

***Northeast Minnesota Wetland Mitigation
Inventory & Assessment***

Phase II: Final Assessment Report

***Prepared for
The Board of Water and Soil Resources (BWSR)***

January 2010



**Northeast Minnesota
Wetland Mitigation Inventory & Assessment
Phase II: Final Assessment Report
Table of Contents**

1.0	Executive Summary.....	1
1.1	Recommendations.....	1
1.2	Data Refinement	3
1.3	Phase II Goals	4
2.0	Phase II Purpose and Goals	6
3.0	Summary of Phase II Results.....	7
4.0	Siting Analysis/Recommendations.....	12
4.1	Develop Northeast Minnesota Interagency Wetland Mitigation Committee	12
4.1.1	Mitigation Siting Planning Effort	12
4.1.1.1	Recommendation	13
4.1.2	Mitigation Siting Priorities	13
4.1.2.1	Recommendation	15
4.1.3	Wetland Protection Priorities.....	15
4.1.3.1	Recommendation	15
4.1.4	Additional Guidance on Partially Drained Wetlands.....	15
4.1.4.1	Recommendation	16
4.1.5	Additional Guidance on Wetland Preservation on Public Land	16
4.1.5.1	Recommendation	17
4.1.6	Strengthen Wetland Banking	17
4.1.6.1	Recommendation	17
4.2	Develop a Northeast Regional Wetland Mitigation Cooperative.....	17
4.2.1	Recommendations	19
4.3	Promote Watershed-based Wetland Management Planning	19
4.3.1	Recommendations	20
4.4	Develop a Northeast Wetland Mitigation Registry	21
4.5	Develop BWSR programs to assist wetland mitigation in northeast Minnesota.....	21
4.5.1	Promotion of Wetland Banking	21
4.5.1.1	Recommendations	22
4.5.2	Study of Wetland Bank Land Abandonment and Property Values.....	22
4.5.2.1	Recommendations	22
4.6	Sector Siting by Mitigation Method.....	22
4.6.1	Roads	22
4.6.1.1	Recommendation	22
4.6.2	Residential and Commercial.....	23
4.6.2.1	Recommendation	23
4.6.3	Infrastructure	23
4.6.3.1	Recommendation	23

4.6.4	Mining	23
4.6.4.1	Recommendation	24
4.7	Develop Mitigation Guidelines	24
4.7.1	Exceptional Natural Resource Value – Private	24
4.7.1.1	Recommendations	25
4.7.2	Impaired Waters	26
4.7.2.1	Recommendation	26
4.8	Next Steps	26
5.0	Advisory Committee and Outreach Meetings	27
5.1	Advisory Committee	27
5.2	Outreach Meetings	27
5.2.1	SWCD, LGU and BWSR Concerns and Comments	28
5.2.2	County Commissioners Concerns and Comments	29
5.2.3	Mining Interests	29
5.2.4	Wetland Banker Interests	30
5.2.5	State and Federal Agencies, Tribal Interests	31
5.2.6	Stakeholders Forum	31
6.0	Phase II Data Refinement and Detailed Results	33
6.1	Wetland Restoration Methods	33
6.1.1	Farmed Wetlands	33
6.1.1.1	Data Refinement	33
6.1.1.2	Results	34
6.1.2	Partially Drained Wetlands	35
6.1.2.1	Data Refinement	35
6.1.2.2	Results	37
6.1.3	Drained Wetlands	37
6.2	Wetland Preservation Methods	38
6.2.1	Restoration and Protection of Exceptional Natural Resource Value (ENRV) Wetlands on Private Land	38
6.2.1.1	Results	39
6.2.2	Wetland Preservation on Land Owned by the State or Local Unit of Government	40
6.2.2.1	Results	40
6.2.3	White Cedar	41
6.2.3.1	Results	41
6.2.4	Trout Streams	42
6.2.4.1	Results	42
6.2.5	Impaired Waters	43
6.2.5.1	Results	43
6.3	Wetland Enhancement	44
6.3.1	Invasive Species	44
6.3.1.1	Results	45
6.4	Wetland Creation Methods	46
6.4.1	Gravel Pits	46

6.4.1.1	Results	46
6.5	Field Checked Data.....	46
7.0	Mitigation Siting Analysis.....	48
7.1	Prioritization Factors.....	48
7.2	Mitigation Opportunity Watershed Analysis	49
7.2.1	Great Lakes (Lake Superior) Basin	50
7.2.2	Mississippi River Basin	50
7.2.3	Red River Basin.....	51
7.3	Mitigation Opportunity Bank Service Area	54
7.3.1	Great Lakes Bank Service Area.....	54
7.3.2	Rainy River Bank Service Area.....	54
7.3.3	Red River Bank Service Area.....	55
7.3.4	Mississippi River Headwaters Bank Service Area	55
7.3.5	St. Croix River Bank Service Area.....	55
7.3.6	Upper Mississippi River Bank Service Area	56
8.0	GIS Tool.....	59
8.1	Design Goals and Considerations	59
8.2	GIS Tool Functionality	60
8.3	Application	61
8.4	Metadata	61
9.0	References	64

List of Tables

Table 1-1 Phase II Mitigation Method and Regulatory Credit2

Table 1-2 Phase II Potential Mitigation Area and Credits (data rounded) 3

Table 3-1 Potential Wetland Mitigation Area and Credit Summarized by County and Method (Sites over 20 acres).....10

Table 3-2 Potential Wetland Mitigation Area and Credit Summarized by County and Methods (Sites 20 acres and less)11

Table 6-1 Farmed Wetlands Statistics (sites over 20 acres)35

Table 6-2 Partially Drained Wetland Restoration Potential Criteria.....36

Table 6-3 Partially Drained Wetland Statistics - Selected Counties (sites over 20 acres).....37

Table 6-4 Drained Wetland Statistics (sites over 20 acres).....38

Table 6-5 Private Land ENRV Statistics (sites over 20 acres)40

Table 6-6 Wetland Preservation Statistics County & State Lands (sites over 20 acres).....41

Table 6-7 White Cedar Statistics (sites over 20 acres).....42

Table 6-8 Trout Stream Statistics (sites over 20 acres)43

Table 6-9 Impaired Water Statistics (sites over 20 acres)44

Table 6-10 Invasive Species Statistics (sites over 20 acres).....45

Table 6-11 Gravel Pit Statistics (Over 20 Acres).....47

Table 7-1 Wetland Mitigation Opportunity Summary by Major Watershed, Basin, and Method (>20 ac sites)52

Table 7-2 Wetland Mitigation Opportunity Summary by Major Watershed, Basin, and Method (20 ac sites and smaller)53

Table 7-3 Potential Wetland Mitigation Area and Credit Summarized by Bank Service Area and Method (>20 ac sites)57

Table 7-4 Potential Wetland Mitigation Area and Credit Summarized by Bank Service Area and Method (20 ac sites and smaller)58

List of Figures

Figure 1 Study Area

Figure 2 Farmed Wetlands Over 20-acres

Figure 3 Partially Drained Wetlands Over 20-acres

Figure 4 Drained Wetlands Over 20-acres

Figure 5 ENRV (Private Lands) Over 20-acres

Figure 6 ENRV (County and State Lands) Over 20-acres

Figure 7 White Cedar Over 20-acres

Figure 8 Trout Streams Over 20-acres

Figure 9 Impaired Waters Over 20-acres

Figure 10 Invasive Species Over 20-acres

Figure 11 Gravel Pits Over 20-acres

Figure 12 Field Checked Potential Mitigation Sites

Figure 13 GIS Wetland Mitigation Site Distribution – Option 2

Figure 14 Ownership Percentages by Potential Mitigation Method

Figure 15 Ownership Area Breakdown by Potential Mitigation Method

Figure 16 Ownership and Credit Breakdown by Potential Mitigation Method

List of Appendices

Appendix A: Technical Committee Members & Meeting Notes

Appendix A.1 April 16, 2009 Advisory Committee Minutes

Appendix A.2 July 9, 2009 Advisory Committee Minutes

Appendix B: Public Outreach Meeting Notes

Appendix B.1 Public Outreach with SWCDs, LGUs, and BWSR Staff Meeting Notes

Appendix B.2 County Commissioners Meeting Notes

Appendix B.3 Public Outreach with Mining Interests Meeting Notes

Appendix B.4 Public Outreach with Wetland Bankers Meeting Notes

Appendix B.5 Public Outreach with Federal, State and Tribal Meeting Notes

Appendix B.6 Public Meeting Grand Rapids - All Interests - Meeting Notes

Appendix C: GIS Tool Data Layers

Appendix C.1 GIS Tool Data Layers Considered

Appendix C.2 GIS Tool Data Layers

Appendix D: GIS Metadata

Appendix E: Metadata for Methods and Processes

Appendix E.1 County

Appendix E.2 Methods

1.0 Executive Summary

The Northeast Minnesota Wetland Mitigation Inventory and Assessment Project is a two phase project to identify potential wetland mitigation opportunities located in northeastern Minnesota and analyze those opportunities to develop goals and priorities. Both phases of the project are designed to address the technical aspects of wetland mitigation. Issues affecting the viability of wetland mitigation banking in the region were identified during public outreach meetings and future policy or program changes may be necessary to solve those issues. Issues and recommendations are outlined in Section 4 of this document. Phase I was designed to identify potential wetland mitigation sites and inventory and assess mineland wetlands and Phase II assessed siting recommendations based on priorities, including but not limited to: mitigation types/methods, water quality, proximity to impaired waters, technical feasibility, and wetland functions. This report provides a brief summary of Phase I and addresses the Phase II siting analysis in more detail, including recommendations for future actions. Figure 1 shows the project study area. During each phase of the project an Advisory Committee was convened to provide review and guidance of the inventory and siting process.

1.1 Recommendations

The Phase II Siting Analysis recommendations are summarized below and described in more detail in Section 4.0.

1. Develop Northeast Minnesota Interagency Wetland Mitigation Committee

- A. Establish guidelines for consistent siting requirements for each mitigation method for various state and federal wetland regulatory programs.
- B. Develop mitigation priorities based on analysis of opportunities using GIS tool.
- C. Develop wetland protection priorities based on wetland sensitivity, historic losses, and other factors.
- D. Develop guidance on:
 - Partially drained wetland mitigation feasibility.
 - Impacts on infrastructure
 - Hydrologic restoration
 - Acceptable methods for documenting the magnitude of drainage
- E. New research or improved data sharing to define technical issues related to restoring natural hydrology in partially drained peatlands.
- F. Consideration of a higher percentage of credits early in the wetland bank development process, including restoration of forested wetlands.
- G. Consider additional guidance on the common understanding of the practical difficulties in planning and executing private mitigation projects on public land.
- H. Evaluate the role state and tax forfeited lands may play in mitigation.

- I. Consider regulatory program changes to provide incentives or higher priority on mitigation associated with impaired waters through allocation of more credit in NE Minnesota.

2. Develop a Northeast Regional Wetland Mitigation Cooperative

- A. Identify potential mitigation cooperative sponsors.
- B. Seek start up funding (*preliminary estimate of \$750,000*) for initial development of a cooperative in northeastern Minnesota to facilitate planning and permitting.
- C. Develop mitigation based on priorities
 - o Watershed needs based on historic losses
 - o Wetland impact types
 - o Water quality protection and improvement needs
- D. Utilize northeast interagency wetland mitigation team to guide wetland mitigation projects funded under the cooperative.

3. Promote Watershed-based Wetland Management Planning

1. Obtain funding for wetland planning in the study area.
2. Identify three areas in which to promote wetland management plan development.
3. Identify wetland protection areas.
4. Develop model to identify critical wetlands for protection
 - o This could be used by LGUs to evaluate proposed wetland impacts
5. Develop wetland mitigation priorities and identify strategic sites for mitigation.
6. General components:
 - o May require multiple LGUs cooperating under a joint powers agreement
 - o Watershed and ecosystem-based framework
 - o Mitigation opportunity inventory provides head start
 - o Wetland inventory and functional assessment needed
 - o Improve Consistency with federal program
- G. Identify priority areas for preservation, enhancement and restoration within the northeast region.

4. Develop a Northeast Wetland Mitigation Registry

- A. The registry would serve as a communication tool providing basic information on potential wetland mitigation sites of interested landowners hosted by BWSR.
- B. Features of registry:
 - o Landowners to publicize interest in mitigation
 - o Landowners to submit preliminary banking information
 - o Inclusion in the GIS database
- C. Developing a public notice to promote registry use and banking.

5. Develop BWSR programs to assist wetland mitigation in northeast Minnesota

- A. Develop and implement targeted training programs on regional wetland mitigation projects for northeast LGUs.
- B. Evaluate mitigation on public lands for potential use for the public road mitigation program.
- C. Provide training for LGUs on GIS database and planning tool for management of wetland mitigation opportunities in northeast Minnesota.
- D. Consider a shorter application form and/or review process for smaller wetland banks.
- E. Conduct a study to examine history of wetland bank tax forfeiture, and wetland banking effects on property values

1.2 Data Refinement

During Phase II, farmed wetlands and partially drained wetlands data was re-examined. The refinement of the Initial GIS Analysis Inventory Results identified approximately 8,200 potential wetland mitigation sites representing a total area of approximately 395,000 acres. Applying the typical regulatory credit for each mitigation method (Table 1-1) the total potential credit potential is approximately 156,500 credits (Table 1-2).

Table 1-1 Phase II Mitigation Method and Regulatory Credit

Mitigation Method	Regulatory Credit (%)	Estimated Credit in Analyses (%)
Restoration		
Drained Wetlands	100	100
Farmed Wetlands	10-90	50
Partially Drained Wetlands	50	50
Preservation		
ENRV Private	12.5	12.5
Public Wetland Preservation	12.5	12.5
White Cedar Swamps	12.5	12.5
Trout Stream Riparian Wetlands	12.5	12.5
Impaired Watershed Riparian Wetlands	12.5	12.5
Enhancement		
Invasive Species	30	30
Creation	75	75

To fully evaluate the true potential of available wetland mitigation in the study area, one must consider sites with high potential and landowner willingness. Each of these factors was evaluated during the field verification analysis conducted as part of Phase I. When applying a factor of 13 percent for technical feasibility (based on of the percentage of field assessments determined to have high potential), it appears that there may be the potential for nearly 45,000 mitigation credits within the region. Considering the 11 to 61

percent range of landowner interest (11 percent of landowners expressed interest and an additional 50 percent indicated possible interest); the total likely available, high potential credit identified by the GIS analysis and field verification ranges from approximately 4,950 credits to 27,400 credits (Table 1-2).

Table 1-2 Phase II Potential Mitigation Area and Credits (data rounded)

Mitigation Method	Potential Mitigation Area (ac)	Potential Mitigation Credits	Technically Feasible Credits	Likely Credits (interested landowners)
Restoration	208,700	113,300	39,200	4,300-23,900
Preservation	140,900	17,600	2,350	250-1,450
Enhancement	18,800	5,700	750	100-450
Creation	26,600	19,900	2,650	300-1,600
Total	395,000	156,500	44,950	4,950-27,400

It is important to remember that the actual process for determining suitability of sites for wetland mitigation and approval of wetland replacement sites is laid out in Minnesota Rules 8420 and in Section 404 of the Clean Water Act. Some sites identified (or omitted) as part of the inventory project are subject to determination of whether or not they meet the replacement standards of the Wetland Conservation Act by local government units. Landowners interested in project specific wetland replacement plans and banking plans must submit applications to the local government unit with jurisdiction and are subject to denial or approval decisions by the LGU.

1.3 Phase II Goals

The Phase II Siting Assessment goals include:

- Develop a GIS tool for distributing the Phase I Inventory results to facilitate the regulatory process and improve resource planning.
- Evaluate whether or not the Phase I Inventory results and distribution tool could facilitate the wetland mitigation siting process, and if so, how.
- Identify issues that may require future policy changes to facilitate wetland mitigation planning based on Phase I Inventory results.
- Determine if there are research needs that would improve the usefulness of the Phase I Inventory results.
- Evaluate whether or not there are regulatory or wetland mitigation planning implications on the various industry sectors related to the Phase I Inventory results.

- Evaluate whether or not there is the continued need for promoting wetland banking and possible methods to do so.
- Evaluate the practical challenges involved in planning wetland mitigation based on the various methods allowed and determine if changes may be warranted to policies, rules, guidance, or regulatory processes, or if research is needed.

During the Phase II Siting Assessment, a GIS tool was developed to make the Phase I Inventory results available to the public. The intent was to allow for conducting spatial searches based on mitigation methods and prioritization factors to more effectively plan future mitigation, and to assist the Board of Water and Soil Resources (BWSR) and Technical Evaluation Panels (TEPs) in the evaluation of wetland replacement and banking plan applications.

2.0 Phase II Purpose and Goals

The goals for the Phase II Siting Assessment efforts include:

- Developing a GIS tool for distributing the Phase I Inventory results to facilitate the regulatory process and improve resource planning.
- Evaluating whether or not the Phase I Inventory results and distribution tool could facilitate the wetland mitigation siting process, and if so, how.
- Evaluating the need for policy changes to facilitate wetland mitigation planning based on Phase I Inventory results.
- Determining if there are research needs that would improve the usefulness of the Phase I Inventory results.
- Evaluating whether or not there are regulatory or wetland mitigation planning implications on the various industry sectors related to the Phase I Inventory results.
- Evaluating whether or not there is the continued need for promoting wetland banking and possible methods to do so.
- Evaluating the practical challenges involved in planning wetland mitigation based on the various methods allowed and determine if changes may be warranted to policies, rules, guidance, or regulatory processes, or if research is needed.

During the Phase II Siting Assessment, a GIS tool was developed to make the Phase I Inventory results available to the public. The intent was to allow for conducting spatial searches based on mitigation methods and prioritization factors to more effectively plan future mitigation, and to assist the Board of Water and Soil Resources (BWSR) and Technical Evaluation Panels (TEPs) in the evaluation of wetland replacement and banking plan applications.

3.0 Summary of Phase II Results

Potential wetland mitigation areas were identified within the 18 counties in northeastern Minnesota defined as containing over 80 percent of the historic wetland resources (Figure 1). Potential sites were identified based on ten different wetland mitigation methods, including three restoration methods, five preservation methods, one enhancement method (which is only eligible under the federal wetland program), and one creation method. A detailed Geographic Information System (GIS) analysis was conducted to identify potential wetland mitigation areas. Sites of all sizes were identified with the exception of drained wetlands and farmed wetlands, for which the minimum size was 20 acres. The inventory data were broken into two categories; greater than 20 acre sites and 20 acre or less sites, for presentation purposes. The inventory data were also analyzed by the 35 major watersheds within the region and the seven Bank Service Areas within the study area. Bank Service Areas are groupings of major watersheds within the same major drainage basin that are used in the state and federal regulatory programs for determining acceptable areas for wetland banking as compensatory mitigation.

During the Phase I wetland mitigation inventory, over one million acres of potential wetland mitigation areas were identified. Several additional analyses and data refinements were conducted during Phase II of the study to develop a more robust wetland mitigation inventory. The Phase II refinements included:

1. Assessment of farmed wetland mitigation potential based on regulatory requirements
2. Assessment of partially drained wetland mitigation potential based on upstream drainage and number of land owners
3. An estimation of wild rice farm and sod farm areas that may have potential for mitigation within the study area (these land uses were not identified as opportunities in the Phase I inventory)
4. Assessment of partially drained wetlands within Aitkin County, which was not completed during the Phase I inventory

Due to the specific regulatory criteria governing eligibility for the restoration of farmed wetlands, the potential sites identified were further analyzed to classify those sites with a high likelihood of eligibility for wetland mitigation. Similarly, the restoration of partially drained wetlands in northeastern Minnesota is often hampered by unique challenges, including flooding of upstream properties and complex land ownership since sites typically cover extensive areas. Therefore, partially drained wetlands were also further evaluated to classify those sites with a high likelihood of technical feasibility. The potential wetland mitigation inventory results for farmed wetlands and partially drained wetlands are primarily presented for only those areas determined to have high potential. Section 6.0 includes a presentation of all potential farmed and partially drained mitigation areas, regardless of the technical, legal, and regulatory potential.

The state and federal wetland regulatory programs in effect in Minnesota use the term “credit” to conduct accounting for the replacement or compensation of unavoidable wetland impacts. One wetland mitigation credit is typically used as the equivalent for replacing one acre of wetland impact assuming a 1:1 replacement ratio. For example, one wetland mitigation credit is typically equivalent to:

1. Restoring one acre of drained wetland
2. Restoring two acres of partially drained wetland
3. Preserving eight acres of exceptional natural resource value wetlands
4. Creating 1.33 acres of wetland

The results of the wetland mitigation inventory are presented in two ways: the total area of potential mitigation areas and the likely mitigation credits based on current regulatory guidelines. The distribution of potential wetland mitigation areas identified are also shown geographically across the region on Figures 2-11 for each specific method and the field verification locations are shown on Figure 12. All of the mitigation inventory data (except the wild rice and sod farm sites) will be made available to the public in an interactive web-based GIS Tool (Tool) to assist in wetland mitigation planning. The inventory data and Tool will be managed by the Board of Water Resources. The general structure of the Tool is shown on Figure 13.

A summary of the wetland mitigation inventory results for sites greater than 20 acres in size is provided in Table 3-1. A total of about 324,000 acres within over 3,100 potential wetland mitigation areas were identified during the inventory, which equate to approximately 139,000 mitigation credits. Nearly 209,000 acres of potential mitigation areas are associated with the highest priority, restoration methods, comprising lightly over 60 percent of the mitigation area. Due to the higher percentage of mitigation credits allocated to restoration methods, they comprise nearly 80 percent of the total estimated credits (Table 3-1). Over 7,500 potential mitigation areas 20 acres or less in size contribute an additional 71,200 acres, comprising about 18 percent of the total (Table 3-2). Approximately 74 percent of that potential is comprised of wetland preservation methods, with 14 percent due to wetland creation, and eight percent for partially drained wetlands (Table 3-2). However, the smaller areas only account for about ten percent of the total potential mitigation credits.

The wetland mitigation inventory data were also evaluated to determine the approximate breakdown of public vs. private ownership. Overall, approximately 74 percent of the total potential wetland mitigation area identified appears to be in private ownership with the remaining 26 percent under control of various public entities (Figure 14). Nearly all of the drained and farmed wetland mitigation areas are located on private property (over 90 percent each). However, the majority of partially drained wetland areas identified are located on public land (over 70 percent). Wetland preservation opportunities associated with impaired waters and wetland creation opportunities are both predominantly located on private land (over 80 percent each). By definition, the preservation of wetlands on County and State lands are in public ownership and the preservation of exceptional natural resource value wetlands, are by definition, completely located on private lands. The remaining potential mitigation areas associated with wetland preservation and enhancement contain a mix of

ownership (Figure 14). Based on the overall area of potential wetland mitigation areas identified, farmed wetlands clearly represent the method with the largest area, which is predominantly private ownership (Figure 15). After applying approximate regulatory credit allocations, it becomes clear that wetland restoration methods account for the majority of the potential credits and preservation methods represent a minor component of potential credits (Figure 16).

Table 3-1 Potential Wetland Mitigation Area and Credit Summarized by County and Method (Sites over 20 acres) ¹

County	Restoration				Preservation					Enhancement	Creation	Total Acres
	Drained	Farmed (High Potential) ²	Estimated Farmed Wild Rice and Sod (High Potential)	Partially Drained (High Potential) ²	ENRV Private	ENRV Public	White Cedar	Trout Stream	Impaired Watershed	Invasive Species ³	Creation Gravel Pits	
Potential Wetland Mitigation Area (acres)												
Aitkin	2,888	3,845	6,300	14,657	5,723	407	307	122	2,988	670	28	37,935
Beltrami	3,086	13,522	3,000	5,747	419	622	194	0	294	174	234	27,293
Carlton	0	0	0	0	0	0	0	61	2,032	1,266	106	3,465
Cass	48	137	0	0	2,617	140	53	34	-	3,126	80	6,235
Clearwater	3,241	8,403	7,000	0	370	42	-	360	1,428	0	34	20,897
Cook	0	0	-	0	323	138	108	829	0	44	313	1,756
Crow Wing	98	6,347	300	0	3,543	573	0	0	26	665	1,231	12,782
Hubbard	0	0	0	0	138	0	0	0	0	2,114	0	2,252
Isanti	524	22,590	0	0	3,322	21	0	0	203	60	115	26,835
Itasca	0	45	400	0	327	103	795	21	613	929	1,716	4,950
Kanabec	517	2,093	0	0	4,222	186	-	0	923	0	21	7,963
Koochiching	543	3,773	300	12,917	1,115	458	297	132	912	106	724	21,278
Lake	0	0	0	0	212	173	65	108	0	26	175	760
Lake of the Woods	3,268	43,808	300	5,471	1,812	135	69	0	203	0	877	55,943
Mille Lacs	694	4,475	0	0	198	823	0	0	4,584	38	45	10,857
Pine	582	5,704	1,900	0	2,081	496	0	0	548	859	1,127	13,297
St. Louis	1,930	0	400	11,048	6,431	8,263	5,604	4,903	6,426	6,552	9,989	61,545
Wadena	520	475	0	0	5,344	695	0	285	313	99	46	7,778
Total	17,939	115,217	19,900	49,840	38,199	13,275	7,492	6,874	21,494	16,728	16,861	323,819
Percent of Total	6%	36%	6%	15%	12%	4%	2%	2%	7%	5%	5%	100%
Estimated Wetland Mitigation Credit												
Estimated Credit	100%	50%	50%	50%	12.5%	12.5%	12.5%	12.5%	12.5%	30%	75%	
Aitkin	2,888	1,922	3,150	7,329	715	51	36	15	373	201	21	16,704
Beltrami	3,086	6,761	1,500	2,873	52	78	24	0	37	52	176	14,640
Carlton	0	0	0	0	0	0	0	8	254	380	79	721
Cass	48	69	0	0	327	18	7	4	0	938	60	1,470
Clearwater	3,241	4,201	3,500	0	46	5	0	47	179	0	25	11,245
Cook	0	0	0	0	40	17	13	104	0	13	235	423
Crow Wing	98	3,173	150	0	443	72	0	0	3	199	923	5,061
Hubbard	0	0	0	0	17	0	0	0	0	634	0	651
Isanti	524	11,295	0	0	415	3	0	0	25	18	86	12,366
Itasca	0	23	200	0	41	13	99	3	77	279	1,287	2,021
Kanabec	517	1,047	0	0	528	23	0	0	115	0	16	2,246
Koochiching	543	1,886	150	6,459	139	57	37	17	114	32	543	9,977
Lake	0	0	0	0	26	22	8	14	0	8	132	209
Lake of the Woods	3,268	21,904	150	2,735	227	17	0	0	25	0	658	28,992
Mille Lacs	694	2,238	0	0	25	103	0	0	573	11	34	3,677
Pine	582	2,852	950	0	260	62	0	0	69	258	845	5,878
St. Louis	1,930	0	200	5,524	804	1,033	700	613	803	1,966	7,492	21,065
Wadena	520	238	0	0	668	87	0	36	39	30	35	1,652
Total	17,939	57,609	9,950	24,920	4,775	1,659	937	859	2,687	5,018	12,646	138,999
Percent of Total	12.8%	41.4%	7.2%	17.9%	3.4%	1.2%	0.7%	0.6%	1.9%	3.6%	9.1%	100%

¹Landowner interest is not considered in this table and may result in reduced potential.

²Only areas considered to have a high likelihood of regulatory eligibility and technical feasibility are shown due to specific regulatory requirements and physical and legal constraints.

³Wetland enhancement is not allowed under the Wetland Conservation Act, so there is no potential for credit.

Table 3-2 Potential Wetland Mitigation Area and Credit Summarized by County and Method (Sites 20 acres and less) ¹

County	Restoration				Preservation					Enhancement	Creation	Total Acres
	Drained	Farmed (High Potential) ²	Estimated Farmed Wild Rice and Sod (High Potential)	Partially Drained (High Potential) ²	ENRV Private	ENRV Public	White Cedar	Trout Stream	Impaired Watershed	Invasive Species ³	Creation Gravel Pits	
Potential Wetland Mitigation Area (acres)												
Aitkin	NA ⁴	NA ⁴	0	29	684	428	1,130	29	1,824	168	185	4,475
Beltrami	NA ⁴	NA ⁴	0	1,368	437	133	768	6	658	34	147	3,549
Carlton	NA ⁴	NA ⁴	0	0	0	0	405	124	1,117	7	314	1,967
Cass	NA ⁴	NA ⁴	0	0	921	196	390	151	51	176	149	2,033
Clearwater	NA ⁴	NA ⁴	0	0	70	47	17	125	500	0	239	997
Cook	NA ⁴	NA ⁴	0	0	90	52	332	393	0	-	113	980
Crow Wing	NA ⁴	NA ⁴	0	0	1,712	171	48	25	100	422	1,120	3,594
Hubbard	NA ⁴	NA ⁴	0	0	257	63	44	17	0	68	66	515
Isanti	NA ⁴	NA ⁴	0	0	1,949	80	0	0	370	128	216	2,742
Itasca	NA ⁴	NA ⁴	0	0	462	225	2,827	122	798	212	1,288	5,933
Kanabec	NA ⁴	NA ⁴	0	0	539	32	71	0	854	21	164	1,681
Koochiching	NA ⁴	NA ⁴	0	702	610	390	2,029	140	495	65	410	4,841
Lake	NA ⁴	NA ⁴	0	0	238	76	236	78	27	36	378	1,069
Lake of the Woods	NA ⁴	NA ⁴	0	1,542	416	127	387	0	265	0	366	3,104
Mille Lacs	NA ⁴	NA ⁴	0	0	169	284	0	0	2,206	-	279	2,936
Pine	NA ⁴	NA ⁴	0	0	633	184	118	124	808	114	532	2,514
St. Louis	NA ⁴	NA ⁴	0	2,227	1,455	1,227	11,429	1,944	4,070	639	3,617	26,607
Wadena	NA ⁴	NA ⁴	0	0	1,018	105	12	153	239	21	135	1,683
Total	NA⁴	NA⁴	0	5,866	11,661	3,818	20,241	3,431	14,381	2,110	9,715	71,223
Percent of Total	NA⁴	NA⁴	0%	8%	16%	5%	28%	5%	20%	3%	14%	100%
Estimated Wetland Mitigation Credit												
Estimated Credit	100%	50%	50%	50%	12.5%	12.5%	12.5%	12.5%	12.5%	30%	75%	
Aitkin	NA ⁴	NA ⁴	0	14	86	53	141	4	226	50	139	715
Beltrami	NA ⁴	NA ⁴	0	683	55	17	96	1	82	10	110	1,054
Carlton	NA ⁴	NA ⁴	0	0	0	0	51	16	140	2	236	443
Cass	NA ⁴	NA ⁴	0	0	115	24	49	19	6	53	112	378
Clearwater	NA ⁴	NA ⁴	0	0	9	6	2	16	63	0	179	274
Cook	NA ⁴	NA ⁴	0	0	11	6	42	49	0	0	64	193
Crow Wing	NA ⁴	NA ⁴	0	0	214	21	6	3	12	127	840	1,223
Hubbard	NA ⁴	NA ⁴	0	0	32	8	6	2	0	20	49	117
Isanti	NA ⁴	NA ⁴	0	0	244	10	0	0	46	38	162	500
Itasca	NA ⁴	NA ⁴	0	0	58	28	353	15	100	64	965	1,583
Kanabec	NA ⁴	NA ⁴	0	0	67	4	9	0	107	6	123	316
Koochiching	NA ⁴	NA ⁴	0	351	76	49	254	18	62	19	307	1,136
Lake	NA ⁴	NA ⁴	0	0	30	10	30	10	3	11	283	376
Lake of the Woods	NA ⁴	NA ⁴	0	771	52	16	48	0	33	0	275	1,195
Mille Lacs	NA ⁴	NA ⁴	0	0	21	35	0	0	276	0	209	542
Pine	NA ⁴	NA ⁴	0	0	79	23	15	16	101	34	399	667
St. Louis	NA ⁴	NA ⁴	0	1,113	182	153	1,429	243	509	192	2,713	6,533
Wadena	NA ⁴	NA ⁴	0	0	127	13	1	19	30	6	101	299
Total	NA⁴	NA⁴	0	2,933	1,458	477	2,530	429	1,798	633	7,286	17,544
Percent of Total	NA⁴	NA⁴	0.0%	16.7%	8.3%	2.7%	14.4%	2.4%	10.2%	3.6%	41.5%	100%

¹Landowner interest is not considered in this table and may result in reduced potential.

²Only areas considered to have a high likelihood of regulatory eligibility and technical feasibility are shown due to specific regulatory requirements and physical and legal constraints.

³Wetland enhancement is not allowed under the Wetland Conservation Act, so there is no potential for credit.

⁴NA = Not Assessed.

4.0 Siting Analysis/Recommendations

Several suggestions were provided during the Phase II Advisory Committee and Outreach meetings that were considered, but are not included as recommendations for a number of reasons that are discussed below.

1. Wetland Preservation Flexibility – It was suggested that flexibility could be provided to allow wetland preservation for the replacement of low quality wetlands. There is no regulatory basis for allowing this without consideration of wetland restoration opportunities first.
2. Wetland Preservation on Private Lands – It was suggested that wetland protection without a restoration or improvement component should be allowed on private lands, similar to what is allowed on public land. Since new WCA rules were recently implemented, it is not likely that such a change would be considered.
3. Farmed Wetlands – Since the majority of potential wetland mitigation sites identified are farmed wetlands, but only a small percentage of those are considered to have a high potential for eligibility, could the 20 year agricultural history requirement be reduced? The 20 year requirement was recently upheld in development of the current WCA rules and is not likely to be modified.
4. Could flexibility be provided in northeastern Minnesota to allow mitigation in areas of the state (i.e., counties with less than 50 percent of historic wetlands) where there may be greater ecological need and public benefit (e.g., improve wildlife habitat, add flood retention capacity). The state and federal regulatory programs have specific siting criteria that must be followed. The wetland mitigation inventory shows that there appear to be opportunities within all watersheds in the region. Wetland mitigation opportunities must be evaluated within each priority siting level before moving on to the next priority level.

Recommendations are prioritized below from highest priority to lowest priority.

4.1 Develop Northeast Minnesota Interagency Wetland Mitigation Committee

The development of an interagency wetland mitigation committee for northeastern Minnesota would be valuable for addressing a number of issues identified with respect to conducting wetland mitigation and wetland banking in northeastern Minnesota.

4.1.1 Mitigation Siting Planning Effort

Both state and federal mitigation siting guidelines are subjective in the level of effort necessary prior to moving to the next siting priority level listed in Section 5.1.1.

In determining if suitable planning effort has been undertaken at each siting level, the WCA Rules (M.R. 8420.0522, Subp.7E.) state:

When reasonable, practicable, and environmentally beneficial replacement opportunities are not available in siting priorities listed in items A to D, the applicant may seek opportunities at the next level. For the purposes of this item, “reasonable, practicable, and environmentally beneficial replacement opportunities” means opportunities that are:

- (1) ecologically suitable and sustainable according to Subpart 5; and*
- (2) available and capable of being done after taking into consideration cost, existing technology, and logistics consistent with the overall project purposes. The cost of replacement credits alone is not sufficient reason to conclude that reasonable, practicable, or environmentally beneficial replacement opportunities are not available.*

The St. Paul District Compensatory Mitigation Policy for Minnesota (Corps, 2009) states that the Corps must determine the compensatory mitigation required based upon what is available, practicable, and capable of compensating for the lost wetland functions. Regarding the level of effort required at each siting level, the Corps defines practicable opportunities for in-place compensation to include those that:

- Take advantage of naturally occurring landscape position without the need for dikes or excavation or other alterations of the landscape;
- Have a high likelihood of becoming a functional wetland that will continue in perpetuity; and
- Do not adversely affect other habitats or ecological communities that are important in maintaining the ecological diversity of the area.

While the state and federal guidelines regarding suitable mitigation planning effort are similar in the stated criteria, they are both subjective in nature and may be interpreted differently. More consistency between state and federal wetland programs would provide added certainty to project applicants regarding the level of detail that will be expected to comply with the siting guidelines.

4.1.1.1 Recommendation

Establish guidelines for consistent siting requirements for each mitigation method for various state and federal wetland regulatory programs. Discuss the level of effort required at each priority siting level and for each mitigation method to provide more certainty to project proponents.

4.1.2 Mitigation Siting Priorities

Wetland mitigation planning in Minnesota is currently conducted following state and federal siting guidelines, which are similar to one another in following watershed management principles, but differ slightly in the

detailed requirements. Both the state wetland mitigation rules and federal mitigation policy place a priority on replacement in the project watershed first.

The Wetland Conservation Act (WCA) Rules (M.R. 8420.0522, Subp.7.) govern the siting of replacement. Siting wetland replacement must follow the priority order listed below for northeastern Minnesota:

1. In the same minor watershed as the affected wetland;
2. In the same major watershed as the affected wetland;
3. By wetland banking within the same wetland bank service area as the affected wetland;
4. By wetland banking in an adjacent wetland bank service area if credits are not reasonably available in the same bank service area as the affected wetland;
5. In the same county as the affected wetland;
6. Statewide.

The Corps St. Paul District allows more flexibility in siting mitigation than the federal Mitigation Rule. The St. Paul District specifies the following preferential sequence for compensatory mitigation:

- (1) Mitigation banking credits In the same 8-digit HUC watershed (81 in MN);
- (2) Project-specific on-site;
- (3) Project-specific in the same minor watershed (10-digit HUC code, 5,600 in MN) as the impact;
- (4) Project-specific in the same major watershed (8-digit HUC code, 81 in MN) as the impact;
- (5) Mitigation banking credits in an adjacent 8-digit HUC watershed within the same bank service area;
- (6) Mitigation banking credits anywhere in the same BSA;
- (7) Wetland banking credits or project-specific in the same modified 6-digit HUC watershed (10 in MN) as the impact;
- (8) Wetland banking credits or project-specific in the same 4-digit HUC watershed (4 in MN) as the impact;
- (9) Statewide.

Both the WCA and federal Section 404 wetland regulatory programs place a priority on the restoration of degraded or drained wetlands first over the creation, enhancement, or preservation of wetlands. In addition, both wetland programs place an emphasis on replacing impacted wetland types in-kind, for which, some

incentives are provided. Currently, the primary incentive in the state and federal wetland regulatory programs for replacing impacted wetlands in-kind, is through minor adjustments to mitigation ratios in some instances. However, planning and implementing the restoration of the predominant wetland types present in northeastern Minnesota, (forested swamps and bogs, open bogs, and shrub swamps) has not been well proven, is risky, and can increase monitoring liabilities by up to 15 years.

4.1.2.1 Recommendation

Mitigation priorities for the region could be developed based on analysis of opportunities using GIS tool. The development of a wetland mitigation cooperative could be a way to implement those priorities and provide opportunities to replace impacts in-kind. Consider regulatory program changes to provide incentives or higher priority on in-kind mitigation and mitigation associated with impaired waters through allocation of more credit in northeastern Minnesota.

