2008 Project Abstract

For the Period Ending June 30, 2010

PROJECT TITLE: Install Riparian Buffers in the Whitewater River Watershed

Project Manager: Megan Kranz-McGuire
Affiliation: Whitewater Joint Powers Board
Mailing Address: 400 Wilson St, PO Box 39
City / State / Zip : Lewiston, MN 55952
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Legal Citation: M.L. 2008, Chap. 367, Sec. 2, Subd. 4(d)

Appropriation Language:
$52,000 is from the trust fund to the Board of Water and Soil Resources for an agreement with the Whitewater Joint Powers Board to inventory streams and adjacent land use and survey riparian landowners to assist in the prioritization of restoration efforts to improve water quality, habitat, and future enforcement of riparian buffers in the southeast ten-county region of the Southeast Minnesota Water Resources Board.

Appropriation Amount: $52,000

Overall Project Outcome and Results

Riparian buffers can provide significant water quality benefits by filtering contaminants such as nitrate, phosphorus, sediment, and pesticides from surface runoff. In addition, buffers stabilize streambanks, enhance riparian and in-stream habitat, and provide landscape connectivity. The DNR's Shoreland Rule requires that landowners maintain a 50 foot buffer of perennial vegetation on public waters. According to previous BWSR estimates, 50% or more of the buffer area in some counties was cropped. Local officials have often struggled to increase compliance with the buffer rule because they did not know the extent and locations of un-buffered streams. This project eliminated that barrier by mapping land use along all public waters in the ten county region of Southeast Minnesota.

a. Mapping

The Whitewater River Watershed Project contracted with Cannon River Watershed Partnership to produce the maps. The mapping process utilized aerial photography and a Geographic Information System (GIS) to conduct an assessment and analysis of existing stream courses, channels and land use within shoreland areas. The assessment included all perennial streams within the 10-county region and utilized post flood aerial photos where available. Land cover adjacent to protected waters in all participating counties was also identified based on aerial photo interpretation.

From this assessment and analysis, two GIS shapefiles were created for each county: a retraced stream layer and a shoreland layer, which maps the land use within 300 feet of the center line of streams.

A total of 3,800 linear miles of streams were mapped, equaling 430 square miles of buffer area. Approximately 60,000 individual polygons were traced, representing 40 unique land uses. These detailed maps show that a much smaller area is being cropped than previously estimated. All counties had 50 foot buffers on at least 90% of their streams.

All GIS files are available to the public on the CRWP website. However, some experience with GIS is necessary to successfully utilize this data. For non-GIS users, contacting your County for maps they have produced using this data will be more efficient.

b. Surveys and Focus Groups

In addition to mapping shoreland land use, the project also conducted landowner surveys and focus groups to 1) explore the barriers to buffer adoption, 2) identify opportunities for establishing and maintaining buffers, and 3) explore what actions would increase adoption of these buffers. Reports summarizing the survey and focus group results are available.

Many counties are moving forward to address areas that lack shoreland buffers. Goodhue is implementing a "Hayable Buffer" program, Olmsted has sent out letters to landowners that are out of compliance, Winona is developing a buffer plan, and additional counties are making progress to ensure all streams are protected by perennial buffers.

Project Results Use and Dissemination

The results of the mapping, surveys, and focus groups were presented and discussed at regional meetings including the Basin Alliance of the Lower Mississippi in Minnesota, the Southeast Water Resources Board, and the Southeast Minnesota Association of County Planning and Zoning Administrators. The maps and land use summary statistics are available on the CRWP website (http://www.crwp.net/Programs/Conservation/ShorelandMapping/ShorelandMapping.html). The project was discussed in a July 8th, 2010 article in AgriNews, a newspaper that reaches many farmers in Southeast Minnesota.

In addition to county staff and commissioners, others are using the data for a variety of purposes related to water quality. Minnesota Pollution Control Agency staff is using the maps to help identify stressors to the ecology of streams in the Root River Watershed, and the Fillmore SWCD is using the data to help identify gullies in pastures adjacent to streams. The data can also be used to assess habitat connectivity.

Trust Fund 2008 Work Program Final Report

Date of Report: August 16, 2010
Date of Next Status Report: Final Report
Date of Work program Approval: June 30, 2008
Project Completion Date: June 30, 2010

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Fax Number: 507-523-3717
Web Page address: whitewaterwatershed.org

Location: Winona, Wabasha, Olmsted, Steele, Rice, Dodge, Fillmore, Goodhue, Houston, and Mower Counties. See attached map.

Total Trust Fund Project Budget:	**Trust Fund Appropriation:**	**$ 52,000**
	Minus Amount Spent:	**$ 51,750**
	Equal Balance:	**$ 250**

Legal Citation: M.L. 2008, Chap. 367, Sec. 2, Subd. 4(d)

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II. and III. FINAL PROJECT SUMMARY:

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Riparian buffers can provide significant water quality benefits by filtering contaminants such as nitrate, phosphorus, sediment, and pesticides from surface runoff. In addition, buffers stabilize streambanks, enhance riparian and in-stream habitat, and provide landscape connectivity. The DNR's Shoreland Rule requires that landowners maintain a 50 foot buffer of perennial vegetation on public waters. According to previous BWSR estimates, 50% or more of the buffer area in some counties was cropped. Local officials have often struggled to increase compliance with the buffer rule because they did not know the extent and locations of un-buffered streams. This project eliminated that

barrier by mapping land use along all public waters in the ten county region of Southeast Minnesota.

The Whitewater River Watershed Project contracted with Cannon River Watershed Partnership to produce the maps. Two GIS shapefiles were created for each county: a retraced stream layer and a shoreland layer, which maps the land use within 300 feet of the center line of streams. A total of 3,800 linear miles of streams were mapped, equally 430 square miles of buffer area. Approximately 60,000 individual polygons were traced, representing 40 unique land uses. All GIS files are available to the public on the CRWP website. These detailed maps show that a much smaller area is being cropped than previously estimated. All counties had 50 foot buffers on at least 90% of their streams.

In addition to mapping shoreland land use, the project also conducted landowner surveys and focus groups to 1) explore the barriers to buffer adoption, 2) identify opportunities for establishing and maintaining buffers, and 3) explore what actions would increase adoption of these buffers. Reports summarizing the survey and focus group results are available.

Many counties are moving forward to address areas that lack shoreland buffers. Goodhue is implementing a “Hayable Buffer” program, Olmsted has sent out letters to landowners that are out of compliance, Winona is developing a buffer plan, and additional counties are making progress to ensure all streams are protected by perennial buffers.

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IV. OUTLINE OF PROJECT RESULTS*:*

Result 1: Assess Stream Channels and Adjacent Land Use

Description: The project team will assess perennial streams within the 10-county region utilizing post flood aerial photos where available. Land cover adjacent to protected waters in all participating counties will be identified based on aerial photo

interpretation. A temporary staff person will be hired to utilize aerial photography and GIS to conduct an assessment and analysis of existing stream courses, channels and land use within shoreland areas.

Summary Budget Information for Result 1: **Trust Fund Budget: $ 40,100**
Amount Spent: $ 39,999
Balance: $ 101

Deliverable	Completion Date	Budget	Status
1. Assess riparian landuse and stream channels on perennial streams in 3 participating counties in the 10-county SE MN region.	January 31, 2009	20,000	16,540
2. Complete assessment of riparian landuse and stream channels on perennial streams in all participating counties in the 10-county SE MN region.	January 31, 2010	15,900	20,459
3. Compile maps and reports for each watershed organization and county.	June 30, 2010	4,000	3,000

Completion Date: June 30, 2010

Final Report Summary: August 16, 2010

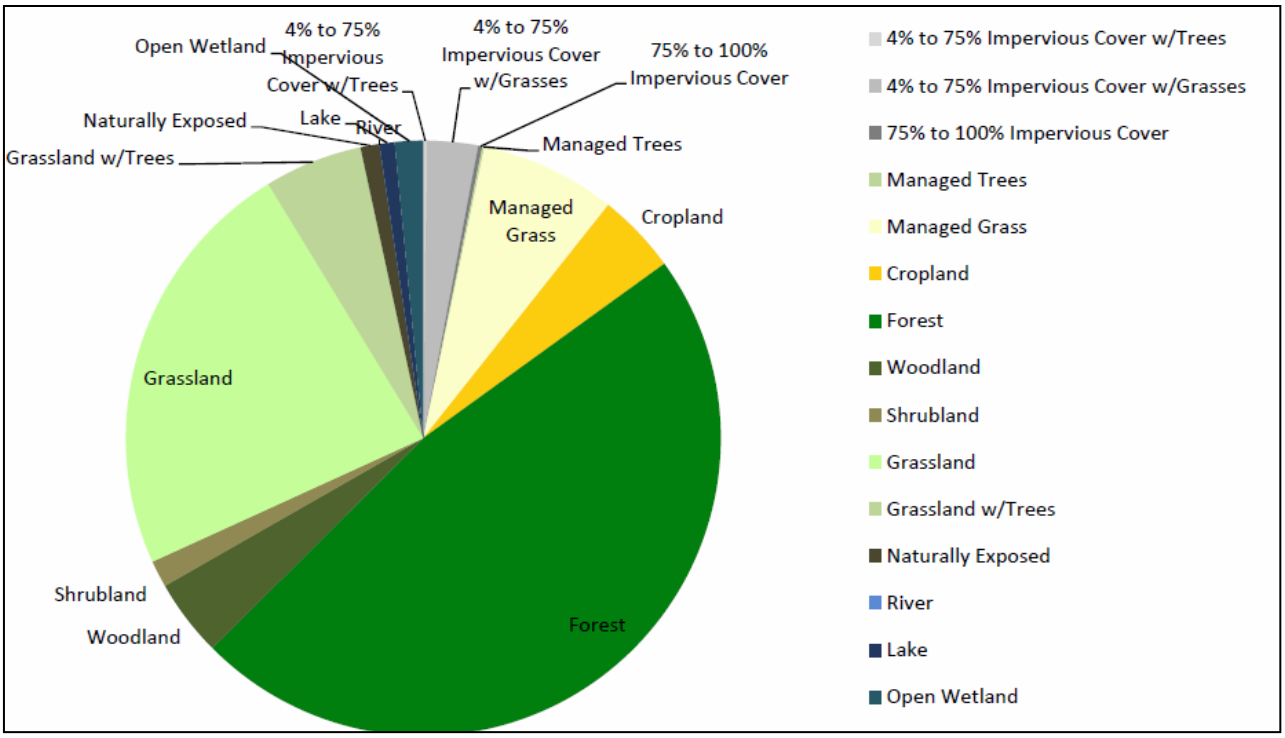
All ten counties were completed as planned. Two GIS shapefiles were created for each county: 1) a retraced stream layer, which corrects inaccuracies in the DNR's public waters stream layer, and 2) a shoreland land use layer, which maps the land use within 300 feet of the center line of the streams. All GIS files are available to the public on the Cannon River Watershed Partnership website (http://www.crwp.net/download.html). County Zoning and Planning staff, SWCD staff, and others are able to download and utilize the maps.

New stream layers were necessary because existing layers were traced from USGS Quads. Sometimes the stream lines were many meters off the actual stream locations due to poor resolution of source data, inaccuracies in digitizing the quads, and changes in stream channels due to flooding or siltation. Very precise stream layers were needed to accurately map the 300 foot buffer area. The new stream layers were created using 2008 FSA NAIP one-meter aerial photography, Lidar topographic layers, and additional information where available.

To create the land use maps, a 300 foot buffer was created around the corrected stream layer. Data was digitized from 2008 FSA aerial photography and coded using a subset of the Minnesota Land Cover Classification System. Data is meant to reflect very basic land use information (eg. forest, grassland, cropland, etc.) within 300 feet of DNR-protected river and stream centerlines for a given county. The data has not been

verified in the field. A total of 3800 linear miles of streams were mapped, equally 430 square miles of buffer area. Approximately 60,000 individual polygons were traced, representing 40 unique land uses.

Two summary reports were compiled and are also available on CRWP's website. One provides summary statistics for land use in the 300 foot shoreland area, and the other provides summary statistics for land use in the 50 foot shoreland area. Region-wide, less than 5% of the area within the 50 foot shoreland buffer is cropped with annuals. In the ten county area, the 50 foot buffer area is composed of: 48% forest, 23% grassland, 7% managed grassland, 4% woodland, and several other land uses with less than 4% coverage. These coverage statistics are estimates, but provide data at a much finer scale than earlier reports, which listed cropped riparian buffer area in Mower County, for example, as high as 56% (BWSR, "Cultivated Riparian Zone Estimates").



Result 2: Landowner Survey and Focus Groups

Description: Develop and administer a survey of riparian landowners with the purpose of identifying the barriers and benefits associated with converting riparian areas from cropland to perennial vegetation. Convene a focus group of riparian landowners to determine the means of eliminating barriers to buffer development.

Summary Budget Information for Result 2: **Trust Fund Budget: $ 11,900**
Amount Spent: $ 11,751
Balance: $ 149

Deliverable	Completion Date	Budget	Status
1. Develop and administer a	March 31, 2009	8,100	4,500

	survey to riparian landowners to I.D. barriers and benefits to riparian buffer adoption.			
2.	Convene a focus group of riparian landowners to determine the means of eliminating barriers.	February 28, 2010	3,000	6,400
3.	Assemble a report summarizing the survey and focus group findings	June 30, 2010	1,000	1,000

Completion Date: June 30, 2010

Final Report Summary: August 16, 2010

The landowner surveys were intended to identify barriers to vegetative buffer adoption and to determine landowner education and assistance needs. The survey was completed in November 2009. Survey questions were developed with an advisory committee and piloted with a small group of landowners to test the workability of the survey. Out of a total of 600 mailed surveys, 282 were returned. The Southeast Minnesota Water Resources Board staff compiled the survey responses and produced a report describing the results. Survey responses are tabulated in an Excel format, as well as analyzed in the written report.

Survey results show that 70% of respondents are aware that the stream on their property is classified as public waters, but only 43% know that their county requires that agricultural lands have a 50 ft. buffer of perennial vegetation next to rivers and streams. In Goodhue County only 28% of respondents were aware that their county requires a 16 1/2 foot buffer of perennial vegetation next to ditches, although this question was worded poorly and did not specify public ditches. A majority of respondents (56%) are aware that under state and county shore land law they can hay, pasture, or manage their shore land buffer as they see fit, as long as it is maintained in permanent vegetation. The survey results indicate the three greatest barriers for land owners to voluntarily plant and maintain a 50' buffer along streams are maintenance cost and time (22%), lack of information regarding shoreland buffer requirements (22%), and reduced row crop production (19%).

Two landowner focus group sessions were held in Southeastern Minnesota during March, 2010. The intent of the focus groups was to: 1) explore the barriers to buffer adoption, 2) identify opportunities for establishing and maintaining buffers, and 3) explore what actions would increase adoption of these buffers. Several prevalent themes came up in both focus group sessions: 1) a whole watershed and whole farm approach should be utilized in considering the establishment of buffers, 2) the cost of installing and maintaining buffers needs to be addressed, and 3) there is a definite interest in streamlining the process related to buffers. The detailed landowner responses are compiled in the focus group report.

V. TOTAL TRUST FUND PROJECT BUDGET:

Staff or Contract Services: $47,090
Equipment:
Development: $
Restoration: $
Acquisition, including easements: $
Other: $4,910

TOTAL TRUST FUND PROJECT BUDGET: $52,000

Explanation of Capital Expenditures Greater Than $3,500:

VI. OTHER FUNDS & PARTNERS:

A. Project Partners: Southeast Minnesota Water Resources Board; Winona State University, Cannon, Zumbro and Root Watershed staff; County Water Planners; SWCD staff; MPCA; MDNR; Olmsted County Environmental Commission and Township Officers.

Cannon River Watershed Partnership: $35,949 for GIS mapping.

Southeast Water Resources Board: $9,381 for landowner surveys and focus groups.

B. Other Funds Spent during the Project Period: Cannon River Watershed Partnership received funding from MPCA to educate local officials about the shoreland ordinance, $50,000. This education was conducted by Ross Hoffman, which helped build relationships and inform staff and local officials about the county maps. Olmsted County, in partnership with Olmsted SWCD, is currently undertaking a county-wide buffer enforcement project. This project is consuming considerable staff time and resources to bring all landowners into compliance with the buffer requirement. The Zumbro Watershed Partnership received a grant from Minnesota Water Continuation Partnership Grant for $5,000 to provide direct education to out-of-compliance shoreland landowners in the Zumbro about the shoreland rule, the benefits of buffers, and incentive programs. The ZWP has produced a brochure for landowners and will be hosting educational workshops in the coming months.

C. Past Spending: *none*

D. Time: *no additional time needed*

VII. DISSEMINATION: Maps of riparian buffer land use are available for download through the Cannon River Watershed Partnership website. Counties, SWCDs, and other agencies have been notified of their availability. Summary statistics of land use in the 300 foot buffer and 50 foot buffer are also available on the CRWP website. Information on the maps and the landowner surveys and focus groups were distributed at multiple regional meetings including the Basin Alliance of the Lower Mississippi in Minnesota, the Southeast Water Resources Board, and the

Southeast Minnesota Association of County Planning and Zoning Administrators. Reports will also be made available on the Whitewater Watershed web site soon.

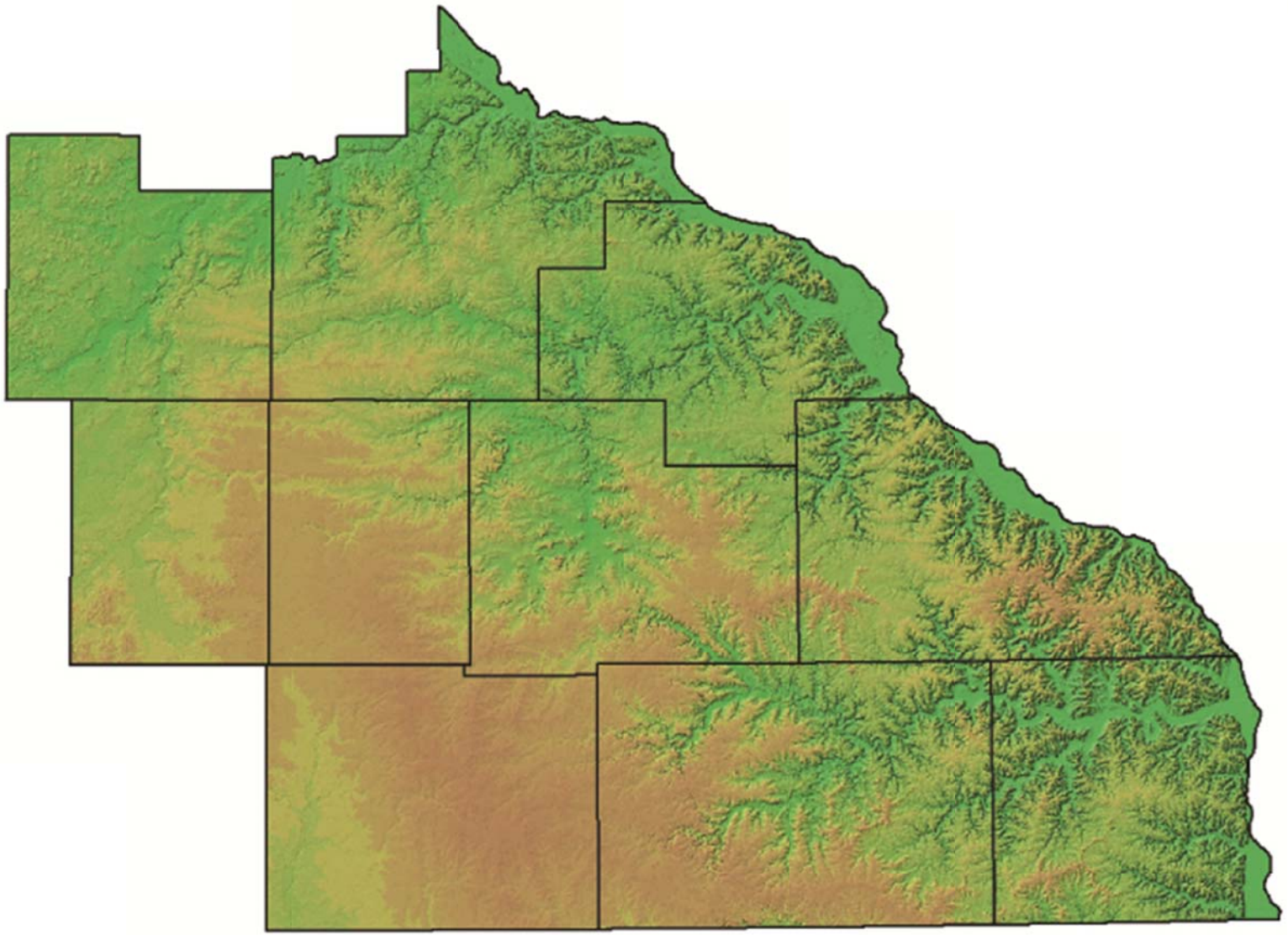
VIII. REPORTING REQUIREMENTS:

Periodic work program progress reports will be submitted not later than February 1 2009, August 1 2009, February 1 2010. A final work program report and associated products will be submitted between June 30 and August 16, 2010 as requested by the LCCMR

IX. RESEARCH PROJECTS: *N/A*

ATTACHMENTS: CRWP Shoreland Mapping Presentation
50 Ft. Shoreland Area Land Use Statistics
300 Ft. Shoreland Area Land Use Statistics

Dodge - Fillmore - Goodhue - Houston - Mower



Olmsted - Steele - Rice - Wabasha - Winona

Whitewater Watershed Project
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Lewiston, MN 55952
(507) 523-2171

Southeast Minnesota Shoreland Buffer Assessment

Funded by an Environmental and Natural Resources Trust Fund Grant to the
Whitewater River Watershed Project

Mapping conducted by Ross Hoffman, Cannon River Watershed Partnership

Survey and Focus Groups conducted by Linda Dahl, Southeast Water Resources Board

Project Summary

The Southeast Shoreland Buffer Assessment Project consisted of three parts: 1) GIS mapping of riparian area land use conducted by Ross Hoffman of the Cannon River Watershed Partnership, 2) landowner surveys, and 3) landowner focus groups conducted by Linda Dahl of the Southeast Water Resources Board.

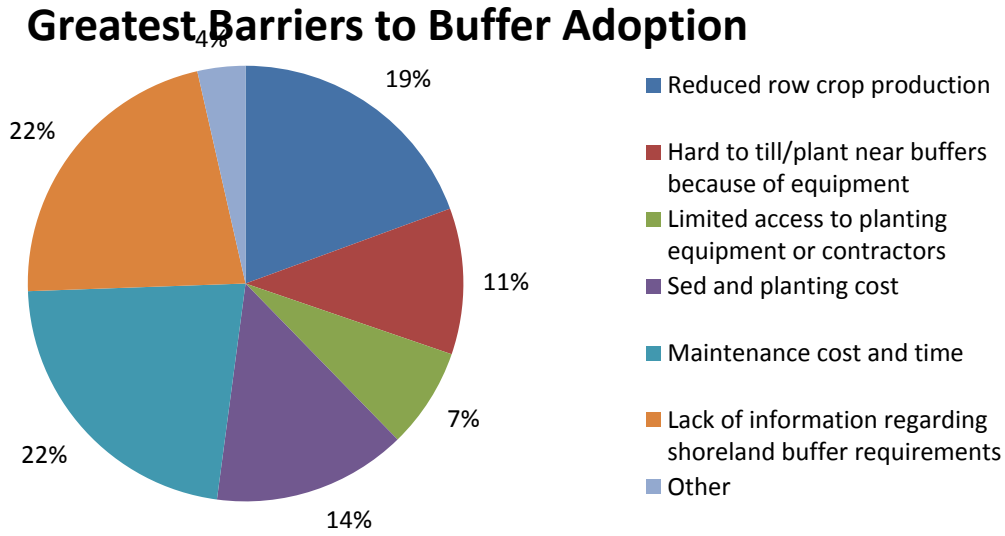
The shoreland mapping component of the project used aerial photos to digitally map the different land uses within SE Minnesota's public water's shoreland. The GIS data and summary reports are available on the CRWP website. Region-wide, 4.34% of land within 50 feet of public waterways is cropped, and 21.39% of land within 300 feet of waterways is cropped. The maps can be used to identify locations needing additional perennial vegetation buffers, and can be utilized for other water quality enhancement projects, such as locating sites of erosion in pasture or enhancing wildlife corridors.

The landowner surveys were intended to identify barriers to vegetative buffer adoption and to determine landowner education and assistance needs. Goodhue, Olmsted, and Winona Counties were selected for the survey. 200 surveys were sent per county to landowners with parcels that contained public waters. Of the 282 surveys returned, 109 were from Olmsted County, 85 from Winona County and 88 from Goodhue County.

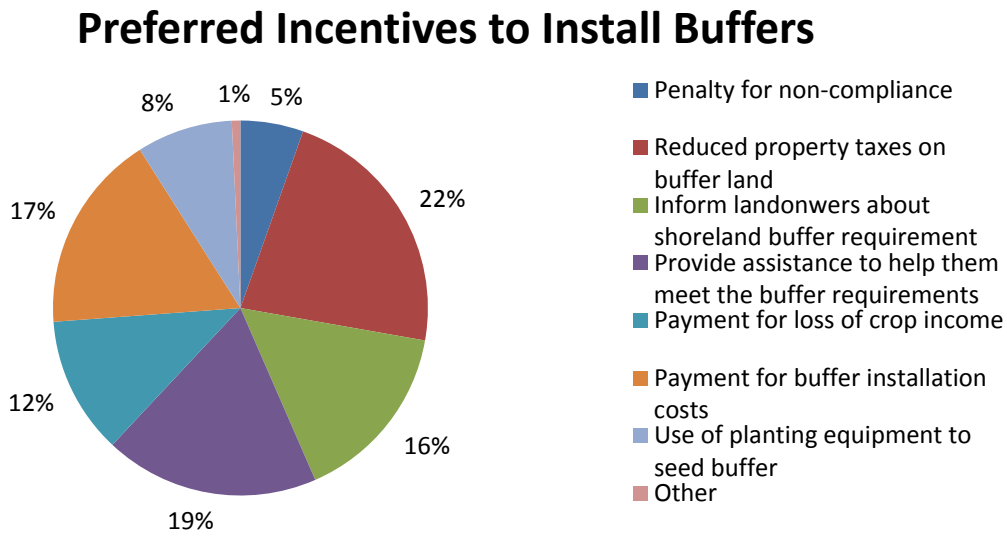
Two landowner focus group sessions were held in Southeastern Minnesota during March, 2010. The intent of the focus groups was to: 1) explore the barriers to buffer adoption, 2) identify opportunities for establishing and maintaining buffers, and 3) explore what actions would increase adoption of these buffers. The summary results are listed below. Detailed reports can be requested by contacting the Whitewater Watershed Project.

Highlights of Survey Data:

- 43% of landowners did not know that their county requires that agricultural lands have a 50 ft. buffer of perennial vegetation next to rivers and streams.
- 44 % of landowners were not aware that under state and county shoreland law they can hay, pasture, or manage their shoreland buffer as they see fit, as long as it is maintained in permanent vegetation.
- Landowners were asked to choose the three greatest barriers to buffer adoption from a list. The chart below shows the percentage of total responses for each category.



- Landowners were asked to select all incentives that would encourage installation of buffers. The chart below shows the percentage of total responses for each category.



Summary of Focus Group Themes:

Several prevalent themes came up in both focus group sessions: 1) a whole watershed and whole farm approach should be utilized in considering the establishment of buffers, 2) the cost of installing and maintaining buffers needs to be addressed, and 3) there is a definite interest in streamlining the process related to buffers.

Additional common themes included the following:

Rule Education/Enforcement

- Farmers want consistency in rule enforcement. ("Why should I maintain a buffer if my neighbor doesn't maintain his?")
- The need for additional education was a reoccurring theme. Participants stated that they did not understand what was permitted and what was not permitted in the buffer area (haying, burning, pesticide applications, mowing, etc.).
- Maintenance is an ongoing need. Landowners need information on maintenance issues such as burning, grazing, and herbicides that can be used near water bodies.

Technical and financial assistance

- Participants suggested that the county, SWCD, and NRCS coordinate services so landowners can get all the information they need at one office.
- Participants suggested trying unconventional approaches such as tours, maintenance demonstrations, or videos
- One size does not fit all situations. Landowners prefer flexibility: buffer width should vary depending on factors such as field operability, slope, and erosion potential.
- Landowners desire financial assistance for seed cost, no-till drill rental, and land rental rates.
- Tax reductions would provide financial relief for loss of crop production.

Survey Results

Of the 282 surveys returned, 109 were from Olmsted County, 85 from Winona County and 88 from Goodhue County, and 80% of the surveys returned were from individuals over the age of 50.

Results show that 70% of respondents are aware that the stream on their property is classified as public waters, but only 43% know that their county requires that agricultural lands have a 50 ft. buffer of perennial vegetation next to rivers and streams. In Goodhue County only 28% of respondents were aware that their county requires a 16 1/2 foot buffer of perennial vegetation next to ditches, although this question was worded poorly and did not specify public ditches. A majority of respondents (56%) are aware that under state and county shore land law they can hay, pasture, or manage their shore land buffer as they see fit, as long as it is maintained in permanent vegetation.

In terms of water quality, 76% of respondents think the water quality in the stream on their property is good or excellent. The most common recreational activities respondents said they engage in include wildlife observation, fishing and swimming/wading. The most common agricultural activities respondents indicated they use their stream for are pasturing and watering livestock.

The benefits of shoreland buffers that are most important to the respondents and their families are wildlife habitat (19%) erosion control by stabilizing stream bank (19%) and erosion control by filtering sediment (19%), followed by pesticide and fertilizer filtering (13%) and pasturing (10%).

The survey results indicate the three greatest barriers for land owners to voluntarily plant and maintain a 50' buffer along streams are maintenance cost and time (22%), lack of information regarding shoreland buffer requirements (22%), and reduced row crop production (19%).

If a landowner does not maintain 50' of permanent vegetation along the stream, 40% of respondents think education should be provided, 32% think financial assistance should be provided, and 17% think the landowner should be required to install a buffer. Respondents indicate that landowners would be encouraged to install buffers by reduced property taxes (22%), technical assistance to meet buffer requirements (19%), payment for buffer installation (17%), and informing landowners about buffer requirements (16%).

