SURVEY OF PERCEPTIONS OF WETLAND VALUES IN SOUTH CENTRAL MINNESOTA

INTRODUCTION

County water planners in South Central Minnesota faced a problem. Where do they locate constructed and restored wetlands to make the best use of limited funds? The limited funds factor required prioritization and prioritization required evaluation. One of the components in the decision making process was the publics perception of wetland values and their preferred locations. In response to this need, the Mankato State University wetlands classes of 1995 developed a prototype questionnaire, followed by the 1996 class which reformatted, beta tested, refined, distributed, and analyzed the results.

The basis of this study was applied rather than esoteric. However, it did provide for an indirect approach to gauge the values the public places on wetlands in general and on preferred wetland locations.

A second question arose once we had determined the public's perception of wetland values. That question was: Are the regional state agency personnel, county environmental technical personnel, and academics on the same page as the public? If they are, the populations are homogeneous. If they aren't, the populations may well represent different paradigms and education between these paradigms becomes important. Further, who leads in this education effort and should they lead from in front or behind?

The purpose of this perception-value study was to determine the public's perception-values of wetlands and to see if it varies from and among agency, county, and academic technical personnel.

METHODS

The Mankato State University wetlands class of 1995 developed an initial survey on perception-values of wetlands for our region. The 1996 class reworked the questionnaire, beta tested it at Mankato East High School, refined it, distributed and analyzed the results. The questionnaire is seen in Figure 8. Jane Starz, Brown County water planner, provided the idea of using high school students, from general biology classes (required of all students) and their parents as our "public" population. Of the 22 students in class, 11 came from regional high schools. We divided the class into 11 teams to survey these schools. Each team was headed by the particular school's graduate, who knew the respective general biology teacher. The students in the respective high school classes were instructed by our teams on the questionnaire during their class time with the support of their teachers. Additionally, questionnaires were sent home for their parents to fill out and returned via their student to school. The process worked very well considering it was

DEPARTMENT OF BIOLOGICAL SCIENCES

WETLAND SITE CONSTRUCTION SURVEY

County Water Planning

by MSU - Wetlands Class, 1996

County Water Planners face a problem: Where do they locate new wetlands to make the best use of limited funds. **This survey has been drafted to gather your opinions for assisting in this decision making process.**

A priority system to determine wetland site selection is needed. Guidelines for this system will be established based on the values received from you. This survey contains a list of factors to consider when selecting future wetland sites. **Your rating of each factor will help determine its relative importance in these decisions.**

In order to usefully evaluate your responses, it is important to receive information on who you are. Please complete the questions below:

1. School _____

2. What township do you live in? _____

3. What county do you live in? _____

4. You are: (circle one)

   a. High school student
   b. Parent / Guardian
   c. Other (please specify)_____

5. Your home is : (circle one)

   a. Rural (farm)
   b. Rural (non-farm, hobby farm)
   c. Urban (population less than 5,000)
   d. Urban (population greater than 5,000)

Figure 8. Survey of perception of wetland values in South Central Minnesota by site selection

A SURVEY TO ASSESS LOCAL VALUES FOR PRIORITIZING POTENTIAL SITES FOR WETLAND CONSTRUCTION/RESTORATION

On a scale of 0 to 10, 0 being a low wetland construction priority site and 10 being the highest wetland construction priority site, rate the parameters below by circling a number:

WATER QUALITY/QUANTITY

How important is it to you to build a new wetland near (river, lake, drainage ditch) in order to improve the water quality of that (river, lake, drainage ditch)?

1. **a river**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

2. **a lake**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

3. **a drainage ditch**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

How important is it to you to build a wetland near (river, lake, drainage ditch) in order to moderate the water level during a flood or drought?

4. **a river**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

5. **a lake**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

6. **a drainage ditch**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

DOWNSLOPE OF POTENTIAL POLLUTION SOURCES

How valuable to you would a wetland be to a lake or river if it was placed in between each of the following possible sources of pollution and that lake or river?

7. **erosion - loss of soil due to water and wind**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

8. urban runoff - runoff from urban storm drains and lawns

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

9. hazardous point source - hazardous chemicals as defined by the EPA originating from a single site or location

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

10. non-hazardous point source - non-hazardous chemicals including organic waste - chemical storage facilities, septic sewer systems, livestock barns - originating from a single site or location

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

WILDLIFE HABITAT AND RECREATION

Wildlife Habitat

How valuable to you would it be to build a wetland next to each of the following wildlife habitat types?

