Rapid Watershed Assessment
Shell Rock
(MN / IA) HUC: 07080202

DRAFT

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land–owners and local leaders set priorities and determine the best actions to achieve their goals.

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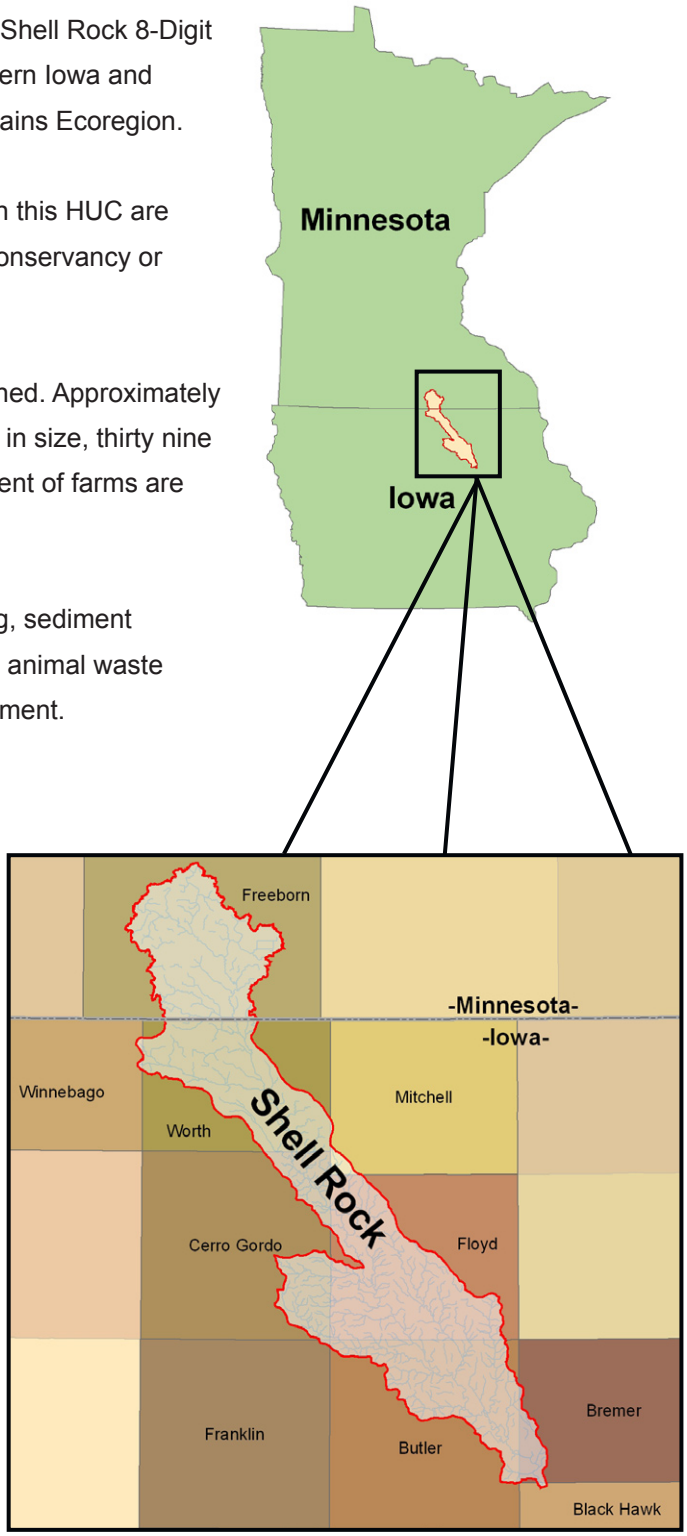
Introduction

Located in Southeast Minnesota and Northeast Iowa, the Shell Rock 8-Digit Hydrologic Unit Code (HUC) subbasin lies within the Eastern Iowa and Minnesota Drift Plains portion of the Western Corn Belt Plains Ecoregion.

Approximately ninety eight percent of the 692,712 acres in this HUC are privately owned. The remaining acres are state, county, conservancy or federal lands or held by corporate interests.

Assessment estimates indicate 1,798 farms in the watershed. Approximately fifty two percent of the operations are less than 180 acres in size, thirty nine percent are from 180 to 1000 acres in size, and nine percent of farms are greater than 1000 acres in size.

The main resource concerns in the watershed are flooding, sediment and erosion control, drinking and source water protection, animal waste management, nutrient management and wetland management.



County Totals

County	Acres in HUC	% HUC
Winnebago - IA	1,063	0.2%
Mitchell	4,992	0.7%
Worth	138,605	20.0%
Cerro Gordo	67,182	9.7%
Floyd	178,888	25.8%
Bremer	16,271	2.3%
Franklin	477	0.1%
Butler	127,675	18.4%
Black Hawk	348	0.1%
Freeborn	157,211	22.7%
Total acres:	**692,710**	**100%**

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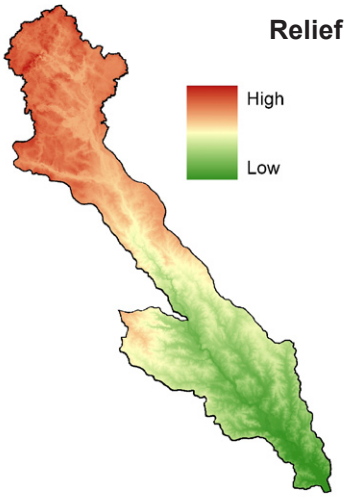
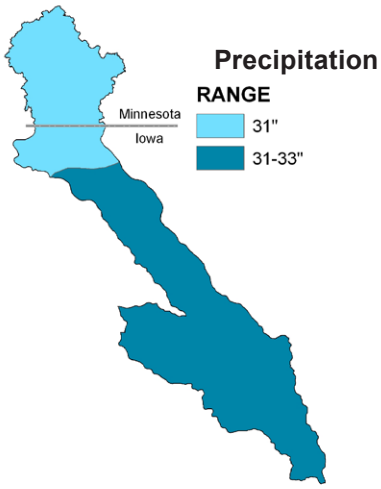
Physical Description

Elevations in the Shell Rock watershed range from approximately 1,380 feet above sea level to elevations of 865 feet, with an average elevation of 1080 feet above mean sea level.



Precipitation in the watershed ranges from 31 to 33 inches each year. Evaporation estimates for the Minnesota portion of the subbasin are between 31 to 34 inches annually (Minnesota State Climatologists Office, 1999).

Soils within this HUC are predominantly highly productive and well suited to agricultural uses. Primary land uses / land covers are Row Crops (78.6%), Residential/Commercial Development (8.4%), Grass/Pasture/Hay (7.4%), Forest (2.2%), and Wetlands (2.1%).