The survey indicates there is still work to be done to increase landowner awareness of buffer requirements and to provide education about the benefits of buffers. In addition to public education and awareness, the barriers of maintenance time and cost and reduced row crop production could be alleviated by providing technical and financial assistance for both buffer establishment and maintenance. Seventeen percent of respondents felt that enforcement is a tool to be used where education and assistance are not successful.

Reoccurring Themes from Focus Group Respondents

In general it was felt that buffers are one component of a conservation plan for a farm; a whole watershed and whole farm approach would encourage landowners or renters to install and maintain buffers. Participants felt that buffers should be part of a total conservation plan used to protect their land and soil as well as water quality and wildlife and fish habitat.

The cost of installing and maintaining buffers was a reoccurring theme. Respondents cited the costs of seed, labor, and preparing the area as issues for installation. Participants felt that incentive payments or cost share money should be similar to rental rates in order to fairly compensate for lost production and income on the land allocated to buffers. Financial disincentives should be applied if landowner doesn't maintain buffers.

Issues mentioned as concerns for maintenance were weed control, burning, and other on-going maintenance. Burning can be difficult because many landowners don't have the experience needed to burn their buffers, and the cost to hire it out is too high due to liability. It can also be difficult to find chemicals to control weeds in the buffer area because of proximity to the water.

A repeated technical assistance theme advocated for was to streamline the process for landowners who want to install buffers, so the farmer can get all the information they need from one agency during one contact. A whole farm, whole plan effort working one-on-one with SWCD staff is requested. Technical assistance (planning, burning, no-till drill rental, etc.) coordinated by an agency team was seen as desirable. Flexibility in how buffers are designed should be considered to help farmers improve their farming operation.

Educational needs identified included more information from agencies, assistance in developing a whole farm plan, and information about the laws and available technical support.

A variety of information dissemination methods could be utilized. Agencies should consider new methods of communication such as Facebook, TV, Internet and cell phones. However, traditional methods like letters, brochures, and meetings still need to be utilized. Additionally, hands-on approaches such as individual phone calls and farm visits were suggested, especially if they come from someone who understand farming, such as a retired farmer. Learning from neighbors with established buffers via farms tours or DVD's was seen as a potential method.

Farmers are an independent group and don't like being told what to do, especially by governmental agencies. Enforcement needs to be consistent. They like their neighbors to follow the same practices that they do. Avoid the use of terms such as "Clean Water Act" and a heavy handed, bureaucratic approach.

Enforcement should occur in a soft, step approach beginning with a letter and ending in fines if necessary. Individual situations should be considered.

Southeast Minnesota Riparian Buffer Focus Groups: Final Report

Submitted
June 23, 2010

Authored by:
Sheila Craig, Doug Malchow

Prepared for the Southeast Minnesota Water Resources Board
Linda Dahl, Executive Director

Funded by an Environmental and Natural Resources Trust Fund Grant:
Riparian Buffers in the Whitewater River Watershed

Grant Administered by the Whitewater Watershed Project
Megan Kranz-McGuire Authorized Agent

Table of Contents

Executive Summary

Two focus group sessions were held in Southeastern Minnesota during March, 2010. A total of eleven volunteer riparian landowners attended the two sessions. The intent of the focus groups was to explore the barriers to and opportunities for establishing and maintaining vegetative buffers along Southeast Minnesota waterways and what actions would increase adoption of these buffers. A simple go-around the table format was followed. All responses were noted and recorded in writing. Attendees were assured that their responses would remain anonymous. The most prevalent reoccurring themes that came out of the two sessions were that a whole watershed and whole farm approach needs to be utilized in considering the establishment of buffers, the cost of installing and maintaining buffers needs to be addressed, and there is a definite interest in stream-lining the process related to buffers.

Introduction

Two focus group sessions were held in Southeastern Minnesota during March, 2010. The first was held in Goodhue at the Goodhue County Soil and Water Conservation District Office meeting room from 1 to 3 p.m. on Thursday, March 25, 2010. The first focus group was attended by five volunteer riparian landowners. The second was held at the Winona County Soil and Water Conservation District Office meeting room in Lewiston from 10 a.m. to noon on Tuesday, March, 26. The second focus group was attended by six volunteer riparian landowners.

Originally three focus group sessions were planned: one each in Olmsted, Goodhue, and Winona Counties. However, only one person volunteered for the Olmsted County session; that person agreed to attend the Winona County session.

Attendees were chosen on a first-come first served basis. Each attendee was offered $65 in remuneration.

The intent of the focus groups was to explore the barriers to and opportunities for establishing and maintaining vegetative buffers along Southeast Minnesota waterways and what actions would increase adoption of these buffers.

Refreshments were served at each of the sessions.

In addition to the invited rural residents, both focus groups were attended by Linda Dahl, SE MN Water Resources Board Director, Sheila Craig, response recorder for both sessions, and Doug Malchow, who facilitated both sessions.

Protocol followed at the focus group sessions

Each attendee was provided with a copy of the agenda which included the list of questions that were to be addressed. Each question was read aloud by the facilitator and a short reflection time was provided.

After that reflection period each attendee was given ample individual time to provide their answers to the question. A simple go-around the table format was followed, with a different person being the first to answer subsequent questions. If the first person responsible for answering an individual question was not prepared to be the first to answer, the next person in line was provided that opportunity. Each attendee was offered the opportunity to pass on individual questions followed by the opportunity to answer later, if desired. After each attendee had the opportunity to answer an individual question, all attendees were given the opportunity to add to what had already been said. If a point of clarification was necessary, either the facilitator or response recorder would ask for that clarification during the attendees' responses. After all responses were noted and recorded in writing, Ms. Craig read a short summary of what had been said by the group with the opportunity for attendees to comment on whether the responses had been accurately recorded and portrayed.

Attendees were assured that their responses would remain anonymous. However, they were also made aware that the responses would be broken out by county of residence for reporting purposes. Attendees were also told that they would receive a copy of the final report. Each session was completed within the allotted time period.

Agenda followed at each of the sessions, including questions asked

1. Introductions: After introductions by the focus group facilitator, focus group response recorder, and project coordinator, each attendee was asked to introduce themselves and provide some background on their farming operation. To promote that, the respondents were asked to address the following two points for each distinct farming operation or rural parcel:
a. Tell us briefly about your farming operation(s) if you farm.
b. Share with us where your land is located and its relationship to a body of water (river, stream, lake, public drainage, other).

2. Overview of Shoreland Buffer ordinance and this project: Linda Dahl provided a short introduction, including an overview of the project purpose, definitions of terms we would be using, and current Minnesota shoreland setback rules for agricultural land.

The following questions were asked at each session.

3. Are there benefits to a shoreland buffer? If so, what are they?

4a. What do you see as barriers to landowners installing shoreland buffers?
4b. What do you see as barriers to landowners maintaining shoreland buffers?

5a. If you have installed buffers, what motivated you to establish them?
5b. If you don't have buffers, what would motivate you to install them?

6a. What would motivate landowners to install buffers?
6b. What would motivate landowners to maintain buffers?

The following four questions were introduced with the following: "If you were to design a program that would increased the amount of stream buffers in southeastern Minnesota, what would the program include for ….
7a. Education
7b. Technical Assistance
7c. Financial Assistance
7d. Enforcement

Focus Group 1 Results – March 25, 2010

All the respondents were assigned within the following demographic classifications:
F = currently practicing farmer
RF = retired farmer
RR = rural resident
The classification scheme is used throughout the document. There were two rural residents and three currently active farmers participating in this focus group. Following is a list and brief description of the attendees for Focus Group 1.

RR S, North Fork Zumbro River, rural non-farming resident. This participant is related by marriage to RR B. While the authors are not suggesting that their responses were always similar, there might be the perception that this relationship might weight the overall amount of responses in favor or against a given idea. Those responses were given for the same land, shoreland practices and farming operation.

RR B, North Fork Zumbro River, rural non-farming resident. This participant is related by marriage to RR S. While the authors are not suggesting that their responses were always similar, there might be the perception that this relationship might weight the overall amount of responses in favor or against a given idea. Those responses were given for the same land, shore land practices and farming operation.

F T, Previous dairy, now beef, vegetable crops, on Bitter Creek and also works off farm.

F G, Farms in Dakota and Mower counties, also works off-farm.

F D, Dairy farm on Pine Island creek.

At Focus Group 1 Question 3 was asked of all respondents and each offered all of their responses before the question was asked of the next respondent.

3. Do you feel there are benefits to shoreland buffers? If so, what are they?

RR B Buffers retard leaching of chemicals; they provide aesthetic qualities for family, canoeists, fisherman**;** they grow interesting species that require more water
F G Buffers are good for erosion control
F T Has buffer on both sides Bitter Creek yet banks continue to erode; buffer provides sediment control; absorb nitrogen coming from feedlots

Responses to the remaining questions are organized by like type response category: public versus private rights, ecological, financial, physical, education, and other. Additionally, the classification of respondent is included in the response category breakdown.

4a. "What do you see as the barriers to landowners <u>installing</u> shoreland buffers?"

<u>Public versus private rights barriers</u>
RR B Inconsistent enforcement of buffers
RR B All believe in buffers, but they don't all do it; assistance agencies works with landowners where landowners have buffers, but don't assist tenants who then farm the land
RR B –inconsistent practices by farmers

<u>Ecological barriers</u>
RR S Cattle (beef and dairy) and hogs are in the river so there is no shoreline on which to establish a buffer.
RR B Used to live by Northfield, drainage from dairy (a neighbor) was a problem and the government forced farmer out. Need buffers on fields where manure is spread, need buffer for feedlots too

<u>Financial barriers</u>
F T Tenant farmers want to farm every acre; they take out all grassed waterways, want to make every dime
F T Landowners can't get as many dollars if land has a buffer
F G Cost of seed
F G Labor to install buffer and control weeds needed
FG For leased land, rental contracts don't always require a buffer or no-till zone

<u>Physical barriers</u>
None

<u>Educational barriers</u>
F G There is a lack of information and help from agencies; staff at the Dodge County SWCD is good, easy to contact, had helpful info, and offered help to design

<u>Other</u>
F G The Department of Natural Resources (DNR) is difficult to work with

4b. "What do you see as the barriers to landowners <u>maintaining</u> shoreland buffers?"

<u>Public versus private rights barriers</u>
F T Lack of enforcement

<u>Ecological barriers</u>
F G Noxious weeds at first when getting established

<u>Financial barriers</u>
RR **S** Cost of maintaining, especially with current economy

<u>Physical barriers</u>
None

<u>Educational barriers</u>
F G Need improved communication with farmers; when he installed a buffer, another farmer didn't understand why he was putting in switchgrass
F G Need ongoing information, need assistance with developing a plan
F G Need to put it in the (cost share) contract that the buffer has to be maintained
RR B He thinks if the farmer put it in, it will be maintained, but if land changes hands it will not be maintained
F T People put them in and forget about them, he does custom mowing for people; need education on maintaining

<u>Other</u>
None

5a. "If you installed buffers, what motivated you to install them?"

Public versus private rights motivators
None

Ecological motivators
F T Buffers are part of a conservation plan
F T Grew up with conservation as a way to leave the farm better than he found it, if all good soil leaves farm, then wouldn't do him any good
F T To protect creek
F G He wanted to preserve his own soil
F G Vermillion River in Dakota Co. started project to restore a streambank, now a beautiful river, he has a small area like that with the idea to pond it
F D Wildlife habitat

Financial motivators
F T If all good soil leaves farm wouldn't do him any good
F G He wanted to preserve his own soil

Physical motivators
RR B Aesthetics motivated us to install a buffer

Educational motivators
F G SWCD had ideas to help establish buffers

Other
F D Even though this respondent is on Pine Island Creek, he doesn't have buffers because the land is so flat that water drains slowly to the creek, therefore, he is not sure that buffers are necessary in all situations; but probably might still put a buffer in.

5b. "If you don't have buffers, what would motivate you to install them?"

Public versus private rights motivators
F D Knowing it's a law would motivate the respondent, but no one came and told him

Ecological motivators
F G Aesthetics; from his perspective to leave the land better than found it; wildlife
RR S Change grasses to types that looks better

Financial motivators
F D Will get some production from hay; but would still need to maintain
F G Improving the overall farm for economics as buffers will increase value of farm

Physical motivators
None

Educational motivators
F D One size does not always fit all; not a good fit for his land because it's so flat
F D Going to put them in with Soil and Water Conservation District's (SWCD) help as SWCD makes buffers sound appealing

Other
None

6a. "What do you think would motivate other landowners to <u>install</u> buffers?"

<u>Public versus private rights motivators</u>
None

<u>Ecological motivators</u>
RR B Need to think for future; it would be helpful to have some kind of incentive

<u>Financial motivators</u>
RR B Need some kind of incentive
F G Cost sharing
F T Cost share

<u>Physical motivators</u>
RR B Every acre is not the same, therefore, flexibility in programs is needed

<u>Educational motivators</u>
RR B Education that it needs to be done
RR S Education, by example from your neighbor, better than a law
F D Education, more information needed, all conservation works together; needs all the rest of the farm taken care of too through a whole farm plan (ie. grass waterways are even more important)
F G Education
F T Should be whole farm plan and watershed approach**, e**ducation about tools available (such as no-till drill, seeding plans)**,** education about what they can use that land for (hay, crop)

<u>Other</u>
None

6b. "What do you think would motivate other landowners to <u>maintain</u> buffers?"

The group agreed that the answers to this question were covered above with the addition of:

<u>Educational motivators</u>
Group believes that that it is important to reinforce the need for maintenance and what the maintenance requirements are for buffers

For the questions comprising question 7, the answers were grouped using the following categories: Marketing Methods, Staff Efforts, Educational Topics, Things to Avoid

7a. "If you were to design a program that would increase the amount of stream buffers in southeastern Minnesota, what would that program include for education"?

Marketing Methods
F T Newsletter from Natural Resource Conservation Service (NRCS) and or Soil and Water Conservation District as they are easier to work with than Department of Natural Resources and Minnesota Pollution Control Agency (MPCA)
F G Sending letter to landowners to shape up

Staff Efforts
F G Dodge County is doing more, they have maps for entire county laid out

Educational Topics
RR S Some way to see whole picture, and to learn about progress on your stretch of the water
F G DVD video of projects that are done in the area (like implement dealers do)
RR B Legal requirements, sources of assistance, provide aerial map of the stream
F D Measure water quality to show benefits, show before and after erosion stopped

Things to Avoid
None

7b. "If you were to design a program that would increase the amount of stream buffers in southeastern Minnesota, what would that program include for technical assistance?"

Marketing Methods None

Staff Efforts
RR B Some method to measure gradient along stream is needed because the steeper the gradient the sooner the buffer issue should be addressed
RR B Prioritize buffer needs by erosion potential within a county
RR S The process needs to be simplified so landowner doesn't have to go to multiple agencies
F G Dodge County is good to work with as they have a whole package; seed, surveyor, etc
F T I had to go to many agencies to get permits, etc
F D Make up mind and get it done with one stop at SWCD; work with just one person with one set of rules, one office

Educational Topics None

Things to Avoid None

7c. "If you were to design a program that would increase the amount of stream buffers in southeastern Minnesota, what would that program include for financial assistance?"

F G No-till drills should be made available through SWCD and one half the seed cost should be cost shared just like in the Conservation Reserve Program (CRP)
F T Assistance to provide waterways on farm, not just buffers; should get money back for drill and seed
F D Don't charge for permits

7d. "If you were to design a program that would increase the amount of stream buffers in southeastern Minnesota, what would that program include for enforcement?"

RR B Don't want enforcement agency staff to act like vigilantes
F T Do enforcement in steps beginning with education and then fines as a last step; start friendly
F D Goodhue County staff comes out to visit and talk; they are innovative to fit situation, as different situations exist for each landowner
Staff shouldn't be pig-headed because that makes the farmer pig-headed;
Fines. Fines levied only if really bad, longtime situation and fines are used as the last resort.

Group In summary the group agreed that a whole farm plan is the best solution and that the plan needs to be followed by a renter as well as the landowner

Focus Group 2 – March 26, 2010

All the respondents were assigned within the following classifications:
F = currently practicing farmer
RF = retired farmer
RR = rural resident

The classification scheme is used throughout the document. Participating in this focus group were three currently active farmers, one rural resident, and three retired farmers. Following is a list of the attendees for Focus Group 2.

F R – Dairy farmer near Altura, dairy and beef, has property on two creeks that are trout habitat.

RR J– Not farmers, gravel pit with 2 lakes, eventually want to convert lakes to recreation. They also have farm property with a stream, that land is rented out.

F B – Farms; beef cows; soybean, corn, hay rotation, Middle Branch of Whitewater River.

F E – Farms cropland in the Fremont area, beef cows; bean, corn, hay rotation, Pine Creek; some land in trees; rotational grazing. Saratoga Township on a trout stream; has beef on rotational grazing.

RF B– Retired, son & grandson farm a dairy, cropland on the South Branch of the Whitewater River.

RF D – Farmed in the St. Charles area, retired, now rent their cropland acres for corn, beans, hay; they have beef cows, keep hay ground; headwaters of Whitewater River. This participant is related by marriage to RF S. While the authors are not suggesting that their responses were always similar, there might be a perception that this relationship might weight the overall amount of responses in favor or against a given idea. Those responses were given for the same land, shore land practices and farming operation.

RF S – This participant has the same characteristics as the RF D respondent as these two participants were related by marriage. While the authors are not suggesting that their responses were always similar, there might be the perception that this relationship might weight the overall amount of responses in favor or against a given idea. Those responses were given for the same land, shore land practices and farming operation.

At Focus Group 2, Question 3 was asked of all respondents and responses were offered in an around the table fashion, with each individual able to offer one response until all responses were exhausted.

3. Do you feel there are benefits to shoreland buffers? If so, what are they?

RF D Wildflowers and the personal view
RF B Eliminate short rows next to stream for the economic advantage
F E Enhance wildlife habitat
F B Reduces soil erosion
RR J Shading for fish when trees are part of the buffer
F R Debris control, filtration by re-establishing wetland
F R Slowing down of flood waters
RF S Filter out chemicals

Responses to the remaining questions are organized by like type response category: public versus private rights, ecological, financial, physical, and other. Additionally, the classification of respondent is included in the response category breakdown.

4a. "What do you see as the barriers to landowners <u>installing</u> shoreland buffers?"

<u>Public versus private rights barriers</u>
RF D Anti-government mentality, nobody wants ASCS or SWCD on their land telling them what to do
F E People don't like to be told what to do
RF S Don't want time limits on practices
FE Big farmers spreading manure on frozen ground need a buffer around the field; why should I do a buffer if the big farmer doesn't have to have a buffer?

<u>Ecological barriers</u>
RR J People have an attitude that they don't care about the environment until it affects them
F R Ecologically some soils are difficult to establish buffer vegetation, some soil needs hand planting to establish and re-establish native grasses

<u>Financial barriers</u>
FE Often payments of whatever program they are in do not keep up with possible rent
F B There is not enough cost share to cover costs; it is just seed cost that get paid. There are other costs to installing a buffer such as moving a fence to get ready to put in buffer, etc.
F R If you have bad practices you get rewarded with CRP or being able to get cost share, but if you are already doing good conservation, then no reward
RF D Set aside payments haven't kept up with rental rates $106 vs. $200; the cost of reimbursement

<u>Physical barriers</u>
RF B Boxelder trees are not a good buffer because they are so thick; the landowner needs to get rid of the trees first in order to see what they have as options for a buffer
RF B Department of Natural Resources regulations require that if you push a tree down the landowner needs to have a place to put the tree to let it dry before burning it

<u>Other</u>
None

4b. "What do you see as the barriers to landowners <u>maintaining</u> shoreland buffers?"

<u>Public versus private rights barriers</u>
None

<u>Ecological barriers</u>
FR Chemical control is a barrier, for example the chemical that will control buckthorn can't be used by water; the chemicals that you can use by water will not kill the weeds that need to be killed

<u>Financial barriers</u>
F E The landowner needs help to maintain them
FB Cost sharing to remove trees, etc.
FR Landowners fear prescribed burning. It costs $4,000-5,000 to get someone to burn because of liability; there needs to be a group doing it who provides the labor and liability insurance
RF S Cost to maintain and the knowledge to do it; the tree issue
RF B If the landowner is in CRP they should get payment every year only if the buffer is maintained, if the buffer is not maintained then no payment

<u>Physical barriers</u>
RF B Buffer strips require ongoing maintenance to keep out boxelders

<u>Education barriers</u>
FB Farmers need more technical support, information on what they can and can't do; farmers need more knowledge and where to get information
RF S Landowners need to know what to do; we didn't even know that we could burn
RF D Landowners need more knowledge of how to maintain; just the awareness of the need to do it is costly

<u>Other</u>
None

5a. "If you installed buffers, what motivated you to install them?"

Public versus private rights motivators
F B Stay ahead of farm regulations, like feedlot improvements – want to do it before being forced

Ecological motivators
RF S It is environmentally the right thing to do even on their good land
RF D Wildlife and flowers can be seen by everyone; the buffers were installed because the landowner could see the need to do something was coming
F E Wanted to do something to preserve the quality of the water, to do our part to keep water clean for everybody
F R Buffers improve the aesthetics such as wildlife and wildflowers

Financial motivators
F B Received cost share initiative
F R Reinvest in Minnesota (RIM) payments were available; the payment was $2600/acre for the one time perpetual easement; it paid enough to do it

Physical motivators
RF B The use of buffers make it easier to farm by eliminating short rows

Other
None

5b. "If you don't have buffers, what would motivate you to install them?"

Public versus private rights motivators
F B The Conservation Reserve Program (CRP) rules need to be changed to allow more acres for inclusion; wanted to put more into CRP to eliminate short rows

Ecological motivators
RR J Buffer to keep lakes clean, so not polluted or developed
RR J Improve fish habitat

Financial motivators
RF B More cost sharing

Physical motivators
None

Other
None

6a. "What do you think would motivate other landowners to <u>install</u> buffers?"

<u>Public versus private rights motivators</u>
None

<u>Ecological motivators</u>
RR J Personal interest in environment and wildlife
F R The flood in 2007 was a tragedy, but it opened up opportunity for landowners to install buffers through additional government assistance programs
F B More flexibility such as 40' to 70' to straighten rows or to follow a contour

<u>Financial motivators</u>
RR J Money
F B Cost share
F B The right rental rate
F R Economic benefit; it needs to be the right amount of money, especially for a program like RIM, where the land will be in it forever
F B Cost sharing

<u>Physical motivators</u>
None

<u>Education motivators</u>
RF S Education; small tract owners knowing about buffer zone requirements
RF D Someone from SWCD going along rivers like they do for the feedlot program
F B Olmsted County sent letters because of a complaint; they have mapped it all and fines are being levied
F B Education

<u>Other</u>
None

6b. "What do you think would motivate other landowners to <u>maintain</u> buffers?"

Public versus private rights motivators
None

Ecological motivators
None

Financial motivators
F R Enforcement could be used via a letter like for CRP; if not maintained the cost share dollars could be pulled

Physical motivators
None

Education motivators
RF S Buffer strip maintenance differs, therefore more information is needed
RF B More awareness that burning can and should be used. Also, how to get help
RF B More technical help
F E Assistance in just trying to understand the DNR rules; need to work closer with them, it causes confusion not knowing if there are other rules
F B Need technical assistance and to know how/where to get information

Other
None

For the questions comprising question 7, the answers were grouped using the following categories: Marketing Methods, Staff Efforts, Educational Topics, Things to Avoid.

7a. "If you were to design a program that would increase the amount of stream buffers in southeastern Minnesota, what would your program include for education?"

Marketing Methods

RF S Need to reach out and not just in the newspaper; then people just say it doesn't apply to them.
RF S Brochure sent by direct mailing, personal invitation to a meeting
RF B Education, door to door on RIM and CRP and other programs; educate on the options and value of doing buffers.
RF S Use new technology such as Facebook
RR J Having someone go door to door, meetings, flyers, phone time for questions, TV, Internet
F R Direct mailing like Olmsted County, which is a proactive county; include going door to door, cell phone; being available for absentee landowners after hours
F E Tours of examples of successes
F E Help neighbors by cutting thistles, noxious weeds, and use flash grazing

Staff Efforts

RF S If you've got property along streams then you need to be contacted
RF S Make effort to connect with small tract farmers
RF B Used the local SWCD person
RR J Need to trust person that comes out
F B Explain during Farm Service Agency appointment about buffers

Educational Topics

RF D Information that beef cattle can be grazed; education on allowable uses
RF B Education, door to door on RIM and CRP and other programs; what are the options for and values of doing buffers?
RR J Include basic information about buffers: what they are, what they do and the pros/cons.
RR J Get local people that aren't government to promote them such as retired or part-time farmers, especially if they have buffers on their own land
F R Information on basics such as the importance of buffers, then provide more technical help
F E Educate the youth in high school regarding the importance of buffers as they are the next generation
F B Understanding of the of current state laws; the basics of the law needs to be explained

Things to Avoid

RF D Don't use term Clean Water Act: that turns farmers off
F R Enforcement

7b. "If you were to design a program that would increase the amount of stream buffers in southeastern Minnesota, what would your program include for technical assistance?"

Marketing Methods
RF D Brochure from SWCD on what you can choose, when grazing can be done, etc
F B Field visits, scheduled every couple years, about what to do for maintenance, such as should they burn, spray, cut trees etc.

Staff Efforts
RF S Staff needs to reach out to absentee landowners who rent to big corporations. It is the renter who comes to FSA, not the owner. Contact the owner directly and help them understand the options without being overly technical
RF D Personal approach by having SWCD come out and 'step-it-off', so farmer could see what it would look like
RF B Use more micro management via assistance from SWCD to explain the pros & cons of different options. Do this when the landowner signs up or go door to door
RR J Have a local crew that could come out to burn, cut, etc.; use volunteers or maybe even a 'for-hire' crew for those who couldn't do it themselves
F R Need clearing house of mapping software that would show where CRP could be used; another layer of mapping with RIM; go through all the options and let the farmer see what it would look like using mapping software and then match this up with dollars and benefits
F B Set up appointment for SWCD personal contact

Education Topics
F E Fishermen say don't take grazing animals off the creeks because that helps to keep the weeds down; DNR regulations concerning animals is confusing; SWCD could be helpful with understanding rules
F E DNR may have information about burning options

Things to Avoid
None

7c. "If you were to design a program that would increase the amount of stream buffers in southeastern Minnesota, what would that program include for financial assistance?"

F B Buffer payments need to equal rental payments
F B Buffer payments are difficult to deal with when a farmer has a rental contract
F B Why should a landowner need to have financial assistance to comply with a law?
F B If buffer put in and maintained incentives should be given on taxes

7d. "If you were to design a program that would increase the amount of stream buffers in southeastern Minnesota, what would that program include for enforcement?"

RF D Start with a call from SWCD to look at existing conditions followed by a soft visit from SWCD to look at their shoreland
RF S Soft, diplomatic, call first
F B Soft approach, because people don't like government
F B If enrolled in a program, remove part of the payment if the landowner doesn't maintain the buffer, prorate the payment on number of years in program
F B If someone is not maintaining a buffer, withhold a portion of the payment(s) they receive from various programs, but this process needs to be explained first
F R Winona County sends a noxious weed letter; this is a good model to follow which uses a step program with the goal of getting the buffer up to par

Reoccurring Themes from Focus Group Respondents

In general it was felt that buffers are one component of a conservation plan for a farm; a whole watershed and whole farm approach would encourage landowners or renters to install and maintain buffers. Participants felt that buffers should be part of a total conservation plan used to protect their land and soil as well as water quality and wildlife and fish habitat.

The cost of installing and maintaining buffers was a reoccurring theme. Respondents cited the costs of seed, labor, and preparing the area as issues for installation. Participants felt that incentive payments or cost share money should be similar to rental rates in order to fairly compensate for lost production and income on the land allocated to buffers. Financial disincentives should be applied if landowner doesn't maintain buffers.

Issues mentioned as concerns for maintenance were weed control, burning, and other on-going maintenance. Burning can be difficult because many landowners don't have the experience needed to burn their buffers, and the cost to hire it out is too high due to liability. It can also be difficult to find chemicals to control weeds in the buffer area because of proximity to the water.

A repeated technical assistance theme advocated for was to streamline the process for landowners who want to install buffers, so the farmer can get all the information they need from one agency during one contact. A whole farm, whole plan effort working one-on-one with SWCD staff is requested. Technical assistance (planning, burning, no-till drill rental, etc.) coordinated by an agency team was seen as desirable. Flexibility in how buffers are designed should be considered to help farmers improve their farming operation.

Educational needs identified included more information from agencies, assistance in developing a whole farm plan, and information about the laws and available technical support.

A variety of information dissemination methods could be utilized. Agencies should consider new methods of communication such as Facebook, TV, Internet and cell phones. However, traditional methods like letters, brochures, and meetings still need to be utilized. Additionally, hands-on approaches such as individual phone calls and farm visits were suggested, especially if they come from someone who understand farming, such as a retired farmer. Learning from neighbors with established buffers via farms tours or DVD's was seen as a potential method.

Farmers are an independent group and don't like being told what to do, especially by governmental agencies. Enforcement needs to be consistent. They like their neighbors to follow the same practices that they do. Avoid the use of terms such as "Clean Water Act" and a heavy handed, bureaucratic approach.

Enforcement should occur in a soft, step approach beginning with a letter and ending in fines if necessary. Individual situations should be considered.

Buffers were thought to be aesthetically pleasing and ecologically beneficial.

Southeast Minnesota Shoreland Buffer Survey

Southeast Minnesota Water Resources Board

November 3, 2009

The shoreland buffer survey is one component of a Legislative and Citizens Commission on Minnesota Resources (LCCMR) grant received by the Whitewater Watershed Project in 2008. Through this grant the SE MN Water Resources Board (SEMWRB) was engaged to develop and administer a survey of a representative sample of riparian landowners in three Southeast Minnesota counties. This survey is part of a larger effort through the LCCMR grant to conduct a shoreland buffer survey, convene focus groups of riparian landowners, and map shoreland buffers in SE Minnesota. The purpose of the survey is to determine the means of eliminating the barriers to, and increasing adoption of, riparian buffers.

A steering committee of county and agency staff was convened to select three Southeast Minnesota counties that represent the diversity of agricultural land in SE Minnesota. The steering committee took into account agricultural practices, land use, topography, and county interest in the selection process, leading to the selection of Olmsted, Goodhue and Winona Counties.

