	0.092248		-1.94524	0.025873	0.051746
Temperate Prairies	TolPct	Mean	-9.43914	5.713894	-20.6382	1.759891		-1.65196	0.049271	0.098542
Statewide	FishDELTPct	Mean	-0.22424	0.071137	-0.36367	-0.08482		-3.15225	0.00081	0.00162
Mixed Wood Plains	FishDELTPct	Mean	-0.4352	0.155076	-0.73915	-0.13126		-2.80638	0.002505	0.00501
Mixed Wood Shield	FishDELTPct	Mean	0.020461	0.078159	-0.13273	0.17365		0.261784	0.603256	0.793488
Temperate Prairies	FishDELTPct	Mean	-0.29408	0.13095	-0.55074	-0.03742		-2.24574	0.01236	0.024721
Statewide	PiscivorePct	Mean	-0.18002	0.995931	-2.13201	1.771964		-0.18076	0.428278	0.856556
Mixed Wood Plains	PiscivorePct	Mean	-0.15866	2.168348	-4.40854	4.091226		-0.07317	0.470836	0.941671
Mixed Wood Shield	PiscivorePct	Mean	0.02891	2.478839	-4.82952	4.887345		0.011663	0.504653	0.990695
Temperate Prairies	PiscivorePct	Mean	-0.19907	0.712214	-1.59499	1.19684		-0.27951	0.389925	0.779851
Statewide	SLithopPct	Mean	3.473078	3.13739	-2.67609	9.62225		1.106996	0.865852	0.268296
Mixed Wood Plains	SLithopPct	Mean	4.934142	4.92163	-4.71207	14.58036		1.002542	0.841959	0.316082
Mixed Wood Shield	SLithopPct	Mean	3.222538	6.440193	-9.40001	15.84508		0.500379	0.691596	0.616808
Temperate Prairies	SLithopPct	Mean	3.26767	4.298425	-5.15709	11.69243		0.760202	0.776433	0.447134
Statewide	MacroIBI	Mean	4.516544	2.284019	0.039949	8.993139		1.977455	0.976005	0.04799
Mixed Wood Plains	MacroIBI	Mean	5.186653	3.939318	-2.53427	12.90757		1.316637	0.90602	0.18796
Mixed Wood Shield	MacroIBI	Mean	3.835503	4.160223	-4.31839	11.98939		0.921946	0.821722	0.356557
Temperate Prairies	MacroIBI	Mean	3.674582	2.731766	-1.67958	9.028745		1.345131	0.910709	0.178583
Statewide	TaxaCount	Mean	2.37128	0.803697	0.796064	3.946497		2.950466	0.998414	0.003173
Mixed Wood Plains	TaxaCount	Mean	2.928929	1.194268	0.588206	5.269652		2.452488	0.992906	0.014187
Mixed Wood Shield	TaxaCount	Mean	4.314693	1.478657	1.41658	7.212807		2.917982	0.998238	0.003523
Temperate Prairies	TaxaCount	Mean	0.510822	1.159205	-1.76118	2.782823		0.440666	0.670273	0.659455
Statewide	Tolerant	Mean	0.182842	0.50992	-0.81658	1.182267		0.358569	0.640041	0.719917
Mixed Wood Plains	Tolerant	Mean	0.69103	0.600719	-0.48636	1.868417		1.150339	0.874998	0.250004
Mixed Wood Shield	Tolerant	Mean	0.499955	0.919656	-1.30254	2.302447		0.543633	0.706653	0.586694
Temperate Prairies	Tolerant	Mean	-0.30471	0.909008	-2.08633	1.476913		-0.33521	0.368733	0.737466
Statewide	VeryTolerant	Mean	-0.38305	0.377838	-1.12359	0.357503		-1.01378	0.155343	0.310686
Mixed Wood Plains	VeryTolerant	Mean	-0.52518	0.487373	-1.48041	0.430053		-1.07757	0.140612	0.281224