11. river

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

12. lake

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

13. woodland

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

14. wetlands

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

15. grassland

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

Recreation

How valuable to you would it be to build a wetland next to each of the following recreational areas?

16. trails (scenic value)

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

17. roads (scenic value)

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

18. homes (scenic value)

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

19. areas used for hunting, trapping, etc.

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

20. areas used for bird & nature observation, etc.

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

COUNTY LAND USE ZONES

How valuable to you would a wetland be if it were constructed within:

21. conservation zone - the management of resources including wetlands, both natural and man made so as to use them economically and preserve the environment

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

22. heavy industry zone - industry that involves bulky raw materials with large end products: Examples are ethanol refineries, chemical and agricultural plants

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

23. light industry zone - industrial property which does not produce the noise, odors, and pollution characteristics of heavy industry

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

24. rural township zone - low density area where municipal utilities are available: population density less than 100 per acre

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

25. city zone - a developed community

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

26. prime agriculture zone - highly desirable agricultural land expected to produce consistently high yields

not important 0 1 2 3 4 5 6 7 8 9 10 very important — don't know

27. limited agriculture zone - moderately desirable agricultural land with medium yields received: supports only limited variety of crops

not important 0 1 2 3 4 5 6 7 8 9 10 very important don't know

28. general business zone - retail, service, and general commercial businesses in the rural area

not important 0 1 2 3 4 5 6 7 8 9 10 very important don't know

Systems

How valuable to you would a wetland be if it were one of the following types of systems?

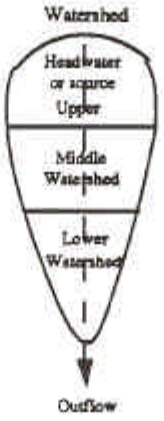
29. a wetland that has little movement of water across its boundaries.

not important 0 1 2 3 4 5 6 7 8 9 10 very important don't know

30. a wetland that has an abundant exchange of water across its boundaries (flow through).

not important 0 1 2 3 4 5 6 7 8 9 10 very important don't know

Watersheds



How valuable to you would a wetland be if it were constructed within each of the following areas?

31. upper watersheds - headwaters

not important 0 1 2 3 4 5 6 7 8 9 10 very important don't know

32. middle watersheds

not important 0 1 2 3 4 5 6 7 8 9 10 very important don't know

33. lower watersheds

not important 0 1 2 3 4 5 6 7 8 9 10 very important don't know

A SURVEY TO ASSESS LOCAL VALUES FOR PRIORITIZING POTENTIAL SITES FOR WETLAND CONSTRUCTION/RESTORATION BASED ON BROAD CATEGORIES

On a scale of "0-10", "0" being non-important and "10" being most important, what value would you place on each of the following broad categories for prioritizing wetland construction. Please determine your rating value for each by circling a number.

1. **Water Quality Proximity to Water Body (Lake, Stream, Ditch, Wetland)**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

2. **Water Quantity Proximity to Water Body (Lake, Stream, Ditch, Wetland)**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

3. **Downslope of Potential Sources of Pollution**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

4. **Proximity to Wildlife Habitat**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

5. **Proximity to Recreation Sites**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

6. **County Land Use Zones**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

7. **Closed (depressional) Open (flow thru) System**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

8. **Watershed Location**

not important 0 1 2 3 4 5 6 7 8 9 very important 10 don't know

a time consuming endeavor for the students and parents. A list of participating schools and number of respondents is seen in Table VII.

In all there were 637 usable surveys received from students and 388 surveys received from parents. In additions to separating the group into age categories (students and parents), the individuals were also asked to select a residence category. The four residence category selections were: rural farm (191), rural non-farm or hobby farm (242), urban with a population less than 5000 (351), and urban with a population greater than 5000 (241). The parentheses indicate the number of surveys received in each category.

The survey was set up on a 0-10 scaling, with 0 corresponding to not important and 10 corresponding to very important. There was also a "don't know" selection available. There were 41 questions total in 9 different sections. A total of 33 questions were specific and fell into 8 categories: water quality, water quantity, downslope of potential pollution sources, adjacent to wildlife habitats, adjacent to recreational areas, county land use zones, type of wetland system, and placement in watershed. The ninth category was a section where the individuals were asked to rate these 8 broad categories for importance, therefore this section consisted of 8 questions. The data was placed into File Maker Pro 2.0v, a Macintosh database, and the averages calculated.