The steering committee guided the development of the survey with the goal of identifying barriers and motivators for converting riparian areas from cropland to perennial vegetation. The survey was then piloted with two landowners to assess the ease of use. The survey finalized for use in all three counties were identical with the exception of one additional question asked in Goodhue County to gather information about landowner understanding of buffer requirements along ditches (question 4 of the Goodhue survey). In the other two counties participating in the survey the drainage ditch question was not applicable.

Each county used GIS to select parcels that intersect shoreland, and provided the SEMWRB with excel spreadsheets of those rural parcels that abut public waters. The process for narrowing the parcels down to 200 per county was different for each county, but involved a combination of removing duplicates and out of state landowners (retaining adjacent WI landowners), and removing small parcels. Of the remaining parcels, the final 200 parcels within each county for inclusion in the survey were randomly selected.

The survey was anonymous, with no landowner name or address tied to it. The surveys and cover letters (attached) were mailed to the selected recipients along with postage-paid return envelopes between June 29th and July 5th, 2009. The counties opted to have the survey cover letters printed on SEMWRB letterhead. Of the 600 surveys mailed out, 275 were received back by the end of August. A few have continued to trickle in, with a total of 282 returned to date.

Survey Results

Of the 282 surveys returned, 109 were from Olmsted County, 85 from Winona County and 88 from Goodhue County, and 80% of the surveys returned were from individuals over the age of 50.

Results show that 70% of respondents are aware that the stream on their property is classified as public waters, but only 43% know that their county requires that agricultural lands have a 50 ft. buffer of perennial vegetation next to rivers and streams. In Goodhue County only 28% of respondents were aware that their county requires a 16 1/2 foot buffer of perennial vegetation next to ditches, although this question was worded poorly and did not specify public ditches. A majority of respondents (56%) are aware that under state and county shore land law they can hay, pasture, or manage their shore land buffer as they see fit, as long as it is maintained in permanent vegetation.

In terms of water quality, 76% of respondents think the water quality in the stream on their property is good or excellent. The most common recreational activities respondents said they engage in include wildlife observation, fishing and swimming/wading. The most common agricultural activities respondents indicated they use their stream for are pasturing and watering livestock.

The benefits of shoreland buffers that are most important to the respondents and their families are wildlife habitat (19%) erosion control by stabilizing stream bank (19%) and erosion control by filtering sediment (19%), followed by pesticide and fertilizer filtering (13%) and pasturing (10%).

The survey results indicate the three greatest barriers for land owners to voluntarily plant and maintain a 50' buffer along streams are maintenance cost and time (22%), lack of information regarding shoreland buffer requirements (22%), and reduced row crop production (19%).

If a landowner does not maintain 50' of permanent vegetation along the stream, 40% of respondents think education should be provided, 32% think financial assistance should be provided, and 17% think the landowner should be required to install a buffer. Respondents indicate that landowners would be encouraged to install buffers by reduced property taxes (22%), technical assistance to meet buffer requirements (19%), payment for buffer installation (17%), and informing landowners about buffer requirements (16%).

The survey indicates there is still work to be done to increase landowner awareness of buffer requirements and to provide education about the benefits of buffers. In addition to public education and awareness, the barriers of maintenance time and cost and reduced row crop production could be alleviated by providing technical and financial assistance for both buffer establishment and maintenance. Seventeen percent of respondents felt that enforcement is a tool to be used where education and assistance are not successful.

Shoreland Mapping in Southeast Minnesota

Whitewater Watershed Project with Cannon River Watershed Partnership

Ross Hoffmann
Cannon River Watershed Partnership

Project Overview

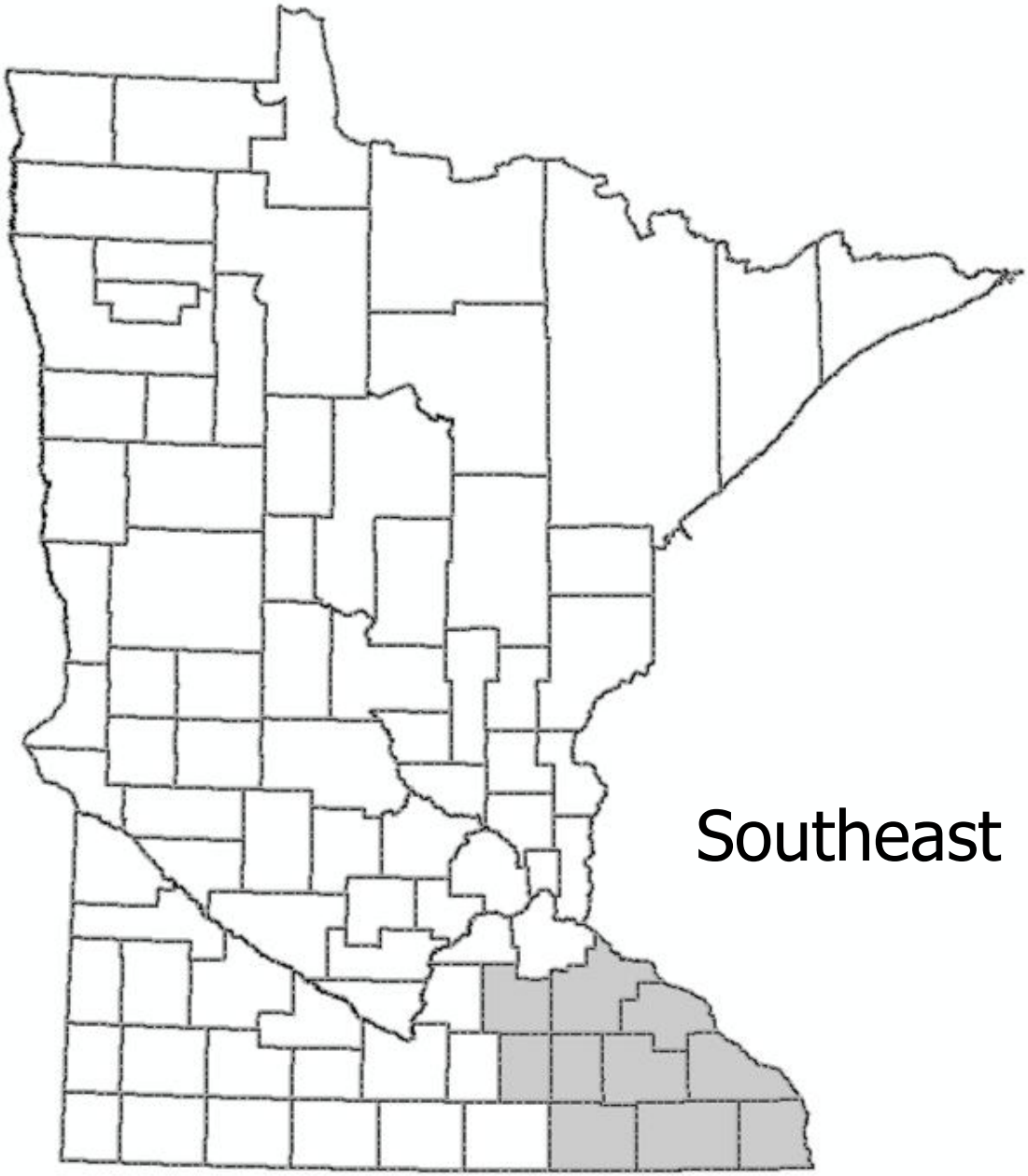
- Applied for by Whitewater River Watershed Project
- Funded by Minnesota Environment and Natural Resources Trust Fund
- Contracted with Cannon River Watershed Partnership for GIS mapping.

GIS Mapping

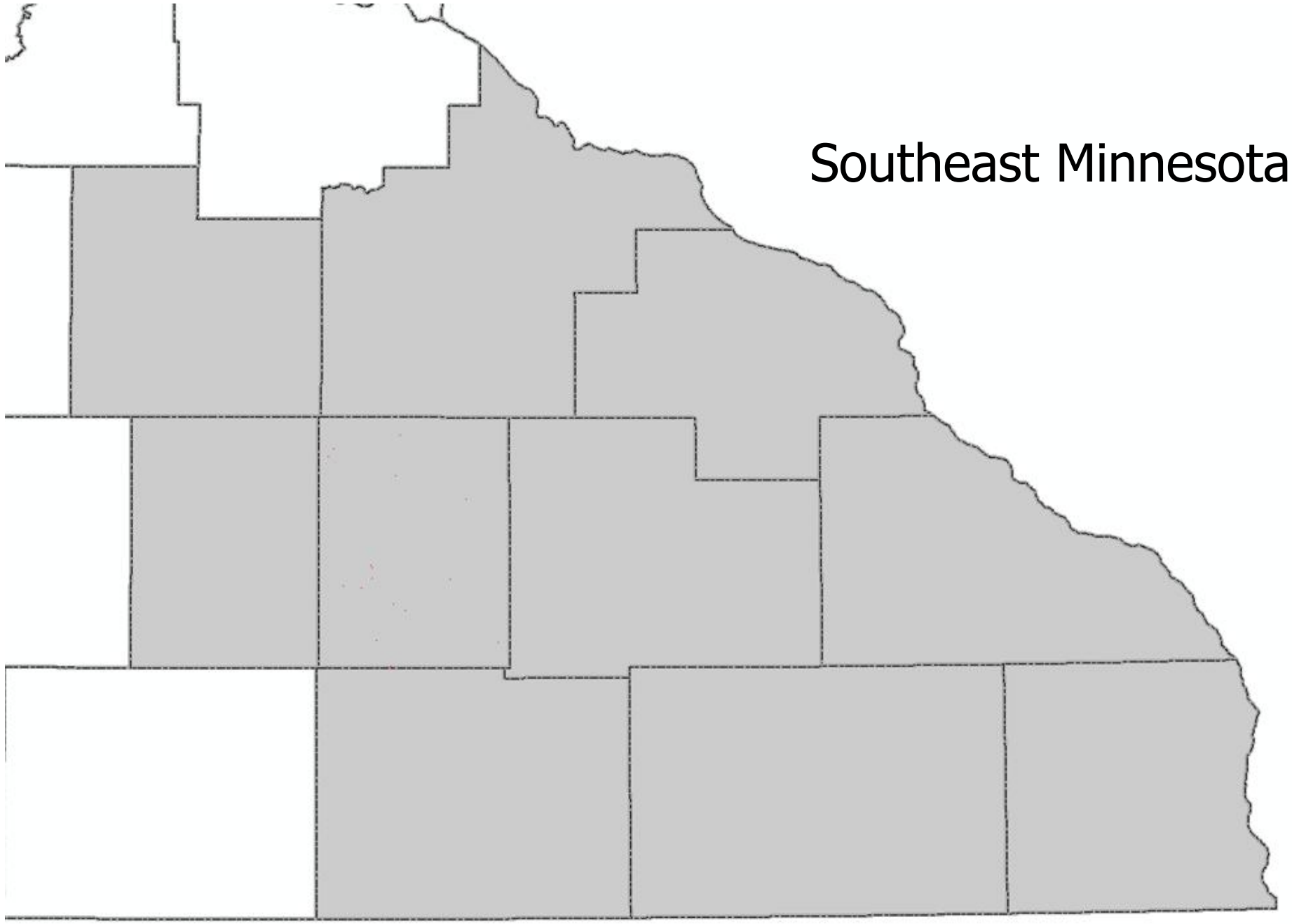
- Obtain a better picture of landuse in SE Minnesota's stream and river shoreland areas.
- Use Geographic Information Systems (GIS).
- Using aerial photography and other spatial data, digitally outline landuses within shoreland areas.

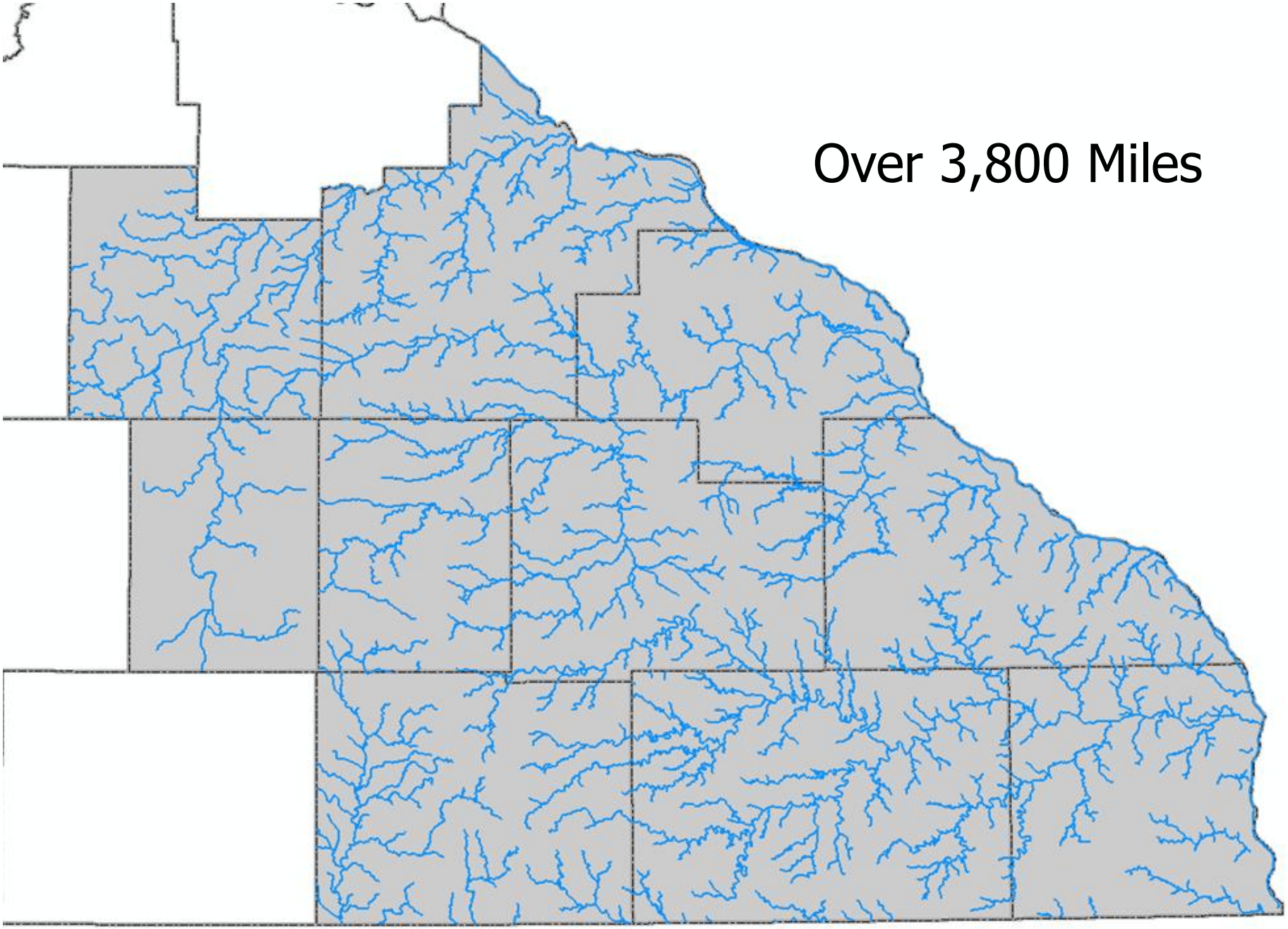
Mapping Example

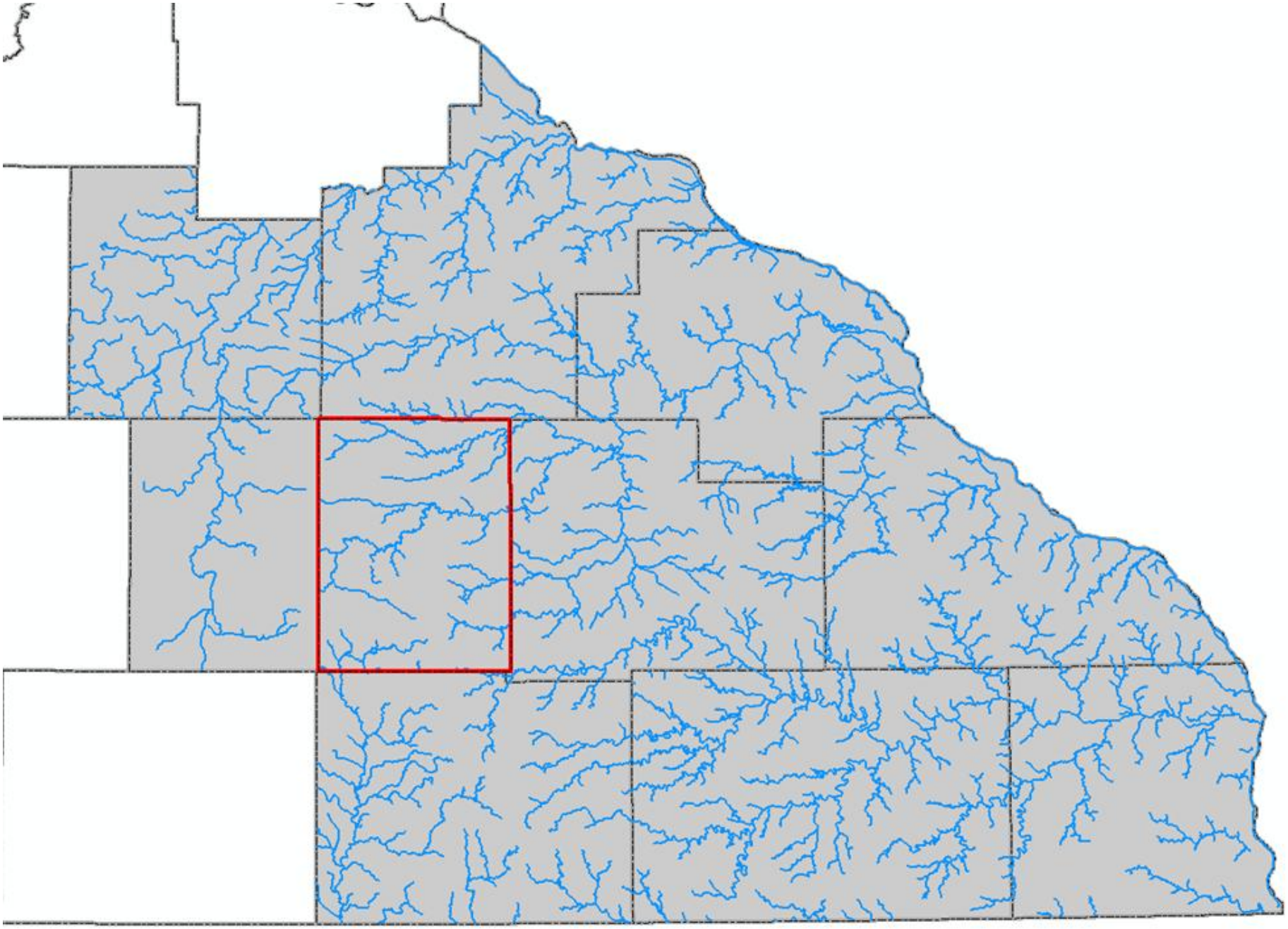
State of Minnesota

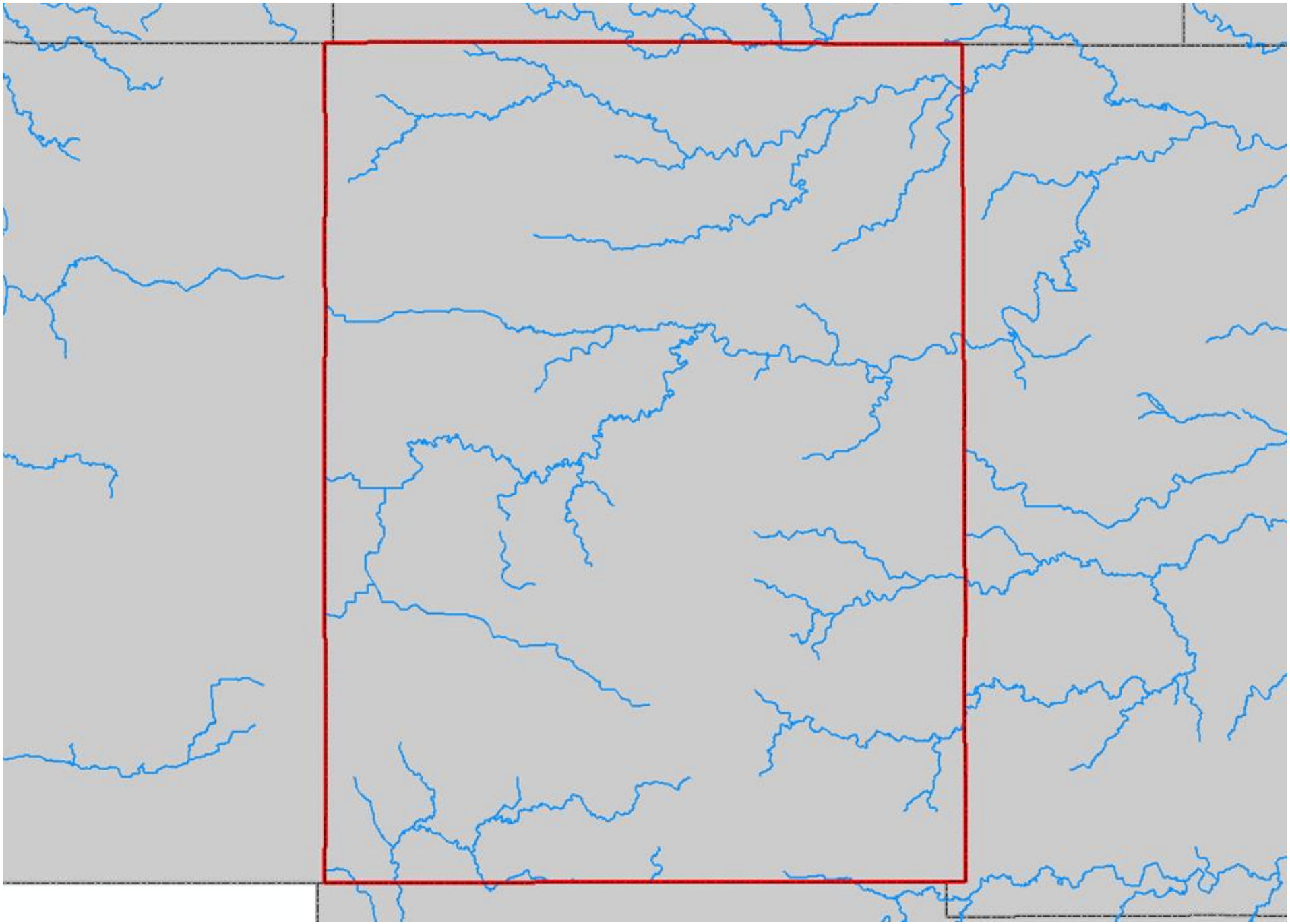


Southeast Minnesota


Southeast Minnesota

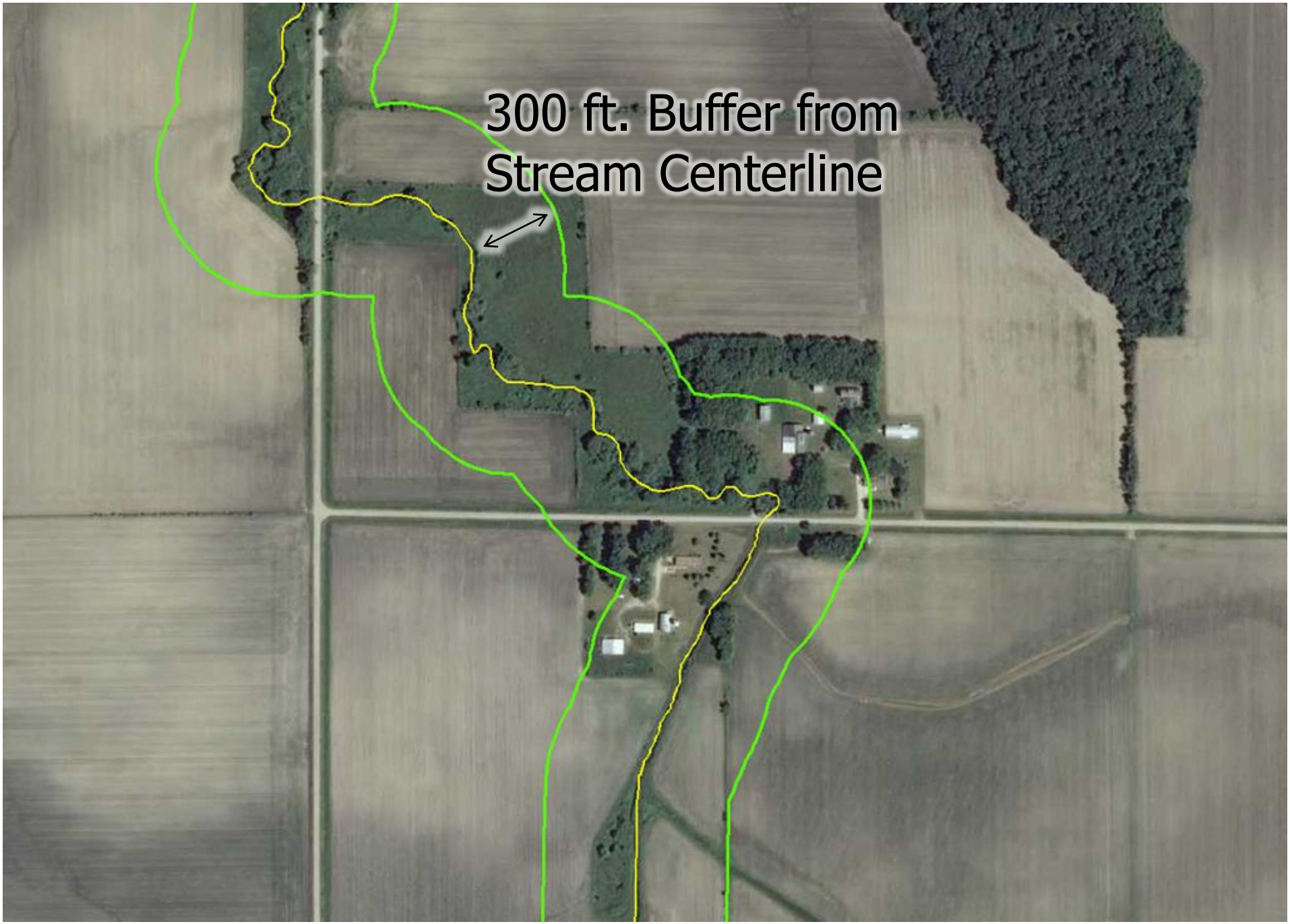

Over 3,800 Miles






Existing Data


Retrace Streams


300 ft. Buffer from
Stream Centerline


32100
24000
61200
61200
13230
24000
24000
42000
24000
62100
32100
61200
24000
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62100
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24000
61200
32100
21000
23200
24000
13220
32100
61200
24000
24000
61200
62100
24000

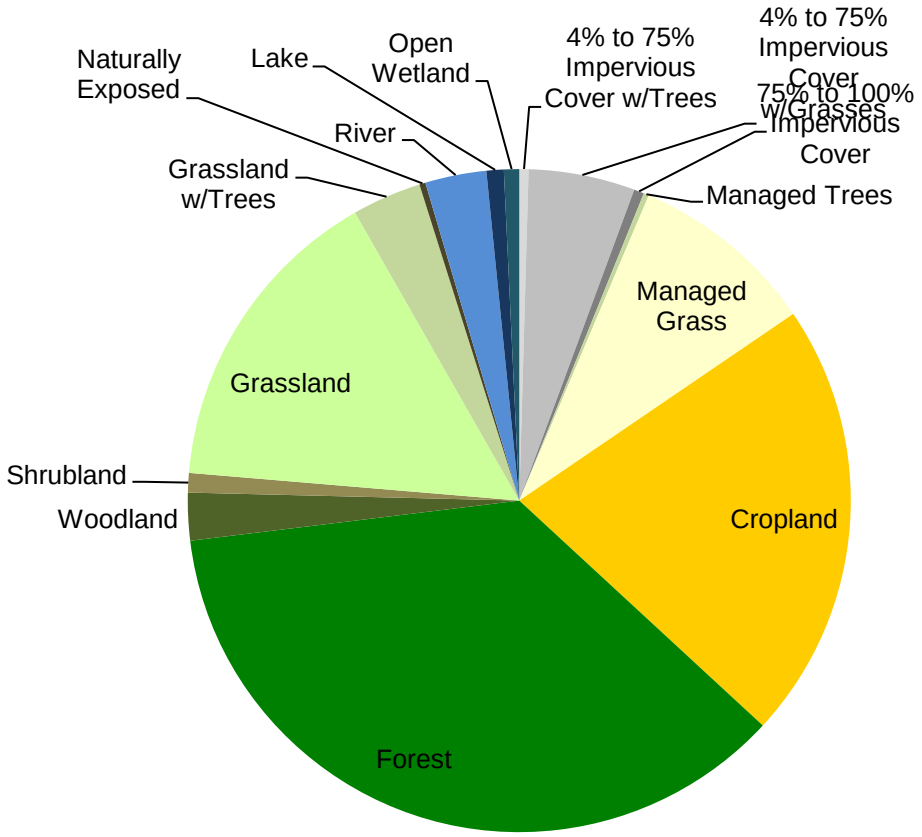

Landuse within
50 ft. Buffer from
Stream Centerline

Mission Accomplished

- At the end of May 2010, mapping concluded.
- All totaled, 60,000 individual polygons traced, representing 40 unique landuses.