Mixed Wood Shield	VeryTolerant	Mean	-0.0147	0.669707	-1.3273	1.297901		-0.02195	0.491244	0.982488
Temperate Prairies	VeryTolerant	Mean	-0.54932	0.641689	-1.80701	0.708363		-0.85606	0.195982	0.391964
Statewide	EPT	Mean	1.907083	0.589165	0.752341	3.061826		3.236924	0.999396	0.001208
Mixed Wood Plains	EPT	Mean	2.033189	0.8812	0.306068	3.76031		2.307295	0.989481	0.021038
Mixed Wood Shield	EPT	Mean	2.476021	1.097857	0.32426	4.627782		2.255321	0.987943	0.024113
Temperate Prairies	EPT	Mean	1.278352	0.720471	-0.13375	2.69045		1.774328	0.961996	0.076009

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Statewide	Ephemeroptera	Mean	0.270011	0.24194	-0.20418	0.744205		1.116027	0.867795	0.26441
Mixed Wood Plains	Ephemeroptera	Mean	0.215509	0.392838	-0.55444	0.985458		0.548594	0.708358	0.583284
Mixed Wood Shield	Ephemeroptera	Mean	0.223828	0.41164	-0.58297	1.030629		0.543747	0.706692	0.586616
Temperate Prairies	Ephemeroptera	Mean	0.29814	0.337742	-0.36382	0.960102		0.882745	0.811313	0.377374
Statewide	Plecoptera	Mean	0.297982	0.085278	0.130841	0.465124		3.494252	0.999762	0.000475
Mixed Wood Plains	Plecoptera	Mean	0.312844	0.101092	0.114708	0.510981		3.094654	0.999015	0.00197
Mixed Wood Shield	Plecoptera	Mean	0.537604	0.237888	0.071353	1.003856		2.259909	0.988087	0.023827
Temperate Prairies	Plecoptera	Mean	0.101307	0.044526	0.014037	0.188576		2.275224	0.988554	0.022892
Statewide	Trichoptera	Mean	1.33909	0.363155	0.627319	2.05086		3.687381	0.999887	0.000227
Mixed Wood Plains	Trichoptera	Mean	1.504836	0.501158	0.522585	2.487087		3.002719	0.998662	0.002676
Mixed Wood Shield	Trichoptera	Mean	1.714588	0.745549	0.25334	3.175837		2.299767	0.989269	0.021461
Temperate Prairies	Trichoptera	Mean	0.878906	0.426403	0.043171	1.71464		2.061209	0.980358	0.039283
Statewide	ChironomidaeCh	Mean	0.990875	0.669163	-0.32066	2.30241		1.480769	0.930666	0.138668
Mixed Wood Plains	ChironomidaeCh	Mean	1.34741	1.019434	-0.65064	3.345463		1.321724	0.90687	0.18626
Mixed Wood Shield	ChironomidaeCh	Mean	0.524059	1.172461	-1.77392	2.822041		0.446973	0.672553	0.654895
Temperate Prairies	ChironomidaeCh	Mean	1.121403	1.083973	-1.00315	3.245951		1.03453	0.849556	0.300888
Statewide	TaxaCountAllChir	Mean	3.667747	1.260908	1.196414	6.139081		2.908815	0.998186	0.003628
Mixed Wood Plains	TaxaCountAllChir	Mean	4.352251	1.673862	1.071541	7.63296		2.600125	0.995341	0.009319
Mixed Wood Shield	TaxaCountAllChir	Mean	5.279596	2.20123	0.965264	9.593928		2.398475	0.991768	0.016464
Temperate Prairies	TaxaCountAllChir	Mean	1.923865	1.828215	-1.65937	5.5071		1.052319	0.853673	0.292653
Statewide	IntolerantCh	Mean	1.204347	0.326925	0.563587	1.845108		3.683866	0.999885	0.00023