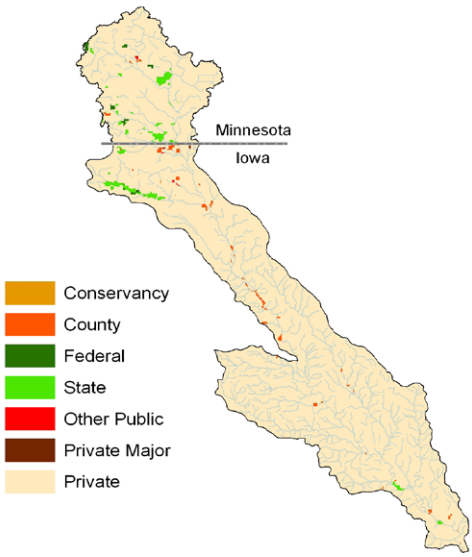


Land use within the watershed is largely agricultural, with rowcrops and pasture/grass lands accounting for approximately 86% of the overall watershed acres.

Development pressure is low to moderate in most areas, with occasional farms, timberland, and shoreline being parceled out for development, recreation or country homes.

Ownership[1]

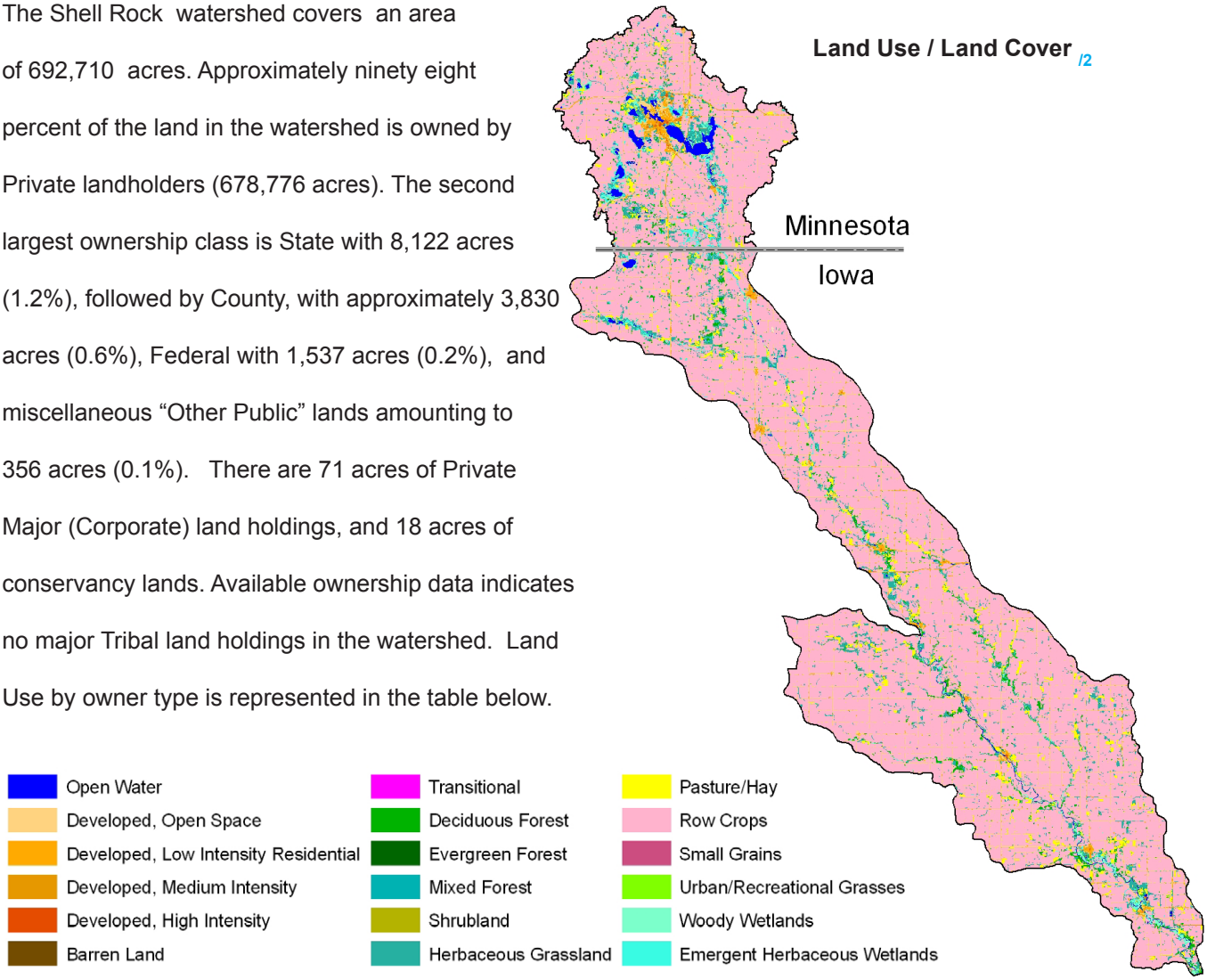
Ownership Type	Acres	% of HUC
Conservancy	18	0.003
County	3,830	0.6
Federal	1,537	0.2
State	8,122	1.2
Other	356	0.1
Tribal	-	-
Private Major	71	0.01
Private	678,776	98.0
Total Acres:	**692,710**	**100**



* Ownership totals derived from 2007 MN DNR GAP Stewardship and Iowa GAP Coverage data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

Ownership / Land Use

The Shell Rock watershed covers an area of 692,710 acres. Approximately ninety eight percent of the land in the watershed is owned by Private landholders (678,776 acres). The second largest ownership class is State with 8,122 acres (1.2%), followed by County, with approximately 3,830 acres (0.6%), Federal with 1,537 acres (0.2%), and miscellaneous "Other Public" lands amounting to 356 acres (0.1%). There are 71 acres of Private Major (Corporate) land holdings, and 18 acres of conservancy lands. Available ownership data indicates no major Tribal land holdings in the watershed. Land Use by owner type is represented in the table below.