Region-wide Results (300ft)

- 36% Forest
- 21% Cropland
- 15% Grassland
- 9% Managed Grassland
- 5% Impervious Cover w/Grasses

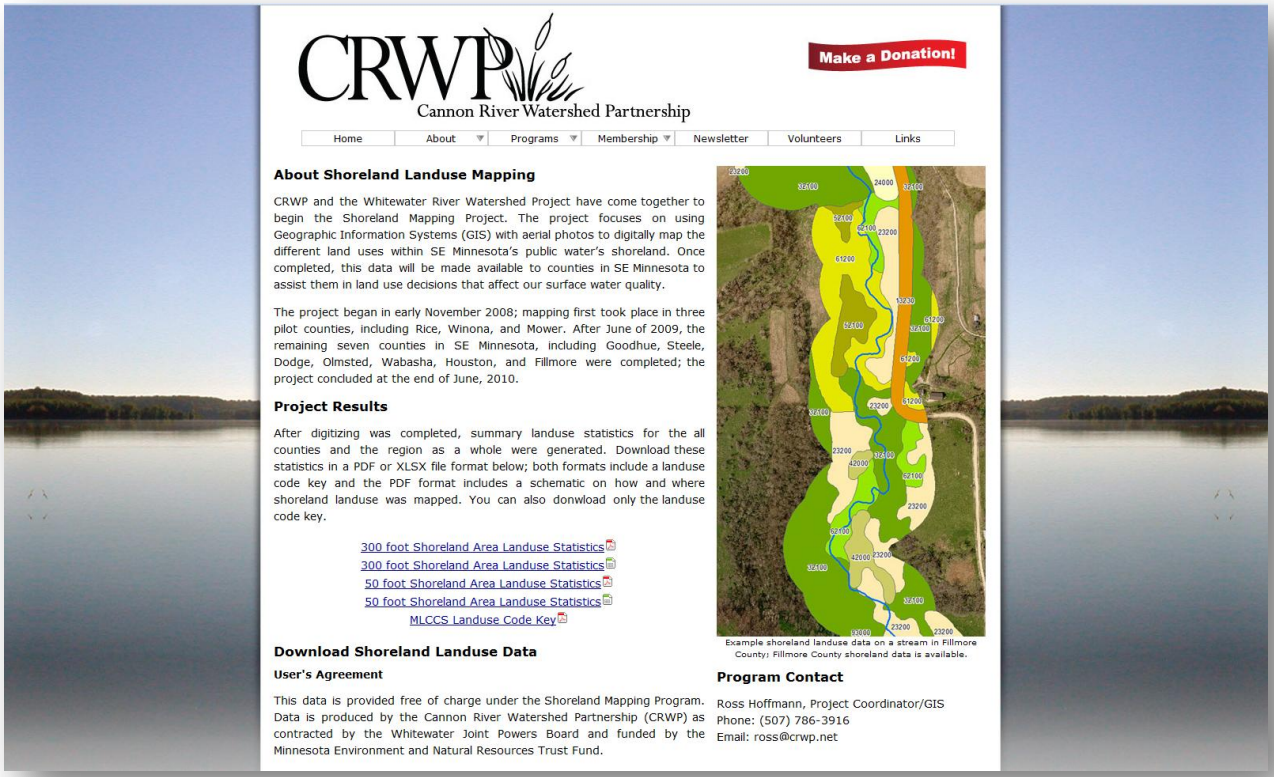


Data Available for Download

- Data is public, available to anyone; requires GIS.
- Data is not 100% accurate; not field verified.
- Landuse codes, high degree of accuracy at level one or two.
- Read user's agreement before downloading.

http://www.crwp.net/Programs/Conservation/ShorelandMapping/ShorelandMapping.html

Data Available for Download



CRWP
Cannon River Watershed Partnership

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About Shoreland Landuse Mapping

CRWP and the Whitewater River Watershed Project have come together to begin the Shoreland Mapping Project. The project focuses on using Geographic Information Systems (GIS) with aerial photos to digitally map the different land uses within SE Minnesota's public water's shoreland. Once completed, this data will be made available to counties in SE Minnesota to assist them in land use decisions that affect our surface water quality.

The project began in early November 2008; mapping first took place in three pilot counties, including Rice, Winona, and Mower. After June of 2009, the remaining seven counties in SE Minnesota, including Goodhue, Steele, Dodge, Olmsted, Wabasha, Houston, and Fillmore were completed; the project concluded at the end of June, 2010.

Project Results

After digitizing was completed, summary landuse statistics for the all counties and the region as a whole were generated. Download these statistics in a PDF or XLSX file format below; both formats include a landuse code key and the PDF format includes a schematic on how and where shoreland landuse was mapped. You can also donwload only the landuse code key.

300 foot Shoreland Area Landuse Statistics
300 foot Shoreland Area Landuse Statistics
50 foot Shoreland Area Landuse Statistics
50 foot Shoreland Area Landuse Statistics
MLCCS Landuse Code Key

Download Shoreland Landuse Data

User's Agreement

This data is provided free of charge under the Shoreland Mapping Program. Data is produced by the Cannon River Watershed Partnership (CRWP) as contracted by the Whitewater Joint Powers Board and funded by the Minnesota Environment and Natural Resources Trust Fund.

Example shoreland landuse data on a stream in Fillmore County; Fillmore County shoreland data is available.

Program Contact

Ross Hoffmann, Project Coordinator/GIS
Phone: (507) 786-3916
Email: ross@crwp.net

http://www.crwp.net/Programs/Conservation/ShorelandMapping/ShorelandMapping.html

Questions?

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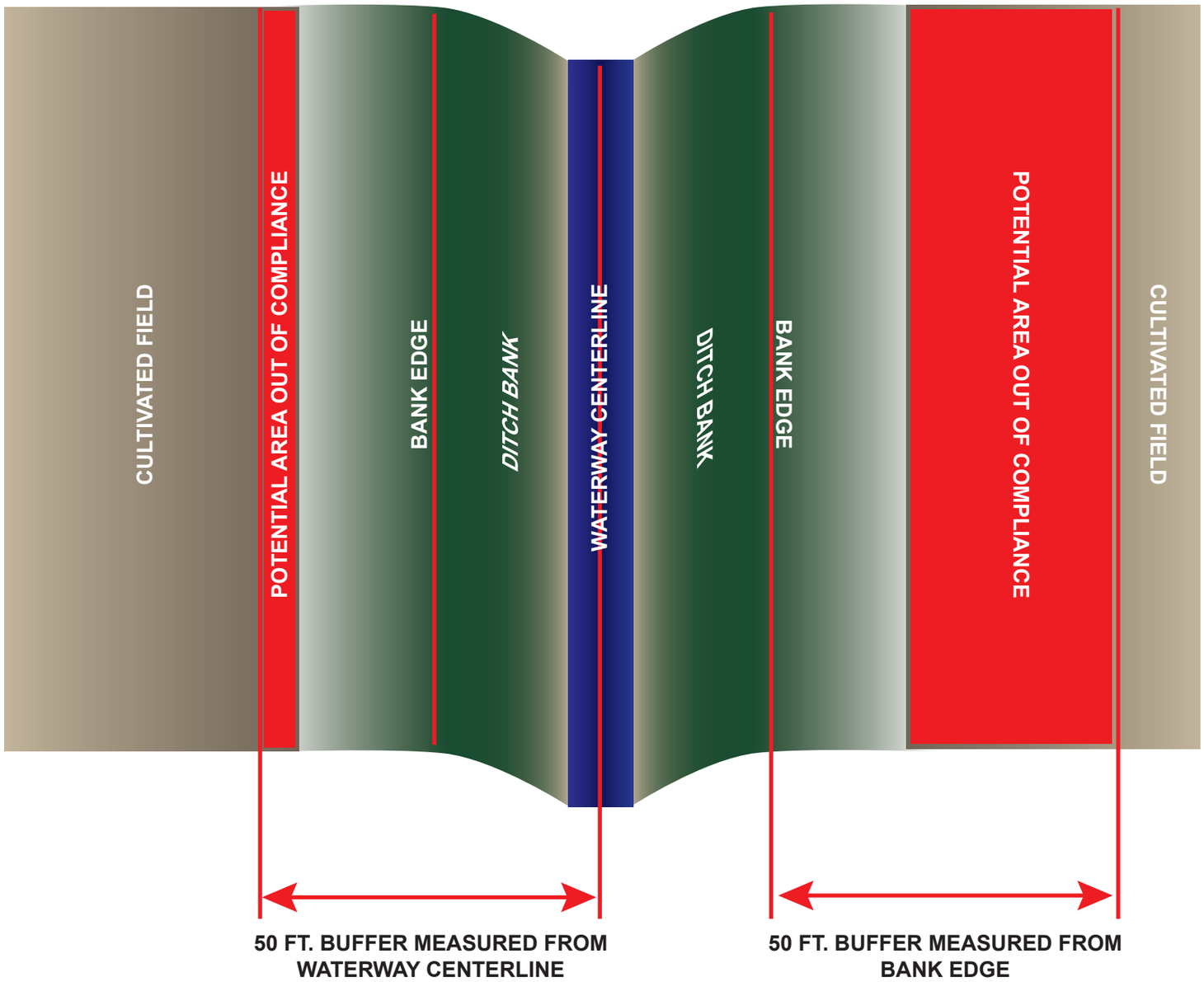
Northfield, MN 55057
Phone: (507) 786-3916
Email: *ross@crwp.net*



ATTENTION

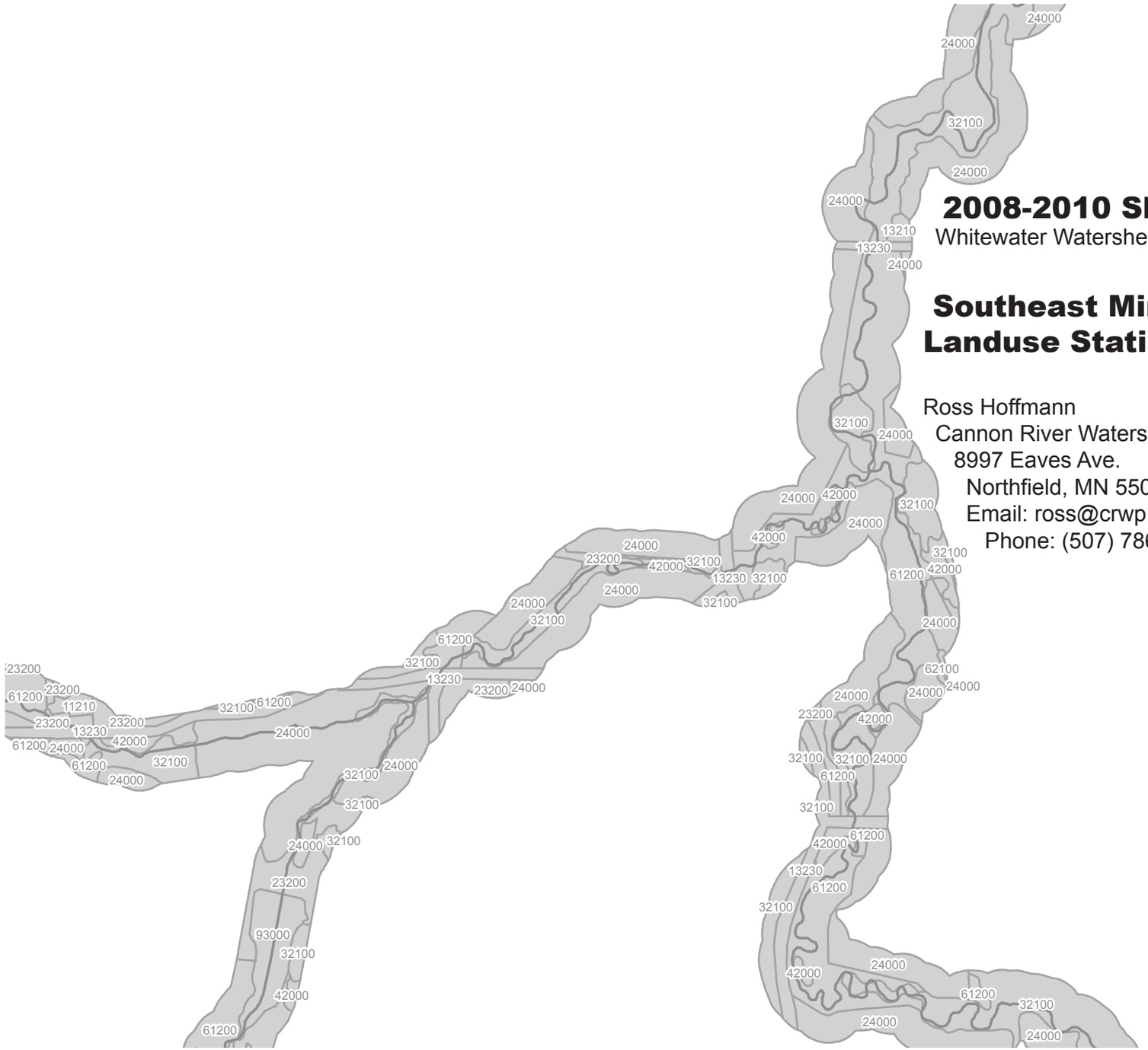
If using this information to identify possible areas out of compliance with local and/or state buffer rules, be aware that:

The 50 foot buffer statistics are computed from the stream centerline. These statistics do not take into account that on some streams, drainage ditches in particular, a buffer may be measured from the bank edge, not from the stream centerline. When measuring the buffer from the bank edge, this will yield a larger area that may be potentially out of compliance with local and/or state buffer rules (see figure).

These statistics for the 50 foot buffer area provide a broad regional overview and do not take into consideration local factors such as the above. Using GIS, these local factors can be adjusted for by using the 300 foot shoreland landuse data, digitizing the boundary where the buffer should be measured from, buffering the desired distance from that boundary, and clipping the 300 foot shoreland landuse data using this new buffer area. This will yield more accurate statistics in specific areas such as, for example, drainage ditches.

This data is provided free of charge under the Shoreland Mapping Program. Data is produced by the Cannon River Watershed Partnership (CRWP) as contracted by the Whitewater Joint Powers Board and funded by the Minnesota Environment and Natural Resources Trust Fund.

Data was digitized from 2008 FSA NAIP one-meter aerial photography and coded using a subset of the Minnesota Land Cover Classification System. While every effort was made to ensure the data correctly reflects land use, CRWP cannot guarantee 100% accuracy. Data is meant to reflect regional, very basic land use information (eg. forest, grassland, cropland, etc.) within 300 feet of DNR-protected river and stream centerlines for a given county. Data has not been verified in the field. Cannon River Watershed Partnership assumes no responsibility for how data is used or its end products.



2008-2010 Shoreland Mapping Project

Whitewater Watershed Project/Cannon River Watershed Partnership

Southeast Minnesota Public Water Shoreland Landuse Statistics - 50ft. Shoreland Area

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Cannon River Watershed Partnership
8997 Eaves Ave.
Northfield, MN 55057
Email: ross@crwp.net
Phone: (507) 786-3916

Whitewater River Watershed Project

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

CRWP GIS
Cannon River Watershed Partnership

Project Detail:

Counties mapped include Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, and Winona.

Only public waterways as identified in the MN Department of Natural Resources' "24k Streams" GIS shapefile were mapped.

Landuse was primarily interpreted, mapped, and coded at a scale of 1:5,000 from 2008 FSA NAIP 1-meter resolution aerial photography for all counties.

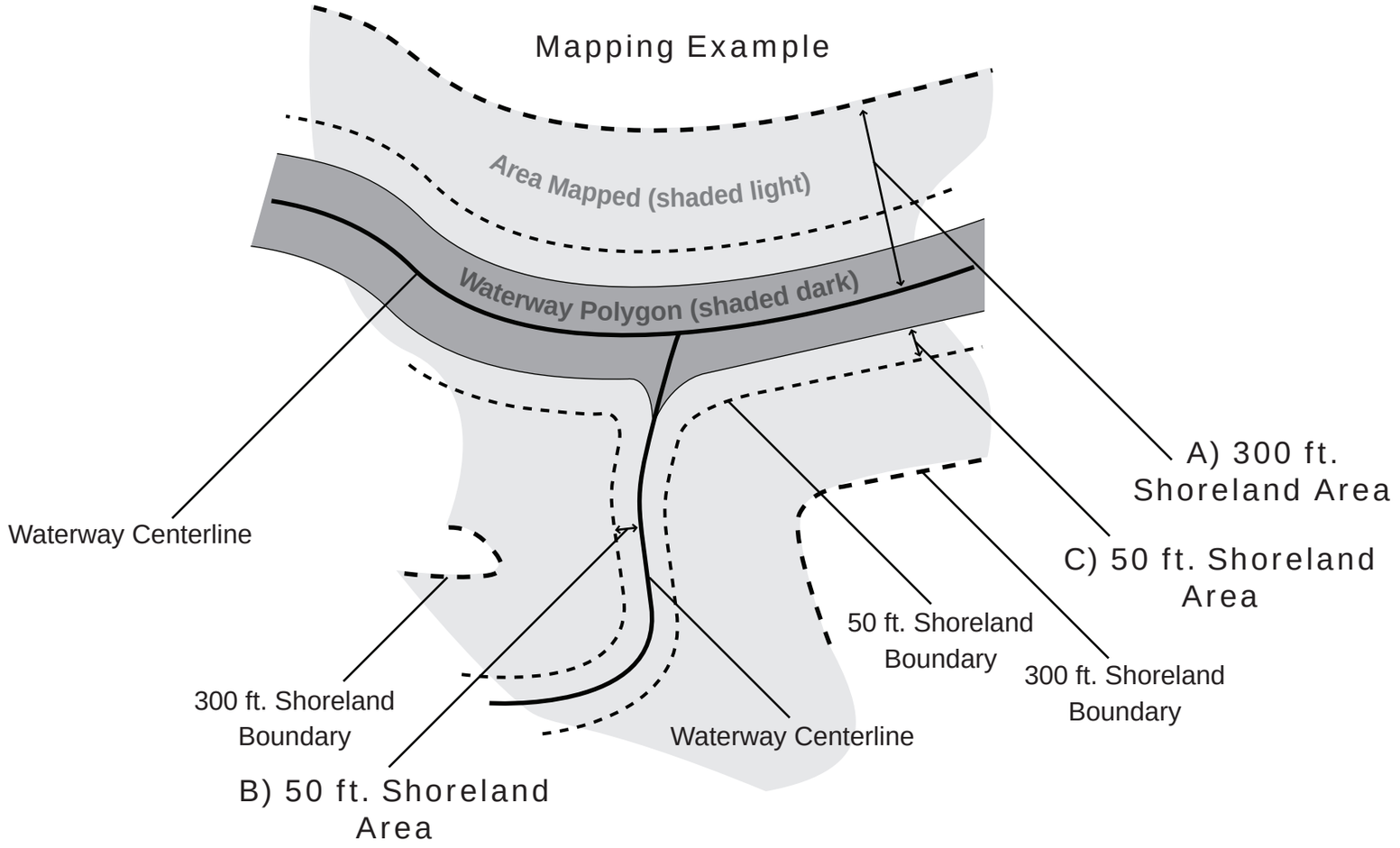
The 300 foot shoreland area is measured from the waterway centerline outward (perpendicular to flow), for a maximum diameter of 600 feet across the waterway (see **A** to right).

The 50 foot shoreland area is measured from the waterway centerline outward (perpendicular to flow) (see **B** to right), however, where a waterway is large enough to be mapped as a polygon, landuse within the 50 foot shoreland area is measured from the polygon edge outward (perpendicular to the shoreline) (see **C** to right).

While every effort was made to ensure the data correctly reflects landuse, CRWP cannot guarantee 100% accuracy; data is meant to reflect very basic landuse information (eg. forest, grassland, cropland, etc.)

Landuse codes are most accurate to level two only; landuse coding from level three and beyond has a high degree of interpretation (see example to right).

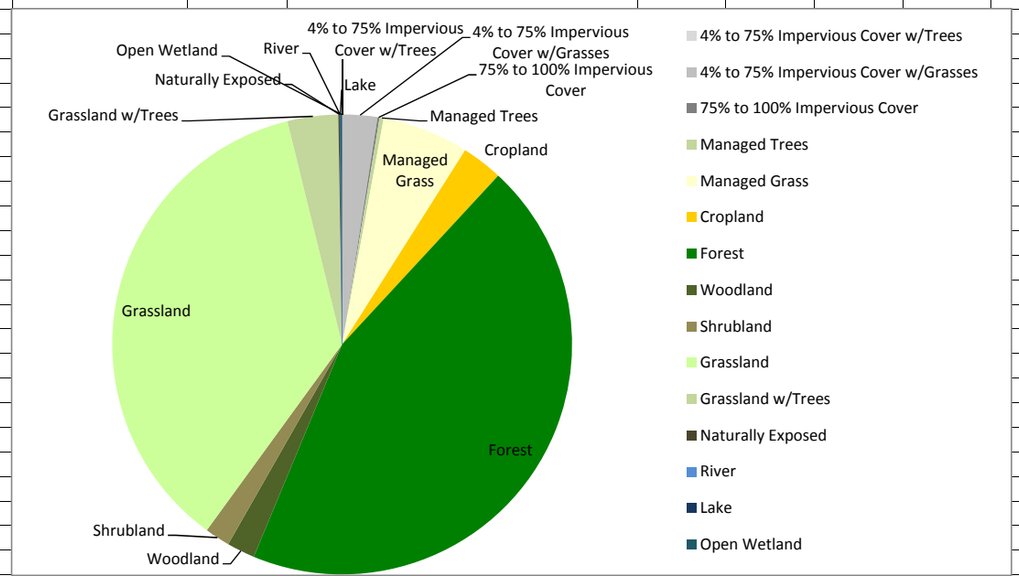
Mapping Example



Coding Level and Accuracy Example

High Accuracy	Level 1: **<u>1</u>0000** - Impervious Surfaces
	Level 2: **<u>11</u>000** - Impervious Surfaces w/Tree Cover
Low Accuracy/ High Interpretation	Level 3: **<u>112</u>00** - Impervious Surfaces w/Deciduous Tree Cover
	Level 4: **<u>1121</u>0** - 4%-10% Impervious Cover w/Deciduous Tree Cover
	Level 5: **<u>11213</u>** - 4%-10% Impervious Cover w/Maple-Basswood Deciduous Tree Cover

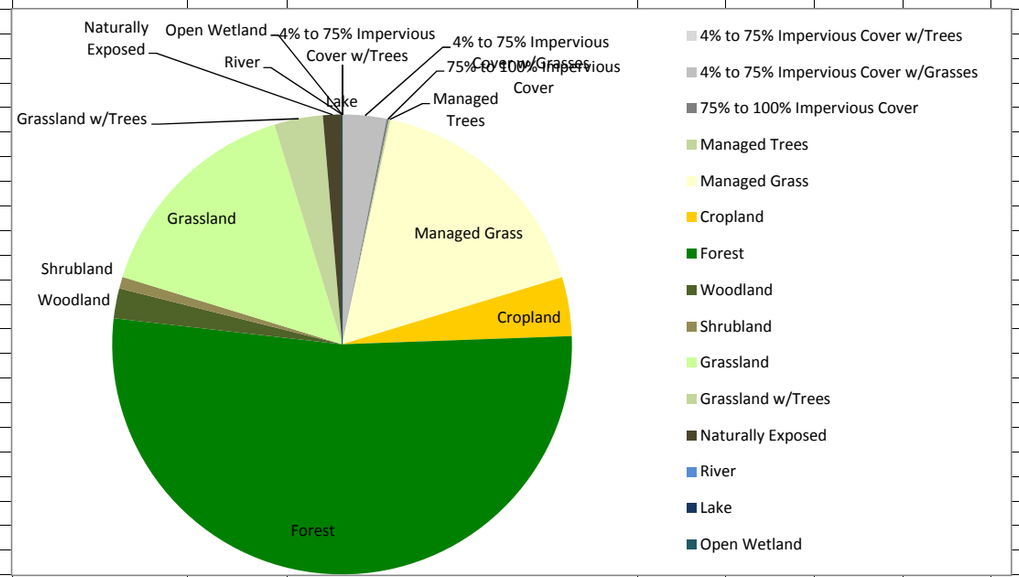
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description	MLCCS Table Value	Table Data	Label
11210	3	1036.16	0.26	0.01%	4% to 10% Impervious Cover w/Trees	11000	0.01%	4% to 75% Impervious Cover w/Trees
11220	3	302.42	0.07	0.00%	11% to 25% Impervious Cover w/Trees	13000	2.45%	4% to 75% Impervious Cover w/Grasses
11230	3	145.69	0.04	0.00%	26% to 50% Impervious Cover w/Trees	14000	0.15%	75% to 100% Impervious Cover
13110	5	3532.30	0.87	0.03%	4% to 10% Impervious Cover w/Grasses and Sparse Trees	21000	0.30%	Managed Trees
13120	10	2355.88	0.58	0.02%	11% to 25% Impervious Cover w/Grasses and Sparse Trees	23000	6.07%	Managed Grass
13130	12	9466.06	2.34	0.08%	26% to 50% Impervious Cover w/Grasses and Sparse Trees	24000	2.89%	Cropland
13140	1	579.12	0.14	0.00%	51% to 75% Impervious Cover w/Grasses and Sparse Trees	32000	44.41%	Forest
13210	6	1128.50	0.28	0.01%	4% to 10% Impervious Cover w/Grasses	42000	1.96%	Woodland
13220	22	9445.30	2.33	0.08%	11% to 25% Impervious Cover w/Grasses	52000	1.78%	Shrubland
13230	218	272179.82	67.26	2.23%	26% to 50% Impervious Cover w/Grasses	61000	36.15%	Grassland
13240	1	532.29	0.13	0.00%	51% to 75% Impervious Cover w/Grasses	62000	3.58%	Grassland w/Trees
14110	5	1414.09	0.35	0.01%	76% to 90% Impervious Cover w/Buildings and Pavement	80000	0.11%	Naturally Exposed
14120	36	15761.71	3.89	0.13%	91% to 100% Impervious Cover w/Buildings and Pavement	~~91000~~	~~0.00%~~	~~River~~
14210	1	21.16	0.01	0.00%	0% to 10% Impervious Cover w/Exposed Earth	92000	0.02%	Lake
14220	1	666.07	0.16	0.01%	11% to 25% Impervious Cover w/Exposed Earth	93000	0.12%	Open Wetland
21000	43	36464.90	9.01	0.30%	Planted, Maintained, or Cultivated Trees			
23200	261	741225.31	183.16	6.07%	Planted and Maintained Grasses			
24000	312	353623.39	87.38	2.89%	Cropland			
32100	534	5425211.94	1340.60	44.41%	Upland Deciduous Forest			
32200	1	124.97	0.03	0.00%	Wetland Forest			
42000	129	239492.46	59.18	1.96%	Woodland			
42200	1	90.37	0.02	0.00%	Wetland Woodland			
52100	167	216194.83	53.42	1.77%	Upland Deciduous Shrublands			
52300	2	797.01	0.20	0.01%	Wetland Deciduous Shrublands			
61200	497	4322769.39	1068.18	35.39%	Upland Grassland			
61300	6	86312.79	21.33	0.71%	Temporarily Flooded Grasslands			
61500	2	917.33	0.23	0.01%	Seasonally Flooded Grasslands			
61600	1	1912.67	0.47	0.02%	Semipermanently Flooded Grasslands			
61800	3	4360.36	1.08	0.04%	Permanently Flooded Grasslands			
62100	171	436947.09	107.97	3.58%	Grassland w/Sparse Trees			
83210	16	13506.60	3.34	0.11%	Sandy and Gravel Shores			
92000	1	2652.54	0.66	0.02%	Lake			
93000	18	14834.81	3.67	0.12%	Open Wetland			
TOTAL	**2492**	**12216005.32**	**3018.64**	**100.00%**				



Fillmore

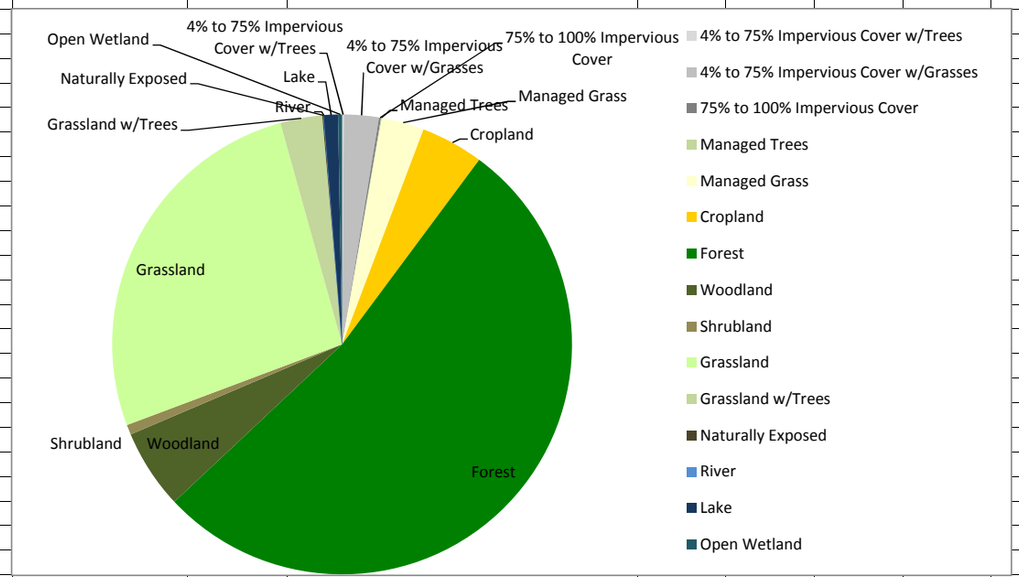
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	14	16146.88	3.99	0.05%	4% to 10% Impervious Cover w/Trees
11220	3	1954.61	0.48	0.01%	11% to 25% Impervious Cover w/Trees
11230	1	424.07	0.10	0.00%	26% to 50% Impervious Cover w/Trees
13110	11	3517.05	0.87	0.01%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	17	5115.54	1.26	0.02%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	5	1672.59	0.41	0.01%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	1	1719.52	0.42	0.01%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	21	8597.25	2.12	0.03%	4% to 10% Impervious Cover w/Grasses
13220	47	18046.79	4.46	0.06%	11% to 25% Impervious Cover w/Grasses
13230	469	934605.97	230.95	2.93%	26% to 50% Impervious Cover w/Grasses
13240	7	2602.77	0.64	0.01%	51% to 75% Impervious Cover w/Grasses
14110	4	1864.02	0.46	0.01%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	61	29159.07	7.21	0.09%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	17	20185.24	4.99	0.06%	0% to 10% Impervious Cover w/Exposed Earth
21000	21	36768.39	9.09	0.12%	Planted, Maintained, or Cultivated Trees
23200	964	5392777.55	1332.58	16.89%	Planted and Maintained Grasses
24000	716	1320612.84	326.33	4.14%	Cropland
32100	1625	16729404.29	4133.93	52.40%	Upland Deciduous Forest
42000	260	664614.78	164.23	2.08%	Woodland
42200	3	3567.21	0.88	0.01%	Wetland Woodland
52100	141	262064.20	64.76	0.82%	Upland Deciduous Shrublands
52300	4	2593.86	0.64	0.01%	Wetland Deciduous Shrublands
61200	956	4478629.37	1106.69	14.03%	Upland Grassland
61300	286	463372.36	114.50	1.45%	Temporarily Flooded Grasslands
61800	12	10263.72	2.54	0.03%	Permanently Flooded Grasslands
62100	383	983543.02	243.04	3.08%	Grassland w/Sparse Trees
62300	45	104392.28	25.80	0.33%	Temporarily Flooded Grassland w/Sparse Trees
83210	278	423099.42	104.55	1.33%	Sandy and Gravel Shores
93000	4	2526.01	0.62	0.01%	Open Wetland
TOTAL	**6376**	**31923840.66**	**7888.55**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.05%	4% to 75% Impervious Cover w/Trees
13000	3.06%	4% to 75% Impervious Cover w/Grasses
14000	0.16%	75% to 100% Impervious Cover
21000	0.12%	Managed Trees
23000	16.89%	Managed Grass
24000	4.14%	Cropland
32000	52.40%	Forest
42000	2.09%	Woodland
52000	0.83%	Shrubland
61000	15.51%	Grassland
62000	3.41%	Grassland w/Trees
80000	1.33%	Naturally Exposed
~~91000~~	~~0.00%~~	~~River~~
92000	0.00%	Lake
93000	0.01%	Open Wetland