Following the survey of the public's perception-values survey of wetlands, Carrie Trytton, a graduate student, used the same survey instrument on other select groups. These included: regional staff of state agencies (Board of Water and Soil Resources, BWSR; Minnesota Pollution Control Agency, MPCA; and Minnesota Department of Natural Resources, MDNR); county technical water planning personnel (13 County South Central Minnesota Comprehensive County Water Planning Project staff planners; and Soil and Water Conservation District staff); and academics (1998 and 1999 Mankato State University, upper division and graduate student wetlands classes). These groups represent wetland specialists and were compared to the "public" responses as well as between and amongst themselves. A statistical computer program, SPSS, was used for descriptive statistics and testing of significant differences of the means at the .05 significance level using the Tukey HSD test. Since the numbers of respondents in some groups were low several categories were lumped together.

RESULTS

Public Perception of Wetland Values

The results of the 33 specific questions (shown in Table VIII), and the results of the broad categories (shown on Table IX) were used to examine several different questions. The first step was to look for population homogeneity. Second, if homogeneity was found, was it related to all questions or just certain questions? Last, the results

Table VII. South Central Minnesota participating high schools and numbers of respondents

High School	Students	Parents
Madelia	54	35
Mankato East	65	51
Mankato West	50	30
Blue Earth Area	79	44
LeCenter	22	5
Nicollet	44	31
St. Clair	71	34
Lake Crystal Welcome Memorial (LCWM)	38	26
LeSueur Henderson	31	30
Janesville, Waldorf, Pemberton (JWP)	90	58
Waseca	98	50
Total Returned	642	394
Total Utilized*	637	388

Table VIII. Results of the specific questions by student versus parent and by location (each question based on a maximum of 10 points)

Category	Question	Averages		Rural Farm	Rural Nonfarm	Urban Less 5000	Urban More 5000
		Student	Parent				
Water Quality	River	6.9	6.7	6.1	7.0	7.1	7.0
	Lake	7.3	7.1	6.2*	7.3	7.5	7.7
	Drainage Ditch	5.5	5.6	4.7	5.7	5.6	6.0
Water Quantity	River	7.0	6.6	6.1	6.7	7.2	7.1
	Lake	6.5	6.4	5.7	6.6	6.8	6.5
	Drainage Ditch	6.0	5.7	5.1	5.9	6.1	6.1
Downslope of Pollution Sources	Erosion	6.5	6.6	6.1	6.6	6.8	6.6
	Urban Runoff	6.3	6.9	6.4	6.4	6.7	6.6
	Hazardous Point Source	7.1	7.7	7.3	7.4	7.4	7.2
	Non-Hazardous Point Source	6.6	6.8	6.0	6.9	6.8	6.6
Adjacent to Wildlife Habitats	River	6.9	6.7	6.0	6.9	7.1	7.0
	Lake	7.2	6.9	6.2*	7.2	7.3	7.2
	Woodland	7.6	7.0	6.5*	7.7	7.6	7.7
	Wetland	6.5	6.3	5.7	6.5	6.6	6.8
	Grassland	6.9	6.4	6.0	6.8	7.0	6.9
Adjacent to Recreational Areas	Trails (Scenic)	6.3	6.1	5.2*	6.6	6.4	6.5
	Roads (Scenic)	5.1	5.0	4.1*	5.2	5.4	5.2
	Homes (Scenic)	5.2	4.8	4.2*	5.2	5.3	5.2
	Hunting	6.7	6.3	6.1	7.0	6.6	6.2
	Nature Observation	7.3	7.1	6.2*	7.4	7.4	7.5
Constructed Within County Landuse Zones	Conservation Zone	7.2	7.2	6.4*	7.5	7.4	7.4
	Heavy Industry Zone	4.5	4.8	4.5	4.6	4.6	4.7
	Light Industry Zone	5.6	5.2	5.0	5.6	5.6	5.5
	Rural Township Zone	6.3	5.7	5.3	6.4	6.2	6.2
	City Zone	5.3	5.0	4.8	5.0	5.3	5.4
	Prime Agriculture Zone	5.8*	4.4*	4.0*	5.5	5.5	5.7
	Limited Agriculture Zone	5.9	5.3	4.8*	5.9	5.9	6.0
	General Business Zone	4.6	4.3	3.9	4.4	4.8	4.5
Type of Wetland System	Closed System	5.9	5.3	5.0	5.9	5.8	6.0
	Open System	6.8	6.5	5.8*	6.9	6.8	6.9
Placement in Watershed	Upper Watershed	6.0	5.8	5.4	6.0	6.2	6.1
	Middle Watershed	6.2	5.9	5.5	6.3	6.2	6.2
	Lower Watershed	6.0	6.1	5.7	6.1	6.2	6.3