Ownership / Land Use /3

	Public		Private**		Tribal			
Landcover/Use	**Acres**	**% Public**	**Acres**	**% Private**	**Acres**	**% Tribal**	**Total Acres**	**Percent**
Forest	1,045	0.2%	13,989	2.0%	0	0.0%	15,034	2.2%
Grass, etc	4,685	0.7%	46,857	6.8%	0	0.0%	51,542	7.4%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	2,997	0.4%	541,363	78.2%	0	0.0%	544,360	78.6%
Shrub etc	0	0.0%	361	0.1%	0	0.0%	361	0.1%
Wetlands	3,182	0.5%	11,611	1.7%	0	0.0%	14,793	2.1%
Residential/Commercial	690	0.1%	57,277	8.3%	0	0.0%	57,967	8.4%
Open Water*	1,113	0.2%	7,340	1.1%	0	0.0%	8,453	1.2%
Watershed Totals:	**13,713**	**1.98%**	**678,798**	**98.0%**	**0**	**0.0%**	**692,710**	**100%**

* ownership undetermined ** includes private-major

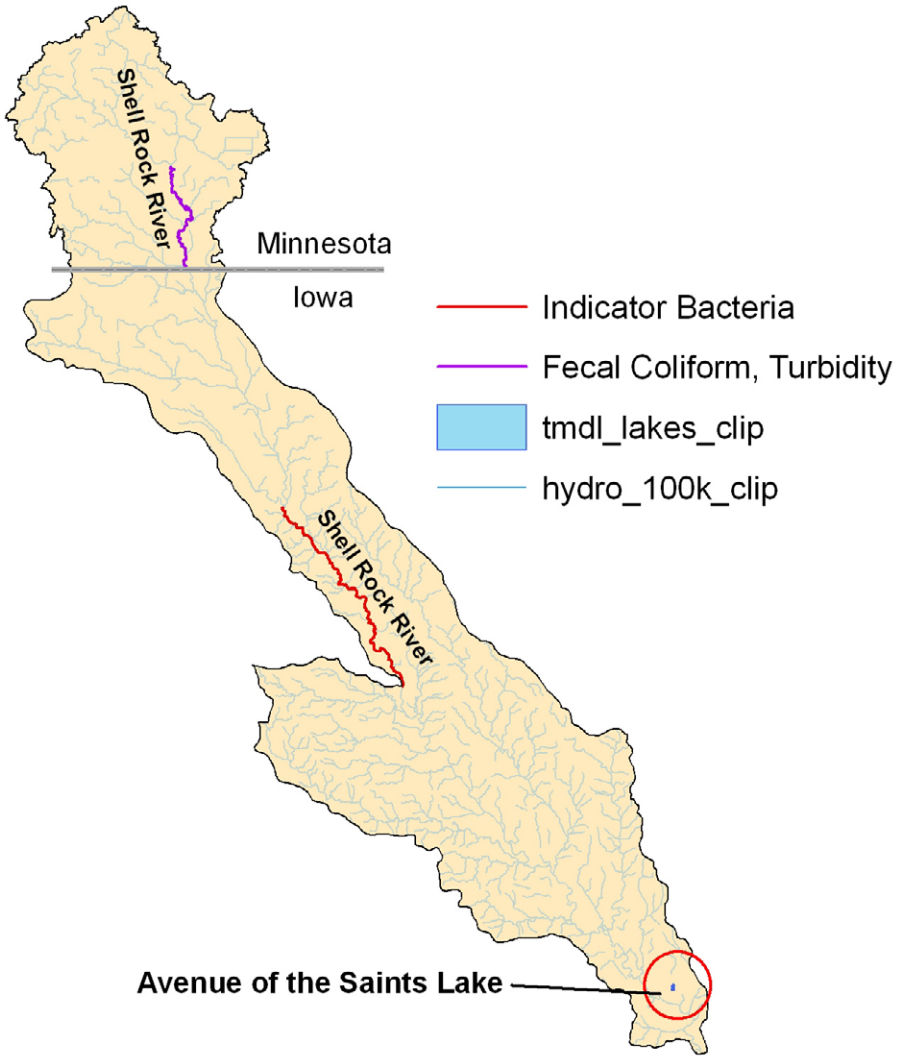
Physical Description (continued)

			cu. ft/sec
Stream Flow Data	USGS 05462000 Shell Rock River at Shell Rock, IA	**2007 Total Avg.**	1,408
		May–Sep. 2007 Avg.	1,421
Stream Data[4] *(*Percent of Total HUC Stream Miles)*		**MILES**	**PERCENT**
	Total Miles – (100K Hydro GIS Layer)	1,174	---
	303d/TMDL Listed Streams (DEQ)	34.4	2.9%
Riparian Land Cover/Land Use[5] *(Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)*	**Land Use Type**	**Acres**	**Percent**
	Forest	1,798	6.3%
	Grain Crops	0	0.0%
	Grass, etc	4,804	16.9%
	Orchards	0	0.0%
	Row Crops	16,088	56.7%
	Shrub etc	5	0.0%
	Wetlands	2,379	8.4%
	Residential/Commercial	1,855	6.5%
	Open Water*	1,450	5.1%
	Total Buffer Acres:	**28,378**	**100%**
Crop and Pastureland Land Capability Class[6] *(NLCD Croplands & Pasturelands extracted from SSURGO Non-irrigated Land Capability Classification)*	**1** – slight limitations	26,845	5%
	2 – moderate limitations	256,014	46%
	3 – severe limitations	204,942	37%
	4 – very severe limitations	51,727	9%
	5 – no erosion hazard, but other limitations	5,238	1%
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	11,131	2%
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	0	0%
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	5,238	1%
	Total NLCD Crop/Pasture land (MN)	**561,136**	-
Irrigated Lands[7] *(Adjusted 2002 NASS Irrigated Cropland Totals)*	**TYPE OF LAND**	**Acres**	**% of Crop Lands** / **% of HUC**
	Cultivated Cropland / Pastureland	1,572.9	0.2% / 0.003%
	Uncultivated Cropland	0	0% / 0%
	Total Irrigated Lands	1,572.9	0.2% / 0.003%

Assessment of Waters

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury.

2006 TMDL Listed Waters - Shell Rock [8]



Listed Stream	Impairment	Affected Use
Shell Rock River	Indicator Bacteria	Primary Contact
Shell Rock River Albert Lea Lk to Goose Creek	Turbidity, Fecal Coliform	Aquatic Life
Avenue of the Saints Lake	Turbidity, Algae	Aquatic Life & Recreation

Common Resource Areas[9]

A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area (General Manual Title 450 Subpart C 401.21)

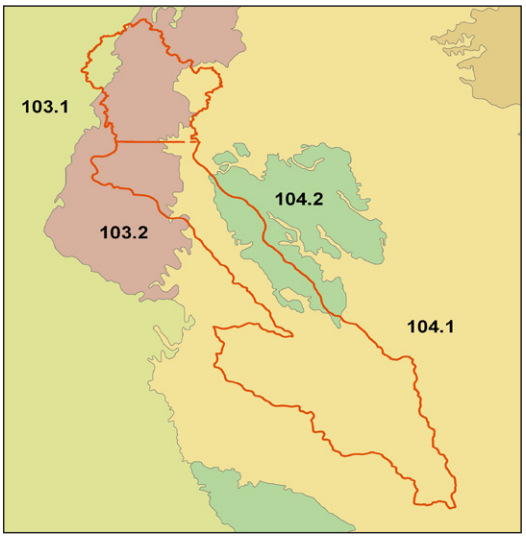
Common Resource Areas are created by subdividing MLRAs by resource concerns, soil groups, hydrologic units, resource use, topography, other landscape features, and human considerations affecting use and treatment needs.

The Shell Rock Watershed encompasses four common resource areas, 103.1, 103.2, 104.1 and 104.2.