Goodhue

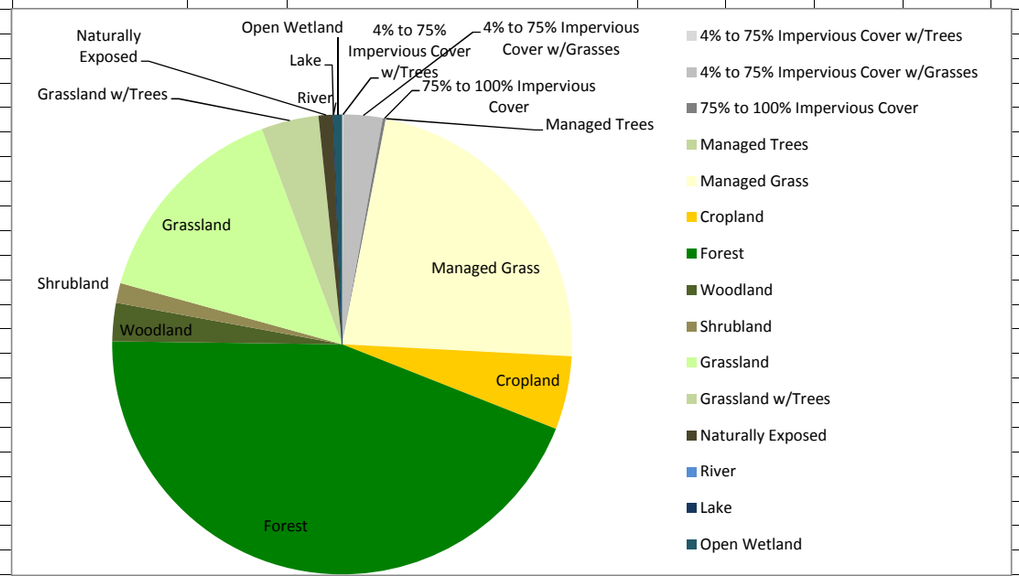
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description	MLCCS Table Value	Table Data	Label
11210	14	15215.16	3.76	0.06%	4% to 10% Impervious Cover w/Trees	11000	0.11%	4% to 75% Impervious Cover w/Trees
11220	18	10221.98	2.53	0.04%	11% to 25% Impervious Cover w/Trees	13000	2.46%	4% to 75% Impervious Cover w/Grasses
11230	4	623.81	0.15	0.00%	26% to 50% Impervious Cover w/Trees	14000	0.13%	75% to 100% Impervious Cover
11240	1	2896.11	0.72	0.01%	51% to 75% Impervious Cover w/Trees	21000	0.07%	Managed Trees
13110	19	7218.55	1.78	0.03%	4% to 10% Impervious Cover w/Grasses and Sparse Trees	23000	2.99%	Managed Grass
13120	25	9967.80	2.46	0.04%	11% to 25% Impervious Cover w/Grasses and Sparse Trees	24000	4.40%	Cropland
13130	7	2347.15	0.58	0.01%	26% to 50% Impervious Cover w/Grasses and Sparse Trees	32000	52.85%	Forest
13140	2	3213.99	0.79	0.01%	51% to 75% Impervious Cover w/Grasses and Sparse Trees	42000	5.57%	Woodland
13210	14	4884.42	1.21	0.02%	4% to 10% Impervious Cover w/Grasses	52000	0.70%	Shrubland
13220	36	18484.61	4.57	0.07%	11% to 25% Impervious Cover w/Grasses	61000	26.38%	Grassland
13230	375	578531.07	142.96	2.28%	26% to 50% Impervious Cover w/Grasses	62000	2.95%	Grassland w/Trees
13240	6	1600.29	0.40	0.01%	51% to 75% Impervious Cover w/Grasses	80000	0.11%	Naturally Exposed
14110	5	3799.82	0.94	0.01%	76% to 90% Impervious Cover w/Buildings and Pavement	~~91000~~	~~0.00%~~	~~River~~
14120	44	29330.39	7.25	0.12%	91% to 100% Impervious Cover w/Buildings and Pavement	92000	1.00%	Lake
14210	2	104.38	0.03	0.00%	0% to 10% Impervious Cover w/Exposed Earth	93000	0.28%	Open Wetland
21000	17	18051.63	4.46	0.07%	Planted, Maintained, or Cultivated Trees			
23200	345	760059.16	187.81	2.99%	Planted and Maintained Grasses			
24000	802	1117625.48	276.17	4.40%	Cropland			
32100	768	13430885.77	3318.84	52.82%	Upland Deciduous Forest			
32200	6	6835.94	1.69	0.03%	Wetland Forest			
42000	354	1278283.21	315.87	5.03%	Woodland			
42200	10	138983.52	34.34	0.55%	Wetland Woodland			
52100	92	178141.00	44.02	0.70%	Upland Deciduous Shrublands			
52300	1	164.97	0.04	0.00%	Wetland Deciduous Shrublands			
61200	964	6275122.06	1550.62	24.68%	Upland Grassland			
61300	45	340319.88	84.09	1.34%	Temporarily Flooded Grasslands			
61400	6	15986.06	3.95	0.06%	Saturated Grasslands			
61600	8	40352.93	9.97	0.16%	Semipermanently Flooded Grasslands			
61700	4	20297.47	5.02	0.08%	Intermittently Exposed Grassland			
61800	6	16846.82	4.16	0.07%	Permanently Flooded Grasslands			
62100	213	648190.49	160.17	2.55%	Grassland w/Sparse Trees			
62300	11	100761.25	24.90	0.40%	Temporarily Flooded Grassland w/Sparse Trees			
83210	22	28363.73	7.01	0.11%	Sandy and Gravel Shores			
92000	3	253152.77	62.56	1.00%	Lake			
93000	8	70193.64	17.35	0.28%	Open Wetland			
TOTAL	**4257**	**25427057.31**	**6283.16**	**100.00%**				



Houston

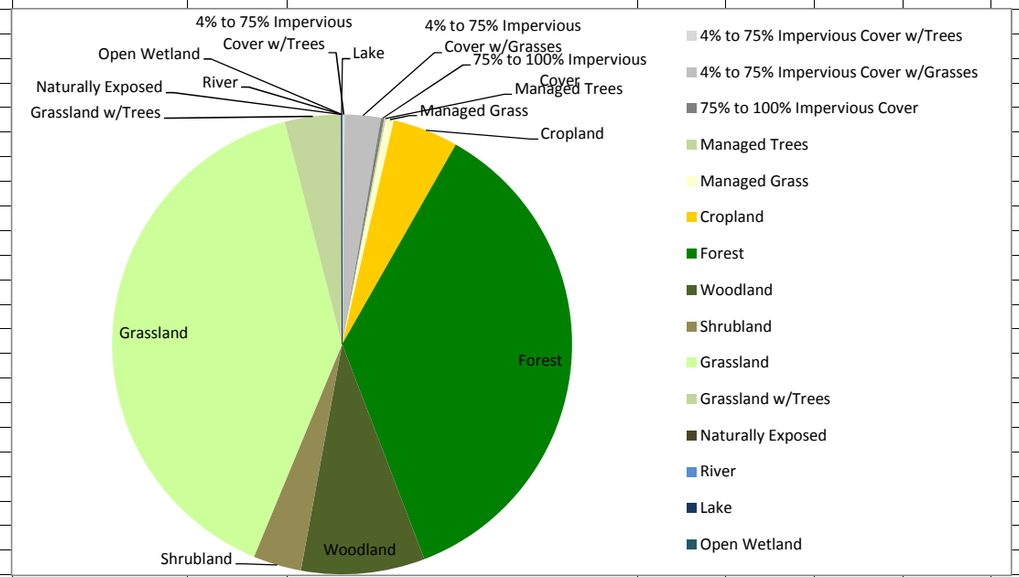
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	6	14797.10	3.66	0.09%	4% to 10% Impervious Cover w/Trees
11220	2	275.47	0.07	0.00%	11% to 25% Impervious Cover w/Trees
13110	8	6370.59	1.57	0.04%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	15	9058.82	2.24	0.06%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13140	1	669.10	0.17	0.00%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	25	16208.19	4.01	0.10%	4% to 10% Impervious Cover w/Grasses
13220	46	31259.63	7.72	0.20%	11% to 25% Impervious Cover w/Grasses
13230	234	365916.02	90.42	2.32%	26% to 50% Impervious Cover w/Grasses
13240	2	1269.81	0.31	0.01%	51% to 75% Impervious Cover w/Grasses
14120	45	23145.37	5.72	0.15%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	9	8863.15	2.19	0.06%	0% to 10% Impervious Cover w/Exposed Earth
21000	12	5992.12	1.48	0.04%	Planted, Maintained, or Cultivated Trees
23200	541	3589664.53	887.03	22.76%	Planted and Maintained Grasses
24000	381	813005.06	200.90	5.16%	Cropland
32100	1010	6813355.41	1683.62	43.21%	Upland Deciduous Forest
32200	18	159804.50	39.49	1.01%	Wetland Forest
42000	184	391786.19	96.81	2.48%	Woodland
42200	9	33230.47	8.21	0.21%	Wetland Woodland
52100	112	211603.85	52.29	1.34%	Upland Deciduous Shrublands
52300	8	8830.12	2.18	0.06%	Wetland Deciduous Shrublands
61200	417	1883077.18	465.32	11.94%	Upland Grassland
61300	71	189489.84	46.82	1.20%	Temporarily Flooded Grasslands
61400	12	140909.61	34.82	0.89%	Saturated Grasslands
61500	14	44003.90	10.87	0.28%	Seasonally Flooded Grasslands
61600	5	5309.53	1.31	0.03%	Semipermanently Flooded Grasslands
61700	6	81460.60	20.13	0.52%	Intermittently Exposed Grassland
61800	8	24616.89	6.08	0.16%	Permanently Flooded Grasslands
62100	222	563780.45	139.31	3.58%	Grassland w/Sparse Trees
62300	25	74113.99	18.31	0.47%	Temporarily Flooded Grassland w/Sparse Trees
81100	2	3377.15	0.83	0.02%	Cliffs
83210	82	158154.13	39.08	1.00%	Sandy and Gravel Shores
92000	1	37.63	0.01	0.00%	Lake
93000	18	96155.74	23.76	0.61%	Open Wetland
TOTAL	**3551**	**15769592.16**	**3896.75**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.10%	4% to 75% Impervious Cover w/Trees
13000	2.73%	4% to 75% Impervious Cover w/Grasses
14000	0.20%	75% to 100% Impervious Cover
21000	0.04%	Managed Trees
23000	22.76%	Managed Grass
24000	5.16%	Cropland
32000	44.22%	Forest
42000	2.70%	Woodland
52000	1.40%	Shrubland
61000	15.02%	Grassland
62000	4.05%	Grassland w/Trees
80000	1.02%	Naturally Exposed
~~91000~~	~~0.00%~~	~~River~~
92000	0.00%	Lake
93000	0.61%	Open Wetland



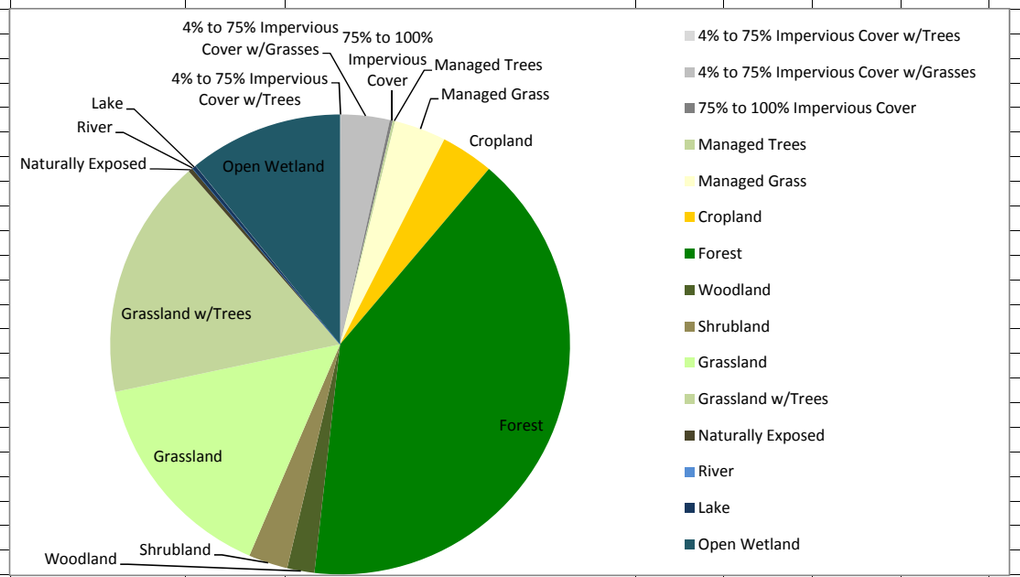
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	14	4391.22	1.09	0.02%	4% to 10% Impervious Cover w/Trees
11220	17	13525.36	3.34	0.06%	11% to 25% Impervious Cover w/Trees
11230	18	22325.25	5.52	0.11%	26% to 50% Impervious Cover w/Trees
11240	1	12.21	0.00	0.00%	51% to 75% Impervious Cover w/Trees
13110	14	9091.92	2.25	0.04%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	27	15884.67	3.93	0.08%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	13	9311.49	2.30	0.04%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	3	4643.90	1.15	0.02%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	15	12032.02	2.97	0.06%	4% to 10% Impervious Cover w/Grasses
13220	26	37298.41	9.22	0.18%	11% to 25% Impervious Cover w/Grasses
13230	369	433438.83	107.11	2.08%	26% to 50% Impervious Cover w/Grasses
13240	4	2108.11	0.52	0.01%	51% to 75% Impervious Cover w/Grasses
14110	9	8638.10	2.13	0.04%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	37	33800.07	8.35	0.16%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	12	7679.35	1.90	0.04%	0% to 10% Impervious Cover w/Exposed Earth
21000	22	24412.32	6.03	0.12%	Planted, Maintained, or Cultivated Trees
23200	132	115337.63	28.50	0.55%	Planted and Maintained Grasses
24000	676	961644.99	237.63	4.61%	Cropland
32100	480	5742487.59	1419.00	27.52%	Upland Deciduous Forest
32200	125	1760228.83	434.96	8.44%	Wetland Forest
42000	222	1399112.04	345.73	6.70%	Woodland
42200	56	414446.56	102.41	1.99%	Wetland Woodland
52100	266	661821.80	163.54	3.17%	Upland Deciduous Shrublands
52300	21	46020.10	11.37	0.22%	Wetland Deciduous Shrublands
61200	746	7234658.63	1787.72	34.67%	Upland Grassland
61300	154	1015041.35	250.82	4.86%	Temporarily Flooded Grasslands
61400	1	2333.69	0.58	0.01%	Saturated Grasslands
61600	7	3732.97	0.92	0.02%	Semipermanently Flooded Grasslands
61700	24	31122.68	7.69	0.15%	Intermittently Exposed Grassland
61800	5	1830.20	0.45	0.01%	Permanently Flooded Grasslands
62100	128	761882.49	188.27	3.65%	Grassland w/Sparse Trees
62300	15	64411.21	15.92	0.31%	Temporarily Flooded Grassland w/Sparse Trees
83210	2	2413.22	0.60	0.01%	Sandy and Gravel Shores
93000	8	10289.36	2.54	0.05%	Open Wetland
TOTAL	**3669**	**20867408.54**	**5156.45**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.19%	4% to 75% Impervious Cover w/Trees
13000	2.51%	4% to 75% Impervious Cover w/Grasses
14000	0.24%	75% to 100% Impervious Cover
21000	0.12%	Managed Trees
23000	0.55%	Managed Grass
24000	4.61%	Cropland
32000	35.95%	Forest
42000	8.69%	Woodland
52000	3.39%	Shrubland
61000	39.72%	Grassland
62000	3.96%	Grassland w/Trees
80000	0.01%	Naturally Exposed
~~91000~~	~~0.00%~~	~~River~~
92000	0.00%	Lake
93000	0.05%	Open Wetland



MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	2	360.39	0.09	0.00%	4% to 10% Impervious Cover w/Trees
11230	2	7728.37	1.91	0.03%	26% to 50% Impervious Cover w/Trees
11240	1	13.55	0.00	0.00%	51% to 75% Impervious Cover w/Trees
13110	59	57020.08	14.09	0.26%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	117	219004.55	54.12	0.98%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	13	9118.66	2.25	0.04%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	8	10601.42	2.62	0.05%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	16	11158.86	2.76	0.05%	4% to 10% Impervious Cover w/Grasses
13220	18	42503.16	10.50	0.19%	11% to 25% Impervious Cover w/Grasses
13230	277	419318.58	103.62	1.88%	26% to 50% Impervious Cover w/Grasses
14110	6	3734.48	0.92	0.02%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	12	11630.36	2.87	0.05%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	12	16843.09	4.16	0.08%	0% to 10% Impervious Cover w/Exposed Earth
14220	1	763.75	0.19	0.00%	11% to 25% Impervious Cover w/Exposed Earth
14230	5	12490.53	3.09	0.06%	26% to 50% Impervious Cover w/Exposed Earth
21000	23	36090.90	8.92	0.16%	Planted, Maintained, or Cultivated Trees
23200	178	813312.53	200.97	3.64%	Planted and Maintained Grasses
24000	529	825506.03	203.99	3.70%	Cropland
32100	883	7421147.75	1833.81	33.25%	Upland Deciduous Forest
32200	138	1638848.41	404.97	7.34%	Wetland Forest
42000	77	414890.41	102.52	1.86%	Woodland
42200	6	10602.30	2.62	0.05%	Wetland Woodland
52100	119	516028.62	127.51	2.31%	Upland Deciduous Shrublands
52300	26	102885.46	25.42	0.46%	Wetland Deciduous Shrublands
61200	441	2659910.08	657.28	11.92%	Upland Grassland
61300	38	250373.54	61.87	1.12%	Temporarily Flooded Grasslands
61400	45	348723.66	86.17	1.56%	Saturated Grasslands
61500	20	129309.47	31.95	0.58%	Seasonally Flooded Grasslands
61600	3	1244.93	0.31	0.01%	Semipermanently Flooded Grasslands
61800	8	5286.85	1.31	0.02%	Permanently Flooded Grasslands
62100	410	3688106.33	911.35	16.53%	Grassland w/Sparse Trees
62300	7	80558.79	19.91	0.36%	Temporarily Flooded Grassland w/Sparse Trees
81100	17	76025.73	18.79	0.34%	Cliffs
83210	2	128.42	0.03	0.00%	Sandy and Gravel Shores
92000	3	56758.22	14.03	0.25%	Lake
93000	34	2418522.87	597.63	10.84%	Open Wetland
TOTAL	**3556**	**22316551.17**	**5514.54**	**100.00%**	

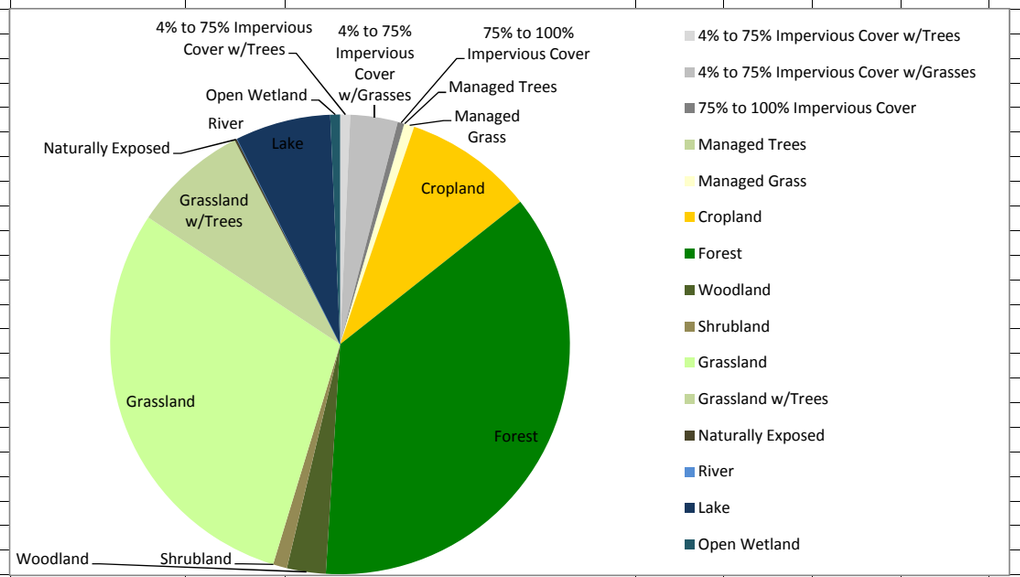
MLCCS Table Value	Table Data	Label
11000	0.04%	4% to 75% Impervious Cover w/Trees
13000	3.44%	4% to 75% Impervious Cover w/Grasses
14000	0.20%	75% to 100% Impervious Cover
21000	0.16%	Managed Trees
23000	3.64%	Managed Grass
24000	3.70%	Cropland
32000	40.60%	Forest
42000	1.91%	Woodland
52000	2.77%	Shrubland
61000	15.21%	Grassland
62000	16.89%	Grassland w/Trees
80000	0.34%	Naturally Exposed
~~91000~~	~~0.00%~~	~~River~~
92000	0.25%	Lake
93000	10.84%	Open Wetland



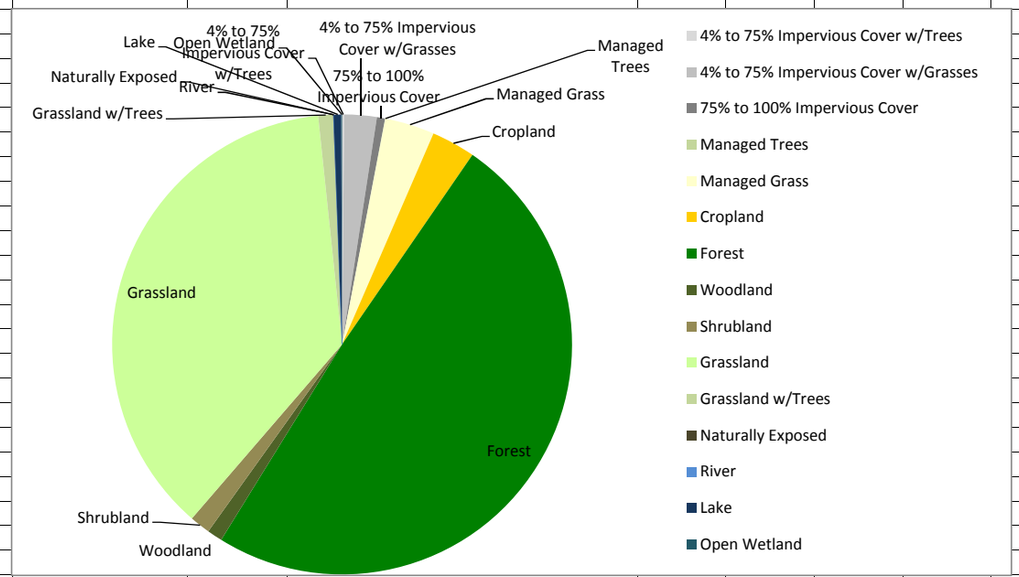
Rice

MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	11	20135.25	4.98	0.11%	4% to 10% Impervious Cover w/Trees
11220	22	40034.05	9.89	0.22%	11% to 25% Impervious Cover w/Trees
11230	20	36220.34	8.95	0.20%	26% to 50% Impervious Cover w/Trees
11240	21	30699.48	7.59	0.17%	51% to 75% Impervious Cover w/Trees
13110	10	16161.08	3.99	0.09%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	38	54888.15	13.56	0.31%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	3	4905.63	1.21	0.03%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13210	37	53654.60	13.26	0.30%	4% to 10% Impervious Cover w/Grasses
13220	54	48880.81	12.08	0.27%	11% to 25% Impervious Cover w/Grasses
13230	234	368126.89	90.97	2.06%	26% to 50% Impervious Cover w/Grasses
13240	28	49003.50	12.11	0.27%	51% to 75% Impervious Cover w/Grasses
14110	15	17846.77	4.41	0.10%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	41	50281.96	12.42	0.28%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	1	256.65	0.06	0.00%	0% to 10% Impervious Cover w/Exposed Earth
14220	3	11519.52	2.85	0.06%	11% to 25% Impervious Cover w/Exposed Earth
21000	9	9113.06	2.25	0.05%	Planted, Maintained, or Cultivated Trees
23200	84	121326.72	29.98	0.68%	Planted and Maintained Grasses
24000	612	1628603.01	402.44	9.11%	Cropland
32100	574	6539649.91	1615.98	36.60%	Upland Deciduous Forest
32200	3	8809.03	2.18	0.05%	Wetland Forest
42000	86	487589.55	120.49	2.73%	Woodland
52100	85	176591.84	43.64	0.99%	Upland Deciduous Shrublands
61200	497	4322100.31	1068.01	24.19%	Upland Grassland
61400	72	708641.76	175.11	3.97%	Saturated Grasslands
61500	13	182130.83	45.01	1.02%	Seasonally Flooded Grasslands
61600	11	76296.41	18.85	0.43%	Semipermanently Flooded Grasslands
62100	174	1439319.67	355.66	8.06%	Grassland w/Sparse Trees
62300	1	12862.84	3.18	0.07%	Temporarily Flooded Grassland w/Sparse Trees
83210	25	32553.85	8.04	0.18%	Sandy and Gravel Shores
92000	20	1197296.57	295.86	6.70%	Lake
93000	27	122938.13	30.38	0.69%	Open Wetland
TOTAL	**2831**	**17868438.17**	**4415.39**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.71%	4% to 75% Impervious Cover w/Trees
13000	3.33%	4% to 75% Impervious Cover w/Grasses
14000	0.45%	75% to 100% Impervious Cover
21000	0.05%	Managed Trees
23000	0.68%	Managed Grass
24000	9.11%	Cropland
32000	36.65%	Forest
42000	2.73%	Woodland
52000	0.99%	Shrubland
61000	29.60%	Grassland
62000	8.13%	Grassland w/Trees
80000	0.18%	Naturally Exposed
~~91000~~	~~0.00%~~	~~River~~
92000	6.70%	Lake
93000	0.69%	Open Wetland