Mixed Wood Plains	IntolerantCh	Mean	1.01514	0.456712	0.120001	1.910279		2.222715	0.986882	0.026235
Mixed Wood Shield	IntolerantCh	Mean	2.193791	0.747227	0.729254	3.658328		2.935911	0.998337	0.003326
Temperate Prairies	IntolerantCh	Mean	0.503196	0.345908	-0.17477	1.181163		1.45471	0.927125	0.14575
Statewide	PredatorCh	Mean	0.892343	0.450906	0.008583	1.776102		1.979	0.976092	0.047816
Mixed Wood Plains	PredatorCh	Mean	0.944867	0.516699	-0.06784	1.957577		1.828661	0.966275	0.06745
Mixed Wood Shield	PredatorCh	Mean	2.111001	0.682824	0.77269	3.449311		3.091573	0.999005	0.001991
Temperate Prairies	PredatorCh	Mean	-0.03454	0.820684	-1.64305	1.573974		-0.04208	0.483216	0.966432
Statewide	ClingerCh	Mean	2.640009	0.712106	1.244306	4.035712		3.707325	0.999895	0.000209
Mixed Wood Plains	ClingerCh	Mean	2.56536	1.181681	0.249307	4.881413		2.170941	0.985032	0.029936
Mixed Wood Shield	ClingerCh	Mean	3.282704	1.272779	0.788104	5.777304		2.579164	0.995048	0.009904
Temperate Prairies	ClingerCh	Mean	2.056301	0.907982	0.276688	3.835914		2.264692	0.988234	0.023532
Statewide	ScraperCh	Mean	0.3016	0.208953	-0.10794	0.711139		1.443388	0.925544	0.148911
Mixed Wood Plains	ScraperCh	Mean	0.011592	0.365004	-0.7038	0.726988		0.031759	0.512668	0.974664
Mixed Wood Shield	ScraperCh	Mean	0.40576	0.4088	-0.39547	1.206993		0.992564	0.839539	0.320923
Temperate Prairies	ScraperCh	Mean	0.360783	0.329557	-0.28514	1.006702		1.094752	0.863187	0.273625
Statewide	CollectorfiltererCh	Mean	0.776996	0.311819	0.165842	1.38815		2.491817	0.993645	0.012709
Mixed Wood Plains	CollectorfiltererCh	Mean	0.950373	0.443852	0.08044	1.820307		2.141195	0.983871	0.032258
Mixed Wood Shield	CollectorfiltererCh	Mean	1.123865	0.502945	0.13811	2.109619		2.234566	0.987277	0.025446
Temperate Prairies	CollectorfiltererCh	Mean	0.337958	0.42451	-0.49407	1.169983		0.796113	0.787017	0.425966
Statewide	CollectorgathererCh	Mean	1.132517	0.572178	0.011069	2.253965		1.979309	0.976109	0.047781
Mixed Wood Plains	CollectorgathererCh	Mean	1.39825	0.760295	-0.0919	2.888401		1.839088	0.967049	0.065902

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Mixed Wood Shield	CollectorgathererCh	Mean	0.489161	1.107429	-1.68136	2.659682		0.441708	0.67065	0.6587
Temperate Prairies	CollectorgathererCh	Mean	1.399461	0.76291	-0.09581	2.894737		1.834373	0.966701	0.066599
Statewide	TanytarsiniCh	Mean	0.034799	0.183806	-0.32545	0.395051		0.189323	0.57508	0.84984
Mixed Wood Plains	TanytarsiniCh	Mean	0.313197	0.290403	-0.25598	0.882377		1.078491	0.859593	0.280815
Mixed Wood Shield	TanytarsiniCh	Mean	-0.33777	0.302735	-0.93111	0.255584		-1.11571	0.132273	0.264545
Temperate Prairies	TanytarsiniCh	Mean	0.148442	0.297811	-0.43526	0.732141		0.498444	0.690914	0.618171