Table IX. Results of the broad category questions by student versus parent and by location (each question based on a maximum of 10 points)

	Averages					
CATEGORY	Student	Parent	Rural Farm	Rural Nonfarm	Urban Less 5000	Urban More 5000
Water Quality	7.4	7.3	6.8	7.5	7.5	7.6
Water Quantity	6.9	6.6	6.2	6.9	6.9	6.9
Downslope Pollution Sources	6.7	7.1	6.6	6.8	7.0	7.0
Wildlife Habitat	8.0	7.5	7.1	8.0	8.0	7.9
Recreational Areas	6.9	6.3	5.8*	6.8	6.8	6.9
County Land Use Zones	6.1	5.9	5.5	6.4	6.1	6.0
Type of Wetland System	6.5	6.1	5.7	6.5	6.5	6.4
Placement in Watershed	6.6	6.8	6.4	6.7	6.8	6.7

***** indicates a difference of 1.0 or greater

were used to see if, as a whole, wetlands are valued by any or all populations and which wetland functions are valued the most and the least.

Age Categories: Students vs. Parents

The first comparison was the age categories, students vs. parents. There were differences in averages greater than 0.5 in 7 of the 33 questions, and in 25 of the 33 questions the students' averages were higher than that of the parents. The difference in averages exceeded 1.0 (shown by the asterisk on Table VIII) in only one question, which asked the value of a wetland constructed within a counties prime agriculture zone.

Residence Categories: Rural Farm vs. Rural Non-farm vs. Urban Less Than 5000 vs. Urban Greater Than 5000

In 31 of the 33 questions the rural farm category response averages were lower than the rural non-farm, urban less than 5000, and urban greater than 5000. When comparing the rural farm averages to the next lowest average, within the residence categories, the rural farm average was lower by 0.5 or more in 27 of the 33 questions, with 11 being lower by a difference of 1.0 or more (Table VIII).

Rural non-farm, urban less than 5000, and urban greater than 5000 categories showed more uniformity in their response, with no tendency for any category to be higher or lower consistently and only small differences between averages.

Broad Categories

There was also a section in the questionnaire in which all the 33 questions were condensed into their eighth respective broad categories (Table IX).

The averages show the broad categories follow the same pattern as the 33 specific questions. The students' and parents' averages were fairly close, with the greatest differences seen in the recreational areas category (0.6), and the wildlife habitats category (0.5).

Looking at the residence comparisons, we again see that rural farm averages were lower in all categories, the greatest difference, as with the student and parent averages, being in the recreational areas category (1.0). The other three categories (rural non-farm, urban less than 5000, and urban greater than 5000) again showed more homogeneity in their averages with no differences exceeding 0.4.

In the broad categories, land use zones were ranked as the least important by all groups (age and residence). Wildlife habitat was ranked highest by all groups, and also achieved the top average of 8.0 by three groups (students, rural non-farm, and urban less than 5000).

Further Analysis of Rural Farm: Rural Farm Student vs. Rural Farm Parent

Since the rural farm category showed some differences to the other residence categories, a further analysis was performed to determine the source of these differences. The rural farm category was further broken down into students and parents.

The result of this breakdown, Figure 9, shows the results of the rural farm student vs. rural farm parent for the 33 specific questions, while the results of the broad category questions are shown in Figure 10. The box plot shows the range of data trimming off the top and bottom ten percentile in an effort to exclude outliers and shows the middle fifty percent of responses including the mean (average) and median. The parents' averages are lower in every question except for the two questions concerning urban runoff, and hazardous point sources (Figure 10). In 23 of the 33 specific questions and in 5 of the 8 broad questions the difference was at least 1.0.

Public Perception of Wetland Values Compared to Select Groups

The participant groups being compared were: high school students and parents (representing the public); BWSR, MDNR, and MPCA (representing regional offices of state agencies); county technical staff (13 county water planners and SWCD staff); and academics (1998 and 1999 advanced students in upper division wetlands classes). Water quality and quantity were combined as well as wildlife habitat and recreation. The number of responses as well as means in percent by respondent group and value category are given in Table X. It should be noted that we did receive 22 responses from the MDNR but they were received too late for statistical analysis, however, they are included in the descriptive data. The total frequency of responses ranged from 57.7 for high school students to 0.2 percent for BWSR. The frequency inequities were taken into consideration by the statistics used.

