

The Middle Des Moines River Rapid Watershed Assessment (RWA) provides initial estimates of where conservation investments would best address the resource concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help landowners and local leaders set priorities and determine the best actions to achieve their goals to conserve and improve soil and water resources.

The Middle Des Moines River Watershed 8-Digit Hydrologic Unit Code (HUC) contains 1,203,644 acres. Fifteen percent of the watershed is in Pocahontas County, 3.65 percent in Humboldt County, 31.71 percent in Webster County, 3.13 percent in Greene County, 25.24 percent in Boone County, 7.86 percent in Dallas County, 9.03 percent in Polk County, and the remaining 4.37 percent is split between Buena Vista, Clay, Palo Alto, Wright, Calhoun, Hamilton, and Story counties (1). Four percent of the watershed is publicly owned, and 96 percent is privately owned (2).

Seventy-five percent of the watershed is in row crop, 6.7 percent is pasture or hayland, 8.8 percent in woodland, natural area, or wetland, 1.2 percent is water, and 8.6 percent is developed or urban areas (3). Elevations range from 1471.52 feet to 761.09 feet (4). The primary Land Capability Class in the watershed is class 2. The Land Capability Class (LCC) breakdown for the watershed is: 15 percent in class 1; 63.7 percent in class 2; 11.5 percent in class 3; 1.1 percent in class 4; 1.1 percent in class 5; 1.9 percent in class 6; 2.6 percent in class 7; and 0.5 percent in class 8 (5). Rainfall ranges from 29 to 35 inches per year (6).

The HUC includes 11 state highways (3, 4, 7, 10, 15, 17, 141, 144, 175, 210, and 415) and three US Highways (20, 30, and 169) (7).

Conservation assistance is provided by 13 Soil and Water Conservation Districts (SWCD) and 13 Natural Resources Conservation (NRCS) Field Offices, which are mutually located in the towns of Spencer, Emmetsburg, Pocahontas, Humboldt, Rockwell City, Fort Dodge, Webster City, Jefferson, Boone, Nevada, Adel, and Ankeny. Four Resource Conservation and Development (RC&D) offices cover the watershed include Iowa Lakes RC&D in Spencer, Prairie Partners RC&D in Humboldt, Prairie Rivers RC&D in Ames, and Iowa Heartland RC&D in Ankeny. An office locator is found at <http://offices.sc.egov.usda.gov/locator/app>

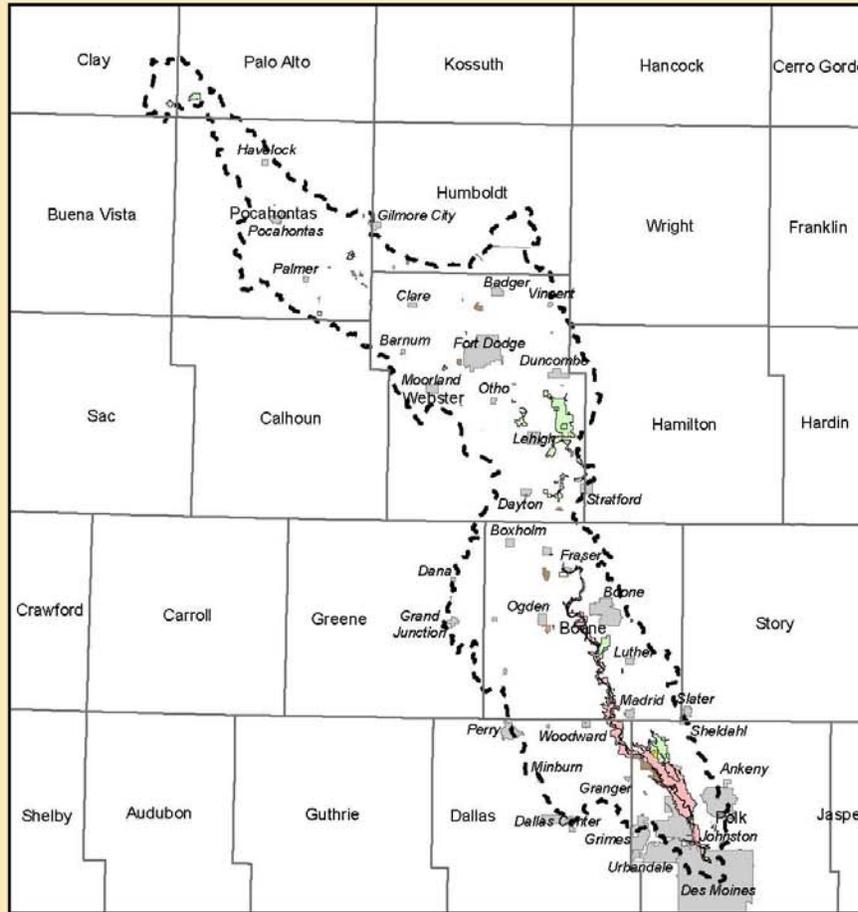
The Middle Des Moines River Watershed HUC includes 12 NRCS conservation easements totaling 479.8 acres. The easements include the Emergency Watershed Program (EWP), Emergency Wetland Reserve Program (EWRP), and the Wetlands Reserve Program (WRP). Twenty four percent of the easements are in Boone County, 44.1 percent in Dallas County, 2 percent in Greene County, 7.9 percent in Humboldt County, 7.5 percent in Polk County, and 14.3 percent in Webster County (8).

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Iowa Rapid Watershed Assessment

Middle Des Moines River - Ownership Stewardship



Ownership	No. Of Areas	Acres
ACE	63	23,643
County Conservation Board	37	3,874
FWS	2	389
Iowa DNR	53	16,575
Other	6	23
Private Conservation Area	24	571
Municipal Areas	59	58,844
Private Agricultural Land	0	999,739

Data Source: Iowa Gap Analysis Program, 01/01/2002, Iowa DNR & Iowa DOT INCORP Data Set, 1997

Total Acres in Middle Des Moines Watershed - 1,103,657
 Municipal City Boundary Acres - 58,844 (5.3% of basin)
 GAP Stewardship Acres - 45,074 (4.1% of basin)
 Private Agricultural Land Acres - 999,739 (90.6% of basin)

Stewardship data identifies ownership and management boundaries for conservation and recreation areas.

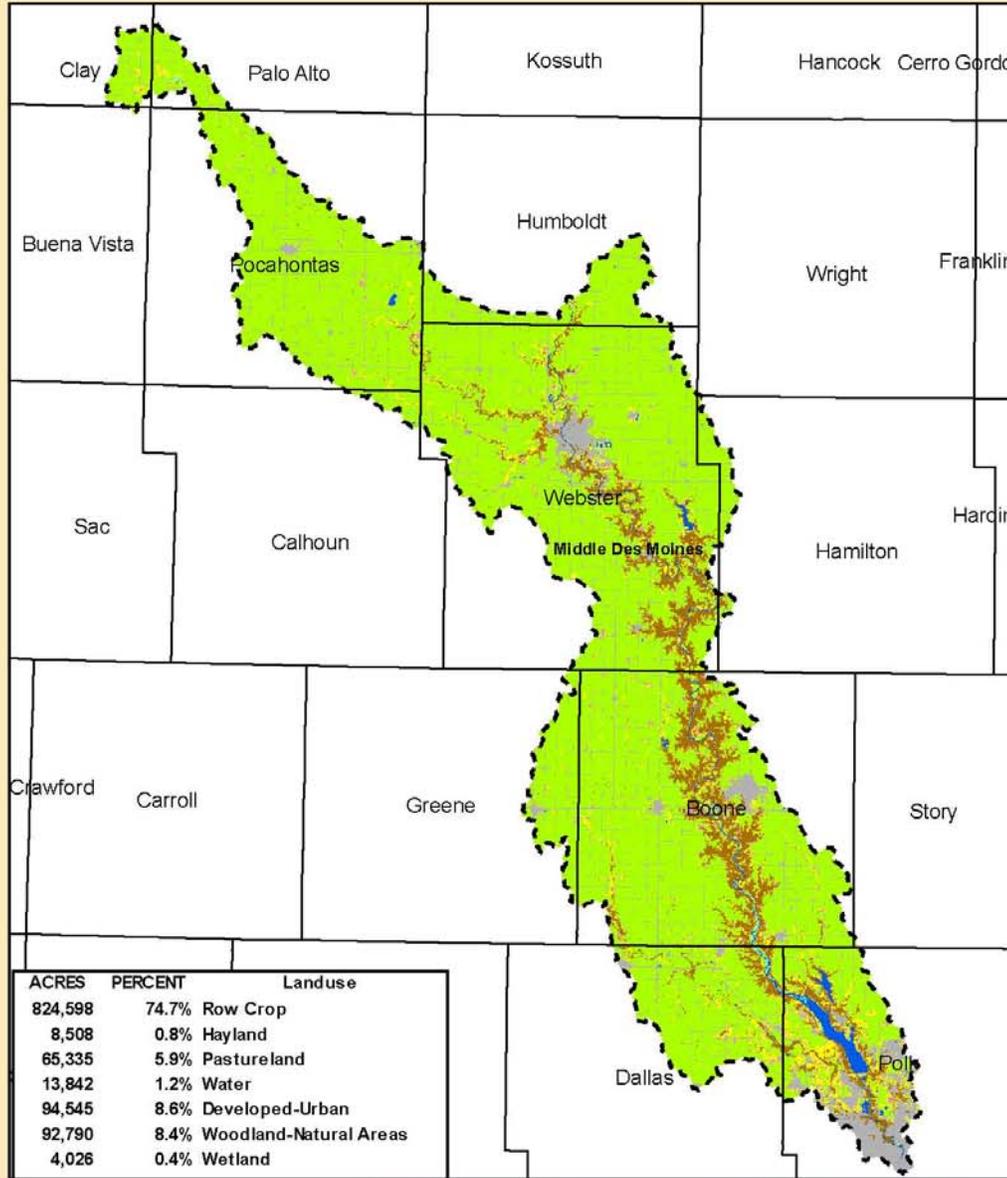
Legend

-  County Boundary - IA
-  M. Des Moines River Basin
-  Cities-Towns - M. DSM
- Stewardship - Middle DSM**
- Ownership Group**
-  Iowa DNR
-  Other
-  Private
-  County Conservation Board
-  Slate Land
-  FWS
-  The Nature Conservancy



Iowa Rapid Watershed Assessment

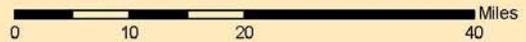
Middle Des Moines River - Landuse/Landcover



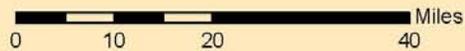
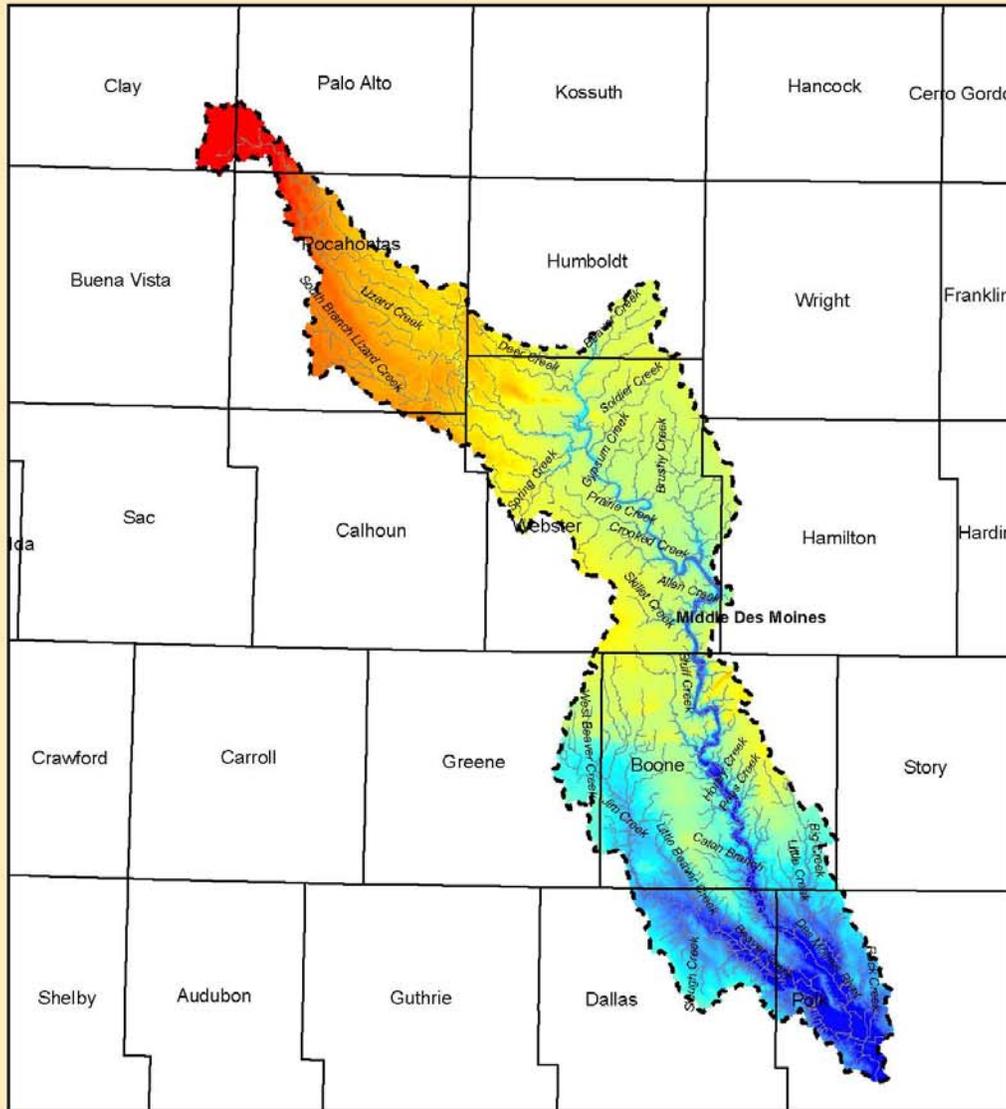
Data Source: USDA - National Ag Statistics 2006; Reclassified Landuse

Legend

-  County Boundary - IA
-  Middle Des Moines Landuse
-  Developed-Urban
-  Hayland
-  Pastureland
-  Row Crop
-  Water
-  Wetland
-  Woodland-Natural Areas



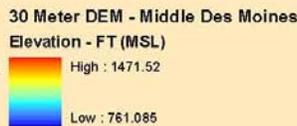
Iowa Rapid Watershed Assessment Middle Des Moines River- Elevation Map