Statewide	LongLivedCh	Mean	1.084006	0.258845	0.576679	1.591333		4.187857	0.999986	2.82E-05
Mixed Wood Plains	LongLivedCh	Mean	0.814469	0.432453	-0.03312	1.662062		1.883368	0.970175	0.05965
Mixed Wood Shield	LongLivedCh	Mean	1.660171	0.486235	0.707167	2.613175		3.414337	0.99968	0.000639
Temperate Prairies	LongLivedCh	Mean	0.790942	0.323863	0.156182	1.425702		2.442212	0.992701	0.014598
Statewide	InvertTolerantPct	Mean	-6.33729	3.100852	-12.4149	-0.25974		-2.04373	0.02049	0.040981
Mixed Wood Plains	InvertTolerantPct	Mean	-4.93831	3.760605	-12.309	2.432344		-1.31317	0.094563	0.189126
Mixed Wood Shield	InvertTolerantPct	Mean	-6.38261	5.100748	-16.3799	3.614669		-1.25131	0.105411	0.210822
Temperate Prairies	InvertTolerantPct	Mean	-6.44144	5.224751	-16.6818	3.798888		-1.23287	0.108812	0.217624
Statewide	VeryTolerantPct	Mean	-2.93242	3.79183	-10.3643	4.499428		-0.77335	0.219657	0.439314
Mixed Wood Plains	VeryTolerantPct	Mean	-1.74564	4.877354	-11.3051	7.813797		-0.35791	0.360206	0.720413
Mixed Wood Shield	VeryTolerantPct	Mean	-9.70385	5.426097	-20.3388	0.931108		-1.78837	0.036858	0.073717
Temperate Prairies	VeryTolerantPct	Mean	2.158787	6.265879	-10.1221	14.43968		0.344531	0.634776	0.730447
Statewide	EPTPct	Mean	4.744861	2.849546	-0.84015	10.32987		1.665129	0.952056	0.095887
Mixed Wood Plains	EPTPct	Mean	5.244384	4.098145	-2.78783	13.2766		1.279697	0.899674	0.200652
Mixed Wood Shield	EPTPct	Mean	2.528421	4.534593	-6.35922	11.41606		0.557585	0.711436	0.577128
Temperate Prairies	EPTPct	Mean	5.599857	4.612054	-3.4396	14.63932		1.214179	0.88766	0.22468
Statewide	EphemeropteraPct	Mean	-1.41762	1.905657	-5.15264	2.317397		-0.7439	0.228468	0.456936
Mixed Wood Plains	EphemeropteraPct	Mean	-0.84003	2.549653	-5.83726	4.157196		-0.32947	0.370901	0.741801
Mixed Wood Shield	EphemeropteraPct	Mean	-6.62521	3.004397	-12.5137	-0.7367		-2.20517	0.013721	0.027442
Temperate Prairies	EphemeropteraPct	Mean	1.86293	3.276672	-4.55923	8.285088		0.568543	0.715167	0.569666
Statewide	PlecopteraPct	Mean	0.375021	0.147956	0.085032	0.665009		2.534679	0.994372	0.011255
Mixed Wood Plains	PlecopteraPct	Mean	0.153111	0.079166	-0.00205	0.308273		1.934053	0.973447	0.053107
Mixed Wood Shield	PlecopteraPct	Mean	0.960247	0.463724	0.051364	1.869129		2.070727	0.980808	0.038384
Temperate Prairies	PlecopteraPct	Mean	0.055138	0.031731	-0.00705	0.11733		1.737662	0.958865	0.08227
Statewide	TrichopteraPct	Mean	5.787463	1.619219	2.613852	8.961074		3.574231	0.999824	0.000351
Mixed Wood Plains	TrichopteraPct	Mean	5.931306	2.397974	1.231364	10.63125		2.473466	0.99331	0.013381
Mixed Wood Shield	TrichopteraPct	Mean	8.19338	3.031933	2.2509	14.13586		2.702362	0.996558	0.006885