4.1.3 Wetland Protection Priorities

State and federal wetland programs have well-defined requirements for avoiding and minimizing wetland impacts. Typically, wetland avoidance and minimization efforts are conducted in the project context, often after substantial project planning has already been undertaken. Wetland avoidance efforts may be more effective if conducted in a broader planning forum, ahead of specific project plan development. One method to enhance wetland avoidance may be to identify wetland protection priorities either on a regional scale or locally.

4.1.3.1 Recommendation

Wetland protection priorities could be developed by the Interagency Wetland Committee based on an analysis of wetland sensitivity, historic losses, impaired waters, unique resources, and other factors. Wetland protection priorities could also be identified through the development of basin wetland management planning.

4.1.4 Additional Guidance on Partially Drained Wetlands

The restoration of partially drained wetlands is defined in WCA as restoring the natural hydrologic regime and vegetation of wetlands degraded by drainage, filling or diversion of the natural watershed. Partially drained wetlands with no vegetation alteration (which is the primary condition of partially drained wetlands identified in Phase I), are eligible for up to 50 percent credit based on the current WCA rules. The new WCA rules have eliminated the need for extensive study to determine the exact level of drainage. However, one must still document the extent of hydrologic impacts due to ditching, which may also need to take into account the presence of beaver dams. There is still some question regarding when 50 percent credit is suitable and under what conditions less than 50 percent credit would be applied.

While the new WCA rules have minimized some of the uncertainty in planning the restoration of partially drained wetlands, there are several practical difficulties in effectively planning such a restoration:

- Practicability and methods of restoring the natural hydrology in partially drained peatlands due to subsidence along ditches
- Effects of beaver dams on determining credit allocations for restoring partially drained peatlands
- Practical potential for restoring partially drained wetlands on public land
- Magnitude of potential effects of restoration on roads, infrastructure, and upstream properties

The current *St. Paul Compensatory Mitigation Policy for Minnesota* (Corps, 2009), which governs the federal wetland program, defines the eligibility of restoring partially drained wetlands as “rehabilitating” wetland hydrology. The guidance for “rehabilitation” eligibility is based on the percent of the natural hydrologic regime that has been removed. This guidance suggests that it is possible to determine fairly precisely, the natural hydrologic regime that would have been in place prior to disturbance. The guidance states that a case-by-case analysis must be done using professional judgment.

4.1.4.1 Recommendation

While some former issues related to the applicability of partially drained wetlands have been resolved, few projects involving the restoration of partially drained peatlands have been completed successfully, and there are still a number of issues that make planning uncertain. Interagency discussions and the development of guidance or conducting research on the following issues would be helpful:

- Research or improved data sharing to define the technical feasibility of restoring natural hydrology in partially drained credits and provide guidance on the allocation of credits (i.e., is it feasible, what are appropriate methods, are there successful project examples that could be shared with the public and review agencies to facilitate planning and review).
- Acknowledgement that potential impacts to infrastructure can significantly limit restoration potential.
- What are acceptable methods for documenting the magnitude of drainage and could general guidance be developed.
- Recognition that agencies in charge of public lands often will not allow their future property management rights to be compromised. Clarify the mechanisms appropriate for granting permanent conservation easements over state and tax forfeit lands and develop guidance for the regulated public.
- Evaluate the role state and tax forfeited lands may play in mitigation.

4.1.5 Additional Guidance on Wetland Preservation on Public Land

The general WCA requirements for wetland preservation on public land are:

1. Protection of the wetland through granting a permanent conservation easement
2. There is a high probability the wetland will be degraded or impacted
3. Presence of exceptional natural resource value or benefits an exceptional natural resource; is of a type or function that is rare, difficult to replace, or of high watershed value; contains a rare or declining plant community; or is of a type not likely to regenerate.

This method can only be granted after considering all other mitigation methods first. Credit is allocated at 12.5 percent. This method is likely to have significant limitations to private project proponents. The granting of a permanent conservation easement on state land requires legislative authorization. Historically, the state has been hesitant to restrict use of its property due to its mission/mandate to maximize the potential to generate income from the land. Therefore, this method may not be utilized extensively.

Section 404 of the Clean Water Act allows compensatory mitigation on publicly owned lands if the credits are based solely on providing wetland functions that are over and above those provided by public programs already planned or in place. Wetland preservation is also an accepted mitigation method in the Section 404 program. To generate compensation credit, the wetlands must perform physical or biological functions that are important to the region and must be under demonstrable threat of loss or substantial degradation due to human activities that might not otherwise be restricted (Corps, 2009). Preservation is typically credited at 12.5 percent of the area preserved through legal protection by covenants, a conservation easement, or transfer of ownership to a public natural resource agency or private conservation organization.

4.1.5.1 Recommendation

Evaluate the role state and tax forfeited lands may play in mitigation. State and/or federal policy changes or additional guidance could be considered to develop a common understanding of the practical difficulties in planning and executing private mitigation projects on public land. In addition, future policy changes could consider special credit allocation for preservation of ENRV wetlands in northeastern Minnesota.

4.1.6 Strengthen Wetland Banking

Wetland bankers expressed concerns over schedules for certifying wetland bank credits due to the high costs for developing wetland banks and the slow rate of return.

4.1.6.1 Recommendation

Consider allowing certification of a higher percentage of credits early in the wetland bank development process, particularly for restoration of forested wetlands as an incentive to spur wetland banking.

4.2 Develop a Northeast Regional Wetland Mitigation Cooperative

Wetland banking in northeastern Minnesota has not kept pace with impacts and mitigation needs in the region over the past several years. There appear to be a number of factors involved in this trend, including:

- Market uncertainties – demand, investment, and economic return
- More involved wetland banking application process
- Longer wetland bank application approval times
- Lack of cost-effective wetland bank opportunities
- Uncertainty in the acceptable location for compensatory mitigation
- Uncertainty for liability for long-term wetland maintenance
- Regulatory preference for replacement in-kind, instead of types desirable to banking proponent

The concept of a wetland mitigation cooperative for northeastern Minnesota was discussed during the Northeastern Minnesota Wetland Management Strategy efforts that led to this project. The primary goals envisioned for a Wetland Mitigation Cooperative were to develop a program to:

1. Establish and ensure a self-sustaining, positive balance of wetland mitigation credits for use in northeastern Minnesota.
2. Establish wetland bank credits based on priorities for location and wetland type derived from an evaluation of historic wetland resources, opportunities within the various watersheds, impaired waters, significant natural resources, and other factors.
3. Establish wetland bank credits that have multiple ecological and societal benefits, including water quality protection/improvement, wildlife habitat, flood control, fisheries habitat protection, carbon sequestration, and biodiversity.

It is envisioned that a wetland mitigation cooperative would be managed by a public entity with oversight from an interagency committee to ensure, to the extent practicable, that impacted wetland types are replaced in-kind in watersheds where the impacts occur. Several counties in northeastern Minnesota have expressed concern that excessive mitigation is being planned in their counties to compensate for impacts occurring in other counties. The development of a wetland mitigation cooperative would provide one avenue for local concerns to be expressed regarding locating wetland mitigation. This concept is consistent with state and federal wetland regulatory programs. There are two primary hurdles for development of a wetland mitigation cooperative:

1. Identification of a public organization to manage the cooperative
2. Initial funding to develop mitigation bank credits

In June 2009, a proposal was made to the Iron Range Resources (IRR) Board soliciting funding and their interest in managing a mitigation cooperative. The IRR Board voted against funding support and did not feel

that they were equipped to manage a mitigation cooperative. Further efforts to establish such an entity could prove to be beneficial to wetland banking in northeastern Minnesota.

4.2.1 Recommendations

1. Identify potential mitigation cooperative sponsors.
2. Seek start up funding (*preliminary estimate of \$750,000*) for initial development of a cooperative in NE Minnesota to facilitate planning and permitting.
3. Develop mitigation based on priorities
 - Watershed needs based on historic losses
 - Wetland impact types
 - Water quality protection and improvement needs
4. Utilize northeast interagency wetland mitigation team to guide wetland mitigation projects funded under the cooperative.

4.3 Promote Watershed-based Wetland Management Planning

The WCA contains provisions for conducting local comprehensive wetland protection and management plans (M.R. 8420.0830). The ultimate goal of a comprehensive wetland protection and management plan is to maintain and improve the quality, quantity, and biological diversity of wetland resources within watersheds through the prioritization of existing wetlands and the strategic selection of replacement sites. The purpose of developing a plan is to provide a watershed and ecosystem-based framework to make wetland impact and replacement decisions that meet state standards and locally identified goals and support the sustainability or improvement of wetland resources in watersheds while providing local flexibility. Local plans may be developed by a local government unit or a number of local government units operating under a joint powers agreement. This is the next logical step in attempting to resolve some of the wetland mitigation conflicts inherent to northeastern Minnesota due to the unique characteristics of the region, including:

- A high percentage of land area covered by existing wetlands
- Few wetland restoration opportunities in some areas
- A shortage of wetland banking credits
- A high percentage of land in public and tribal ownership

The plan may provide for the classification of wetlands in the plan area based on:

1. An inventory of existing wetlands in the plan area;
2. An assessment of the wetland functions;

3. Landscape position, adjacent habitats or buffers, connectivity with or between important resources, projected land use, and other watershed-scale criteria; and
4. Resulting public values.

The plan must include an inventory and prioritization of replacement sites based on an analysis of the types and locations of replacement project that will provide the desired wetland functions, benefit the watershed from a landscape perspective, and best offset losses of public value caused by approved impacts. The goal of the analysis is to provide a framework from which replacement actions and locations will provide the greatest value to the public based on the ecological needs of the watershed. This project has completed an inventory of replacement sites including types and locations. Some factors have been identified that could be analyzed locally to prioritize replacement sites to benefit watersheds and offset the loss of public values. Specific areas of watersheds could be identified that would qualify as high-priority areas for wetland preservation, enhancement, restoration, and establishment to help guide mitigation planning efforts.

Through the local plan development process, the WCA allows for the implementation of local flexibility based on the unique circumstances within the plan area and the ability to maintain no net loss of wetland quantity, quality, and biological diversity over the life of the plan. Based on the classification and criteria in the plan, flexibility can be implemented through:

- Varying sequencing standards (i.e., avoidance, minimization, and replacement)
- Varying replacement standards (i.e., in-kind replacement, replacement ratios, ecological suitability, upland buffers, replacement siting, and replacement timing)
- Varying actions eligible for credit (e.g., define methods in more detail, consider alternative credit allocations)

The development of local wetland plans is an existing tool that would allow local government units to more comprehensively address wetland mitigation issues unique to each watershed or bank service area. The BWSR could promote the development of wetlands plans throughout the region by conducting training sessions and providing assistance to interested local government units in the development of joint powers agreements, budgeting, and initial planning. It may also be useful for the BWSR and the U.S. Army Corps of Engineers to develop interagency guidance regarding the applicability of local wetland plans to Section 404 of the Clean Water Act.

4.3.1 Recommendations

1. Pursue funding for wetland planning in the study area.
2. Identify three areas in which to promote wetland management plan development.
3. Identify wetland protection areas.

4. Develop model to identify critical wetlands for protection
 - This could be used by LGUs to evaluate proposed wetland impacts
5. Develop wetland mitigation priorities and identify strategic sites for mitigation.
6. General components:
 - May require multiple LGUs cooperating under a joint powers agreement
 - Watershed and ecosystem-based framework
 - Mitigation opportunity inventory provides head start
 - Wetland inventory and functional assessment needed
 - Improve consistency with federal program
7. Identify priority areas for preservation, enhancement and restoration within the northeast region.

4.4 Develop a Northeast Wetland Mitigation Registry

The Advisory Committee suggested the concept of a wetland mitigation opportunity registry in which landowners could advertise their property and interest in wetland mitigation. It was suggested that BWSR could host such a registry on their website. The registry would serve as a communication tool providing basic information on potential wetland mitigation sites of interested landowners hosted by BWSR. The initial concept is that landowners could submit a form to BWSR containing information on potential mitigation sites for posting to the registry and within the GIS Tool. A field could be added to the GIS Tool for contact information, when it was voluntarily provided by a landowner. To further promote the concept, BWSR could put out a notice informing the public of the registry, its utility, and the method for posting information. Such information may spur wetland banking activity and could be useful to project applicants for locating potential wetland mitigation sites.

Features of registry might include:

- Landowners publicize interest in mitigation
- Landowners submit preliminary banking information
- Inclusion in the GIS database

4.5 Develop BWSR programs to assist wetland mitigation in northeast Minnesota

4.5.1 Promotion of Wetland Banking

Soil and Water Conservation Districts (SWCDs) and Local Units of Government (LGUs) often serve as the first point of contact for local constituents regarding aspects of the WCA including wetland banking. In that role, some SWCDs provide assistance with wetland banking, when asked. The development of the wetland mitigation opportunity data in Phase I and the GIS Tool in Phase II may assist SWCDs and LGUs in providing more comprehensive insight into wetland banking, and possibly even promoting wetland banking. Publicizing the wetland mitigation opportunity database and GIS planning tool may also facilitate wetland bank development. The BWSR could provide more guidance to SWCDs and LGUs to help promote wetland banking

in their region, conduct periodic training sessions on the GIS Tool, and place a notice on their website publicizing the GIS Tool.

4.5.1.1 Recommendations

1. Develop and implement targeted training programs on regional wetland mitigation and banking projects for northeast LGUs to assist in streamlining the banking process.
2. Provide training for LGUs on GIS database and planning tool for management of wetland mitigation opportunities in northeast Minnesota.
3. The bank review process has been stated as a deterrent to wetland bankers. A shorter application form and/or review process be considered in northeastern Minnesota for small bank sites (e.g., <20 acres), particularly where larger mitigation opportunities are not available.
4. Consider a shorter application form and/or review process for smaller wetland banks.

4.5.2 Study of Wetland Bank Land Abandonment and Property Values

During the public outreach meetings with County Commissioners, two concerns were expressed:

- In the event that a wetland bank went bankrupt resulting in tax forfeiture of the property, counties would be left with a shortfall of tax revenue, and maintenance responsibilities for the wetland banks would fall to the counties as the manager of tax forfeit properties.
- Wetland mitigation may artificially inflate property values.

4.5.2.1 Recommendations

1. Evaluate mitigation on public lands for potential use by the public road mitigation program.
2. Conduct a study to examine the history of wetland bank tax forfeiture, and wetland banking effects on property values.

4.6 Sector Siting by Mitigation Method

4.6.1 Roads

Wetland mitigation planning for road projects in accordance with the WCA is governed by M.R. 8420.0544, which allows for statewide replacement of impacts occurring in the study area. Typically, wetland replacement is completed through the purchase of wetland bank credits from the BWSR road bank, when credits are available. BWSR occasionally solicits proposals for the development of wetland banks for deposit into the road bank. Historically, BWSR has generally been able to manage this program to maintain an adequate supply of credits for road projects.

4.6.1.1 Recommendation

Road projects are conducted by public entities and the BWSR road bank is planned and administered by a state agency. Therefore, there may be some benefit for the road program to evaluate potential for mitigation on

public lands where opportunities exist. Particularly in areas where high priority wetland restoration opportunities are limited, there could be some benefit if the road bank evaluated wetland preservation on public lands.

4.6.2 Residential and Commercial

Wetland impacts for residential and commercial projects are generally relatively small. Mitigation has historically been planned either on-site through creation or through the purchase of wetland bank credits. It is generally not practicable for projects with small impacts to pursue wetland restoration opportunities individually. Due to the lack of wetland bank credits in the region in general, and the absence of wetland bank credits in some areas, project proponents may be forced to replace outside of the project watershed or to create wetlands with higher risk of failure and potentially of lower quality.

4.6.2.1 Recommendation

Efforts to revitalize the wetland banking program in northeastern Minnesota will benefit residential and commercial projects as well as the wetland resource in the region. The development of a wetland mitigation cooperative could also increase the likelihood that sufficient wetland banking credits are available for the residential and commercial sectors.

4.6.3 Infrastructure

Wetland impacts for infrastructure projects, which include the development of public facilities (i.e., schools, airports, and other public buildings), are also generally small but some projects such as the airport expansions may be larger. Mitigation has historically been planned either on-site through creation or through the purchase of wetland bank credits. It is generally not practicable for projects with small impacts to pursue wetland restoration opportunities individually. Due to the lack of wetland bank credits in the region in general, and the absence of wetland bank credits in some areas, project proponents may be forced to replace outside of the project watershed or to create wetlands with higher risk of failure and potentially of lower quality.

4.6.3.1 Recommendation

Efforts to revitalize the wetland banking program in northeastern Minnesota will benefit infrastructure projects as well as the wetland resource in the region. The development of a wetland mitigation cooperative could also increase the likelihood that sufficient wetland banking credits are available for the residential and commercial sectors.

4.6.4 Mining

Wetland impacts associated with mining operations are typically larger in scale due to the expansive land requirements for mining. Wetland mitigation planning for mining projects has historically been through project specific mitigation or development of wetland banks specifically for use by the individual company or within the mining industry. Occasionally, mitigation is planned on-site through the development of wetlands

within tailings basins or mine pits. This strategy is typically planned for implementation during reclamation at the close of the project. The purchase of wetland bank credits from the state wetland bank credits has not been a common method of mitigation due to the lack of credits available in the region.

Therefore, the mining industry has more opportunity to pursue larger wetland restoration opportunities. However, due to the relative scarcity of restoration opportunities in many of the areas where mining occurs, the industry has experienced significant challenges in planning mitigation, particularly due to the uncertainty in the level of effort needed to exhaust opportunities within each siting level. With larger impacts and mitigation requirements, the mining industry may have more opportunity to pursue a range of mitigation methods.

4.6.4.1 Recommendation

The mining industry has indicated that there would be value in having a wetland banking program that could supply sufficient wetland mitigation credits of a variety of types located in the watersheds in which mining occurs. Having such a resource would reduce the need for significant planning efforts and would provide more certainty in permitting along with reduced long-term liabilities. The existing wetland banking program does not appear to have the capability to meet the needs of the mining industry. However, a wetland mitigation cooperative, as envisioned in the Northeastern Minnesota Wetland Management Strategy, may be better equipped to meet those needs (see Section 5.4.1.4). Regulatory flexibility could be considered to provide incentives for planning wetland mitigation into the mineland reclamation landscape. The mineland wetland and water resource assessment conducted in Phase I indicated that there should be significant potential for this strategy based on an evaluation of past mining landscapes in which wetlands developed with little to no planning for their development.

4.7 Develop Mitigation Guidelines

The general eligibility requirements for all potential wetland mitigation methods evaluated in the mitigation opportunity inventory (except enhancement of wetlands impacted by invasive and nonnative species) are defined in WCA. However, several of the methods have not been implemented to a degree where there is a common understanding of the practical difficulties associated with planning and executing high quality mitigation projects. Developing more specific guidance and a common understanding of the hurdles associated with the various mitigation methods amongst project proponents and review agencies could facilitate more consistent expectations regarding the level of effort required to fulfill the mitigation siting requirements.

4.7.1 Exceptional Natural Resource Value – Private

The general eligibility requirements for private ENRV projects in the WCA rules are threefold:

1. Restore and protect wetlands and adjacent areas to improve or directly contribute to the function and sustainability of an exceptional natural resource

2. Wetlands and adjacent areas must be determined to be exceptional by the TEP
3. Wetlands must be protected by a permanent conservation easement

Applicable exceptional natural resources to northeastern Minnesota listed in WCA, include:

1. Habitat for state-listed endangered or threatened species
2. Rare native communities
3. Special fish and wildlife resources
4. Sensitive surface waters
5. White cedar swamps
6. Floodplain and riparian wetlands and upland buffers
7. Habitat corridors with other important resources
8. Wetlands adjacent to trout waters
9. Other resources determined to be exceptional

Project eligibility and the allocation of credit are determined by the local government unit with concurrence by the TEP.

Wetland preservation is an accepted mitigation method in the Section 404 program. To generate compensation credit, the wetlands must perform physical or biological functions that are important to the region and must be under demonstrable threat of loss or substantial degradation due to human activities that might not otherwise be restricted (Corps, 2009). Preservation is typically credited at 12.5 percent of the area preserved through legal protection by covenants, a conservation easement, or transfer of ownership to a public natural resource agency or private conservation organization.

4.7.1.1 Recommendations

Two aspects of these provisions lead to significant uncertainty for project proponents in attempting to plan wetland mitigation: 1) Most of the exceptional natural resources listed in the WCA are not well-defined, and 2) The differences between state and federal wetland programs can lead to different conclusions regarding eligibility. To ensure more consistency and provide more certainty to project proponents in planning mitigation, more detailed definitions and guidance on eligibility and allocation of credit may be warranted. In addition, future policy changes could consider special credit allocation for preservation of ENRV wetlands in northeastern Minnesota.

There are differences in eligibility and credit allocation between WCA and Section 404 of the Clean Water Act regarding wetland preservation. The federal guidelines require that a demonstrable threat be documented for a

site to qualify, however, no restoration is required and wetlands do not have to be of any particular type, scarcity, or special resource. The federal guidelines allow up to 12.5 percent credit for wetland preservation. During the future development of rules, guidelines and policies; developing more consistency between state and federal wetland programs would be beneficial to the public in general.

4.7.2 Impaired Waters

The method labeled “impaired waters” refers to degraded wetlands located within an impaired watershed that have the potential for enhancement. This method may also include riparian and floodplain wetlands along an impaired watercourse that could be restored and preserved. There are no special wetland mitigation provisions within WCA or Section 404 of the Clean Water Act related to impaired waters. Currently, wetland mitigation opportunities must fit into one of the accepted mitigation methods in order to be allowed for mitigation.

4.7.2.1 Recommendation

The Advisory Committee agreed that there is value in restoring and protecting wetlands located within impaired watersheds. However, there is currently little incentive within the existing regulatory framework to restore or protect wetlands in impaired watersheds. Future state and/or federal policy changes or additional guidance could be considered to provide additional incentives or place a higher priority on wetland mitigation associated with impaired waters, possibly through the allocation of more mitigation credit when done in northeastern Minnesota. Another suggestion was to provide flexibility that would allow and/or provide incentives for in-kind wetland creation within impaired watersheds where restoration opportunities do not exist.

4.8 Next Steps

The recommendations provided in this section could be evaluated by the Interagency Wetland Group, the Board of Water and Soil Resources and other agencies involved in wetland regulation, policy, and management to determine priorities and identify leaders to pursue those of highest priority.

5.0 Advisory Committee and Outreach Meetings

5.1 Advisory Committee

The project team assembled an Advisory Committee to provide technical review and guidance of the siting process. The Committee included representatives of BWSR, the Minnesota Department of Natural Resources (MNDNR), the U.S. Army Corps of Engineers (COE), the U.S. Fish and Wildlife Service (USFWS), the Minnesota Pollution Control Agency (MPCA) Barr Engineering and Community GIS. A complete list of the Advisory Committee is found in Appendix A.

The Advisory Committee provided input on:

- Prioritization factors
- Data Refinement from Phase I for farmed wetlands and partially drained wetlands;
- Discussion of Regional needs, Priorities and Goals regarding:
 - Bank Service Areas
 - Major Watersheds
 - Mitigation Methods
 - Mitigation Site Size
 - Water Quality Improvement Needs
- GIS Data Tool design considerations and data layer options;
- Mitigation methods to be evaluated; and
- Goals and Objectives for the Public Outreach Meetings.

5.2 Outreach Meetings

The project team met with various stakeholder groups to share overall results from the Phase I Inventory, Phase II data refinement for farmed wetlands and partially drained wetlands, to provide an update on sector mitigation needs, to receive input on the GIS Tool alternatives for locating mitigation opportunities and to receive input on the identification of stakeholder priorities and goals. The stakeholder groups included representatives from Soil and Water Conservation Districts (SWCDs) & Local Government Units (LGUs), County Commissioners, Mining Interests, Wetland Bankers, State and Federal Agencies. Several attempts were made to include Tribal interest and input, but no comments were received.

During the Outreach Meetings each stakeholder group was asked about their preferences on priorities and goals concerning siting wetland mitigation within the region. The questions on goals and priorities included:

- 2) How should the following topics factor in wetland mitigation priorities?
 - a) Bank Service Area
 - b) Major watersheds

- c) Mitigation methods
 - d) Mitigation site size
 - e) Water quality improvement needs
- 3) Should priorities in wetland mitigation be based on the need for restoration methods first; and then followed by enhancement, creation, and preservation?
 - 4) Should certain sectors (i.e. mining, roads, residential/commercial development, etc.) target specific methods or types of projects?
 - 5) Should certain wetland functions be targeted?
 - 6) Should specific watershed basins be targeted?
 - 7) Should large sites be targeted only for banking, road programs, or mining?
 - 8) Should small sites be targeted only for residential/commercial or public infrastructure?
 - 9) What priority should the following take in wetland mitigation?
 - a) Special waters such as impaired waters, trout streams
 - b) Riparian wetlands
 - c) Impaired watersheds
 - d) Bank service areas

The general comments and lessons learned from the outreach meetings are discussed below.

5.2.1 SWCD, LGU and BWSR Concerns and Comments

A meeting was held in Grand Rapids on April 9, 2009 with representatives of the region's SWCDs, LGUs and BWSR staff. These groups are the key players in the implementation of WCA. It was important to receive input from the people who not only provide technical assistance to many property owners but also oversee the siting of wetland mitigation. Many of the comments received from the SWCD staff present focused around suggested changes to the regulatory process. A summary of the SWCD, LGU, and BWSR meeting notes is in Appendix B.1.

Their main comments and suggestions included:

- Can there be more credit for provided for preservation? Preservation only offers 1 acre of wetland credit for each 8 acres preserved (12.5%).
- Can the wetland banking process be stream lined because it's too complicated? Perhaps there could be a short form for processing or evaluation small banking sites?
- Use preservation to offset impacts on poor quality and low functioning wetlands.
- Should mitigation be accomplished in the watershed regardless of the costs to purchase wetland credits?

5.2.2 County Commissioners Concerns and Comments

A meeting was held with County Commissioners from the region on April 15, 2009 in Duluth. County commissioners in the greater than 80% counties have long been concerned about wetland mitigation policy in the region. Several key concerns expressed during this meeting may affect the way future siting and planning of wetland mitigation is addressed at the local level. A summary of the County Commissioners' meeting notes is in Appendix B.2.

Their comments on siting wetland mitigation included:

- Many commissioners are concerned about too much mitigation occurring within their county. They are especially concerned about the overall loss of tax revenues from active properties becoming wetland mitigation banks. Their fear is that the owners of these parcels will abandon their tax paying responsibilities and allow the properties to become tax-forfeit where the counties would then pick up the long term maintenance responsibility as the administrators of tax-forfeited properties. Under the WCA, the responsibility of maintaining the wetlands in perpetuity lies with the land owner.
- Another concern expressed was wetland credits affecting area property values. Wetland credits from banking typically sell for thousands of dollars per acre. The concern was that the demand for mitigation might artificially raise the assessed value of adjacent properties.
- County commissioners were also concerned about the lack of real mitigation opportunities within their counties.
- Many commissioners questioned the concept of requirement to replace in the same watershed when other areas of the state experience poor water quality due to previous drainage.

5.2.3 Mining Interests

A meeting was held with mining interests on April 24, 2009 in Eveleth Office of Iron Range Resources. The meeting included representatives from nearly all of the area's active iron mines and some of the non-ferrous mining interests as well. A summary of the meeting notes is in Appendix B.3.

Their comments on siting wetland mitigation included:

- The quality of wetlands created on minelands should be compared to typical wetlands in the region.
- They wished to reiterate that the wetlands evaluated just developed naturally without any planning or management and without little reclamation efforts.

- More certainty is needed in mitigation planning and in the regulatory process for mining development projects. Many mining projects take years to plan only to be upset in the middle of planning efforts by rule and policy changes.
- Concern was expressed about the penalty for out of watershed mitigation, especially when other watersheds have experienced greater wetland losses and now have poorer water quality.

5.2.4 Wetland Banker Interests

A meeting was held with BWSR and representatives of the Wetland Bankers on May 18, 2009 in Grand Rapids. Wetland banking is a needed component to streamlining the regulatory process in wetland mitigation. When considering setting goals and priorities, the biggest hurdle to mitigation is the upfront costs and the need for technical expertise in the creation of wetland banks and mitigation. A summary of the meeting notes is in Appendix B.4.

The comments of the wetland bankers included:

- When establishing a wetland bank there is a substantial risk provided in outlaying significant capital, designing a suitable wetland bank according to complicated rules, negotiating credits and credit availability, and waiting for prospective buyers to come along and purchase those credits.
- Upfront incentives are needed to stimulate more mitigation development
- Adjustments are necessary to the allowable for more flexibility in the credit release schedules (making more credits available sooner).
- Concerned about creating a level playing field for banking in which all parties do the “rule” required monitoring and other things that allow a wetland bank to be maintained in perpetuity.
- Wetland bankers suggested a minimum mitigation bank size of 20 to 30 acres be established in order to feasibly recoup the expensive initial investment of establishing a bank at a reasonable price for wetland credits.
- Restoration will be heavily favored over the other mitigation methods (enhancement, creation, and preservation). Wetland bankers will probably tend toward the greatest return on their investment (i.e. credit/cost ratio). A parcel of land can be restored and receive wetland credits of 50 to 100% of the acreage will be easier to develop at much less cost and greater profit than a preservation parcel which only receives 12% credit.
- Additional considerations for water quality enhancements may be valid but they take away from the wetland bankers who have existing banks with credits to sell.

5.2.5 State and Federal Agencies, Tribal Interests

A meeting was held with the federal and state agencies at the Inter-Agency Wetland Group meeting in St. Paul on June 9, 2009. Fond du Lac Reservation was the only band in attendance and to provide feedback. A summary of the meeting notes is in Appendix B.5.

The main comments expressed from this meeting were:

- Goals and priorities should be to match compensation needs (wetland mitigation) with the projected impacts. For replacing wetland types, higher priorities should be placed on the historical loss trends. This trend has been towards the losses of forested wetlands, bogs, and shrub swamps in the northeastern part of the state. Priorities should examine the 81 major watersheds first, and then onto the Bank Service Area of the major watershed of the impact. (USACE)
- Forested wetlands might be a key goal on and have greater opportunity on farmed wetland sites.
- Wetland banks should be encouraged to be developed to the closest point of impact possible.
- Preservation of forested wetlands on public lands may come into conflict with financial return management objectives.

5.2.6 Stakeholders Forum

A project Stakeholders Forum was held in Grand Rapids on October 19, 2009. The meeting was attended by stakeholders representing industry, LGUs, state and federal agencies. A summary of the meeting notes is in Appendix B.6.

The meeting purpose was to update stakeholders on project progress, specifically:

- Review the Phase I Inventory results,
- Review and discuss the goals and objectives of the Phase 2 Siting and Assessment, including data refinements,
- Demonstrate and receive feedback on the GIS Tool identifying wetland mitigation opportunities, and
- Review and receive feedback on the project final report recommendations.

The stakeholders expressed the following observations and comments:

- Preservation should be further explored for the northern counties.
- The GIS Tool appears to be well developed and a useful tool to search for wetland mitigation opportunities.

- There were several questions regarding credit on farmed wetlands and the documentation required.
- The Red River Valley should be considered as a potential wetland mitigation area for NE MN to assist that part of the State with flood control issues.

6.0 Phase II Data Refinement and Detailed Results

The Phase I results included the identification of nearly one million acres of wetland mitigation potential within just the farmed wetland and partially drained wetland categories. Based on field experience within the region, BWSR and the Advisory Committee concluded that the potential mitigation opportunities for these two mitigation methods appeared to be unrealistic given the regulatory requirements and technical impracticalities. Therefore, further analysis was conducted on farmed wetlands and partially drained wetlands in an effort to depict a more realistic potential for these two mitigation methods. Except for the sites that were field checked during the Phase I Inventory, farmed wetlands and partially drained wetlands were the only methods that were analyzed and classified for potential based on additional GIS analyses. The refinement methods and final wetland mitigation opportunity inventory results are discussed within Section 5.

6.1 Wetland Restoration Methods

A summary of the results for each of the mitigation methods is discussed below and illustrated in Figures 2 through 11.

6.1.1 Farmed Wetlands

6.1.1.1 Data Refinement

There are two provisions within the WCA that allow wetland replacement credit for restoring farmed wetlands: 1) restoration of partially drained wetland areas (M.R. 8420.0526, Subp. 4), and 2) vegetative restoration of farmed wetlands (M.R. 8420.0526, Subp. 5). Partially drained wetlands that have been in seeded crops for at least ten of the past 20 years are eligible for 50 to 100 percent credit. Partially drained wetlands that have been in seeded crop production for less than ten of the past 20 years are eligible for up to 50 percent credit. Section 404 of the Clean Water Act also allows wetland mitigation credit for restoring partially drained, farmed wetlands and farmed wetlands with no hydrologic modifications. The former method is eligible for 50 to 100 percent credit depending on the degree of hydrologic modification and restoration. The restorations of wetlands with unaltered hydrology that have been row-cropped during at least six of the past ten years are eligible for 50 percent credit. Therefore, given the range of conditions for eligibility and credit allocation, 50 percent credit was assumed for the restoration of farmed wetlands in all efforts to estimate potential mitigation credits.

BWSR staff field experience has indicated that much of the agricultural activity in the northeastern part of the state is composed of hay production and/or pasturing, not annual seeded crop production; thereby, reducing the potential eligibility for wetland restoration credit. Eligibility for credit under the WCA is based on the documentation of seeded crop history over the previous twenty years. Therefore, farmed wetland mitigation opportunities were further analyzed to determine the likely regulatory eligibility by intersecting the most current USDA cropland data (2008) with the potential farmed wetland mitigation sites. The intersection of the

Phase I farmed wetland polygon data with 2008 USDA cropland from raster imagery was categorized into high, medium, and low potential based on the following criteria:

1. High potential - If 20% or more of an identified farmed wetland polygon intersected with seeded crops
2. Medium potential - If there was less than 20% of the farmed wetland polygon intersected with seeded crops, or greater than or equal to 20% of the farmed wetland polygon intersected with pasture land, hay land, or idle cropland adjacent to a stream
3. Low potential - Sites with undocumented seed crops or less than 20% of the farmed wetland polygon intersected with pasture land, hay land, or idle cropland adjacent to a stream

It is important to note that the 2008 cropland data did not include wild rice or sod farms, therefore, it is likely that greater potential for these farmed wetland areas exists.

6.1.1.2 Results

Only 17 percent (115,217 acres) of the farmed wetland potential acreage identified in Phase I was rated as having high potential based on regulatory eligibility (Table 6-1). An additional 19,900 acres of wild rice farms and sod farms are estimated to be present within the study area, which also represent sites with high potential (Table 3-1). Wild rice production is considered an eligible agricultural practice for mitigation, but sod production is not. However, sod production is typically only successful where complete or partial drainage of hydrology is maintained. The high potential farmed wetlands are estimated to make up nearly half of the potential mitigation credits in the region, a total of almost 67,600 acres (Table 3-1). Over 94 percent of the high potential area exists in eight of the eighteen counties (Aitkin, Beltrami, Clearwater, Crow Wing, Isanti, Lake of the Woods, Mille Lacs, and Pine) as shown in Table 6-1. Lake of the Woods County comprises about 32 percent of the high potential farmed wetland opportunities in the study area. No farmed wetlands with high potential were identified in Carlton, Cook, Hubbard, or Lake counties. Figure 2 illustrates the distribution of farmed wetland potential for sites over 20 acres.

Table 6-1 Farmed Wetlands Statistics (sites over 20 acres)

County	High Potential			Medium Potential		Low Potential		Total	
	# of Sites	GIS Located (Acres)	Est. Wild Rice and Sod (Acres)	# of Sites	Acres	# of Sites	Acres	# of Sites	Acres
Aitkin	6	3,845	6,300	75	53,941	293	15,787	374	73,573
Beltrami	42	13,522	3,000	111	20,737	193	12,683	346	46,942
Carlton	0	0	0	10	1,154	96	4,962	106	6,116
Cass	2	137	0	34	2,409	155	7,082	191	9,627
Clearwater	32	8,403	7,000	45	22,421	49	1,870	126	32,694
Cook	0	0	0	0	0	3	210	3	210
Crow Wing	15	6,347	300	92	9,300	152	7,938	259	23,585
Hubbard	0	0	0	4	161	16	458	20	620
Isanti	169	22,590	0	113	11,422	42	1,780	324	35,791
Itasca	2	45	400	21	2,076	308	15,593	331	17,714
Kanabec	30	2,093	0	99	7,723	87	3,595	216	13,411
Koochiching	11	3,773	300	50	18,638	374	22,322	435	44,733
Lake	0	0	0	0	0	3	81	3	81
Lake of the Woods	79	43,808	300	85	21,970	164	12,194	328	77,972
Mille Lacs	50	4,475	0	160	15,052	138	6,264	348	25,791
Pine	35	5,704	1,900	79	14,786	125	5,654	239	26,144
St Louis	0	0	400	46	44,249	1,313	158,837	1,359	203,086
Wadena	12	475	0	104	19,592	190	11,296	306	31,363
Total	485	115,217	19,900	1,128	265,629	3,703	288,606	5,314	689,352
Percent of Total	9%	17%	3%	21%	38%	70%	42%	100%	100%

Note: This table does not include landowner interest, which may reduce the potential.

6.1.2 Partially Drained Wetlands

6.1.2.1 Data Refinement

The restoration of partially drained wetlands (without agricultural history) is allowed up to 50 percent credit by the WCA (M.R. 8420.0526, Subp. 4). Section 404 of the Clean Water Act also allows wetland mitigation credit for restoring partially drained wetlands, which is termed “rehabilitation.” Wetland mitigation credit ranges from 50 to 100 percent credit depending on the degree of hydrologic modification and restoration. Given the range of credits applied, estimations of wetland mitigation credit in this study were computed assuming 50 percent credit.

Partially drained wetland mitigation areas were identified in five counties containing extensive peatlands (Aitkin, Beltrami, Koochiching, Lake of the Woods and St. Louis Counties). The partially drained wetland mitigation opportunities identified are primarily comprised of large, relatively flat, ditched peatland complexes, typically on the order of thousands to tens of thousands of acres in size. However, smaller areas of potential partially drained wetlands were also identified. Many of the ditch systems cross multiple landowners

with many higher order ditches being fed by numerous upstream tributaries. Restoration of a ditched, partially drained, flat peatland can result in raising water levels far upstream. One premise of the wetland mitigation programs is that all landowners affected by wetland restoration activities be agreeable to the planned hydrologic changes to their property. Therefore, the feasibility of restoring partially drained wetlands located near the downstream end of a large wetland complex (with higher order ditches and numerous affected landowners) is lower than for headwater wetland areas. BWSR and the Advisory Committee agreed a re-examination of partially drained wetland polygons was warranted, limiting high potential sites to first order ditches (only one tributary) and to single ownership. The data refinement identified the potential restoration sites located in headwater areas as those with the highest potential for success.