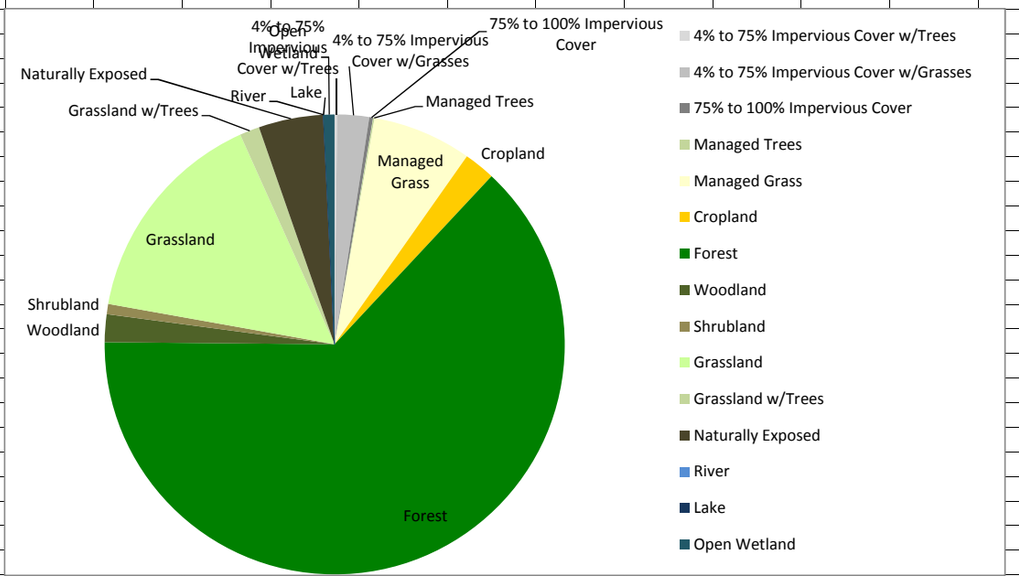


MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description	MLCCS Table Value	Table Data	Label
11210	4	774.78	0.19	0.01%	4% to 10% Impervious Cover w/Trees	11000	0.15%	4% to 75% Impervious Cover w/Trees
11220	8	6272.55	1.55	0.11%	11% to 25% Impervious Cover w/Trees	13000	2.27%	4% to 75% Impervious Cover w/Grasses
11230	2	1497.47	0.37	0.03%	26% to 50% Impervious Cover w/Trees	14000	0.58%	75% to 100% Impervious Cover
13110	1	846.49	0.21	0.01%	4% to 10% Impervious Cover w/Grasses and Sparse Trees	21000	0.02%	Managed Trees
13120	12	6588.52	1.63	0.11%	11% to 25% Impervious Cover w/Grasses and Sparse Trees	23000	3.50%	Managed Grass
13130	5	5680.36	1.40	0.10%	26% to 50% Impervious Cover w/Grasses and Sparse Trees	24000	3.08%	Cropland
13140	1	560.43	0.14	0.01%	51% to 75% Impervious Cover w/Grasses and Sparse Trees	32000	49.23%	Forest
13210	1	0.68	0.00	0.00%	4% to 10% Impervious Cover w/Grasses	42000	1.07%	Woodland
13220	24	22602.35	5.59	0.39%	11% to 25% Impervious Cover w/Grasses	52000	1.45%	Shrubland
13230	95	95860.46	23.69	1.64%	26% to 50% Impervious Cover w/Grasses	61000	37.01%	Grassland
13240	1	594.01	0.15	0.01%	51% to 75% Impervious Cover w/Grasses	62000	1.04%	Grassland w/Trees
14110	4	530.63	0.13	0.01%	76% to 90% Impervious Cover w/Buildings and Pavement	80000	0.04%	Naturally Exposed
14120	45	33191.58	8.20	0.57%	91% to 100% Impervious Cover w/Buildings and Pavement	~~91000~~	~~0.00%~~	~~River~~
14210	5	242.95	0.06	0.00%	0% to 10% Impervious Cover w/Exposed Earth	92000	0.53%	Lake
21000	8	1088.12	0.27	0.02%	Planted, Maintained, or Cultivated Trees	93000	0.05%	Open Wetland
23200	127	204702.92	50.58	3.50%	Planted and Maintained Grasses			
24000	128	180292.54	44.55	3.08%	Cropland			
32100	301	2858432.01	706.33	48.81%	Upland Deciduous Forest			
32200	8	24500.82	6.05	0.42%	Wetland Forest			
42000	26	62390.03	15.42	1.07%	Woodland			
52100	88	80380.69	19.86	1.37%	Upland Deciduous Shrublands			
52300	5	4391.42	1.09	0.07%	Wetland Deciduous Shrublands			
61200	195	1960927.36	484.56	33.49%	Upland Grassland			
61300	48	187125.09	46.24	3.20%	Temporarily Flooded Grasslands			
61400	6	15707.15	3.88	0.27%	Saturated Grasslands			
61500	3	481.85	0.12	0.01%	Seasonally Flooded Grasslands			
61600	4	1988.24	0.49	0.03%	Semipermanently Flooded Grasslands			
61800	1	1141.19	0.28	0.02%	Permanently Flooded Grasslands			
62100	34	60769.38	15.02	1.04%	Grassland w/Sparse Trees			
83210	4	2231.40	0.55	0.04%	Sandy and Gravel Shores			
92000	2	31149.96	7.70	0.53%	Lake			
93000	12	2996.32	0.74	0.05%	Open Wetland			
TOTAL	**1208**	**5855939.72**	**1447.03**	**100.00%**				



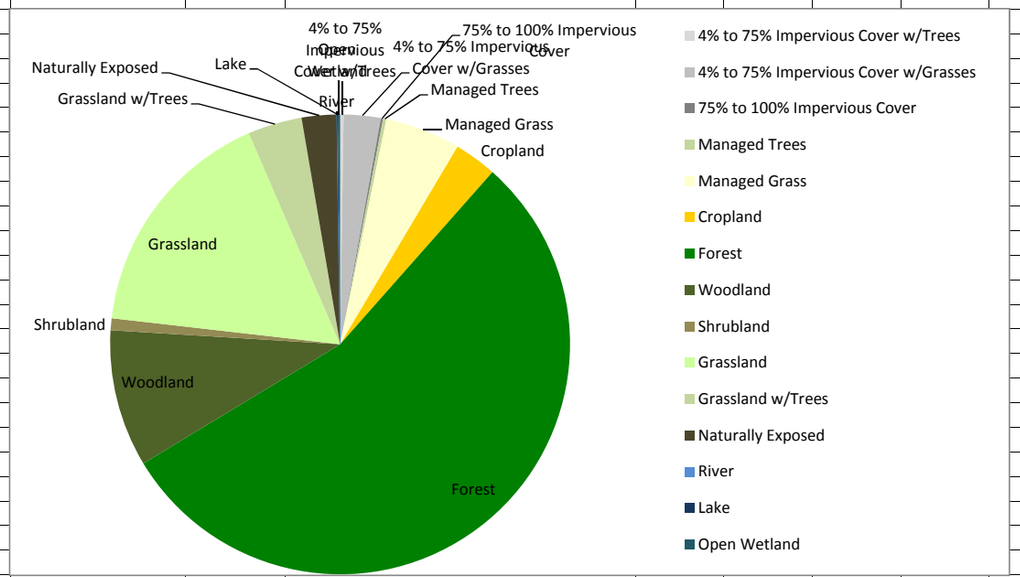
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	13	25838.31	6.38	0.18%	4% to 10% Impervious Cover w/Trees
11230	3	750.61	0.19	0.01%	26% to 50% Impervious Cover w/Trees
13110	9	11666.30	2.88	0.08%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	20	27091.14	6.69	0.19%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	4	5459.22	1.35	0.04%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	1	1743.33	0.43	0.01%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	8	5649.34	1.40	0.04%	4% to 10% Impervious Cover w/Grasses
13220	16	9182.23	2.27	0.06%	11% to 25% Impervious Cover w/Grasses
13230	152	263605.94	65.14	1.81%	26% to 50% Impervious Cover w/Grasses
13240	1	19.28	0.00	0.00%	51% to 75% Impervious Cover w/Grasses
14110	3	4065.43	1.00	0.03%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	27	29408.01	7.27	0.20%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	9	5968.92	1.48	0.04%	0% to 10% Impervious Cover w/Exposed Earth
21000	12	13235.24	3.27	0.09%	Planted, Maintained, or Cultivated Trees
23200	273	1015275.82	250.88	6.97%	Planted and Maintained Grasses
24000	256	319635.82	78.98	2.20%	Cropland
32100	537	9030667.28	2231.53	62.02%	Upland Deciduous Forest
32200	26	174085.83	43.02	1.20%	Wetland Forest
42000	141	278741.36	68.88	1.91%	Woodland
42200	8	4851.05	1.20	0.03%	Wetland Woodland
52100	63	94948.01	23.46	0.65%	Upland Deciduous Shrublands
52300	4	10443.09	2.58	0.07%	Wetland Deciduous Shrublands
61200	709	1736125.96	429.01	11.92%	Upland Grassland
61300	39	110196.97	27.23	0.76%	Temporarily Flooded Grasslands
61400	12	89763.85	22.18	0.62%	Saturated Grasslands
61500	21	96916.23	23.95	0.67%	Seasonally Flooded Grasslands
61600	16	61205.57	15.12	0.42%	Semipermanently Flooded Grasslands
61700	14	56714.24	14.01	0.39%	Intermittently Exposed Grassland
61800	18	97376.44	24.06	0.67%	Permanently Flooded Grasslands
62100	105	189223.88	46.76	1.30%	Grassland w/Sparse Trees
62300	2	14702.93	3.63	0.10%	Temporarily Flooded Grassland w/Sparse Trees
83210	273	661997.09	163.58	4.55%	Sandy and Gravel Shores
93000	12	114470.46	28.29	0.79%	Open Wetland
TOTAL	**2807**	**14561025.21**	**3598.11**	**100.00%**	

MLCCS Tab	Table Data	Label
11000	0.18%	4% to 75% Impervious Cover w/Trees
13000	2.23%	4% to 75% Impervious Cover w/Grasses
14000	0.27%	75% to 100% Impervious Cover
21000	0.09%	Managed Trees
23000	6.97%	Managed Grass
24000	2.20%	Cropland
32000	63.22%	Forest
42000	1.95%	Woodland
52000	0.72%	Shrubland
61000	15.44%	Grassland
62000	1.40%	Grassland w/Trees
80000	4.55%	Naturally Exposed
~~91000~~	~~0.00%~~	~~River~~
92000	0.00%	Lake
93000	0.79%	Open Wetland



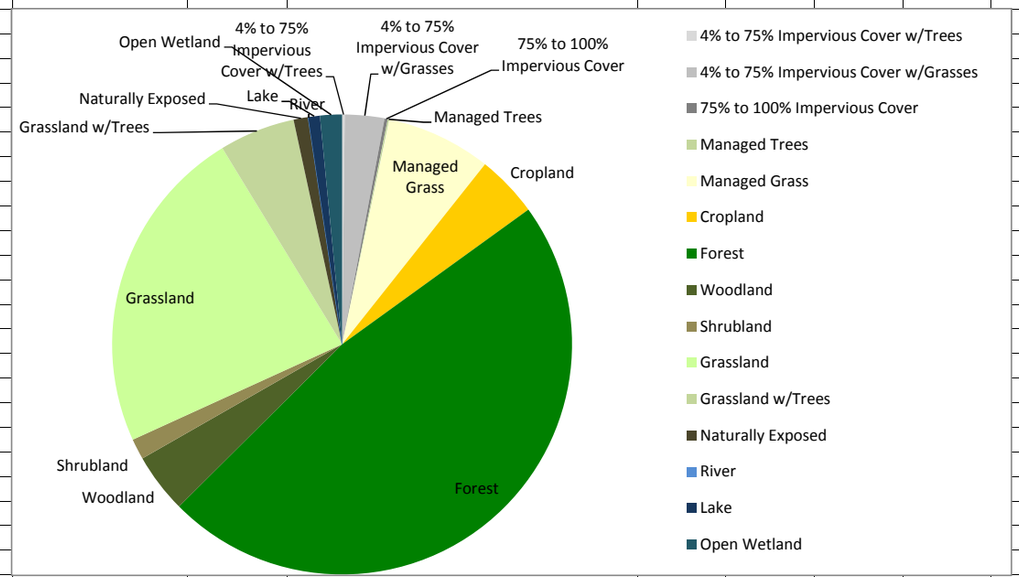
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	25	29747.71	7.35	0.14%	4% to 10% Impervious Cover w/Trees
11220	18	18095.36	4.47	0.09%	11% to 25% Impervious Cover w/Trees
11230	5	4633.41	1.14	0.02%	26% to 50% Impervious Cover w/Trees
13110	18	34069.56	8.42	0.16%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	25	32314.67	7.99	0.15%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	11	2806.92	0.69	0.01%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13210	36	37561.80	9.28	0.18%	4% to 10% Impervious Cover w/Grasses
13220	23	15164.14	3.75	0.07%	11% to 25% Impervious Cover w/Grasses
13230	212	421538.15	104.16	2.00%	26% to 50% Impervious Cover w/Grasses
13240	4	1533.84	0.38	0.01%	51% to 75% Impervious Cover w/Grasses
14110	3	4920.82	1.22	0.02%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	17	16187.49	4.00	0.08%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	10	13848.02	3.42	0.07%	0% to 10% Impervious Cover w/Exposed Earth
21000	21	47777.04	11.81	0.23%	Planted, Maintained, or Cultivated Trees
23200	335	1121060.88	277.02	5.31%	Planted and Maintained Grasses
24000	330	626787.76	154.88	2.97%	Cropland
32100	587	11357976.52	2806.62	53.84%	Upland Deciduous Forest
32200	19	206582.17	51.05	0.98%	Wetland Forest
42000	335	2033905.81	502.59	9.64%	Woodland
42200	2	345.31	0.09	0.00%	Wetland Woodland
52100	93	178404.72	44.08	0.85%	Upland Deciduous Shrublands
61200	688	3344512.87	826.45	15.86%	Upland Grassland
61300	16	63549.16	15.70	0.30%	Temporarily Flooded Grasslands
61400	1	5294.46	1.31	0.03%	Saturated Grasslands
61500	2	1928.10	0.48	0.01%	Seasonally Flooded Grasslands
61600	12	33845.17	8.36	0.16%	Semipermanently Flooded Grasslands
61700	9	53113.30	13.12	0.25%	Intermittently Exposed Grassland
61800	9	17738.29	4.38	0.08%	Permanently Flooded Grasslands
62100	251	783576.35	193.63	3.71%	Grassland w/Sparse Trees
62300	4	18163.39	4.49	0.09%	Temporarily Flooded Grassland w/Sparse Trees
83210	177	518781.23	128.19	2.46%	Sandy and Gravel Shores
92000	1	12957.32	3.20	0.06%	Lake
93000	5	35567.81	8.79	0.17%	Open Wetland
TOTAL	**3304**	**21094289.57**	**5212.51**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.25%	4% to 75% Impervious Cover w/Trees
13000	2.58%	4% to 75% Impervious Cover w/Grasses
14000	0.17%	75% to 100% Impervious Cover
21000	0.23%	Managed Trees
23000	5.31%	Managed Grass
24000	2.97%	Cropland
32000	54.82%	Forest
42000	9.64%	Woodland
52000	0.85%	Shrubland
61000	16.69%	Grassland
62000	3.80%	Grassland w/Trees
80000	2.46%	Naturally Exposed
~~91000~~	~~0.00%~~	~~River~~
92000	0.06%	Lake
93000	0.17%	Open Wetland

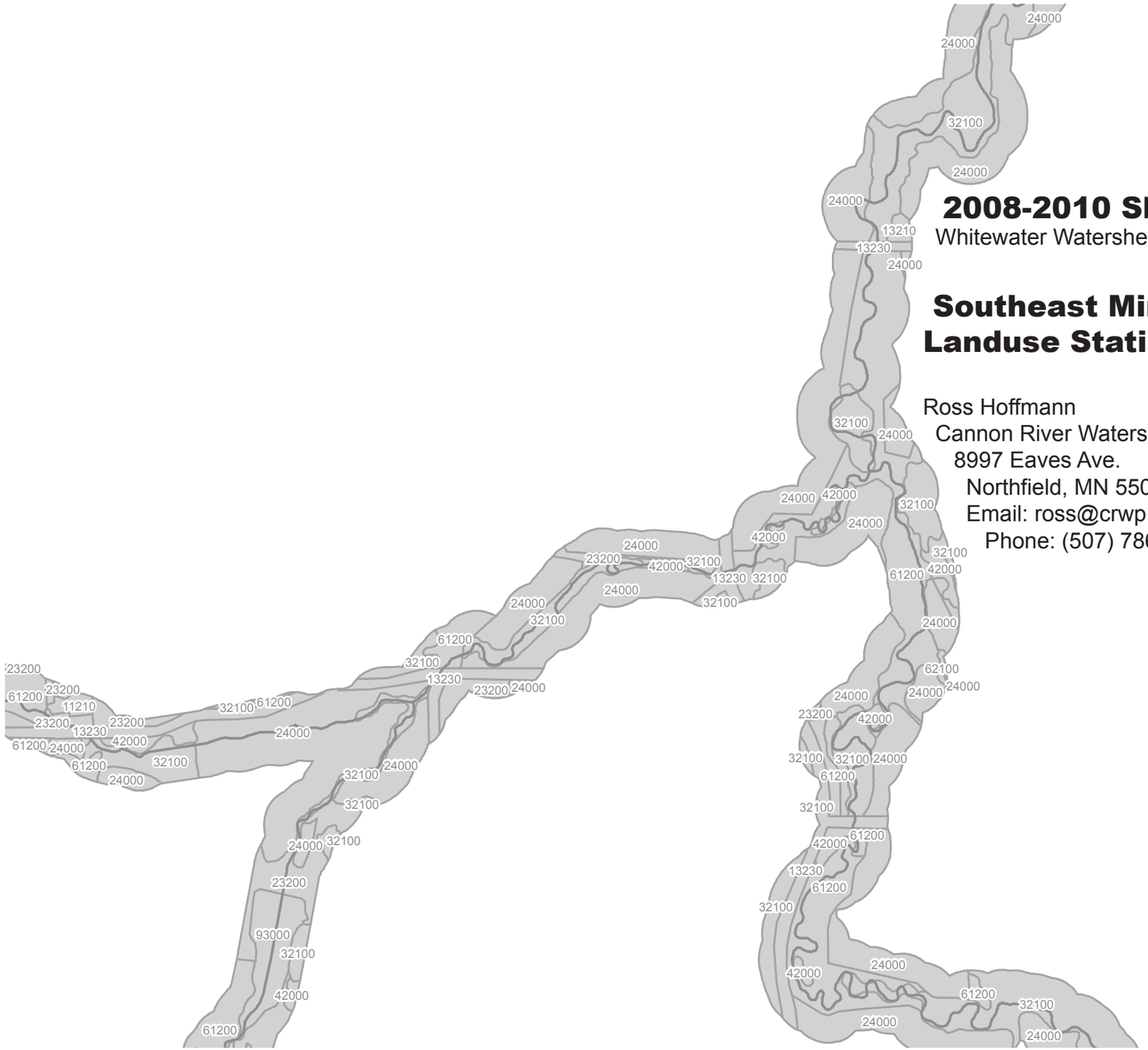


Region

MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description	MLCCS Table Value	Table Data	Label
11210	106	128442.96	31.74	0.07%	4% to 10% Impervious Cover w/Trees	11000	0.17%	4% to 75% Impervious Cover w/Trees
11220	91	90681.81	22.41	0.05%	11% to 25% Impervious Cover w/Trees	13000	2.78%	4% to 75% Impervious Cover w/Grasses
11230	58	74349.02	18.37	0.04%	26% to 50% Impervious Cover w/Trees	14000	0.22%	75% to 100% Impervious Cover
11240	24	33621.36	8.31	0.02%	51% to 75% Impervious Cover w/Trees	21000	0.12%	Managed Trees
13110	154	149493.93	36.94	0.08%	4% to 10% Impervious Cover w/Grasses and Sparse Trees	23000	7.38%	Managed Grass
13120	306	382269.76	94.46	0.20%	11% to 25% Impervious Cover w/Grasses and Sparse Trees	24000	4.34%	Cropland
13130	73	50768.08	12.55	0.03%	26% to 50% Impervious Cover w/Grasses and Sparse Trees	32000	47.54%	Forest
13140	18	23730.81	5.86	0.01%	51% to 75% Impervious Cover w/Grasses and Sparse Trees	42000	4.18%	Woodland
13210	179	150875.66	37.28	0.08%	4% to 10% Impervious Cover w/Grasses	52000	1.46%	Shrubland
13220	312	252867.42	62.48	0.13%	11% to 25% Impervious Cover w/Grasses	61000	23.07%	Grassland
13230	2635	4153121.75	1026.26	2.21%	26% to 50% Impervious Cover w/Grasses	62000	5.34%	Grassland w/Trees
13240	54	59263.91	14.64	0.03%	51% to 75% Impervious Cover w/Grasses	80000	1.02%	Naturally Exposed
14110	54	46814.16	11.57	0.02%	76% to 90% Impervious Cover w/Buildings and Pavement	~~91000~~	~~0.00%~~	~~River~~
14120	365	271896.01	67.19	0.14%	91% to 100% Impervious Cover w/Buildings and Pavement	92000	0.83%	Lake
14210	78	74012.91	18.29	0.04%	0% to 10% Impervious Cover w/Exposed Earth	93000	1.54%	Open Wetland
14220	5	12949.33	3.20	0.01%	11% to 25% Impervious Cover w/Exposed Earth			
14230	5	12490.53	3.09	0.01%	26% to 50% Impervious Cover w/Exposed Earth			
21000	188	228993.71	56.59	0.12%	Planted, Maintained, or Cultivated Trees			
23200	3240	13874743.06	3428.52	7.38%	Planted and Maintained Grasses			
24000	4742	8147336.91	2013.25	4.34%	Cropland			
32100	7299	85349218.47	21090.25	45.42%	Upland Deciduous Forest			
32200	344	3979820.51	983.44	2.12%	Wetland Forest			
42000	1814	7250805.83	1791.71	3.86%	Woodland			
42200	95	606116.80	149.77	0.32%	Wetland Woodland			
52100	1226	2576179.55	636.59	1.37%	Upland Deciduous Shrublands			
52300	71	176126.04	43.52	0.09%	Wetland Deciduous Shrublands			
61200	6110	38217833.20	9443.83	20.34%	Upland Grassland			
61300	703	2705780.98	668.61	1.44%	Temporarily Flooded Grasslands			
61400	155	1327360.23	328.00	0.71%	Saturated Grasslands			
61500	75	455687.71	112.60	0.24%	Seasonally Flooded Grasslands			
61600	67	225888.42	55.82	0.12%	Semipermanently Flooded Grasslands			
61700	57	242708.29	59.97	0.13%	Intermittently Exposed Grassland			
61800	70	179460.76	44.35	0.10%	Permanently Flooded Grasslands			
62100	2091	9555339.14	2361.18	5.09%	Grassland w/Sparse Trees			
62300	110	469966.68	116.13	0.25%	Temporarily Flooded Grassland w/Sparse Trees			
81100	19	79402.88	19.62	0.04%	Cliffs			
83210	881	1841229.08	454.98	0.98%	Sandy and Gravel Shores			
92000	31	1554005.01	384.00	0.83%	Lake			
93000	146	2888495.14	713.76	1.54%	Open Wetland			
TOTAL	**34051**	**187900147.84**	**46431.14**	**100.00%**				



MLCCS code	Code Description
0	Unknown
10000	Artificial surfaces
11000	Artificial Surfaces w/Tree Cover
11210	4% to 10% Impervious Cover w/Trees
11220	11% to 25% Impervious Cover w/Trees
11230	26% to 50% Impervious Cover w/Trees
11240	51% to 75% Impervious Cover w/Trees
13000	Artificial Surfaces w/Grass Cover
13110	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	4% to 10% Impervious Cover w/Grasses
13220	11% to 25% Impervious Cover w/Grasses
13230	26% to 50% Impervious Cover w/Grasses
13240	51% to 75% Impervious Cover w/Grasses
14000	Artificial Surfaces w/Buildings and Pavement
14110	76% to 90% Impervious Cover w/Buildings and Pavement
14120	91% to 100% Impervious Cover w/Buildings and Pavement
14200	Artificially Exposed Earth
14210	0% to 10% Impervious Cover w/Exposed Earth
14220	11% to 25% Impervious Cover w/Exposed Earth
14230	26% to 50% Impervious Cover w/Exposed Earth
20000	Planted or Cultivated Vegetation
21000	Planted, Maintained, or Cultivated Trees
21100	Planted, Maintained, or Cultivated Coniferous Trees
21200	Planted, Maintained, or Cultivated Deciduous Trees
21300	Planted, Maintained, or Cultivated Mixed Trees
23200	Planted and Maintained Grasses
23211	Planted and Maintained Short Grasses
23212	Planted and Maintained Long Grasses
24000	Cropland
24110	Cropland on Upland Soils
24120	Cropland on Hydric Soils
30000	Forests
31100	Upland Coniferous Forest
31200	Wetland Coniferous Forest
32100	Upland Forest
32100	Upland Deciduous Forest
32200	Wetland Forest
32200	Wetland Deciduous Forest
32200	Wetland Forest
33100	Upland Mixed Forest
42000	Woodland
42200	Wetland Woodland
50000	Shrublands
51100	Wetland Coniferous/Evergreen Shrublands
52100	Upland Shrublands
52100	Upland Deciduous Shrublands
52300	Wetland Shrublands
52300	Wetland Deciduous Shrublands
60000	Herbaceous
61200	Upland Grassland
61300	Temporarily Flooded Grasslands
61400	Saturated Grasslands
61500	Seasonally Flooded Grasslands
61600	Semipermanently Flooded Grasslands
61700	Intermittently Exposed Grassland
61800	Permanently Flooded Grasslands
62100	Grassland w/Sparse Trees
62300	Temporarily Flooded Grassland w/Sparse Trees
80000	Sparse Vegetation
81100	Cliffs
81200	Upland Sparse Vegetation
82000	Upland Naturally Exposed Earth
83200	Wetland Sparse Vegetation
83210	Sandy and Gravel Shores
83310	Mud Flats
90000	Water
91000	River
92000	Lake
93000	Open Wetland



2008-2010 Shoreland Mapping Project

Whitewater Watershed Project/Cannon River Watershed Partnership

Southeast Minnesota Public Water Shoreland Landuse Statistics - 300ft. Shoreland Area

Ross Hoffmann
Cannon River Watershed Partnership
8997 Eaves Ave.
Northfield, MN 55057
Email: ross@crwp.net
Phone: (507) 786-3916

Whitewater River Watershed Project

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

CRWP GIS
Cannon River Watershed Partnership

Project Detail:

Counties mapped include Dodge, Fillmore, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, and Winona.

Only public waterways as identified in the MN Department of Natural Resources' "24k Streams" GIS shapefile were mapped.

Landuse was primarily interpreted, mapped, and coded at a scale of 1:5,000 from 2008 FSA NAIP 1-meter resolution aerial photography for all counties.

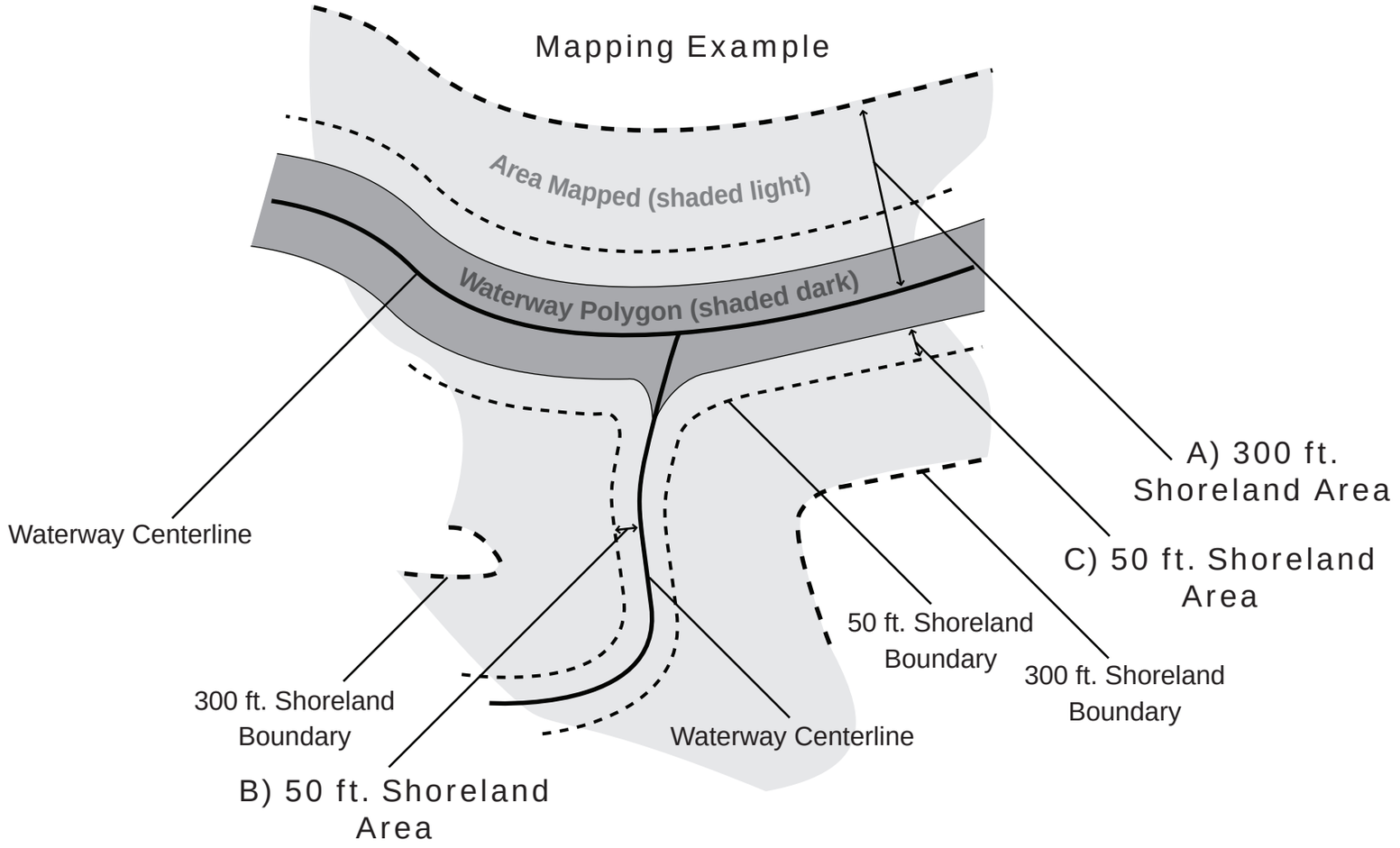
The 300 foot shoreland area is measured from the waterway centerline outward (perpendicular to flow), for a maximum diameter of 600 feet across the waterway (see **A** to right).

The 50 foot shoreland area is measured from the waterway centerline outward (perpendicular to flow) (see **B** to right), however, where a waterway is large enough to be mapped as a polygon, landuse within the 50 foot shoreland area is measured from the polygon edge outward (perpendicular to the shoreline) (see **C** to right).

While every effort was made to ensure the data correctly reflects landuse, CRWP cannot guarantee 100% accuracy; data is meant to reflect very basic landuse information (eg. forest, grassland, cropland, etc.)

Landuse codes are most accurate to level two only; landuse coding from level three and beyond has a high degree of interpretation (see example to right).