The first test ran each of the six value categories against the seven participant groups. A total of 16 comparisons out of 42 (38 percent) had mean differences that were significant at the .05 level (Table XI). One of the sixteen was between parents and students with the other 15 all between technical participant groups verses the students or parents (public). In all these 15 cases of significant differences the public had the lower mean. Watershed location, type of system, and down slope of pollution sources contained 15 of 16 significant differences.

The same type of analysis was then run combining the 7 participant groups into 4 categories: public (student and parents), county (water planners and SWCD staff), state agency regional personnel (BWSR and MPCA), and academics (university wetlands students). The grouping resulted in 10 comparisons out of 24 (42 percent) having a mean difference that was significant at the .05 level (Table XII). In all 10 cases of significance the differences were to the public category which always had a lower mean. The value

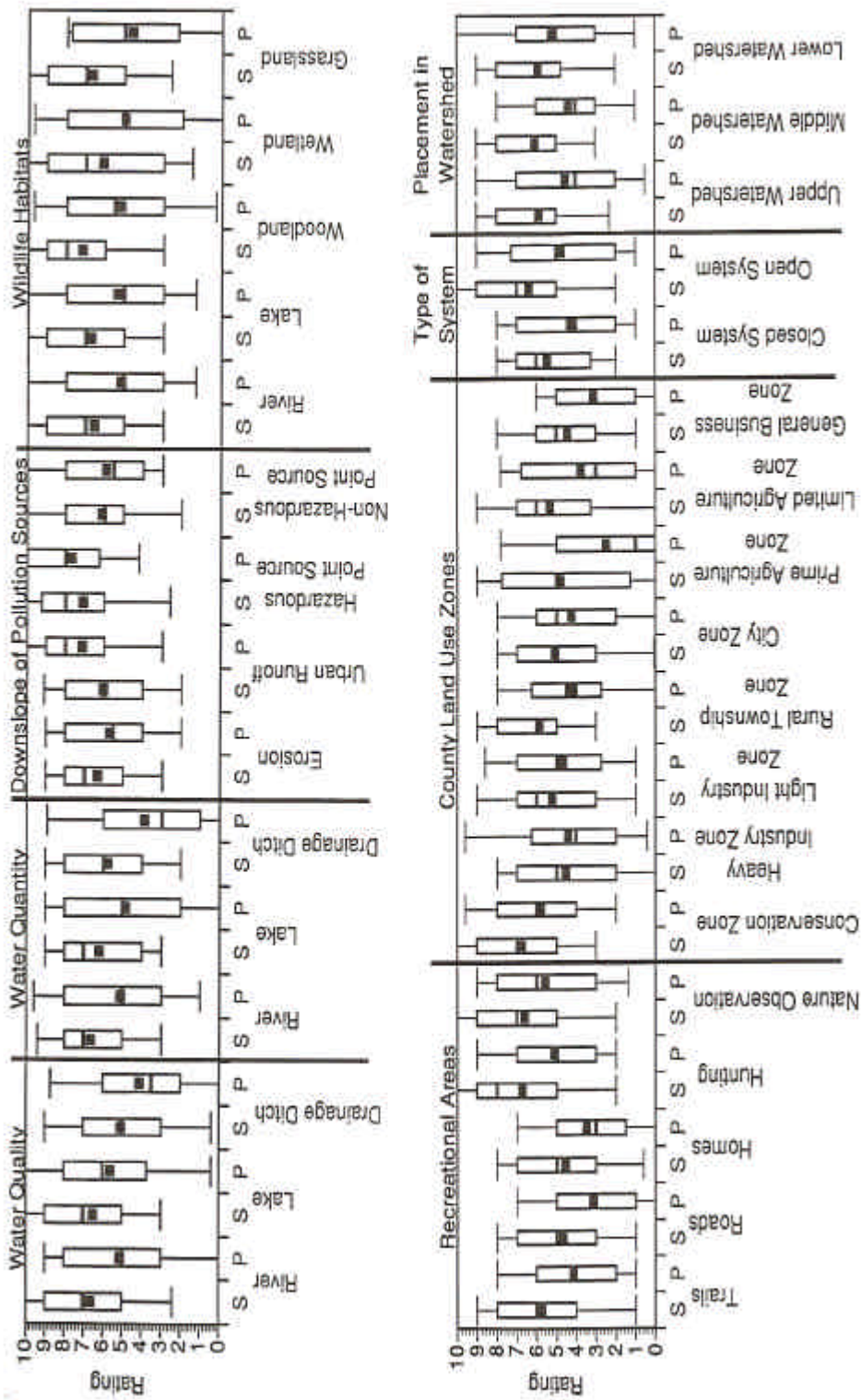


Figure 9. Rural farm student (S) vs. rural farm parent (P) specific questions. See Figure 10 for key.