Partially drained wetlands may also be associated with county judicial ditch systems. Restoration of wetlands adjacent to judicial ditch systems has a much higher degree of uncertainty than restoring wetlands along private ditch systems. In order to restore wetlands along a judicial ditch system, the ditch would typically have to be abandoned through the ditch abandonment process, which includes public hearings and agreement by all benefitted parties. It is important to determine the realistic potential of the restoration credit for partially drained wetlands. The potential rating criteria were developed based on the likelihood of being able plan and execute restoration. The chance of restoration success increases as the number of landowners decreases. Therefore, the wetlands adjacent to ditch segments with one or two property owners at the headwaters of the ditch system have a higher potential for restoration. Moving down the ditch system, the potential for planning wetland restoration without affecting other properties diminishes. The restorations of wetlands along main arterial ditches were classified as having no potential. Restoring wetlands along an arterial ditch would have great potential to flood upstream properties along numerous tributaries or affect infrastructure such as roads and utilities. The potential based on the number of property owners is identified in Table 6-2.

Table 6-2 Partially Drained Wetland Restoration Potential Criteria

Potential	Basis for Potential	Hydrologic Reasoning
High	1 owner	Up to second order tributaries
Medium	2-3 owners	Third and fourth order tributaries
Low	>3 owners	Third order and greater tributaries
None	Main arterials of the ditch system	Greater than fourth order tributaries

6.1.2.2 Results

As a result of this data refinement, high potential, partially drained wetlands only represent 14 percent of the total Phase I estimate. In addition, approximately 207,500 acres of the partially drained wetlands identified (60 percent) were determined to have no potential. Aitkin, Koochiching, and St. Louis Counties have the highest potential for this restoration method as indicated in Table 6-3. Figure 3 illustrates the high, medium, low and no potential for partially drained wetlands.

Table 6-3 Partially Drained Wetland Statistics - Selected Counties (sites over 20 acres)

County	High Potential		Medium Potential		Low Potential		No Potential		Total	
	# of Sites	Acres	# of Sites	Acres	# of Sites	Acres	# of Sites	Acres	# of Sites	Acres
Aitkin	106	14,515	125	11,049	12	924	88	12,724	331	39,213
Beltrami	70	5,747	111	12,086	17	2,527	135	76,807	333	97,168
Koochiching	89	12,917	53	6,974	15	5,461	61	43,354	218	68,706
Lake of Woods	91	5,471	110	14,777	15	3,887	66	43,815	282	67,950
St Louis	166	11,048	223	22,455	55	7,805	112	30,821	556	72,129
Total	416	49,698	497	67,341	102	20,604	374	207,521	1,389	345,166

Note: This table does not include landowner interest which may reduce the potential acres.

High potential, partially drained wetland mitigation opportunities make up 15 percent of the total potential area. Despite the fact that partially drained wetland restorations are only eligible for about 50 percent credit, partially drained wetlands comprise almost 18 percent of the total potential mitigation credits (Table 3-1).

6.1.3 Drained Wetlands

Drained wetlands are eligible for the highest percentage of potential credits (100 percent) under both state and federal wetland programs due to a gain in both wetland acres and wetland functions. Over eighty percent of the drained wetland potential was identified in five counties: Aitkin, Beltrami, Clearwater, Lake of the Woods, and St. Louis. A total of 17,939 acres of potential drained wetland mitigation was identified (Table 6-4).

While potential drained wetland mitigation opportunities make up only six percent of the total potential mitigation area, the potential credits make up 15 percent of the total (Table 6-4). The inventory did not indicate any drained wetland potential for the counties of Carlton, Cook, Hubbard, Itasca and Lake. The results for all drained wetlands are graphically displayed in Figure 4.

Table 6-4 Drained Wetland Statistics (sites over 20 acres)

County	# of Wetland Sites	Total Acres
Aitkin	45	2,888
Beltrami	55	3,086
Carlton	0	0
Cass	2	48
Clearwater	36	3,241
Cook	0	0
Crow Wing	3	98
Hubbard	0	0
Isanti	5	524
Itasca	0	0
Kanabec	18	517
Koochiching	15	543
Lake	0	0
Lake of the Woods	68	3,268
Mille Lacs	21	694
Pine	6	582
St. Louis	36	1,930
Wadena	14	520
Total	324	17,939

Note: This table does not include landowner interest, which may reduce the potential acres.

The three highest priority wetland mitigation methods, based on state and federal regulatory programs, are the wetland restoration methods: farmed wetlands, partially drained wetlands, and drained wetlands. Together, those three methods make up 53 percent (208,762 acres) of the total potential wetland mitigation area identified and 72 percent (113,351 acres) of the potential wetland mitigation credits identified. However, the potential wetland restoration areas are not evenly distributed throughout the region. Approximately 63 percent of the potential restoration area is located in four counties (Aitkin, Beltrami, Isanti, and Lake of the Woods) and over 88 percent is located in seven counties (Aitkin, Beltrami, Clearwater, Isanti, Koochiching, Lake of the Woods, and St. Louis).

6.2 Wetland Preservation Methods

6.2.1 Restoration and Protection of Exceptional Natural Resource Value (ENRV) Wetlands on Private Land

The Wetland Conservation Act allows wetland replacement credits for the restoration and protection of exceptional natural resource value wetlands (ENRV) on private lands (M.R. 8420.0526, Subp. 8). Exceptional natural resource value wetlands include:

1. Calcareous fens
2. White cedar swamps

3. Floodplain or riparian wetlands and upland buffers
4. Habitat corridors with other important resources
5. Wetlands adjacent to designated trout waters
6. Habitat for state-listed endangered or threatened species
7. Rare native plant communities
8. Special fish and wildlife resources (e.g., fish passage and spawning areas, colonial water bird nesting colonies, migratory waterfowl concentration areas, deer wintering areas, and wildlife travel corridors)
9. Other resources determined to be exceptional by the technical evaluation panel

To be eligible for credit, the action must improve or directly contribute to the function and sustainability of the exceptional natural resource. Wetland replacement credit is determined by the local government unit with the concurrence of the technical evaluation panel. The WCA Guidance Paper 2003-1 suggests 12.5 percent credit for the preservation of ENRV wetlands protected with a permanent conservation easement. Section 404 of the Clean Water Act allows wetland mitigation credit for the preservation of wetlands that involves the removal of a threat to the wetland or preventing degradation of wetland functions by an action that is outside of regulatory authorities (e.g., logging of a cedar swamp, or maintenance of an established ditch system). Wetlands eligible for preservation should generally have at least one function rated high and three or more functions rated medium as a result of a MNRAM assessment. Credit allocation is also suggested at 12.5 percent of the area that is legally protected. Estimations of wetland mitigation credit in this study were computed assuming 12.5 percent credit.

6.2.1.1 Results

Nearly 40,000 acres of potential private land ENRV wetlands (greater than 20 acres in size) were identified within the study area (Table 6-5). However, due to the low credit allocation for preservation, potential private ENRV wetland preservation areas only account for less than four percent (4,775 credit acres) of the potential mitigation credit (Table 3-1). Over 90 percent of the potential acreage on private lands is located in nine counties: Aitkin, Cass, Crow Wing, Isanti, Kanabec, Lake of the Woods, Pine, St. Louis, and Wadena (Table 6-5). Figure 5 illustrates that most of the private ENRV potential is concentrated in the southern quarter of the study area. Carlton County was the only county that did not have ENRV potential on privately owned parcels.

Table 6-5 Private Land ENRV Statistics (sites over 20 acres)

County	# of Private ENRV Sites	Total Acres
Aitkin	35	5,723
Beltrami	11	419
Carlton	0	0
Cass	38	2,617
Clearwater	7	370
Cook	8	323
Crow Wing	60	3,543
Hubbard	4	138
Isanti	78	3,322
Itasca	11	327
Kanabec	42	4,222
Koochiching	22	1,115
Lake	6	212
Lake of the Woods	21	1,812
Mille Lacs	6	198
Pine	36	2,081
St. Louis	85	6,431
Wadena	57	5,344
Total	527	38,199

Note: This table does not include landowner interest, which may reduce the potential acres.

6.2.2 Wetland Preservation on Land Owned by the State or Local Unit of Government

Only within the study area is wetland replacement credit allowed in Minnesota by the WCA for the preservation of wetlands on lands owned by the state or local unit of government (M.R. 8420.0526, Subp. 9). Exceptional natural resource value wetlands are defined similarly to those described in Section 5.2.1. One additional eligibility requirement is that there must be a high probability that the wetland will be degraded or impacted in the future. Wetland replacement credit is allocated at 12.5 percent of the area protected by a permanent conservation easement. Land ownership is not a factor considered for wetland preservation under Section 404 of the Clean Water Act. The same provisions and credit allocation for preservation apply to wetlands located on public lands as discussed in Section 5.2.1. Credit was assumed at 12.5 percent for credit estimation calculations performed for this project.

6.2.2.1 Results

Slightly over 13,000 acres of public wetland preservation mitigation potential was identified within the study area (Table 6-6), which only represents about one percent of the potential mitigation credits estimated (Table 3-1). Opportunities were found in all but Carlton and Hubbard counties. The potential for preservation of ENRV wetlands on federal or tribal lands was not evaluated as part of this study. Nearly two thirds (62 percent) of the public land preservation potential was located in St. Louis County (Table 6-6). The remaining 38 percent of the identified polygons are scattered across 15 counties as shown on Figure 6. Opportunities

within portions of the study area may not be identified as completely as others because the County Biological Survey (CBS) data was not available for all counties. The CBS has not been completed for Beltrami, Clearwater, Koochiching, and Lake of the Woods counties or the northern parts of Cook, Lake, and St. Louis counties.

**Table 6-6 Wetland Preservation Statistics County & State Lands
(sites over 20 acres)**

County	# of Pres. Sites	Total Acres
Aitkin	10	407
Beltrami	3	622
Carlton	0	0
Cass	6	140
Clearwater	1	42
Cook	2	138
Crow Wing	13	573
Hubbard	0	0
Isanti	1	21
Itasca	3	103
Kanabec	5	186
Koochiching	12	458
Lake	4	173
Lake of the Woods	5	135
Mille Lacs	10	823
Pine	10	496
St. Louis	86	8,263
Wadena	7	695
Total	178	13,275

Note: This table does not include County Board or State Agencies' interest, which may reduce the potential acres.

6.2.3 White Cedar

The restoration and protection of white cedar swamps on private land is allowed under the ENRV provisions of the WCA (M.R. 8420.0526, Subp. 8), for which, 12.5 percent credit is typically allocated. Preservation of relatively non-degraded white cedar swamps is generally eligible for mitigation credit under Section 404 of the Clean Water Act with mitigation credit allocated at 12.5 percent. Estimations of wetland mitigation credit in this study were computed assuming 12.5 percent credit.

6.2.3.1 Results

Approximately 7,500 acres of white cedar swamps were identified throughout the study area (Table 6-7), which represents about two percent of the total potential mitigation areas identified within the study area (Table 3-1). The estimated mitigation credits account for less than one percent of the total, potential credits (Table 3-1). White cedar preservation opportunities were only identified in nine of the eighteen counties. Approximately 75 percent of the potential is located in St. Louis County, with another 21 percent located in

four other counties: Aitkin, Beltrami, Itasca and Koochiching. Figure 7 illustrates the spatial distribution of the potential opportunities and Table 6-7 summarizes the number of sites and acreage for potential wetland preservation areas 20 acres or more in size.

Table 6-7 White Cedar Statistics (sites over 20 acres)

County	# of Sites	Total Acres
Aitkin	9	307
Beltrami	6	194
Carlton	0	0
Cass	2	53
Clearwater	0	0
Cook	4	108
Crow Wing	0	0
Hubbard	0	0
Isanti	0	0
Itasca	25	795
Kanabec	0	0
Koochiching	11	297
Lake	3	65
Lake of the Woods	2	69
Mille Lacs	0	0
Pine	0	0
St. Louis	157	5,604
Wadena	0	0
Total	219	7,492

Note: This table does not include landowner interest, which may reduce the potential acres.

6.2.4 Trout Streams

The restoration and protection of wetlands located adjacent to designated trout streams is allowed under the ENRV provisions of the WCA (M.R. 8420.0526, Subp. 8), for which, 12.5 percent credit is typically allocated. Preservation of riparian trout stream wetlands is generally eligible for mitigation credit under Section 404 of the Clean Water Act with mitigation credit allocated at 12.5 percent. Estimations of wetland mitigation credit in this study were computed assuming 12.5 percent credit.

6.2.4.1 Results

Nearly 7,000 acres of wetlands adjacent to designated trout streams were identified that may have the potential for preservation (Table 6-8) accounting for less than one percent of the total potential mitigation credits (Table 3-1). Figure 8 shows the distribution of potential wetland preservation opportunities adjacent to trout streams in the region. Table 6-8 shows that trout stream preservation opportunities are only found within the ten of the eighteen counties. Over 70 percent of the potential lies in St. Louis County and 75 percent of trout stream

wetlands are located within the Lake Superior watershed. The remainder of the opportunities is found in seven other counties.

Table 6-8 Trout Stream Statistics (sites over 20 acres)

County	# of Sites	Total Acres
Aitkin	3	122
Beltrami	0	0
Carlton	2	61
Cass	1	34
Clearwater	8	380
Cook	21	829
Crow Wing	0	0
Hubbard	0	0
Isanti	0	0
Itasca	1	21
Isanti	0	0
Koochiching	4	132
Lake	3	108
Lake of the Woods	0	0
Mille Lacs	0	0
Pine	0	0
St. Louis	92	4,902
Wadena	6	285
Total	141	6,874

Note: This table does not include landowner interest, which may reduce the potential acres.

6.2.5 Impaired Waters

Section 303(d) of the Clean Water Act requires that states identify impaired waters and set pollutant reduction goals to restore those waters. Wetlands play a role in protecting water quality within streams and lakes. Therefore, the restoration and/or preservation of wetlands within impaired watersheds may serve as one tool in meeting the federal water quality requirements. The restoration or protection of wetlands adjacent to streams within impaired watersheds may be eligible for wetland replacement credit under the ENRV provisions of the WCA (M.R. 8420.0526, Subp. 8) as riparian or floodplain wetlands. In accordance with Section 404 of the Clean Water Act, moderate to high quality riparian wetlands located within impaired watersheds may be eligible for wetland mitigation credit through preservation. Restoration and/or protection of riparian wetlands in impaired watersheds would likely be eligible for 12.5 percent credit under both state and federal regulatory programs.

6.2.5.1 Results

Over 20,000 acres of potentially eligible wetlands were identified adjacent to streams within impaired watersheds that make up over two percent of the potential wetland mitigation credits estimated (Table 6-9).

Figure 9 illustrates the potential opportunities around impaired waters based on the 2008 impaired waters data. The results are generally clustered within the impaired watersheds in the study area. Over 80 percent of this potential is concentrated within five counties: Aitkin, Carlton, Clearwater, Mille Lacs, and St. Louis. Most of the opportunities identified are located in the Clearwater, Little Fork, Mississippi, Rum, and St. Louis River watersheds. Table 6-9 summarizes the number of sites with more than 20 acres of potential, and the total acreage of impaired waters wetland potential within fourteen counties.

Table 6-9 Impaired Water Statistics (sites over 20 acres)

County	# of Sites	Total Acres
Aitkin	52	2,988
Beltrami	8	294
Carlton	28	2,032
Cass	0	0
Clearwater	15	1,428
Cook	0	0
Crow Wing	1	26
Hubbard	0	0
Isanti	3	203
Itasca	19	613
Kanabec	27	923
Koochiching	18	912
Lake	0	0
Lake of the Woods	5	203
Mille Lacs	103	4,584
Pine	14	548
St. Louis	124	6,426
Wadena	8	313
Total	425	21,494

Note: This table does not include landowner interest, which may reduce the potential acres.

Potential wetland preservation areas make up 36 percent (140,866 acres) of the total potential wetland mitigation area identified and only 8 percent (17,608 acres) of the potential wetland mitigation credits estimated. However, the potential wetland preservation areas are not evenly distributed throughout the region. Approximately 58 percent of the potential preservation area is located in four counties (Aitkin, Mille Lacs, St. Louis, and Wadena) and 76 percent is located in eight counties (Aitkin, Crow Wing, Itasca, Kanabec, Koochiching, Mille Lacs, St. Louis, and Wadena).

6.3 Wetland Enhancement

6.3.1 Invasive Species

Restoration of vegetation within wetlands degraded by invasive and nonnative vegetation was an allowable wetland replacement method in the WCA rules at the time the Phase I inventory was conducted. However, the

WCA rules that went into effect in August 2009 no longer allow such actions for replacement credit. Section 404 of the Clean Water Act does allow the enhancement of wetlands degraded by invasive species as a suitable wetland mitigation method. Such actions require long-term management plans and financial assurance and are allocated 33 to 50 percent credit. Since this method is no longer allowed under the WCA, it is less likely to be utilized for wetland mitigation in Minnesota. For this study, a credit allocation of 30 percent was used for estimating the potential credits. Invasive species enhancement opportunities were only identified for wetlands degraded by purple loosestrife. Digital data is not currently available for other invasive species such as reed canary grass. The project only utilized digital data what was available at the time the inventory was conducted.

6.3.1.1 Results

Table 6-10 shows the acreage and number of sites identified within each county. Figure 10 displays these opportunities spatially throughout the study area. Nearly 17,000 acres of wetlands affected by purple loosestrife were identified during the inventory. However, this data is based solely on point source occurrences of purple loosestrife provided by the Minnesota DNR. The inventory assumed that the entire wetland within which the point data intersected was impacted by purple loosestrife. Therefore, the actual area of potential wetland enhancement may be smaller than depicted. Wetland enhancement is no longer allowed by the Wetland Conservation Act rules.

Table 6-10 Invasive Species Statistics (sites over 20 acres)

County	# of Sites	Total Acres
Aitkin	13	670
Beltrami	3	174
Carlton	3	1,266
Cass	14	3,126
Clearwater	0	0
Cook	1	44
Crow Wing	14	665
Hubbard	6	2,114
Isanti	2	60
Itasca	10	929
Kanabec	0	0
Koochiching	1	106
Lake	1	26
Lake of the Woods	0	0
Mille Lacs	1	38
Pine	5	859
St. Louis	61	6,552
Wadena	2	99
Total	137	16,728

Note: This table does not include landowner interest, which may reduce the potential acres.

6.4 Wetland Creation Methods

6.4.1 Gravel Pits

Wetland creation is an acceptable, but lower priority wetland mitigation method that involves converting upland areas into wetland. Credit allocation differs between state and federal wetland regulations: the WCA allows 75 percent credit and Section 404 of the Clean Water Act allows a range from 50 to 100 percent, depending on the risk of failure and connectivity to other wetlands. Within much of the study region, upland areas are predominantly forested habitats. Conversion of forested uplands to wetlands has not been considered an appropriate mitigation method under the federal wetland program. During the inventory of potential wetland mitigation sites, the only known data that would help assist with identifying wetland creation opportunities, is the location of gravel pits. Gravel/aggregate extraction is often completed once the water table is encountered and gravel pits must be reclaimed upon completion. Therefore, the development of wetlands can be the most fitting reclamation strategy, recognizing that significant effort is generally required to develop high quality, sustainable wetlands.

6.4.1.1 Results

Nearly 17,000 acres of potential wetland creation sites greater than 20 acres in size (less than 300 sites), were identified across the study area, which represents about eleven percent of the potential mitigation credits estimated (Table 6-11). An additional 10,000 acres within over 1,000 sites smaller than 20 acres in size were also identified. Almost 60 percent of all potential wetland creation sites identified are located in St. Louis County. Figure 11 illustrates that a large concentration of potential is located along the Mesabi Iron Range. It is possible that many of the sites identified may be former mine pits. Table 6-11 shows that most of the remaining potential is concentrated in Crow Wing, Itasca, and Pine counties.

6.5 Field Checked Data

Figure 12 illustrates the field checked data from the Inventory of Phase I. Each general method (restoration, preservation, enhancement, and creation) were evaluated in each of the 18 counties in order to test the GIS model and evaluate the potential for each wetland method across the region. All sites that were rated for having a high potential are identified in red. It can be seen in Figure 12 that most of the high potential observed from the field checked sites were found on the southern and western portions of the region.

Table 6-11 Gravel Pit Statistics (Over 20 Acres)

County	# of Sites	Total Acres
Aitkin	1	28
Beltrami	6	234
Carlton	4	106
Cass	1	80
Clearwater	1	34
Cook	5	313
Crow Wing	27	1,231
Hubbard	0	0
Isanti	3	115
Itasca	36	1,716
Kanabec	1	21
Koochiching	9	724
Lake	5	175
Lake of the Woods	25	877
Mille Lacs	2	45
Pine	26	1,127
St. Louis	139	9,989
Wadena	1	46
Total	292	16,861

Note: This table does not include landowner interest, which may reduce the potential acres.

7.0 Mitigation Siting Analysis

7.1 Prioritization Factors

To effectively establish goals and priorities for mitigation during Phase II, it is important to have the ability to sort data by a number of different prioritization factors. BWSR and the Advisory Committee concluded that the following prioritization factors be incorporated into the GIS Tool:

- **Wetland Mitigation Method** –The GIS Tool identified polygons associated with specific methods described in the general categories of restoration, preservation, enhancement, and creation. Restoration is the method preferred by state and federal wetland programs.
- **Land Ownership** – General ownership categories, including State, Tax-forfeit, County, Private and Private (Industrial) Lands were compiled during the GIS modeling analysis and were verified in more detail for selected sites during field verification. Tribal and Federal lands were not analyzed because conservation easements (required for mitigation) historically have not been possible on these lands.
- **Water Quality/Impaired Waters** – Wetlands play an important role in maintaining water quality. Therefore, the proximity of potential wetland mitigation sites to impaired streams or lakes or their watersheds was noted during the GIS modeling analysis, recognizing the role restored wetlands could play in moderating impairments.
- **Technical Feasibility** – The GIS modeling methods used to identify potential wetland mitigation sites could not fully assess technical feasibility. The technical feasibility of selected sites was evaluated during field verification efforts of the Inventory during Phase I. Ultimately, technical feasibility will have to be decided when evaluating potential sites on the ground.
- **Watershed Location** – The Wetland Conservation Act and Section 404 of the Clean Water Act require that wetland replacement be conducted within the project watershed, when feasible. Therefore, it was important to the Advisory Committee to identify the major and minor watersheds, as well as the wetland Bank Service Area in which each potential wetland mitigation site lies. It was also suggested by the Advisory Committee that the wetland hydrologic setting and landscape setting be considered in prioritizing mitigation in an effort to replace wetland functions related to the key hydrologic components.

In addition to the prioritization factors described above, other specific information related to each potential mitigation site was compiled. The information outlined below may assist in analyzing the data and determining mitigation goals and priorities.

- County Location – The Wetland Conservation Act currently gives some preference to replacing unavoidable wetland impacts within the county where the impacts occur. Some of the stakeholders also indicated a preference for maintaining wetland resources within each county. The GIS modeling analysis and field verification efforts were conducted on a county-by-county basis and the county location was compiled for all potential mitigation sites.
- Potential Wetland Mitigation Site Size – The potential acreage was identified for each site during the GIS modeling analysis and was verified during field verification efforts for selected sites. In addition, the Advisory Committee suggested considering the size of the wetland basin/complex in which impacts occur as well as the size of mitigation wetland basins to improve wetland functions that may be affected by the size of the wetland.
- Landowner Interest – Landowner interest in wetland mitigation was assessed for selected sites during the field verification efforts of Phase I. This data can be found in the GIS Tool Database.

Two additional prioritization factors were suggested by the Advisory Committee, but the data are currently not available for inclusion in the GIS Tool.

1. The MN DNR identified species of greatest conservation need in their Comprehensive Wildlife Conservation Strategy (MN DNR, 2006). The species identified are animal species whose populations are rare, declining, or vulnerable in Minnesota. It is thought that regions within northeastern Minnesota could be mapped with habitat value to a suite of wetland-dependent species. That mapping could then be used as a prioritization factor for mitigation in the GIS Tool in the future and could be used as additional justification for ENRV wetland restoration and protection.
2. Historical wetland loss data would be helpful in prioritizing mitigation to replace wetland types lost historically. This data could be developed by comparing historic wetland data (i.e., Marschner, et al., 1930) with current wetland inventory data. However, a suitable comprehensive inventory of wetland distribution and wetland types within the region has not been completed.

7.2 Mitigation Opportunity Watershed Analysis

There are three major drainage basins within the study area: 1) Great Lakes (Lake Superior), 2) Mississippi River, and 3) Red River comprised of 35 major watersheds (Figure 1). The Great Lakes basin contains five watersheds and the Mississippi River and Red River basins each contain 15 watersheds. The results of the wetland mitigation inventory are summarized by major watershed in Table 7-1 and Table 7-2 and the unique circumstances within each major basin and specific individual watersheds are discussed further in this section. It is important to remember in this analysis that the actual process for determining suitability of sites for wetland mitigation and approval of wetland replacement sites is laid out in Minnesota Rules 8420 and in Section 404 of the Clean Water Act. Some sites identified (or omitted) as part of the inventory project are

subject to determination of whether or not they meet the replacement standards of the Wetland Conservation Act by local government units. Landowners interested in project specific wetland replacement plans and banking plans must submit applications to the local government unit with jurisdiction and are subject to approval or denial decisions by the LGU.

7.2.1 Great Lakes (Lake Superior) Basin

Over 800 potential mitigation sites (greater than 20 acres in size) were identified within the Great Lakes basin encompassing nearly 52,000 acres. Over 55 percent of the wetland mitigation potential in the Great Lakes basin is from preservation methods while only 22 percent is composed of restoration methods. Only one high potential, farmed wetland area was identified within any of the major watersheds in the Great Lakes basin (Table 7-1). Drained wetlands were only identified in the St. Louis River watershed. The drained wetlands are focused in the central part of the watershed where ditches have not been maintained on a regular basis. Therefore, the drained wetland potential may be overestimated. No potential restoration sites were identified within the Lake Superior – North or Nemadji River watersheds. The restoration method with the largest area in the Great Lakes Basin is partially drained wetlands, which are concentrated in the large peatlands within the center of the watershed.

While wetland preservation represents the largest area of mitigation potential, it only accounts for about one-third of the estimated mitigation credits. Each preservation method makes up nearly an equal percentage of the identified area. Potential wetland creation sites are primarily focused along the Mesabi Iron Range, many of which may not serve as viable mitigation sites because many areas have probably been inactive for more than 10 years, which is a limitation within the WCA.

7.2.2 Mississippi River Basin

Over 1,300 potential mitigation sites (greater than 20 acres in size) were identified within the Mississippi River Basin encompassing nearly 135,000 acres. Over 56 percent of the wetland mitigation potential in the Mississippi River basin is from priority restoration methods while 32 percent is composed of preservation methods. White cedar swamps, and wetlands adjacent to trout streams are of limited extent within the basin, each only comprising 0.5 percent or less of the total area. High potential farmed wetlands have the most potential of any single method, including over 40 percent of the area. Drained wetlands are predominantly located in four watersheds (encompassing 84 percent of drained wetlands within the basin) including: Mississippi River-Brainerd, Rum River, Mississippi River-Grand Rapids, and Snake River watersheds in order from highest to lowest potential (Table 7-1). Almost half of the farmed wetland potential is located in the southern part of the basin (Rum River watershed), with few opportunities in the northern half of the basin (Figure 2). The restoration method with the largest area in the Mississippi River Basin is farmed wetlands. The majority of the preservation potential (63 percent) is due to private land ENRV, which is concentrated in the central and southern parts of the basin (Figure 5). Wetlands associated with impaired watersheds make up

over 25 percent of the preservation potential, primarily connected to the Mississippi, Rum, and Snake Rivers (Figure 9).

Small potential mitigation sites (20 acres or less) add about 28,000 acres of potential in the basin (Table 7-2). The most prevalent methods comprising the small sites are wetlands associated with impaired waters, private land ENRV, gravel pits, and white cedar.

Wetland restoration represents the largest area of all mitigation potential (46 percent) followed closely by wetland preservation methods (40 percent). However, restoration methods account for about 67 percent of the estimated mitigation credits in the basin with preservation and creation each contributing about 14 percent.

7.2.3 Red River Basin

Over 900 potential mitigation sites (greater than 20 acres in size) were identified within the Red River basin encompassing almost 137,000 acres. Over 84 percent of the greater than 20 acre potential wetland mitigation sites in the Red River basin is from priority restoration methods. Wetland preservation comprises about eleven percent of the area, while enhancement and creation each comprise 3 percent of the potential area or less. High potential farmed wetlands are the most predominant of any single method, including 58 percent of the larger site potential. Drained wetlands are primarily located in three watersheds in the far western part of the basin (encompassing 73 percent of drained wetlands within the basin) including: Clearwater River, Thief River, and Lake of the Woods watersheds in order from highest to lowest potential (Table 7-1, Figure 4). Over 87 percent of the farmed wetland potential is located in the northwestern corner of the basin, in the Lake of the Woods, Rainy River-Baudette, Thief River, and Clearwater River watersheds (Figure 2). Partially drained wetlands are focused within watersheds in the western half of the basin and comprise over 18 percent of the potential (Table 7-1, Figure 3). Less than 200 acres of mitigation potential each, was identified within the Red Lake River, Roseau River, and Wild Rice River watersheds. The two easternmost watersheds in the basin, the Rainy River-Headwaters and Vermilion River, each have less than 2000 acres of wetland mitigation potential.

Small potential mitigation sites (20 acres or less) add about 19,000 acres of potential in the basin (Table 7-2). The most prevalent methods comprising the small sites are white cedar swamps and partially drained wetlands.

Wetland restoration represents the largest area of mitigation potential, and also accounts for about 88 percent of the estimated mitigation credits in the basin. Preservation, enhancement, and creation methods each comprise six percent or less of the potential mitigation credits.

Table 7-1 Wetland Mitigation Opportunity Summary by Major Watershed, Basin, and Method¹
(>20 ac sites)

Watershed Number	Major Watershed	Restoration Methods				Preservation Methods					Enhancement	Creation	Total
		Drained Wetlands	Farmed (High Potential) ²	Estimated Farmed Wild Rice and Sod (High Potential)	High Potential Partially Drained Wetlands ³	ENRV County & State Lands	ENRV Private Lands	Trout Stream	White Cedar	Impaired Water	Invasive Species ³	Gravel Pit	
Potential Wetland Mitigation Area (acres)													
Lake Superior Basin													
1	Lake Superior - North	0	0	0	0	138	375	912	129	0	44	313	1,911
2	Lake Superior - South	0	0	0	95	458	546	453	170	112	331	114	2,279
3	St. Louis River	1,930	0	400	8,216	5,061	4,853	2,709	3,209	3,562	4,706	5,532	40,178
4	Cloquet river	0	0	0	878	2,093	511	1,038	1,874	0	119	418	6,927
5	Nemadji River	0	0	0	0	0	0	40	0	649	0	0	689
Basin Total		1,930	0	400	9,186	7,750	6,285	5,152	5,381	4,323	5,200	6,377	51,984
Mississippi River Basin													
7	Mississippi River - Headwaters	24	96	0	432	74	382	0	55	108	791	372	2,312
8	Leech Lake River	0	46	0	0	51	63	0	53	0	2,897	80	3,190
9	Mississippi River - Grand Rapids	915	0	3,500	7,329	210	728	122	396	1,293	1,269	3,242	19,003
10	Mississippi River - Brainerd	2,002	6,182	3,500	7,329	273	6,166	0	24	2,097	893	608	29,073
11	Pine River	0	373	0	0	408	1,960	0	0	0	201	283	3,226
12	Crow Wing River	482	253	0	0	774	6,226	197	0	313	2,353	299	10,697
13	Redeye River	62	313	0	0	56	1,906	122	0	0	37	46	2,542
14	Long Prairie River	0	0	0	0	0	0	0	0	0	0	0	0
15	Mississippi River - Sartell	0	365	0	0	0	0	0	0	0	0	69	435
17	Mississippi River - St. Cloud	0	1,042	0	0	667	99	0	0	0	0	0	1,809
21	Rum River	1,209	21,343	0	0	139	3,202	0	0	3,780	126	160	29,958
34	St. Croix River - Upper	43	1,676	0	0	41	411	0	0	0	244	261	2,677
35	Kettle River	285	1,960	1,500	0	213	1,432	0	0	1,701	0	809	7,889
36	Snake River	874	4,559	400	0	193	3,518	0	0	2,129	615	93	12,381
37	St. Croix River - Stillwater	0	7,563	0	0	292	1,532	0	0	91	0	42	9,521
Basin Total		5,896	45,761	8,900	15,089	3,391	27,605	441	527	11,512	9,426	6,363	134,913
Red River Basin													
60	Wild Rice River	83	45	0	0	0	0	52	0	0	0	0	179
62	Upper/Lower Red Lake	443	2,085	0	3,007	0	420	0	101	0	77	119	6,251
63	Red Lake River	0	0	0	113	0	0	0	0	0	0	0	113
65	Thief River	2,619	11,437	0	1,178	0	59	0	0	294	0	37	15,624
66	Clearwater River	3,158	8,307	10,000	0	42	347	328	0	1,428	0	34	23,644
71	Roseau River	0	0	0	145	0	0	0	0	0	0	0	145
72	Rainy River - Headwaters	0	0	0	0	798	275	0	101	0	0	455	1,630
73	Vermilion River	0	0	0	319	0	170	0	49	0	334	549	1,422
74	Rainy River - Rainy Lake	0	0	0	2,101	48	73	396	82	0	368	114	3,183
75	Rainy River - Manitou	479	1,754	0	182	20	503	0	60	865	0	0	3,862
76	Little Fork River	0	0	0	1,965	136	320	373	337	2,869	1,128	1,325	8,452
77	Big Fork River	64	0	300	8,297	134	154	132	629	0	195	611	10,516
78	Rapid River	746	5,615	100	3,852	820	513	0	156	0	0	121	11,922
79	Rainy River - Baudette	861	16,898	100	2,266	0	785	0	0	144	0	241	21,295
80	Lake of the Woods	1,661	23,314	100	2,139	135	690	0	69	59	0	515	28,683
Basin Total		10,113	69,455	10,600	25,565	2,134	4,309	1,281	1,583	5,659	2,102	4,122	136,923
Total		17,939	115,217	19,900	49,840	13,275	38,199	6,874	7,492	21,494	16,728	16,861	323,819

¹Landowner interest is not considered in this table and may result in reduced potential.

²Only areas considered to have a high likelihood of regulatory eligibility and technical feasibility are shown due to specific regulatory requirements and physical and legal constraints.

³Wetland enhancement is not allowed under the Wetland Conservation Act, so there is no potential for credit.

Table 7-2 Wetland Mitigation Opportunity Summary by Major Watershed, Basin, and Method¹
(20 ac sites and smaller)

Watershed Number	Major Watershed	Restoration Methods				Preservation Methods					Enhancement	Creation	Total
		Drained Wetlands	Farmed (High Potential) ²	Estimated Farmed Wild Rice and Sod (High Potential)	High Potential Partially Drained Wetlands ²	ENRV County & State Lands	ENRV Private Lands	Trout Stream	White Cedar	Impaired Waters	Invasive Species ³	Gravel Pit	
Potential Wetland Mitigation Area (acres)													
Lake Superior Basin													
1	Lake Superior - North	NA ⁴	NA ⁴	0	0	70	140	429	414	0	-	179	1,231
2	Lake Superior - South	NA ⁴	NA ⁴	0	95	77	234	509	390	318	45	269	1,957
3	St. Louis River	NA ⁴	NA ⁴	0	1,498	699	943	799	6,516	2,825	383	2,324	15,987
4	Cloquet river	NA ⁴	NA ⁴	0	111	462	370	370	2,497	0	73	243	4,128
5	Nemadji River	NA ⁴	NA ⁴	0	0	0	0	98	48	273	19	36	474
Basin Total		NA⁴	NA⁴	-	1,705	1,308	1,686	2,204	9,866	3,416	520	3,071	23,776
Mississippi River Basin													
7	Mississippi River - Headwaters	NA ⁴	NA ⁴	0	74	59	352	23	1,083	97	74	274	2,036
8	Leech Lake River	NA ⁴	NA ⁴	0	0	105	188	17	252	0	105	113	781
9	Mississippi River - Grand Rapids	NA ⁴	NA ⁴	0	0	301	368	26	1,907	1,726	172	1,451	5,972
10	Mississippi River - Brainerd	NA ⁴	NA ⁴	0	29	177	970	42	197	617	323	746	3,100
11	Pine River	NA ⁴	NA ⁴	0	0	110	524	39	45	0	93	295	1,106
12	Crow Wing River	NA ⁴	NA ⁴	0	0	245	1,859	123	25	280	197	194	2,924
13	Redeye River	NA ⁴	NA ⁴	0	0	15	401	142	0	0	21	113	693
14	Long Prairie River	NA ⁴	NA ⁴	0	0	0	0	0	0	0	0	0	0
15	Mississippi River - Sartell	NA ⁴	NA ⁴	0	0	0	44	0	0	0	0	21	65
17	Mississippi River - St. Cloud	NA ⁴	NA ⁴	0	0	79	56	0	0	0	0	0	135
21	Rum River	NA ⁴	NA ⁴	0	0	147	1,980	0	30	2,073	139	535	4,904
34	St. Croix River - Upper	NA ⁴	NA ⁴	0	0	90	359	107	42	0	51	142	791
35	Kettle River	NA ⁴	NA ⁴	0	0	70	329	23	258	1,100	17	494	2,291
36	Snake River	NA ⁴	NA ⁴	0	0	223	515	0	79	1,874	56	220	2,967
37	St. Croix River - Stillwater	NA ⁴	NA ⁴	0	0	16	321	0	0	274	17	45	672
Basin Total		NA⁴	NA⁴	0	103	1,636	8,287	541	3,919	8,041	1,266	4,643	28,436
Red River Basin													
60	Wild Rice River	NA ⁴	NA ⁴	0	0	23	20	0	0	0	0	8	51
62	Upper/Lower Red Lake	NA ⁴	NA ⁴	0	693	121	165	6	698	106	0	120	1,928
63	Red Lake River	NA ⁴	NA ⁴	0	110	0	0	0	6	12	0	0	128
65	Thief River	NA ⁴	NA ⁴	0	479	35	56	0	25	510	0	0	1,104
66	Clearwater River	NA ⁴	NA ⁴	0	0	24	50	102	0	495	0	175	844
71	Roseau River	NA ⁴	NA ⁴	0	0	7	9	0	11	0	0	11	39
72	Rainy River - Headwaters	NA ⁴	NA ⁴	0	0	17	0	0	324	6	5	345	699
73	Vermilion River	NA ⁴	NA ⁴	0	116	7	17	15	732	32	45	235	1,198
74	Rainy River - Rainy Lake	NA ⁴	NA ⁴	0	50	81	96	166	411	0	119	54	978
75	Rainy River - Manitou	NA ⁴	NA ⁴	0	171	45	175	0	562	367	0	80	1,400
76	Little Fork River	NA ⁴	NA ⁴	0	520	77	320	263	1,583	1,133	68	450	4,414
77	Big Fork River	NA ⁴	NA ⁴	0	285	185	343	133	1,471	0	86	148	2,652
78	Rapid River	NA ⁴	NA ⁴	0	391	137	174	0	385	0	0	64	1,151
79	Rainy River - Baudette	NA ⁴	NA ⁴	0	621	0	65	0	63	119	0	122	990
80	Lake of the Woods	NA ⁴	NA ⁴	0	622	114	177	0	185	145	0	189	1,433
Basin Total		NA⁴	NA⁴	0	4,059	874	1,688	685	6,456	2,924	323	2,001	19,009
Total		NA⁴	NA⁴	0	5,866	3,818	11,661	3,431	20,241	14,381	2,110	9,715	71,222

¹Landowner interest is not considered in this table and may result in reduced potential.