103.1 Iowa and Minnesota Till Prairies: Primarily loamy glacial till soils with scattered lacustrine areas, potholes, outwash and flood plains. Nearly level to gently undulating with relatively short slopes. Most of the wet soils have been artificially drained to maximize crop production. Primary land use is cropland. Corn, soybeans, sugar beets, peas and sweet corn are the major crops. Native vegetation was dominantly tall grass prairie. Resource concerns are water and wind erosion, nutrient management, and water quality.

103.2 Iowa and Minnesota Rolling Prairie/Forest Moraines: Primarily loamy glacial till soils with some potholes, outwash and flood plains. Gently undulating to rolling with relatively short, complex slopes. Organic soils occur in the larger basins. Primary land use is cropland. Corn, soybeans, and hay are the major crops. Native vegetation was dominantly mixed tall grass prairie and deciduous trees. Resource concerns are water and wind erosion, nutrient management, water quality and wildlife habitat management.

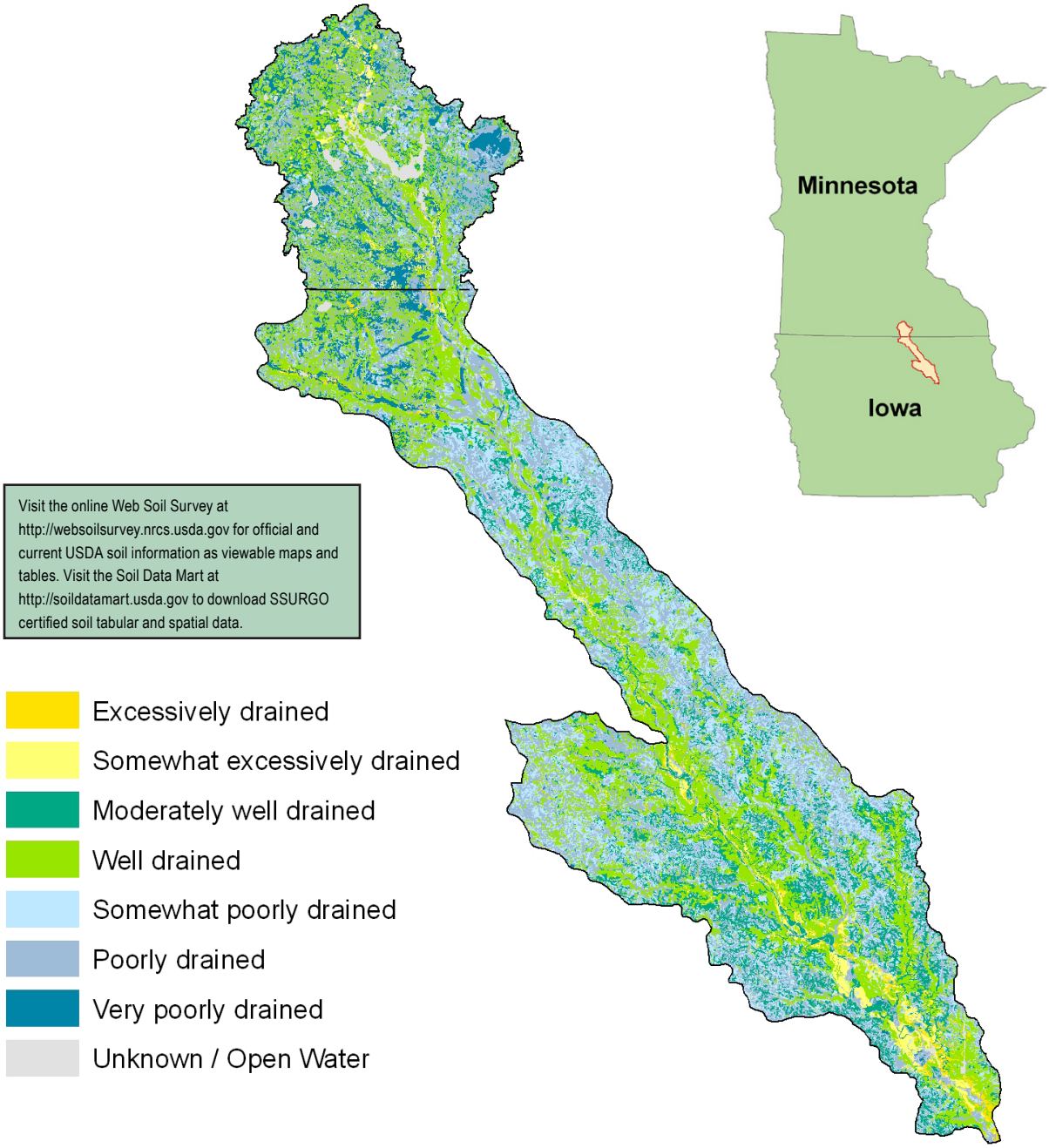
104.1 Silty and Loamy Mantled Firm Till Plain: Gently sloping to very steep dissected till plain. Soils are predominantly well drained and are formed in thin silty material over loamy till, underlain by sedimentary bedrock. Cropland and grazing land on ridge tops and valley bottoms with a mix of dairy, beef and cash grain agricultural enterprises. Deciduous forest on side slopes. Primary resource concerns are cropland erosion, surface water quality, grazing land and woodland productivity, and soil erosion during timber harvest.



Only the major CRA units are described herein.
For further information, go to:
http://soils.usda.gov/survey/geography/cra.html

104.2 Eastern Iowa Eroded Till Plain: This area is made up of broad upland, nearly level to moderately sloping, moderately well drained to poorly drained soils that formed in silty/loamy material over glacial till. Many low gradient drainage ways are common in this unit. Native vegetation was mostly prairie with timber and brush in valleys and steeper side slopes. Corn and soybeans are common crops with many swine and poultry production facilities. Resource concerns are soil erosion, water quality and nutrient management.