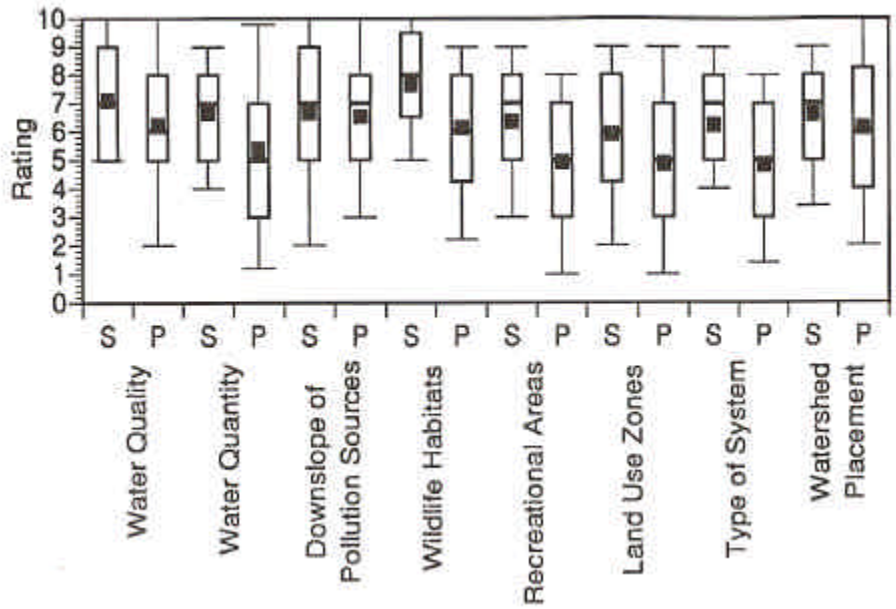
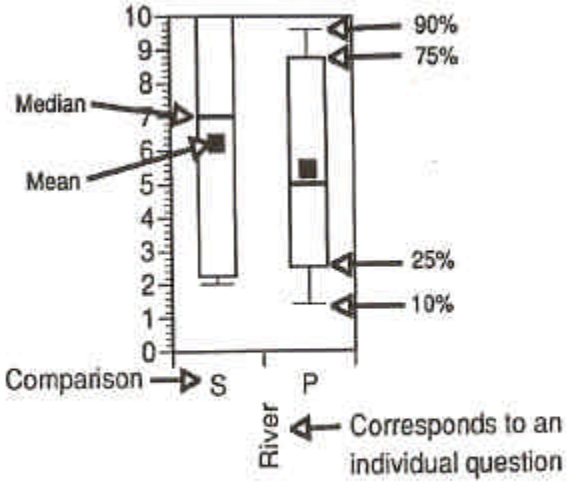


Figure 10. Rural farm student (S) vs. rural farm parent (P) broad category questions



Box plot key for Figures 9 and 10

Table X. Number of responses and means by respondent groups and value categories

	Water Quality/Quantity (60)	Downslope of Potential Pollution Sources (40)	Wildlife Habitat and Recreation (100)	County Land Use Zones (80)	Type of Systems (20)	Watershed Location (30)
High School Students	627 38.3	612 25.0	634 64.7	618 43.4	596 12.5	540 18.2
Parents	384 37.2	381 27.4	386 61.0	382 41.0	349 11.7	318 17.7
BWSR	3 46.0	3 34.0	3 41.3	3 44.3	3 18.7	3 27.0
MPCA	6 44.5	6 25.3	6 67.2	6 56.7	6 17.8	6 26.6
MDNR	22 50.7	18 31.5	22 78.9	21 51.4	21 14.4	21 22.7
13 County Water Planners	15 46.0	15 33.8	15 73.6	15 50.5	14 14.3	15 23.3
SWCD	7 49.0	7 32.3	7 62.6	7 54.3	6 13.5	7 23.0
Wetland Classes 98-99	48 42.0	48 31.7	48 66.6	48 49.3	46 14.8	47 23.2