²Only areas considered to have a high likelihood of regulatory eligibility and technical feasibility are shown due to specific regulatory requirements and physical and legal constraints.

³Wetland enhancement is not allowed under the Wetland Conservation Act, so there is no potential for credit.

⁴NA = Not Assessed.

7.3 Mitigation Opportunity Bank Service Area Analysis

There are seven bank service areas (BSA) within the study area (Figure 1), encompassing three major drainage basins: 1) Great Lakes, 2) Mississippi River, and 3) Red River. Only one BSA is completely contained within the study area, the Great Lakes #1. Approximately 98 percent of the Rainy River BSA is contained within the study area and about 78 percent of the Mississippi River Headwater and St. Croix River BSAs are contained within the study area. The remaining three BSAs include from three percent to 30 percent of the watershed within the study area. The Rainy River BSA has the largest land area, with approximately 11,000 square miles followed by the Mississippi River Headwater BSA with 9,000 square miles and the Great Lakes BSA with over 6,000 square miles. The remaining four BSAs all have 3,200 square miles or less within the study area. Only 225 square miles of the Upper Red River BSA is located within the study area, which is only three percent of the total BSA.

7.3.1 Great Lakes Bank Service Area

Bank Service Area #1 makes up the entire Great Lakes Basin with about 52,000 acres of mitigation potential within sites larger than 20 acres, but only 16,700 acres of potential credit. Over 55 percent of the potential wetland mitigation area identified in BSA #1 (including sites greater than 20 acres in size) is through wetland preservation methods (Table 7-3). However, the wetland preservation potential only comprises about 22 percent of the estimated credits. Nearly one-fourth of the potential wetland mitigation area identified in BSA #1 is through restoration methods (Table 7-3), which make up 40 percent of the estimated credit potential. Over 6,000 acres of wetland creation potential was identified in BSA #1, comprising almost 30 percent of the credit potential.

The area of wetland mitigation potential increases by about 50 percent, to a total of over 75,700 acres, when considering sites of 20 acres or less (Table 7-4). Over 78 percent (about 18,500 acres) of the smaller potential sites identified are wetland preservation methods and over 3,000 acres are wetland creation.

7.3.2 Rainy River Bank Service Area

The Rainy River Bank Service Area (#2) is composed of nine major watersheds with almost 91,000 acres of wetland mitigation potential for sites greater than 20 acres and about 43,500 acres of potential mitigation credit (Table 7-3). The wetland mitigation potential is predominantly composed of restoration methods, which make up 80 percent of the potential mitigation area and almost 90 percent of the potential credits (Table 7-3). High potential farmed wetlands alone comprise over 50 percent of the potential with partially drained wetlands making up another 23 percent. Over 95 percent of the farmed wetland mitigation potential is focused in three watersheds (Lake of the Woods, Rainy River-Baudette, and Rapid River) located in the western part of the BSA (Figure 2) and over 85 percent of drained wetland mitigation potential is located in the same three watersheds (Figure 4). High potential, partially drained wetlands are also focused in the western half of the watershed. With nearly all of the highest priority potential mitigation sites located in the western part of the BSA, there is likely to be greater mitigation pressure within Lake of the Woods and Koochiching Counties.

Small potential mitigation sites (20 acres or less) add approximately another 15,000 acres, with about 68 percent composed of wetland preservation methods (Table 7-4).

7.3.3 Red River Bank Service Area

The Red River Basin includes two BSAs (#3 and #4) and five major watersheds with approximately 46,000 acres of wetland mitigation potential for sites larger than 20 acres and about 25,000 acres of potential credit (Table 7-3). Approximately 93 percent of the potential wetland mitigation area identified is in the three restoration methods, which comprise 98 percent of the potential credit (Table 7-3). Preservation and creation opportunities appear to be limited within the Red River Basin. Approximately an additional 4,000 acres of potential mitigation areas were identified within sites 20 acres or smaller. That mitigation potential for smaller sites is predominantly due to preservation methods (over 60 percent) with over 30 percent due to restoration methods (Table 7-4).

7.3.4 Mississippi River Headwaters Bank Service Area

The Mississippi River Headwaters basin (BSA #5) encompasses all or parts of seven major watersheds in the southwest part of the study area with over 70,000 acres of wetland mitigation potential in sites greater than 20 acres in size (Table 7-3). The estimated potential mitigation credit is over 27,000 acres. There is a broad distribution of wetland mitigation potential within BSA #5 with restoration methods accounting for 47 percent of the larger site mitigation area and preservation methods making up 34 percent. Enhancement and creation methods each make up twelve and seven percent of the total, respectively (Table 7-3). The distribution of potential wetland mitigation credits is quite different from the distribution of mitigation area with restoration methods making up 66 percent of the potential credits and each of the other methods comprising between nine and 13 percent. The drained wetland potential and high potential farmed wetlands identified, are concentrated in approximately the southern quarter of the BSA (Figures 2 and 4). Private land ENRV preservation makes up over 85 percent of the preservation potential, the majority of which are also focused in the southern part of the BSA. Wetland mitigation potential within sites 20 acres or less adds another one-quarter to the total area, of which almost 75 percent is comprised of preservation methods (Table 7-4). There is a very uneven distribution of potential wetland mitigation sites within the watershed that may result in focused pressure for mitigation in Aitkin, Crow Wing, and Wadena Counties.

7.3.5 St. Croix River Bank Service Area

The St. Croix River basin (BSA #6) is composed of all or parts of five major watersheds in the southeast part of the study area. There is over 32,000 acres of wetland mitigation potential composed of sites greater than 20 acres in size and about 12,600 acres of potential mitigation credits (Table 7-3). Over half of the area identified is high potential farmed wetlands and 36 percent are associated with preservation methods (Table 7-3). Restoration methods make up nearly 80 percent of the potential mitigation credit. The high potential farmed wetlands are concentrated primarily in the southern part of the BSA (Figure 2). Potential mitigation sites of 20

acres or less add about 6,700 acres, the majority of which is associated with impaired waters and private land ENRV preservation (Table 7-4).

7.3.6 Upper Mississippi River Bank Service Area

The Upper Mississippi River basin (BSA #7) is composed of parts of three major watersheds in the southern part of the study area with about 32,000 acres of wetland mitigation potential in sites greater than 20 acres in size (Table 7-3). The estimated potential mitigation credit is about 14,000 acres. Almost 75 percent of the potential wetland mitigation area is in two restoration methods (drained wetlands and farmed wetlands), which comprise over 90 percent of the estimated potential credit (Table 7-3). Preservation and enhancement methods together make up about 25 percent of the potential mitigation area while wetland creation opportunities only comprise about one percent (Table 7-3). The high potential farmed wetlands, which make up over 70 percent of the potential mitigation area, are concentrated in approximately the southern half of the BSA (Figure 2). Small potential mitigation sites (20 acres or less) represent approximately an additional 5,000 acres, with over 80 percent comprised of private land ENRV preservation and wetlands within impaired watersheds (Table 7-4).

Table 7-3 Potential Wetland Mitigation Area and Credit Summarized by Bank Service Area and Method
(>20 ac sites)¹

Bank Service Area - Potential Wetland Mitigation Area (ac)								
Mitigation Method	1 Great Lakes	2 Rainy River	3 Lower Red River	4 Upper Red River	5 Miss. River Headwaters	6 St. Croix River	7 Upper Miss. River	Total
Restoration								
Drained Wetlands	1,930	3,811	6,220	83	3,485	1,202	1,209	17,939
High Potential Farmed Wetlands ²	0	47,581	21,830	45	7,264	15,747	22,750	115,217
High Potential Farmed Wild Rice and Sod	400	600	10,000	0	7,000	1,900	0	19,900
High Potential Partially Drained Wetlands ²	9,186	21,122	4,443	0	15,089	0	0	49,840
Preservation								
ENRV County & State Lands	7,750	2,092	42	0	1,845	740	806	13,275
ENRV Private Lands	6,265	3,483	626	0	17,411	6,893	3,301	38,199
Trout Stream	5,152	901	328	52	441	0	0	6,874
White Cedar	5,381	1,483	101	0	527	0	0	7,492
Impaired Water Enhancement	4,323	3,936	1,722	0	3,811	3,921	3,780	21,494
Enhancement								
Invasive Species ³	5,200	2,025	77	0	8,441	859	126	16,728
Creation								
Gravel Pit	6,377	3,931	190	0	4,929	1,208	229	16,861
Total	51,984	90,985	45,778	179	70,243	32,468	32,202	323,819
Estimated Wetland Mitigation Credit								
Restoration								
Drained Wetlands	1,930	3,811	6,220	83	3,485	1202	1209	17,939
High Potential Farmed Wetlands ²	0	23,790	10,915	22	3,632	7874	11375	57,608
High Potential Farmed Wild Rice and Sod	200	300	5,000	0	3,500	950	0	9,950
High Potential Partially Drained Wetlands ²	4,593	10,561	2,222	0	7,544	0	0	24,920
Preservation								
ENRV County & State Lands	969	262	5	0	231	92	101	1,659
ENRV Private Lands	786	435	103	0	2,178	862	413	4,775
Trout Stream	644	113	41	6	55	0	0	859
White Cedar	673	185	13	0	66	0	0	937
Impaired Water Enhancement	540	492	215	0	476	490	473	2,687
Enhancement								
Invasive Species ³	1,560	608	23	0	2,532	256	38	5,018
Creation								
Gravel Pit	4,783	2,949	143	0	3,697	904	171	12,646
Total	16,677	43,505	24,899	111	27,395	12,632	13,779	138,999

¹Landowner interest is not considered in this table and may result in reduced potential.

²Only areas considered to have a high likelihood of regulatory eligibility and technical feasibility are shown due to specific regulatory requirements and physical and legal constraints.

³Wetland enhancement is not allowed under the Wetland Conservation Act, so there is no potential for credit.

Table 7-4 Potential Wetland Mitigation Area and Credit Summarized by Bank Service Area and Method
(20 ac sites and smaller)

Mitigation Method	Bank Service Area - Potential Wetland Mitigation Area (ac)							Total
	1 Great Lakes	2 Rainy River	3 Lower Red River	4 Upper Red River	5 Miss. River Headwaters	6 St. Croix River	7 Upper Miss. River	
Restoration								
Drained Wetlands	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴
High Potential Farmed Wetlands ²	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴
High Potential Farmed Wild Rice and Sod	0	0	0	0	0	0	0	0
High Potential Partially Drained Wetlands ²	1,705	2,777	1,282	0	103	0	0	5,866
Preservation								
ENRV County & State Lands	1,308	664	187	23	1,012	399	225	3,818
ENRV Private Lands	1,686	1,369	299	20	4,682	1,524	2,080	11,661
Trout Stream	2,204	577	108	0	412	130	0	3,431
White Cedar	9,866	5,716	740	0	3,509	380	30	20,241
Impaired Waters	3,416	1,802	1,122	0	2,720	3,247	2,073	14,381
Enhancement								
Invasive Species ³	520	323	0	0	987	140	139	2,110
Creation								
Gravel Pit	3,071	1,687	306	8	3,187	901	556	9,715
Total	23,776	14,914	4,044	51	16,612	6,721	5,103	71,222
Estimated Wetland Mitigation Credit								
Restoration								
Drained Wetlands	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴
High Potential Farmed Wetlands ²	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴	NA ⁴
High Potential Farmed Wild Rice and Sod	0	0	0	0	0	0	0	0
High Potential Partially Drained Wetlands ²	852	1,388	641	0	51	0	0	2,933
Preservation								
ENRV County & State Lands	163	83	23	3	126	50	28	477
ENRV Private Lands	211	171	37	2	585	191	260	1,458
Trout Stream	276	72	13	-	51	16	0	429
White Cedar	1,233	715	93	0	439	47	4	2,530
Impaired Water Enhancement	427	225	140	0	340	406	259	1,798
Enhancement								
Invasive Species ³	156	97	-	0	296	42	42	633
Creation								
Gravel Pit	2,303	1,266	229	6	2,390	676	417	7,286
Total	5,622	4,017	1,177	11	4,279	1,428	1,010	17,544

¹ Landowner interest is not considered in this table and may result in reduced potential.

² Only areas considered to have a high likelihood of regulatory eligibility and technical feasibility are shown due to specific regulatory

³ Wetland enhancement is not allowed under the Wetland Conservation Act, so there is no potential for credit.

⁴ NA = Not Assessed.

8.0 GIS Tool

One of the main goals of the Phase II Siting Assessment was the creation of an interactive web-based GIS Tool (Tool) that would be available to permittees, wetland planners, wetland bankers, local government units, Soil and Water Conservation Districts and state and federal agencies. The following discussion includes the alternative designs considered, the overall functionality of the Tool, general information about the application design, and metadata for the specific data layers in the Tool.

8.1 Design Goals and Considerations

During the Advisory Committee and Outreach meetings, three design options or alternatives were presented for consideration. The three alternatives described below increase in complexity and in cost, respectively.

1. Alternative 1 - Operates with a Google/Microsoft Earth interface based on a static database. This alternative would be database driven instead of GIS based. The user interface would have the look and feel of Google Maps. One would have the ability to pan and zoom to different parts of the state. The user would be able to click on site balloons to download and print created maps, reports and preset data. The user would not be able to create custom maps or perform spatial queries. All aerial imagery and spatial data would be provided by Google (Figure 13).
2. Alternative 2 - Operates using ArcGIS software containing numerous spatial data layers. This alternative would operate on a stand alone GIS server at BWSR. This interactive Tool would be accessed via the internet without the need for any special software other than a web browser. Alternative 2 would allow for shapefile and data exchange to keep the supporting database up-to-date. A user would be able to measure distances and areas. Data layers could be turned on and off in order to conduct wetland mitigation planning and create custom maps. Users would have the ability to perform spatial searches of the wetland mitigation inventory database and develop maps and reports containing the results of the searches. An ArcGIS based system would require a little more expertise than Alternative 1 and users might require some training (Figure 14).
3. Alternative 3 – The operating platform would use a combination of a Google interface with ArcGIS to make a little more user-friendly option. The functions would be essentially identical to Alternative 2 but initially, would be more complicated to develop. Alternative 3 would require more programming initially to create spatial analysis tools and functionality, but the goal would be to make it functional for more users and have a simpler look and feel (Figure 15).

Most of the feedback from the Advisory Committee and the Outreach meetings supported Alternatives 2 or 3 because each would allow the database to be updated as information changed. BWSR considered the input

from the various stakeholders and selected Alternative 2 because this alternative best fit BWSR's needs and ability to upgrade and support the database.

8.2 GIS Tool Functionality

The project team reviewed numerous potential data layers with the Advisory Committee to design the planned functionality in the Tool. More than 30 data layers including: aerial photography, topography, wetlands, soils, water, geography and various special categories were reviewed with the Advisory Committee. The Committee also suggested other data layers that might be considered. Some of these data layers used to generate the "potential" polygons could not be used in the interactive Tool due to the large file size and network limitations. Data layers that were evaluated, but were not included in the Tool include: national wetland inventory (NWI), the digital elevation model (hillshade), hydric soils, and the historic wetland mapping from the Phase I Inventory. The Tool is set up in Universal Transverse Mercator (UTM) coordinates.

Political district lines and SWCD districts were considered as possible data layers but BWSR and the Committee decided that these could be listed under useful web links. The design team considered including wetland mitigation credit potential in the Tool, but that data was left out because mitigation credits are determined by the TEP based on a site visit and detailed, site-specific data. However, there is capability within the Tool for SWCDs and LGUs to modify the database with information obtained from more detailed site evaluations (e.g., rating the likely regulatory eligibility based on a site visit, landowner interest, etc.). Allowing modifications to the database from outside BWSR requires a password-protected; two tier security systems in which SWCDs or LGUs enter data and then BWSR verifies the data before making the information available to the public. Site-specific eligibility ratings are stored as attributes associated with the wetland mitigation potential spatial data. Having the functionality within the tool to maintain the most current knowledge of potential mitigation sites will help the Tool remain valuable over the long-term. A general listing of the data layers evaluated for inclusion in the Tool is included in Appendix C.1. The final list of interactive data layers is shown in Appendix C.2.

The Tool was designed to meet the needs of a variety of user groups. The Tool is a watershed based approach with the ability to search within a bank service area, major watershed, minor watershed or county. The Tool also offers the ability to search for potential opportunities by mitigation method, evaluate opportunities within an impaired watershed, to turn various data layers on and off to create maps and tables of information related to those potential opportunities.

The Tool has been designed to sort out realistic opportunities with high regulatory potential for farmed wetlands and partially drained wetlands, while showing the spatial distribution of opportunities. For example no wetland restoration opportunities were identified in Lake and Cook counties.

The Tool can assist project proponents with wetland mitigation planning efforts by identifying potential mitigation opportunities in close proximity to proposed impacts, as well as identifying other possibilities

within the project watershed and nearby watersheds or bank service areas. The user can also search within a specified buffer distance of a target point. The Tool identifies BWSR bank sites that may have potential wetland credits for sale within a bank service area.

The Tool can also assist regulatory officials in tracking wetland mitigation sequencing required by rules. It should be able to assist agencies planning where opportunities for wetland banks might be needed on watershed basis or to assist wetland bankers in identifying sites that may have the greatest potential for development. It is BWSR's intent over time, to be able to update information within the database in order to save time in the search for realistic opportunities. It is hoped that Technical Evaluation Panels could update the database as they review potential mitigation sites in the field.

8.3 Application

The Tool uses an ArcGIS 9.3.1 Server as its platform. To create some of the visual screens, the Tool incorporates displays from Microsoft's Visual Studios. The field checked data is linked to the Tool using an Oracle relational database.

8.4 Metadata

The following list of data sources were used to construct a geographic information system (GIS) model to identify and assess the wetland mitigation opportunities within the project study area. This information included the following data sets obtained from the Minnesota DNR Data Deli and county sources. Appendix D lists the individual layers used and the source and link if available.

1. USGS 30-Meter digital elevation model (DEM)

Slope percentages were calculated for all counties and areas of 1% slope or less were extracted except St. Louis, Lake, and Cook counties where areas of 4% slope or less were extracted.

2. NRCS SSURGO 2.2 Soil Surveys

All hydric soils were extracted from the SURGO certified soil surveys. Database queries were run to identify the hydric soils and hydrologic soil groups. The resulting dataset is a hybrid of the hydric soils and hydrologic soil groups that have a water table within 1 foot of the ground surface during at least fifty percent of the growing season. Some counties within the project area did not have a completed soil survey at the time of the analysis. In those areas, geomorphology data was used as a substitute for hydric soil information.

3. MN DNR Geomorphology

Areas containing attributes of peat, alluvial, lacustrine, outwash plains, and flat areas such as marshes and bogs were identified in counties with incomplete soil surveys as a substitute for hydric soils.

4. USGS 2001 National Land Cover Data (NLCD)
Lowland attributes were identified and extracted from the dataset. These attributes included scrub shrub, woody wetlands, and emergent herbaceous wetlands.
5. MN DNR GAP Land Cover Data (Vector Data)
Lowland attributes were identified and extracted from the dataset. These attributes included lowland deciduous shrub, lowland evergreen shrub, floating aquatic, sedge meadow, broadleaf sedge/cattail, balsam fir mix, lowland black spruce, stagnant black spruce, tamarack, stagnant tamarack, lowland northern white cedar, stagnant northern white cedar, stagnant conifer, aspen/birch, black ash, lowland deciduous, lowland conifer/deciduous mix)
6. Manitoba Land Cover
Agriculture, development, gravel pits, and wetlands attributes were extracted from the dataset. These attributes included: cultivated land, grassland, development, gravel pits, and wetlands.
7. International Coalition Land Cover
Agriculture, development, gravel pits, and wetland attributes were extracted from the dataset. These attributes included: cultivated land, pasture and hay land, transitional agricultural land, grassland, development, gravel pits, and wetlands.
8. National Wetlands Inventory (NWI)
NWI systems of Palustrine and Riverine were extracted from the dataset.
9. FEMA Floodplains
100 and 500-year floodplains were identified and extracted from the dataset. Any floodplains that were categorized as being open water were excluded.
10. County and Municipal Boundaries
11. Major Watershed Boundaries
Major and minor watershed boundaries were identified and extracted from the dataset along with major basins also known as Wetland Bank Service Areas. DNR Estimated Lakeshed boundaries were also included.
12. Property Ownership
Ownership was identified and divided into general classifications of federal, state, county, private and private industrial ownership.
13. Ditches and Streams
DNR 24K Streams data was used.

14. Aerial Photography

Current true color aerials and available historical photos (2003 and 1991)

15. Invasive Species

The only available data for invasive species was point data received from the MNDNR for purple loosestrife.

16. Endangered and Threatened Species

17. Impaired Waters (including TMDL Streams, Lakes, and Wetlands)

2006(8) MPCA Impaired water data (streams and lakes)

18. Scientific and Natural Areas (SNAs).

19. PLS Coordinates – Section, Town and Range data

20. UTM coordinates

21. Existing BWSR wetland bank sites

22. State and Federal forests/parks

23. Wildlife Management Areas

Various attributes of the slope, hydric soils, land cover, NWI and floodplain data layers were selected to create a “potential historic wetland areas” base layer. Then other attributes were intersected with the base layer to identify the potential wetland mitigation opportunities. A general listing of data and links are provided in Appendix D. The metadata methods and process of putting the data together for the Tool is described in Appendix E.

9.0 References

- U.S. Army Corps of Engineers. 2009. St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota. January 2009.
- Marschner, F.J. (circa) 1930. Pre-settlement Vegetation of Minnesota. USDA Bureau of Agriculture Economics. Compiled from the General Land Office Public Lands Survey (1847-1907). Digitized by DNR in early-mid 1990s. [DNR Data Deli - pveg_mrschpy1](#)
- Minnesota Department of Natural Resources. 2006. *Tomorrow's Habitat for the Wild and Rare:— An Action Plan for Minnesota Wildlife*. Comprehensive Wildlife Conservation Strategy. Division of Ecological Services, Minnesota Department of Natural Resources.

Figures

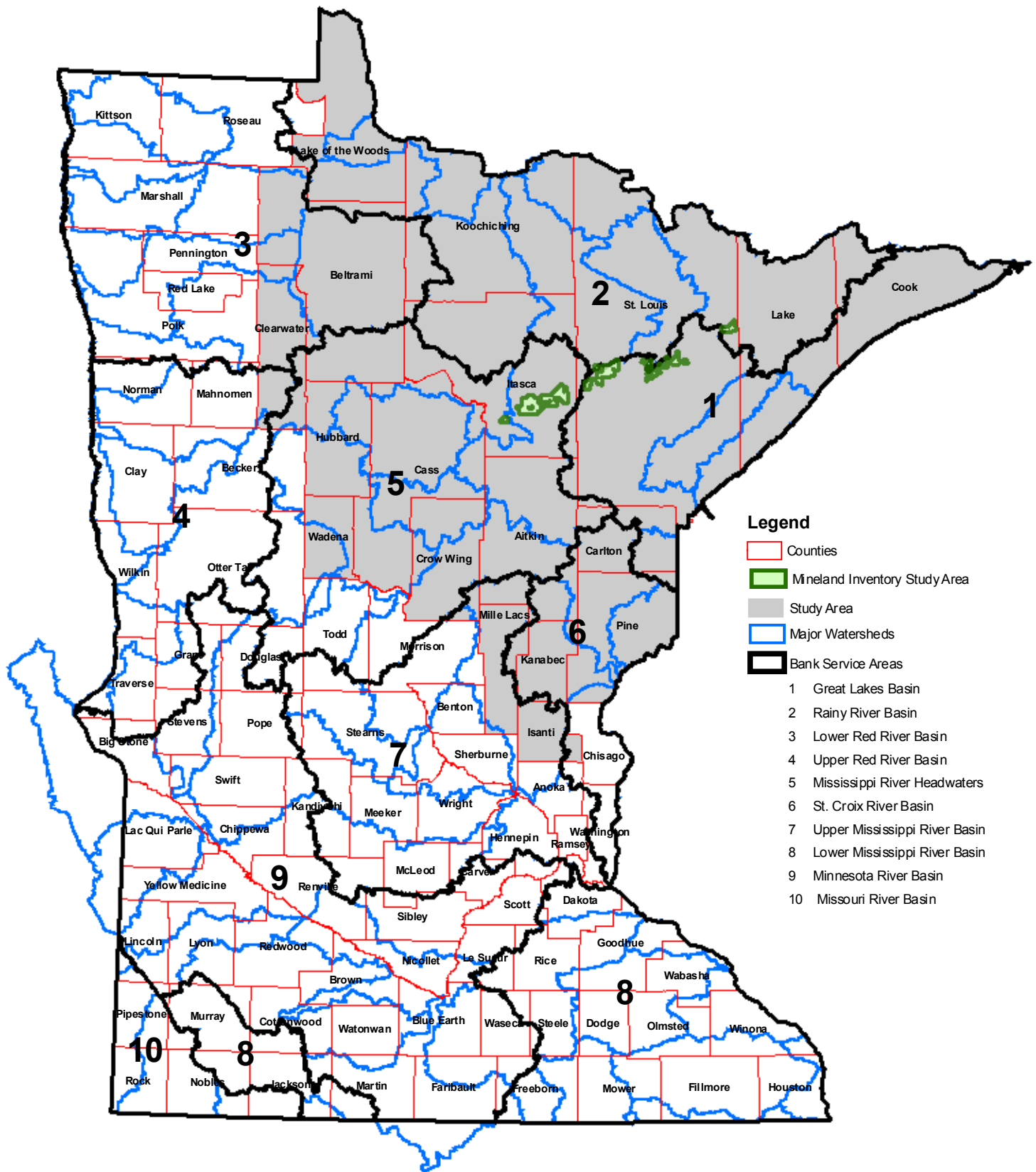
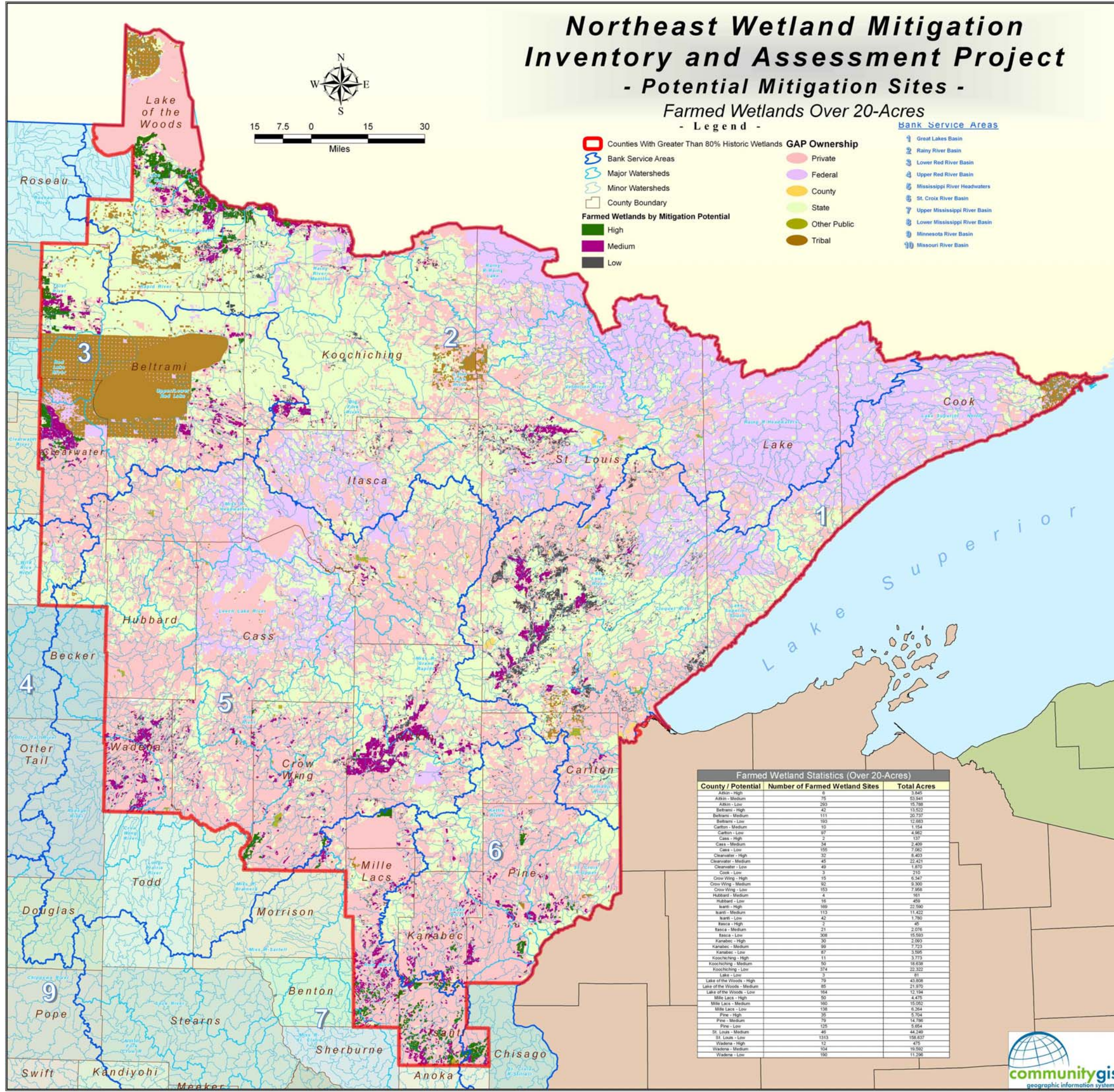


Figure 1

STUDY AREA
 Northeast Wetland Mitigation
 Inventory and Assessment Project

Northeast Wetland Mitigation Inventory and Assessment Project - Potential Mitigation Sites - Farmed Wetlands Over 20-Acres

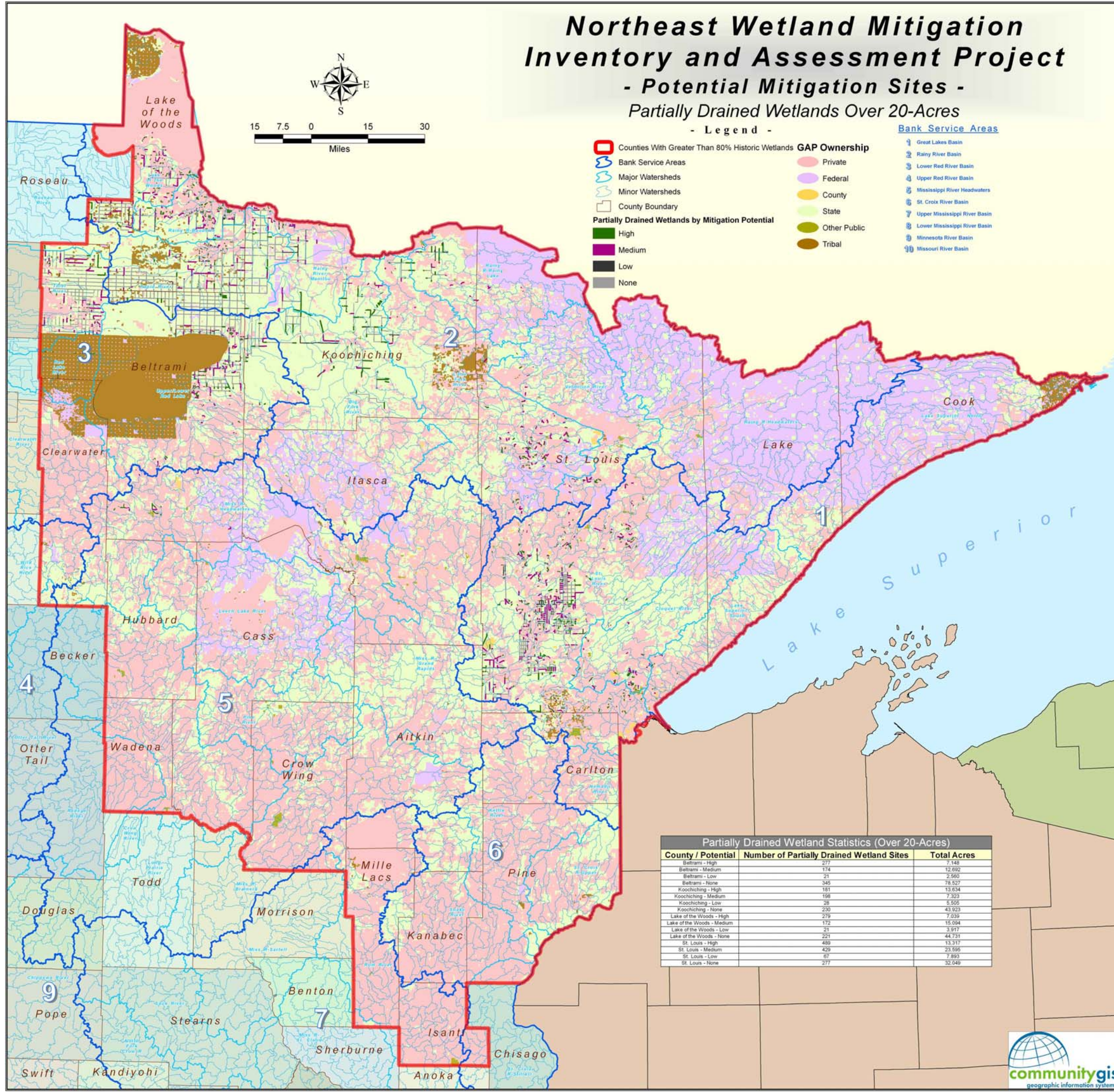


Farmed Wetland Statistics (Over 20-Acres)		
County / Potential	Number of Farmed Wetland Sites	Total Acres
Aitkin - High	6	3,845
Aitkin - Medium	75	53,941
Aitkin - Low	293	57,768
Beltrami - High	43	13,532
Beltrami - Medium	111	25,737
Beltrami - Low	163	32,283
Carlton - Medium	10	1,154
Carlton - Low	97	4,462
Cass - High	2	137
Cass - Medium	34	2,409
Cass - Low	158	7,262
Clearwater - High	32	6,403
Clearwater - Medium	48	22,421
Clearwater - Low	49	1,876
Cook - Low	3	210
Crow Wing - High	15	6,347
Crow Wing - Medium	92	3,700
Crow Wing - Low	153	7,958
Hubbard - Medium	4	161
Hubbard - Low	18	498
Itasca - High	169	22,550
Itasca - Medium	113	11,432
Itasca - Low	42	1,785
Kanabec - High	2	45
Kanabec - Medium	21	2,076
Kanabec - Low	308	15,583
Kanabec - High	30	2,063
Kanabec - Medium	99	7,723
Kanabec - Low	67	3,565
Koochiching - High	11	3,773
Koochiching - Medium	50	16,638
Koochiching - Low	314	23,332
Lake - Low	3	81
Lake of the Woods - High	79	43,808
Lake of the Woods - Medium	85	11,670
Lake of the Woods - Low	164	12,184
Mille Lacs - High	50	4,470
Mille Lacs - Medium	160	15,052
Mille Lacs - Low	138	6,264
Pine - High	39	1,354
Pine - Medium	79	14,786
Pine - Low	125	3,854
St. Louis - High	48	44,248
St. Louis - Medium	1313	156,837
St. Louis - Low	12	475
Wadena - Medium	164	18,562
Wadena - Low	190	11,296

Figure 2
FARMED WETLANDS OVER
20-ACRES
Northeast Wetland Mitigation
Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project - Potential Mitigation Sites - Partially Drained Wetlands Over 20-Acres



Partially Drained Wetland Statistics (Over 20-Acres)		
County / Potential	Number of Partially Drained Wetland Sites	Total Acres
Beltrami - High	277	7,148
Beltrami - Medium	174	12,692
Beltrami - Low	21	2,960
Beltrami - None	345	78,527
Koochiching - High	181	13,634
Koochiching - Medium	198	7,323
Koochiching - Low	28	5,505
Koochiching - None	230	43,623
Lake of the Woods - High	279	7,039
Lake of the Woods - Medium	172	15,094
Lake of the Woods - Low	21	3,917
Lake of the Woods - None	221	44,731
St. Louis - High	489	13,317
St. Louis - Medium	429	23,595
St. Louis - Low	67	7,893
St. Louis - None	277	32,049

Figure 3
PARTIALLY DRAINED WETLANDS OVER
20-ACRES
Northeast Wetland Mitigation
Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project

