

## **CONCLUSIONS**

### **COMPARISON OF EVALUATION METHODOLOGIES**

- In an era of limited resources, evaluation methodologies are needed because not all wetlands can be saved nor are they all equal.
- Different wetlands have different values and the determination of values is often based on the perception of those constructing the evaluation tool. Therefore, evaluation methodologies vary greatly.
- The purpose of evaluation methodologies should be “no net loss of function and value”, not just “no net loss of acres”.

### **MODEL OF PERCEPTION**

- We need to develop a comprehensive evaluation methodology, based on both wetland function and perception, that will result in management policy that will satisfy all scales from the local to the global scale.
- Historically, wetland policy has been based on the model of Structure –Function--Values—Management with values being strictly related to scientific function. Wetland values should be determined not just by function (science), but also by human perceptions.
- Incorporating perceptions into wetland policy is difficult because of the diversity of wetland values and because human perceptions are related to scale, location, and an individuals paradigm. Further, classification systems reflect value paradigms.
- The model we developed places “values” as the central focal point for wetland policy.

### **PERCEPTION OF WETLAND VALUES IN THE WRITTEN MEDIA**

- Our study indicates that there are differences in descriptive parameters utilized by the written media categories. The type and location of wetlands are similar but those parameter sets dealing with approach, emphasis, and methods used in examining wetland values differ. These differences impact the credibility (source,

determination, and model) as well as emphasis (policy) of each media category and therefore constitute individual paradigms.

- Our study indicates that different wetland values are emphasized by different media categories, supporting the contention that they are individual paradigms. It is important to understand, however, that these are not statistically generated and are subjective.

### **Academic Paradigm**

The academic paradigm can be characterized by a dominance of referenced and original sources and the use of quantitative procedures in determining values (unique to the five media categories). This paradigm has the highest value citations per article of the value categories biochemical processes, climate, food chain, assessment techniques, and bibliography.

### **News Paradigm**

The news paradigm can be characterized as having the most non-referenced and combined non-referenced/ implied citations in regard to source. This paradigm was the only one of the five to emphasize regulation from the policy perspective.

### **Agency Paradigm**

The agency paradigm is unique in being dominant in the use of the replacement model and was the dominant in all of the paradigms in emphasis of management in the policy set. Water quality and hydrology were higher than the other four paradigms in percent of articles citing these values.

### **Trade Paradigm**

The trade paradigm had the highest restored wetland coverage of all media types. Legislative policy was cited more frequently than regulation or management, the only paradigm where this was the case. This paradigm had the highest percentage of values in the economic and general value categories.

### **Environmental Paradigm**

The environmental paradigm had 85 percent of its citations non referenced or implied for sources and they were predominantly qualitative. Both habitat and hydrologic were the highest for all media categories in values cited.

## **SURVEY OF PERCEPTIONS OF WETLAND VALUES IN SOUTH CENTRAL MINNESOTA**

### **Comparison of Public Perception of Wetland Values**

A comparison of regional high school students and their parents on their perceptions of wetland values, based on selection of potential construction sites, revealed the following:

- The students' and parents' averages define these groups as being a homogeneous population with the single exception being that of constructing a wetland in a prime agricultural zone.
- The same data, when examined by residence category, showed the rural farm differing from the rural non-farm, urban less than 5000 and urban greater than 5000. The rural farm group was lower in almost all value categories except questions pertaining to wetlands constructed downslope of urban runoff and downslope of hazardous point sources. 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 down.

Almost all questions averages fell within the range of 5.0 to 7.5, on a 10 point scale, indicating that the general public values wetlands. As the broad and specific questions show, wetlands are most highly valued as habitat for wildlife by the public.

### **Comparison of Public Perception of Wetland Values to Professional, Technical Select Groups**

A comparison of public perception of wetland values (high school students and parents) to regional offices of state agencies (BWSR, MDNR, MPCA), county technical staff (13 county S C Minnesota county water planners and SWCD's), and academics (1998 and 1999 students in upper division wetlands classes) revealed the following:

- For all 6 value categories, parents (60 percent) and students (62 percent) had the lowest means with MPCA and MDNR (76 percent), BSWR (74 percent), and SWCD (73 percent) all at the high end.
- Within each comparison of individual respondent groups to value categories 4 of the 6 lows were found within the parent group. All 6 of the highs were found within the regional state offices.

All Participant Groups: (Table XI):

- When comparing the 7 respondent groups to the 6 value categories, thirty eight percent of the means showed a significant difference at the .05 level.
- No significant differences were found between participant groups and water quality/quantity or wildlife habitat/recreation.
- In all significant cases it was the parents or students who were lower.

Combining Participant Groups: (Table XII):

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

Within Professional/Technical Respondent Groups: (Table XIII):

- When comparing just the technical groups to each other, only 17 percent of the comparisons were significant.
- The significant comparisons were only found in the type of system and watershed location.

In summary, the comparisons that included all participant categories found the public was 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. In general, the technical groups are homogeneous.

**OVERALL CONCLUSION**

As stated in the introduction, my purpose in this 10 year endeavor was to address the extremely complex issue of wetland perception and values with emphasis on South Central Minnesota. This was deemed critical because both federal and state wetland legislation were for the first time emphasizing no net loss of value, not just acres and this

put an added burden on county and state technical personnel. The science of wetlands, structure and function, was far advanced over the process of establishing value, and remains so today. The relationship of perception to values as applied to wetland evaluation was almost non-existent. A great deal of credit however should be given to Eugene Odum whose 1978 paper really opened up the dialog on wetland values.

With the students in my wetlands classes, we accomplished the three major goals set out in the introduction. A new model of wetland values was developed which includes perception and classification feedback loops. The model also puts “values” as the central focus.

A study of wetland values and perception in five major written media categories was completed and it was concluded that written media paradigms do exist in regards to wetland values.

A South Central Minnesota perception and values survey was developed, given and assessed as to perception of wetland values. The survey was given to and analyzed for similarity and differences among the general public, county technical personnel, regional state agency personnel, and academics. The public in general valued wetlands lower, often significantly, than the other three groups. However, it should be noted that all four groups placed high values on wetlands, with differences being relative.

It is my concluding thought that the public needs more education on the hierarchy of wetland values and the professional/technical wetlands scientists need more education on the broader, not just scientific, aspects of values and perception.

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