Table XI. Significant mean difference at the .05 level for comparisons of all participant groups

Dependent Variable	Participant Group 1	Participant Group 2	Significant Mean Difference
Water Quality/Quantity (60)*	---	---	---
Downslope of Potential Pollution Sources (40)	Parents (27.4)	High School Students (25.0)	2.44
	13 Counrty Water Planners (31.7)	High School Students (25.0)	8.83
	MSU Wetland Classes (31.7)	High School Students (25.0)	6.68
	MSU Wetland Classes (31.7)	Parents (27.4)	4.23
Wildlife Habitats & Recreation (100)	---	---	---
County Land Use Zone (80)	MSU Wetlands Class (49.3)	Parents (41)	8.77
Type of System (20)	MSU Wetland Classes (14.8)	High School Students (12.5)	2.31
	MSU Wetland Classes (14.8)	Parents (11.7)	3.11
	MPCA (17.8)	High School Students (12.5)	5.32
	MPCA (17.8)	Parents (11.7)	6.11
	BWSR (18.7)	Parents (11.7)	6.95
Watershed Location (30)	MPCA (26.6)	High School Students (18.2)	8.34
	MPCA (26.6)	Parents (17.7)	8.82
	13 Co. Water Planners (23.3)	High School Students (18.2)	5.17
	13 Co. Water Planners (23.3)	Parents (17.7)	5.66
	MSU Wetland Classes (23.2)	High School Students (18.2)	4.99
	MSU Wetland Classes (23.1)	Parents (17.7)	5.47

*(X) is maximum possible

Table XII. Significant mean difference at the .05 level for comparisons of the four lumped participant groups to value categories

Dependent Variable	Participant Group 1	Participant Group 2	Significant Mean Difference at 0.05
Water Quality/Quantity (60)*	13 Co. SWCD (46.9)	High School Students and Parents (37.9)	9.07
Downslope of Potential Pollutions Sources (40)	13 Co. Water Planners & SWCD (33.3)	High School Students & Parents (25.9)	7.41
	Wetland Classes (31.6)	High School Students and Parents (25.9)	5.74
Wildlife Habitat & Recreation (100)	---	---	---
County Land Use Zones (80)	13 Co. Water Planners & SWCD (51.7)	High School Students and Parents (42.5)	9.23
	Wetland Classes (49.73)	High School Students and Parents (42.5)	7.23
Type of System (20)	Wetland Classes (14.8)	High School Students and Parents (12.2)	2.6
	BWSR & MPCA (18.11)	High School Students and Parents (12.2)	5.89
Watershed Location (30)	13 Co. Water Planners and SWCD (23.2)	High School Students and Parents (18.0)	5.24
	Wetland Classes (23.1)	High School Students and Parents (18.0)	5.17
	BWSR & MPCA (26.7)	High School Students and Parents (18.0)	8.68

* (x) is maximum possible

category of wildlife habitat/recreation revealed no significant differences in means while the other 5 ranged from 3 to 1.

Again one needs to ask why the non public responses were higher than the public in all 42 percent of the significant comparisons.

A final analysis was run to look for differences among the technical categories of water professionals. This comparison resulted in 3 out of 18 significant differences (17 percent) (Table XIII).

The three differences were in the type of system and watershed location questions. In all three cases the regional state agency staff had higher means. No differences were found between county technical staff and the academic category.

DISCUSSION/SUMMARY

Public Perception of Wetland Values

The students' and parents' averages define these groups as being homogenous populations, with one notable exception. The two groups differ on the value of a wetland constructed within a prime agriculture zone, with students placing a higher value on this question (a difference of 1.4).

Although the same homogeneity didn't follow in the residence categories, it was limited to the rural farm differing from the other 3 categories (rural non-farm, urban less than 5000, and urban greater than 5000). The group was lower in almost all questions, but there were two questions where they had the highest means (the questions pertaining to wetlands constructed downslope of urban runoff, and downslope of hazardous point sources). The other three location categories rural non-farm, urban less than 5000, and urban greater than 5000) showed no differences.