Drainage Classification /10



Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized–excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”

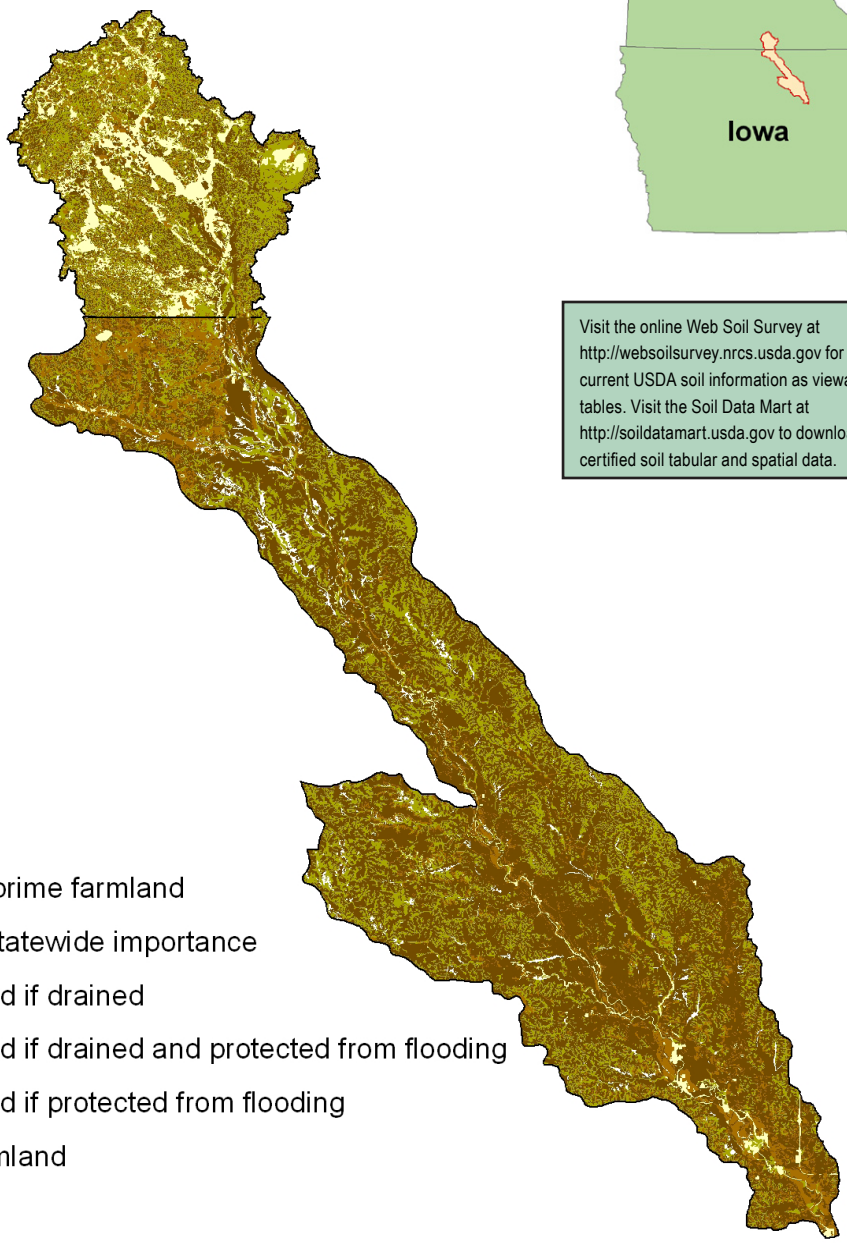
Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.

Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.



- All areas are prime farmland
- Farmland of statewide importance
- Prime farmland if drained
- Prime farmland if drained and protected from flooding
- Prime farmland if protected from flooding
- Not prime farmland

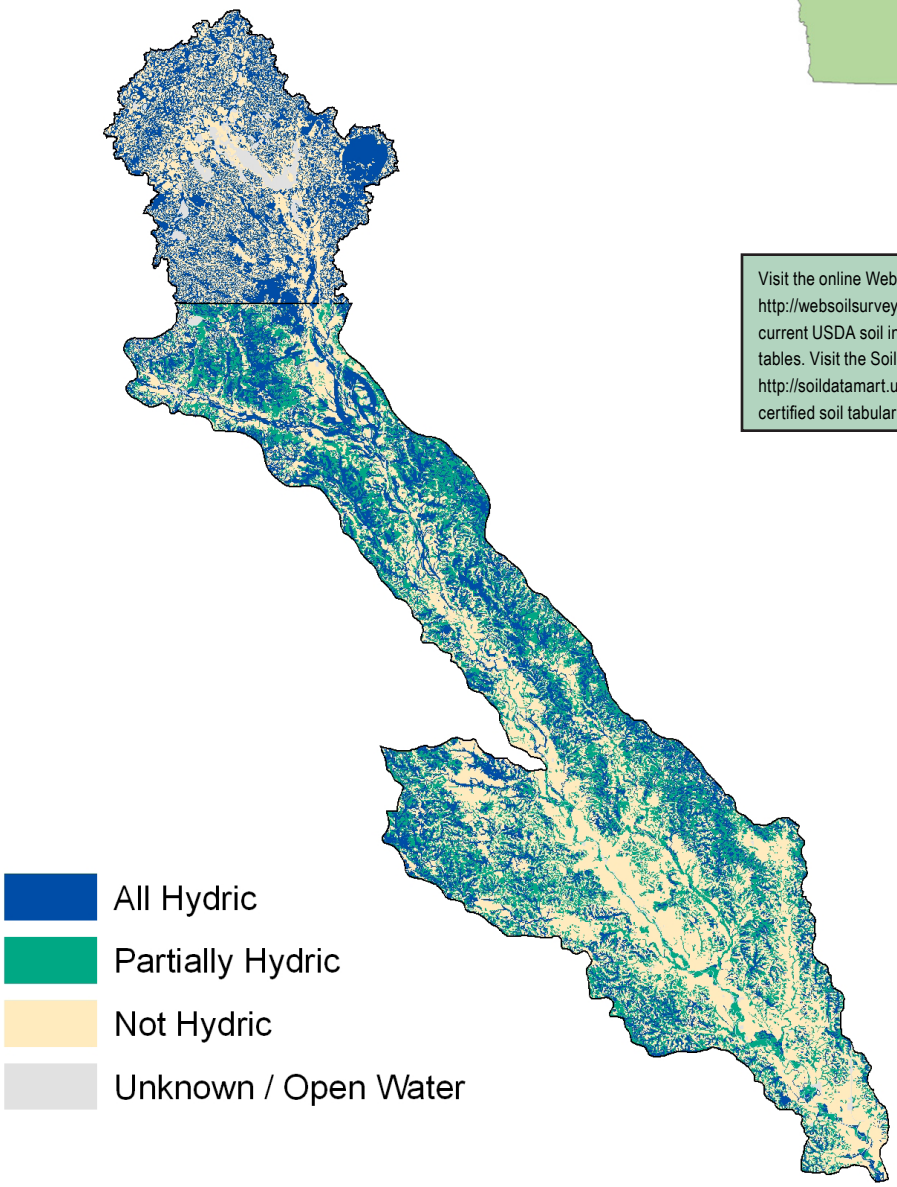
Note: Historical Soil Determination Standards, scale, and methodology can vary on a county-to-county basis, leading to irregularities in thematic maps representing farmclass determinations.

Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non–hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

Visit the online Web Soil Survey at http://websoilsurvey.nrcs.usda.gov for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at http://soildatamart.usda.gov to download SSURGO certified soil tabular and spatial data.