- Potential Mitigation Sites -

Drained Wetlands Over 20-Acres

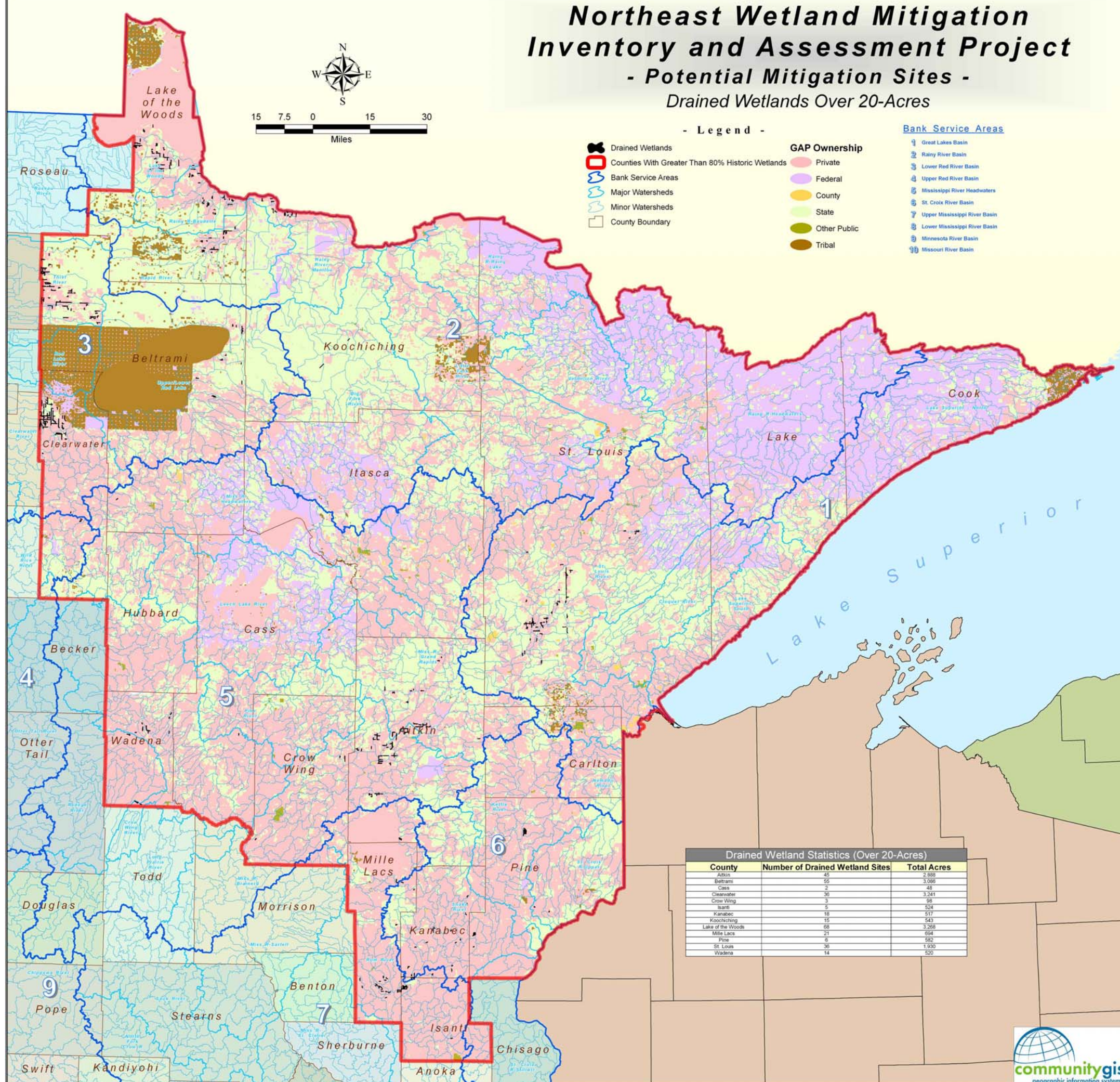


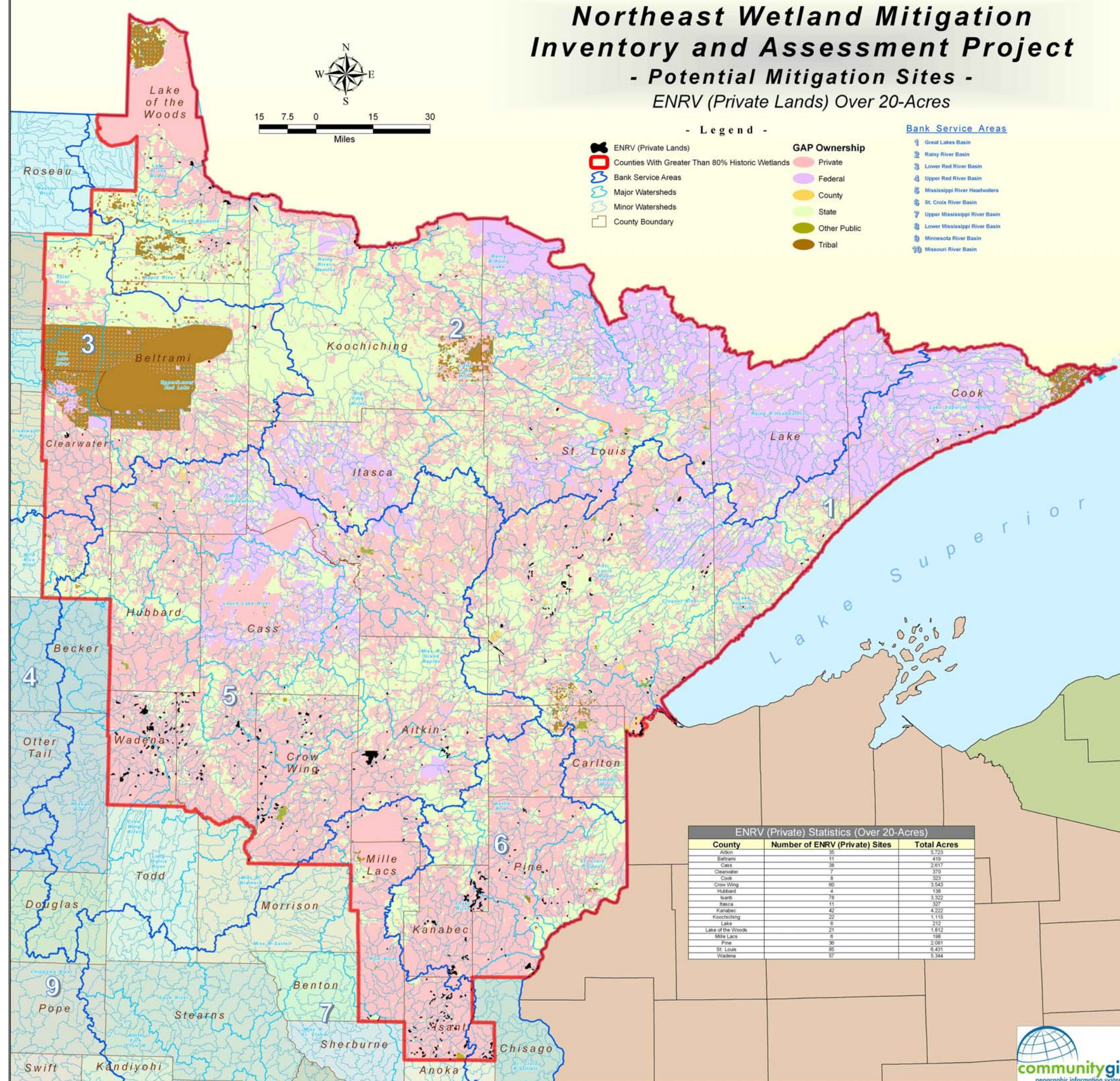
Figure 4
 DRAINED WETLANDS OVER 20-ACRES
 Northeast Wetland Mitigation Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project

- Potential Mitigation Sites -

ENRV (Private Lands) Over 20-Acres



County	Number of ENRV (Private) Sites	Total Acres
Adair	35	5,725
Beltrami	11	419
Cass	38	2,617
Clearwater	7	370
Cook	8	323
Crow Wing	60	3,543
Hubbard	4	138
Itasca	78	3,327
Itasca	11	327
Kanabec	42	4,222
Koochiching	22	1,115
Lake	6	212
Lake of the Woods	21	1,812
Mille Lacs	6	198
Pine	36	2,081
St. Louis	85	6,431
Wadena	57	5,344

Figure 5
ENRV (PRIVATE LANDS) OVER 20-ACRES
Northeast Wetland Mitigation
Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project

- Potential Mitigation Sites -

ENRV (County & State Lands) Over 20-Acres

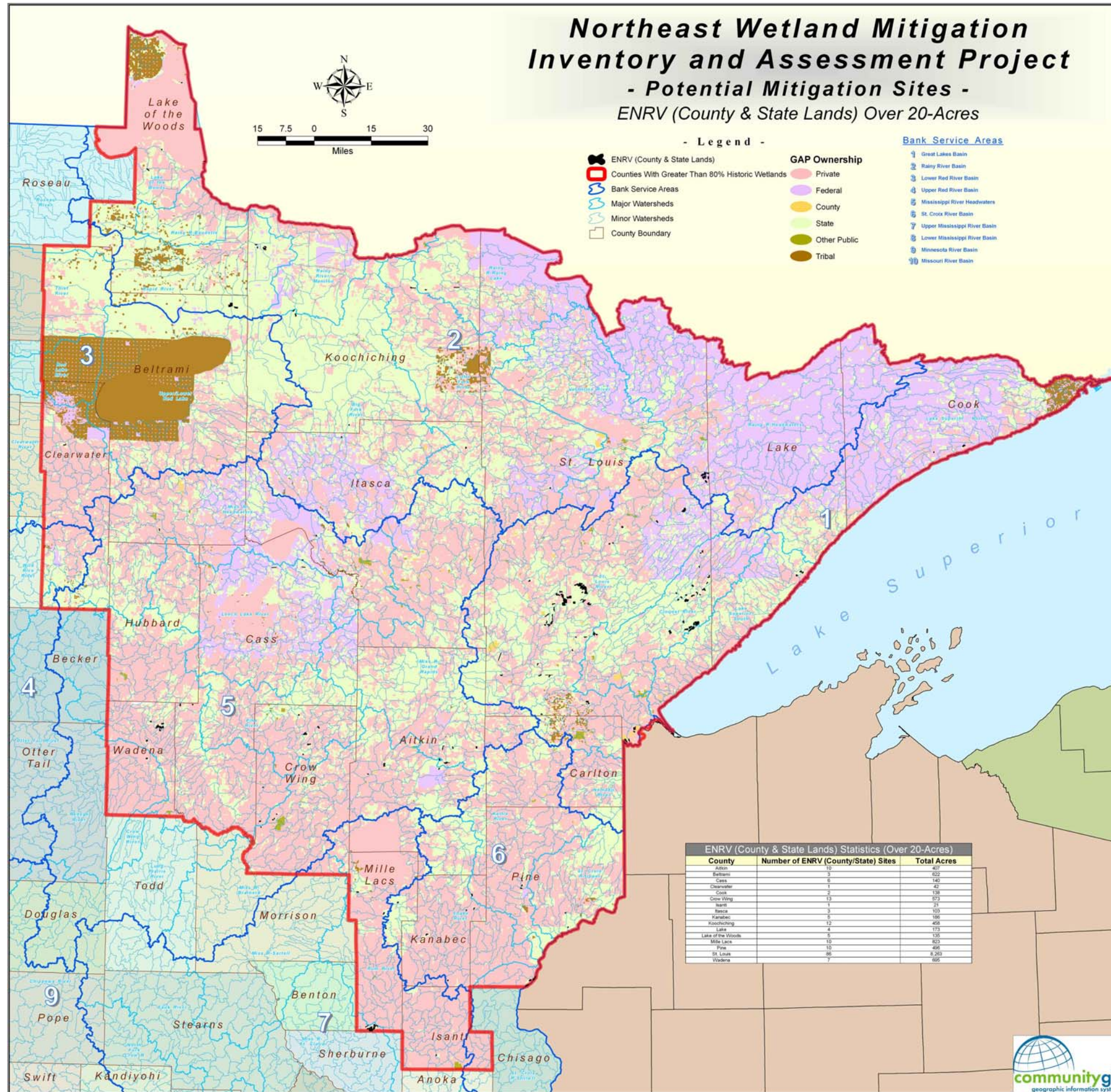


Figure 6
PUBLIC PRESERVATION
OVER 20-ACRES
Northeast Wetland Mitigation
Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project

- Potential Mitigation Sites -

White Cedar Over 20-Acres

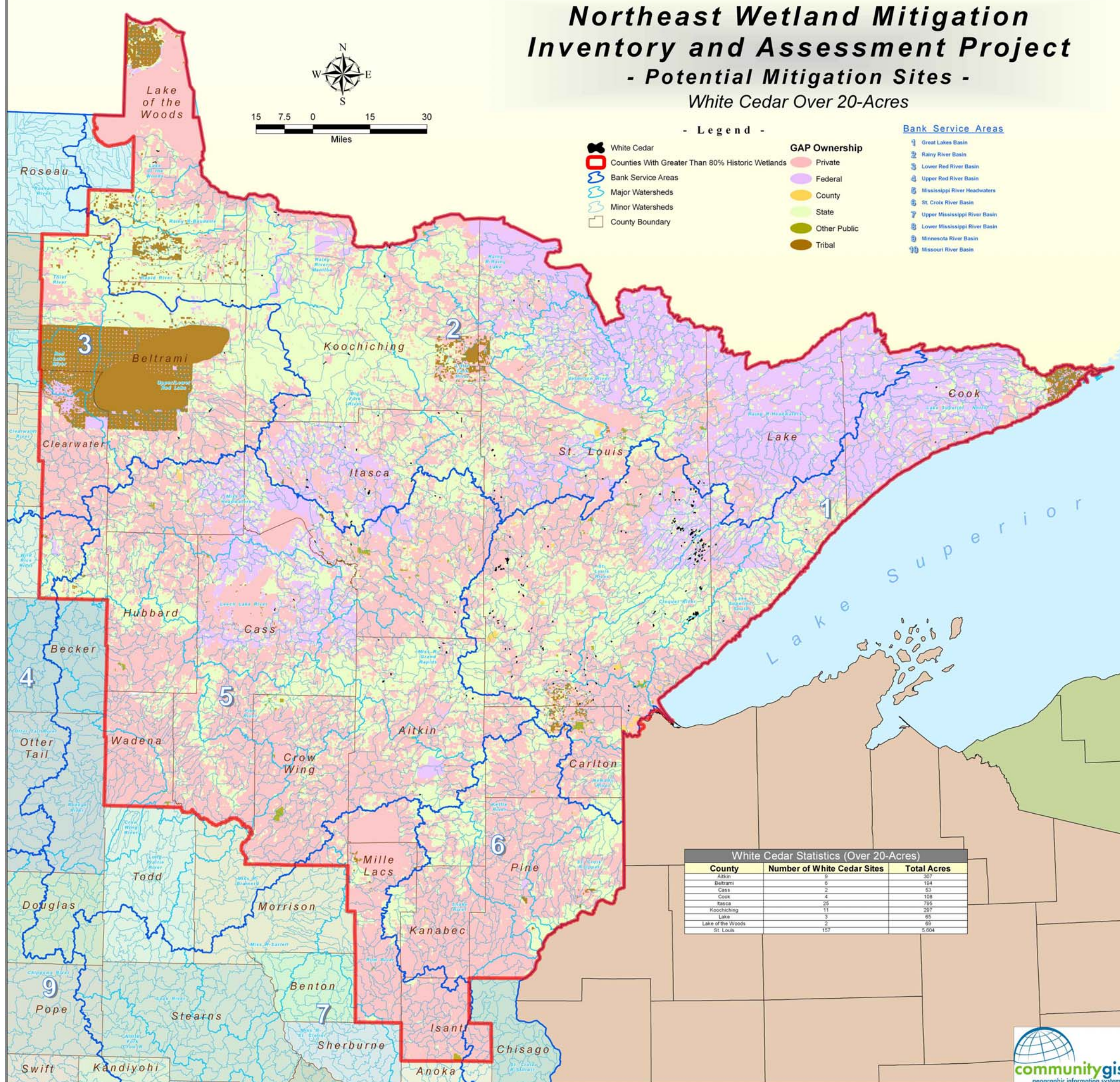


Figure 7

WHITE CEDAR OVER 20-ACRES
 Northeast Wetland Mitigation
 Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project - Potential Mitigation Sites - Trout Streams Over 20-Acres

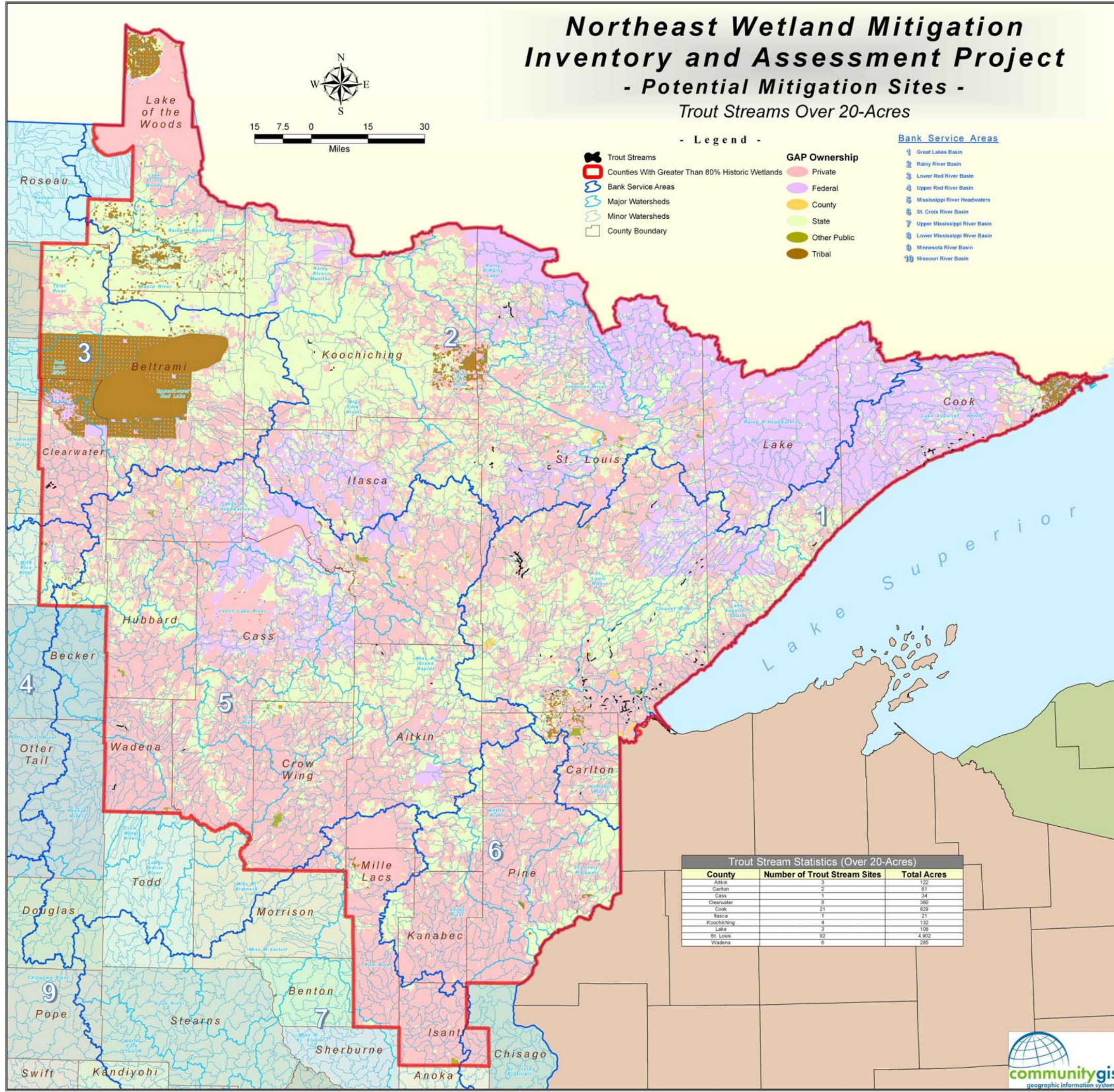


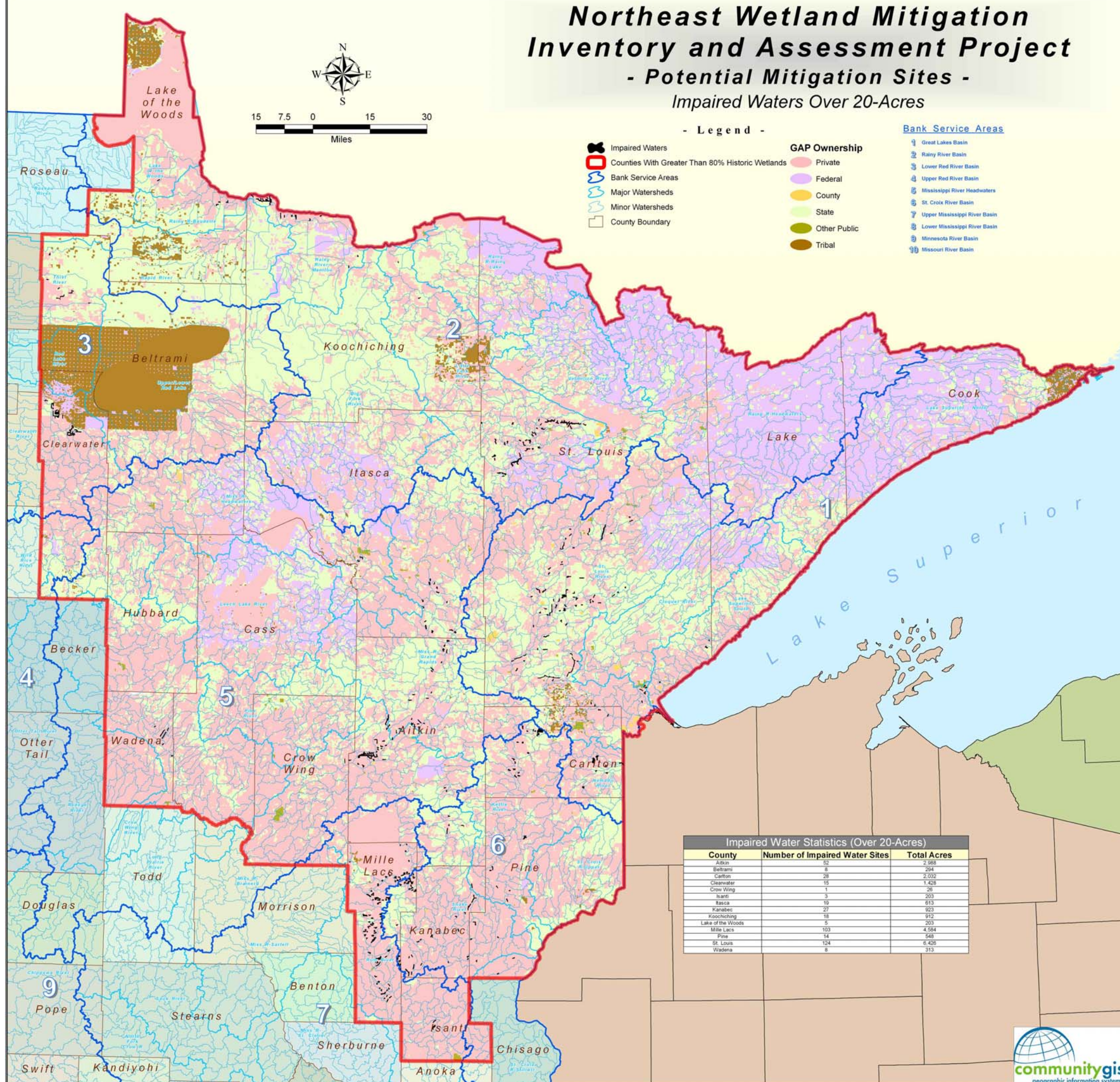
Figure 8
TROUT STREAMS OVER 20-ACRES
Northeast Wetland Mitigation
Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project

- Potential Mitigation Sites -

Impaired Waters Over 20-Acres



Impaired Water Statistics (Over 20-Acres)		
County	Number of Impaired Water Sites	Total Acres
Aitkin	52	2,968
Beltrami	8	204
Carlton	28	2,032
Clearwater	15	1,428
Crow Wing	1	26
Hennepin	3	203
Itasca	19	613
Kanabec	27	923
Koochiching	18	912
Lake of the Woods	5	203
Mille Lacs	103	4,564
Pine	14	548
St. Louis	124	6,426
Wadena	8	313

Figure 9
 IMPAIRED WATERS OVER 20-ACRES
 Northeast Wetland Mitigation Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project

- Potential Mitigation Sites -

Invasive Species Over 20-Acres

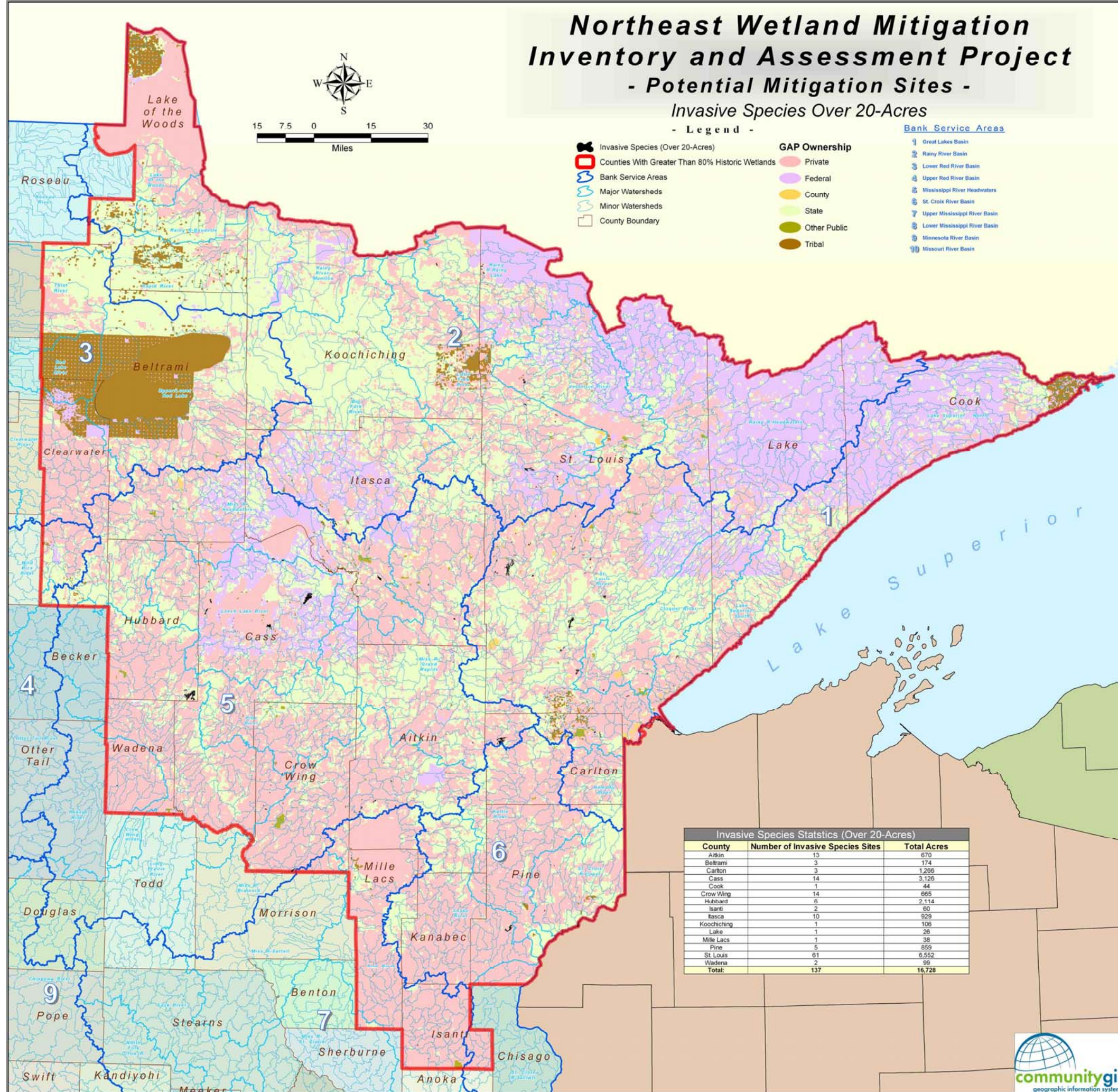


Figure 10
 INVASIVE SPECIES
 OVER 20-ACRES
 Northeast Wetland Mitigation
 Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project

- Potential Mitigation Sites -

Gravel Pits Over 20-Acres

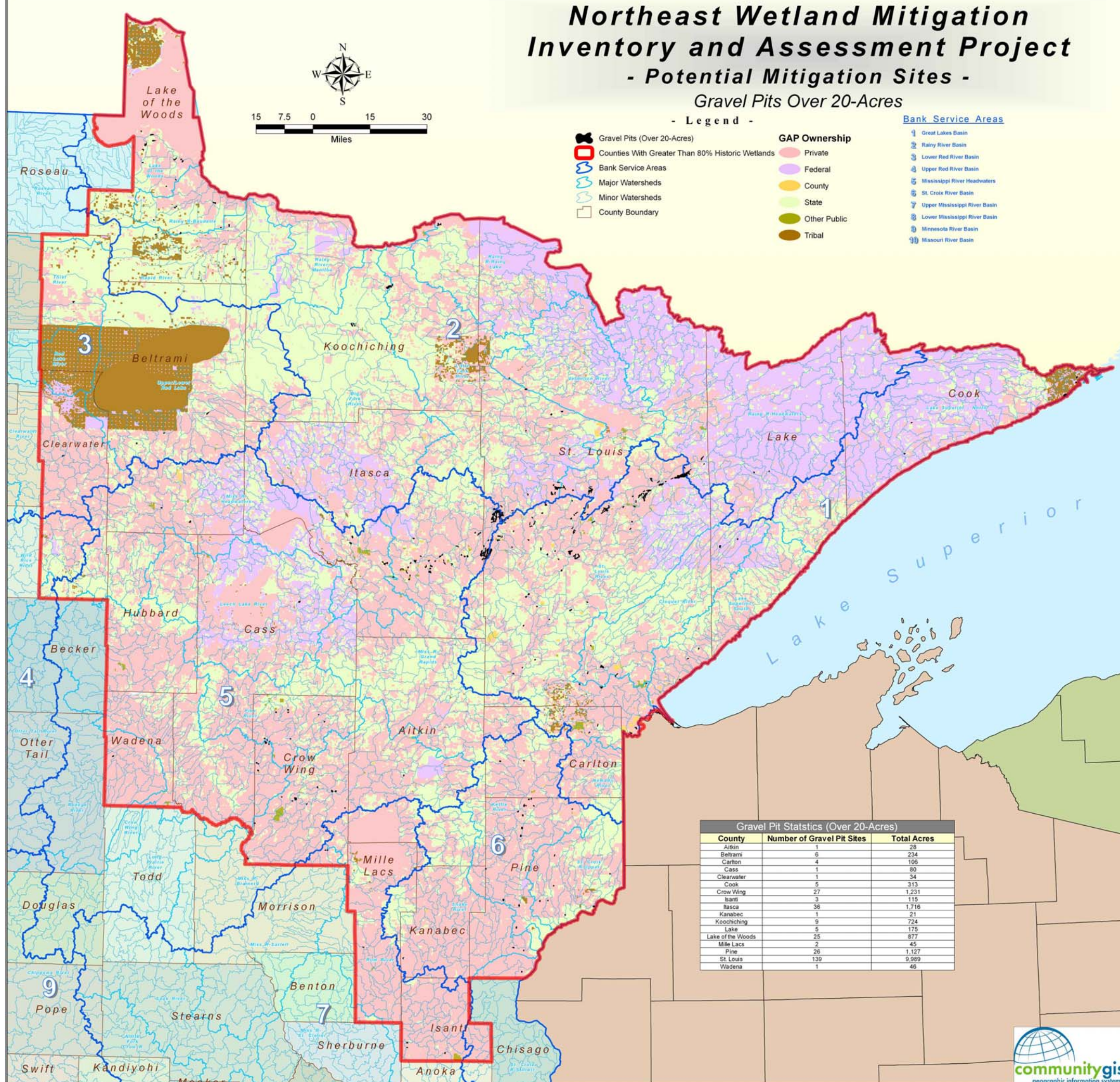


Figure 11
GRAVEL PITS OVER 20-ACRES
Northeast Wetland Mitigation
Inventory and Assessment Project



Northeast Wetland Mitigation Inventory and Assessment Project

- Field Checked Potential Mitigation Sites -

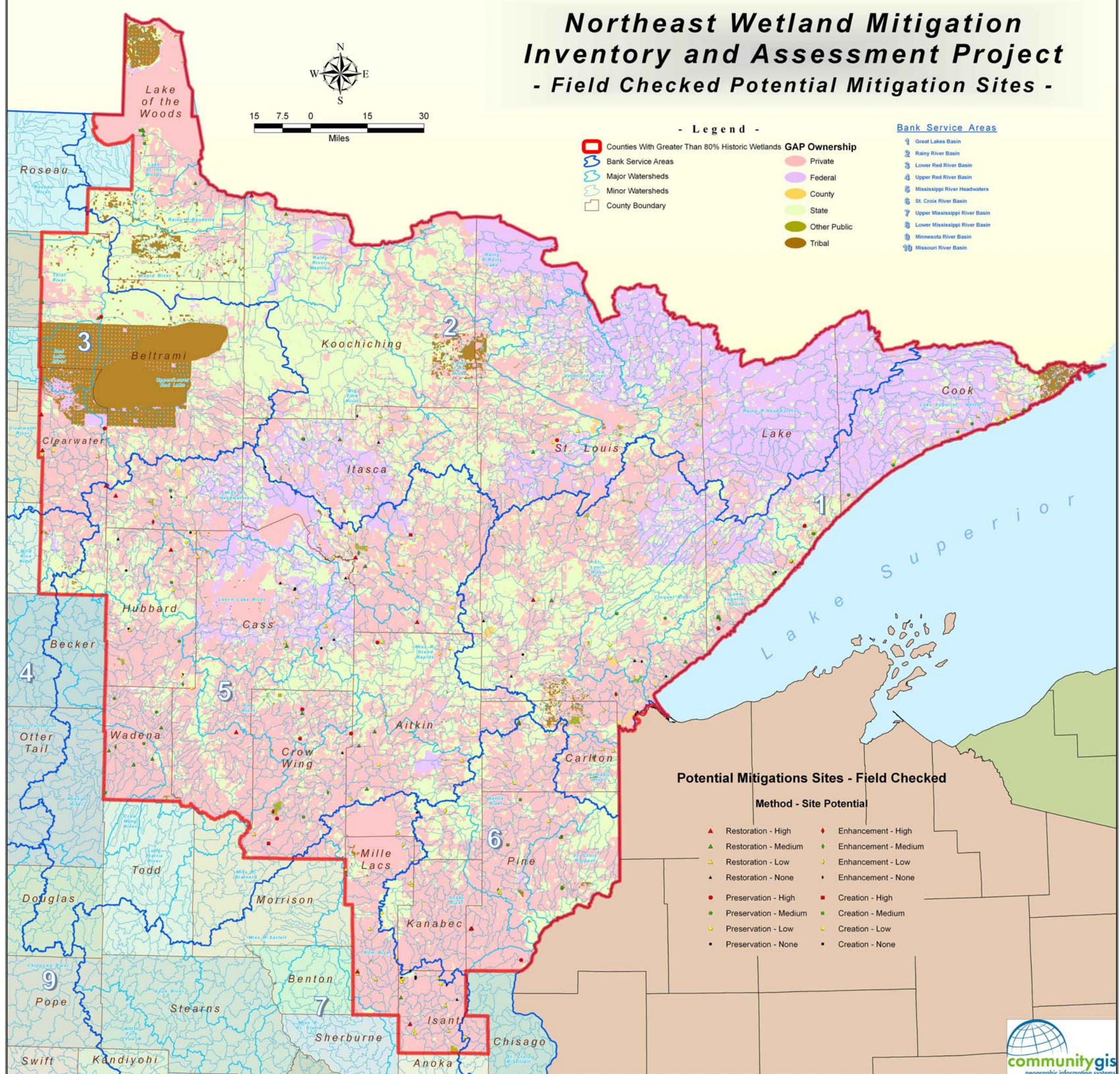
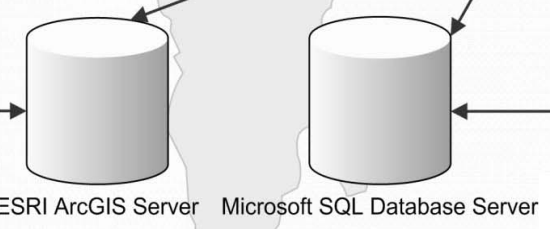
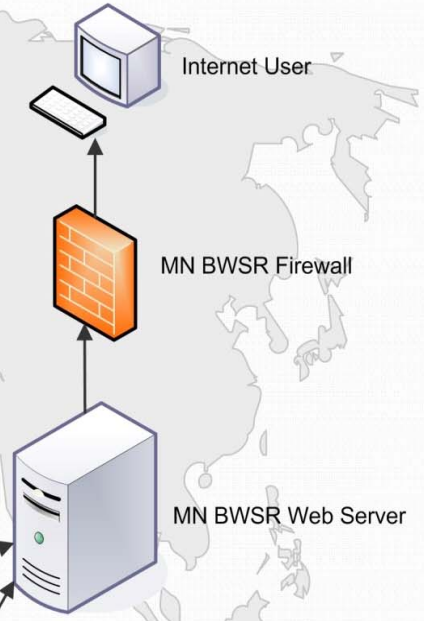


Figure 12
 FIELD CHECKED POTENTIAL MITIGATION SITES
 Northeast Wetland Mitigation Inventory and Assessment Project

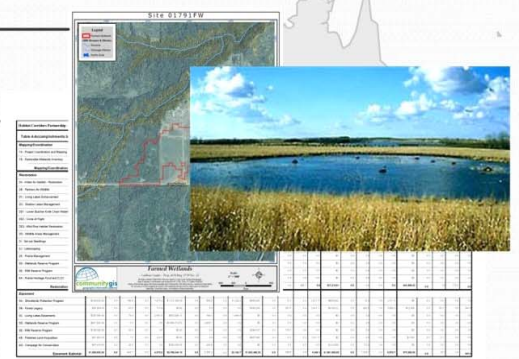


Figure 13: GIS Wetland Mitigation Site Distribution – Option 2

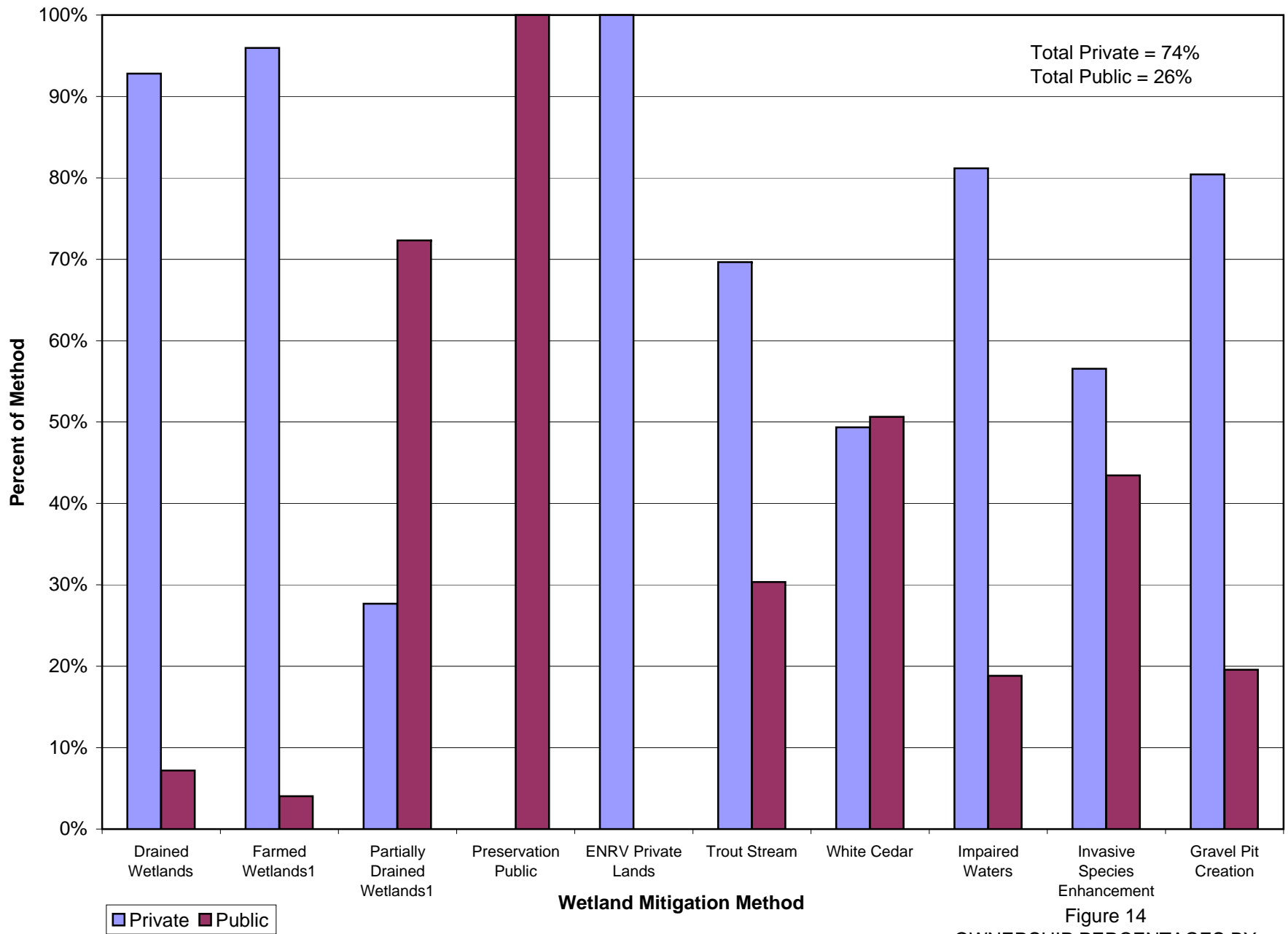
- Web application is GIS/database driven
- User interface will be a ArcGIS web application.
 - Ability to pan and zoom to different areas of the state.
 - Ability to measure distances/areas.
 - View different types of data sets relating to the project.
 - Ability to turn layers on/off.
 - Click on feature with Identify tool to obtain information/data.
 - Interactively select multiple features to acquire information/data.
 - Create buffers to select multiple features and acquire data/info.
 - Create custom maps and output to printer or image format.
- Users will have the ability to perform spatial queries on relating datasets to acquire published maps, reports, data, and images.
- Modifications/additions to datasets can be easily incorporated into application.
- Ability to create an administrative user interface that will allow updates to database information.
- Users not familiar to GIS may need some training.