Through further breakdown of the rural farm category into students and parents, it was seen that the rural farm parents' averages were driving the rural farm category averages lower. The rural farm students' averages were only slightly lower than the rural non-farm, urban less than 5000, and urban greater than 5000. A similar breakdown was run on the other residence categories and the results did not show differences between the students and parents except in the question concerning the placement of a wetland within a prime agriculture zone, but this difference was limited to the rural non-farm and urban less than 5000. This leads to the conclusion that it is not necessarily the rural farm category that disrupts the homogeneity, but it is the rural farm parent category that is different.

Table XIII. Significant mean difference at the .05 level for comparisons of the grouped technical water professionals to value categories

Dependent Variable	Participant Group 1	Participant Group 2	Significant Mean Difference at 0.05
Water Quallity/Quantity (60)	---	---	---
Downslope of Potential Pollution Sources (40)	---	---	---
Wildlife Habitat and Recreation (100)	---	---	---
County Land Use (80)	---	---	---
Type of System(20)	BWSR/MPCA (18.1)	13 Co./ SWCD (14.0)	4.1
	BWSR/MPCA (18.1)	Wetland Classes (14.8)	3.3
Watershed-Location (30)	BWSR/MPCA (26.7)	Wetland Classes (23.2)	3.5

Key: Regional State Personel=BWSR, MPCA
County Personel= 13 County Water Planners & SWCD
Academic=Wetlands Classes

Almost all questions' averages fell within the range of 5.0-7.5 indicating that wetlands are overall valued by the general population. As the broad and specific questions show, wetlands are most highly valued as habitat for wildlife, but not in areas of agriculture.

Public Perception of Wetland Values Compared to Select Groups

The groups being compared were students and parents (representing the public), BWSR, MDNR, and MPCA (representing regional offices of state agencies), county technical staff (13 county S C Minnesota water planners and SWCD's), and academics (1998 and 1999 advanced students in upper division wetland classes). Converting Table X, which shows the number responding and mean points for each value category, into percentages is shown in Table XIV and gives a simplified summary of the data.

The following summary points are noted:

- For all 6 value categories parents (60 percent) and students (62 percent) were lowest with MPCA and MDNR (76 percent), 13 county water planners (75 percent), BWSR (74 percent), and SWCD (73 percent) all at the high end for overall mean. It should be noted that all were above 50 percent which indicated a positive view of the overall value of wetlands.

- Within the six value categories downslope of potential pollution sources and watershed location (76 percent), and water quality/water quantity and type of system (74 percent) were highest with land use zoning lowest (61 percent) when comparing the mean of all groups against value categories.

- Within each comparison of individual respondent groups to value categories, 4 of the 6 lows were found within the parent group with the other 2 in the state regional offices group. All 6 of the highs were found within the regional state offices (BWSR 3, MDNR 2, and MPCA 1).

- There was a 38 percent difference in means, significant at the .05 level, when comparing the 7 respondent groups to the 6 value categories (Table XI). No significant differences were found between the participant groups and water quality/ water quantity or wildlife habitat/ recreation. In all significant cases, it was the parents or students who were lower.

- When combining the responses into four categories (public, regional state offices, county water technicians, and academics) there was a significant difference in 42 percent of the comparisons (Table XII). In all significant comparisons the public had the lower means. There were no significant differences in wildlife/recreation.

Table XIV. Summary respondents versus value categories by percent of possible

Participant (Mean %) Group	Water Quality Water Quantity	Downslope of Pollution	Habitat and Recreation	Land Use	Systems	Watershed Location
Students (62)	64	63	65	54	63	61
Parents (60)	62	69	61	51	59	59
BWSR (74)	77	85	41	55	94	90
MDNR (76)	85	80	79	64	70	77
MPCA (76)	74	63	67	71	89	89
County Water Planners (75)	77	85	74	63	72	78
SWCD (73)	82	81	63	68	68	77
Wetlands Class (72)	70	79	67	62	74	77
Mean of Values	74	76	65	61	74	76

- When comparing just the technical groups to each other only 17 percent of the comparisons were significant (Table XIII). The significant comparisons were only found in the type of system and watershed location. Within the significant comparisons the state regional offices were always higher than county technical or academic.

In summary the comparisons, that included all participant categories, found the public (students and parents) were always lower, with regional state offices, county technical and academic much higher. This probably reflects the education, training, and career emphasis on wetlands inherent within the latter groups and perhaps indicates that more public education and awareness of wetland values is needed.

Within the non public, technical groups, the regional state agencies are significantly higher than the county technical and academic in only 2 of 6 value categories (these numbers would have undoubtedly been higher if MDNR had been included in the statistical analysis). In general the technical groups are homogeneous.