Note: Historical Hydric Soil Determination Standards, scale, and methodology can vary on a county-to-county basis, leading to irregularities in thematic maps representing hydric soil determinations.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

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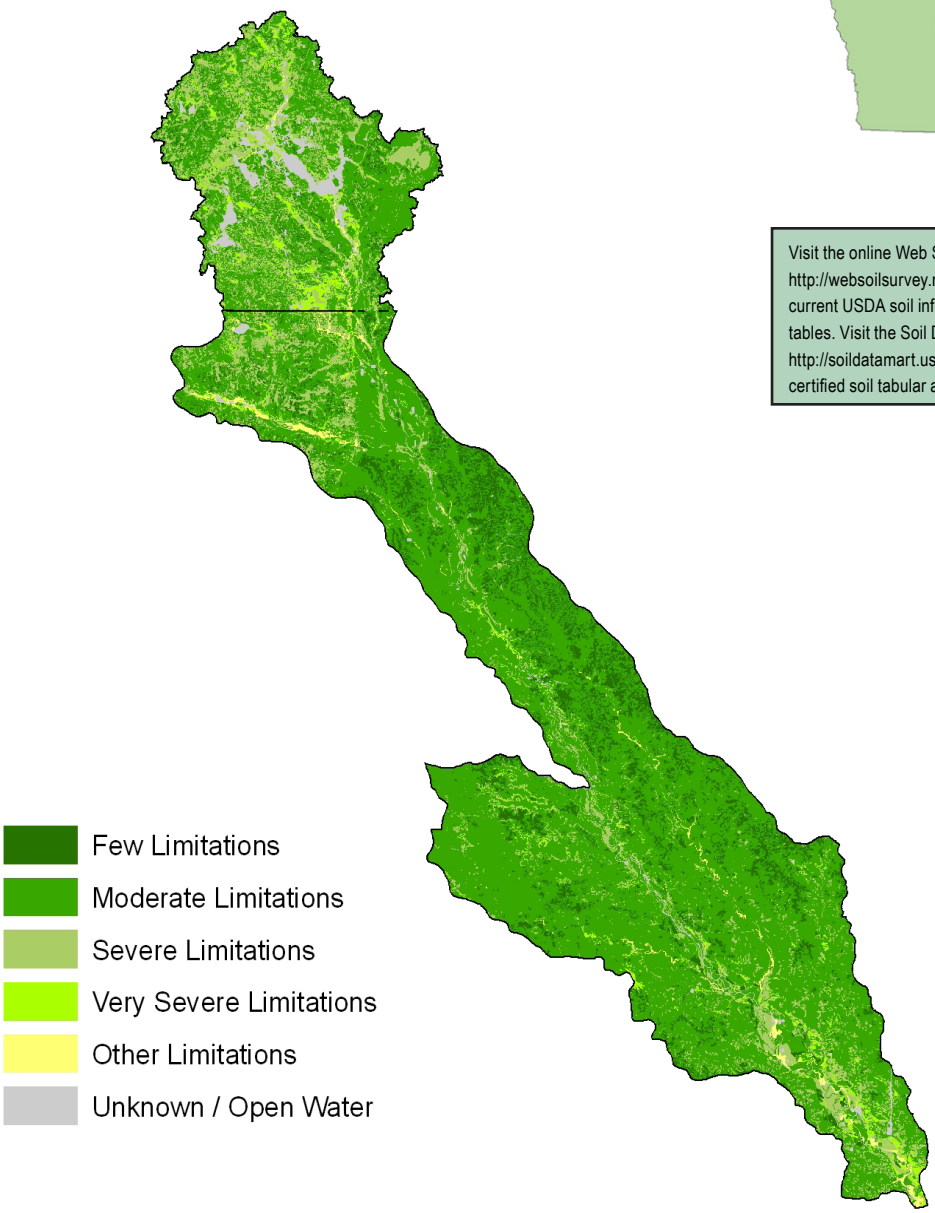


Performance Results System Data

PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	MN & IA TOTALS
Total Conservation Systems Planned (acres)	4,764	20,147	13,854	15,137	18,446	N/A	23,940	25,761	23,795	145,844
Total Conservation Systems Applied (acres)	5,907	15,549	10,717	14,103	15,195	N/A	22,184	21,769	27,097	132,521
Conservation Practices										
Total Waste Management (313) (numbers)	0	3	0	1	2	0	1	1	0	8
Riparian Forest Buffers (391) (acres)	275	190	385	875	130	12	68	68	7	2,010
Erosion Control Total Soil Saved (tons/year)	3,965	43,985	32,524	33,443	31,524	N/A	N/A	N/A	N/A	145,441
Total Nutrient Management (590) (Acres)	1,646	4,727	3,109	4,798	2,656	1,320	2,118	4,974	2,960	28,308
Pest Management Systems Applied (595A) (Acres)	1,646	2,607	3,109	3,787	2,709	804	2,150	5,254	1,958	24,024
Prescribed Grazing 528a (acres)	0	26	0	30	46	126	129	0	0	357
Tree & Shrub Establishment (612) (acres)	173	282	508	151	40	28	51	51	23	1,307
Residue Management (329A-C) (acres)	5,303	12,819	4,127	6,265	6,179	9,460	13,336	4,897	1,578	63,964
Total Wildlife Habitat (644 - 645) (acres)	1,528	2,602	5,785	4,755	5,072	526	2,458	3,534	3,744	30,004
Total Wetlands Created, Restored, or Enhanced (acres)	253	675	444	876	862	256	1,564	526	475	5,931
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	3,090	5,410	7,276	6,445	4,128	N/A	2,652	4,351	3,088	36,440
Wetlands Reserve Program	0	2,021	945	380	1,167	N/A	1,653	429	1,075	7,670
Environmental Quality Incentives Program	1,074	9,070	2,583	2,925	1,451	N/A	3,851	5,074	5,960	31,988
Wildlife Habitat Incentive Program	0	0	0	0	0	N/A	0	0	10	10
Farmland Protection Program	0	0	0	0	0	N/A	0	0	0	0

THREATENED AND ENDANGERED SPECIES/14

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered, and candidate species as well as species of special concern that occur in or near both the Minnesota and Iowa portions of the subbasin.