Stand Alone ArcGIS Web application to View Data, Create Maps, and Perform Spatial Queries.



Published Maps, Reports, and imagery provided through MS SQL Database



1 - High potential mitigation sites only

Figure 14
OWNERSHIP PERCENTAGES BY
POTENTIAL MITIGATION
METHOD
(All potential mitigation sites)

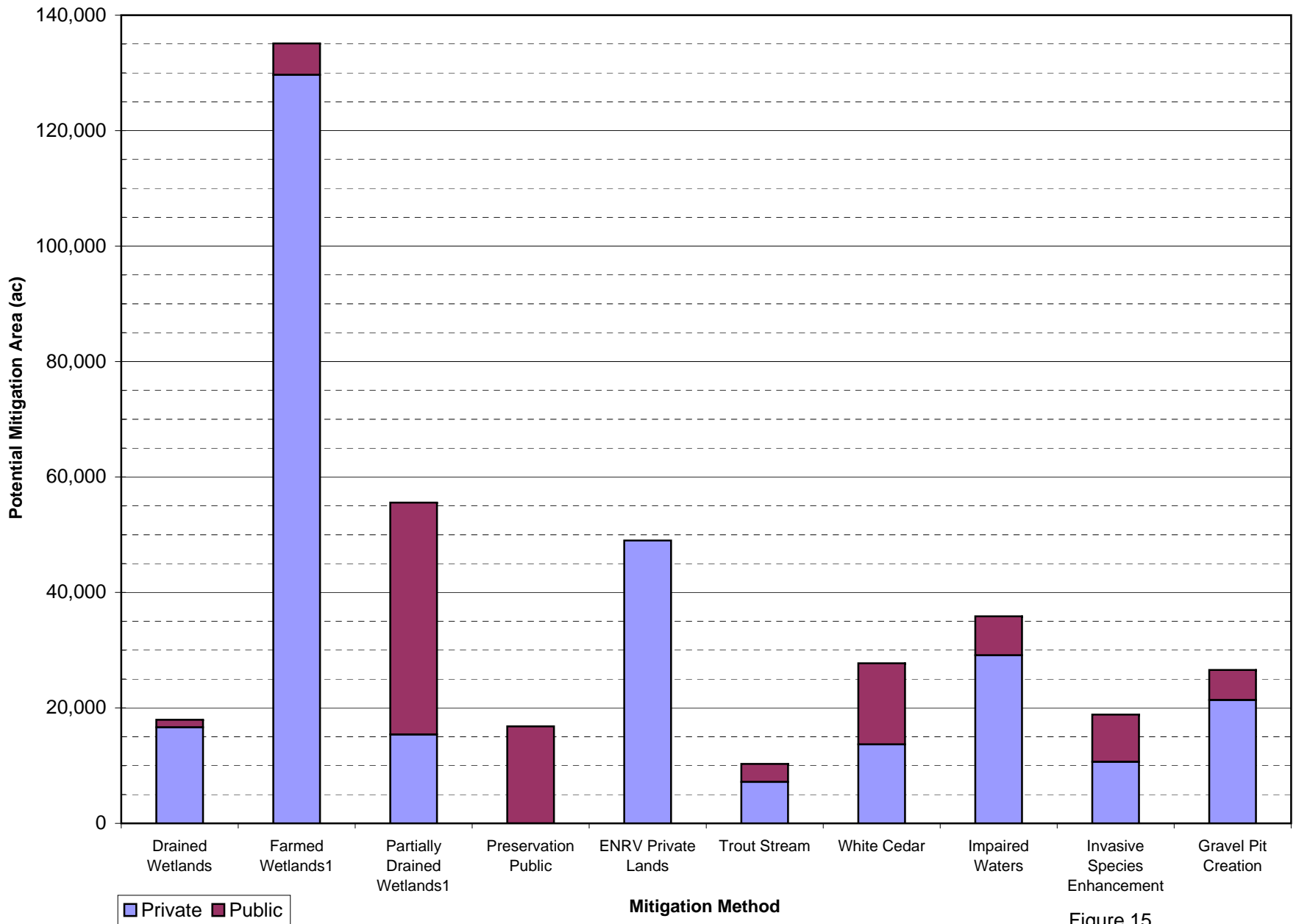


Figure 15
 OWNERSHIP AREA BREAKDOWN BY
 POTENTIAL MITIGATION METHOD
 (All potential mitigation sites)

1 - High potential mitigation sites only

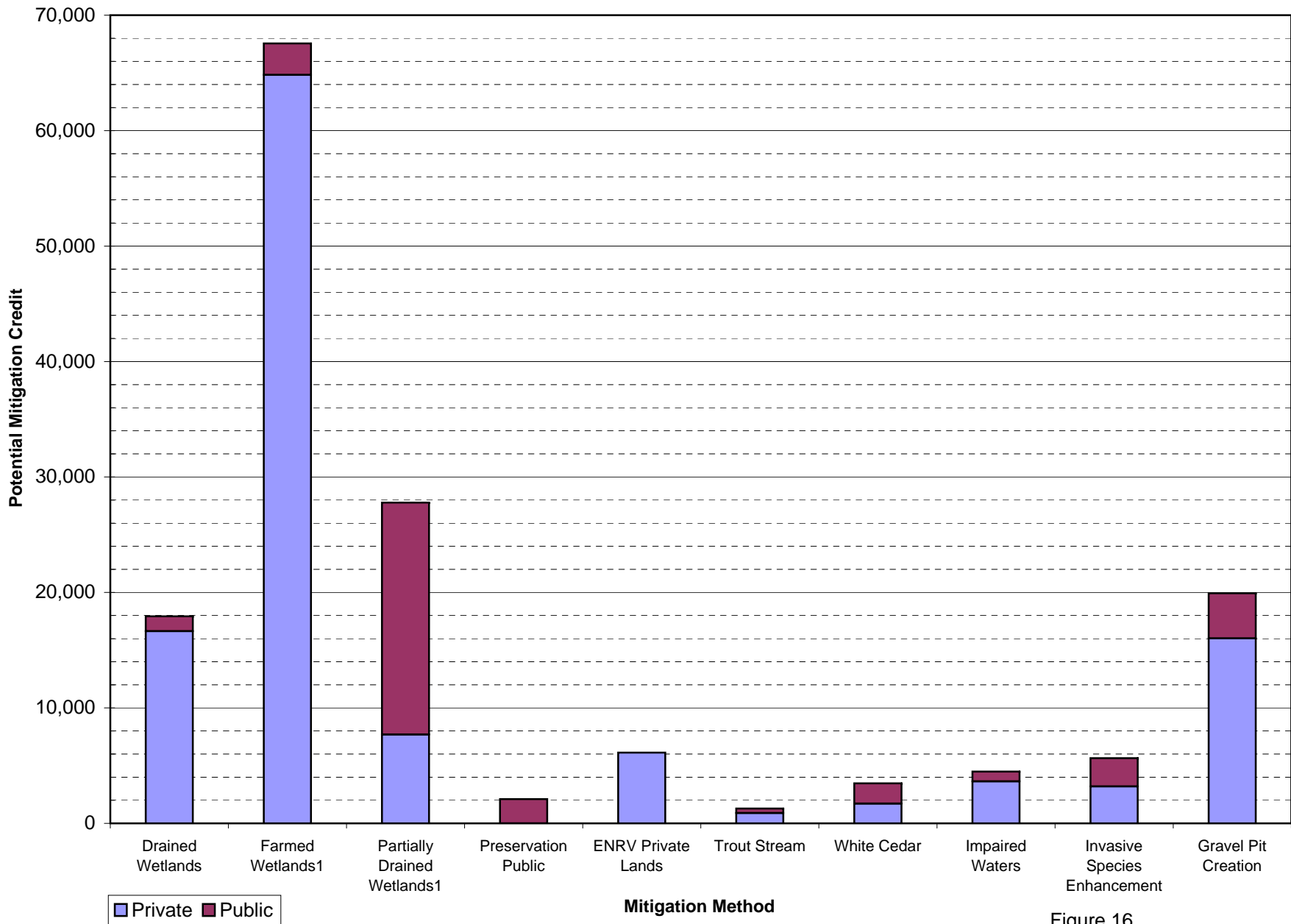


Figure 16
 OWNERSHIP AND CREDIT BREAKDOWN
 BY POTENTIAL MITIGATION METHOD
 (All potential mitigation sites)

1 - High potential mitigation sites only

Appendices

Appendix A

Technical Committee Members

Technical Committee Meeting Participants

Member

Representing

Dale Krystosek	Board of Water & Soil Resources (BWSR)
Joan Weyandt	Board of Water & Soil Resources (BWSR)
Doug Norris	Department of Natural Resources (Ecological Services)
Brian Frederickson	Pollution Control Agency
Steve Eggers	U.S. Army Corps of Engineers
Nick Rowse	U.S. Fish and Wildlife Service
Brian Huberty	U.S. Fish and Wildlife Service
Mark Jacobson	Barr Engineering Company
Keith Hanson	Barr Engineering Company
Tom Tri	Barr Engineering Company
Tony Kroska	Community GIS Services
John Kubiak	Community GIS Services

Appendix A.1

April 16, 2009 Advisory Committee Meeting Minutes

NE MN Phase II: Meeting Minutes for Advisory Committee Meeting - April 16, 2009

PREPARED FOR: MN Wetland Mitigation Advisory Committee
PREPARED BY: Tom Tri (Barr Engineering Co.)
COPIES: File
DATE: April 16, 2009

The first Advisory Committee (TAC) meeting with Barr for the NE MN Wetland Mitigation Inventory convened at 10:00am on April 16, 2009 at Barr's Office in Duluth.

Attendees:

Doug Norris (MN DNR and BWSR)
Dale Krystosek (BWSR)
Joan Weyandt (BWSR)
Nick Rowse (USFWS)
Brian Huberty (USFWS)
Brian Fredrickson (MPCA)
Chad Nelson (Community GIS)
Tony Kroska (Community GIS)
John Kubiak (Community GIS)
Mark Jacobson (Barr Engineering Co.)
Keith Hanson (Barr)
Tom Tri (Barr)

Those unable to attend:

Bill Schnell (DNR Forestry)
Jason Meyer (St. Louis County Land Dept.)
Steve Eggers (USACOE)
Kurt Johnson (NRRI)
Tom Malterer (NRRI)

The main topics of the meeting:

1. Wetland Mitigation Inventory Data Refinement
2. Priorities and goals
3. GIS Model development

Specific points discussed are as follows:

History of the Project, and Phase II Work Plan

Mark Jacobson (Barr) presented an overview of Phase I and a Phase II Work Plan for the Committee's review. The Committee was advised that Phase I had over identified potential opportunities for farmed wetlands and partially drained wetlands. Mr. Jacobson outlined steps taken to refine the data to develop a more accurate understanding of the potential opportunities for these mitigation methods. In addition, the team presented the Phase II Work Plan including further data analysis, a development of the GIS Tool (with 3 alternatives), a discussion of priorities and goals and a schedule for the outreach meetings.

Data Refinement:

Mr. Jacobson presented refined farmed wetlands and partially drained wetland criteria for classifying the data based on likely regulatory eligibility.

- Farmed wetlands polygons were intersected with 2008 NRCS agricultural data (raster data set) to predict regulatory potential (high, medium and low). High potential sites were identified as those containing at least 20 percent of the potential wetland area mapped with seeded crops. Moderate potential was identified as those sites with less than 20 percent of the area identified as seeded crops or at least 20 percent hay, idle cropland, or riparian pasture land. Low potential sites were identified as those sites with less than 20 percent hay, idle cropland or riparian pasture. The high potential farmed wetland area was only 22 percent of the total identified in Phase I.
- Partially drained wetland mitigation potential, which was identified in four counties, were re-examined to accurately reflect the likely potential based on the feasibility due to the potential for flooding upstream properties and the complexity of ownership. High potential sites were identified as those with first order ditches (only one upstream tributary) and only one landowner. Moderate potential sites included those with second and third order ditches and no more than two landowners. Low potential sites contained ditches higher than third order with three or more landowners. Sites located along main arterial ditches (fourth order or greater) were considered to have no potential due to the extensive potential to flood upstream property. The high potential, partially drained wetland area was only 13 percent of the total identified in Phase I.

Data Analysis by Mitigation Method:

Mr. Tri discussed the results for each of the other methods with the Committee.

- ENRV on Public Lands (preservation) 62% within St. Louis County.
- ENRV public and private has an estimated 66,000 acres but when applying the 12.5% credit for preservation, the acreage is significantly diminished.
- Creation - in aggregate pits 60% within St. Louis County.

- Impaired waters wetlands – 80% is located within 5 counties. This is an estimated 20,000 acres, but then applying 12.5% credit for enhancement would result in 2,500 acres of credit.
- Trout streams – There is an estimated 7,000 acres, but when applying 12.5% credit for enhancement/preservation would only result in 560 acres of credit.
- White cedar – There is an estimated 7,500 acres, but when applying 12.5% credit for enhancement/preservation would only result in 600 acres of credit.

GIS Tool

Mr. Kroska (Community GIS Services) discussed the GIS Interactive Tool and three alternatives for the GIS tool were presented.

- Alternative One would operate as a Google/Microsoft Earth interface based on a database but would not be upgradeable. This alternative would be database driven instead of GIS-based. The user interface would have the look and feel of Google Maps. One would have the ability to pan and zoom to different parts of the state. The user would be able to click on site balloons to download and print created maps, reports and preset data. The user would not be able to create custom maps or perform spatial queries. All aerial imagery and spatial data would be provided by Google.
- Alternative Two would use ArcGIS software, with numerous spatial data layers available for use in conducting mitigation searches. This would operate on a standalone GIS server at BWSR, and people could use this interactive tool via the internet to even exchange shapefiles/data to allow the database to be up-dated. A user would be able to measure distances and areas. Data layers could be turned on and off in order to create different custom maps. Users would have the ability to perform spatial queries on the wetland mitigation inventory data and develop maps, reports showing the results of searches. An ArcGIS based system would require a little more expertise and users might require some training.

Alternative Three would use a combination of Alternatives One and Two using a Google interface with ArcGIS to make a little more user friendly option. The functions would be essentially identical to Alternative Two but initially, would be more complicated to develop. Alternative Three would require more programming initially to create spatial analysis tools and functionality, but the goal would be to make it more user-friendly.

The Committee discussed the advantages and disadvantages of each alternative and suggested that either alternative 2 or 3 would be preferable, leaving the final decision to BWSR. Dale Krystosek said that BWSR would decide based on the alternative that would best serve its needs.

Priorities and Goals: Priorities and goals were briefly discussed with the Committee to get their input and better define the process of mitigation siting. The Committee was asked for input on priorities and goals concerning:

- Watersheds (including Bank Service Areas)
- Mitigation Methods (Restoration, Enhancement, Creation, Preservation)
- Minimum Mitigation Site Size
- Water Quality Improvement Needs

Outreach Meetings:

The Committee agreed with the proposed work plan that the team would meet with stakeholder groups to present the refined data and receive input on the GIS Tool and overall goals and priorities. The project team would meet with each of the stakeholder groups and have a large group meeting with all stakeholder groups invited together in the fall. A list of stakeholder groups is listed below:

- County Commissioners
- Soil and Water Conservation Districts
- Wetland Bankers
- Mining Interests
- State, and Federal Agencies, Tribal Interests

Appendix A.2

July 9, 2009 Advisory Committee Meeting Minutes

NE MN Phase II: Draft Meeting Minutes for Advisory Committee Meeting -July 09, 2009

PREPARED FOR: MN Wetland Mitigation Advisory Committee
PREPARED BY: Tom Tri (Barr Engineering Co.)
COPIES: File
DATE: July 20, 2009

The second Advisory Committee (TAC) meeting with Barr for the NE MN Wetland Mitigation Inventory convened at 10:00am on July 09, 2009 at Barr's Office in Duluth.

Attendees:

Doug Norris (MN DNR and BWSR)
Dale Krystosek (BWSR),
Nick Rowse (USFWS),
Brian Huberty (USFWS),
Brian Fredrickson (MPCA),
Chad Nelson (Community GIS),
Tony Kroska (Community GIS),
John Kubiak (Community GIS),
Mark Jacobson (Barr Engineering Co.),
Keith Hanson (Barr),
Tom Tri (Barr).

Those unable to attend:

Bill Schnell (DNR Forestry),
Jason Meyer (St. Louis County Land Dept.)
Steve Eggers (USACOE),
Kurt Johnson (NRRI),
Tom Malterer (NRRI)

The main topics of the meeting:

1. Results from the Public and Agency Outreach Meetings
2. GIS Model development

Specific points discussed are as follows:

Public and Agency Outreach Meetings

Mark Jacobson and Tom Tri (Barr) presented the feedback from the various outreach meetings previously held to get input on the siting strategy, the GIS tool and project priorities. The following issues were discussed:

Changes to Policy: There was a discussion of the potential for future changes to policy based on what the data shows and how recommendations might be carried forward. It was suggested by some that this could be achieved by modification to guidance or future discussions. Doug Norris questioned who should suggest recommendations for changes to current policy (e.g. BWSR, NE interests, others). Doug also suggested that where there's not agreement on a recommendation, it may be best to describe the benefits and drawbacks of each recommendation in the final report for this project.

Streamlining the banking process: The committee suggested that the process could be streamlined by customizing training for the region, and talking to the Corps of Engineers about streamlining the banking documentation and process.

SWCD's role in promoting wetland banking: Some SWCD's are already promoting wetland banking. BWSR could provide more guidance to help promote wetland banking in the region. The committee felt that the SWCD's were best able to help their constituents develop banks.

Prioritizing wetland functions: The committee suggested including prioritization factors that aren't considered in the evaluation of in-kind wetland mitigation (i.e., hydrologic setting, landscape setting, and the size of wetland basins impacted).

Preservation: During the outreach meetings it was suggested that preservation could potentially mitigate impacts to low quality wetlands. It was suggested by the committee that preservation could be expanded to private lands and a legislative change could be proposed to accommodate this.

Miscellaneous information:

DNR obtained leaf-off, four band aerial photography for NWI update that could be available more broadly by the end of summer 2009. It was flown in spring but may only include $\frac{3}{4}$ of the area. The availability of the photography is uncertain at this time.

Existing digital elevation models (DEM): There is a \$5 million bonding bill for DEM improvements. Brian Huberty suggested that the NE should be a focus for the money.

The Advisory Committee commented on issues raised at the County Commissioners meeting:

- There was a concern expressed by the County Commissioners that mitigation credits raise land values which could in-turn, raise general farmland prices.
- However, the committee suggested that this would provide a benefit by raising more tax revenue.
- The committee asked whether or not land on which mitigation is done, should be assessed at a value equivalent to the value of mitigation credit sales until they are sold out, and then drop the assessed value after the credits are sold?
- The committee thought that wetlands should be taxed at their value for producing income, which generally could be very low unless the wetlands are shown to have recreational or other value.
- Judicial ditches were discussed. Most county commissioners are not interested in abandonment of public ditches. It was mentioned that there is a prescribed process for the abandonment of county judicial ditches, so opinions may not be a significant consideration.

Could there be further guidance on the appropriate level of effort needed to complete wetland mitigation siting? The committee suggested that process of siting is in rule already.

Non-degradation and carbon sequestration were briefly discussed and were not thought to be of much value in consideration of external benefits/credits for wetland mitigation. Climate change should be discussed and acknowledged in the report, but the effects of wetland impacts on the carbon flux must also be considered.

The tribes did not participate in the outreach meetings or submit any comments. It was suggested that Barr follow up with the tribes to discuss the project, especially regarding wild rice concerns. Tim Petronski, USFWS, was recommended as a Tribal Liaison.

Mitigation opportunity registry: It was suggested that a wetland mitigation opportunity registry could be developed for landowners to advertise/promote their interest in developing wetland mitigation/banking on their property. BWSR could be the host for such a registry or it could potentially be hosted on the website of a non-profit group. An owner could submit a form to BWSR for a preliminary check to ensure that mitigation potential exists before posting the data to the registry. Chad Nelson (Community GIS) mentioned that he could add a field in the GIS tool for contact information. It was further suggested that BWSR could put out a notice for people to submit information if they are interested.

GIS Tool

The GIS Interactive Tool was discussed. Various search categories were sent out to the committee for their review and comment. The committee suggested other data layers that might be considered.

Doug Norris introduced a series of tables from the MN DNR Wildlife Action Plan describing species of greatest conservation need developed based on habitat types and sorted by ecological subsection.

- This could be used to prioritize wetland mitigation types based on the intrinsic value in supporting those particular species.
- This could be used to provide additional justification for Exceptional Natural Resource Value wetland preservation and/or enhancement
- The ecological subsection data layer would be needed as a base layer if this were to be used
- DNR would have to generate broad polygons indicating habitat value to a suite of wetland-dependent species.
- Doug will follow-up with Natural Heritage staff to determine if there is value in adding this data to the GIS tool.

The following data layers were emailed to the committee and briefly reviewed for additions or subtractions:

- Photos - Current Aerials, Available Historical, Color Infrared
- Elevation and Slope
 - Quad maps
 - Digital Elevation Model (hill shade)
- Id Wetlands
 - NWI data
 - Historic wetland mapping from Phase I Inventory model
- Soils - Hydric soils
- Water
 - DNR streams
 - Trout Streams
 - Lakes
 - Impaired Waters (streams, lakes, wetlands, including impairment attributes)
 - Ditch Data
- Geography
 - Road names and numbers
 - Section numbers
 - Section lines
 - Township lines and names
 - UTM coordinates
 - Latitude and Longitude
 - Counties
 - Municipalities
 - Iron Range
 - Ownership by 40's or other publicly available
 - Ecological Classification System
- Special Categories
 - ENRV- exceptional natural resource value
 - White cedar
 - Gravel pits

-
- Invasive species

Additional Data Layers were suggested:

- SWCD Districts and contact information
- Political Districts
- Add a field for field truth verification that could be updated based on a site visit.
- Add a field indicating landowner interest with contact information.
- Including wetland mitigation credit potential, based on method, in the GIS tool was discussed. It was determined that it should be left out because mitigation credits are determined by the TEP based on a site visit and more detailed, site-specific data. However, SWCDs and LGUs could enter a regulatory applicability rating based on a site visit with some indication of the level of investigation. Including this information would require a two tier security system with personal passwords provided by BWSR so SWCDs and LGUs could add land owner interest into the data base, which would then be verified by BWSR before making the information available to the public.
- It was questioned whether the shapefiles created should be made available to the public? It was suggested that the shapefiles could be provided as a snapshot of potential sites with appropriate disclaimers that the information will likely change over time.

Appendix A.3

September 17, 2009 Advisory Committee Meeting Minutes

NE MN Phase II: Draft Meeting Minutes for Advisory Committee Meeting -September 17, 2009

PREPARED FOR: Northeast MN Wetland Mitigation Technical Advisory Committee
PREPARED BY: Mark Jacobson (Barr Engineering Co.)
COPIES: File
DATE: September 17, 2009

The third Technical Advisory Committee (TAC) meeting with Barr for the NE MN Wetland Mitigation Inventory convened at 10:00am on September 17, 2009 at Barr's Office in Duluth.

Attendees:

Dale Krystosek (BWSR)
Doug Norris (MN DNR and BWSR)
Steve Eggers (USACOE)
Brian Fredrickson (MPCA),
Lucinda Johnson (NRRI)
Tony Kroska (Community GIS)
John Kubiak (Community GIS)
Mark Jacobson (Barr Engineering Co.)
Keith Hanson (Barr)

The main topics of the meeting:

1. Demonstration of the GIS Tool
2. GIS Model development

Specific points discussed are as follows:

GIS Tool Demonstration

John Kubiak presented a live demonstration of the GIS tool to show the current functionality and to obtain feedback from the Advisory Committee.

Home Page: The home page of the tool will show the portion of the state covered by the GIS data that are part of the tool. It was suggested that a disclaimer screen also pop up on the home page so that all users will understand the limits of the data prior to utilizing it.

Search Criteria: The general search criteria were shown and a few searches were demonstrated. The TAC suggested reordering the list of search criteria to:

- Emphasize watersheds and bank service areas
- Emphasize restoration methods over preservation or creation methods

- Categorize mitigation methods by: restoration, preservation, enhancement, creation

General Comments:

- Make tool completely user-guided so there would be no training needed.
- Do not use acronyms.
- Make legend dynamic so that all active reference layers are shown.
- Include GAP ownership data as a reference layer.
- Include lake watersheds as a reference layer.
- Include field verification and mitigation potential ratings as search criteria.
- Add link to county websites or LGUs to direct user to appropriate resources for assistance.

Appendix B

Public Outreach Meeting Notes

Appendix B.1

Public Outreach with SWCDs, LGUs, and BWSR Staff Meeting Notes

Meeting Notes
Outreach Meeting with SWCDs, LGUs, and BWSR Representatives
April 9, 2009

Organizations Represented

Beltrami Co. Environmental Services, Carlton SWCD, Clearwater Co SWCD, Crow Wing SWCD, Hubbard Co SWCD, Itasca Co SWCD, Koochiching SWCD, MN DNR – Bemidji (Con Con Lands), BWSR, Barr Engineering and Community GIS.

Presentation Summary

Approximately 20 representatives from the organizations listed above participated in the meeting. The group was presented with updated and revised data from the Phase 1 Inventory. Maps of potential opportunities for nine mitigation methods were displayed and discussed with the audience. In addition, assumptions used in revising the data were explained. Three GIS Tool Alternatives to identify potential mitigation opportunities were explained. Now that preliminary data is in, the presenters received input on goal and priority preferences, questions and comments.

Questions and comments from the SWCDs, LGUs and other BWSR staff present.

Q. Should certain types of mitigation be tied to particular ownership (e.g. should preservation be restricted to public land...)?

A. Preservation might be a good method to use for the road banking program, but is allowed on both public and private lands.

Q. What role should the SWCDs play in the allocation of siting mitigation banks? Should they be proactive in promoting them or allow the private sector to figure it out with limited governmental intervention?

A. There is a fine line between education and promotion. SWCDs and LGUs should be proactive in promoting wetland banking, leaving it solely to the private sector has been ineffective.

Q. How should LGUs balance private financial gains in banking with neighboring county wetland bank credits? (e.g. Hubbard County impacts being replaced by Becker County wetland bank credits)

A. This will always be a common occurrence unless there are more banks developed and/or in combination with local plans due to the nature of the regulatory programs.

Q. WCA rule siting requirements restricts going outside of the county, what is the relationship between the siting requirements with the cost of credits?

A. The WCA rule does not restrict going outside of the county, but provides a stepwise process required for siting mitigation. Wetland banking is a free market system that is affected, to some degree, by regulatory decisions, so there is no specific relationship.

Q. It is a complicated and difficult process to establish a bank. Can it be streamlined?

A. There is a need to ensure competent consultants guide property owners through the process. However, there is usually a high establishment cost and credits are sometimes unpredictable.

Q. Should there be credit reconsideration for Northeastern Minnesota? Credit yields for replacement credit generation options in Northeastern Minnesota makes banking less attractive. Can there be variable credit based on location in the state (i.e. more credit for preservation, and other methods that have been reduced)?

A. There already is a variable credit based on the location in Minnesota. The Northeastern part of the state is 1:1 while the southern part of the state is 2:1. Credit for the other methods is based on the Memorandum of Understanding between BWSR and the Corps of Engineers and the proposed rule changes.

Q. If the majority of restoration opportunities are farmed wetlands, is there a possibility of reducing the requirement for 20 years?

A. There are no proposed rule changes that address this at this time and it is not anticipated to change in the near future.

C. Can certain wetland functions be targeted? There is a question whether mitigation actually replaces the lost functions of impacts.

Q. Can there be a General Statewide Bank that everyone can come to, even for violations?

A. There is an ongoing discussion for a Wetland Cooperative Mitigation Bank for Northeastern Minnesota. The details have not been worked out as yet.

C. There needs to be some long term monitoring for the maintaining the quality of wetland banks. There have been some failures due to the invasion of reed canary grass. Further discussion suggested good site selection and maintenance fees to ensure perpetuity.

Q. Can BWSR provide a short form or a short process for small bank sites? In other words, can the state make it easier for sites under 5 acres to be banked especially where big sites are unavailable?

A. The Corps of Engineers generally does not consider bank sites under 5 acres. It may not be feasible to create a bank site for less than 20 acres when one considers establishment fees and the rate of return of credits (investment) over time.

C. Perhaps Preservation of high quality wetlands could be used to offset the impacts to poor quality and low functioning wetlands.

C. Use large bank sites for the road program.

Q. What about using wetland mitigation to help establish flood retention impacts where it's needed elsewhere in the state – i.e. Red River Valley?

A. Current rules provide guidance to replace wetlands as close as possible to the point of impact.

Q. How closely are the mining companies being held to WCA, regarding replacement wetland functionality and location?

A. Minnesota DNR is charged with enforcing the WCA when they issue a permit to mine.

GIS Tool needs

Q. Can drain points be added to the tool – to help determine flow of the wetlands (hydrology)?

A. Yes.

C. NWI is useless information

Q. Can crop history data be added so that it is easier to determine eligible parcels?

A. NRCS controls the crop history which is currently protected under data privacy laws. It is probably easier to contact the individual property owner for their records.

C. Color infrared layer should be added to enhance wetland determinations.

Overall, there was a general consensus that either Alternative 2 or 3 would work for the SWCD's. It was important to note that only 7 of the 18 SWCD/Counties were represented and 2 of these did not have ARC GIS capabilities – so it is important to develop this tool in such a way that the software is accessible by someone who does not have access to GIS; in short – make it easy for anyone to view and download information.

Appendix B.2

County Commissioners Meeting Notes

Meeting Notes
Outreach Meeting with County Commissioners
April 15, 2009

Presentation of the NE MN Wetlands Mitigation Project at the Arrowhead Region County Commissioners April Meeting;

Commissioners from the following counties attended the meeting: Aitkin, Carlton, Cook, Lake, Lake of the Woods, Koochiching, Pine, and St. Louis. Also attending was the Director of the Arrowhead Regional Planning Commission.

Presentation Summary

Approximately 30 county commissioners and staff and other from the organizations cited above participated in the meeting. The group was presented with updated and revised data from the Phase 1 Inventory. Maps of potential opportunities for nine mitigation methods were displayed and discussed with the audience. In addition, assumptions used in revising the data were explained. Three GIS Tool Alternatives to identify potential mitigation opportunities were explained. Now that preliminary data is in, the presenters received input on goal and priority preferences, questions and comments.

Participant Comments

Q – What about judicial ditches?

A – The potential opportunities for this type of restoration will need further examination. All of the answers are not available yet.

Q – How long will those 4,200 acres last?

A – That depends on wetland impacts, mitigation needs.

Q – Were landowners contacted? Was government property involved in the study? Reservations?

A – An effort was made to contact each property owner but not all were contacted. State and County land was inventoried in the study. No federal or Reservation land was inventoried because BWSR currently cannot put an easement on reservation or forest service land. There is a lot of Federal and Government ownership in the northeast part of the study area and thus, less opportunity within the Arrowhead region, for instance.

Q – So, how many real acres of potential?

A – It is estimated that there is 137,000 acres on the high side, and when you consider those acres having high potential and interested property owners - 4,200 on the low side. Landowner interest is only a snapshot in time. This factor can be more variable than the natural features, which means opinion can change. This is a VERY significant factor. There ARE opportunities, but it will take more looking.

Q – If only 11% of the property owners are willing, is it because they are unhappy with this idea?

C – In a “wet” county, wetlands are less precious (Aitkin). It is very difficult to find mitigation opportunities.

Q – Who was notified?

A – During the Ground Truthing or Field Verification Efforts Soil and Water Conservation Districts (SWCDs or County Environmental Staff were enlisted and instructed to contact property owners to about access to their property and about their preferences concerning wetland mitigation on their property.

C – Commissioners expressed concern about wetlands banking easement which may handicap land management.

Q – How did you pick 20-acre gravel pits?

A – Yes, that is big, but need to have a minimum size in order to make it financially feasible with the establishment costs and fees for creating a wetland bank.

Q – What about the Magnet Project?

A. – The Inventory evaluated inactive mine areas, like old tailings basins. There was an assessment of mine features but not on any mine property that is currently working.

Q – What about the Cuyuna Range?

A – Most of the Cuyuna Range was mined creating very deep lakes. Much of these do not offer credit as wetlands which have a maximum depth of 6 feet.

Q – Pre-settlement wetlands are supposed to be ones here originally, when MN became a state. But – has there been any consideration for how those were increased with dams and locks? Have you checked on those existing wetlands (80%) to correlate the numbers?

A – No.

Q – Is Barr looking at managing wetlands or selling mitigation credits?

A – No – Barr is just looking at the opportunities.

Q – There are potential opportunities for someone to manage these lands... How does that play out?

A – Barr is not a land managing agency but an engineering consultant firm.

Q – What does the state do with this data? What if landowners are not interested?

A - BWSR is sensitive to that potential, respecting the fact that some landowners are not interested. There is a need to manage the data carefully. When the data is released it may start an uptick in mitigation projects. BWSR does not want to pre-dispose any entity to this information.

C – Keep in mind that ARDC has a great server for GIS. ARDC would like to collaborate on GIS

A – The Different GIS Tool options have different costs and management

C – Developer came in to build Pamida store, struggled to find credits. This is a very real issue. Some Land commissioners are not supportive because of easement issues.

Q – When the ground truthing efforts were being conducted was there any identification of any amount per acre?

A – No, the landowner just asked if they were interested.

Q – Isn't it like asking "Do you want to give up farming when you make a money offer"?

A – No – the opportunities for mitigation really is about looking for potential where people are interested. It really depends on how you ask the question. Especially in LOW County – it could be a problem. BWSR is NOT doing a sales job. There may be some real concern if the wetland credit value may be \$8,000 to \$12,000 per acre with the current property values. Farmland that has been cropped and seeded (with records) for 20 years, is of maximum value.

Q – If there is a 20-year crop history, what if it is not consecutive?

A – Then a percentage of the acres would be given as credit.

Q – Kanabec is totally farmed, so there is high price and high potential. But, there may not be any interest. It depends. Who ends up running the properties that become wetland mitigation? Will it have to be off the tax rolls?

A – No, land is still privately held, BWSR holds an easement.

Q – What if they quit paying taxes on it?

A – Not aware of any cases, at least it's not happening now.

A – There is an example of a potential site in which the owner wants to stay on site and create a forested wetland and pay taxes. This is a win/win situation for the landowner and the county which is concerned about tax revenues.

C – BWSR needs to keep track of these situations. The mitigation sites should be mostly local landowners. The County will be responsible in perpetuity. For the first 5 years there would be local monitoring, a BWSR issue.

Q – In Pine County – is there any retroactive ability to this program? If a wetland was created in the past and the owner didn't know about this program...

A – It depends. For gravel pits, it takes time to create a wetland. Can apply within 10 years of ceasing mining – needs to be active. There needs to be a vegetation plan, established hydrology, and hydric soils.

Q – Of those 500-600 acres needed per year, are there individually projected numbers by county?

A – No – those are just overall estimates. There is no county specific data.

Q – Did you contact anyone like Potlatch? They own lots of wetlands.

A – No particular owners were targeted in the Inventory. However, BWSR has looked at cedar preservation on a site formerly owned by them.

Q – Where do you see disadvantages preservation of cedar for county with tax forfeited land?

A – If you receive wetland credits, the harvest of timber may be prohibited under an agreement with the

Corps of Engineers (COE). Timber management may be allowed but under a forest management plan and at a reduced credit. The COE wants to ensure that permanent impacts are being replaced.

C – Seems like more of a plan than policy setting

A - Policy exists outside this program (WCA). BWSR has applied existing policy to create estimates of the potential mitigation based on known program standards.

C – In Pine County we have mud volcanoes. These are mud flats down south that are getting bigger and bigger. Now we have a HUGE wetland. Maybe we should let it grow and then sell credits!

Q –Shouldn't we be more concerned about moving ahead into the rest of the state? Need to ID wetlands. Now there is a process – how can that be applied statewide? Is it appropriate to ask for policy idea when project is half done?

A – The part of the project that is done – is ONLY the Inventory. How does this tie in to the WCA? Other parts of the state do not have the same problems.

C – Commissioners make policy, technicians stay out of policy and present the facts.

C- We do have opportunities to create banks. We went to legislature to help find banking potential, and received funding.

C -It is a policy decision to identify what wetlands to target. Groups – target certain watersheds and opportunities in certain watersheds.

Q – Issue is identified, so then how to make policy?

A – Have to lay out current policy, get data, and decide on further policy.

C - Outlook should be for the health of the county.

C – There is a need to provide banking possibilities to help business development/ other development. Find a bank in each county.

Q – What are the ramifications of the study? Make certain any properties sold for credits do not affect neighboring properties' assessments. Information derived is not proprietary – results and identified properties should be held only by each county and not available to the “used car salesmen” types. It could be a business opportunity for somebody. If government is creating a “need”, it shouldn't have the data just “out there”.

Q – What are those formulas for replacement? Are they actually statutory?