Temperate Prairies	TrichopteraPct	Mean	3.681789	2.343315	-0.91102	8.274603		1.571188	0.941931	0.116139
Statewide	ChironomidaeChPct	Mean	-0.51992	3.00371	-6.40709	5.367239		-0.17309	0.431289	0.862577
Mixed Wood Plains	ChironomidaeChPct	Mean	5.337622	4.75452	-3.98107	14.65631		1.122642	0.869205	0.26159
Mixed Wood Shield	ChironomidaeChPct	Mean	-1.61378	3.511244	-8.49569	5.268129		-0.4596	0.3229	0.6458
Temperate Prairies	ChironomidaeChPct	Mean	-2.88505	5.986775	-14.6189	8.848818		-0.4819	0.314937	0.629875
Statewide	AmphipodaPct	Mean	1.276487	2.713463	-4.0418	6.594777		0.470427	0.680975	0.63805
Mixed Wood Plains	AmphipodaPct	Mean	-9.09384	2.966598	-14.9083	-3.27941		-3.06541	0.001087	0.002174
Mixed Wood Shield	AmphipodaPct	Mean	-9.84604	2.211737	-14.181	-5.51112		-4.45172	4.26E-06	8.52E-06
Temperate Prairies	AmphipodaPct	Mean	14.9804	5.298909	4.594729	25.36607		2.827072	0.997651	0.004698

Subpopulation	Indicator	Statistic	DiffEst	StdError	LCB95Pct	UCB95Pct		Z	Prob Z < 0	Prob Z ≠ 0
Statewide	PredatorPct	Mean	2.809439	1.498106	-0.12679	5.745672		1.875328	0.969626	0.060748
Mixed Wood Plains	PredatorPct	Mean	4.303674	2.892386	-1.3653	9.972646		1.487932	0.931616	0.136769
Mixed Wood Shield	PredatorPct	Mean	6.616227	2.575221	1.568887	11.66357		2.569188	0.994903	0.010194
Temperate Prairies	PredatorPct	Mean	-0.7257	2.329986	-5.29239	3.840985		-0.31146	0.377725	0.755449
Statewide	ScraperPct	Mean	-7.50771	3.03034	-13.4471	-1.56835		-2.47751	0.006615	0.01323
Mixed Wood Plains	ScraperPct	Mean	-1.24164	4.507952	-10.0771	7.59378		-0.27543	0.391491	0.782983
Mixed Wood Shield	ScraperPct	Mean	-2.15904	3.847639	-9.70027	5.382199		-0.56113	0.287354	0.574707
Temperate Prairies	ScraperPct	Mean	-14.622	5.789112	-25.9685	-3.27556		-2.52578	0.005772	0.011544
Statewide	CollectorfiltererPct	Mean	4.913598	2.129401	0.740048	9.087148		2.307502	0.989487	0.021027
Mixed Wood Plains	CollectorfiltererPct	Mean	2.340322	3.899522	-5.3026	9.983245		0.600156	0.725799	0.548402
Mixed Wood Shield	CollectorfiltererPct	Mean	9.855573	2.934786	4.103497	15.60765		3.358191	0.999608	0.000785
Temperate Prairies	CollectorfiltererPct	Mean	2.192781	2.820612	-3.33552	7.72108		0.777413	0.781542	0.436915
Statewide	CollectorgathererPct	Mean	-6.33856	3.11328	-12.4405	-0.23664		-2.03597	0.020876	0.041753
Mixed Wood Plains	CollectorgathererPct	Mean	-8.35202	3.795292	-15.7907	-0.91339		-2.20063	0.013881	0.027762
Mixed Wood Shield	CollectorgathererPct	Mean	-21.0082	3.186882	-27.2543	-14.762		-6.59207	2.17E-11	4.34E-11
Temperate Prairies	CollectorgathererPct	Mean	5.622033	6.224696	-6.57815	17.82221		0.903182	0.816785	0.366429