Common Name	Scientific Name	Class	Common Name	Scientific Name	Class
Central Newt	Notophthalmus viridescens	AMPHIBIANS	Water Starwort	Callitriche heterophylla	PLANTS (DICOTS)
Mudpuppy	Necturus maculosus	AMPHIBIANS	Yellow Monkey Flower	Mimulus glabratus	PLANTS (DICOTS)
Common Moorhen	Gallinula chloropus	BIRDS	Deep Green Sedge	Carex tonsa	PLANTS (MONOCOTS)
American Brook Lamprey	Lampetra appendix	FISH	Field Sedge	Carex conoidea	PLANTS (MONOCOTS)
Black Redhorse	Moxostoma duquesnei	FISH	Hidden Sedge	Carex umbellata	PLANTS (MONOCOTS)
Orangethroat Darter	Etheostoma spectabile	FISH	Northern Panic-grass	Dichanthelium boreale	PLANTS (MONOCOTS)
Western Sand Darter	Ammocrypta clara	FISH	Purple Fringed Orchid	Platanthera psycodes	PLANTS (MONOCOTS)
Creek Heelsplitter	Lasmigona compressa	FRESHWATER MUSSELS	Sullivant's Milkweed	Asclepias sullivantii	PLANTS (DICOTS)
Creeper	Strophitus undulatus	FRESHWATER MUSSELS	Small White Lady's Slipper	Cypripedium candidum	PLANTS (MONOCOTS)
Cylindrical Papershell	Anodontoides ferussacianus	FRESHWATER MUSSELS	Sterile Sedge	Carex sterilis	PLANTS (MONOCOTS)
Ellipse	Venustaconcha ellipsiformis	FRESHWATER MUSSELS	Tall Cotton Grass	Eriophorum angustifolium	PLANTS (MONOCOTS)
Slippershell Mussel	Alasmidonta viridis	FRESHWATER MUSSELS	Tawny Cottongrass	Eriophorum virginicum	PLANTS (MONOCOTS)
Yellow Sandshell	Lampsilis teres	FRESHWATER MUSSELS	Tubercled Orchid	Platanthera flava	PLANTS (MONOCOTS)
Dion Skipper	Euphyes dion	INSECTS	Yellow-eyed Grass	Xyris torta	PLANTS (MONOCOTS)
Bigroot Prickly-pear	Opuntia macrorhiza	PLANTS (DICOTS)	Bog Clubmoss	Lycopodium inundatum	PLANTS (PTERIODOPHYTES)
Rattlesnake Master	Eryngium yuccifolium	PLANTS (DICOTS)	Crowfoot Clubmoss	Lycopodium digitatum	PLANTS (PTERIODOPHYTES)
Brittle Prickly Pear	Opuntia fragilis	PLANTS (DICOTS)	Leathery Grape Fern	Botrychium multifidum	PLANTS (PTERIODOPHYTES)
Buckbean	Menyanthes trifoliata	PLANTS (DICOTS)	Tuberous Indian-plantain	Arnoglossum plantagineum	PLANTS (PTERIODOPHYTES)
Crossleaf Milkwort	Polygala cruciata	PLANTS (DICOTS)	Northern Adder's-tongue	Ophioglossum pusillum	PLANTS (PTERIODOPHYTES)
Earleaf Foxglove	Tomanthera auriculata	PLANTS (DICOTS)	Woodland Horsetail	Equisetum sylvaticum	PLANTS (PTERIODOPHYTES)
Eastern Jointweed	Polygonella articulata	PLANTS (DICOTS)	Blanding's Turtle	Emydoidea blandingii	REPTILES
Lance-leaved Violet	Viola lanceolata	PLANTS (DICOTS)	Smooth Green Snake	Liochlorophis vernalis	REPTILES
Orange Grass St. John's Wort	Hypericum gentianoides	PLANTS (DICOTS)	Red-shouldered Hawk	Buteo lineatus	BIRDS
Pink Milkwort	Polygala incarnata	PLANTS (DICOTS)	Topeka Shiner	Notropis topeka	FISH
Racemed Milkwort	Polygala polygama	PLANTS (DICOTS)	Short-eared Owl	Asio flammeus	BIRDS
Sage Willow	Salix candida	PLANTS (DICOTS)	Blacknose Shiner	Notropis heterolepis	FISH
Slender Copperleaf	Acalypha gracilens	PLANTS (DICOTS)	Western Prairie Fringed Orchid	Platanthera praeclara	PLANTS (MONOCOTS)
Small Fringed Gentian	Gentianopsis procera	PLANTS (DICOTS)	Wood Turtle	Clemmys insculpta	REPTILES
Valerian	Valeriana edulis ssp. ciliata	PLANTS (DICOTS)	Beaked Snakeroot	Sanicula trifoliata	PLANTS (DICOTS)

RESOURCE CONCERNS

Conservation Districts in the watershed have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

- **Sediment and Erosion Control.** Excessive amounts of suspended solids from cropland, urban lands, streambanks and streambeds is a primary threat to area waters. Working hand-in-hand with waste management and prevention plans and nutrient management plans, counties in the watershed seek to retain water on the landscape to reduce flooding and subsequent soil erosion, and improve water resources.

- **Drinking Water and Source Water Protection.** Parts of the region are particularly susceptible to groundwater contamination. Ease of infiltration, aging septic systems, abandoned wells and historical tiling practices threaten public drinking water supplies.

- **Feedlot and Animal Waste Management**. Managing farms to minimize excess nutrients, pathogens, and odors released into the environment is important to the health of surface and ground water. Setback of open tile intakes and placement of agricultural waste systems in high priority riparian areas and areas with highly permeable soils will greatly reduce the effects of animal feed operations on area waters.

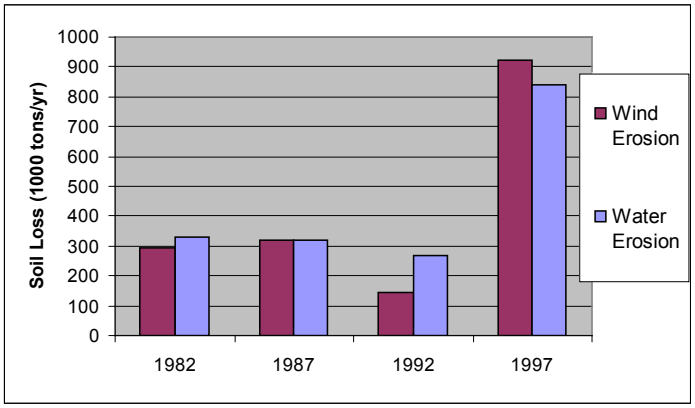
- **Nutrient Management.** Excessive amounts of nutrients, namely phosphorus and nitrogen, contaminate groundwater and create nuisance algae presence in area waters. Major contributors are cropland, urban grasses, municipal wastewater, aging or non-compliant septic systems, and internal cycling.

- **Wetland Management.** Due to the historical draining of much of the areas wetlands and homgenic agricultural practices, priority is given to both wetland preservation and restoration. Wetlands that have been filled and drained retain their characteristic soil and hydrology, often allowing their natural functions to be reclaimed. Restoration is a complex process requiring planning, implementation, monitoring, and management.

NRI Soil Loss Estimates /13

- NRI estimates for sheet and rill erosion by water on cropland and pastureland ***increased*** by approximately 512,900 tons of soil between 1982 and 1997 (155%).

- NRI estimates for wind erosion on crop and pastureland ***increased*** by 626,300 tons of soil between 1982 and 1997 (212%).



Socioeconomic and Agricultural Data (Relevant)

Estimations for the Shell Rock subbasin indicate a current population of 50,149 people. Median household income throughout the district is approximately $39,110 annually, roughly 84% of the national average.