A – It depends on the rules.

Q – Looks very inequitable, looking at it as a new member/layperson. Formula should be tailored to take into account the particulars of certain kinds of lands. This seems unfair.

A – Depends on what part of replacement equation you are looking at. North is 1:1, South is 2:1 maybe should look at varying those numbers. Consider all other agencies – like ACOE, use most restrictive.

Q – Presentation – Why can't counties get any input (Aitkin) on the mining companies and dealing with mitigation on their own. Why are they working only with the DNR?

A – DNR – issues the permit to mine and is charged with the Wetland Conservation Act regarding mining activity.

Q – Is there policy – impaired water with TS – would mitigation be required on that site?

A – LGU could make that decision. If doing an enhancement, maximum credit will be 25%

Q – Again, should the ratios/formulas be revisited?

C - Look at the restoration/enhancement opportunities – each have credit ratio, determined by BWSR and the ACOE. Look at the situation.

Q- Why can't there be some consideration for wetland mitigation in the areas that have lost their wetlands?

A – There are always questions about out-of-watershed replacement. State & Federal guidelines address replacement in the watershed first. This study is not supposed to address the policy-making process, but present the facts.

C – (DF) Seems to be creating winners and losers – the winners are those who have already filled in their wetlands, and can now create them again...

Appendix B.3

Public Outreach with Mining Interests Meeting Notes

Meeting Notes
Outreach Meeting with Mining Interest Representatives
April 24, 2009

Organizations Represented

ArcelorMittal Minorca Mine, BWSR, Cliffs Natural Resources, DNR Minerals, Duluth Metals, Essar Steel, Encampment Minerals, Franconia Minerals, Magnetation, Mesabi Nugget, Polymet, Iron Range Resources, Iron Mining Association, Mining Minnesota, United Taconite, USS Keetac, USS Mintac.

Presentation Summary

Approximately 35 representatives from the organizations cited above participated in the meeting. The group was presented with updated and revised data from the Phase 1 Inventory. Maps of potential opportunities for nine mitigation methods were displayed and discussed with the audience. In addition, assumptions used in revising the data were explained. Three GIS Tool Alternatives to identify potential mitigation opportunities were explained. Now that preliminary data is in, the presenters received input on goal and priority preferences, questions and comments.

Participant Comments

Q – Is 4,200 acres actually what's out there?

A – I think the real potential is somewhere between 4,200 and 20,000 acres.

Q – Where could mitigation ultimately go provided there is little opportunity in the northeast?

A – Looking at the opportunities on a watershed basis, and if there are no opportunities found there may be some possibility in examining changes to current policies of replacing in the watershed.

Q – Why aren't farmed wetlands receiving credit for a cropping history when it is hayed?

A – The Wetland Conservation Act rules allow credit for farmed wetlands based on the percentage of seeded crops or rotations during the past 20 year period. There is new guidance coming out on the restoration of farmed wetlands. For example, a site with documented seeded crops in 15 out of the past 20 years would receive 75% credit for the total acreage restored.

Q – Can you provide all of us with a copy of the presentation?

A- Yes

C – Mineland assessment slide looks bad to the lay person. This should be restated more positively.

- *Possibly rate wetlands using the wetland management classification as another way to show the overall value.*
- *It might help to look at the acreage of the wetlands in conjunction with the quality ratings.*
- *Evaluate the percent of the mine landscape covered by wetlands compared to undisturbed areas in that part of the state.*
- *Compare the quality ratings of mineland wetlands to typical wetlands in the region.*
- *Reiterate that the wetlands evaluated just developed naturally without any planning or management and little reclamation.*
- *The mining methods used in the areas evaluated typically differed from those used today and reclamation was either nonexistent or limited.*

C – The legislation provided for mineland assessments out of concern of environmental groups. Environmental groups expressed concern to document mining impacts to wetlands and to determine if mitigation was taking place in the area of the mining activity.

Trends / Goals/ Priorities were discussed.

C – A delayed mitigation strategy concept was discussed briefly.

- *Flexibility could be considered to allow on-site wetland development in tailings basins or mine pits during reclamation with in-time compensation through preservation or enhancement.*

Q – Can you transfer credits to the BWSR Bank from a mining project?

A – Yes, although project specific mitigation would have to be reviewed and approved using the banking procedures before credits could be deposited in the bank. Credits can also be transferred from one company to another.

Priorities were discussed. Current state and federal regulatory guidelines give preference to restoration of completely or partially impacted wetlands. Wetland enhancement, preservation, and creation should only be considered after restoration opportunities have been evaluated.

Q – What are some examples of priorities involving wetland functions?

A – Wooded wetlands are one of the predominant, natural wetland types present in the northeast and also infrequently restored for compensatory mitigation. Therefore, the restoration of wooded wetlands has generally been a priority. Restoring wooded wetlands with a high quality community component is probably the most frequently implemented wetland function priority. Inundated wetlands (Types 3, 4, and 5) are generally discouraged in the northeast region because they represent only a small proportion of natural wetlands in the region.

Q – There is the perception that there is greater ecological need for restoring wetlands in areas of the state where >50 percent of historic wetlands have been lost (i.e., outside of the project study area). Is it a desired outcome of this study to support broader regulatory acceptance of that?

A – The options will be reviewed and potential policy issues will be discussed in the future; hopefully using the results of his study as supporting data. However, this study has shown that there are some potential compensatory mitigation opportunities in the region.

Q – Is there any movement on the part of the USACE to allow mitigation outside of the Bank Service Area without penalty?

A – No, not to any greater degree than is already allowed. However, the current USACE compensatory wetland mitigation policy allows projects in which wetlands are impacted in Bank Service Area #1 to replace those impacts with wetland bank credits in BSA #2 without penalty.

With the limited opportunities identified in the northeast, there were questions about going from one bank service area to another since there has been some resistance from county commissioners regarding staying within the Bank Service Area.

Q - Are there current guidelines on how much effort must be undertaken to identify opportunities within the project watershed (i.e., when it is feasible to go outside of the watershed).

A – Yes, general guidelines are included in both the WCA rules and USACE mitigation policy that must be followed in searching for feasible opportunities. While these guidelines are general in nature and somewhat subjective, they do provide a framework for mitigation siting efforts.

- 1. Take advantage of naturally occurring landscape position with minimal landscape alteration,*
- 2. Have a high likelihood of becoming a functional wetland in perpetuity, and*
- 3. Do not adversely affect other habitats or ecological communities important to maintaining ecological diversity.*

The WCA also includes consideration of whether sites are available and capable of being done after considering cost, existing technologies, and logistics. Further guidance could be pursued based on the results of this study to clarify this guidance.

C – There needs to be more certainty in mitigation planning for development projects.

C – Iron Range Resources (IRR) received a letter from Mining MN suggesting that the mitigation cooperative be funded in the amount of \$2 million. The suggested budget was not approved, but \$250,000 was budgeted for starting development of a wetland banking cooperative for northeastern MN to facilitate mitigation planning and permitting in the region. It is clear that this is available for both public and private development. Money is intended to be available by July, 2009. IRR would possibly serve as the cooperative administrator to provide a market.ⁱ

C – There was a carbon sequestration study in regards to wetland mitigation in the legislative finance bills.

Q – PCA non-degradation rules are coming out. Is there a way to consider whether or not wetland mitigation could be incorporated into this program?

C – Priorities – pushing bigger sites to bigger companies could raise an issue with those entities having the most economical advantage at expense of smaller entities.

ⁱ The Iron Range Resources Board at a following meeting did not vote to approve the suggested \$250,000 budget for a mitigation cooperative. No other funding is available at this writing to provide an incentive or seed money for a wetland mitigation cooperative market.

Appendix B.4

Public Outreach with Wetland Bankers Meeting Notes

Meeting Notes
Outreach Meeting with Wetland Bankers
April 9, 2009

Persons Represented

Wetland Bankers: Michael Whitt, Gerald Grog

BWSR: Dale Krystosek

Barr Engineering: Mark Jacobson, Tom Tri

Presentation Summary

A cozy meeting was held with two representatives from the Wetland Bankers organization. The group was presented with updated and revised data from the Phase 1 Inventory, including maps of potential opportunities for nine mitigation methods. In addition, assumptions used in revising the data were explained. Three GIS Tool alternatives to identify potential mitigation opportunities were explained. Now that preliminary data is in, the presenters received input on goal and priority preferences, questions and comments.

Questions and comments from the Wetland Bankers.

Q – Did you use topographic maps to determine slope in the creation of the model?

A – Yes, the model used variables of 0-1%, 1-3% and >3% slopes to determine potential wetland polygons.

Q – Is it true that Koochiching County has an ordinance preventing farmland from being converted into wetlands?

A – No, that is probably not true.

Q – Is the Corps of Engineers (COE) still maintaining a presence in the Study? How would credits work in their review of sites?

A – The Memorandum of Understanding (MOU) between BWSR and the COE outlines the credits for both parties' rules.

Q – Has there been a new MOU signed?

A – There is nothing new since the last one that was signed in 2007.

Q- How is it possible to show a demonstrable threat in relation to Preservation on public land?

A – It is not easy to show a demonstrable threat on public lands except for the cases of timber harvest or impending development (sale) as in tax forfeit lands, or in the case of peat mining.

Q- What is the credit ration for Trout stream enhancements and cedar preservation?

A – 12.5 % or 1 acre for every 8 preserved.

Q – If public funds are used for mitigation, the money has to be paid back with interest. How would that work if the Wetland Cooperative were created? What are the mines doing now?

A – Many are going to Aitkin County. Others are buying a particular property and banking some additional credits beyond the impacts of the project at the time of permitting.

Questions and Comments about setting Goals and Priorities

C – When Considering setting Goals and Priorities, the biggest hurdle to mitigation is the upfront costs and the need for technical expertise in creation of the wetland banks and mitigation.

C – Wetland bankers are interested in creating a level playing field for banking in which all parties do the required monitoring and other things that allow a wetland bank to be maintained in perpetuity. It is expected that the Wetland Cooperative if created would be held to the same standards.

C – Regarding establishing priorities based on a particular method or desired wetland function; wetland bankers will probably tend toward the greatest return on their investment (i.e. credit/cost ratio). Mitigation that gives you a 100% credit is going to be more favorable for going forward than something that provides 12.5 % credit.

C – The problem with mitigation is the wait – waiting for the return on the investment with high upfront costs. There needs to be more incentives upfront to stimulate more mitigation development and there needs to be some adjustments to credit release schedules. For some wetlands, wetlands may quickly be restored, while the credit release schedule is not advanced.

C – The Wetland Bankers agree with the idea of a minimum wetland bank size of 20-30 acres, when the upfront costs are considered in order to make it a viable project.

C – The additional considerations for water quality enhancements may be valid but they take away from wetland bankers who have existing banks with credits to sell.

Appendix B.5

Public Outreach with Federal, State and Tribal Meeting Notes

Meeting Notes
Outreach Meeting with State, Federal, and Tribal Interests
June 9, 2009

Agencies or Firms Represented

The Board of Water and Soil Resources (BWSR), MN Department of Agriculture (MDA), MN Department of Natural Resources (DNR), MN Department of Transportation (MNDOT), MN Pollution Control Agency (MPCA), US Fish and Wildlife Service (USFWS), US Army Corps of Engineers (USACE), Fond du Lac Environmental Services, Svoboda Ecological Resources, Barr Engineering.

Presentation Summary

The group was presented with updated and revised data from the Phase 1 Inventory. Maps of potential opportunities for nine mitigation methods identified in the presentation and discussed with the audience. In addition, assumptions used in revising the data were explained. The proposed GIS Tool to identify potential mitigation opportunities was explained. Now that preliminary data is in, the presenters received input on goal and priority preferences, questions and comments.

Questions and comments from the State, Federal, and Tribal Interests.

Comments received from Steve Eggers (Corps of Engineers):

Goals and Priorities should be to match compensation needs (wetland mitigation) with the projected impacts. For replacing wetland types, higher priorities should be placed on the historical loss trends. This trend has been toward the higher losses of forested wetlands, bogs, and shrub swamps in the northeastern part of the state. Priorities should look at the 81 major watersheds first, and then onto the Bank Service Area of the major watershed of the impact. The identifications of wetland functions is tough but until an easier method comes along it is assumed to be replaced by the same kind of wetland in the same landscape position.

Comments received from Rick Dahlman (MN DNR Forestry):

Forested wetlands might be a key goal and have greater opportunity on farmed wetland sites.

Q. Which mitigation methods might be targeted towards public lands rather than private lands?

A. The methods which might lend itself more towards public lands, would be:

- creation in aggregate pits,
- some of the preservation opportunities with high quality wetlands, or ENRV sites on public lands.

Most of the public lands are not going to have many restoration opportunities. Wetland Bankers have weighed in that they would be targeting sites that might bring the best return on the high initial investment. These would be mainly restoration opportunities on drained wetlands, partially drained wetlands or farmed wetland sites.

There was some discussion about the feasibility of preservation of high quality forested wetlands on public land. Many public agencies who manage forest land are looking for annual rate of return from those lands either through timber, gravel or peat mining sales. If forested wetlands were preserved from harvest, then the agencies would be looking for some compensation for the annual income from these lands.

Further items discussed included the possibility of replacing that income with other sources such as the sale of carbon credits or water pollution credits.

C. Wetland banks should be encouraged to be developed close to the point of impact if possible.

A. It was felt that if the Regional Wetland Cooperative was up and running, this could stimulate the wetland banking market to accomplish this within the TAA. Some additional money could potentially be raised to generate partnership projects for areas outside the TAA.

Appendix B.6

Public Meeting Grand Rapids - All Interests - Meeting Notes

Meeting Notes
Outreach Meeting with All Interests - Grand Rapids, MN.
October 19, 2009

Presenting Team

Dave Weirens	Board of Water and Soil Resources (BWSR)
Dale Krystosek	Board of Water and Soil Resources (BWSR)
Mark Jacobson	Barr Engineering
Tom Tri	Barr Engineering
Tony Kroska	Community GIS Services
John Kubiak	Community GIS Services
Josh Pocklington	Community GIS Services

Attendees (signed in)

Mark Pannkak	St. Louis County Land Department
Jason Meyer	St. Louis County Land Department
John Steward	MN Department of Natural Resources (DNR)
Dan Jordan	Iron Range Resources (IRR)
Gabe Johnson	Cliffs Natural Resources
Dave Skolasinski	Cliffs Natural Resources
Tony Kerick	Agazzi
Christa Miller	MN Department of Natural Resources (DNR)
Jeff Hanson	Floating Islands
Julie Klejeski	Hibbing Taconite
Dennis Schubbe	Duluth Metals Corp.
Tom Estabrooks	MN Pollution Control Agency (MPCA)
Brian Frederickson	MN Pollution Control Agency (MPCA)
Shanna Skillet	U. S. Steel
Robert Wright	Cass County
Howard Maki	MN Department of Transportation (MNDOT)
Cheryl Adams	UPM Blandin
Jim Marshall	UPM Blandin
Keith Grow	Board of Water and Soil Resources (BWSR)
Kate Gunderson	MN Department of Natural Resources (DNR)
Luke Rutten	Chippewa National Forest
Bob Tammen	Breitung Township
Pat Tammen	Breitung Township
Joan Weyandt	Board of Water and Soil Resources (BWSR)
Rod Otterness	City of International Falls
Craig Pagel	Iron Mining Association
Matt Johnson	Itasca Soil and Water Conservation District
Brian Huberty	U.S. Fish and Wildlife Service
Mike Hoppins	MN Department of Natural Resources (DNR)
Rick Dahlman	MN Department of Natural Resources (DNR)
Kathy Rasch	Clearwater Soil and Water Conservation District
Beth Jaeqman	Aitkin County

Presentation Summary

Mr. Weirens (BWSR) opened the meeting with a summary of the project's history. The group was presented with updated and revised data from the Phase 1 Inventory and an overview of Phase II by Mr. Jacobson (Barr Engineering). Maps of potential opportunities for nine mitigation methods identified in the presentation and briefly discussed with the audience. In addition, assumptions used in revising the data were explained. The proposed GIS Tool to identify potential mitigation opportunities was demonstrated by Mr. Kubiak (Community GIS Services). Mr. Jacobson also summarized the feedback from the other outreach meetings regarding goals and priorities in wetland mitigation. Upon completion of the presentation, the presenters received questions and comments.

Questions and comments

C. It's hard to believe that there isn't more than 900 acres of preservation within the study area. There seems to be more potential acres for preservation.

A. The 900 acres represents available creditable acres projected with ownership approval. Mr. Krystosek said that he would re-evaluate the numbers over the next couple of months.

Q. Why doesn't the study extend out into the Red River Valley Area? Why couldn't the Study take into consideration the mitigation potential for flood control?

A. The Study only included the area for the 18 counties that are considered to have retained greater than 80% of the pre-settlement wetlands.

Q. Will the data in the GIS Tool be downloadable?

A. Yes.

Q. Why aren't the wild rice and sod farm data included in the totals?

A. The NRCS data did not capture that data in their files. Consequently, this may understate the mitigation restoration potential on farmed wetlands.

Q. Why is there variable credit given on farmed wetlands?

A. Allowable credit for farmed wetlands is identified by rule and is based on an annual seed crop history of 20 years.

Q. What kind of documentation is required to get credit on a farmed wetland?

A. If the landowner can provide evidence that there has been an annual seeding. Aerial photography can verify this. Sometimes, neighbors can verify crop history.

Q. What is the schedule of the remainder of this project?

A. The Final Report will go to the BWSR Board in December. Final approval will take place in January and a copy of the Report will go to the Legislature in February.

Q. Can we get a copy of the PowerPoint presentation?

A. A copy of the presentation will be posted on the BWSR Website.

Appendix C

GIS Tool Data Layers

Appendix C.1: Suggested Design Data Layers

The following data layers were emailed to the Technical Committee and briefly reviewed for additions or subtractions:

- Photos – Current True Color Aerials, Available Historical (2003 & 1991), Color Infrared
- Elevation and Slope
 - Quad maps (250K, 100k, 24k)
 - Digital Elevation Model (hill shade)
- Id Wetlands
 - NWI data
 - Historic wetland mapping from Phase I Inventory model
- Soils – Hydric soils
- Water
 - DNR streams
 - Trout Streams
 - Lakes
 - Impaired Waters (streams, lakes, wetlands, including impairment attributes)
 - Ditch Data
 - Banks Service Areas, Major/Minor Watersheds, Lakesheds
- Geography
 - Road names and numbers
 - Section numbers
 - Section lines
 - Township lines and names
 - UTM coordinates
 - Latitude and Longitude
 - Existing BWSR Banksites
 - Wildlife Management Areas
 - Scientific & Natural Areas
 - State Forests/Parks
 - National Forests/Parks
 - Counties
 - County Seats
 - Populated Places
 - Municipalities
 - Iron Range
 - Ownership by 40's or other publicly available (Public/Private Classification only)
 - Ecological Classification System
- Special Categories
 - ENRV- exceptional natural resource value
 - White cedar
 - Gravel pits
 - Invasive species (The mitigation site polygons indicate these locations already)

Additional Data Layers were suggested:

- SWCD Districts and contact information
- Political Districts
- Database field for field truth verification that could be updated based on a site visit.
- Database field indicating landowner interest with contact information.
- Database field Including wetland mitigation credit potential, based on method

Appendix C.2: GIS Tool Data Layers

The following data layers were emailed to the Technical Committee and briefly reviewed for additions or subtractions:

- Photos – Current True Color Aerials, Available Historical (2003 & 1991)
- Elevation and Slope
 - Quad maps (250K, 100k, 24k)
- Water
 - DNR streams
 - Trout Streams
 - Lakes
 - Impaired Waters (streams, lakes, wetlands, including impairment attributes)
 - Ditch Data
 - Banks Service Areas, Major/Minor Watersheds, Lakesheds
- Geography
 - Road names and numbers
 - Section numbers
 - Section lines
 - Township lines and names
 - UTM coordinates
 - Existing BWSR Banksites
 - Wildlife Management Areas
 - Scientific & Natural Areas
 - State Forests/Parks
 - National Forests/Parks
 - Counties
 - County Seats
 - Populated Places
 - Municipalities
 - **Iron Range**
 - Ownership by 40's or other publicly available (Public/Private Classification only)
 - **Ecological Classification System**
- Special Categories
 - **ENRV- exceptional natural resource value**
 - **White cedar**
 - **Gravel pits**
 - **Invasive species (The mitigation site polygons indicate these locations already)**

Appendix D
Geographic Information System Metadata

Geographic Information System Metadata

The following is a list of the data layers used, the sources for the data and links to Metadata. Metadata was not available for all sources of information. When the data is released publicly by BWSR, the metadata for creating the model will be released at that time.

<u>Data Layer</u>	<u>Source</u>	<u>Metadata Link, if available</u>
DNR 24K Streams	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L260000072102
DNR GAP Data Tile Raster	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L390002710606
DNR GAP Land Cover Vector	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L280000150202
International Coalition Land Cover	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L250000102101
Manitoba Land Cover	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L250000112101
National Land Cover USGS	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L390005710606
MN Trout Streams	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L260000240202
Municipal Boundaries	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L390001310201
County Boundaries	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L220000030201
Major Watershed	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L260000210201
Minnesota Geomorphology	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L280000062101
Minnesota Impaired Lakes 2006	MPCA	http://www.pca.state.mn.us/water/tmdl/tmdl-maps.html
Minnesota 2006 Impaired Streams	MPCA	http://www.pca.state.mn.us/water/tmdl/tmdl-maps.html
Minnesota NHIS Polygon	DNR	http://www.dnr.state.mn.us/eco/nhnrp/nhis.html
Minnesota NHIS Point	DNR	http://www.dnr.state.mn.us/eco/nhnrp/nhis.html
Scientific Natural Areas SNA	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L220000150201
USGS DEM	USGS	http://seamless.usgs.gov/products/1arc.php

National Wetland Inventory NWI	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L260000162101
Mesabi Elevation Data	DNR Lands and Minerals	matt.oberhelman@dnr.state.mn.us
Mine Features Data	DNR Lands and Minerals	http://www.lmic.state.mn.us/gc/stds/metadata.htm
Most County Soil Data	NRCS	http://soildatamart.nrcs.usda.gov/SSURGOMetadata.aspx
Invasive Species Data	DNR	luke.skinner@dnr.state.mn.us
Fema Floodplains	DNR Data Deli	http://deli.dnr.state.mn.us/metadata.html?id=L260000102101

Soils Data Availability and Additional County Data Sources:

The following table illustrates which Minnesota Counties have completed soil surveys. In the case of unavailable soil data from the USDA – NRCS, geomorphology was substituted to identify potential hydric soils. In addition, some counties were able to provide ownership data and some timber inventory data to aid in the completion of the wetland inventory.

COUNTY NAME	SOILS DATA SOURCE	OWNERSHIP DATA SOURCE	COUNTY TIMBER INVENTORY PROVIDED?
Aitkin	USDA SOILS	COUNTY	YES
Beltrami	USDA SOILS	GAP	NO
Carlton	USDA SOILS	GAP	YES
Cass	USDA SOILS	GAP	NO
Clearwater	USDA SOILS	COUNTY	YES
Cook	GEOMORPHOLOGY	GAP	NO
Crow Wing	GEOMORPHOLOGY	COUNTY	YES
Hubbard	USDA SOILS	COUNTY	YES
Isanti	USDA SOILS	GAP	NO
Itasca	USDA SOILS	COUNTY	YES
Kanabec	USDA SOILS	GAP	NO
Koochiching	GEOMORPHOLOGY	COUNTY	NO
Lake	GEOMORPHOLOGY	COUNTY	YES
Lake of the Woods	USDA SOILS	GAP	NO
Mille Lacs	USDA SOILS	GAP	NO
Pine	GEOMORPHOLOGY	GAP	NO
St. Louis	USDA SOILS & GEOMORPHOLOGY	GAP	NO
Wadena	USDA SOILS	COUNTY	NO

Appendix E

Metadata for Methods and Processes

Appendix E.1

County

aitkin_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: aitkin_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client 7

\Barr\CountybyCounty_Analysis\Aitkin\wet_analysis\aitkin_wet_index.s
hp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -93.822473

East_Bounding_Coordinate: -93.053305

North_Bounding_Coordinate: 47.032880

South_Bounding_Coordinate: 46.152111

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog
9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 568823

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Aitkin County Historic Wetland Model Index

Entity_Type_Definition: Aitkin County Historic Wetland Model Index

Entity_Type_Definition_Source: aitkin_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: AITFIN3_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: AITFIN3_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:
Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 185.965

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

beltrami_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: beltrami_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Beltrami\wet_analysis\beltrami_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.618680

East_Bounding_Coordinate: -94.399402

North_Bounding_Coordinate: 48.559417

South_Bounding_Coordinate: 47.391934

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 590541

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abcissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Beltrami County Historic Wetland Model Index

Entity_Type_Definition: Beltrami County Historic Wetland Model Index

Entity_Type_Definition_Source: beltrami_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: BELTCLN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: BELTCLN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer,

Aspen/White Birch, Black Ash, Lowland Deciduous,
Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands, Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI dataset were present

Enumerated_Domain_Value_Definition_Source: Areas containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA Flood Plain dataset were present
Enumerated_Domain_Value_Definition_Source: Areas containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 227.122

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Generated by [mp](#) version 2.9.6 on Thu Oct 15 08:40:45 2009

carlton_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: carlton_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Carlton\wet_analysis\carlton_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -93.064754

East_Bounding_Coordinate: -92.288128

North_Bounding_Coordinate: 46.769572

South_Bounding_Coordinate: 46.416378

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 260032

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Carlton County Historic Wetland Model Index

Entity_Type_Definition: Carlton County Historic Wetland Model Index

Entity_Type_Definition_Source: carlton_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: CARLFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: CARLFIN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:
Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 111.308

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Generated by [mp](#) version 2.9.6 on Thu Oct 15 08:41:32 2009

cass_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: cass_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

[\\Client7\F on Client 7](#)

\\Barr\CountybyCounty_Analysis\Cass\wet_analysis\cass_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -94.815018

East_Bounding_Coordinate: -93.758000

North_Bounding_Coordinate: 47.483527

South_Bounding_Coordinate: 46.270673

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 643092

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Cass County Historic Wetland Model Index

Entity_Type_Definition: Cass County Historic Wetland Model Index

Entity_Type_Definition_Source: cass_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: CASSFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: CASSFIN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: USGS

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029
Contact_Facsimile_Telephone: 218-755-4201
Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 254.958

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

clearwater_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: clearwater_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Clearwater\wet_analysis\clearwater_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.595846

East_Bounding_Coordinate: -95.162505

North_Bounding_Coordinate: 48.028728

South_Bounding_Coordinate: 47.144707

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 259415

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:
Abscissa_Resolution: 0.000000
Ordinate_Resolution: 0.000000
Planar_Distance_Units: meters

Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1983
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137.000000
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Clearwater County Historic Wetland Model Index
Entity_Type_Definition: Clearwater County Historic Wetland Model Index
Entity_Type_Definition_Source: clearwater_wet_index

Attribute:

Attribute_Label: FID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain:
Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA
Attribute_Definition: Square Meter measurement of polygon
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER
Attribute_Definition: Linear measurement of polygon boundary
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: CLEARFIN_
Attribute_Definition: ARCINFO unique polygon number
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: CLEARFIN_I
Attribute_Definition: ARCINFO unique polygon number
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY
Attribute_Definition: Base value of zero for wetland model
Attribute_Definition_Source: Community GIS Services, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA Flood
Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 98.779

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

cook_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: cook_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Cook\wet_analysis\cook_wet_index.s
hp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -91.058822

East_Bounding_Coordinate: -89.477711

North_Bounding_Coordinate: 48.248460

South_Bounding_Coordinate: 47.429577

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog
9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 242037

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Cook County Historic Wetland Model Index

Entity_Type_Definition: Cook County Historic Wetland Model Index

Entity_Type_Definition_Source: cook_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COOKFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COOKFIN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero to four percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than four percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero to four percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: GEOMORPH

Attribute_Definition: Areas of surficial geology with hydric elements

Attribute_Definition_Source:

University of Minnesota-Duluth Geology Department, MN Geological Survey, MN DNR

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Sediment associations with Alluvium,
Lacustrine, Outwash, or Peat or having topographic
attributes of Level

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent
datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its
characteristics extracted from the individual parent
datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 98.726

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

crow_wing_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: crow_wing_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Crow_Wing\wet_analysis\crow_wing_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -94.411073

East_Bounding_Coordinate: -93.766856

North_Bounding_Coordinate: 46.810604

South_Bounding_Coordinate: 46.150920

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 283714

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Crow Wing County Historic Wetland Model Index

Entity_Type_Definition: Crow Wing County Historic Wetland Model Index

Entity_Type_Definition_Source: crow_wing_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: CROWFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: CROWFIN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: GEOMORPH

Attribute_Definition: Areas of surficial geology with hydric elements

Attribute_Definition_Source:

University of Minnesota-Duluth Geology Department, MN Geological Survey, MN DNR

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Sediment associations with Alluvium,
Lacustrine, Outwash, or Peat or having topographic
attributes of Level

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent
datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic
wetland potential based on the wetland characteristics
extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 93.753

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

hubbard_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: hubbard_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Hubbard\wet_analysis\hubbard_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.188090

East_Bounding_Coordinate: -94.647515

North_Bounding_Coordinate: 47.421267

South_Bounding_Coordinate: 46.795317

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 207744

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
 Abscissa_Resolution: 0.000000
 Ordinate_Resolution: 0.000000
Planar_Distance_Units: meters
Geodetic_Model:
 Horizontal_Datum_Name: North American Datum of 1983
 Ellipsoid_Name: Geodetic Reference System 80
 Semi-major_Axis: 6378137.000000
 Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Hubbard County Historic Wetland Model Index
Entity_Type_Definition: Hubbard County Historic Wetland Model Index
Entity_Type_Definition_Source: hubbard_wet_index

Attribute:

Attribute_Label: FID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
 Unrepresentable_Domain:
 Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
 Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA
Attribute_Definition: Square Meter measurement of polygon
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER
Attribute_Definition: Linear measurement of polygon boundary
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: HUBFIN_
Attribute_Definition: ARCINFO unique polygon number
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: HUBFIN_ID
Attribute_Definition: ARCINFO unique polygon number
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY
Attribute_Definition: Base value of zero for wetland model
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains.

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 77.575

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

isanti_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: isanti_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

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7\Barr\CountybyCounty_Analysis\Isanti\wet_analysis\isanti_wet_index.s
hp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -93.513628

East_Bounding_Coordinate: -93.019583

North_Bounding_Coordinate: 45.735500

South_Bounding_Coordinate: 45.410562

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 101375

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Isanti County Historic Wetland Model Index

Entity_Type_Definition: Isanti County Historic Wetland Model Index

Entity_Type_Definition_Source: isanti_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: ISANTFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: ISANTFIN_I

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: GEOMORPH

Attribute_Definition: Areas of surficial geology with hydric elements

Attribute_Definition_Source:

University of Minnesota-Duluth Geology Department, MN Geological Survey, MN DNR

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from Geomorphology dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from Geomorphology dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Sediment associations with Alluvium, Lacustrine, Outwash, or Peat or having topographic attributes of Level

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 35.735

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: [<http://www.esri.com/metadata/esriprof80.html>](http://www.esri.com/metadata/esriprof80.html)

Profile_Name: ESRI Metadata Profile

itasca_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: itasca_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Itasca\wet_analysis\itasca_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -94.428331

East_Bounding_Coordinate: -93.055656

North_Bounding_Coordinate: 47.901538

South_Bounding_Coordinate: 47.016723

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 943052

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
 Abscissa_Resolution: 0.000000
 Ordinate_Resolution: 0.000000
Planar_Distance_Units: meters
Geodetic_Model:
 Horizontal_Datum_Name: North American Datum of 1983
 Ellipsoid_Name: Geodetic Reference System 80
 Semi-major_Axis: 6378137.000000
 Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Itasca County Historic Wetland Model Index
Entity_Type_Definition: Itasca County Historic Wetland Model Index
Entity_Type_Definition_Source: itasca_wet_index

Attribute:

Attribute_Label: FID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
 Unrepresentable_Domain:
 Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
 Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA
Attribute_Definition: Square Meter measurement of polygon
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER
Attribute_Definition: Linear measurement of polygon boundary
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: ITASFIN2_
Attribute_Definition: ARCINFO unique polygon number
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: ITASFIN2_I
Attribute_Definition: ARCINFO unique polygon number
Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY
Attribute_Definition: Base value of zero for wetland model
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:
Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI
Attribute_Definition: National Wetlands Inventory palustrine/riverine features
Attribute_Definition_Source: U.S. Fish & Wildlife Service
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA
Attribute_Definition: 100/500 year flood plains where available
Attribute_Definition_Source: Federal Emergency Management Administration
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL
Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys
Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029
Contact_Facsimile_Telephone: 218-755-4201
Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 326.942

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

kanabec_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: kanabec_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Kanabec\wet_analysis\kanabec_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -93.520916

East_Bounding_Coordinate: -93.053601

North_Bounding_Coordinate: 46.159747

South_Bounding_Coordinate: 45.729584

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 162451

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Kanabec County Historic Wetland Model Index

Entity_Type_Definition: Kanabec County Historic Wetland Model Index

Entity_Type_Definition_Source: kanabec_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: BKMSCLN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: BKMSCLN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 58.000

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

koochiching_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: koochiching_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Koochiching\wet_analysis\koochiching_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -94.443205

East_Bounding_Coordinate: -93.080709

North_Bounding_Coordinate: 48.720268

South_Bounding_Coordinate: 47.840199

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 576791

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Koochiching County Historic Wetland Model Index

Entity_Type_Definition: Koochiching County Historic Wetland Model Index

Entity_Type_Definition_Source: koochiching_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: KOOCHFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: KOOCHFIN_I

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: GEOMORPH

Attribute_Definition: Areas of surficial geology with hydric elements

Attribute_Definition_Source:

University of Minnesota-Duluth Geology Department, MN Geological Survey, MN DNR

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Sediment associations with Alluvium,
Lacustrine, Outwash, or Peat or having topographic
attributes of Level

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent
datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic
wetland potential based on the wetland characteristics
extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 198.889

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

lake_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: lake_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Lake\wet_analysis\lake_wet_index.sh

p

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -91.826970
East_Bounding_Coordinate: -90.994918
North_Bounding_Coordinate: 48.206420
South_Bounding_Coordinate: 46.929298

Keywords:

Theme:

Theme_Keyword_Thesaurus: index
Theme_Keyword: historic wetland model
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow
Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the
Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog
9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 426158

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Lake County Historic Wetland Model Index

Entity_Type_Definition: Lake County Historic Wetland Model Index

Entity_Type_Definition_Source: lake_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: LAKEFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: LAKEFIN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero to four percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than four percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero to four percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA Flood Plain
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: GEOMORPH

Attribute_Definition: Areas of surficial geology with hydric elements

Attribute_Definition_Source:

University of Minnesota-Duluth Geology Department, MN Geological Survey, MN DNR

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Sediment associations with Alluvium,
Lacustrine, Outwash, or Peat or having topographic
attributes of Level

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent
datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic
wetland potential based on the wetland characteristics
extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 159.821

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

Lake Of The Woods County

LOTW_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: LOTW_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\LOTW\wet_analysis\LOTW_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete
Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.382290
East_Bounding_Coordinate: -94.420621
North_Bounding_Coordinate: 49.394713
South_Bounding_Coordinate: 48.352749

Keywords:

Theme:

Theme_Keyword_Thesaurus: index
Theme_Keyword: historic wetland model
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow
Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the
Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog
9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 236918

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Lake Of The Woods County Historic Wetland Model Index

Entity_Type_Definition: Lake Of The Woods County Historic Wetland Model Index

Entity_Type_Definition_Source: LOTW_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: LOTWFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: LOTWFIN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029
Contact_Facsimile_Telephone: 218-755-4201
Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 76.308

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

millelacs_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: millelacs_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Mille_Lacs\wet_analysis\millelacs_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -93.814195

East_Bounding_Coordinate: -93.424911

North_Bounding_Coordinate: 46.247568

South_Bounding_Coordinate: 45.557048

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 174071

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Mille Lacs County Historic Wetland Model Index

Entity_Type_Definition: Mille Lacs County Historic Wetland Model Index

Entity_Type_Definition_Source: millelacs_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: BKMSCLN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: BKMSCLN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:
Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 63.759

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

pine_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: pine_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Pine\wet_analysis\pine_wet_index.sh

p

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -93.144080

East_Bounding_Coordinate: -92.289747

North_Bounding_Coordinate: 46.419550

South_Bounding_Coordinate: 45.727967

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog
9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 372098

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Pine County Historic Wetland Model Index

Entity_Type_Definition: Pine County Historic Wetland Model Index

Entity_Type_Definition_Source: pine_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PINEFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PINEFIN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:
This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: GEOMORPH

Attribute_Definition: Areas of surficial geology with hydric elements

Attribute_Definition_Source:

University of Minnesota-Duluth Geology Department, MN Geological
Survey, MN DNR

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from
Geomorphology dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Sediment associations with Alluvium,
Lacustrine, Outwash, or Peat or having topographic
attributes of Level

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent
datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic
wetland potential based on the wetland characteristics
extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no

guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 139.194

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile_Name: ESRI Metadata Profile

saint_louis_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: saint_louis_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

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7\Barr\CountybyCounty_Analysis\Saint_Louis_Merge\wet_analysis\saint_louis_wet_index.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -93.098674

East_Bounding_Coordinate: -91.754951

North_Bounding_Coordinate: 48.631487

South_Bounding_Coordinate: 46.645611

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow

Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the

Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog

9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 1651332

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Saint Louis County Historic Wetland Model Index

Entity_Type_Definition: Saint Louis County Historic Wetland Model Index

Entity_Type_Definition_Source: saint_louis_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: STLHFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: STLHFIN_ID

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero to four percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than four percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero to four percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0
Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:
Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:
Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas
containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: GEOMORPH

Attribute_Definition: Areas of surficial geology with hydric elements

Attribute_Definition_Source:

University of Minnesota-Duluth Geology Department, MN Geological Survey, MN DNR

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from Geomorphology dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified hydric features from Geomorphology dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Sediment associations with Alluvium, Lacustrine, Outwash, or Peat or having topographic attributes of Level

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 7 parent datasets observed within the unique polygon
Enumerated_Domain_Value_Definition_Source:
Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 643.264

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A
City: Duluth
State_or_Province: MN
Postal_Code: 55802
Contact_Voice_Telephone: 218-279-5925
Contact_Facsimile_Telephone: 218-279-5925
Contact_Electronic_Mail_Address: jkubiak@commgis.org
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Time_Convention: local time
Metadata_Extensions:
Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>
Profile_Name: ESRI Metadata Profile

Generated by [mp](#) version 2.9.6 on Thu Oct 15 08:53:10 2009

wadena_wet_index

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: wadena_wet_index

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\CountybyCounty_Analysis\Wadena\wet_analysis\wadena_wet_in
dex.shp

Description:

Abstract:

This model represents and rates areas displaying historic wetland characteristics. It was created through the analysis of multiple datasets such as Slope, NWI, MNDNR GAP Land Use / Land Cover, USGS NLCD 2001 Land Use / Land Cover, USDA NRCS Soil Surveys, FEMA Flood Plain data, and Geomorphology data.