Mapping Example

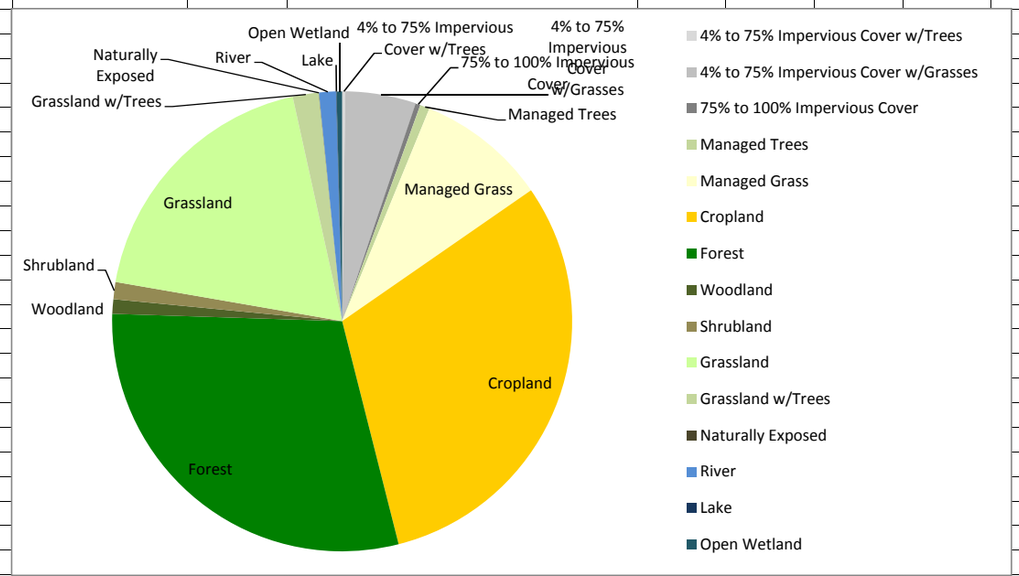


Coding Level and Accuracy Example

High Accuracy	Level 1: **<u>1</u>0000** - Impervious Surfaces
	Level 2: **<u>11</u>000** - Impervious Surfaces w/Tree Cover
Low Accuracy/ High Interpretation	Level 3: **<u>112</u>00** - Impervious Surfaces w/Deciduous Tree Cover
	Level 4: **<u>1121</u>0** - 4%-10% Impervious Cover w/Deciduous Tree Cover
	Level 5: **<u>11213</u>** - 4%-10% Impervious Cover w/Maple-Basswood Deciduous Tree Cover

MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	22	41082.13	10.15	0.06%	4% to 10% Impervious Cover w/Trees
11220	39	86947.69	21.49	0.13%	11% to 25% Impervious Cover w/Trees
11230	10	25027.65	6.18	0.04%	26% to 50% Impervious Cover w/Trees
13110	17	58513.89	14.46	0.09%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	44	172689.66	42.67	0.26%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	29	132930.96	32.85	0.20%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	1	6235.36	1.54	0.01%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	31	129420.84	31.98	0.19%	4% to 10% Impervious Cover w/Grasses
13220	79	321502.90	79.45	0.48%	11% to 25% Impervious Cover w/Grasses
13230	294	2468189.71	609.90	3.68%	26% to 50% Impervious Cover w/Grasses
13240	12	33536.64	8.29	0.05%	51% to 75% Impervious Cover w/Grasses
14110	12	57244.76	14.15	0.09%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	59	141314.61	34.92	0.21%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	4	19822.93	4.90	0.03%	0% to 10% Impervious Cover w/Exposed Earth
14220	1	8219.74	2.03	0.01%	11% to 25% Impervious Cover w/Exposed Earth
21000	129	448783.36	110.90	0.67%	Planted, Maintained, or Cultivated Trees
23200	700	6124600.72	1513.42	9.14%	Planted and Maintained Grasses
24000	981	20572079.45	5083.47	30.71%	Cropland
32100	832	19736897.68	4877.09	29.46%	Upland Deciduous Forest
42000	214	690944.16	170.74	1.03%	Woodland
52100	273	788543.84	194.85	1.18%	Upland Deciduous Shrublands
52300	2	10282.83	2.54	0.02%	Wetland Deciduous Shrublands
61200	810	12382458.03	3059.77	18.48%	Upland Grassland
61300	11	192781.17	47.64	0.29%	Temporarily Flooded Grasslands
61500	4	15304.73	3.78	0.02%	Seasonally Flooded Grasslands
61600	3	8462.82	2.09	0.01%	Semipermanently Flooded Grasslands
61700	1	544.45	0.13	0.00%	Intermittently Exposed Grassland
61800	9	10464.16	2.59	0.02%	Permanently Flooded Grasslands
62100	273	1217264.16	300.79	1.82%	Grassland w/Sparse Trees
83210	17	17697.26	4.37	0.03%	Sandy and Gravel Shores
91000	12	794656.88	196.36	1.19%	River
92000	1	15592.91	3.85	0.02%	Lake
93000	75	264302.62	65.31	0.39%	Open Wetland
TOTAL	**5001**	**66994340.67**	**16554.66**	**100.00%**	

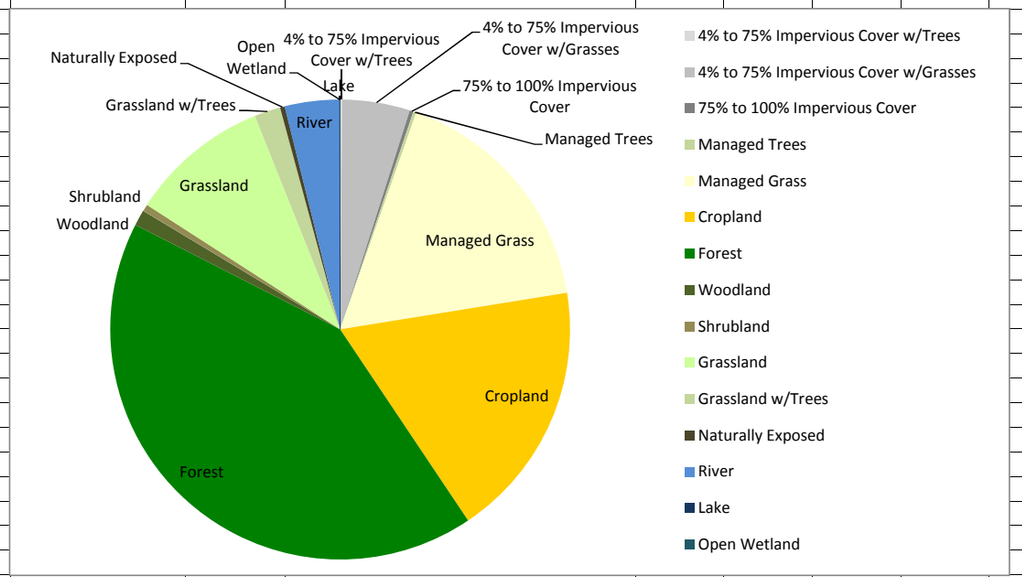
MLCCS Table Value	Table Data	Label
11000	0.23%	4% to 75% Impervious Cover w/Trees
13000	4.96%	4% to 75% Impervious Cover w/Grasses
14000	0.34%	75% to 100% Impervious Cover
21000	0.67%	Managed Trees
23000	9.14%	Managed Grass
24000	30.71%	Cropland
32000	29.46%	Forest
42000	1.03%	Woodland
52000	1.19%	Shrubland
61000	18.82%	Grassland
62000	1.82%	Grassland w/Trees
80000	0.03%	Naturally Exposed
91000	1.19%	River
92000	0.02%	Lake
93000	0.39%	Open Wetland



Fillmore

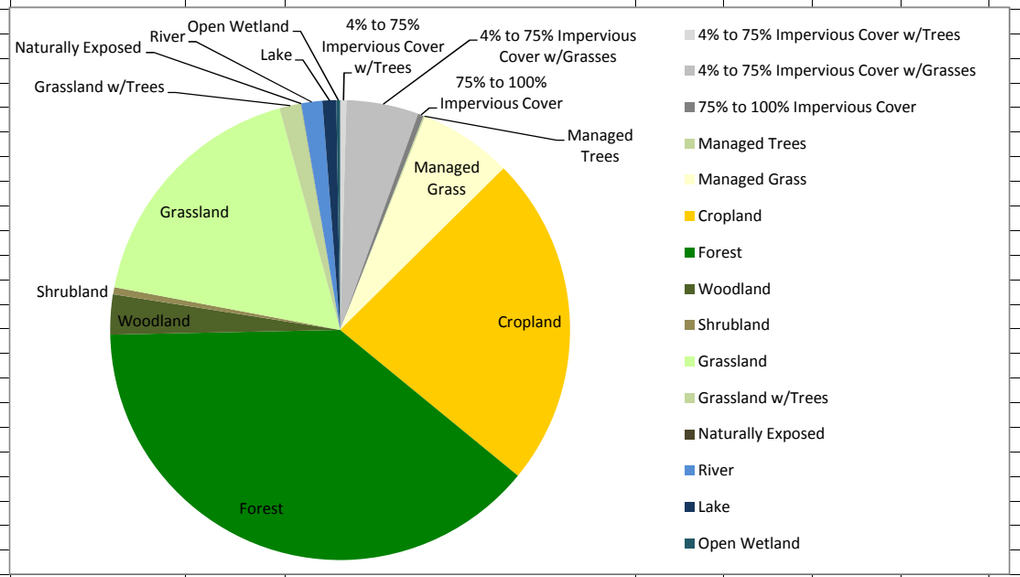
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	52	158519.51	39.17	0.09%	4% to 10% Impervious Cover w/Trees
11220	26	58890.15	14.55	0.03%	11% to 25% Impervious Cover w/Trees
11230	12	31962.96	7.90	0.02%	26% to 50% Impervious Cover w/Trees
13110	40	110469.25	27.30	0.06%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	72	247779.15	61.23	0.14%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	25	79361.50	19.61	0.04%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	3	16653.05	4.12	0.01%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	88	273037.53	67.47	0.15%	4% to 10% Impervious Cover w/Grasses
13220	191	616398.21	152.32	0.35%	11% to 25% Impervious Cover w/Grasses
13230	603	7031556.26	1737.54	3.96%	26% to 50% Impervious Cover w/Grasses
13240	18	78159.66	19.31	0.04%	51% to 75% Impervious Cover w/Grasses
14110	6	40807.62	10.08	0.02%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	91	219024.17	54.12	0.12%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	32	213999.32	52.88	0.12%	0% to 10% Impervious Cover w/Exposed Earth
14220	1	3076.56	0.76	0.00%	11% to 25% Impervious Cover w/Exposed Earth
21000	68	359753.62	88.90	0.20%	Planted, Maintained, or Cultivated Trees
23200	1945	30328083.15	7494.23	17.08%	Planted and Maintained Grasses
24000	1614	32220286.31	7961.81	18.15%	Cropland
32100	2416	74446194.06	18396.06	41.93%	Upland Deciduous Forest
42000	379	1957056.03	483.60	1.10%	Woodland
42200	3	4507.81	1.11	0.00%	Wetland Woodland
52100	262	870632.80	215.14	0.49%	Upland Deciduous Shrublands
52300	4	10666.90	2.64	0.01%	Wetland Deciduous Shrublands
61200	1632	16473589.09	4070.71	9.28%	Upland Grassland
61300	297	906158.90	223.92	0.51%	Temporarily Flooded Grasslands
61800	46	71206.05	17.60	0.04%	Permanently Flooded Grasslands
62100	579	3032692.63	749.39	1.71%	Grassland w/Sparse Trees
62300	48	223342.91	55.19	0.13%	Temporarily Flooded Grassland w/Sparse Trees
83210	278	593917.86	146.76	0.33%	Sandy and Gravel Shores
91000	73	6847877.06	1692.15	3.86%	River
93000	18	37105.20	9.17	0.02%	Open Wetland
TOTAL	**10922**	**177562765.27**	**43876.72**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.14%	4% to 75% Impervious Cover w/Trees
13000	4.76%	4% to 75% Impervious Cover w/Grasses
14000	0.27%	75% to 100% Impervious Cover
21000	0.20%	Managed Trees
23000	17.08%	Managed Grass
24000	18.15%	Cropland
32000	41.93%	Forest
42000	1.10%	Woodland
52000	0.50%	Shrubland
61000	9.83%	Grassland
62000	1.83%	Grassland w/Trees
80000	0.33%	Naturally Exposed
91000	3.86%	River
92000	0.00%	Lake
93000	0.02%	Open Wetland



MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	62	242204.11	59.85	0.17%	4% to 10% Impervious Cover w/Trees
11220	64	280014.71	69.19	0.20%	11% to 25% Impervious Cover w/Trees
11230	14	77056.01	19.04	0.06%	26% to 50% Impervious Cover w/Trees
11240	2	15485.20	3.83	0.01%	51% to 75% Impervious Cover w/Trees
13110	43	205564.57	50.80	0.15%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	77	369657.66	91.34	0.26%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	17	122600.77	30.30	0.09%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	8	82609.81	20.41	0.06%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	74	240221.58	59.36	0.17%	4% to 10% Impervious Cover w/Grasses
13220	157	628592.09	155.33	0.45%	11% to 25% Impervious Cover w/Grasses
13230	514	5385397.14	1330.76	3.86%	26% to 50% Impervious Cover w/Grasses
13240	12	68508.94	16.93	0.05%	51% to 75% Impervious Cover w/Grasses
14110	18	134033.81	33.12	0.10%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	64	275100.41	67.98	0.20%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	14	110703.26	27.36	0.08%	0% to 10% Impervious Cover w/Exposed Earth
14220	1	10550.68	2.61	0.01%	11% to 25% Impervious Cover w/Exposed Earth
21000	34	142255.57	35.15	0.10%	Planted, Maintained, or Cultivated Trees
23200	832	9155893.72	2262.47	6.56%	Planted and Maintained Grasses
24000	1591	32570605.36	8048.37	23.34%	Cropland
32100	1204	54020374.65	13348.73	38.72%	Upland Deciduous Forest
32200	12	62078.91	15.34	0.04%	Wetland Forest
42000	490	3646061.71	900.96	2.61%	Woodland
42200	14	260290.24	64.32	0.19%	Wetland Woodland
52100	152	666737.77	164.75	0.48%	Upland Deciduous Shrublands
52300	11	49499.34	12.23	0.04%	Wetland Deciduous Shrublands
61200	1578	22797038.79	5633.27	16.34%	Upland Grassland
61300	61	1432119.10	353.88	1.03%	Temporarily Flooded Grasslands
61400	18	165493.60	40.89	0.12%	Saturated Grasslands
61500	6	49160.78	12.15	0.04%	Seasonally Flooded Grasslands
61600	16	167928.44	41.50	0.12%	Semipermanently Flooded Grasslands
61700	5	90074.91	22.26	0.06%	Intermittently Exposed Grassland
61800	27	81263.02	20.08	0.06%	Permanently Flooded Grasslands
62100	305	1826437.47	451.32	1.31%	Grassland w/Sparse Trees
62300	15	270820.30	66.92	0.19%	Temporarily Flooded Grassland w/Sparse Trees
83210	23	42579.34	10.52	0.03%	Sandy and Gravel Shores
91000	18	2044553.17	505.22	1.47%	River
92000	4	1378157.93	340.55	0.99%	Lake
93000	14	352771.74	87.17	0.25%	Open Wetland
TOTAL	**7571**	**139520496.63**	**34476.27**	**100.00%**	

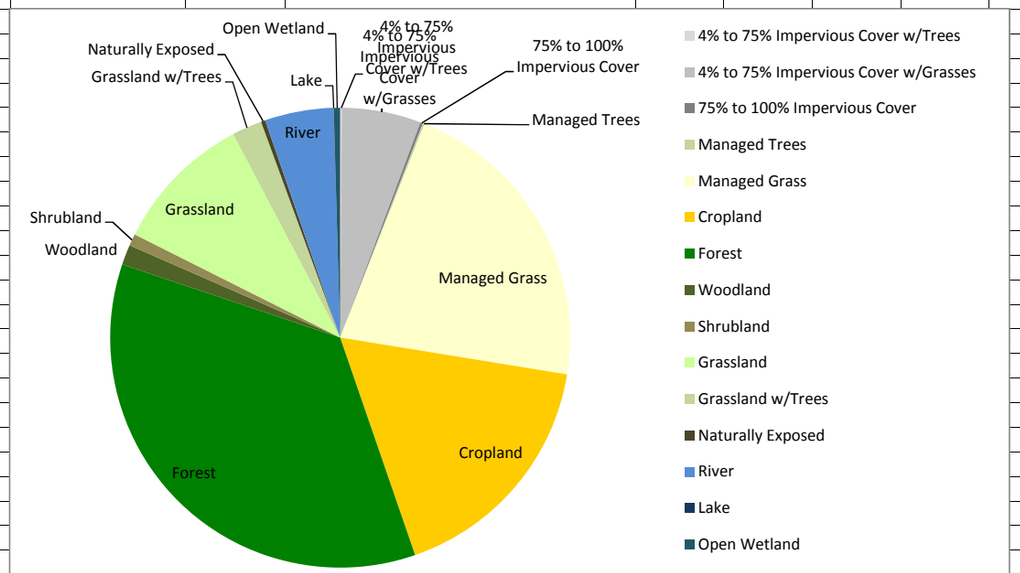
MLCCS Table Value	Table Data	Label
11000	0.44%	4% to 75% Impervious Cover w/Trees
13000	5.09%	4% to 75% Impervious Cover w/Grasses
14000	0.38%	75% to 100% Impervious Cover
21000	0.10%	Managed Trees
23000	6.56%	Managed Grass
24000	23.34%	Cropland
32000	38.76%	Forest
42000	2.80%	Woodland
52000	0.51%	Shrubland
61000	17.76%	Grassland
62000	1.50%	Grassland w/Trees
80000	0.03%	Naturally Exposed
91000	1.47%	River
92000	0.99%	Lake
93000	0.25%	Open Wetland



Houston

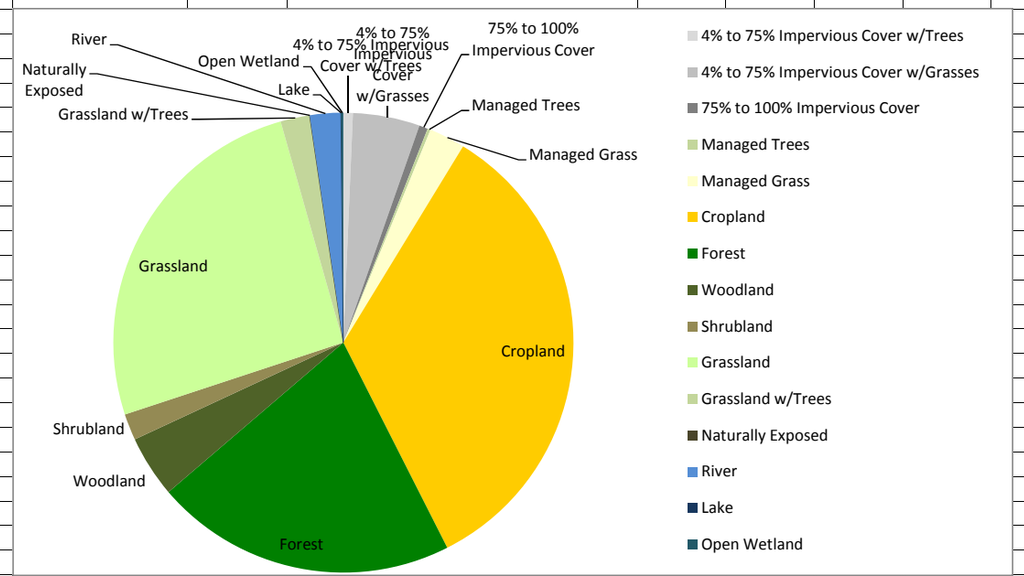
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	19	78014.78	19.28	0.09%	4% to 10% Impervious Cover w/Trees
11220	13	29878.38	7.38	0.03%	11% to 25% Impervious Cover w/Trees
13110	23	80354.91	19.86	0.09%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	40	145507.52	35.96	0.17%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	4	22374.95	5.53	0.03%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	1	23789.37	5.88	0.03%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	66	233457.86	57.69	0.27%	4% to 10% Impervious Cover w/Grasses
13220	157	587988.81	145.30	0.67%	11% to 25% Impervious Cover w/Grasses
13230	355	3775953.58	933.06	4.30%	26% to 50% Impervious Cover w/Grasses
13240	2	13191.33	3.26	0.02%	51% to 75% Impervious Cover w/Grasses
14120	46	33501.71	8.28	0.04%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	14	126109.42	31.16	0.14%	0% to 10% Impervious Cover w/Exposed Earth
21000	25	107977.91	26.68	0.12%	Planted, Maintained, or Cultivated Trees
23200	1080	18945980.17	4681.65	21.57%	Planted and Maintained Grasses
24000	818	15068969.76	3723.62	17.16%	Cropland
32100	1781	30428430.35	7519.03	34.65%	Upland Deciduous Forest
32200	24	707258.67	174.77	0.81%	Wetland Forest
42000	263	1111936.35	274.77	1.27%	Woodland
42200	13	118280.97	29.23	0.13%	Wetland Woodland
52100	195	685109.21	169.29	0.78%	Upland Deciduous Shrublands
52300	14	51995.49	12.85	0.06%	Wetland Deciduous Shrublands
61200	701	6776222.66	1674.44	7.72%	Upland Grassland
61300	88	519730.00	128.43	0.59%	Temporarily Flooded Grasslands
61400	17	558652.92	138.05	0.64%	Saturated Grasslands
61500	16	147668.48	36.49	0.17%	Seasonally Flooded Grasslands
61600	11	60406.88	14.93	0.07%	Semipermanently Flooded Grasslands
61700	11	485639.29	120.00	0.55%	Intermittently Exposed Grassland
61800	20	130383.21	32.22	0.15%	Permanently Flooded Grasslands
62100	341	1629212.99	402.59	1.86%	Grassland w/Sparse Trees
62300	30	229802.13	56.79	0.26%	Temporarily Flooded Grassland w/Sparse Trees
81100	2	4741.08	1.17	0.01%	Cliffs
83210	84	257754.84	63.69	0.29%	Sandy and Gravel Shores
91000	24	4229679.21	1045.18	4.82%	River
92000	1	34395.39	8.50	0.04%	Lake
93000	47	382843.80	94.60	0.44%	Open Wetland
TOTAL	**6346**	**87823194.35**	**21701.58**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.12%	4% to 75% Impervious Cover w/Trees
13000	5.56%	4% to 75% Impervious Cover w/Grasses
14000	0.18%	75% to 100% Impervious Cover
21000	0.12%	Managed Trees
23000	21.57%	Managed Grass
24000	17.16%	Cropland
32000	35.45%	Forest
42000	1.40%	Woodland
52000	0.84%	Shrubland
61000	9.88%	Grassland
62000	2.12%	Grassland w/Trees
80000	0.29%	Naturally Exposed
91000	4.82%	River
92000	0.04%	Lake
93000	0.44%	Open Wetland



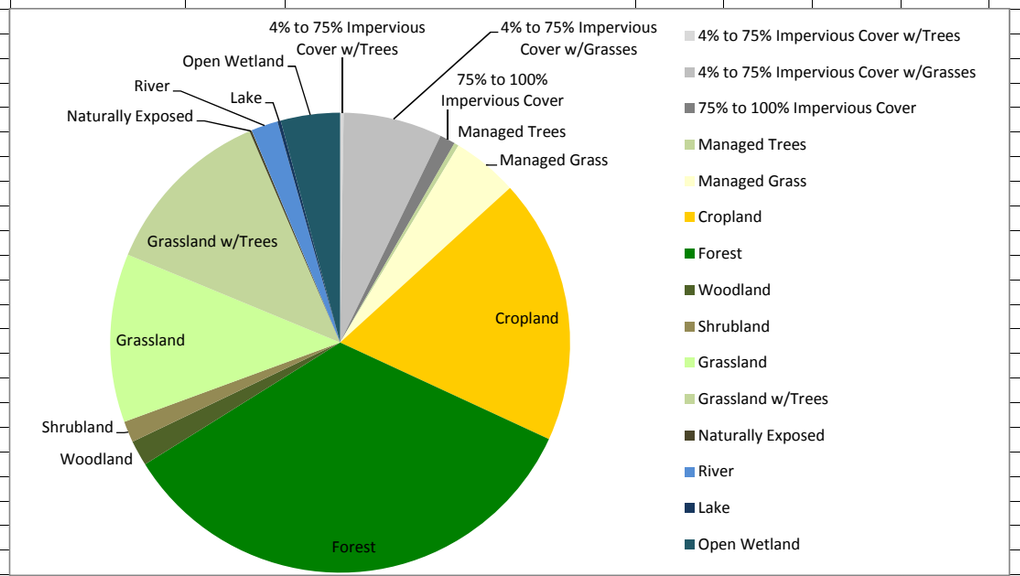
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	42	158090.57	39.07	0.14%	4% to 10% Impervious Cover w/Trees
11220	48	231274.02	57.15	0.20%	11% to 25% Impervious Cover w/Trees
11230	49	340969.27	84.26	0.30%	26% to 50% Impervious Cover w/Trees
11240	5	22351.67	5.52	0.02%	51% to 75% Impervious Cover w/Trees
13110	33	211080.59	52.16	0.18%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	56	423360.43	104.61	0.37%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	33	206480.98	51.02	0.18%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	5	54176.49	13.39	0.05%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	56	258760.20	63.94	0.23%	4% to 10% Impervious Cover w/Grasses
13220	89	551024.18	136.16	0.48%	11% to 25% Impervious Cover w/Grasses
13230	434	3627075.46	896.27	3.15%	26% to 50% Impervious Cover w/Grasses
13240	13	79576.13	19.66	0.07%	51% to 75% Impervious Cover w/Grasses
14110	34	208766.97	51.59	0.18%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	74	298730.49	73.82	0.26%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	33	178448.40	44.10	0.16%	0% to 10% Impervious Cover w/Exposed Earth
14220	2	14081.86	3.48	0.01%	11% to 25% Impervious Cover w/Exposed Earth
21000	60	242144.05	59.84	0.21%	Planted, Maintained, or Cultivated Trees
23200	348	2903437.90	717.46	2.53%	Planted and Maintained Grasses
24000	1593	38898252.52	9611.97	33.83%	Cropland
32100	626	18300573.64	4522.17	15.92%	Upland Deciduous Forest
32200	129	6076879.52	1501.63	5.29%	Wetland Forest
42000	272	3735547.45	923.07	3.25%	Woodland
42200	62	1264046.30	312.35	1.10%	Wetland Woodland
52100	381	1943822.80	480.33	1.69%	Upland Deciduous Shrublands
52300	30	183719.87	45.40	0.16%	Wetland Deciduous Shrublands
61200	1084	25411664.44	6279.36	22.10%	Upland Grassland
61300	210	3816582.85	943.10	3.32%	Temporarily Flooded Grasslands
61400	3	16466.91	4.07	0.01%	Saturated Grasslands
61500	1	4549.20	1.12	0.00%	Seasonally Flooded Grasslands
61600	15	80400.99	19.87	0.07%	Semipermanently Flooded Grasslands
61700	55	119798.39	29.60	0.10%	Intermittently Exposed Grassland
61800	18	41796.37	10.33	0.04%	Permanently Flooded Grasslands
62100	149	2162667.24	534.41	1.88%	Grassland w/Sparse Trees
62300	19	190238.73	47.01	0.17%	Temporarily Flooded Grassland w/Sparse Trees
83210	2	2413.22	0.60	0.00%	Sandy and Gravel Shores
91000	58	2509877.90	620.20	2.18%	River
93000	61	196207.86	48.48	0.17%	Open Wetland
TOTAL	**6182**	**114965335.87**	**28408.55**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.65%	4% to 75% Impervious Cover w/Trees
13000	4.71%	4% to 75% Impervious Cover w/Grasses
14000	0.61%	75% to 100% Impervious Cover
21000	0.21%	Managed Trees
23000	2.53%	Managed Grass
24000	33.83%	Cropland
32000	21.20%	Forest
42000	4.35%	Woodland
52000	1.85%	Shrubland
61000	25.65%	Grassland
62000	2.05%	Grassland w/Trees
80000	0.00%	Naturally Exposed
91000	2.18%	River
92000	0.00%	Lake
93000	0.17%	Open Wetland



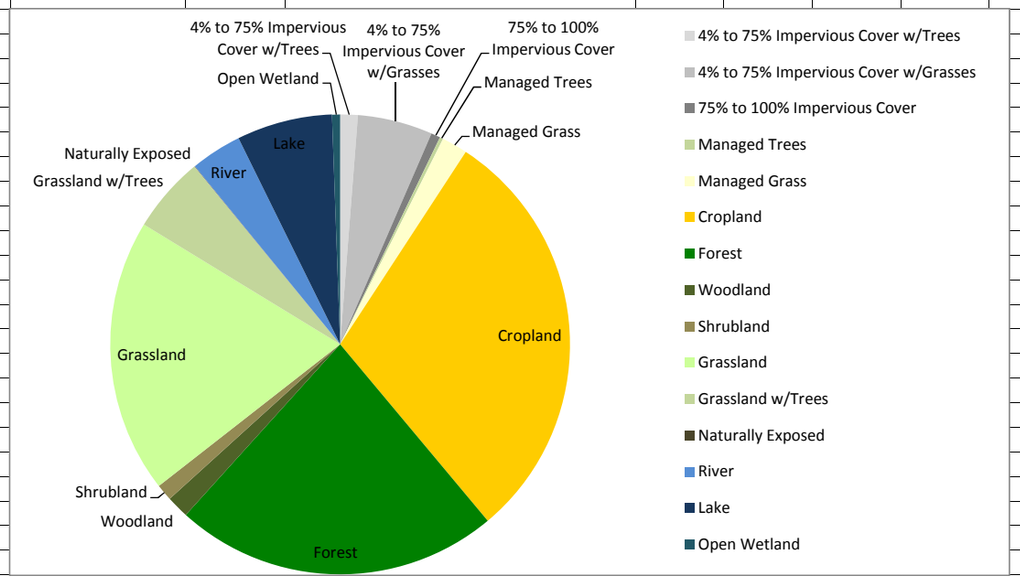
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	18	92793.03	22.93	0.08%	4% to 10% Impervious Cover w/Trees
11220	15	26014.16	6.43	0.02%	11% to 25% Impervious Cover w/Trees
11230	20	148815.48	36.77	0.12%	26% to 50% Impervious Cover w/Trees
11240	7	14247.57	3.52	0.01%	51% to 75% Impervious Cover w/Trees
13110	205	1105705.21	273.23	0.92%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	336	2429387.77	600.31	2.02%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	89	348177.91	86.04	0.29%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	48	254599.13	62.91	0.21%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	58	260850.53	64.46	0.22%	4% to 10% Impervious Cover w/Grasses
13220	58	492878.31	121.79	0.41%	11% to 25% Impervious Cover w/Grasses
13230	406	3479434.72	859.79	2.89%	26% to 50% Impervious Cover w/Grasses
13240	2	7152.68	1.77	0.01%	51% to 75% Impervious Cover w/Grasses
14110	57	253021.04	62.52	0.21%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	96	542995.79	134.18	0.45%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	30	389222.50	96.18	0.32%	0% to 10% Impervious Cover w/Exposed Earth
14220	2	24697.58	6.10	0.02%	11% to 25% Impervious Cover w/Exposed Earth
14230	10	103816.36	25.65	0.09%	26% to 50% Impervious Cover w/Exposed Earth
21000	159	382452.75	94.51	0.32%	Planted, Maintained, or Cultivated Trees
23200	345	5582192.29	1379.39	4.64%	Planted and Maintained Grasses
24000	1132	22451058.61	5547.78	18.65%	Cropland
32100	1416	35135556.87	8682.19	29.19%	Upland Deciduous Forest
32200	174	6073800.31	1500.87	5.05%	Wetland Forest
42000	132	2122674.43	524.52	1.76%	Woodland
42200	11	36889.78	9.12	0.03%	Wetland Woodland
52100	182	1510444.32	373.24	1.25%	Upland Deciduous Shrublands
52300	33	283071.68	69.95	0.24%	Wetland Deciduous Shrublands
61200	756	11585447.65	2862.83	9.62%	Upland Grassland
61300	48	765546.64	189.17	0.64%	Temporarily Flooded Grasslands
61400	83	1338242.77	330.69	1.11%	Saturated Grasslands
61500	27	429554.93	106.15	0.36%	Seasonally Flooded Grasslands
61600	6	25275.04	6.25	0.02%	Semipermanently Flooded Grasslands
61800	13	115504.96	28.54	0.10%	Permanently Flooded Grasslands
62100	677	14607504.02	3609.59	12.13%	Grassland w/Sparse Trees
62300	7	216206.01	53.43	0.18%	Temporarily Flooded Grassland w/Sparse Trees
81100	21	186822.72	46.16	0.16%	Cliffs
83210	4	4978.45	1.23	0.00%	Sandy and Gravel Shores
91000	16	2274345.28	562.00	1.89%	River
92000	11	267351.33	66.06	0.22%	Lake
93000	130	5018942.54	1240.21	4.17%	Open Wetland
TOTAL	**6840**	**120387673.15**	**29748.44**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.23%	4% to 75% Impervious Cover w/Trees
13000	6.96%	4% to 75% Impervious Cover w/Grasses
14000	1.09%	75% to 100% Impervious Cover
21000	0.32%	Managed Trees
23000	4.64%	Managed Grass
24000	18.65%	Cropland
32000	34.23%	Forest
42000	1.79%	Woodland
52000	1.49%	Shrubland
61000	11.84%	Grassland
62000	12.31%	Grassland w/Trees
80000	0.16%	Naturally Exposed
91000	1.89%	River
92000	0.22%	Lake
93000	4.17%	Open Wetland