Unemployment figures for the basin indicate an unemployment rate of 3.9 percent. Census data shows sixty eight percent of the population over the age of 18 is active in the workforce, and approximately 9% of the residents in the watershed are living below the national poverty level.

Assessment estimates indicate 1,798 farms in the watershed. Approximately fifty two percent of the operations are less than 180 acres in size, thirty nine percent are from 180 to 1000 acres in size, and nine percent of farms are greater than 1000 acres in size. Of the 1,946 operators in the Basin, seventy percent are full time producers not reliant on off-farm income.

(MN) HUC# 7080201		Total Acres:	1,085,007
Population Data*	Watershed Population	50,149	
	Unemployment Rate	3.9%	
	Median Household Income	39,109	
	% below poverty level	9%	
	Median Value of Home	70,850	
Farm Data	# of Farms	1,798	
	# of Operators	1,946	**Percent**
	# of Full Time Operators	1,360	70%
	# of Part Time Operators	586	30%
	Total Cropland Acres	**561,136**	81.0%
Farm Size	1 to 49 Acres	10	28%
	50 to 179 Acres	8	24%
	180 to 499 Acres	9	24%
	500 to 999 Acres	5	15%
	1,000 Acres or more	3	9%
	Average Farm Size	**70**	
Livestock & Poultry	Cattle - Beef	6,454	1%
	Cattle - Dairy	2,377	0%
	Chicken	4,034	1%
	Swine	300,251	46%
	Turkey	11,675	2%
	Other	328,137	50%
	Animal Count Total:	**652,929**	
	Total Permitted AFOs:	**431**	

* Adjusted by percent of HUC in the county or by percent of block group area in the HUC, depending on the level of data available

Watershed Projects, Plans and Monitoring

- **Basin Alliance for the Lower Mississippi in MN**
  (BALMM)
- **Eastern Iowa Basins Study**
  U.S. Geological Survey
- **Albert Lea Lake Dam Project**
  Shell Rock River Watershed District
- **Coldwater/Palmer Improvement Project**
  Iowa NRCS / Iowa State University
- **EPA Targeted Watersheds Grant Project**
  US Environmental Protection Agency
- **Larkers Dry Creek Monitoring Project**
  IOWATER - Citizen Monitoring
- **Mississippi Source Water Protection Project**
  Minnesota Department of Health
- **Mississippi River WS Forest Partnership**
  USDA Forest Service
- **Mississippi River Watershed Fund**
  USDA Forest Service / National Fish & Wildlife Federation
- **Mississippi River Basin W.Q. Plan**
  Minnesota Pollution Control Agency
- **Water Quality Assessment - E IA Basins**
  U.S.Geological Survey
- **Wedge Creek Restoration**
  Shell Rock River Watershed District

*** Have a watershed project you'd like to see included? Submit suggestions online @ http://www.mn.nrcs.usda.gov/technical/rwa/**

Conservation Districts, Organizations & Partners

- **Basin Alliance for the Lower Mississippi in MN**
  18 Wood Lake Drive SE Rochester, MN 55904
  Phone (507) 280-3592
- **Conservation Districts of Iowa**
  1711 Osceola Ave Chariton, IA 50049
  Phone (641)774-4461
- **Cedar River Preservation Foundation**
  PO Box 48 St. Ansgar, Iowa 50472
  Phone: (515) 736-4878
- **Freeborn County SWCD**
  1400 W Main St, Albert Lea, MN 56007
  Phone (507) 373-5607
- **Hiawatha Valley RC&D**
  1485 Industrial Drive NW Rochester, MN 55901
  Phone (507) 282-6153
- **Iowa Natural Heritage Foundation**
  505 Fifth Ave., Suite 444 Des Moines, IA 50309
  Phone (515)288-1846
- **Iowa Department of Natural Resources**
  502 E. 9th Street, Des Moines, IA 50319-0034
  Phone (515) 281-5918
- **IOWATER - Iowa DNR**
  109 Trowbridge Hall Iowa City, IA 52242
  www.iowater.net
- **Iowa Assoc. of County Conservation Boards**
  405 SW 3rd St., Ste 1 Ankeny, Iowa 50021
  Phone (515) 963-9582
- **Iowa NRCS - USDA**
  210 Walnut Street Des Moines, IA 50309
  On the Web: www.ia.nrcs.usda.gov
- **Minnesota Department of Natural Resources**
  500 Lafayette Road St. Paul, MN 55155-4040
  Phone (651) 296-6157
- **Minnesota NRCS - USDA**
  375 Jackson Street, Suite 600 St Paul, MN 55101
  On the Web: www.mn.nrcs.usda.gov
- **Mower County SWCD**
  1408 21st Ave NW Ste 2, Austin, MN 55912
  Phone (507) 434-2603
- **Shell Rock River Watershed District**
  P.O. Box 1147, Albert Lea, MN 56007
  Phone (507) 377-5785
- **Trout Unlimited Iowa**
  Decorah, Iowa
  On the Web: www.iadriftless.org
- **Northeast Iowa RC&D**
  101 E. Greene Street Postville, Iowa 52162
  Phone (563) 864-7112

Footnotes / Bibliography

1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc & Iowa Gap analysis Land Stewardship Data. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. IA Stewardship Data: Iowa Gap Analysis Program, Iowa Cooperative Fish and Wildlife Research Unit, 1/1/2002.

2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 20010631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.

3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.

4. U.S. Geological Survey National Hydrography Dataset (NHD) 1:100,000-scale Digital Line Graph (DLG) medium resolution hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). The Hydro 100k layer was compared to MPCA's 303(d) data to derive percentage of listed waters.

5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.

6. Land Capability Class. SSURGO - Nonirrigated Capability Class - Land Classification:This data is a derived product from the digital soil survey and generally is the most detailed level of soil geographic data developed by the National Cooperative Soil Survey. All the county layers were dissolved with single-part option using the attribute field, then merged into one layer using ArcMap 9.1 by MN NRCS RWA Staff to create this final product at the HUC8 Level. Land capability Classification was then extracted to areas classified as Crop and Pasture Land in the processed 2001 NLCD data.

7. 2002 NASS Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. For more information: http://www.agcensus.usda.gov/

8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. http://www.pca.state.mn.us/water/tmdl/index.html#maps.

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Footnotes / Bibliography (continued)

9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at http://soildatamart.nrcs.gov. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Addendum and publication dates vary by county.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm (7/30/04). CREP Acres: http://www.bwsr.state.mn.us/easements/crep/easementsummary.html (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. http://www.nrcs.usda.gov/Technical/efotg/. Where listed, Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 http://www.nmfs.noaa.gov/sfa/magact/

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, http://www.nrcs.usda.gov/programs/watershed/Purpose. Additional Information on listed individual projects can be obtained from the noted parties.

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