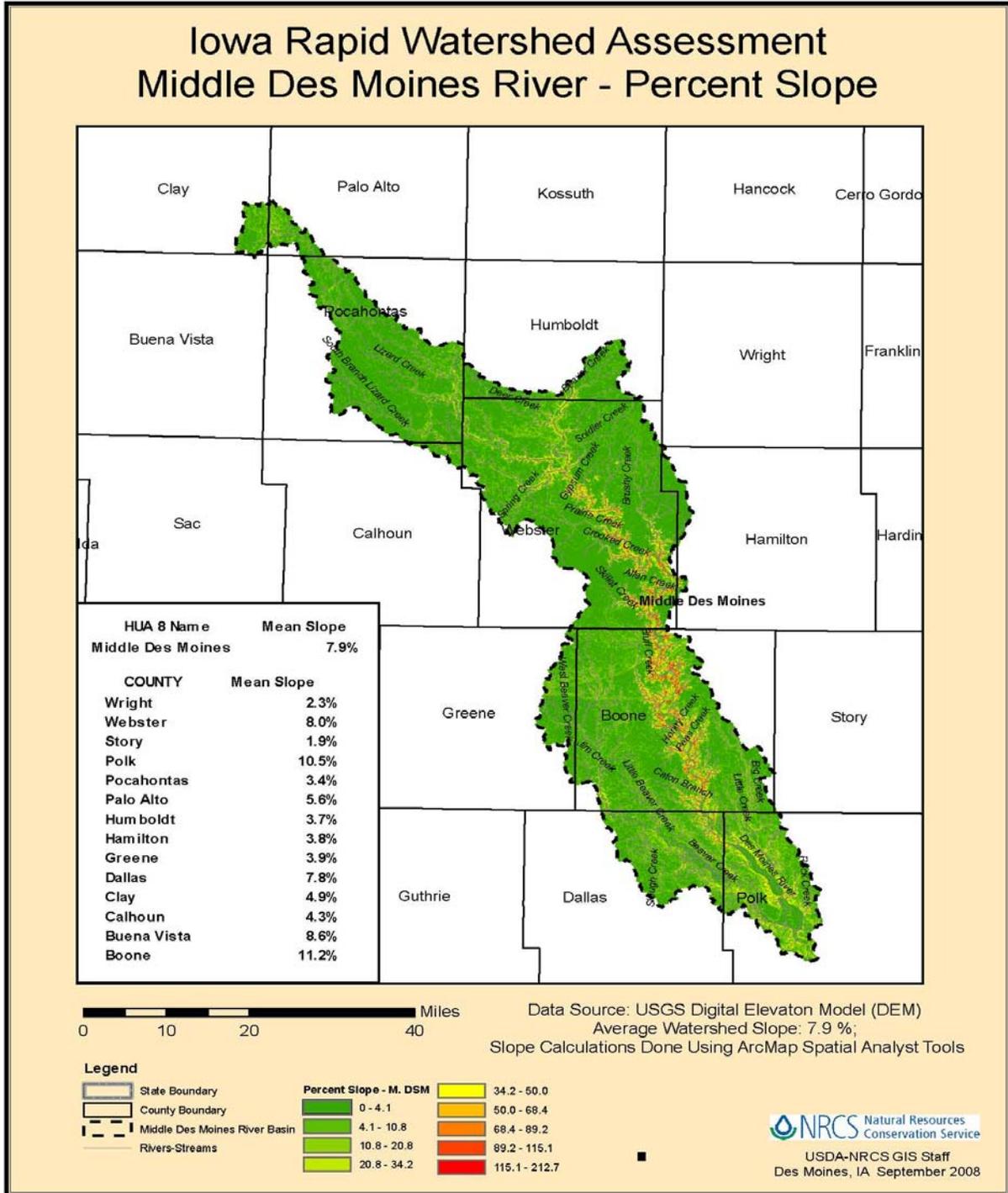
Digital Elevation Model (DEM) Data from USGS 7.5' (1:24,000) Quadrangle Topographic Base Maps

Legend

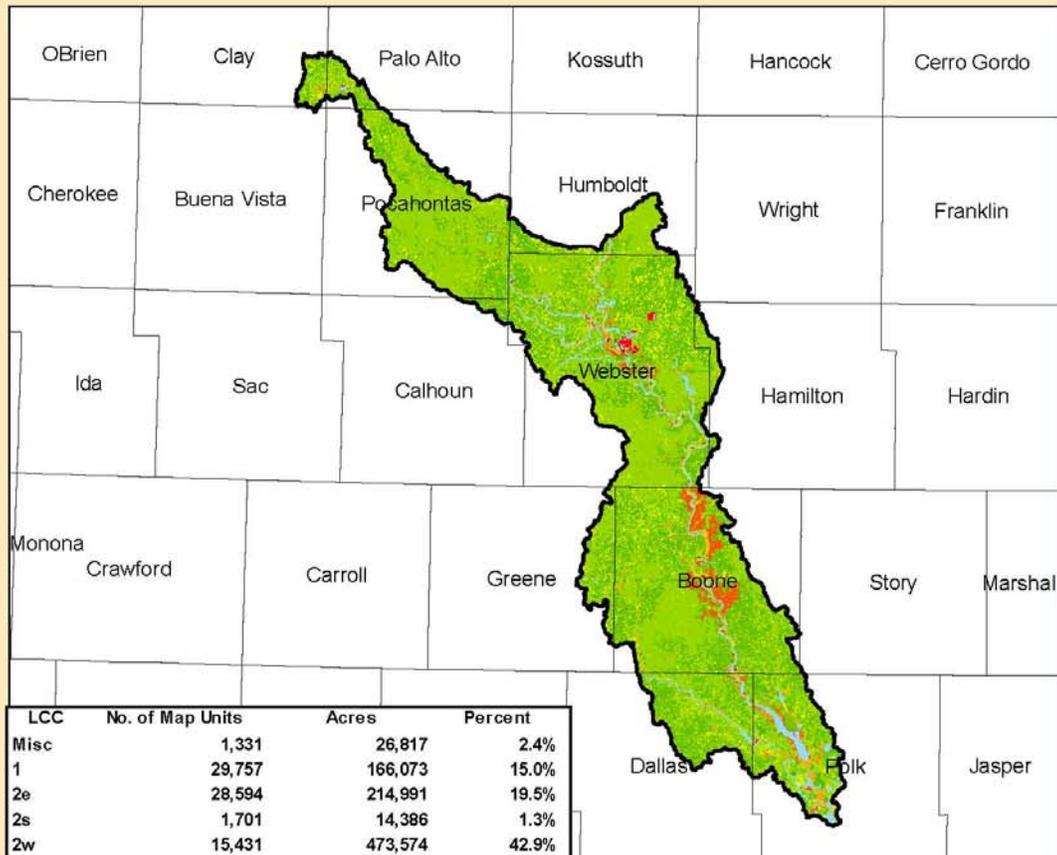
-  State Boundary
-  County Boundary
-  Middle Des Moines River Basin
-  Rivers/Streams - M. DSM



The average watershed slope is 7.9 percent (10).



Iowa Rapid Watershed Assessment Middle Des Moines - Land Capability Class



LCC	No. of Map Units	Acres	Percent
Misc	1,331	26,817	2.4%
1	29,757	166,073	15.0%
2e	28,594	214,991	19.5%
2s	1,701	14,386	1.3%
2w	15,431	473,574	42.9%
3e	11,900	74,284	6.7%
3s	623	4,382	0.4%
3w	12,976	48,467	4.4%
4e	1,088	7,135	0.6%
4s	583	6,030	0.5%
4w	7	184	0.0%
5s	62	2,532	0.2%
5w	226	9,437	0.9%
6e	555	21,127	1.9%
6s	63	243	0.0%
7e	165	24,468	2.2%
7s	152	3,296	0.3%
7w	31	590	0.1%
8s	144	5,640	0.5%



Legend

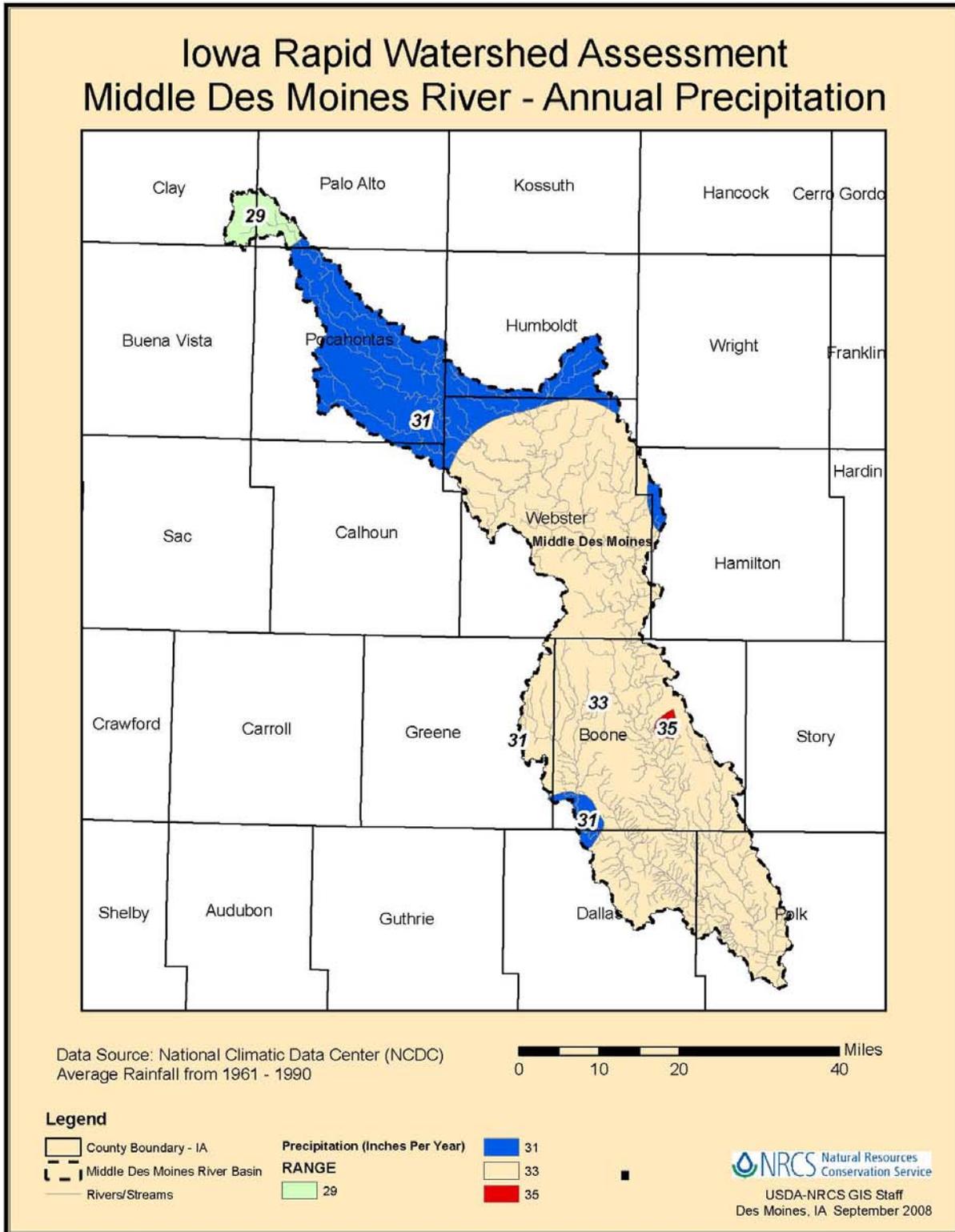


*Misc - Includes Water, Pits, Lagoons, Quarries and Orthents, Loamy type soil

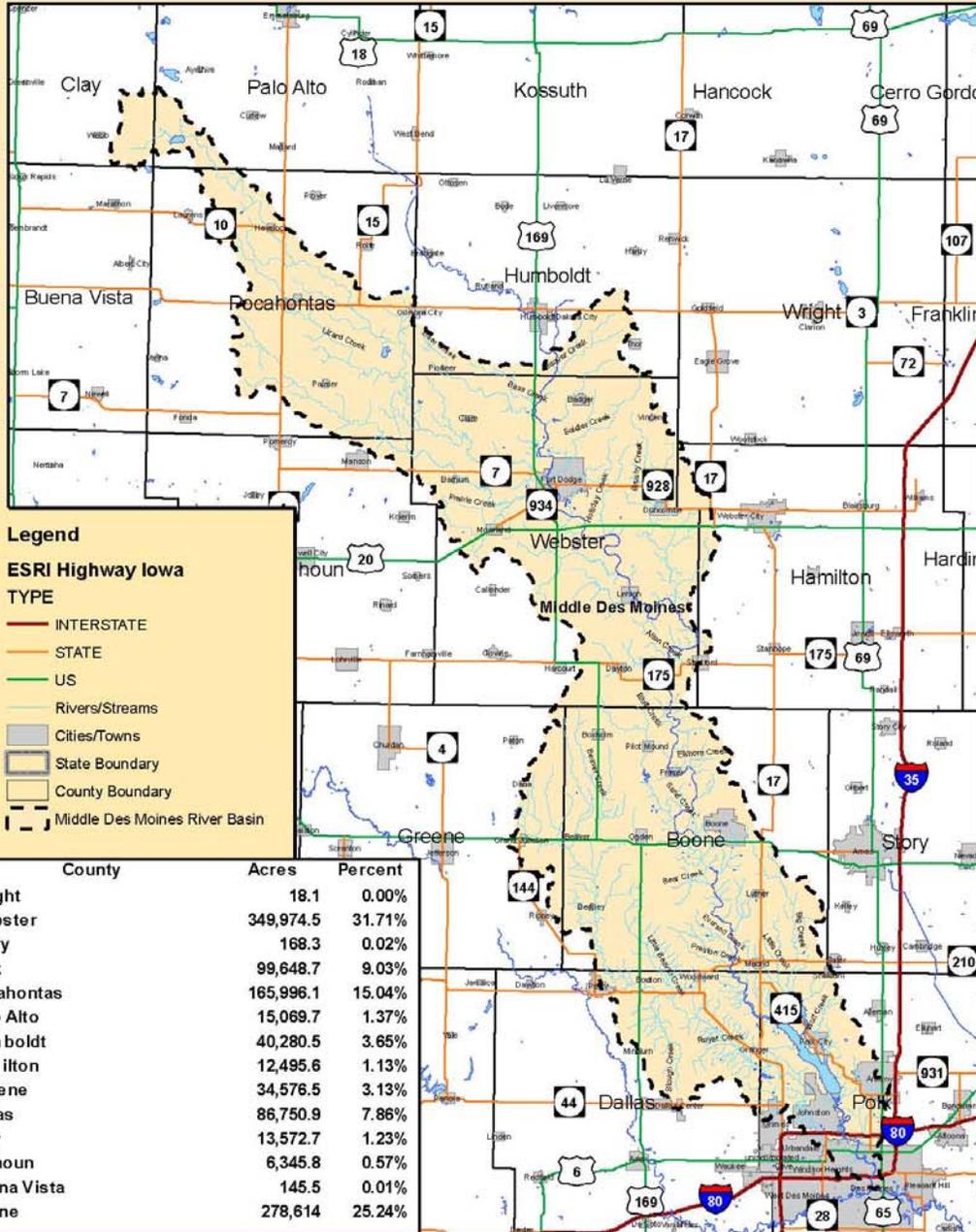
Data Source: Iowa USDA-NRCS Soil Survey
Des Moines, Iowa, July 2008. Summarized data
from individual County SSURGO data sets.



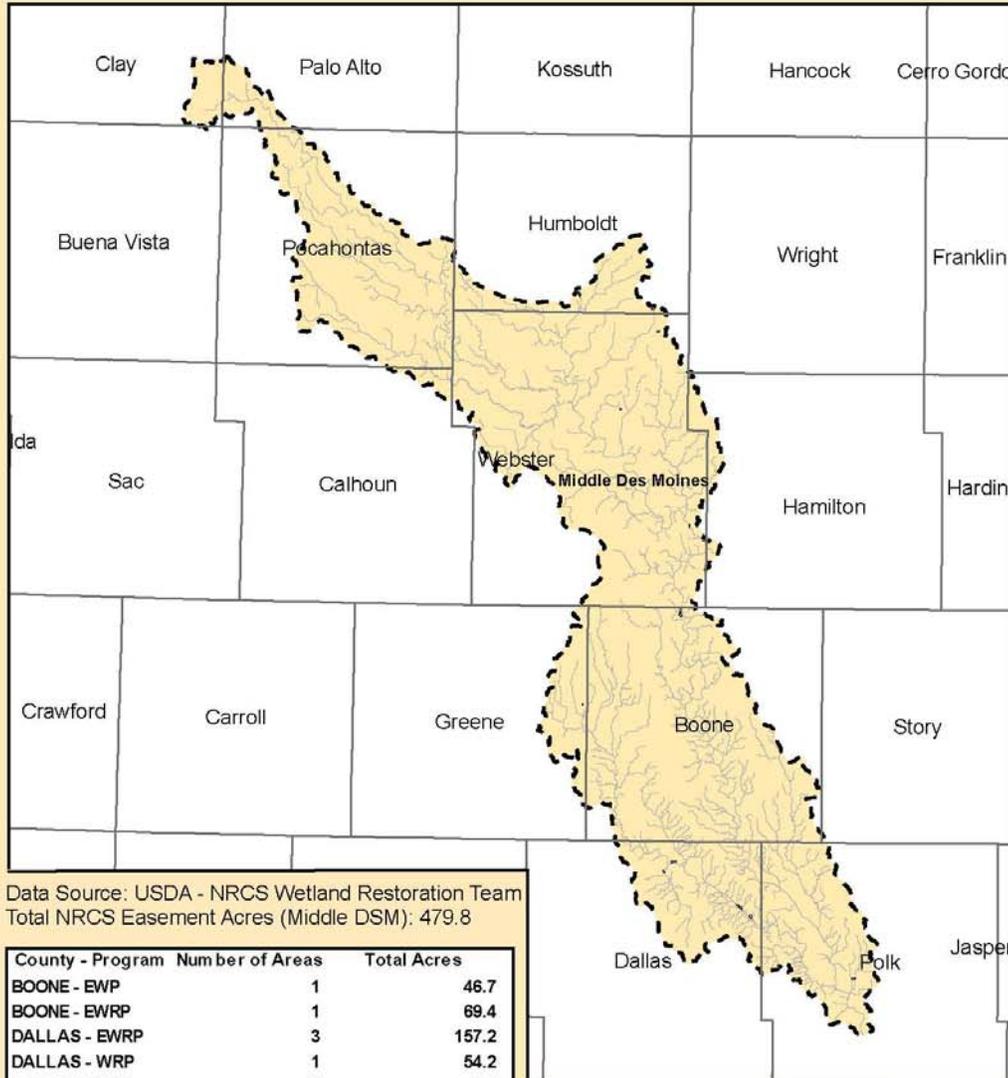
USDA-NRCS GIS Staff
Des Moines, IA October 2008



**Iowa Rapid Watershed Assessment
 Middle Des Moines River - Project Map**

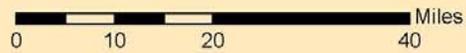


Iowa Rapid Watershed Assessment Middle Des Moines River - NRCS Easements



Data Source: USDA - NRCS Wetland Restoration Team
Total NRCS Easement Acres (Middle DSM): 479.8

County - Program	Number of Areas	Total Acres
BOONE - EWP	1	46.7
BOONE - EWRP	1	69.4
DALLAS - EWRP	3	157.2
DALLAS - WRP	1	54.2
GREENE - WRP	1	9.8
HUMBOLDT - EWRP	1	37.7
POLK - EWRP	1	36
WEBSTER - EWRP	1	12.5
WEBSTER - WRP	2	56.3

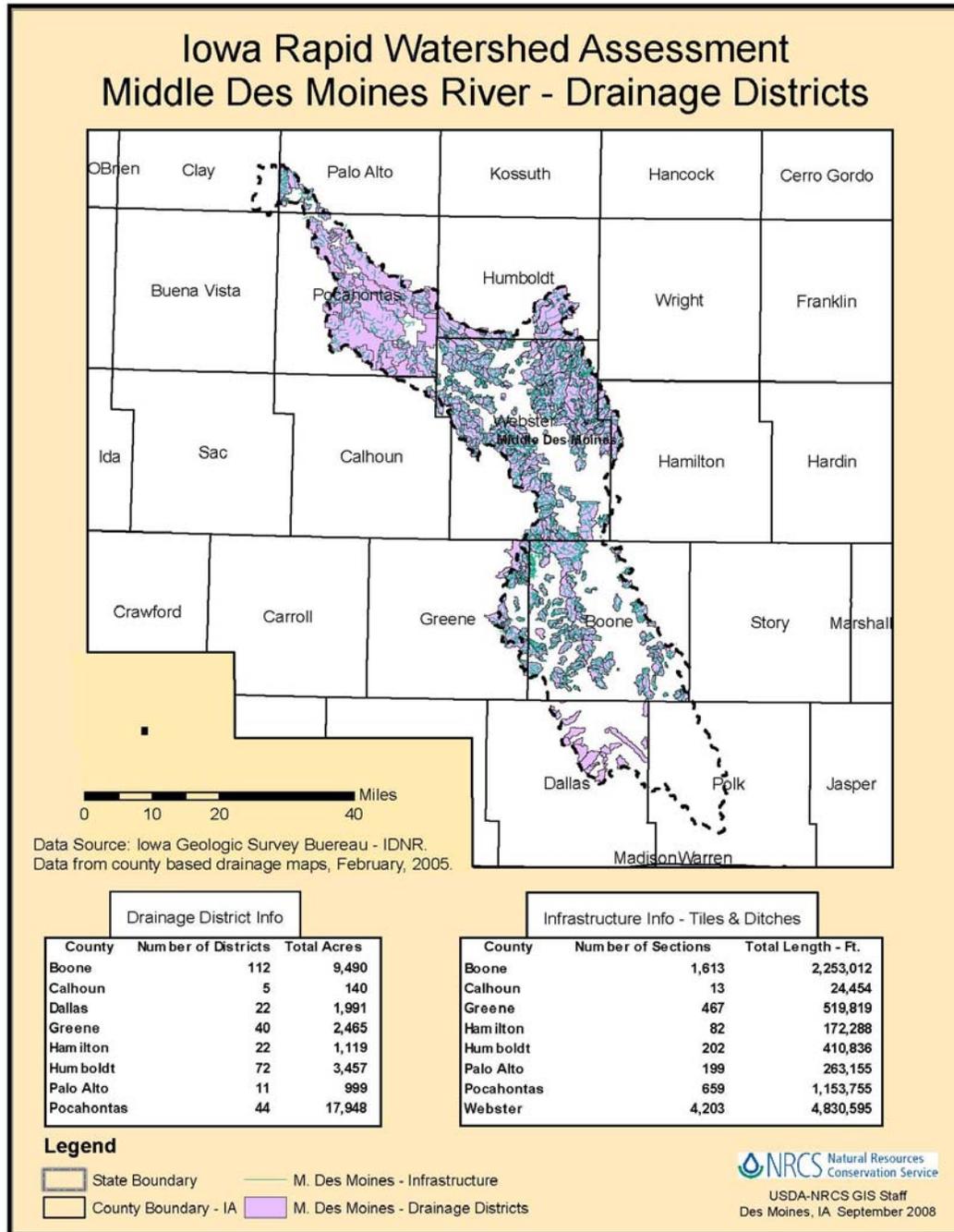


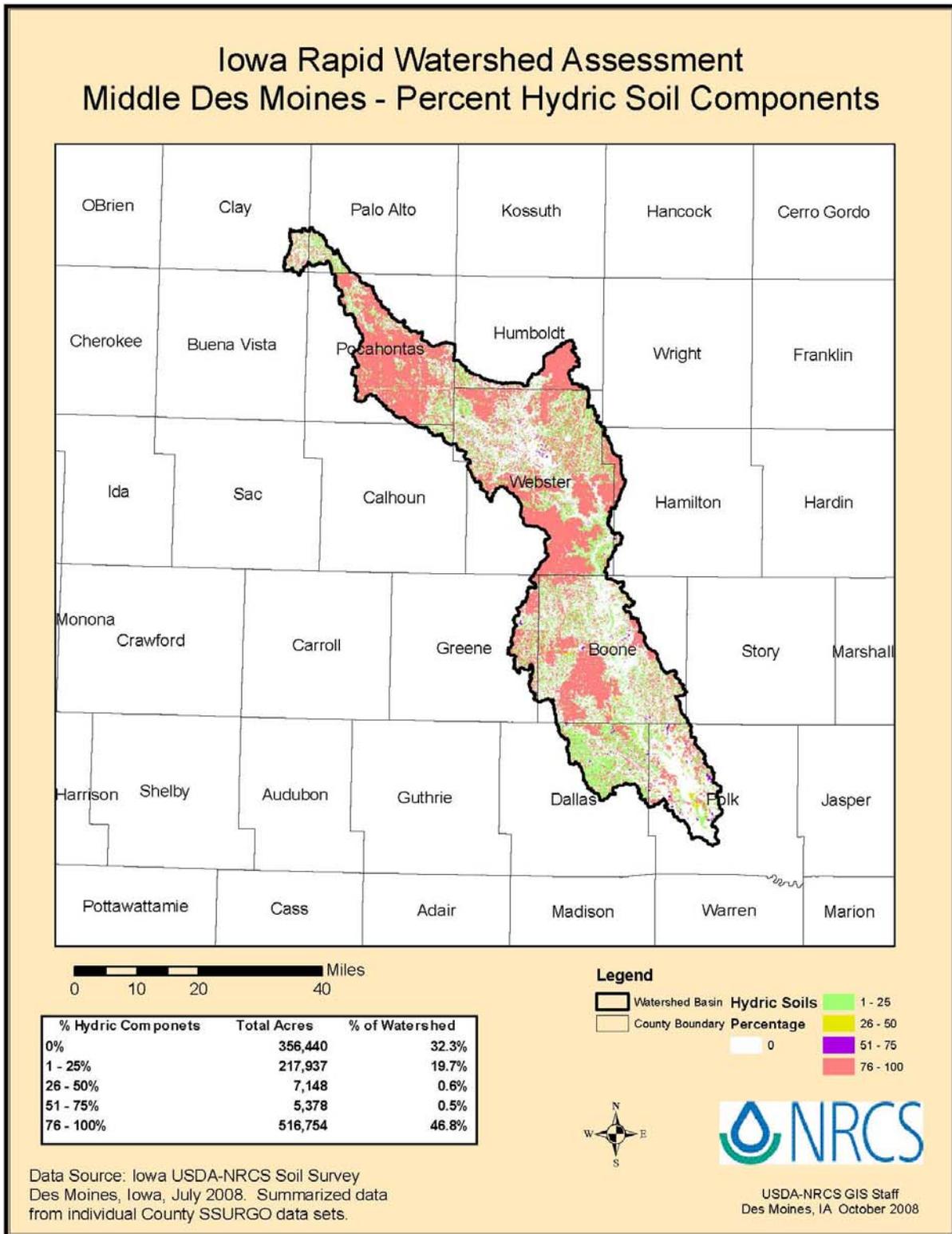
Legend

- State Boundary
- County Boundary
- Middle DSM - NRCS Easement Areas
- Middle Des Moines River Basin
- Rivers/Streams MDSM

Physical Description

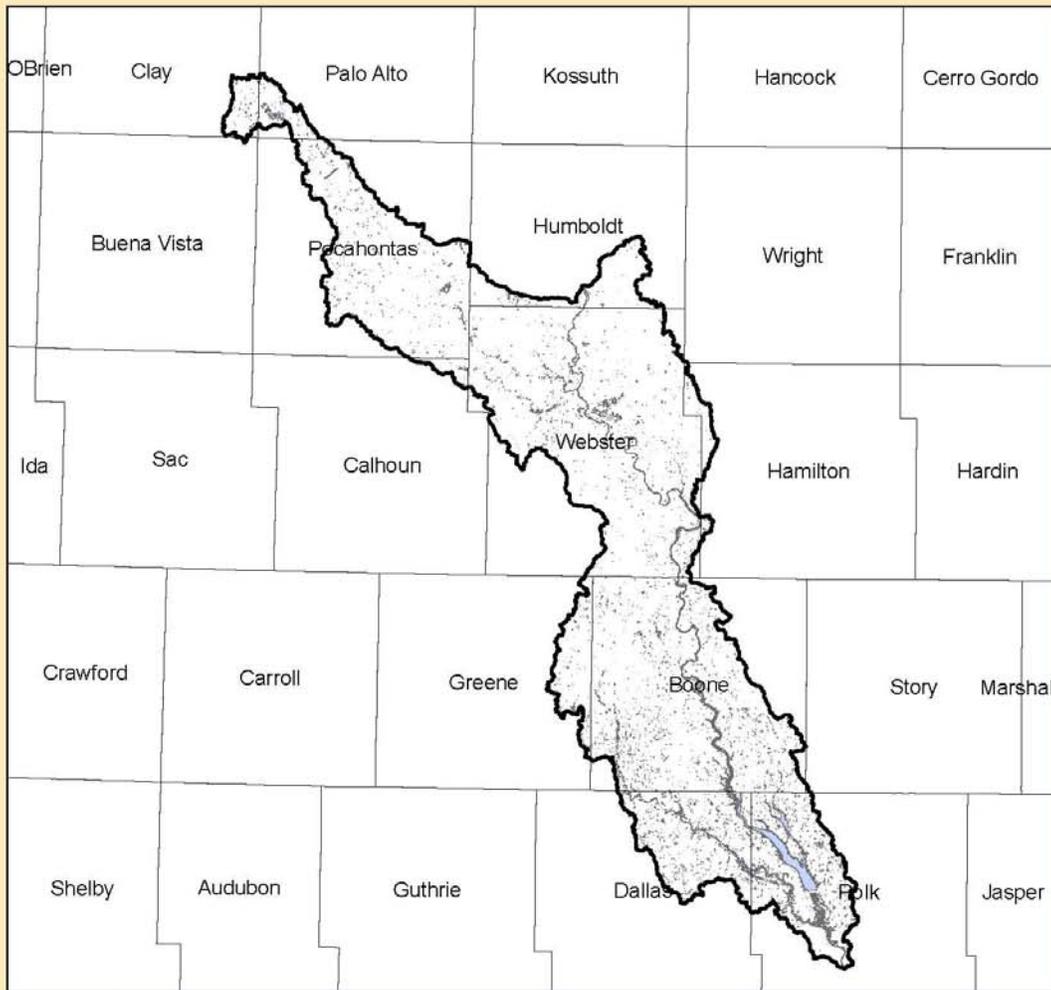
There are 328 drainage districts in the HUC: 25.2 percent of the districts are located in Boone County, 0.4 percent in Calhoun County, 5.3 percent in Dallas County, 6.6 percent in Greene County, 3 percent in Hamilton County, 9.2 percent in Humboldt County, 2.6 percent in Palo Alto County, and 47.7 percent in Pocahontas County (9).





Iowa Rapid Watershed Assessment

Middle Des Moines - National Wetland Inventory



Wetland Type	No. of Areas	Total Acres
Freshwater Emergent Wetland	6,405	6,213
Freshwater Forested/Shrub Wetland	1,407	8,474
Freshwater Pond	828	1,209
Lake	304	11,094
Other	21	94
Riverine	153	3,446

Legend

-  County Boundary
-  Watershed Basin
-  Wetland Areas - MDSM



U.S. Fish and Wildlife Service, 200605, ia_nwi: Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, DC. FWS/OBS-79/31. U.S. Fish and Wildlife Service, Branch of Habitat Assessment, Washington, D.C..

USDA-NRCS GIS Staff

 Des Moines, IA October 2008

Special Considerations

Drainage laws in Iowa are contained in the *Code of Iowa*. Chapter 465 applies to individual drainage rights, including tile drainage. Chapter 455 applies to levee and drainage districts, and Chapter 455B applies to the Department of Natural Resources (33).

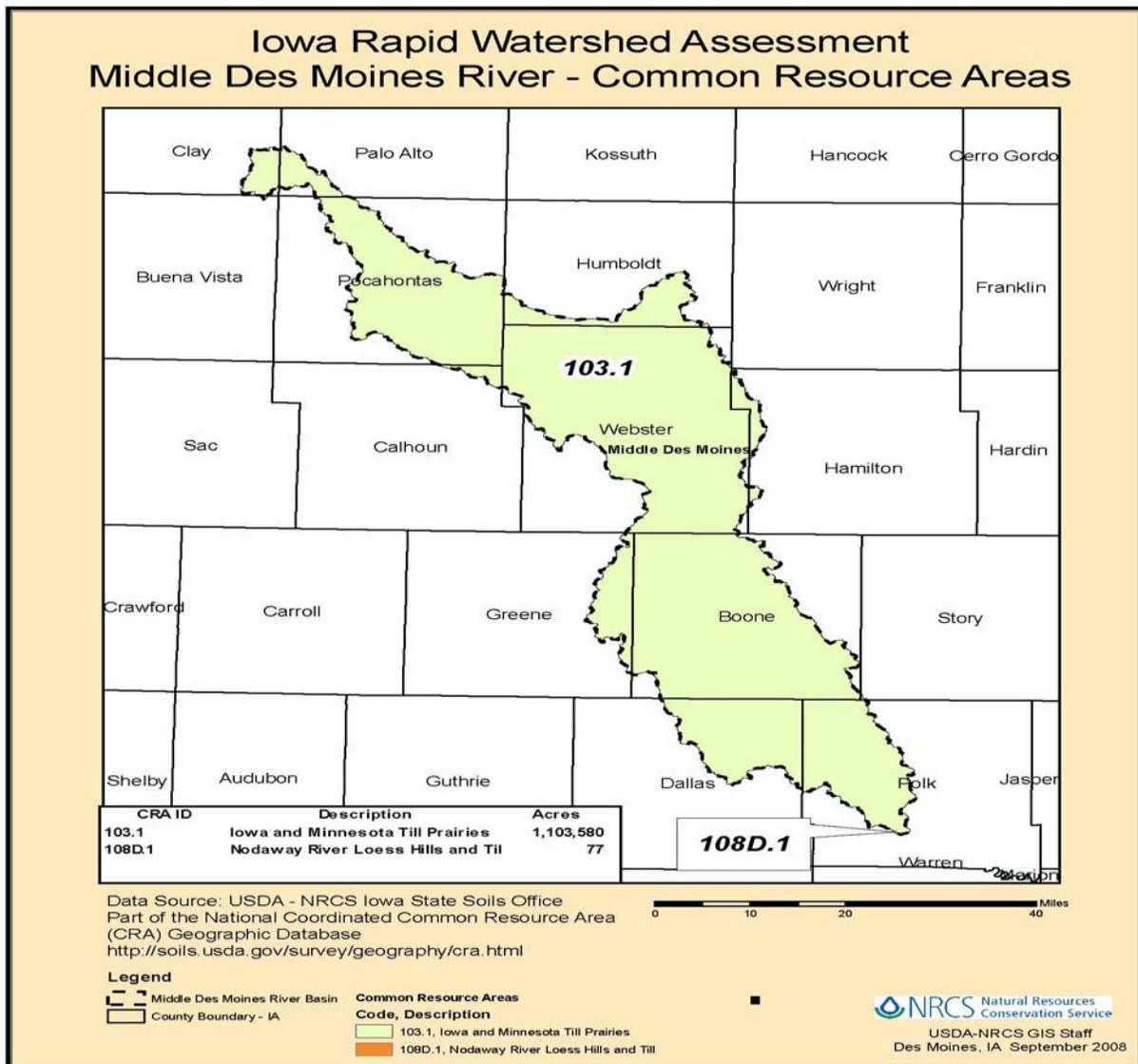
Legal drainage districts are formed according to state laws. Chapter 455 of the Code of Iowa applies to formation by County Board of Supervisors of legal drainage districts. Two or more landowners can petition for the formation of a drainage district, and single individuals can petition for sub-districts. Once established, installation and maintenance is under the direct control of County Board of Supervisors or Drainage District Trustees (33).

Minnesota Drainage Law is contained in Minnesota Statute Chapter 103.

Polk County contains a large and growing urban population. Many streams within developed areas are 303(d) listed streams. Their impairments are due to urban storm water runoff and destruction of the natural hydrologic cycle. As communities grow, more impervious surfaces, such as roof tops and hard surface transportation infrastructure, is added to the landscape. This causes an increase in the volume and rate of storm water runoff. This can lead to more frequent and severe flash flooding and stream bank erosion, leading to potential damage to public and private property and water quality (24).

National Common Resource Area (CRA) 103.1 comprises 99.993 percent of the Middle Des Moines River Watershed. CRA 108D.1 comprises 0.007 percent of the watershed.

The Common Resource Areas (CRA) delineated below for the Middle Des Moines River HUC are described in the next section (for additional information, see <http://soils.usda.gov/survey/geography/cra.html>). A CRA 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) (9).



Common Resource Area Descriptions (9)

The National Coordinated CRA Geographic Database provides:

- A consistent CRA geographic database;
- CRA geographic data compatible with other GIS data digitized from 1:250,000 scale maps, such as land use/land cover, political boundaries, Digital General Soil Map of the U.S. (updated STATSGO), and ecoregion boundaries;
- A consistent (correlated) geographic index for Conservation Management Guide Sheet information and the eFOTG;
- A geographic linkage with the national MLRA framework.

99.993% of Middle Des Moines Watershed

103.1 Iowa and Minnesota Till – Prairies:

Primarily loamy glacial till soils with scattered lacustrine areas, potholes, outwash and floodplains. 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. 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.

.007% of Middle Des Moines Watershed

108D.1 Nodaway River Loess Hills and Till:

This gently undulating to hilly area incorporates a variety of landscapes but dominantly pre-Illinoian glacial till with a thin cover of loess. Native vegetation was prairie and timber, spatially associated with the pattern of ridges and valleys. Most of this area is devoted to farming, with row crops on the smoother uplands and broad valley bottoms and with pastures and woodlands on sloping lands. Resource concerns are water erosion, nutrient management, and pasture and woodland management.

Geology

This watershed is drained by the Des Moines River and its tributary Lizard Creek. Soils and landforms of the watershed developed in deposits laid down by ice and water during the Pleistocene and Holocene Epochs. The unconsolidated deposits rest on Paleozoic and Mesozoic bedrock. In Pocahontas County, the watershed is underlain by the Dakota Formation, which consists of Cretaceous shale and mudstone with minor sandstone. Faulted and highly fractured (brecciated) bedrock in the SE third of Pocahontas County and the NW corner of Webster County is part of the Manson Impact Structure created 74 million years ago. At 23 miles in diameter, it is one of the largest meteorite impact structures in the United States, although it is deeply buried and indiscernible at the surface. In most of Webster County and all of Boone, Dallas and Polk counties, the watershed is underlain by Pennsylvanian-aged Cherokee Group shale and mudstone. Mississippian dolomite and limestone are also present in northern Webster County.

The entire RWA occurs within the boundaries of the Des Moines Lobe landform region of Iowa. The landscape of the RWA is all glacial in origin, but the upper and lower portions resulted from two separate advances of the surging ice lobe between 13,500 and 15,000 years ago. These advances are marked by the Bemis terminal moraine complex at the city of Des Moines and the Altamont end moraine complex in northern Boone County. The moraines are wide bands of prominent ridges and kames interspersed with hummocky terrain. Between these two end moraines and to the north of Boone County, the landscape consists of level till plain, or ground moraine, pocked by kettles (prairie potholes), and glacial lake plains. Elevations in the watershed range from about 800 feet to about 1,300 feet.

The surficial deposits in the watershed include dense basal till, variable supraglacial till, and a complex suite of sorted sediments — silty lake deposits, sands interstratified with loamy till, and outwash sands and gravels — all late-Wisconsinan in age. Younger deposits of the DeForest Formation occur in stream bottoms and floodplains and were deposited by streams in the last 8,000 years. The Peoria Loess that blankets most of the rest of the state pre-dated the Des Moines Ice Lobe and so has only been found here buried below the younger glacial materials.

Soils are predominantly loams, clay loams and sandy loams formed in glacial till, glacial lacustrine sediments, and outwash. Soils on bottomlands and benches of the Des Moines River valley are mainly sandy loams. Till soils are predominantly poorly drained and somewhat poorly drained, while outwash and alluvial soils are typically well-drained.

Resource Concerns

Resource Concerns by Land Use:

Pasture (11)

Location is typically along semi-wooded riparian areas. Predominant species are introduced cool season forages, such as Kentucky Bluegrass and Smooth Bromegrass, with lesser amounts of Tall Fescue and Orchardgrass. Some introduced legumes are present with White (Ladino) Clover being the most predominant. Some Red Clover, Birdsfoot Trefoil, and Alfalfa are included in lesser amounts. Continuous overgrazing is common.

Typically soil erosion as a result of sheet and rill will be less than 1 ton/acre/year. There is some small gully erosion. Stream bank erosion may be significant because grazing animals typically have unlimited access to streams. In time, undesirable woody species may invade older pastures and decrease the productivity of the forage. Soil compaction on cattle paths and around watering sources can increase soil erosion and create a niche for undesirable plant species. Availability of a reliable watering source can be a hindrance to developing rotational grazing.

Hayland (11)

Hayland has been seeded to introduce species, predominantly Smooth Bromegrass and Alfalfa. There will also be lesser amounts of Orchardgrass and Red Clover. Erosion is not typically a problem on hayland. Nutrient and Pest Management are often under utilized. Typically 3 cuttings of hay are taken from May through early September.

Cropland (12, 13, 14)

Cropland is intensively used primarily for corn and soybeans, with a very small amount of oat and meadow as part of a rotation. Corn acres increased in recent years, compared to soybean acres, due to price trends and ethanol plant development.

The mean average slope is 7.9 percent. Predominant resource concerns on cropland include soil erosion (sheet and rill, gully, and wind), soil compaction, soil eutrophication, weed infestation, and decreased soil organic matter. Over application of nutrients (commercial and manure-based) and pesticides is common. In recent years no-till systems on soybean acres have increased, but no-till on corn acres has decreased.

Natural Areas/Woodland (15)

Natural areas in the Middle Des Moines River consist of poor quality woodland and degraded meadow found mostly in odd areas along property corners, fence lines, or abandoned pastures. Typically these areas are too steep or wet to be included into cropland or pasture. Vegetation includes a mixture of native trees, shrubs, and/or prairie with increasing undesirable populations of introduced and often noxious species of woody and non-woody plants. Predominant resource concerns include invasive species, classic gully erosion, habitat fragmentation, increasing homogeneity, and land use conversion to crop or urban land.

SWAPA+H stands for soils, water, air, plants, animals, and humans. SWAPA+H is used in watershed and ecosystem planning to identify natural systems and how they relate to social and economic conditions. The table below lists the resource concern priorities of stakeholders and landowners in the watershed

SWAPA + H Concerns Table (20, 21, 22)

Resource Concerns/Issues by Land Use					
SWAPA*	Specific Resource Concerns/Issues	Cropland	Pasture	Natural Areas	Farmstead
Soil Erosion	Sheet and Rill	X			
	Ephemeral Gully	X			
	Classic Gully		X	X	
	Streambank		X		
	Wind	X			
Water Quality, Surface	Suspended Sediment & Turbidity	X			
	Pesticides	X			
	Excessive Nutrients & Organics		X		
Water Quality, Ground	Excessive Nutrients & Organics	X			X
Soil Condition	Animal Waste & Other Organics (N,P,K)	X			
Plant Condition	Productivity, Health, and Vigor		X		
	Palatability		X		
Domestic Animals	Inadequate Quantity & Quality Feed & Forage		X		
	Inadequate Stock Water		X		
Air Quality	Particulates, Ammonia, CO2				X
Wildlife	Inadequate Cover & Shelter			X	
	T & E Species			X	

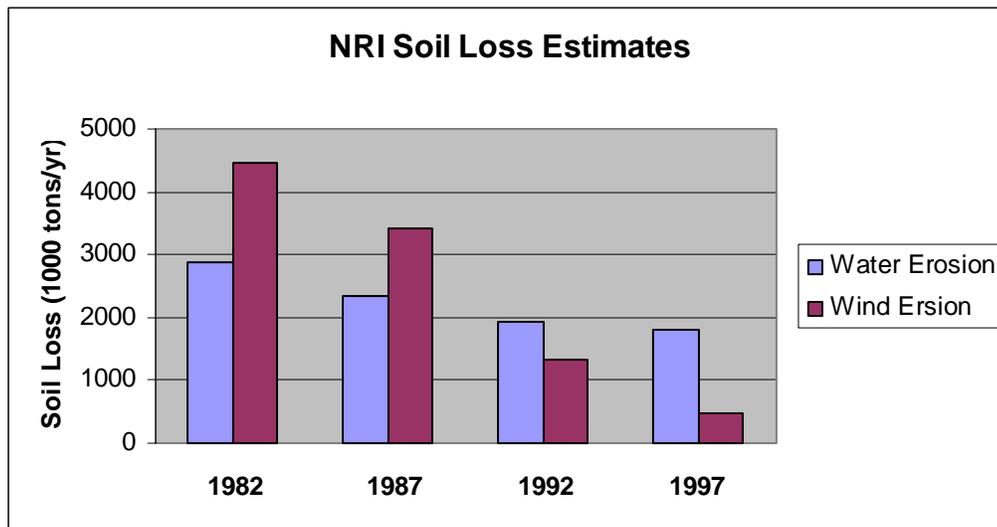
***SWAPA: - Soil, Water, Air, Plants, and Animals**

Human Considerations: Implementation of conservation practices and enhancements has the potential for change in management and cost of production. Installation of practices will have an upfront cost and require maintenance. In the short run, increased management may be required as new techniques are learned. Land may be taken out of production for installation of practices or converted to other uses, such as wildlife habitat. Long term benefits of implemented conservation practices should include increased soil health, improved water quality, increased domestic livestock carrying capacity, better air quality, and diversified wildlife habitat. Other considerations by humans in the watershed should include recreational opportunities, rural and urban land needs, commodity market prices and its relationship to conservation practice costs, farm profitability, and land values.

Soil Loss

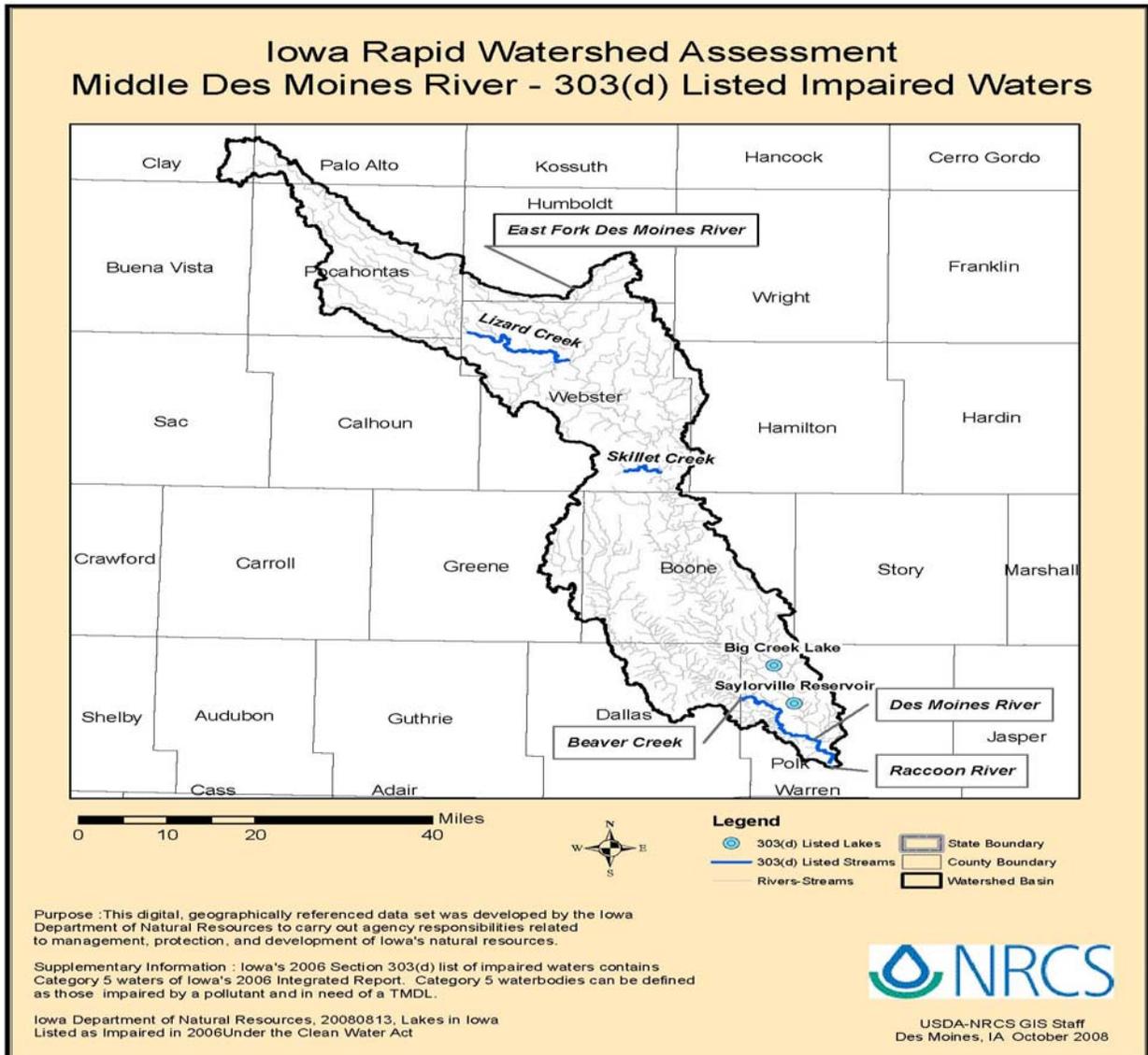
Water erosion (sheet and rill) from cropland accounts for nearly 90 percent of Iowa's soil erosion. In Iowa, there has been a steady decline in sheet and rill erosion from 1982 to 1997, but on average soil erosion remains above the sustainable levels. In order to maintain sustainable levels of soil stability, soil erosion should not exceed 5 tons/acre/year (17).

National Resource Inventory (NRI) estimates for sheet and rill erosion by water on cropland and pastureland decreased by approximately 1,069.7 tons (37 percent) of soil loss between 1982 and 1997. NRCS estimates indicate wind erosion rates decreased by 3,998.7 tons (89 percent) between 1982 and 1997 (17).



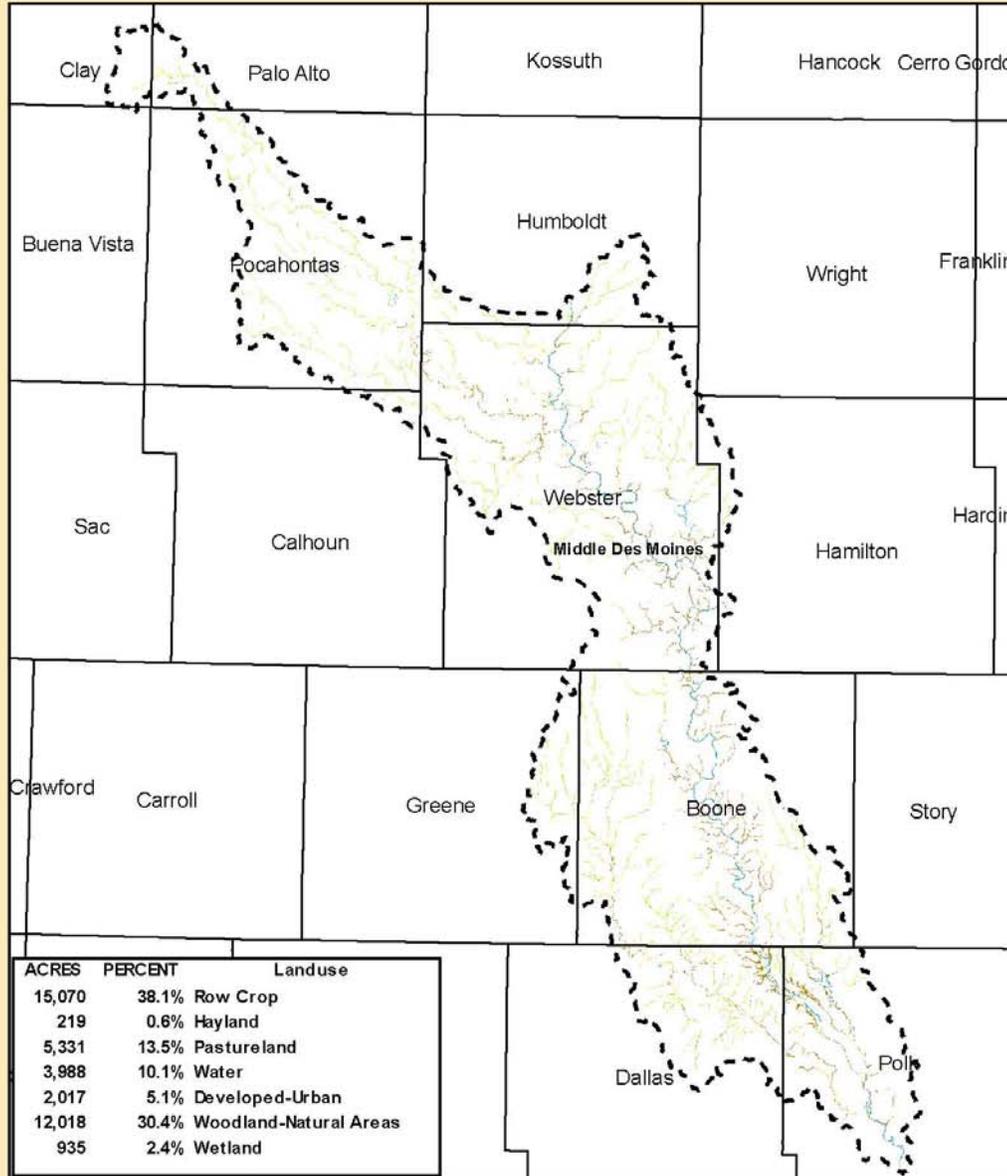
Under Section 303(d) of the Clean Water Act, states are required from "time to time" to submit a list of waters for which effluent limits will not be sufficient to meet all state water quality standards. EPA has defined "time to time" to mean April 1 of even numbered years. The failure to meet water quality standards might be due to an individual pollutant, multiple pollutants, "pollution," or an unknown cause of impairment. The 303(d) listing process includes waters impaired by point sources and nonpoint sources of pollutants. States must also establish a priority ranking for the listed waters, taking into account the severity of pollution and uses. The EPA regulations that govern 303(d) listing can be found in the Code of Federal Regulations 40 CFR 130.7.

The Iowa Department of Natural Resources compiles this impaired water list, or 303(d) listing. The 303(d) listing is composed of those lakes, wetlands, streams, rivers, and portions of rivers that do not meet all state water quality standards. These are considered "impaired waterbodies" and states are required to calculate total maximum daily loads (TMDLs) for pollutants causing impairments (34).



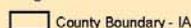
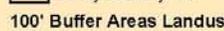
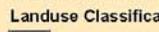
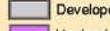
Iowa Rapid Watershed Assessment

Middle Des Moines River - 100' Stream Buffer Landuse



Data Source: USDA - National Ag Statistics 2006; Reclassified Landuse

Legend

-  County Boundary - IA
-  Pastureland
-  100' Buffer Areas Landuse
-  Row Crop
- Landuse Classifications**
-  Developed-Urban
-  Water
-  Hayland
-  Wetland
-  Woodland-Natural Areas



Middle Des Moines River – 07100004
8-Digit Hydrologic Unit Profile

November 2008

Water Quality Concerns Data Graph/Table showing impairments from 303(d) list (18)

Impaired Water Bodies	Stream Miles	Sediment & Siltation	Nutrients	Ammonia	Bacteria & Pathogens	Temperature	Low Dissolved Oxygen	Flow Alteration	Organic Enrichment	Other Impairments
Beaver Creek (UDM-0110_1)	16.2	■								■
Big Creek Lake (UDM-0140-L_0)			■		■					
Des Moines River (UDM-0010_2)	6.5		■		■					
Don Williams Lake (UDM-01650-L_0)		■							■	
Little Beaver Creek (UDM-0124_0)	4.8									■
Lizard Creek (UDM-0300_1)	24.5	■						■		■
Lizard Creek (UDM-0315_2)	13.8			■						
Saylorville Reservoir (UDM-0020-L_0)					■		■		■	■
Skillet Creek (UDM-0170_0)	6.9			■			■		■	

Impaired and TMDL Needed

Other Impairments, TMDL not needed

Impaired, TMDL Complete & Approved

Watershed Projects, Plans, Studies, and Assessments**

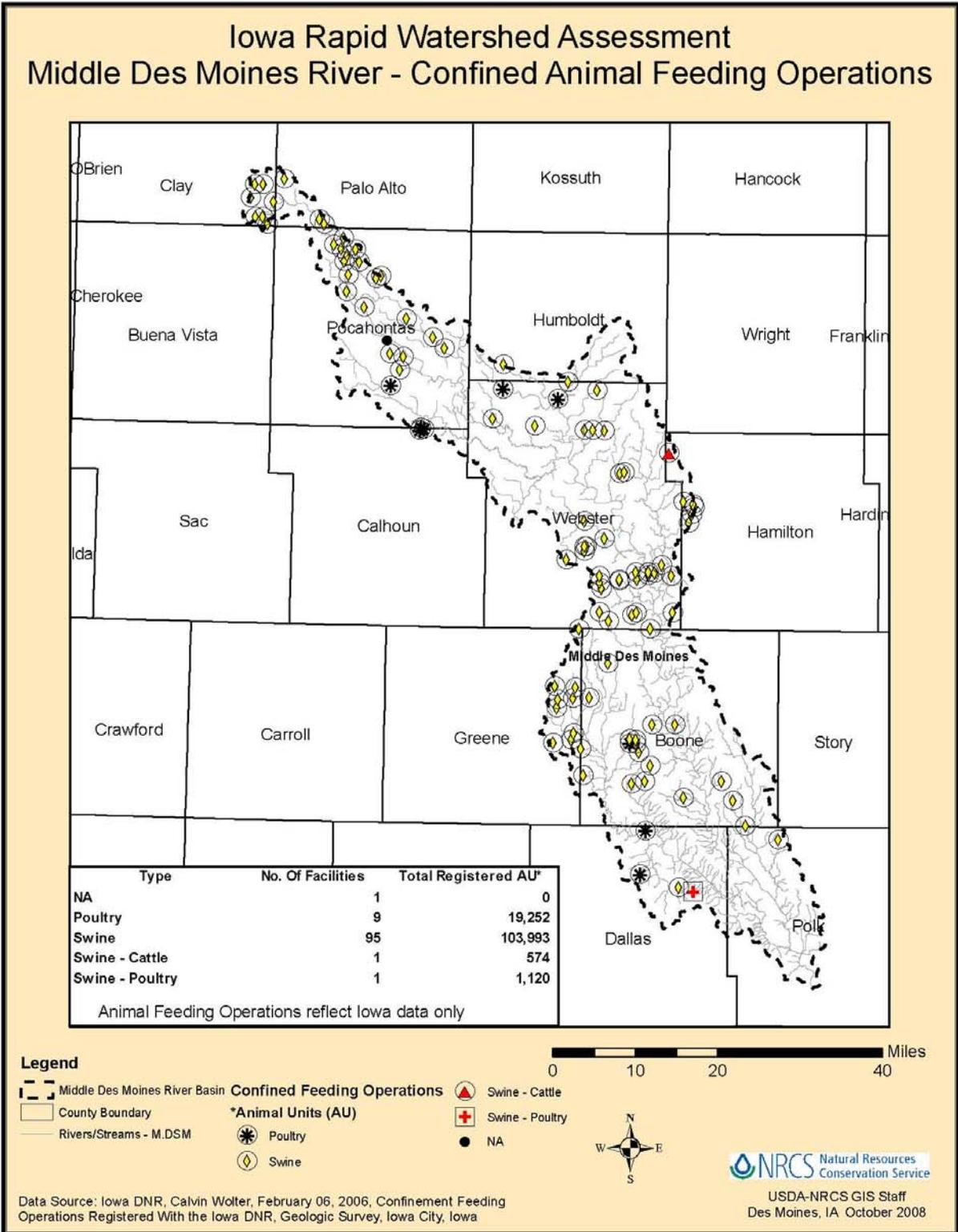
<i>Federal:</i>	<i>State:</i>	<i>Local:</i>
NRCS Watershed Plans/Studies/Assessments	IDNR TMDLs	
	Don Williams Lake (B)	Beaver Creek (D)*
	319 Projects	Slough Creek Development Grant App (D)*
	Brushy Creek (W)	
	Iowa WIRB	
	Saylor Creek (Pk)	
	DSC Development Grant	
	Badger Lake (W)	
	Big Creek (Pk, B)	
	WSPF/WPF	
	Lizzard Lake (Ps)	
	Peas Creek (B)	

* Water Monitoring

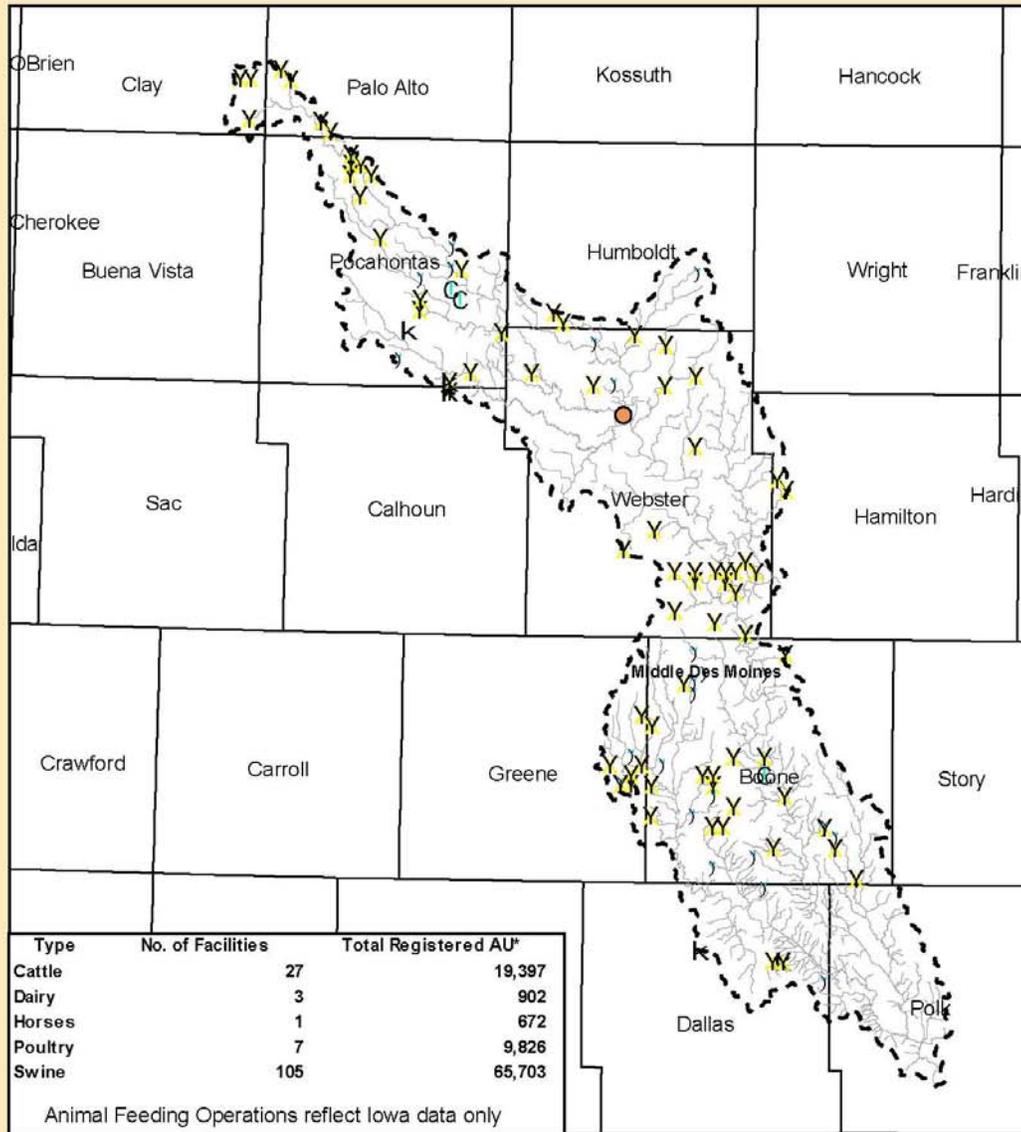
**Listing includes past efforts in the watershed, and ongoing studies and assessments.

Sediment, Nutrients, Pathogens, and their effects are the major pollutants impacting surface waters of the Middle Des Moines River Watershed. Surface waters, especially lakes and ponds, have a repeated history of algal blooms. A variety of human activities contribute directly to pollutant loads in the water bodies; including intensive row crop agriculture, urban storm run off, failing septic systems, and Confined Animal Feeding Operations (CAFOs). The change in hydrology due to stream channel straightening, subsurface drainage systems, wetland destruction, and lack of perennial ground cover has resulted in flashy stream flows, thus contributing to stream down cutting and increased streambank instability.

Conservation practices that can be used to address these water quality issues include erosion control structures, residue management, nutrient management, riparian buffers, drainage control structures, wetland restoration, urban Best Management Practices (BMPs), and improved septic systems (19).



**Iowa Rapid Watershed Assessment
 Middle Des Moines River - Animal Feeding Operations**



Legend

- Middle Des Moines River Basin
- County Boundary
- Rivers/Streams - M.DSM
- Feeding Operations - M.DSM**
- *Animal Units (AU)**
- Horses
- Poultry
- Swine
- Dairy



Middle Des Moines River – 07100004
8-Digit Hydrologic Unit Profile

November 2008

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County													
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk
Birds	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	E		■	■	■		■		■		■		■	■	■	■
	Forster's Tern (<i>Sterna forsteri</i>)	C		■	■												
	Henslow's Sparrow (<i>Ammodramus henslowii</i>)	T					■										
	King Rail (<i>Rallus elegans</i>)	E		■									■				
	Long-Eared Owl (<i>Asio otus</i>)	T									■			■			
	Northern Harrier (<i>Circus cyaneus</i>)	E					■										
	Red-Shouldered Hawk (<i>Buteo lineatus</i>)	E												■			
Amphibian	Mudpuppy (<i>Necturus maculosus</i>)	T									■		■				

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County														
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk	
Mammals	Plains Pocket Mouse (<i>Perognathus flavescens</i>)	E																
	Southern Bog Lemming (<i>Synaptomys Cooperi</i>)	T																
	Southern Flying Squirrel (<i>Glaucomys volans</i>)	C																
	Spotted Skunk (<i>Spilogale putorius</i>)	E																
Reptile	Blandings Turtle (<i>Emydoidea blandingii</i>)	T																
	Bullsnake (<i>Pituophis catenifer sayi</i>)	C																
	Slender Glass Lizard (<i>Ophisaurus attenuatus</i>)	T																
	Smooth Green Snake (<i>Liochlorophis vernalis</i>)	C																
	Ornate Box Turtle (<i>Terrapene ornata</i>)	T																
Fish	Blacknose Shiner (<i>Notropis heterolepis</i>)	T																
	Chestnut Lamprey (<i>Ichthyomyzon castaneus</i>)	T																
	Grass Pickerel (<i>Esox americanus</i>)	T																
	Orangethroat Darter (<i>Etheostoma spectabile</i>)	T																
	Topeka Shiner (<i>Notropis topeka</i>)	T	E															
	Western Sand Darter (<i>Ammocrypta clara</i>)	T																

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County													
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk
Mussel	Creeper (<i>Strophitus undulatus</i>)	T															
	Cylindrical Papershell (<i>Anodontoides ferussacianus</i>)	T															
	Pistolgrip (<i>Tritogonia verrucosa</i>)	E															
	Round Pigtoe (<i>Pleurobema sintoxia</i>)	E															
	Sheepnose Mussel (<i>Plethobasus cyphus</i>)	E	C														
	Yellow Sandshell (<i>Lampsilis teres</i>)	E															
Insects	Acadian Hairstreak (<i>Satyrrium acadicum</i>)	C															
	Arogos Skipper (<i>Atrytone arogos</i>)	C															
	Broad-Winged Skipper (<i>Poanes viator</i>)	C															
	Dion Skipper (<i>Euphyes dion</i>)	C															
	Dusted Skipper (<i>Atrytonopsis hianna</i>)	C															
	Hickory Hairstreak (<i>Satyrrium caryaevorum</i>)	C															
	Mulberry Wing (<i>Poanes massasoit</i>)	T															
	Olympia Marble (<i>Euchloe olympia</i>)	C															
	Powesheik Skipperling (<i>Oarisma powesheik</i>)	T															

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County													
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk
Insects	Purplish Copper (<i>Lycaena helloides</i>)	C															
	Regal Fritillary (<i>Speyeria idalia</i>)	C															
	Silvery Blue (<i>Glaucopsyche lygdamus</i>)	T															
	Two-spotted Skipper (<i>Euphys bimacula</i>)	C															
	Wild Indigo Dusky Wing (<i>Erynnis baptisiae</i>)	C															
	Zabulon Skipper (<i>Poanes zabulon</i>)	C															
	Zebra Swallowtail (<i>Eurytides marcellus</i>)	C															
Plants (Dicots)	Blue Giant Hyssop (<i>Agastache foeniculum</i>)	E															
	Broadleaf Water-milfoil (<i>Myriophyllum heterophyllum</i>)	C															
	Brook Lobelia (<i>Lobelia kalmii</i>)	C															
	Buckbean (<i>Menyanthes trifoliata</i>)	T															
	Canada Plum (<i>Prunus nigra</i>)	E															
	Common Mare's-Tail (<i>Hippuris vulgaris</i>)	C															
	Earleaf Foxglove (<i>Tomanthera auriculata</i>)	C															
	Flat Top White Aster (<i>Aster pubentior</i>)	C															

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County													
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk
Plants (Dicots)	Flatleaf Bladderwort (<i>Utricularia intermedia</i>)	C		■													
	Fragrant False Indigo (<i>Amorpha nana</i>)	T		■	■		■										
	Goosefoot (<i>Chenopodium missouriensis</i>)	C										■		■			
	Green Violet (<i>Hybanthus concolor</i>)	T												■			
	Hawthorn (<i>Crataegus pruinosa</i>)	C												■			
	Hill's Thistle (<i>Cirsium hillii</i>)	C													■		■
	Lesser Bladderwort (<i>Utricularia minor</i>)	C		■													
	Limestone Rockcress (<i>Arabis divaricarpa</i>)	C										■					
	Nodding Thistle (<i>Cirsium undulatum</i>)	C												■	■		
	Pink Milkwort (<i>Polygala incarnata</i>)	T			■										■	■	
	Prairie Bush Clover (<i>Lespedeza leptostachya</i>)	T	T	■	■	■	■	■	■								
	Pretty Dodder <i>Cuscuta indecora</i>)	C													■	■	
	Ragwort (<i>Senecio pseud aureus</i>)	C												■			
	Roundstem Foxglove (<i>Agalinis gattingeri</i>)	T										■		■			

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County														
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk	
Plants (Dicots)	Shadbush (<i>Amelanchier sanguinea</i>)	C		■														
	Shining Willow (<i>Salix lucida</i>)	T		■							■							
	Showy Milkweed (<i>Asclepias speciosa</i>)	T		■	■													
	Small Fringed Gentian (<i>Gentianopsis procera</i>)	C		■	■													
	Spring Avens (<i>Geum vernum</i>)	C												■	■			
	Three-seeded Mercury (<i>Acalypha ostryifolia</i>)	C												■				
	Toothcup (<i>Rotala ramosior</i>)	C															■	
	Water Parsnip (<i>Berula erecta</i>)	T		■	■													
	Water Shield (<i>Brasenia schreberi</i>)	C										■						
	Water Starwort (<i>Callitriche heterophylla</i>)	C												■				
	Western Parsley (<i>Lomatium orientale</i>)	T			■													
	White Prairie Aster (<i>Aster falcatus</i>)	C			■	■												
	Woolly Milkweed (<i>Asclepia lanuginosa</i>)	T			■	■						■						
	Yellow Monkey Flower (<i>Mimulus glabratus</i>)	T												■				

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County													
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk
Plants (Monocots)	Alkali Muhly (<i>Muhlenbergia asperifolia</i>)	S		■										■	■		
	Arrow Grass (<i>Triglochin maritimum</i>)	T		■	■									■	■		
	Beakrush (<i>Rhynchospora capillacea</i>)	T		■	■												
	Crawe Sedge (<i>Carex crawei</i>)	C		■	■						■			■	■		
	Drooping Bluegrass (<i>Poa languida</i>)	C													■		
	Glomerate Sedge (<i>Carex aggregata</i>)	C								■	■	■		■	■		
	Great Plains Ladies'-Tresses (<i>Spiranthes magnicamporum</i>)	C									■	■		■			■
	Green Adder's Mouth (<i>Malaxis unifolia</i>)	C													■		
	Green Arrow Arum (<i>Peltandra virginica</i>)	E											■				
	Hidden Sedge (<i>Carex umbellata</i>)	C										■					
	Hooker's Orchid (<i>Platanthera hookeri</i>)	T													■		
	Leafy Northern Green Orchid (<i>Platanthera hyperborea</i>)	T			■										■		
	Low Nut Rush (<i>Scleria verticillata</i>)	T			■												
	Meadow Bluegrass (<i>Poa wolfii</i>)	C										■			■		
	Oval Ladies'-tresses (<i>Spiranthes ovalis</i>)	T										■	■	■	■	■	■

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County													
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk
Plants (Monocots)	Philadelphia Panic Grass (<i>Panicum philadelphicum</i>)	T		■									■				
	Richardson Sedge (<i>Carex richardsonii</i>)	C		■	■	■											
	Shore Sedge (<i>Carex limosa</i>)	C															
	Showy Lady's Slipper (<i>Cypripedium reginae</i>)	T									■	■		■	■		
	Slender Arrow Grass (<i>Triglochin palustris</i>)	T		■	■												
	Slender Cotton Grass (<i>Eriophorum gracile</i>)	T									■						
	Slender Ladies'-tresses (<i>Spiranthes lacera</i>)	T							■								
	Slender Sedge (<i>Carex tenera</i>)	C										■		■	■		
	Small White Lady's Slipper (<i>Cypripedium candidum</i>)	C		■	■					■		■			■		■
	Straight-leaf Pondweed (<i>Potamogeton strictifolius</i>)	C			■												
	Tall Cotton Grass (<i>Eriophorum angustifolium</i>)	C		■	■							■	■	■			
	Tumble Grass (<i>Schedonnardus paniculatus</i>)	C															
	Western Prairie Fringed Orchid (<i>Platanthera praeclara</i>)	T		■	■	■	■	■	■	■		■	■			■	■
	Yellow Trout-lily (<i>Erythronium americanum</i>)	T													■		

Federally Threatened and Endangered Species (16)

	SPECIES	Status		County														
		State	Federal	Clay	Palo Alto	Buena Vista	Pocahontas	Humboldt	Wright	Calhoun	Webster	Hamilton	Greene	Boone	Story	Dallas	Polk	
Pteridophytes	Glandular Wood Fern (<i>Dryopteris intermedia</i>)	T																
	Ledge Spikemoss (<i>Selaginella rupestris</i>)	C																
	Woodland Horsetail (<i>Equisetum sylvaticum</i>)	T																

http://www.fws.gov/midwest/endangered/lists/iowa_cty.html

E = Endangered Specie

T = Threatened Specie

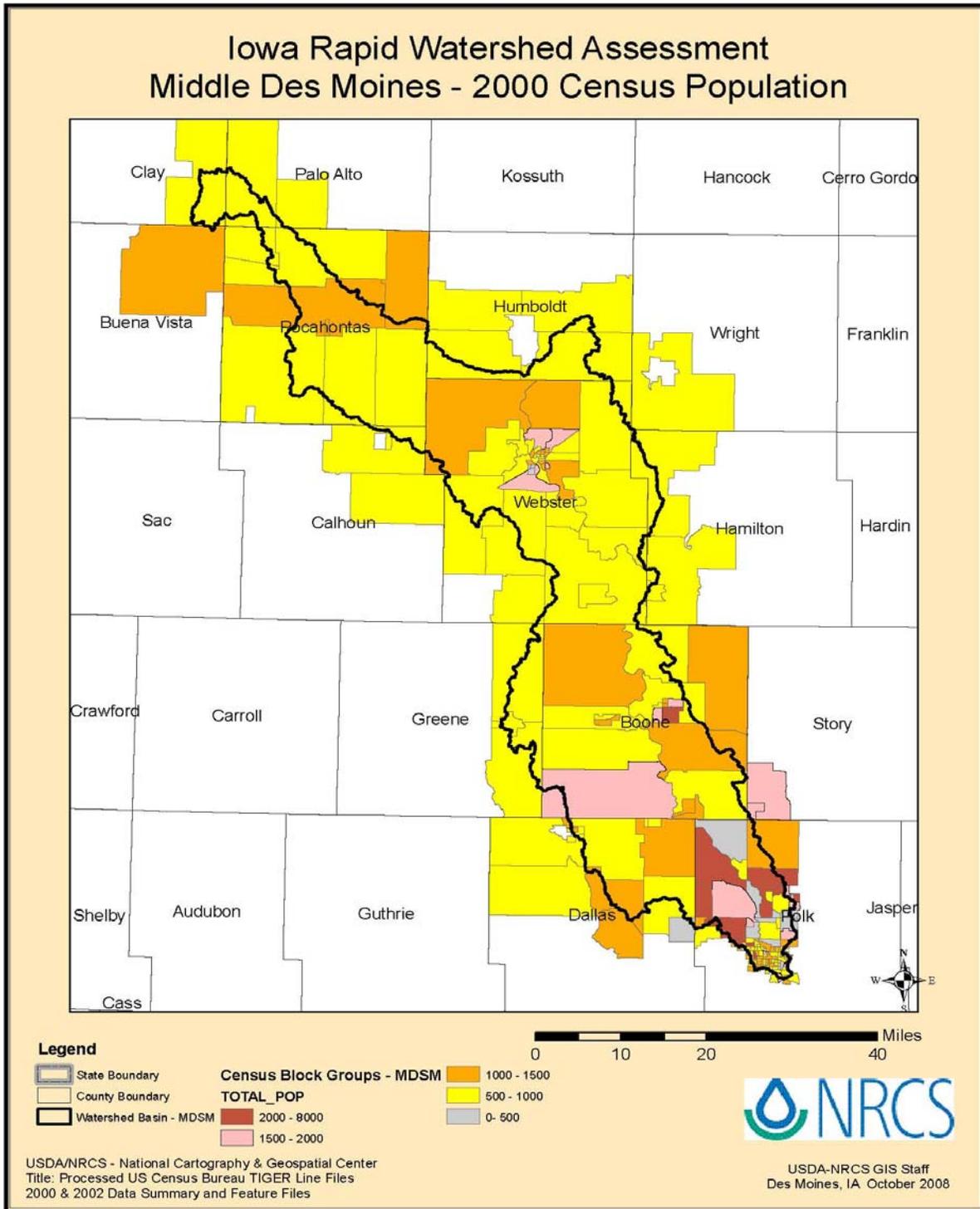
C = Candidate/Species of Concern

Census and Social Data

There are 2338 total farm operators in the watershed. Of these, 2209 are male and 129 are female. There are 1252 principal operators, including 65 percent working full time on the farm (23).

There are 836 farms in the Middle Des Moines Watershed with farm size ranging from one acre to over 1,000 acres. Size of farms: 7 percent are 1-9 acres; 19 percent are 10-49 acres; 21 percent are 50-179 acres; 24 percent are 180-499 acres; 16 percent are 500-999 acres; and 13 percent are over 1,000 acres. The Census of Agriculture is authorized under Public Law (PL) 105-113 and uses the definition of a farm as any place from which \$1,000 or more of agricultural products are produced and sold, or normally would have been sold, during the census year (23).

Limiting factors to conservation practice application include such human issues as lack of knowledge, prohibitive costs, lack of management knowledge and skills, resistance to changes in crop yield and profitability (20).



Total Farms By Size Per County Middle Des Moines Watershed

County	Acres	Percent of Co.	1 - 9 Acres	10 - 49 Acres	50 - 179 Acres	180 - 499 Acres	500 - 999 Acres	> 1000 Acres	Total Farms
Wright	18	0.00%	0	0	0	0	0	0	0
Webster	349,974	31.71%	19	47	62	78	47	43	296
Story	168	0.02%	0	0	0	0	0	0	0
Polk	99,649	9.03%	6	22	16	12	6	6	68
Pocahontas	165,996	15.04%	5	14	18	30	27	15	109
Palo Alto	15,070	1.37%	1	2	2	3	2	1	11
Humboldt	40,280	3.65%	2	3	4	7	4	3	23
Hamilton	12,496	1.13%	1	2	2	2	2	1	10
Greene	34,577	3.13%	1	4	4	6	4	4	23
Dallas	86,751	7.86%	6	22	17	14	8	7	74
Clay	13,573	1.23%	0	1	2	2	2	1	8
Calhoun	6,346	0.57%	0	1	1	1	1	1	5
Buena Vista	146	0.01%	0	0	0	0	0	0	0
Boone	278,614	25.24%	18	45	45	47	29	25	209
	1,103,657	100%	59	163	173	202	132	107	836

Data Source: 2002 National Ag Statistics

County numbers obtained by correlating the percent county which lies within the watershed to determine an estimated number (shown in table).

NASS Farm Operators Middle Des Moines Watershed

COUNTY	STATE	Ac. Co. In Wtshd	% Co. In Wtshd	All Operators	Female Op.	Male Op.	Principal Operators	Full Time Op	Part Time Op
Wright	Iowa	18	0.00%	0	0	0	0	0	0
Webster	Iowa	349,974	31.71%	710	25	685	368	229	139
Story	Iowa	168	0.02%	0	0	0	0	0	0
Polk	Iowa	99,649	9.03%	201	20	181	107	79	28
Pocahontas	Iowa	165,996	15.04%	327	10	317	165	84	81
Palo Alto	Iowa	15,070	1.37%	33	4	29	14	9	5
Humboldt	Iowa	40,280	3.65%	88	5	83	47	27	20
Hamilton	Iowa	12,496	1.13%	27	1	26	14	10	4
Greene	Iowa	34,577	3.13%	69	4	65	36	23	13
Dallas	Iowa	86,751	7.86%	215	14	201	129	88	41
Clay	Iowa	13,573	1.23%	26	2	24	12	7	5
Calhoun	Iowa	6,346	0.57%	13	1	12	7	4	3
Buena Vista	Iowa	146	0.01%	0	0	0	0	0	0
Boone	Iowa	278,614	25.24%	629	43	586	353	248	105
		1,103,657	100%	2,338	129	2,209	1,252	808	444

Data Source: 2002 National Ag Statistics
County numbers obtained by correlating the percent county which lies within the watershed to determine an estimated number (shown in table).

Principal Operators - Person considered to be primarily responsible for managing operations on a farm.
Full Time - Works > 200 Days per year conducting farming activities
Part Time - Works < 200 Days per year conducting farming activities

Resource Concern Trends

Focus of Past 7 Years of Progress

Efforts in the past seven years have included: promotion of conservation tillage and no-till, promotion of CRP and contract extensions to protect sensitive lands, applying comprehensive nutrient management plans, pest management plans, constructing soil retaining structures, and water monitoring through IOWATER (Iowa's volunteer water monitoring program).

Resource Concerns that Require Ongoing Attention

Potential for water quality impairments are increased by manure from livestock that is commonly spread on cropland as fertilizer. Using manure as a fertilizer creates potential water quality challenges from bacteria and nutrients delivered through runoff and subsurface drainage (25). Additional water quality concerns include cattle feedlots and pastures, especially with livestock grazing along streams. Grazing along streams also creates problems with stream bank stability and creates erosion, which is reduced when management restricts cattle access (26).

Underground storage tanks create resource issues due to storage of substances, primarily petroleum products (27).

In the state of Iowa, as of November 2008, there were approximately 60 operating or proposed biofuel plants. At this time, there are 3 ethanol plants in operation in the Middle Des Moines River Watershed. It is reported that 2 - 4 gallons of water is required for every gallon of biofuel produced, creating a concern about water quantity (28).

The Fort Dodge area along the Des Moines River has three gypsum mining companies operating for the primary purpose of creating sheetrock. The site is about 15 square miles and will be depleted in the near future. Due to the close proximity of these mines to the Des Moines River, proper and well planned reclamation is important (30).

Soil erosion by water is an ongoing concern, especially on cropland. Ongoing efforts are needed to increase acres utilizing conservation tillage and no-till (29). Educational activities are needed to promote extension of expiring CRP contracts. Natural Resource-based businesses, diversified agriculture operations, and sustainable agriculture are areas that need to be addressed help improve land management concerns (32).

Wildlife habitat and recreational area resource protection and improvement are ongoing concerns. More information and outreach is needed to provide better management of woodlands and urban greenbelts (29).

The primary natural resource concerns with animal feeding operations are water and air pollution. There are 107 Confined Animal Feeding Operations (CAFOs) in the watershed totaling 124,939 animal units. Eighty-three percent of the CAFOs are swine 16 percent are poultry, and 1 percent is cattle. The watershed also holds 143 Animal Feeding Operations (AFOs) totaling 96,500 animal units. Of which, 68 percent are swine, 20 percent are cattle, 10 percent are poultry, and the remaining 2 percent include dairy and horses (32, 33). Concerns include over applying manure to cropland and associated spills, odor, particulates, and ammonia. Potential air quality issues include effects on human and animal health, impacts on property values, increased risk of nuisance litigation, and NO and NO² pollution (26).

Other resource concerns include potential for flood damage to land due to infrastructure and buildings along major rivers and streams, lack of adequate wastewater facilities and safe drinking water in small and unincorporated towns, and lack of infrastructure for renewable energy efforts.

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WATERSHED NAME & CODE		MIDDLE DES MOINES -					LANDUSE ACRES			73,945	
LANDUSE TYPE		PASTURE/HAYLAND					TYPICAL UNIT SIZE ACRES			10	
POSSIBLE SOURCES OF FUNDING						ESTIMATED PARTICIPATION			9%		
CONSERVATION SYSTEMS BY TREATMENT LEVELS	FUTURE	USDA INVESTMENT					OTHERS			NOTES/COMMENTS	
	New Treatment Units	CTA	EQIP	WRP	WHIP	CSP	CRP/CREP	Fed	State		Local
Progressive System Acres Treated	2,692										
Conservation Cover (ac.) 327	135	X			X		X		X		REAP
Fence (ft.) 382	685,966	X	X		X		X		X		REAP
Pipeline (ft.) 516	247,470	X	X				X				
Pumping Plant (no.) 533	261	X	X								
Riparian Herbaceous Cover (ac.) 390	135	X					X		X		REAP
Use Exclusion (ac.) 472	135	X	X		X		X		X		REAP
Watering Facility (no.) 614	523	X	X				X				
Resource Management System (RMS) Acres Treated	3,328										
Conservation Cover (ac.) 327	35	X			X		X		X		REAP
Fence (ft.) 382	0	X	X		X		X		X		REAP
Forage Harvest Management (ac.) 511	2,496	X									
Nutrient Management (ac.) 590	3,228	X	X				X				
Pasture & Hayland Planting (ac.) 512	3,228	X	X						X		IFIP, REAP
Pest Management (ac.) 595	3,228	X	X				X				
Pipeline (ft.) 516	618,433	X	X				X				
Prescribed Grazing (ac.) 528	3,228	X	X				X		X		REAP
Pumping Plant (no.) 533	112	X	X								
Riparian Herbaceous Cover (ac.) 390	35	X			X		X		X		REAP
Upland Wildlife Habitat Management (ac.) 645	100	X			X		X				
Use Exclusion (ac.) 472	35	X	X				X		X		REAP
Watering Facility (no.) 614	1,516	X	X				X				

WATERSHED NAME & CODE		MIDDLE DES MOINES -			LANDUSE ACRES		73,945		
LANDUSE TYPE		PASTURE/HAYLAND			TYPICAL UNIT SIZE ACRES		10		
ASSESSMENT INFORMATION					ESTIMATED PARTICIPATION		9%		
CONSERVATION SYSTEMS BY TREATMENT LEVELS		CURRENT CONDITIONS	FUTURE CONDITIONS			RESOURCE CONCERNS			
		Total Units	Existing Unchanged Units	New Treatment Units	Total Units	Water Quality – Excessive Nutrients and Organics in Surface Water	Plant Condition – Productivity, Health and Vigor	Domestic Animals – Inadequate Quantities and Quality of Feed and Forage	Domestic Animals – Inadequate Stock Water
Baseline System		System Rating ->			0	0	0	0	
Total Acreage at Baseline Level		38,451	34,606	0	34,606				
No Conservation Practices being applied at this level		0	0	0	0	0	0	0	0
Progressive System		System Rating ->			1	4	3	5	
Total Acreage at Progressive Level		31,057	28,883	2,692	31,575				
Conservation Cover (ac.) 327		1,553	1,444	135	1,579	2	4	0	0
Fence (ft.) 382		7,914,987	7,360,938	685,966	8,046,903	0	2	4	0
Pipeline (ft.) 516		2,855,426	2,655,546	247,470	2,903,016	0	2	0	5
Pumping Plant (no.) 533		3,015	2,804	261	3,065	0	3	0	5
Riparian Herbaceous Cover (ac.) 390		1,553	1,444	135	1,579	0	0	0	0
Use Exclusion (ac.) 472		1,553	1,444	135	1,579	2	4	3	0
Watering Facility (no.) 614		6,030	5,608	523	6,131	0	2	4	5
Resource Management System (RMS)		System Rating ->			4	5	5	5	
Total Acreage at RMS Level		4,437	4,437	3,328	7,764				
Conservation Cover (ac.) 327		133	198	35	233	2	4	0	0
Fence (ft.) 382		0	0	0	0	0	2	4	0
Forage Harvest Management (ac.) 511		3,328	3,328	2,496	5,823	2	4	4	0
Nutrient Management (ac.) 590		4,304	4,304	3,228	7,531	5	3	4	0
Pasture & Hayland Planting (ac.) 512		4,304	4,304	3,228	7,531	2	5	5	0
Pest Management (ac.) 595		4,304	4,304	3,228	7,531	0	5	4	0
Pipeline (ft.) 516		1,091,084	1,290,963	618,433	1,909,396	0	2	0	5
Prescribed Grazing (ac.) 528		4,304	4,304	3,228	7,531	1	5	5	0
Pumping Plant (no.) 533		431	642	112	754	0	3	0	5
Riparian Herbaceous Cover (ac.) 390		133	198	35	233	0	0	0	0
Upland Wildlife Habitat Management (ac.) 645		133	133	100	233	0	4	2	0
Use Exclusion (ac.) 472		133	198	35	233	2	4	3	0
Watering Facility (no.) 614		2,584	3,007	1,516	4,523	0	2	4	5

CONSERVATION INVESTMENT INFORMATION								
CONSERVATION SYSTEMS BY TREATMENT LEVELS	FUTURE	USDA INVESTMENT				PRIVATE INVESTMENT		
	New Treatment Units	Installation Cost 0%	Management Cost - 3 yrs 100%	Technical Assistance 20%	Total Present Value Cost	Installation Cost 100%	Annual O & M + Mgt Costs 100%	Total Present Value Cost
Progressive System Acres Treated	2691.598							
Conservation Cover (ac.) 327	135	\$0	\$0	\$0	\$0	\$21,937	\$658	\$24,709
Fence (ft.) 382	685,966	\$0	\$0	\$0	\$0	\$1,275,896	\$25,518	\$1,383,387
Pipeline (ft.) 516	247,470	\$0	\$0	\$0	\$0	\$395,952	\$7,919	\$429,310
Pumping Plant (no.) 533	261	\$0	\$0	\$0	\$0	\$783,961	\$15,679	\$850,007
Riparian Herbaceous Cover (ac.) 390	135	\$0	\$0	\$0	\$0	\$16,822	\$168	\$17,531
Use Exclusion (ac.) 472	135	\$0	\$0	\$0	\$0	\$5,383	\$161	\$6,063
Watering Facility (no.) 614	523	\$0	\$0	\$0	\$0	\$522,640	\$15,679	\$588,687
0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Subtotal	\$0	\$0	\$0	\$0	\$3,022,591	\$65,783	\$3,299,694
Resource Management System (RMS) Acres Treated	3327.525							
Conservation Cover (ac.) 327	35	\$0	\$0	\$0	\$0	\$5,641	\$169	\$6,354
Fence (ft.) 382	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Forage Harvest Management (ac.) 511	2,496	\$0	\$748,693	\$149,739	\$816,827	\$0	\$249,564	\$384,167
Nutrient Management (ac.) 590	3,228	\$0	\$125,880	\$25,176	\$137,336	\$0	\$41,960	\$64,591
Pasture & Hayland Planting (ac.) 512	3,228	\$0	\$0	\$0	\$0	\$435,739	\$4,357	\$454,094
Pest Management (ac.) 595	3,228	\$0	\$38,732	\$7,746	\$42,257	\$0	\$12,911	\$19,874
Pipeline (ft.) 516	618,433	\$0	\$0	\$0	\$0	\$989,493	\$19,790	\$1,072,855
Prescribed Grazing (ac.) 528	3,228	\$0	\$0	\$0	\$0	\$183,979	\$0	\$183,979
Pumping Plant (no.) 533	112	\$0	\$0	\$0	\$0	\$335,983	\$6,720	\$364,289
Riparian Herbaceous Cover (ac.) 390	35	\$0	\$0	\$0	\$0	\$4,326	\$43	\$4,508
Upland Wildlife Habitat Management (ac.) 645	100	\$0	\$2,995	\$599	\$3,267	\$0	\$998	\$1,537
Use Exclusion (ac.) 472	35	\$0	\$0	\$0	\$0	\$1,384	\$42	\$1,559
Watering Facility (no.) 614	1,516	\$0	\$0	\$0	\$0	\$1,516,231	\$45,487	\$1,707,839
0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Subtotal	\$0	\$916,301	\$183,260	\$999,688	\$3,472,776	\$382,041	\$4,265,646
TOTAL ACRES TREATED / ESTIMATED TREATMENT COSTS	6019.123	\$0	\$916,301	\$183,260	\$999,688	\$6,495,368	\$447,825	\$7,565,340

WATERSHED NAME & CODE		MIDDLE DES MOINES RIVER - 07100004					LANDUSE ACRES			5,463		
LANDUSE TYPE		FARMSTEAD					TYPICAL UNIT SIZE ACRES			3		
POSSIBLE SOURCES OF FUNDING						ESTIMATED PARTICIPATION			9%			
CONSERVATION SYSTEMS BY TREATMENT LEVELS		FUTURE	USDA INVESTMENT					OTHERS			NOTES/COMMENTS	
		New Treatment Units	CTA	EQIP	WRP	WHIP	CSP	CRP/ CREP	Fed	State		Local
Progressive System Acres Treated		199										
Windbreak/Shelterbreak Establishment (ft.) 380		35,085	X	X		X		X		X		REAP
Resource Management System (RMS) Acres Treated		246										
Windbreak/Shelterbreak Establishment (ft.) 380		20,111	X	X		X		X		X		REAP

WATERSHED NAME & CODE		MIDDLE DES MOINES RIVER - 07100004			LANDUSE ACRES		5,463		
LANDUSE TYPE		FARMSTEAD			TYPICAL UNIT SIZE ACRES		3		
ASSESSMENT INFORMATION					ESTIMATED PARTICIPATION		9%		
CONSERVATION SYSTEMS BY TREATMENT LEVELS		CURRENT CONDITIONS	FUTURE CONDITIONS			RESOURCE CONCERNS			
		Total Units	Existing Unchanged Units	New Treatment Units	Total Units	Soil Condition – Contaminants: Animal Waste and Other Organics – P	Water Quality – Excessive Nutrients and Organics in Surface Water	Water Quality – Harmful Levels of Pathogens in Surface Water	Air Quality – Objectionable Odors
Baseline System		System Rating ->			0	0	0	0	
Total Acreage at Baseline Level		2,841	2,556	0	2,556				
No Conservation Practices being applied at this level		0	0	0	0	0	0	0	
Progressive System		System Rating ->			1	0	0	1	
Total Acreage at Progressive Level		2,294	2,134	199	2,332				
Windbreak/Shelterbreak Establishment (ft.) 380		404,824	376,486	35,085	411,571	2	1	0	2
Resource Management System (RMS)		System Rating ->			1	0	0	1	
Total Acreage at RMS Level		328	328	246	574				
Windbreak/Shelterbreak Establishment (ft.) 380		64,598	92,936	20,111	113,047	2	1	0	2
CONSERVATION INVESTMENT INFORMATION									
CONSERVATION SYSTEMS BY TREATMENT LEVELS		FUTURE	USDA INVESTMENT			PRIVATE INVESTMENT			
		New Treatment Units	Installation Cost 50%	Management Cost - 3 yrs 100%	Technical Assistance 20%	Total Present Value Cost	Installation Cost 50%	Annual O & M + Mgt Costs 100%	Total Present Value Cost
Progressive System Acres Treated		198.835							
Windbreak/Shelterbreak Establishment (ft.) 380		35,085	\$26,314	\$0	\$5,263	\$31,576	\$26,314	\$526	\$28,530
0		0	\$0	\$0	\$0	\$0	\$0	\$0	
		Subtotal	\$26,314	\$0	\$5,263	\$31,576	\$26,314	\$526	\$28,530
Resource Management System (RMS) Acres Treated		245.8125							
Windbreak/Shelterbreak Establishment (ft.) 380		20,111	\$15,083	\$0	\$3,017	\$18,100	\$15,083	\$302	\$16,354
0		0	\$0	\$0	\$0	\$0	\$0	\$0	
		Subtotal	\$15,083	\$0	\$3,017	\$18,100	\$15,083	\$302	\$16,354
TOTAL ACRES TREATED / ESTIMATED TREATMENT COSTS		444.6475	\$41,397	\$0	\$8,279	\$49,676	\$41,397	\$828	\$44,885

WATERSHED NAME & CODE		MIDDLE DES MOINES - 07100004		LANDUSE ACRES		824,542					
LANDUSE TYPE		ROW CROP		TYPICAL UNIT SIZE ACRES		115					
POSSIBLE SOURCES OF FUNDING				ESTIMATED PARTICIPATION		9%					
CONSERVATION SYSTEMS BY TREATMENT LEVELS	FUTURE	USDA INVESTMENT					OTHERS			NOTES/COMMENTS	
	New Treatment Units	CTA	EQIP	WRP	WHIP	CSP	CRP/ CREP	Fed	State		Local
Progressive System Acres Treated	30,013										
Conservation Cover (ac.) 327	2,101	X		X	X		X		X		REAP
Conservation Crop Rotation (ac.) 328	0	X	X			X					
Critical Area Planting (ac.) 342	300	X	X						X		IFIP, REAP
Field Border (ft.) 386	954,685	X					X		X		REAP
Filter Strip (ac.) 393	300	X	X				X		X		REAP
Grassed Waterway (ac.) 412	300	X	X				X		X		IFIP
Nutrient Management (ac.) 590	10,205	X	X			X					
Pest Management (ac.) 595	7,803	X	X			X					
Residue and Tillage Management, Mulch Till (ac.) 345	12,305	X	X			X					
Upland Wildlife Habitat Management (ac.) 645	2,101	X	X		X		X				
Resource Management System (RMS) Acres Treated	37,104										
Conservation Cover (ac.) 327	2,385	X		X	X		X		X		REAP
Conservation Crop Rotation (ac.) 328	0	X	X			X					
Critical Area Planting (ac.) 342	129	X	X						X		IFIP, REAP
Field Border (ft.) 386	409,151	X					X		X		REAP
Filter Strip (ac.) 393	129	X	X				X		X		REAP
Grassed Waterway (ac.) 412	129	X	X				X		X		IFIP
Nutrient Management (ac.) 590	24,410	X	X			X					
Pest Management (ac.) 595	26,349	X	X			X					
Residue and Tillage Management, Mulch Till (ac.) 345	2,573	X				X					
Residue Management, No-Till/Strip Till/Direct Seed (ac.) 329	6,308	X	X			X				X	IFIP
Upland Wildlife Habitat Management (ac.) 645	386	X	X		X		X				
Water & Sediment Control Basin (no.) 638	645	X	X						X		IFIP
Wetland Restoration (ac.) 657	2,597	X	X	X	X		X			X	REAP, Private Wetland Mitigation
Wetland Wildlife Habitat Management (ac.) 644	2,597	X		X	X		X			X	Private Wetland Mitigation

WATERSHED NAME & CODE		MIDDLE DES MOINES - 07100004			LANDUSE ACRES		824,542	
LANDUSE TYPE		ROW CROP			TYPICAL UNIT SIZE ACRES		115	
ASSESSMENT INFORMATION					ESTIMATED PARTICIPATION		9%	
CONSERVATION SYSTEMS BY TREATMENT LEVELS	CURRENT CONDITIONS	FUTURE CONDITIONS			RESOURCE CONCERNS			
	Total Units	Existing Unchanged Units	New Treatment Units	Total Units	Soil Erosion – Sheet and Rill	Soil Erosion – Ephemeral Gully	Water Quality – Excessive Nutrients and Organics in Surface Water	Water Quality – Excessive Suspended Sediment and Turbidity in Surface Water
Baseline System	System Rating ->				2	1	1	1
Total Acreage at Baseline Level	428,762	385,886	0	385,886				
Conservation Crop Rotation (ac.) 328	428,762	385,886	0	385,886	4	2	2	2
Residue and Tillage Management, Mulch Till (ac.) 345	218,669	196,802	0	196,802	1	0	0	1
Residue Management, Seasonal (ac.) 344	64,314	57,883	0	57,883	2	1	0	1
Progressive System	System Rating ->				5	5	4	4
Total Acreage at Progressive Level	346,308	322,066	30,013	352,079				
Conservation Cover (ac.) 327	24,242	22,545	2,101	24,646	5	2	2	3
Conservation Crop Rotation (ac.) 328	318,603	323,913	0	323,913	4	2	2	2
Critical Area Planting (ac.) 342	3,463	3,221	300	3,521	5	5	2	4
Field Border (ft.) 386	11,015,594	10,244,503	954,685	11,199,188	4	3	2	2
Filter Strip (ac.) 393	3,463	3,221	300	3,521	0	0	4	4
Grassed Waterway (ac.) 412	3,463	3,221	300	3,521	0	5	2	2
Nutrient Management (ac.) 590	117,745	109,502	10,205	119,707	0	0	5	0
Pest Management (ac.) 595	90,040	83,737	7,803	91,541	0	0	0	2
Residue and Tillage Management, Mulch Till (ac.) 345	318,603	311,608	12,305	323,913	1	0	0	1
Upland Wildlife Habitat Management (ac.) 645	24,242	22,545	2,101	24,646	3	3	0	2
Resource Management System (RMS)	System Rating ->				5	5	5	5
Total Acreage at RMS Level	49,473	49,473	37,104	86,577				
Conservation Cover (ac.) 327	5,442	7,139	2,385	9,523	5	2	2	3
Conservation Crop Rotation (ac.) 328	43,536	76,188	0	76,188	4	2	2	2
Critical Area Planting (ac.) 342	495	737	129	866	5	5	2	4
Field Border (ft.) 386	1,573,656	2,344,748	409,151	2,753,899	4	3	2	2
Filter Strip (ac.) 393	495	737	129	866	0	0	4	4
Grassed Waterway (ac.) 412	495	737	129	866	0	5	2	2
Nutrient Management (ac.) 590	43,536	51,778	24,410	76,188	0	0	5	0
Pest Management (ac.) 595	43,536	49,839	26,349	76,188	0	0	0	2
Residue and Tillage Management, Mulch Till (ac.) 345	35,125	58,897	2,573	61,470	1	0	0	1
Residue Management, No-Till/Strip Till/Direct Seed (ac.) 329	8,410	8,410	6,308	14,718	4	2	2	4
Upland Wildlife Habitat Management (ac.) 645	1,484	2,211	386	2,597	3	3	0	2
Water & Sediment Control Basin (no.) 638	860	860	645	1,506	0	2	2	4
Wetland Restoration (ac.) 657	3,463	3,463	2,597	6,060	0	0	3	3
Wetland Wildlife Habitat Management (ac.) 644	3,463	3,463	2,597	6,060	0	0	0	3

CONSERVATION INVESTMENT INFORMATION								
CONSERVATION SYSTEMS BY TREATMENT LEVELS	FUTURE	USDA INVESTMENT				PRIVATE INVESTMENT		
	New Treatment Units	Installation Cost 0%	Management Cost - 3 yrs 100%	Technical Assistance 20%	Total Present Value Cost	Installation Cost 100%	Annual O & M + Mgt Costs 100%	Total Present Value Cost
Progressive System Acres Treated	30013.3288							
Conservation Cover (ac.) 327	2,101	\$0	\$0	\$0	\$0	\$342,452	\$10,274	\$385,728
Conservation Crop Rotation (ac.) 328	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Critical Area Planting (ac.) 342	300	\$0	\$0	\$0	\$0	\$105,947	\$5,297	\$128,261
Field Border (ft.) 386	954,685	\$0	\$0	\$0	\$0	\$334,140	\$3,341	\$348,215
Filter Strip (ac.) 393	300	\$0	\$0	\$0	\$0	\$1,200,533	\$24,011	\$1,301,675
Grassed Waterway (ac.) 412	300	\$0	\$0	\$0	\$0	\$360,160	\$7,203	\$390,502
Nutrient Management (ac.) 590	10,205	\$0	\$397,977	\$79,595	\$434,194	\$0	\$132,659	\$204,209
Pest Management (ac.) 595	7,803	\$0	\$93,642	\$18,728	\$102,163	\$0	\$31,214	\$48,049
Residue and Tillage Management, Mulch Till (ac.) 345	12,305	\$0	\$738,328	\$147,666	\$805,519	\$0	\$246,109	\$378,849
Upland Wildlife Habitat Management (ac.) 645	2,101	\$0	\$63,028	\$12,606	\$68,764	\$0	\$21,009	\$32,341
Subtotal		\$0	\$1,292,974	\$258,595	\$1,410,640	\$2,343,232	\$481,118	\$3,217,829
Resource Management System (RMS) Acres Treated	37104.39							
Conservation Cover (ac.) 327	2,385	\$0	\$0	\$0	\$0	\$388,686	\$11,661	\$437,804
Conservation Crop Rotation (ac.) 328	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Critical Area Planting (ac.) 342	129	\$0	\$0	\$0	\$0	\$45,406	\$2,270	\$54,969
Field Border (ft.) 386	409,151	\$0	\$0	\$0	\$0	\$143,203	\$1,432	\$149,235
Filter Strip (ac.) 393	129	\$0	\$0	\$0	\$0	\$514,514	\$10,290	\$557,861
Grassed Waterway (ac.) 412	129	\$0	\$0	\$0	\$0	\$154,354	\$3,087	\$167,358
Nutrient Management (ac.) 590	24,410	\$0	\$951,980	\$190,396	\$1,038,614	\$0	\$317,327	\$488,477
Pest Management (ac.) 595	26,349	\$0	\$316,189	\$63,238	\$344,963	\$0	\$105,396	\$162,242
Residue and Tillage Management, Mulch Till (ac.) 345	2,573	\$0	\$154,354	\$30,871	\$168,401	\$0	\$51,451	\$79,202
Residue Management, No-Till/Strip Till/Direct Seed (ac.) 329	6,308	\$0	\$189,232	\$37,846	\$206,453	\$0	\$63,077	\$97,098
Upland Wildlife Habitat Management (ac.) 645	386	\$0	\$11,577	\$2,315	\$12,630	\$0	\$3,859	\$5,940
Water & Sediment Control Basin (no.) 638	645	\$0	\$0	\$0	\$0	\$2,581,175	\$77,435	\$2,907,360
Wetland Restoration (ac.) 657	2,597	\$0	\$0	\$0	\$0	\$3,506,365	\$35,064	\$3,654,066
Wetland Wildlife Habitat Management (ac.) 644	2,597	\$0	\$38,959,610	\$7,791,922	\$42,505,089	\$0	\$12,986,537	\$19,990,849
0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Subtotal		\$0	\$40,582,941	\$8,116,588	\$44,276,151	\$7,333,703	\$13,668,886	\$28,752,462
TOTAL ACRES TREATED / ESTIMATED TREATMENT COSTS	67117.7188	\$0	\$41,875,916	\$8,375,183	\$45,686,791	\$9,676,935	\$14,150,004	\$31,970,291

WATERSHED NAME & CODE		MIDDLE DES MOINES RIVER - 07100004					LANDUSE ACRES			152,406	
LANDUSE TYPE		NATURAL AREAS					TYPICAL UNIT SIZE ACRES			24	
POSSIBLE SOURCES OF FUNDING						ESTIMATED PARTICIPATION			9%		
CONSERVATION SYSTEMS BY TREATMENT LEVELS		FUTURE	USDA INVESTMENT					OTHERS			NOTES/COMMENTS
		New Treatment Units	CTA	EQIP	WRP	WHIP	CSP	CRP/ CREP	Fed	State	
Progressive System Acres Treated		5,548									
No Conservation Practices being applied at this level		0									
Resource Management System (RMS) Acres Treated		6,858									
Forest Stand Improvement (ac.) 666		6,790	X	X		X				X	REAP
Pest Management (ac.) 595		6,858	X	X		X	X				
Tree/Shrub Establishment (ac.) 612		1,372	X	X		X				X	REAP
Underground Outlet (ft.) 620		220,062	X	X						X	IFIP
Upland Wildlife Habitat Management (ac.) 645		6,858	X		X	X					
Use Exclusion (ac.) 472		6,858	X	X		X				X	REAP
Water & Sediment Control Basin (no.) 638		338	X	X						X	IFIP

WATERSHED NAME & CODE		MIDDLE DES MOINES RIVER - 07100004			LANDUSE ACRES		152,406		
LANDUSE TYPE		NATURAL AREAS			TYPICAL UNIT SIZE ACRES		24		
ASSESSMENT INFORMATION					ESTIMATED PARTICIPATION		9%		
CONSERVATION SYSTEMS BY TREATMENT LEVELS		CURRENT CONDITIONS	FUTURE CONDITIONS			RESOURCE CONCERNS			
		Total Units	Existing Unchanged Units	New Treatment Units	Total Units	Soil Erosion – Classic Gully	Plant Condition – T & E Plant Species: Declining Species, Species of Concern	Fish and Wildlife – Habitat Fragmentation	Fish and Wildlife – T & E Species: Declining Species, Species of Concern
Baseline System		System Rating ->			0	0	0	0	
Total Acreage at Baseline Level		79,251	71,326	0	71,326				
No Conservation Practices being applied at this level		0	0	0	0	0	0	0	
Progressive System		System Rating ->			0	0	0	0	
Total Acreage at Progressive Level		64,011	59,530	5,548	65,077				
No Conservation Practices being applied at this level		0	0	0	0	0	0	0	
Resource Management System (RMS)		System Rating ->			2	3	4	3	
Total Acreage at RMS Level		9,144	9,144	6,858	16,003				
Forest Stand Improvement (ac.) 666		9,053	9,053	6,790	15,843	0	1	2	1
Pest Management (ac.) 595		9,144	9,144	6,858	16,003	0	0	0	0
Tree/Shrub Establishment (ac.) 612		1,829	1,829	1,372	3,201	2	3	4	3
Underground Outlet (ft.) 620		293,416	293,416	220,062	513,478	1	0	0	0
Upland Wildlife Habitat Management (ac.) 645		9,144	9,144	6,858	16,003	0	4	4	4
Use Exclusion (ac.) 472		9,144	9,144	6,858	16,003	2	2	3	2
Water & Sediment Control Basin (no.) 638		451	451	338	789	3	0	0	0
CONSERVATION INVESTMENT INFORMATION									
CONSERVATION SYSTEMS BY TREATMENT LEVELS		FUTURE	USDA INVESTMENT				PRIVATE INVESTMENT		
		New Treatment Units	Installation Cost 50%	Management Cost - 3 yrs 100%	Technical Assistance 20%	Total Present Value Cost	Installation Cost 50%	Annual O & M + Mgt Costs 100%	Total Present Value Cost
Progressive System Acres Treated		5547.5784							
No Conservation Practices being applied at this level		0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
0		0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Subtotal			\$0	\$0	\$0	\$0	\$0	\$0	\$0

Resource Management System (RMS) Acres Treated	6858.27							
Forest Stand Improvement (ac.) 666	6,790	\$414,171	\$0	\$82,834	\$497,005	\$414,171	\$24,850	\$518,849
Pest Management (ac.) 595	6,858	\$0	\$82,299	\$16,460	\$89,789	\$0	\$27,433	\$42,229
Tree/Shrub Establishment (ac.) 612	1,372	\$390,921	\$0	\$78,184	\$469,106	\$390,921	\$7,818	\$423,855
Underground Outlet (ft.) 620	220,062	\$660,186	\$0	\$132,037	\$792,223	\$660,186	\$13,204	\$715,805
Upland Wildlife Habitat Management (ac.) 645	6,858	\$0	\$205,748	\$41,150	\$224,472	\$0	\$68,583	\$105,573
Use Exclusion (ac.) 472	6,858	\$137,165	\$0	\$27,433	\$164,598	\$137,165	\$8,230	\$171,833
Water & Sediment Control Basin (no.) 638	338	\$676,247	\$0	\$135,249	\$811,496	\$676,247	\$40,575	\$847,163
0	0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Subtotal	\$2,278,691	\$288,047	\$513,348	\$3,048,689	\$2,278,691	\$190,693	\$2,825,307
TOTAL ACRES TREATED / ESTIMATED TREATMENT COSTS	12405.8484	\$2,278,691	\$288,047	\$513,348	\$3,048,689	\$2,278,691	\$190,693	\$2,825,307