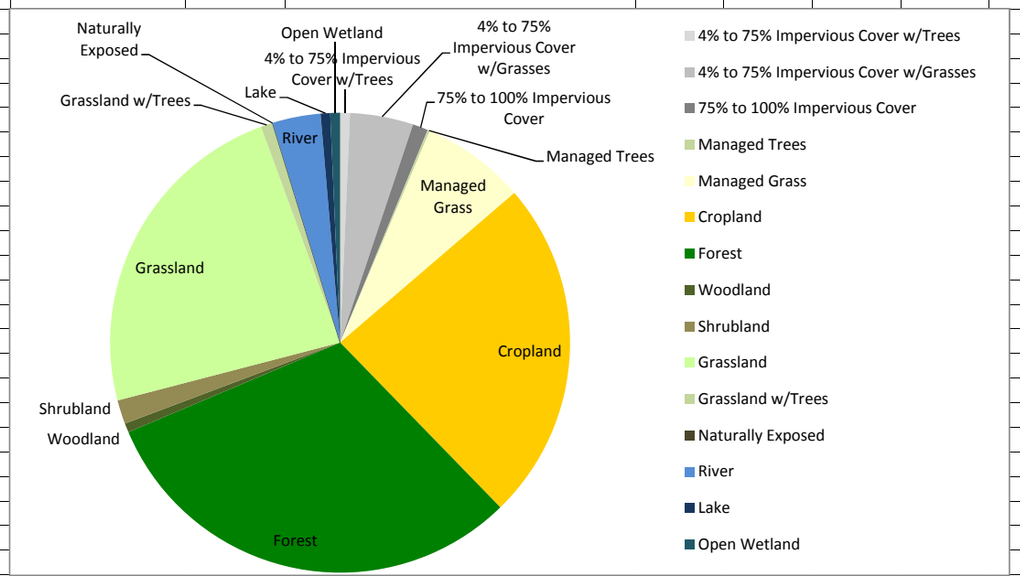
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	21	146116.20	36.11	0.14%	4% to 10% Impervious Cover w/Trees
11220	44	443519.27	109.60	0.44%	11% to 25% Impervious Cover w/Trees
11230	22	327047.37	80.82	0.32%	26% to 50% Impervious Cover w/Trees
11240	32	330777.01	81.74	0.33%	51% to 75% Impervious Cover w/Trees
13110	15	150319.79	37.14	0.15%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	49	664750.40	164.26	0.66%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	4	46674.06	11.53	0.05%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13210	65	662192.19	163.63	0.66%	4% to 10% Impervious Cover w/Grasses
13220	84	855254.06	211.34	0.85%	11% to 25% Impervious Cover w/Grasses
13230	261	2477827.71	612.28	2.46%	26% to 50% Impervious Cover w/Grasses
13240	32	453242.34	112.00	0.45%	51% to 75% Impervious Cover w/Grasses
14110	22	226704.47	56.02	0.22%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	53	267380.11	66.07	0.27%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	11	80596.08	19.92	0.08%	0% to 10% Impervious Cover w/Exposed Earth
14220	3	70910.70	17.52	0.07%	11% to 25% Impervious Cover w/Exposed Earth
21000	21	244218.50	60.35	0.24%	Planted, Maintained, or Cultivated Trees
23200	162	1825709.67	451.14	1.81%	Planted and Maintained Grasses
24000	1037	29957031.05	7402.54	29.72%	Cropland
32100	719	22921028.50	5663.91	22.74%	Upland Deciduous Forest
32200	4	37088.35	9.16	0.04%	Wetland Forest
42000	108	1589200.75	392.70	1.58%	Woodland
52100	144	1172178.18	289.65	1.16%	Upland Deciduous Shrublands
61200	679	14884136.28	3677.95	14.77%	Upland Grassland
61400	89	3259113.71	805.34	3.23%	Saturated Grasslands
61500	15	899849.51	222.36	0.89%	Seasonally Flooded Grasslands
61600	12	399689.95	98.77	0.40%	Semipermanently Flooded Grasslands
62100	193	5347475.81	1321.39	5.31%	Grassland w/Sparse Trees
62300	1	46216.62	11.42	0.05%	Temporarily Flooded Grassland w/Sparse Trees
83210	25	39860.95	9.85	0.04%	Sandy and Gravel Shores
91000	45	3626162.17	896.04	3.60%	River
92000	20	6775995.83	1674.39	6.72%	Lake
93000	36	564710.11	139.54	0.56%	Open Wetland
TOTAL	**4028**	**100792977.70**	**24906.49**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	1.24%	4% to 75% Impervious Cover w/Trees
13000	5.27%	4% to 75% Impervious Cover w/Grasses
14000	0.64%	75% to 100% Impervious Cover
21000	0.24%	Managed Trees
23000	1.81%	Managed Grass
24000	29.72%	Cropland
32000	22.78%	Forest
42000	1.58%	Woodland
52000	1.16%	Shrubland
61000	19.29%	Grassland
62000	5.35%	Grassland w/Trees
80000	0.04%	Naturally Exposed
91000	3.60%	River
92000	6.72%	Lake
93000	0.56%	Open Wetland



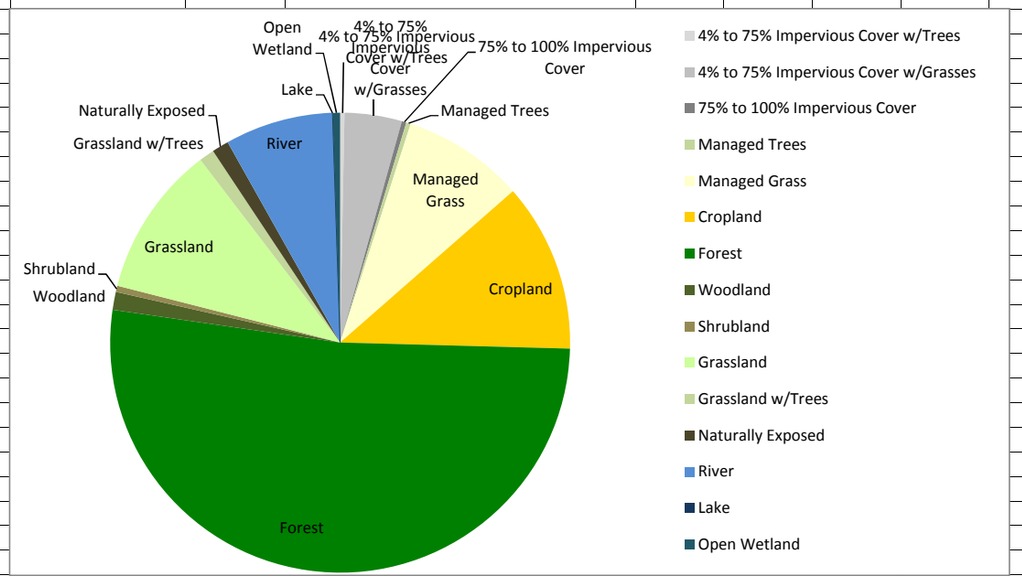
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	21	59290.61	14.65	0.19%	4% to 10% Impervious Cover w/Trees
11220	23	73285.79	18.11	0.23%	11% to 25% Impervious Cover w/Trees
11230	16	82731.91	20.44	0.26%	26% to 50% Impervious Cover w/Trees
11240	1	5864.15	1.45	0.02%	51% to 75% Impervious Cover w/Trees
13110	7	21801.73	5.39	0.07%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	31	103521.03	25.58	0.32%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	20	111374.44	27.52	0.35%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	2	15040.31	3.72	0.05%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	5	8657.47	2.14	0.03%	4% to 10% Impervious Cover w/Grasses
13220	61	272137.29	67.25	0.85%	11% to 25% Impervious Cover w/Grasses
13230	117	869610.34	214.89	2.71%	26% to 50% Impervious Cover w/Grasses
13240	3	20770.38	5.13	0.06%	51% to 75% Impervious Cover w/Grasses
14110	10	23060.36	5.70	0.07%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	73	269692.13	66.64	0.84%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	8	57561.27	14.22	0.18%	0% to 10% Impervious Cover w/Exposed Earth
21000	29	45812.81	11.32	0.14%	Planted, Maintained, or Cultivated Trees
23200	287	2349820.24	580.65	7.33%	Planted and Maintained Grasses
24000	334	7697584.60	1902.11	24.02%	Cropland
32100	475	9765605.55	2413.13	30.47%	Upland Deciduous Forest
32200	13	140244.13	34.66	0.44%	Wetland Forest
42000	48	203738.96	50.35	0.64%	Woodland
42200	2	2308.99	0.57	0.01%	Wetland Woodland
52100	159	485227.15	119.90	1.51%	Upland Deciduous Shrublands
52300	8	49987.18	12.35	0.16%	Wetland Deciduous Shrublands
61200	319	6542247.33	1616.62	20.42%	Upland Grassland
61300	64	847437.59	209.41	2.64%	Temporarily Flooded Grasslands
61400	10	76480.26	18.90	0.24%	Saturated Grasslands
61500	6	9202.39	2.27	0.03%	Seasonally Flooded Grasslands
61600	9	30747.53	7.60	0.10%	Semipermanently Flooded Grasslands
61700	1	7131.23	1.76	0.02%	Intermittently Exposed Grassland
61800	6	9136.88	2.26	0.03%	Permanently Flooded Grasslands
62100	58	259981.52	64.24	0.81%	Grassland w/Sparse Trees
62300	1	1294.12	0.32	0.00%	Temporarily Flooded Grassland w/Sparse Trees
83210	5	4275.73	1.06	0.01%	Sandy and Gravel Shores
91000	30	1086629.35	268.51	3.39%	River
92000	5	213975.21	52.87	0.67%	Lake
93000	53	221460.62	54.72	0.69%	Open Wetland
TOTAL	**2320**	**32044729**	**7918**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.69%	4% to 75% Impervious Cover w/Trees
13000	4.44%	4% to 75% Impervious Cover w/Grasses
14000	1.09%	75% to 100% Impervious Cover
21000	0.14%	Managed Trees
23000	7.33%	Managed Grass
24000	24.02%	Cropland
32000	30.91%	Forest
42000	0.64%	Woodland
52000	1.67%	Shrubland
61000	23.47%	Grassland
62000	0.82%	Grassland w/Trees
80000	0.01%	Naturally Exposed
91000	3.39%	River
92000	0.67%	Lake
93000	0.69%	Open Wetland

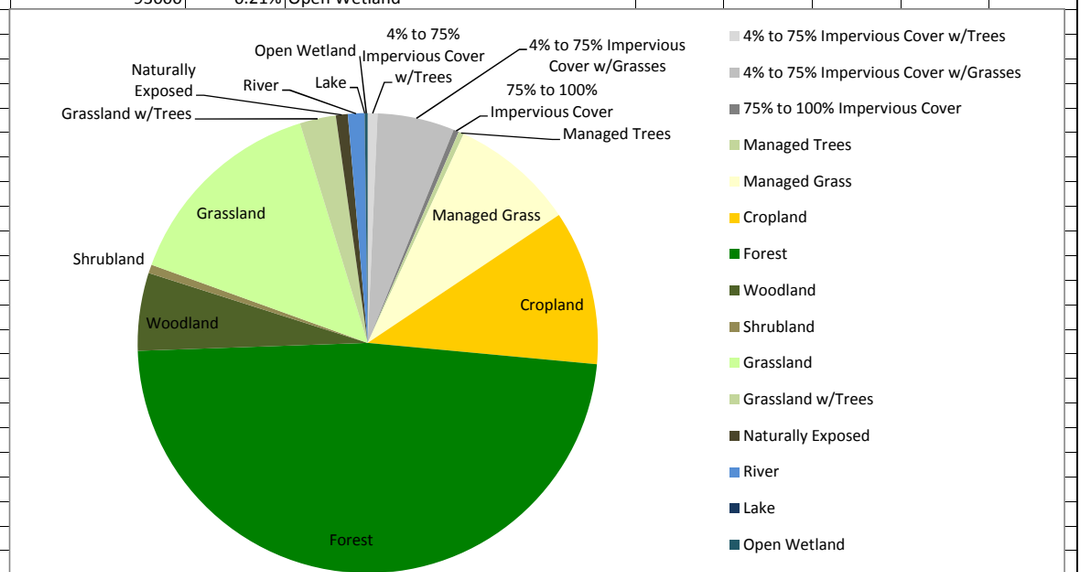


MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	30	200223.12	49.48	0.25%	4% to 10% Impervious Cover w/Trees
11220	11	29074.76	7.18	0.04%	11% to 25% Impervious Cover w/Trees
11230	4	27025.15	6.68	0.03%	26% to 50% Impervious Cover w/Trees
13110	26	132586.28	32.76	0.16%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	45	252978.40	62.51	0.31%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	7	40311.74	9.96	0.05%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	1	10524.04	2.60	0.01%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	43	139497.65	34.47	0.17%	4% to 10% Impervious Cover w/Grasses
13220	67	240408.84	59.41	0.29%	11% to 25% Impervious Cover w/Grasses
13230	215	2464289.67	608.94	3.02%	26% to 50% Impervious Cover w/Grasses
13240	3	7131.68	1.76	0.01%	51% to 75% Impervious Cover w/Grasses
14110	5	29861.69	7.38	0.04%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	39	128715.74	31.81	0.16%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	24	93221.89	23.04	0.11%	0% to 10% Impervious Cover w/Exposed Earth
21000	46	260920.29	64.47	0.32%	Planted, Maintained, or Cultivated Trees
23200	583	7006866.63	1731.43	8.58%	Planted and Maintained Grasses
24000	562	9707903.83	2398.88	11.88%	Cropland
32100	873	41723296.66	10310.05	51.07%	Upland Deciduous Forest
32200	32	645292.30	159.46	0.79%	Wetland Forest
42000	188	986226.10	243.70	1.21%	Woodland
42200	10	39961.63	9.87	0.05%	Wetland Woodland
52100	115	318911.50	78.80	0.39%	Upland Deciduous Shrublands
52300	5	42816.71	10.58	0.05%	Wetland Deciduous Shrublands
61200	1089	6349580.26	1569.02	7.77%	Upland Grassland
61300	45	454798.45	112.38	0.56%	Temporarily Flooded Grasslands
61400	19	254499.74	62.89	0.31%	Saturated Grasslands
61500	28	501490.95	123.92	0.61%	Seasonally Flooded Grasslands
61600	26	574787.23	142.03	0.70%	Semipermanently Flooded Grasslands
61700	26	274352.61	67.79	0.34%	Intermittently Exposed Grassland
61800	42	278998.74	68.94	0.34%	Permanently Flooded Grasslands
62100	170	814997.99	201.39	1.00%	Grassland w/Sparse Trees
62300	2	46240.34	11.43	0.06%	Temporarily Flooded Grassland w/Sparse Trees
83210	273	968613.15	239.35	1.19%	Sandy and Gravel Shores
91000	41	6214159.62	1535.55	7.61%	River
93000	26	433178.94	107.04	0.53%	Open Wetland
TOTAL	**4721**	**81693744.32**	**20186.96**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.31%	4% to 75% Impervious Cover w/Trees
13000	4.02%	4% to 75% Impervious Cover w/Grasses
14000	0.31%	75% to 100% Impervious Cover
21000	0.32%	Managed Trees
23000	8.58%	Managed Grass
24000	11.88%	Cropland
32000	51.86%	Forest
42000	1.26%	Woodland
52000	0.44%	Shrubland
61000	10.64%	Grassland
62000	1.05%	Grassland w/Trees
80000	1.19%	Naturally Exposed
91000	7.61%	River
92000	0.00%	Lake
93000	0.53%	Open Wetland



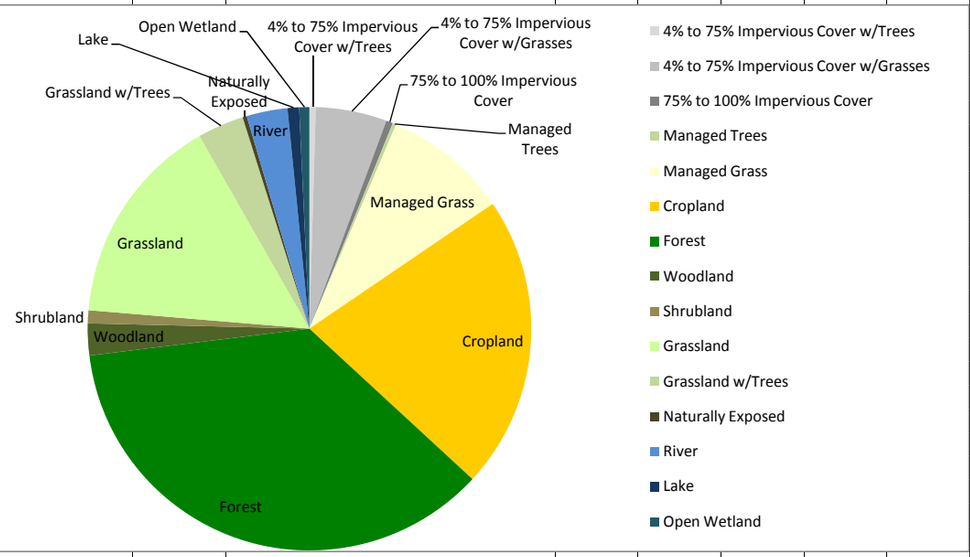
MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description	MLCCS Table Value	Table Data	Label
11210	75	353754.49	87.41	0.31%	4% to 10% Impervious Cover w/Trees	11000	0.67%	4% to 75% Impervious Cover w/Trees
11220	51	324721.15	80.24	0.28%	11% to 25% Impervious Cover w/Trees	13000	5.42%	4% to 75% Impervious Cover w/Grasses
11230	8	85703.35	21.18	0.07%	26% to 50% Impervious Cover w/Trees	14000	0.37%	75% to 100% Impervious Cover
11240	2	4955.33	1.22	0.00%	51% to 75% Impervious Cover w/Trees	21000	0.37%	Managed Trees
13110	53	342038.63	84.52	0.30%	4% to 10% Impervious Cover w/Grasses and Sparse Trees	23000	8.76%	Managed Grass
13120	63	448178.27	110.75	0.39%	11% to 25% Impervious Cover w/Grasses and Sparse Trees	24000	10.88%	Cropland
13130	28	231857.26	57.29	0.20%	26% to 50% Impervious Cover w/Grasses and Sparse Trees	32000	47.98%	Forest
13210	80	417916.69	103.27	0.37%	4% to 10% Impervious Cover w/Grasses	42000	5.46%	Woodland
13220	75	346917.10	85.73	0.30%	11% to 25% Impervious Cover w/Grasses	52000	0.60%	Shrubland
13230	282	4348495.42	1074.54	3.80%	26% to 50% Impervious Cover w/Grasses	61000	14.71%	Grassland
13240	11	64085.04	15.84	0.06%	51% to 75% Impervious Cover w/Grasses	62000	2.53%	Grassland w/Trees
14110	11	69519.31	17.18	0.06%	76% to 90% Impervious Cover w/Buildings and Pavement	80000	0.84%	Naturally Exposed
14120	40	272718.73	67.39	0.24%	91% to 100% Impervious Cover w/Buildings and Pavement	91000	1.16%	River
14210	14	78549.93	19.41	0.07%	0% to 10% Impervious Cover w/Exposed Earth	92000	0.03%	Lake
21000	44	427066.95	105.53	0.37%	Planted, Maintained, or Cultivated Trees	93000	0.21%	Open Wetland
23200	602	10022784.33	2476.68	8.76%	Planted and Maintained Grasses			
24000	663	12445939.25	3075.46	10.88%	Cropland			
32100	906	53967446.36	13335.65	47.19%	Upland Deciduous Forest			
32200	19	908564.94	224.51	0.79%	Wetland Forest			
42000	450	6249082.23	1544.18	5.46%	Woodland			
42200	1	444.15	0.11	0.00%	Wetland Woodland			
52100	139	684673.21	169.19	0.60%	Upland Deciduous Shrublands			
61200	998	15980035.99	3948.75	13.97%	Upland Grassland			
61300	23	202546.35	50.05	0.18%	Temporarily Flooded Grasslands			
61400	4	26703.71	6.60	0.02%	Saturated Grasslands			
61500	5	8100.44	2.00	0.01%	Seasonally Flooded Grasslands			
61600	19	233761.40	57.76	0.20%	Semipermanently Flooded Grasslands			
61700	19	282263.62	69.75	0.25%	Intermittently Exposed Grassland			
61800	19	90683.70	22.41	0.08%	Permanently Flooded Grasslands			
62100	361	2871567.05	709.58	2.51%	Grassland w/Sparse Trees			
62300	4	27427.82	6.78	0.02%	Temporarily Flooded Grassland w/Sparse Trees			
83210	181	956965.68	236.47	0.84%	Sandy and Gravel Shores			
91000	57	1323750.66	327.11	1.16%	River			
92000	1	32191.56	7.95	0.03%	Lake			
93000	17	236522.76	58.45	0.21%	Open Wetland			
TOTAL	**5325**	**114367932.83**	**28260.93**	**100.00%**				



Region

MLCCS Code	Polygon Count	Area (meters)	Area (acres)	Percentage	Landuse Description
11210	362	1530088.55	378.09	0.15%	4% to 10% Impervious Cover w/Trees
11220	334	1583620.08	391.32	0.15%	11% to 25% Impervious Cover w/Trees
11230	155	1146339.14	283.27	0.11%	26% to 50% Impervious Cover w/Trees
11240	49	393680.93	97.28	0.04%	51% to 75% Impervious Cover w/Trees
13110	462	2418434.85	597.61	0.23%	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	813	5257810.30	1299.23	0.51%	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	256	1342144.57	331.65	0.13%	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	69	463627.57	114.56	0.04%	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	566	2624012.53	648.41	0.25%	4% to 10% Impervious Cover w/Grasses
13220	1018	4913101.78	1214.05	0.47%	11% to 25% Impervious Cover w/Grasses
13230	3481	35927830.02	8877.96	3.47%	26% to 50% Impervious Cover w/Grasses
13240	108	825354.81	203.95	0.08%	51% to 75% Impervious Cover w/Grasses
14110	175	1043020.03	257.74	0.10%	76% to 90% Impervious Cover w/Buildings and Pavement
14120	635	2449173.89	605.20	0.24%	91% to 100% Impervious Cover w/Buildings and Pavement
14210	184	1348235.00	333.16	0.13%	0% to 10% Impervious Cover w/Exposed Earth
14220	10	131537.12	32.50	0.01%	11% to 25% Impervious Cover w/Exposed Earth
14230	10	103816.36	25.65	0.01%	26% to 50% Impervious Cover w/Exposed Earth
21000	615	2661385.81	657.64	0.26%	Planted, Maintained, or Cultivated Trees
23200	6884	94245368.83	23288.54	9.10%	Planted and Maintained Grasses
24000	10325	221589710.72	54756.01	21.39%	Cropland
32100	11248	360445404.32	89068.00	34.79%	Upland Deciduous Forest
32200	407	14651207.12	3620.39	1.41%	Wetland Forest
42000	2544	22292468.16	5508.59	2.15%	Woodland
42200	116	1726729.87	426.68	0.17%	Wetland Woodland
52100	2002	9126280.78	2255.15	0.88%	Upland Deciduous Shrublands
52300	107	682040.01	168.54	0.07%	Wetland Deciduous Shrublands
61200	9646	139182420.51	34392.73	13.43%	Upland Grassland
61300	847	9137701.05	2257.98	0.88%	Temporarily Flooded Grasslands
61400	243	5695653.62	1407.43	0.55%	Saturated Grasslands
61500	108	2064881.42	510.24	0.20%	Seasonally Flooded Grasslands
61600	117	1581460.28	390.79	0.15%	Semipermanently Flooded Grasslands
61700	118	1259804.50	311.30	0.12%	Intermittently Exposed Grassland
61800	200	829437.08	204.96	0.08%	Permanently Flooded Grasslands
62100	3106	33769800.87	8344.70	3.26%	Grassland w/Sparse Trees
62300	127	1251588.97	309.27	0.12%	Temporarily Flooded Grassland w/Sparse Trees
81100	23	191563.80	47.34	0.02%	Cliffs
83210	892	2889056.48	713.90	0.28%	Sandy and Gravel Shores
91000	374	30951691.30	7648.33	2.99%	River
92000	43	8717660.16	2154.18	0.84%	Lake
93000	477	7708046.18	1904.70	0.74%	Open Wetland
TOTAL	**59256**	**1036153189.40**	**256039.03**	**100.00%**	

MLCCS Table Value	Table Data	Label
11000	0.45%	4% to 75% Impervious Cover w/Trees
13000	5.19%	4% to 75% Impervious Cover w/Grasses
14000	0.49%	75% to 100% Impervious Cover
21000	0.26%	Managed Trees
23000	9.10%	Managed Grass
24000	21.39%	Cropland
32000	36.20%	Forest
42000	2.32%	Woodland
52000	0.95%	Shrubland
61000	15.42%	Grassland
62000	3.38%	Grassland w/Trees
80000	0.30%	Naturally Exposed
91000	2.99%	River
92000	0.84%	Lake
93000	0.74%	Open Wetland



MLCCS code	Code Description
0	Unknown
10000	Artificial surfaces
11000	Artificial Surfaces w/Tree Cover
11210	4% to 10% Impervious Cover w/Trees
11220	11% to 25% Impervious Cover w/Trees
11230	26% to 50% Impervious Cover w/Trees
11240	51% to 75% Impervious Cover w/Trees
13000	Artificial Surfaces w/Grass Cover
13110	4% to 10% Impervious Cover w/Grasses and Sparse Trees
13120	11% to 25% Impervious Cover w/Grasses and Sparse Trees
13130	26% to 50% Impervious Cover w/Grasses and Sparse Trees
13140	51% to 75% Impervious Cover w/Grasses and Sparse Trees
13210	4% to 10% Impervious Cover w/Grasses
13220	11% to 25% Impervious Cover w/Grasses
13230	26% to 50% Impervious Cover w/Grasses
13240	51% to 75% Impervious Cover w/Grasses
14000	Artificial Surfaces w/Buildings and Pavement
14110	76% to 90% Impervious Cover w/Buildings and Pavement
14120	91% to 100% Impervious Cover w/Buildings and Pavement
14200	Artificially Exposed Earth
14210	0% to 10% Impervious Cover w/Exposed Earth
14220	11% to 25% Impervious Cover w/Exposed Earth
14230	26% to 50% Impervious Cover w/Exposed Earth
20000	Planted or Cultivated Vegetation
21000	Planted, Maintained, or Cultivated Trees
21100	Planted, Maintained, or Cultivated Coniferous Trees
21200	Planted, Maintained, or Cultivated Deciduous Trees
21300	Planted, Maintained, or Cultivated Mixed Trees
23200	Planted and Maintained Grasses
23211	Planted and Maintained Short Grasses
23212	Planted and Maintained Long Grasses
24000	Cropland
24110	Cropland on Upland Soils
24120	Cropland on Hydric Soils
30000	Forests
31100	Upland Coniferous Forest
31200	Wetland Coniferous Forest
32100	Upland Forest
32100	Upland Deciduous Forest
32200	Wetland Forest
32200	Wetland Deciduous Forest
32200	Wetland Forest
33100	Upland Mixed Forest
42000	Woodland
42200	Wetland Woodland
50000	Shrublands
51100	Wetland Coniferous/Evergreen Shrublands
52100	Upland Shrublands
52100	Upland Deciduous Shrublands
52300	Wetland Shrublands
52300	Wetland Deciduous Shrublands
60000	Herbaceous
61200	Upland Grassland
61300	Temporarily Flooded Grasslands
61400	Saturated Grasslands
61500	Seasonally Flooded Grasslands
61600	Semipermanently Flooded Grasslands
61700	Intermittently Exposed Grassland
61800	Permanently Flooded Grasslands
62100	Grassland w/Sparse Trees
62300	Temporarily Flooded Grassland w/Sparse Trees
80000	Sparse Vegetation
81100	Cliffs
81200	Upland Sparse Vegetation
82000	Upland Naturally Exposed Earth
83200	Wetland Sparse Vegetation
83210	Sandy and Gravel Shores
83310	Mud Flats
90000	Water
91000	River
92000	Lake
93000	Open Wetland