Purpose:

The historic wetland model was created primarily to assist in the GIS analysis of screening potential wetland mitigation sites for the BWSR Northeast Wetland Mitigation Siting Inventory and Analysis project. This project covered the greater than 80% historic wetland counties in Northeastern Minnesota.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.172915

East_Bounding_Coordinate: -94.727502

North_Bounding_Coordinate: 46.811881

South_Bounding_Coordinate: 46.361408

Keywords:

Theme:

Theme_Keyword_Thesaurus: index

Theme_Keyword: historic wetland model

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Attribute accuracy information was not specifically analyzed for these data. Each countywide model is completely dependant on the parent datasets. All fields that were created as part of the model were calculated and spot-checked for accuracy.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed, lines intersect where intended, and sliver polygons (less than 500 square meters) have been eliminated.

Completeness_Report:

This is only 1 county of 18 total within the project area where the historic wetland model was created. Due to the size of the countywide datasets, each county was kept separate from one-another. Each of the 18 counties historic wetland models were also kept separate from one another based upon availability of the parent data. At the time of the model creation, not all counties had completed their digital soil surveys and the use of the geomorphology data was used in its place. In one special circumstance (St. Louis County) had only partially completed their digital soil survey and the model uses features from both the soil survey and geomorphology data. Slope percentage values were always Zero percent except in St. Louis, Lake, & Cook counties where 0 - 4 percent slope was used due to topography characteristics along the North Shore of Lake Superior. Users of these data are strongly encouraged to fully read the metadata for each model, as there are subtle differences from county to county.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Specific wetland attributes/characteristics from multiple datasets were intersected to create the most likely locations of historic wetlands. Areas where data overlapped were rated, allowing a designated 'score' for the unique polygon to be calculated based on how many instances of data were recorded at that specific location.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 157787

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000000

Ordinate_Resolution: 0.000000

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Wadena County Historic Wetland Model Index

Entity_Type_Definition: Wadena County Historic Wetland Model Index

Entity_Type_Definition_Source: wadena_wet_index

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: AREA

Attribute_Definition: Square Meter measurement of polygon

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: PERIMETER

Attribute_Definition: Linear measurement of polygon boundary

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: WADENFIN_

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: WADENFIN_I

Attribute_Definition: ARCINFO unique polygon number

Attribute_Definition_Source: ESRI

Attribute:

Attribute_Label: COUNTY

Attribute_Definition: Base value of zero for wetland model

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Base value and boundary for the historic wetland model

Enumerated_Domain_Value_Definition_Source:

This field can be ignored as it was used as a base area and value for running the historic wetland model.

Attribute:

Attribute_Label: SLOPE

Attribute_Definition: Areas of zero percent slope

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Areas where slope is greater than zero percent

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Areas where slope is zero percent

Attribute:

Attribute_Label: GAP

Attribute_Definition: 1993 GAP LULC wetland features

Attribute_Definition_Source: Minnesota Department of Natural Resources

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from GAP LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Lowland Deciduous Shrub, Lowland Evergreen Shrub, Floating Aquatic, Sedge Meadow, Broadleaf Sedge/Cattail, Balsam Fir mix, Lowland Black Spruce, Stagnant Black Spruce, Tamarack, Stagnant Tamarack, Lowland Northern White-Cedar, Stagnant Northern White-Cedar, Stagnant Conifer, Aspen/White Birch, Black Ash, Lowland Deciduous, Lowland Conifer-Deciduous mix

Attribute:

Attribute_Label: NLCD

Attribute_Definition: 2001 NLCD LULC wetland features

Attribute_Definition_Source: U.S. Geologic Survey

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USGS
NLCD LULC dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Shrub/Scrub, Woody Wetlands,
Emergent Herbaceous Wetlands

Attribute:

Attribute_Label: NWI

Attribute_Definition: National Wetlands Inventory palustrine/riverine features

Attribute_Definition_Source: U.S. Fish & Wildlife Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from NWI
dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: Palustrine, Riverine

Attribute:

Attribute_Label: FEMA

Attribute_Definition: 100/500 year flood plains where available

Attribute_Definition_Source: Federal Emergency Management Administration

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from FEMA
Flood Plain dataset were present

Enumerated_Domain_Value_Definition_Source: Areas

containing: 100-Year Flood Plains, 500-Year Flood Plains

Attribute:

Attribute_Label: HYDRICSOIL

Attribute_Definition: Hydric soils derived from SURGO certified digital soil
surveys

Attribute_Definition_Source:

U.S. Department of Agriculture Natural Resource Conservation Service

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were not present

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition:

Areas where identified wetland features from USDA NRCS STATSGO certified soil survey dataset were present

Enumerated_Domain_Value_Definition_Source:

Areas containing: Extracted soils matching database queries identifying hydric soils and hydrologic group soil types. The resulting dataset was a hybrid of the hydric soils and hydrologic group soils that are less than or equal to 1 foot water table height during at least fifty percent of the growing season.

Attribute:

Attribute_Label: SCORE

Attribute_Definition: Historic wetland rating based on parent datasets

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 6

Enumerated_Domain_Value_Definition:

Total number of wetland features from the 6 parent datasets observed within the unique polygon

Enumerated_Domain_Value_Definition_Source:

Rating (or score) of the polygon relating to its historic wetland potential based on the wetland characteristics extracted from the individual parent datasets

Overview_Description:

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029
Contact_Facsimile_Telephone: 218-755-4201
Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 58.808

Metadata_Reference_Information:

Metadata_Date: 20091015

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Appendix E.2

Methods

Drained Wetland Attributes

drained_wetlands_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: drained_wetlands_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from identifying slope and hydric soil characteristics from the county-wide historic wetland models in conjunction with a 300-Foot buffer on the MNDNR/MNDOT ditch attribute from their respective stream datasets.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity within wetlands that are currently being drained or have been drained in the past.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.639066
East_Bounding_Coordinate: -92.166931
North_Bounding_Coordinate: 48.984517
South_Bounding_Coordinate: 45.472987

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential
Theme_Keyword: drained wetlands
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation
Theme_Keyword: restoration

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. All drained wetland polygons less than 20-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Areas where the historic wetland model had a score of 1 for slope and hydric soils (or geomorphology if soil survey was not present) but values of 0 for NWI, NLCD, GAP, & FEMA were selected. A 300-Foot buffer spatial analysis was performed on the MNDNR/MNDOT ditch attributes. The polygons of the selected historic wetland model within the 300-Foot buffer were extracted as potential drained wetland mitigation opportunities. Polygons less than 20-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the drained wetland polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 324

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000
Denominator_of_Flattening_Ratio: 298.257222
Vertical_Coordinate_System_Definition:
Altitude_System_Definition:
Altitude_Resolution: 0.000010
Altitude_Encoding_Method:
Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Drained Wetlands Potential Mitigation Sites

Entity_Type_Definition: Drained Wetlands Potential Mitigation Sites

Entity_Type_Definition_Source: drained_wetlands_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR

Attribute_Definition: Range Direction

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT

Attribute_Definition: Section Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD

Attribute_Definition: Potential Mitigation Method

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID

Attribute_Definition: Unique polygon Site ID

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES

Attribute_Definition: Polygon Acreage

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA

Attribute_Definition: Wetland Bank Service Area Name

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM

Attribute_Definition: Wetland Bank Service Area Number

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM

Attribute_Definition: Combination of wetland bank service area name & number

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME

Attribute_Definition: Name of the geomorphic province that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE

Attribute_Definition: Geomorphic province ID that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAME

Attribute_Definition: Combination of the name and ID of the geomorphic province

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAMENUM

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAMNUM

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

Drained wetland potential mitigation sites were populated with basic descriptive information about each site such as a unique Site ID number, method, and polygon acreage. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. make no representation or warranties, express or implied, with respect to the reuse of data provided herewith, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability, or reliability of this data for any purpose. The user accepts the data 'as is', and assumes all risks associated with its use. By accepting this data, the user agrees not to transmit this data or provide access to it or any part of it to another party unless the user shall include with the data a copy of this disclaimer. The Minnesota Board of Water and Soil Resources and Community GIS Services, Inc. do not assume any responsibility for actual or consequential damage incurred as a result of any user's reliance on this data.

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Exceptional Natural Resource Value Countystate Attributes

envr_countystate_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: envr_countystate_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons displaying enhanced natural resource values (ENRV) characteristics near identified disturbances on county and state owned lands.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through preservation of wetlands on public land that have high value and might be threatened.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.614257

East_Bounding_Coordinate: -89.973031

North_Bounding_Coordinate: 49.196274

South_Bounding_Coordinate: 45.420227

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential

Theme_Keyword: enhanced natural resource value wetlands

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Theme_Keyword: preservation

Theme_Keyword: county or state lands

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. All ENRV - County & State owned wetland polygons less than 5-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

These potential mitigation sites were derived from the county-wide historic wetland models yielding scores of 3 or higher. The initial wetland polygon selection was screened for Enhanced Natural Resource Values (ENRV) characteristics such as proximity to the Natural Heritage database, Minnesota County Biological Survey (MCBS) biodiversity sites classified as either high or outstanding, or Scientific & Natural Areas (SNA's). Wetlands that met these criteria were further analyzed by intersecting these areas with a 300-Foot buffer of some form of disturbance. These disturbances were derived from multiple Land Use / Land Cover datasets and could include agricultural activities, development, gravel pits, grasslands, and municipal encroachment. The remaining wetland polygons were then identified with GAP county and state land ownership. Polygons less than 5-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the county and state ENRV mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 565

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000
Latitude_of_Projection_Origin: 0.000000
False_Easting: 500000.000000
False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Vertical_Coordinate_System_Definition:

Altitude_System_Definition:

Altitude_Resolution: 0.000010

Altitude_Encoding_Method:

Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: ENRV County & State Owned Wetlands Potential Mitigation Sites

Entity_Type_Definition: ENRV County & State Owned Wetlands Potential Mitigation Sites

Entity_Type_Definition_Source: enrv_countystate_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR

Attribute_Definition: Range Direction

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT

Attribute_Definition: Section Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD

Attribute_Definition: Potential Mitigation Method

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID

Attribute_Definition: Unique polygon Site ID

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES

Attribute_Definition: Polygon Acreage

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA

Attribute_Definition: Wetland Bank Service Area Name

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM

Attribute_Definition: Wetland Bank Service Area Number

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM

Attribute_Definition: Combination of wetland bank service area name & number

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME

Attribute_Definition: Name of the geomorphic province that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE

Attribute_Definition: Geomorphic province ID that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAME

Attribute_Definition: Combination of the name and ID of the geomorphic province

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

ENRV county and state owned wetland potential mitigation sites were populated with basic descriptive information about each site such as a unique Site ID

number, method, and polygon acreage. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Generated by [mp](#) version 2.9.6 on Thu Oct 29 13:06:24 2009

Exceptional Natural Resource Value Private Attributes

enrv_private_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: enrv_private_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons displaying enhanced natural resource values (ENRV) characteristics near identified disturbances on privately owned lands.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through preservation of wetlands on private land that have high value and might be threatened.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.636624

East_Bounding_Coordinate: -89.516711

North_Bounding_Coordinate: 49.191686

South_Bounding_Coordinate: 45.369891

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential

Theme_Keyword: enhanced natural resource value wetlands

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Theme_Keyword: preservation

Theme_Keyword: private lands

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. All ENRV - Private owned wetland polygons less than 5-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

These potential mitigation sites were derived from the county-wide historic wetland models yielding scores of 3 or higher. The initial wetland polygon selection was screened for Enhanced Natural Resource Values (ENRV) characteristics such as proximity to the Natural Heritage database, Minnesota County Biological Survey (MCBS) biodiversity sites classified as either high or outstanding, or Scientific & Natural Areas (SNA's). Wetlands that met these criteria were further analyzed by intersecting these areas with a 300-Foot buffer of some form of disturbance. These disturbances were derived from multiple Land Use / Land Cover datasets and could include agricultural activities, development, gravel pits, grasslands, and municipal encroachment. The remaining wetland polygons were then identified with GAP private land ownership. Polygons less than 5-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the private ENRV mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 1679

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Vertical_Coordinate_System_Definition:

Altitude_System_Definition:

Altitude_Resolution: 0.000010

Altitude_Encoding_Method:

Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: ENRV Privately Owned Wetlands Potential Mitigation Sites

Entity_Type_Definition: ENRV Privately Owned Wetlands Potential Mitigation Sites

Entity_Type_Definition_Source: envr_private_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR
Attribute_Definition: Range Direction
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG
Attribute_Definition: Range Number
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT
Attribute_Definition: Section Number
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD
Attribute_Definition: Potential Mitigation Method
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID
Attribute_Definition: Unique polygon Site ID
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES
Attribute_Definition: Polygon Acreage
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA
Attribute_Definition: Wetland Bank Service Area Name
Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM
Attribute_Definition: Wetland Bank Service Area Number
Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM
Attribute_Definition: Combination of wetland bank service area name & number
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME
Attribute_Definition: Name of the geomorphic province that the feature falls within
Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE
Attribute_Definition: Geomorphic province ID that the feature falls within
Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAMEID
Attribute_Definition: Combination of the name and ID of the geomorphic province

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAMENUM

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAMNUM

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

ENRV privately owned wetland potential mitigation sites were populated with basic descriptive information about each site such as a unique Site ID number, method, and polygon acreage. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Generated by [mp](#) version 2.9.6 on Thu Oct 29 13:06:34 2009

Farmed Wetlands Attributes

farmed_wetlands_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: farmed_wetlands_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons which intersected Land Use / Land Cover classifications of agricultural lands, grasslands, and shrubs. Additional analysis was performed using the 2008 USDA NRCS raster Common Land Unit (CLU) data to categorize the polygons by high, medium, or low mitigation potential.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through wetland restoration within areas currently or previously in agricultural use.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.664442
East_Bounding_Coordinate: -89.497028
North_Bounding_Coordinate: 49.382132
South_Bounding_Coordinate: 45.367429

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential
Theme_Keyword: farmed wetlands
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation
Theme_Keyword: restoration

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. Drained wetland or partially drained wetland mitigation sites were used to erase overlapping areas from the farmed wetland analysis. The remaining farmed wetland potential mitigation sites less than 20-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Areas where the historic wetland model had a score of 1 for slope and hydric soils (or geomorphology if soil survey was not present) but values of 0 for NWI, NLCD, GAP, & FEMA were selected. The initial wetland polygon selection was spatially analyzed by intersecting areas considered to be in agricultural use such as agricultural lands, grasslands, or shrubs which were derived from multiple Land Use / Land Cover datasets. After review of the initial farmed wetland potential mitigation sites, it was determined additional analysis was needed to refine these sites into high, medium, and low mitigation potential categories. Many sites from the initial analysis yielded hay & pastures lands which do not typically qualify for mitigation credit.

To categorize these sites by mitigation potential, the 2008 USDA NRCS Common Land Unit (CLU) raster dataset was used to assign weights to specific crop inventory attributes. Most seeded crops were rated as having the highest weight, categories such as alfalfa, fallow/idle cropland, and hay land/pastures within a riparian zone were rated as having medium weight, while hay, pasture, and grassland category types outside of a riparian zone were rated as having the lowest weight. These mitigation weights were applied to the original analysis polygons. Polygons containing 20% or more high weighted CLU data were rated as having high mitigation potential. Polygons containing less than 20% high weighted CLU data but 20% or greater medium weighted CLU data were rated as having medium mitigation potential. If polygons did not meet either of these criteria they were rated as having low mitigation potential. Any polygon less than 20-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the farmed wetland mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 5316

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Vertical_Coordinate_System_Definition:

Altitude_System_Definition:

Altitude_Resolution: 0.000010

Altitude_Encoding_Method:

Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Farmed Wetlands Potential Mitigation Sites

Entity_Type_Definition: Farmed Wetlands Potential Mitigation Sites

Entity_Type_Definition_Source: farmed_wetlands_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR

Attribute_Definition: Range Direction

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT

Attribute_Definition: Section Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD

Attribute_Definition: Potential Mitigation Method

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID

Attribute_Definition: Unique polygon Site ID

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES

Attribute_Definition: Polygon Acreage

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: CRPVALZERO

Attribute_Definition:

Number of low weighted acres within a unique polygon based on additional USDA NRCS CLU crop value analysis

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: CRPVALHALF

Attribute_Definition:

Number of medium weighted acres within a unique polygon based on additional USDA NRCS CLU crop value analysis

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: CRPVALONE

Attribute_Definition:

Number of high weighted acres within a unique polygon based on additional USDA NRCS CLU crop value analysis

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ZEROPCNT

Attribute_Definition:

Percent of unique polygon containing low weighted crop values based on additional USDA NRCS CLU analysis

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: HALFPCNT

Attribute_Definition:

Percent of unique polygon containing medium weighted crop values based on additional USDA NRCS CLU analysis

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ONEPCNT

Attribute_Definition:

Percent of unique polygon containing high weighted crop values based on additional USDA NRCS CLU analysis

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: POTENT

Attribute_Definition: GIS Mitigation Site Potential

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA

Attribute_Definition: Wetland Bank Service Area Name

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM

Attribute_Definition: Wetland Bank Service Area Number

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM

Attribute_Definition: Combination of wetland bank service area name & number

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME

Attribute_Definition: Name of the geomorphic province that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE

Attribute_Definition: Geomorphic province ID that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAME

Attribute_Definition: Combination of the name and ID of the geomorphic province

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

Farmed wetland potential mitigation sites were populated with basic descriptive information about each site such as a unique Site ID number, method, and polygon acreage. Attributes from the USDA NRCS Common Land Unit (CLU) data refinement analysis are also included. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A
City: Duluth
State_or_Province: MN
Postal_Code: 55802
Contact_Voice_Telephone: 218-279-5925
Contact_Facsimile_Telephone: 218-279-5925
Contact_Electronic_Mail_Address: jkubiak@commgis.org
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Time_Convention: local time
Metadata_Extensions:
Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>
Profile_Name: ESRI Metadata Profile

Generated by [mp](#) version 2.9.6 on Thu Oct 29 13:06:44 2009

Gravel Pits Attributes

gravel_pits_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: gravel_pits_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons within 300 feet of a gravel pit.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through creation in or near active or abandoned gravel pits.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.622807

East_Bounding_Coordinate: -89.539831

North_Bounding_Coordinate: 48.961529

South_Bounding_Coordinate: 45.396780

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential

Theme_Keyword: gravel pits

Theme_Keyword: watersheds

Theme_Keyword: wetland mitigation

Theme_Keyword: creation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. All gravel pit sites less than 5-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

These potential mitigation sites were derived from the county-wide historic wetland models displaying NWI or hydric soil characteristics. The initial wetland polygon selection was spatially analyzed for areas within 300 feet of a gravel pit. Wetlands that met these criteria were identified as possible wetland mitigation opportunities for creation. Polygons less than 5-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the gravel pit mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 1318

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Vertical_Coordinate_System_Definition:

Altitude_System_Definition:

Altitude_Resolution: 0.000010

Altitude_Encoding_Method:

Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Gravel Pit Wetland Potential Mitigation Sites

Entity_Type_Definition: Gravel Pit Wetland Potential Mitigation Sites

Entity_Type_Definition_Source: gravel_pits_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR

Attribute_Definition: Range Direction

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT

Attribute_Definition: Section Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD

Attribute_Definition: Potential Mitigation Method

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID

Attribute_Definition: Unique polygon Site ID

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES

Attribute_Definition: Polygon Acreage

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA

Attribute_Definition: Wetland Bank Service Area Name

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM

Attribute_Definition: Wetland Bank Service Area Number

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM

Attribute_Definition: Combination of wetland bank service area name & number

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME

Attribute_Definition: Name of the geomorphic province that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE

Attribute_Definition: Geomorphic province ID that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAMENUM

Attribute_Definition: Combination of the name and ID of the geomorphic province

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAMENUM

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAMNUM

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

Gravel pit wetland potential mitigation sites were populated with basic descriptive information about each site such as a unique Site ID number, method, and polygon acreage. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029
Contact_Facsimile_Telephone: 218-755-4201
Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Impaired Waters Attributes

impaired_waters_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: impaired_waters_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons within 300 feet of all streams of an impaired watershed and in close proximity to some form of disturbance.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through wetland enhancement within an impaired watershed.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.623717

East_Bounding_Coordinate: -91.257021
North_Bounding_Coordinate: 48.855582
South_Bounding_Coordinate: 45.393892

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential
Theme_Keyword: impaired waters
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation
Theme_Keyword: enhancement

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. All impaired water potential mitigation sites less than 5-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

These potential mitigation sites were derived from the county-wide historic wetland models yielding scores of 3 or higher. The initial wetland polygon selection was spatially analyzed for areas within 300 feet of any stream within an impaired watershed. An additional spatial analysis was performed by intersecting these areas with some form of disturbance. These disturbances were derived from multiple Land Use / Land Cover datasets and could include agricultural activities, development, gravel pits, and grasslands. Wetlands that met these criteria were identified as possible wetland mitigation opportunities for enhancement. Polygons less than 5-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the impaired water mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 1946

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222
Vertical_Coordinate_System_Definition:
Altitude_System_Definition:
Altitude_Resolution: 0.000010
Altitude_Encoding_Method:
Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Impaired Water Wetlands Potential Mitigation Sites

Entity_Type_Definition: Impaired Water Wetlands Potential Mitigation Sites

Entity_Type_Definition_Source: impaired_waters_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR

Attribute_Definition: Range Direction

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT

Attribute_Definition: Section Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD

Attribute_Definition: Potential Mitigation Method

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID

Attribute_Definition: Unique polygon Site ID

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES

Attribute_Definition: Polygon Acreage

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA

Attribute_Definition: Wetland Bank Service Area Name

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM

Attribute_Definition: Wetland Bank Service Area Number

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM

Attribute_Definition: Combination of wetland bank service area name & number

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME

Attribute_Definition: Name of the geomorphic province that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE

Attribute_Definition: Geomorphic province ID that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAME

Attribute_Definition: Combination of the name and ID of the geomorphic province

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAMENUM

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAMNUM

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

Impaired water wetland potential mitigation sites were populated with basic descriptive information about each site such as a unique Site ID number, method, and polygon acreage. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Invasive Species Attributes

invasive_species_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: invasive_species_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons that intersected known locations of purple loosestrife. Additional invasive species GIS data was not available at the time of the analysis.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through wetland enhancement of wetlands infested with purple loosestrife.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.225029
East_Bounding_Coordinate: -89.616288
North_Bounding_Coordinate: 48.616380
South_Bounding_Coordinate: 45.399536

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential
Theme_Keyword: invasive species
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation
Theme_Keyword: enhancement

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow
Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the
Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog
9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. All invasive species potential mitigation sites less than 5-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

These potential mitigation sites were derived from the county-wide historic wetland models yielding scores of 3 or higher. A point coverage of known purple loosestrife locations was provided by the MNDNR and intersected with these wetland polygons. Wetlands that met these criteria were identified as possible wetland mitigation opportunities for enhancement. Polygons less than 5-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the invasive species mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 344

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222
Vertical_Coordinate_System_Definition:
Altitude_System_Definition:
Altitude_Resolution: 0.000010
Altitude_Encoding_Method:
Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Invasive Species Wetlands Potential Mitigation Sites

Entity_Type_Definition: Invasive Species Wetlands Potential Mitigation Sites

Entity_Type_Definition_Source: invasive_species_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR

Attribute_Definition: Range Direction

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT

Attribute_Definition: Section Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD

Attribute_Definition: Potential Mitigation Method

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID

Attribute_Definition: Unique polygon Site ID

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES

Attribute_Definition: Polygon Acreage

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA

Attribute_Definition: Wetland Bank Service Area Name

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM

Attribute_Definition: Wetland Bank Service Area Number

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM

Attribute_Definition: Combination of wetland bank service area name & number

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME

Attribute_Definition: Name of the geomorphic province that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE

Attribute_Definition: Geomorphic province ID that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAME

Attribute_Definition: Combination of the name and ID of the geomorphic province

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAMENUM

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAMNUM

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

Invasive species wetland potential mitigation sites were populated with basic descriptive Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Partially Drained Wetlands Attributes

partially_drained_wetlands_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: partially_drained_wetlands_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons which were within 600 feet of an existing ditch. Additional analysis was performed using a combination of land ownership, ditch length, and isolation of ditch stubs to categorize the polygons by high, medium, or low mitigation potential.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through wetland restoration within areas currently being partially drained.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.632240
East_Bounding_Coordinate: -91.921580
North_Bounding_Coordinate: 48.993056
South_Bounding_Coordinate: 46.736240

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential
Theme_Keyword: partially drained wetlands
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation
Theme_Keyword: restoration

Place:

Place_Keyword:

Minnesota, Headwaters, Beltrami, Koochiching, Lake of the Woods, St. Louis, Aitkin

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. Drained wetland mitigation sites were used to erase overlapping areas from the partially drained wetlands analysis. The remaining partially drained potential wetland mitigation sites that were not flagged as having a beaver presence and less than 3-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

Only headwater counties of Beltrami, Lake of the Woods, Koochiching, St. Louis, and Aitkin were included in this analysis. Areas where the historic wetland model had a score of 1 for slope, hydric soils (or geomorphology if soil survey was not present), NWI, and at least one of the land cover attributes (NLCD or GAP) were selected. The initial wetland polygon selection was spatially analyzed for areas within 600 feet of a ditch. These wetlands within 600 feet of a ditch were intersected with Scientific and Natural Areas (SNA's) and beaver locations identified in the National Wetlands Inventory (NWI). These attributes were added to the partially drained wetland potential mitigation sites. After review of the initial partially drained wetland potential mitigation sites, it was determined additional analysis was needed to refine these sites into high, medium, and low mitigation potential categories. Many sites from the initial analysis yielded primary ditch arteries which would not be feasible for any wetland restoration activities.

To categorize these sites by mitigation potential, the 2008 GAP ownership dataset was used to determine number of general ownerships along ditch stubs no longer than 12 miles. The isolated ditch stubs were intersected with the ownership data. Polygons falling within one ownership were rated as having the highest potential, two different ownerships were rated as medium potential, and three or more different ownerships were rated as low potential. All other sites were rated as no potential but were retained in the finished dataset.

Any polygons that were not flagged as having a beaver presence and less than 3-Acres were removed from this published dataset. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the partially drained wetland mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 3044

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Vertical_Coordinate_System_Definition:

Altitude_System_Definition:

Altitude_Resolution: 0.000010

Altitude_Encoding_Method:

Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Partially Drained Wetlands Potential Mitigation Sites

Entity_Type_Definition: Partially Drained Wetlands Potential Mitigation Sites

Entity_Type_Definition_Source: partially_drained_wetlands_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: MINNAMNUM

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SHAPE

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: MAJNAMENUM

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: NEWSITEID

Attribute_Definition: Unique polygon Site ID from data refinement analysis

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SNA_PRES

Attribute_Definition:

Indicates whether a SNA was identified within the unique polygon

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SNA_NAME

Attribute_Definition: The name of the SNA

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BEAV_PRES

Attribute_Definition:

Indicates whether a beaver presence was identified within the unique polygon

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: FED_OWN

Attribute_Definition: Federal Ownership

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Indicates area that is not under federal ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Indicates area that is under federal ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Attribute:

Attribute_Label: TRIBAL_OWN

Attribute_Definition: Tribal Ownership

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Indicates area that is not under tribal ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Indicates area that is under tribal ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Attribute:

Attribute_Label: COUNTY_OWN

Attribute_Definition: County Ownership

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Indicates area that is not under county ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Indicates area that is under county ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Attribute:

Attribute_Label: RDIR

Attribute_Definition: Range Direction

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT

Attribute_Definition: Section Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD

Attribute_Definition: Potential Mitigation Method

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID

Attribute_Definition: Unique polygon Site ID

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES

Attribute_Definition: Polygon Acreage

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: POTENT

Attribute_Definition: GIS Mitigation Site Potential

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA
Attribute_Definition: Wetland Bank Service Area Name
Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM
Attribute_Definition: Wetland Bank Service Area Number
Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM
Attribute_Definition: Combination of wetland bank service area name & number
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME
Attribute_Definition: Name of the geomorphic province that the feature falls within
Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE
Attribute_Definition: Geomorphic province ID that the feature falls within
Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAMEENUM
Attribute_Definition: Combination of the name and ID of the geomorphic province
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: STATE_OWN
Attribute_Definition: State Ownership
Attribute_Definition_Source: Community GIS Services, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Indicates area that is not under state ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Indicates area that is under state ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Attribute:

Attribute_Label: OPUB_OWN
Attribute_Definition: Other Public Ownership
Attribute_Definition_Source: Community GIS Services, Inc.
Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Indicates area that is not under other public ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Indicates area that is under other public ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PIND_OWN

Attribute_Definition: Private Industrial Ownership

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Indicates area that is not under private industrial ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Indicates area that is under private industrial ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Attribute:

Attribute_Label: PNIND_OWN

Attribute_Definition: Private Non-Industrial Ownership

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition:

Indicates area that is not under private non-industrial ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Indicates area that is under private non-industrial ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: PVT_OWN

Attribute_Definition: Private Ownership

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0

Enumerated_Domain_Value_Definition: Indicates area that is not under private ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Enumerated_Domain:

Enumerated_Domain_Value: 1

Enumerated_Domain_Value_Definition: Indicates area that is under private ownership

Enumerated_Domain_Value_Definition_Source: 2008 GAP ownership data

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SUM_OWN

Attribute_Definition: Sum of different owners within a unique polygon

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: 0 - 8

Enumerated_Domain_Value_Definition: Sum of different GAP ownership types

Enumerated_Domain_Value_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SHAPE_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: SHAPE_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

Partially drained wetlands potential mitigation sites were populated with basic descriptive information about each site such as a unique SiteID number, method, and polygon acreage. Attributes from the GAP ownership data refinement analysis are also included. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

Trout Streams Attributes

trout_streams_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: trout_streams_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons within 300 feet of a designated trout stream and in close proximity to some form of disturbance.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through wetland preservation/enhancement along a designated trout stream.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.575226

East_Bounding_Coordinate: -89.658437
North_Bounding_Coordinate: 48.383790
South_Bounding_Coordinate: 45.918023

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential
Theme_Keyword: trout stream
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation
Theme_Keyword: enhancement
Theme_Keyword: preservation

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. All

trout stream potential mitigation sites less than 5-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

These potential mitigation sites were derived from the county-wide historic wetland models yielding scores of 3 or higher. The initial wetland polygon selection was spatially analyzed for areas within 300 feet of any designated trout stream. An additional spatial analysis was performed by intersecting these areas with some form of disturbance. These disturbances were derived from multiple Land Use / Land Cover datasets and could include agricultural activities, development, gravel pits, and grasslands. Wetlands that met these criteria were identified as possible wetland mitigation opportunities for preservation or enhancement. Polygons less than 5-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the trout stream mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 500

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137.000000
Denominator_of_Flattening_Ratio: 298.257222
Vertical_Coordinate_System_Definition:
Altitude_System_Definition:
Altitude_Resolution: 0.000010
Altitude_Encoding_Method:
Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Trout Stream Wetlands Potential Mitigation Sites
Entity_Type_Definition: Trout Stream Wetlands Potential Mitigation Sites
Entity_Type_Definition_Source: trout_streams_att

Attribute:

Attribute_Label: OBJECTID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain:
Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME
Attribute_Definition: County Name
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP
Attribute_Definition: County FIPS Code
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN
Attribute_Definition: Township Number
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR
Attribute_Definition: Range Direction
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT
Attribute_Definition: Section Number
Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD
Attribute_Definition: Potential Mitigation Method
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID
Attribute_Definition: Unique polygon Site ID
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES
Attribute_Definition: Polygon Acreage
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA
Attribute_Definition: Wetland Bank Service Area Name
Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM
Attribute_Definition: Wetland Bank Service Area Number
Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM
Attribute_Definition: Combination of wetland bank service area name & number
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME
Attribute_Definition: Name of the geomorphic province that the feature falls within
Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE
Attribute_Definition: Geomorphic province ID that the feature falls within
Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAMENUM
Attribute_Definition: Combination of the name and ID of the geomorphic province
Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME
Attribute_Definition: The name of the major watershed
Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAMENUM

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAMNUM

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

Trout stream wetland potential mitigation sites were populated with basic descriptive information about each site such as a unique Site ID number, method, and polygon acreage. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

White Cedar Attributes

white_cedar_att

Metadata also available as

Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification_Information:

Citation:

Citation_Information:

Originator: Community GIS Services, Inc.

Publication_Date: Unknown

Title: white_cedar_att

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\Client7\F on Client

7\Barr\Phase2\Geodatabase\BWSR_Wetland_Mit.mdb

Description:

Abstract:

These potential mitigation sites were derived from the county-wide historic wetland model wetland polygons containing white cedar stands near identified disturbances.

Purpose:

The polygons serve as an indicator of potential wetland mitigation opportunity through preservation of white cedar stands that might be threatened.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:

Calendar_Date: unknown

Currentness_Reference: publication date

Status:

Progress: Complete

Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -95.353278
East_Bounding_Coordinate: -89.535237
North_Bounding_Coordinate: 48.933068
South_Bounding_Coordinate: 45.752914

Keywords:

Theme:

Theme_Keyword_Thesaurus: potential
Theme_Keyword: white cedar
Theme_Keyword: watersheds
Theme_Keyword: wetland mitigation
Theme_Keyword: preservation
Theme_Keyword: enhancement

Place:

Place_Keyword:

Minnesota, Aitkin, Beltrami, Carlton, Cass, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Lake of the Woods, Mille Lacs, Pine, St. Louis, Wadena

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Data_Set_Credit:

Minnesota Board of Soil & Water Resources; Community GIS Services, Inc.

Native_Data_Set_Environment:

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.3.1.3000

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Most attributes were populated while conducting the analysis by performing a spatial join to the polygon centroids. All fields were verified to ensure proper attribute population.

Logical_Consistency_Report:

All polygons topologically correct using ARC/INFO 9.1.0.722. All polygons are closed & lines intersect where intended.

Completeness_Report:

This potential mitigation method is only 1 method of 10 total that were analyzed as part of the Northeast Minnesota Wetland Mitigation Inventory & Assessment project. All white cedar polygons less than 5-Acres were removed from this published dataset.

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Horizontal_Positional_Accuracy_Report: Horizontal accuracy was not specifically assessed.

Lineage:

Process_Step:

Process_Description:

These potential mitigation sites were derived from the county-wide historic wetland models yielding scores of 3 or higher and containing a white cedar stand. These initial wetland polygons were further analyzed by identifying disturbances within 300 feet. These disturbances were derived from multiple Land Use / Land Cover datasets and could include agricultural activities, development, gravel pits, and grasslands. Wetlands that met these criteria were identified as possible wetland mitigation opportunities for preservation or enhancement. Polygons less than 5-Acres in size were removed. Locational attributes such as County, Township, Range, Section, etc. were joined by spatially joining these attributes to the centroids of the white cedar mitigation opportunity polygons.

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 2465

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 15

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -93.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.001344

Ordinate_Resolution: 0.001344

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Vertical_Coordinate_System_Definition:

Altitude_System_Definition:

Altitude_Resolution: 0.000010

Altitude_Encoding_Method:

Explicit elevation coordinate included with horizontal coordinates

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: White Cedar Wetlands Potential Mitigation Sites

Entity_Type_Definition: White Cedar Wetlands Potential Mitigation Sites

Entity_Type_Definition_Source: white_cedar_att

Attribute:

Attribute_Label: OBJECTID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: CTYNAME

Attribute_Definition: County Name

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: COUNTY_FIP

Attribute_Definition: County FIPS Code

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: TOWN

Attribute_Definition: Township Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RDIR

Attribute_Definition: Range Direction

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: RANG

Attribute_Definition: Range Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: SECT

Attribute_Definition: Section Number

Attribute_Definition_Source: Minnesota DNR - Minerals Division/Section of Wildlife

Attribute:

Attribute_Label: METHOD

Attribute_Definition: Potential Mitigation Method

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: SITE_ID

Attribute_Definition: Unique polygon Site ID

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: ACRES

Attribute_Definition: Polygon Acreage

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: BNKSRVAREA

Attribute_Definition: Wetland Bank Service Area Name

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BNKSRVNUM

Attribute_Definition: Wetland Bank Service Area Number

Attribute_Definition_Source: Minnesota Board Of Water And Soil Resources

Attribute:

Attribute_Label: BSANAMENUM

Attribute_Definition: Combination of wetland bank service area name & number

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: PROVNAME

Attribute_Definition: Name of the geomorphic province that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PROVINCE

Attribute_Definition: Geomorphic province ID that the feature falls within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: PRVNAME

Attribute_Definition: Combination of the name and ID of the geomorphic province

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MAJNAME

Attribute_Definition: The name of the major watershed

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJOR

Attribute_Definition: Unique major watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MAJNAMENUM

Attribute_Definition: Combination of the name and ID of the major watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: MINNAME

Attribute_Definition: Name of minor watershed that the feature exists within

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINOR5

Attribute_Definition: Unique minor watershed ID

Attribute_Definition_Source: Minnesota DNR - Division of Waters

Attribute:

Attribute_Label: MINNAMNUM

Attribute_Definition: Combination of the name and ID of the minor watershed

Attribute_Definition_Source: Community GIS Services, Inc.

Attribute:

Attribute_Label: Shape_Length

Attribute_Definition: Length of feature in internal units.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Attribute:

Attribute_Label: Shape_Area

Attribute_Definition: Area of feature in internal units squared.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Positive real numbers that are automatically generated.

Overview_Description:

Entity_and_Attribute_Overview:

White cedar wetland potential mitigation sites were populated with basic descriptive information about each site such as a unique Site ID number, method, and polygon acreage. Additional locational attributes were added through spatial joins to aid in queries based upon political boundaries as well as watershed boundaries.

Distribution_Information:

Distributor:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Dale Krystosek

Contact_Organization: Minnesota Board of Water and Soil Resources

Contact_Position: Senior Wetland Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 701 Minnesota Avenue, Suite 234

City: Bemidji

State_or_Province: MN

Postal_Code: 56601

Contact_Voice_Telephone: 218-333-8029

Contact_Facsimile_Telephone: 218-755-4201

Contact_Electronic_Mail_Address: dale.krystosek@state.mn.us

Resource_Description: Downloadable Data

Distribution_Liability:

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Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Metadata_Reference_Information:

Metadata_Date: 20091029

Metadata_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: John Kubiak

Contact_Organization: Community GIS Services, Inc.

Contact_Position: GIS Specialist

Contact_Address:

Address_Type: mailing and physical address

Address: 230 East Superior Street, Suite A

City: Duluth

State_or_Province: MN

Postal_Code: 55802

Contact_Voice_Telephone: 218-279-5925

Contact_Facsimile_Telephone: 218-279-5925

Contact_Electronic_Mail_Address: jkubiak@commgis.org

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile