

The Middle Cedar 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 Cedar River 8-Digit Hydrologic Unit Code (HUC) watershed contains 1,545,695 acres (1). Twenty-five percent of the watershed is in Benton County, 20 percent in Black Hawk County, 19 percent in Grundy County, 11 percent in Linn County, 9 percent in Tama County, 5 percent in Buchanan County, almost 5 percent in Butler County, and the remaining 4 percent is split between Franklin, Hardin and Marshall counties (1). Ninety-one percent of the watershed is privately owned, 7.6 percent includes municipal areas, and the remaining 1.4 percent is split between public areas, railroads, and unincorporated areas

(2). Seventy-three percent of the watershed is in cropland, 11.6 percent is developed urban land use, 9.9 percent is pasture or hayland, 4.6 percent is woodland or natural areas, and 0.8 percent is split between water and wetlands (3).

Elevations range from 700 feet to 1,303 feet (4). The average watershed slope is 3.4 percent (5). The primary Land Capability Class in the watershed is class 2. The Land Capability Class (LCC) breakdown for the watershed is: 9.1 percent in class 1; 65.4 percent in class 2; 14.9 percent in class 3; 5.2 percent in class 4; 2 percent in class 5; and the remaining 2.1 percent is split between classes 6 and 7 (6). Rainfall ranges from 33 to 37 inches per year (7). The HUC includes one interstate highway (380), six US highways (65, 218, 20, 30, 63, 151), and nine state highways (14, 57, 175, 224, 21, 96, 281, 150, 100) (8).

Conservation assistance is provided by ten Soil and Water Conservation Districts (SWCD) and Natural Resources Conservation Service (NRCS) field offices located in Allison, Grundy Center, Hampton, Iowa Falls, Independence, Marion, Marshalltown, Toledo, Vinton, and Waterloo. There are five Resource Conservation and Development (RC&D) offices that cover the watershed, including Cedar Valley in Charles City, Iowa Valley in Amana, Prairie Rivers in Ames, Prairie Winds in Garner, and Northeast Iowa RC&D in Postville. An office locator is found at <http://offices.sc.egov.usda.gov/locator/app>

The Middle Cedar River HUC includes 12 NRCS conservation easements totaling 1148.8 acres. The easements include the Emergency Watershed Protection (EWP) program, Wetlands Reserve Program (WRP), and the Emergency Wetlands Restoration Program (EWRP). Forty three percent of the easements are in Linn County, 39 percent in Black Hawk County, 11 percent in Butler County, 5 percent in Tama County, and the remaining 2 percent in Benton and Franklin Counties (9).

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).



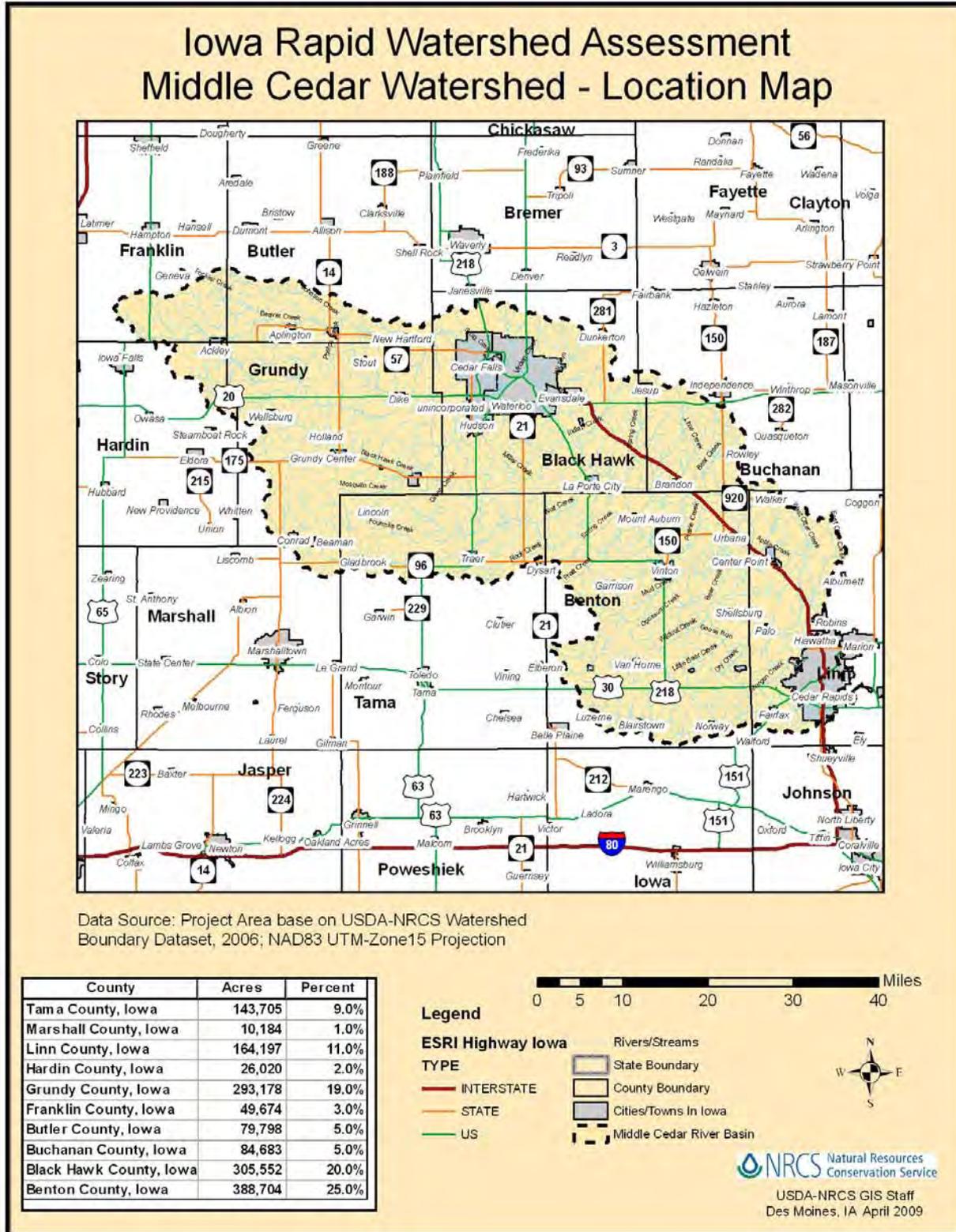
# Middle Cedar River – 07080205

## 8-Digit Hydrologic Unit Profile

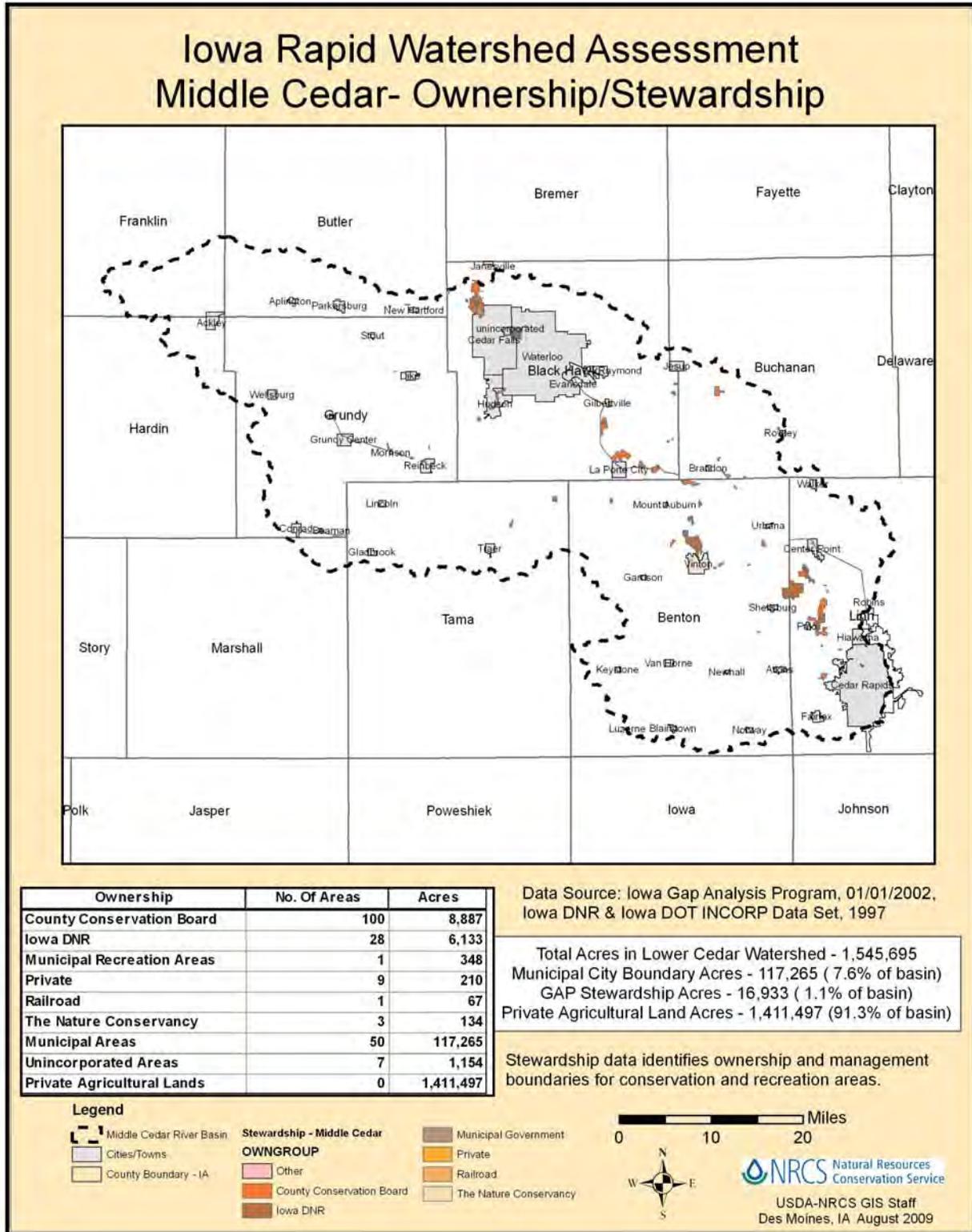
November 2009

Iowa

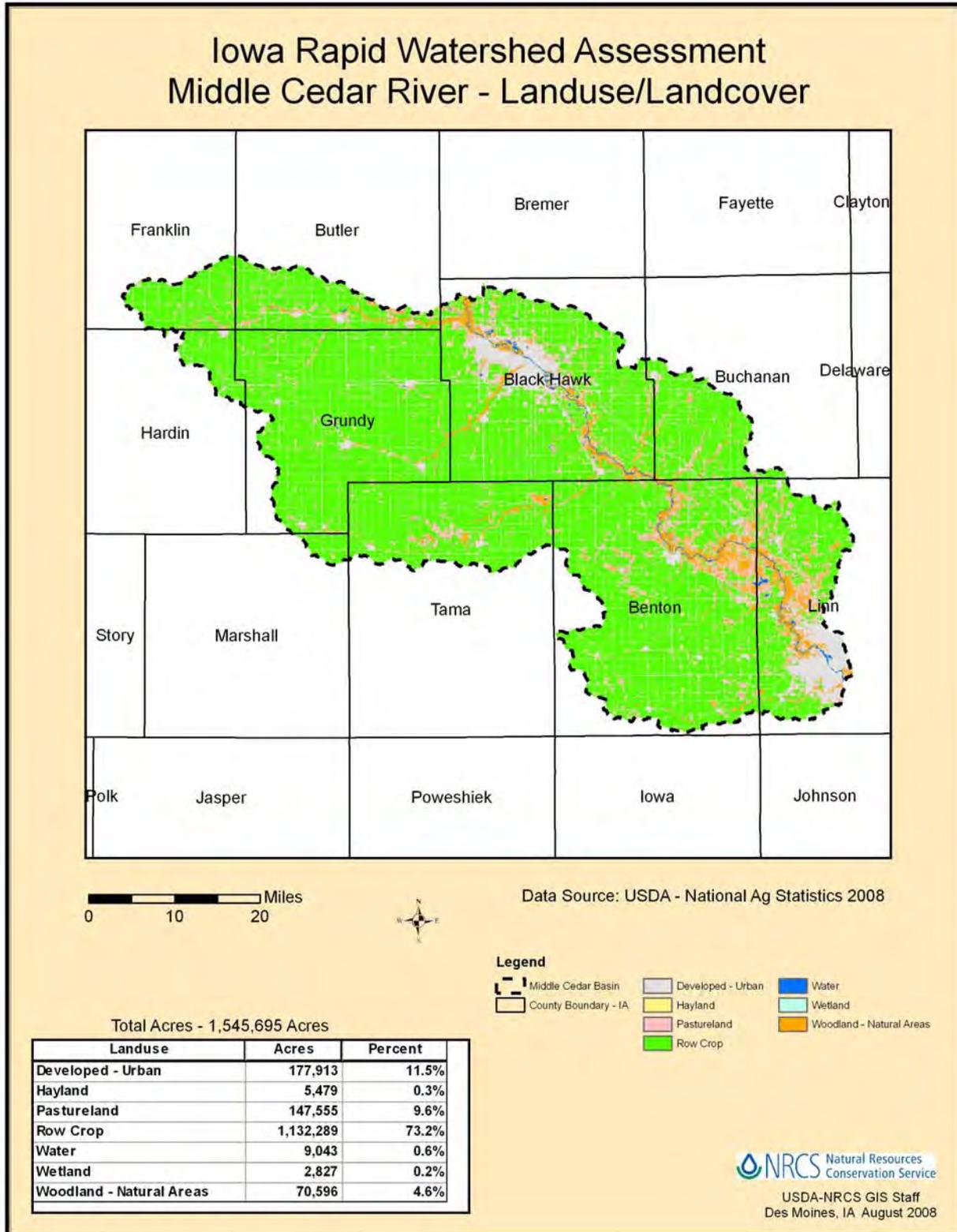
### Physical Description



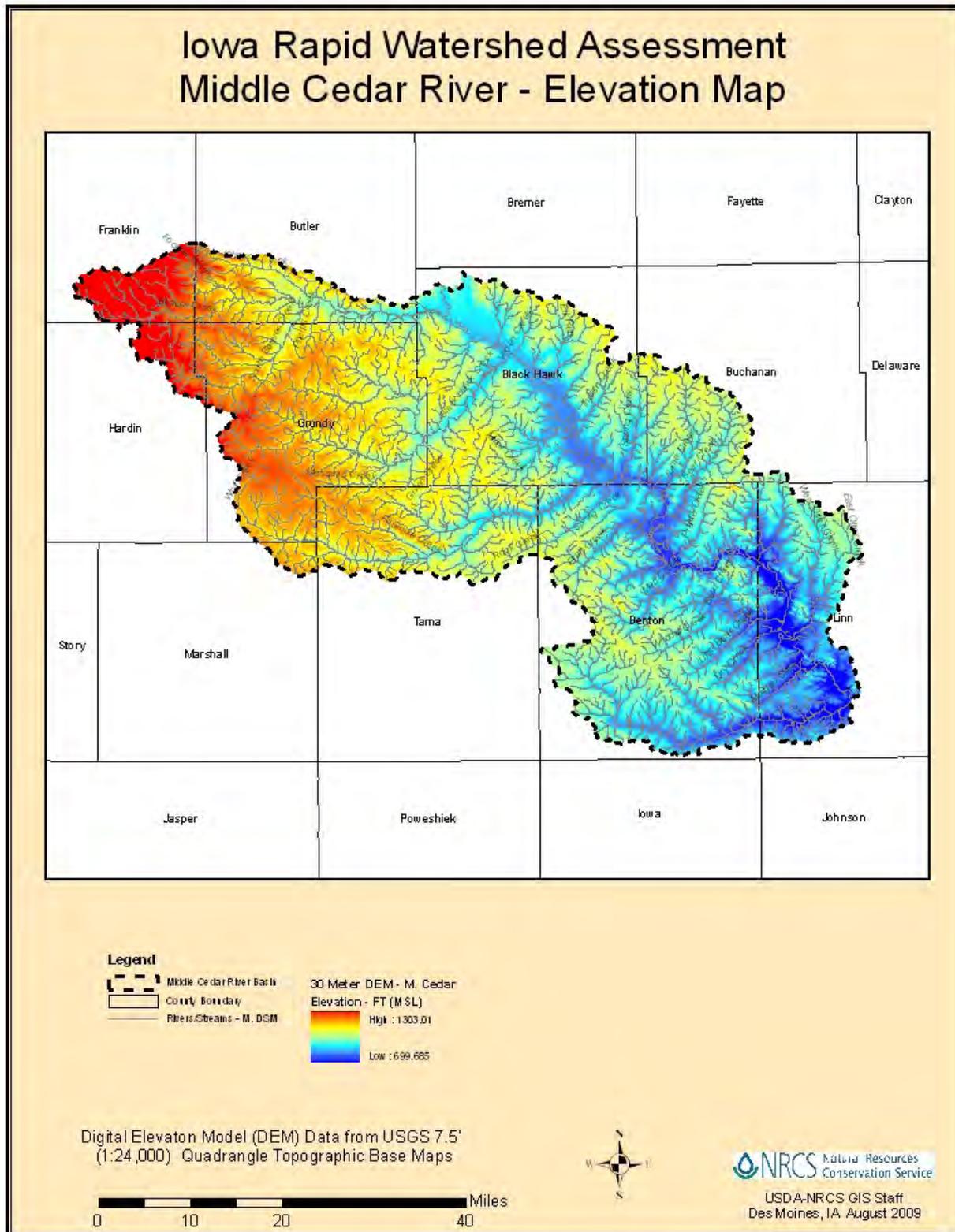
**Physical Description (continued)**



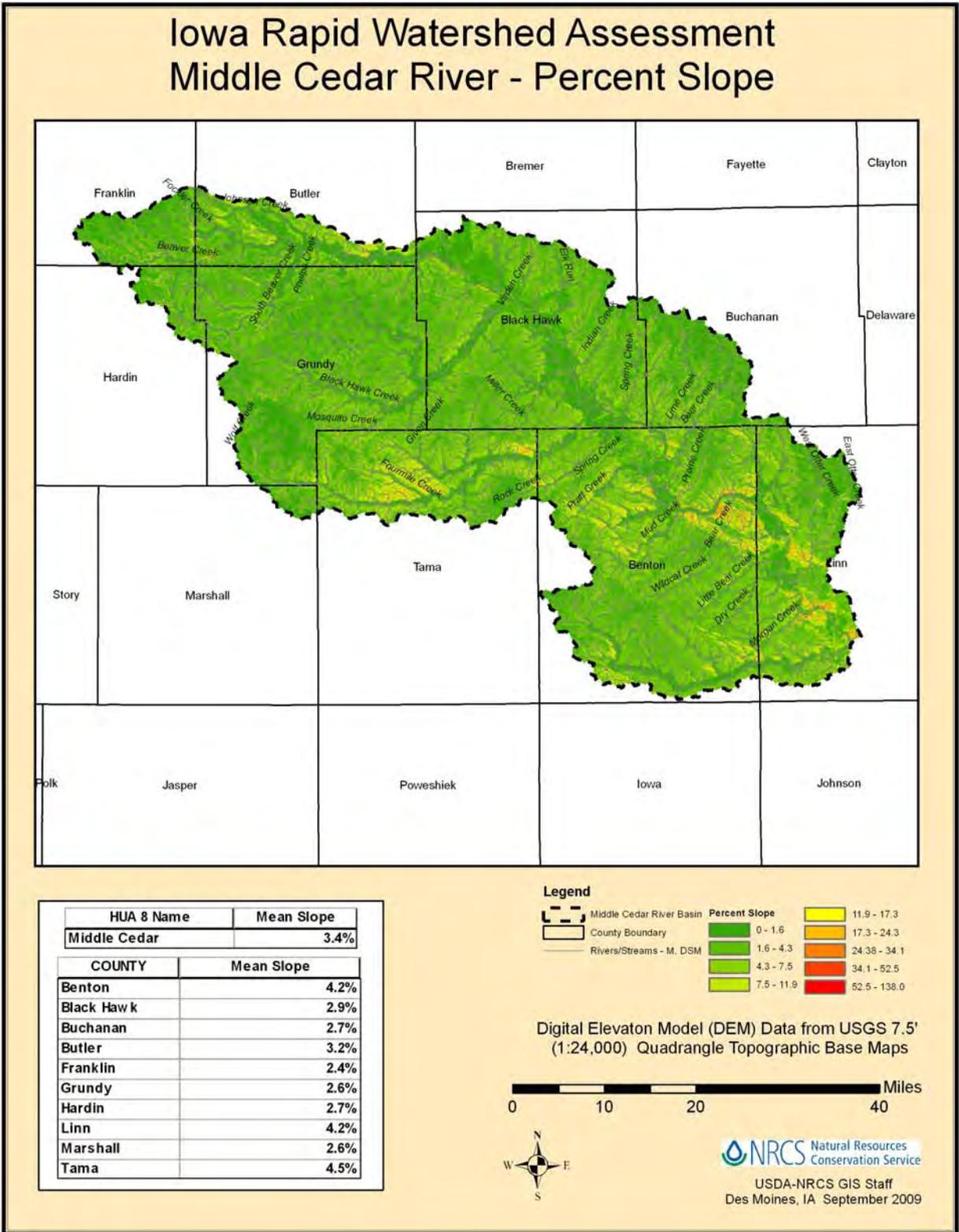
**Physical Description (continued)**



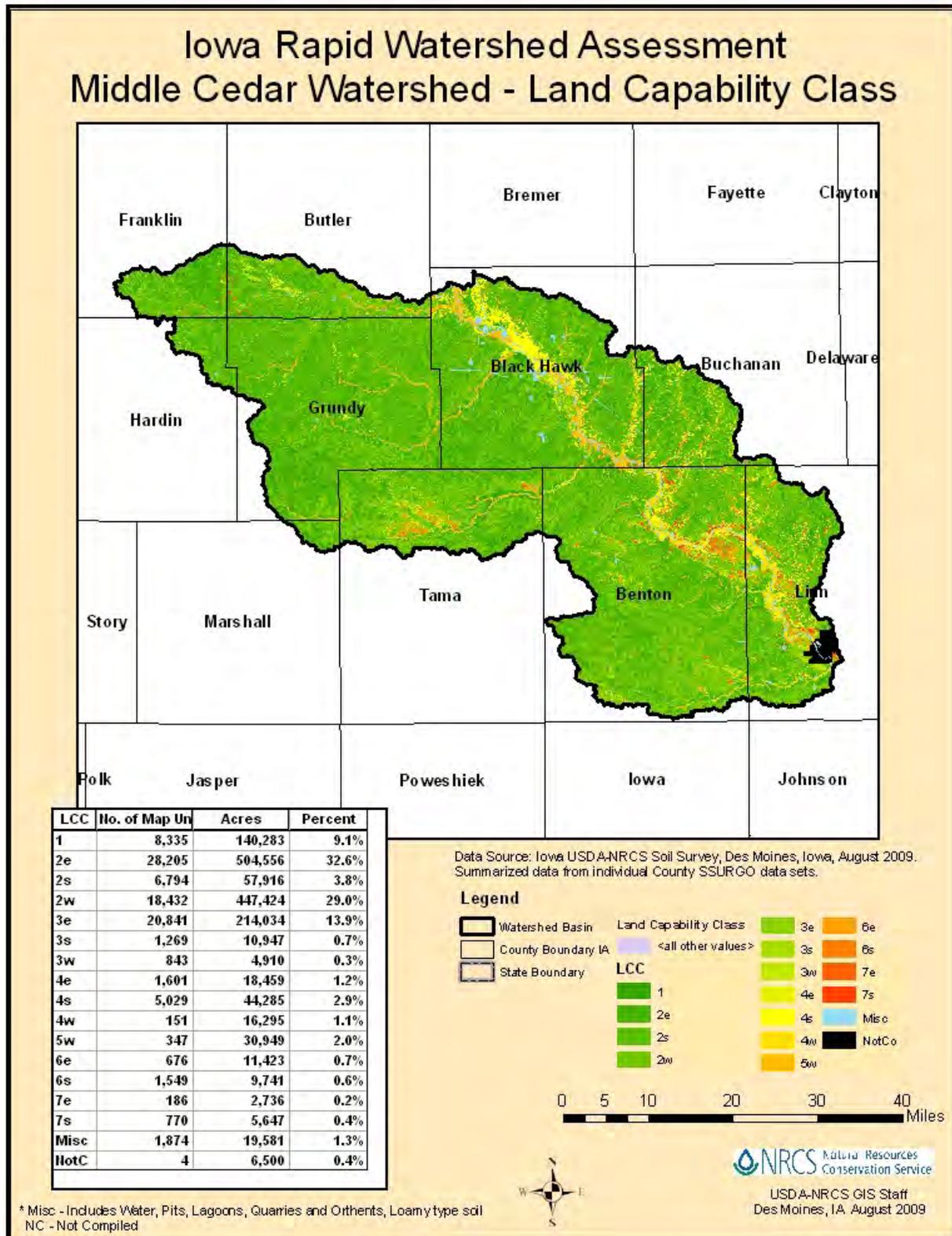
**Physical Description (continued)**



**Physical Description (continued)**

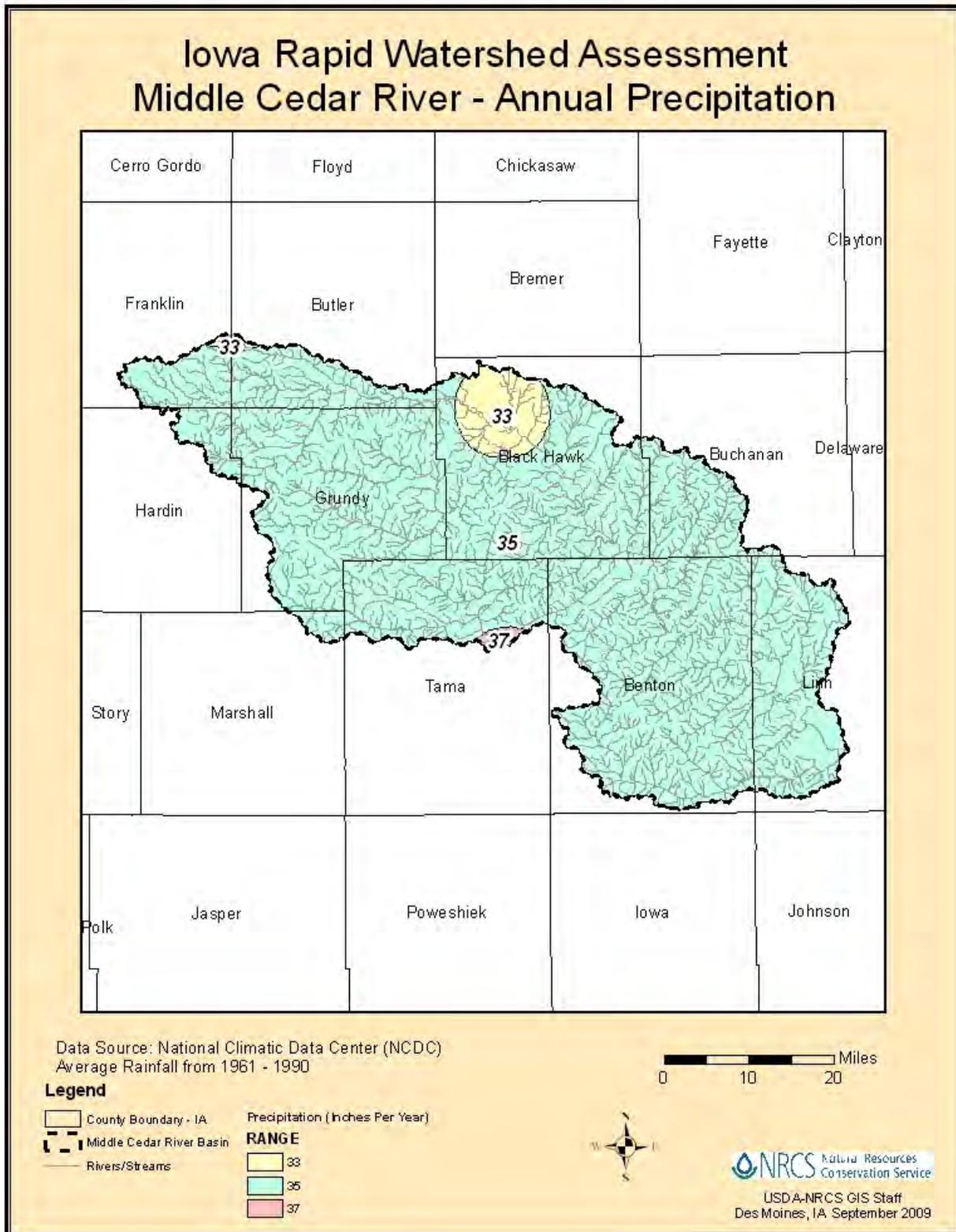


**Physical Description (continued)**

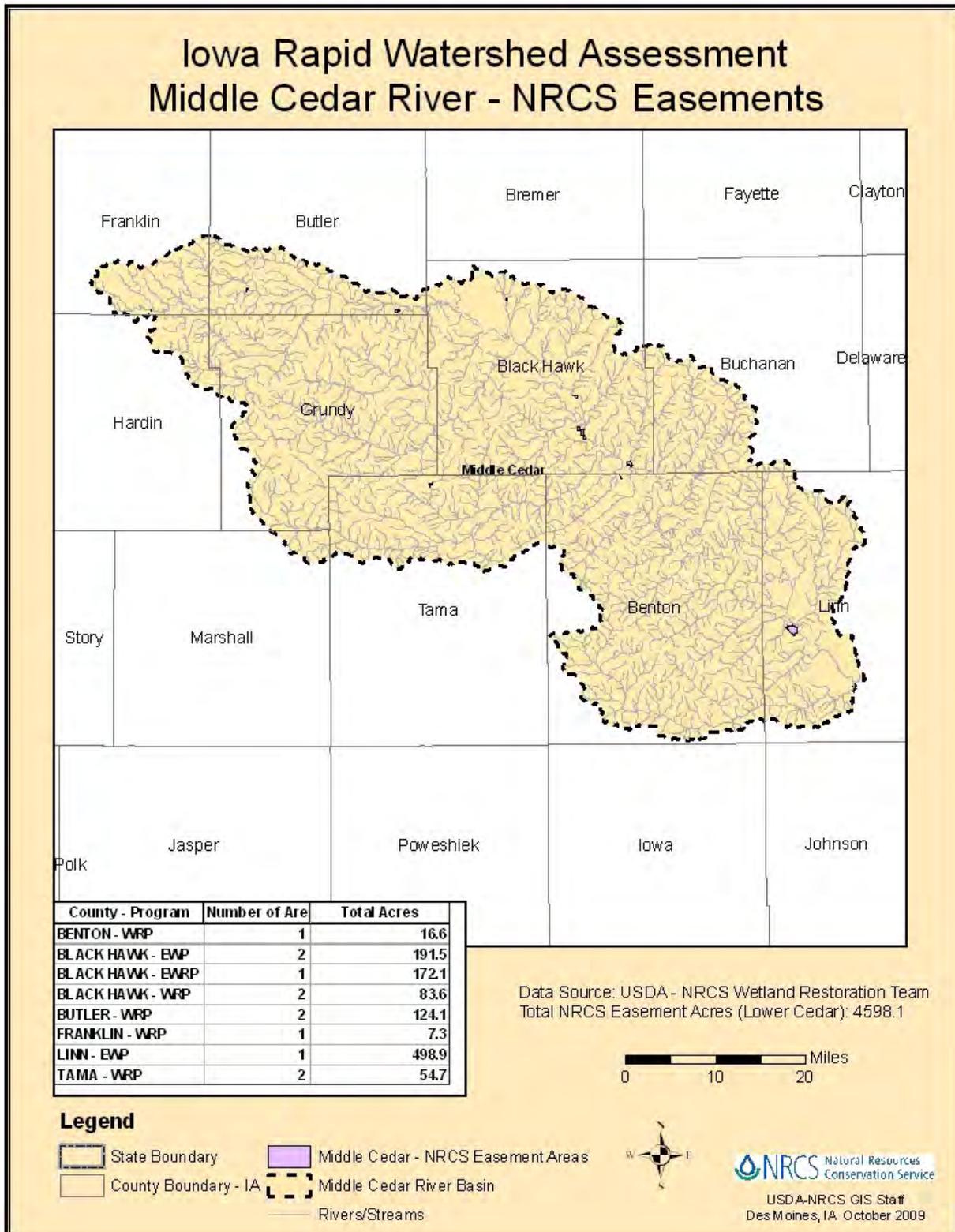


\* Misc - Includes Water, Pits, Lagoons, Quarries and Orthents, Loamy type soil  
NC - Not Compiled

**Physical Description (continued)**

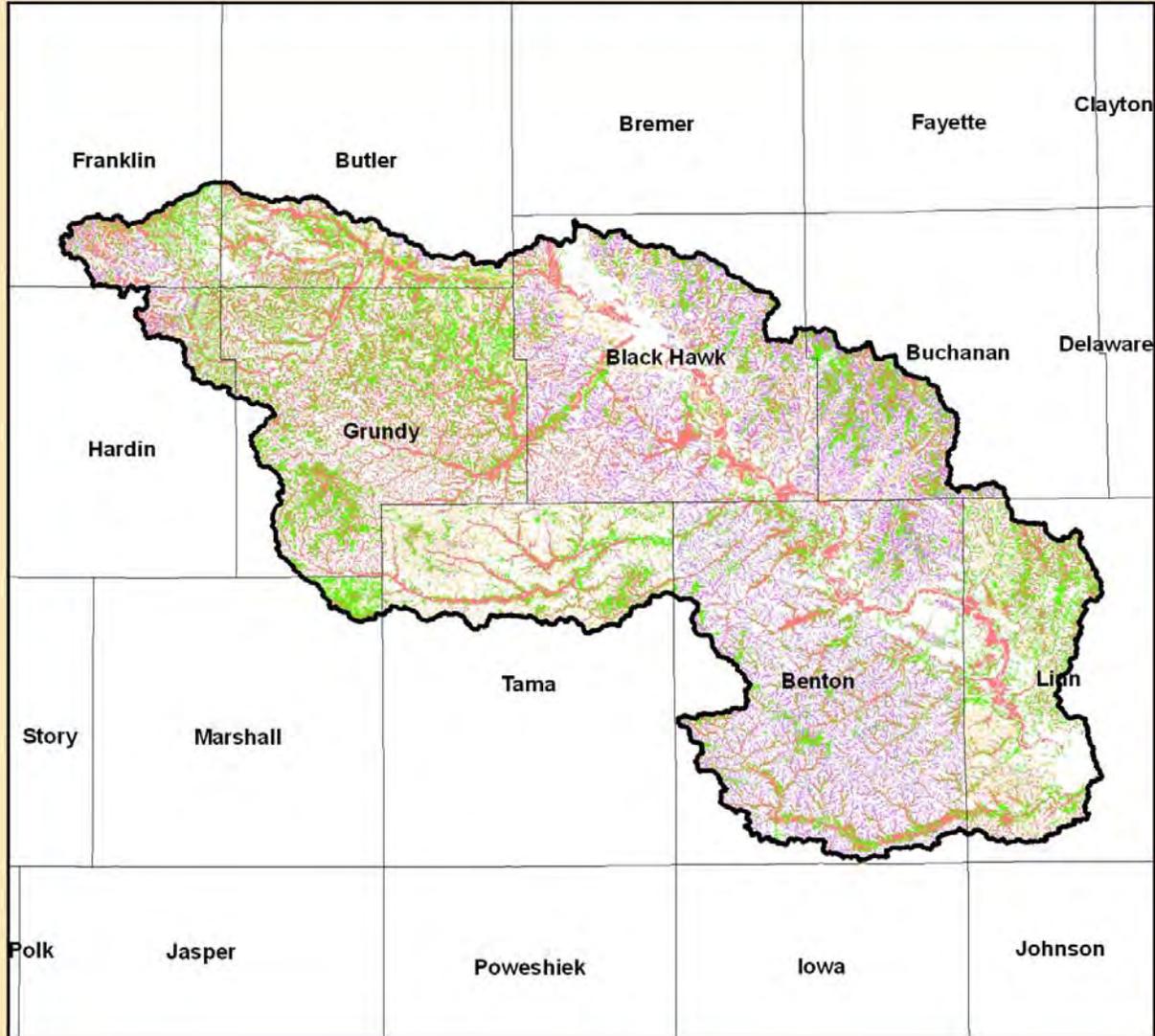


**Physical Description (continued)**



**Physical Description (continued)**

**Iowa Rapid Watershed Assessment  
 Middle Cedar Watershed - Percent Hydric Soil Components**



% Hydric Components	Acres	% of Watershed
0%	863,713	55.9%
1 - 25%	218,074	14.1%
26 - 50%	45,422	2.9%
51 - 75%	123,883	8.0%
76 - 100%	294,591	19.1%

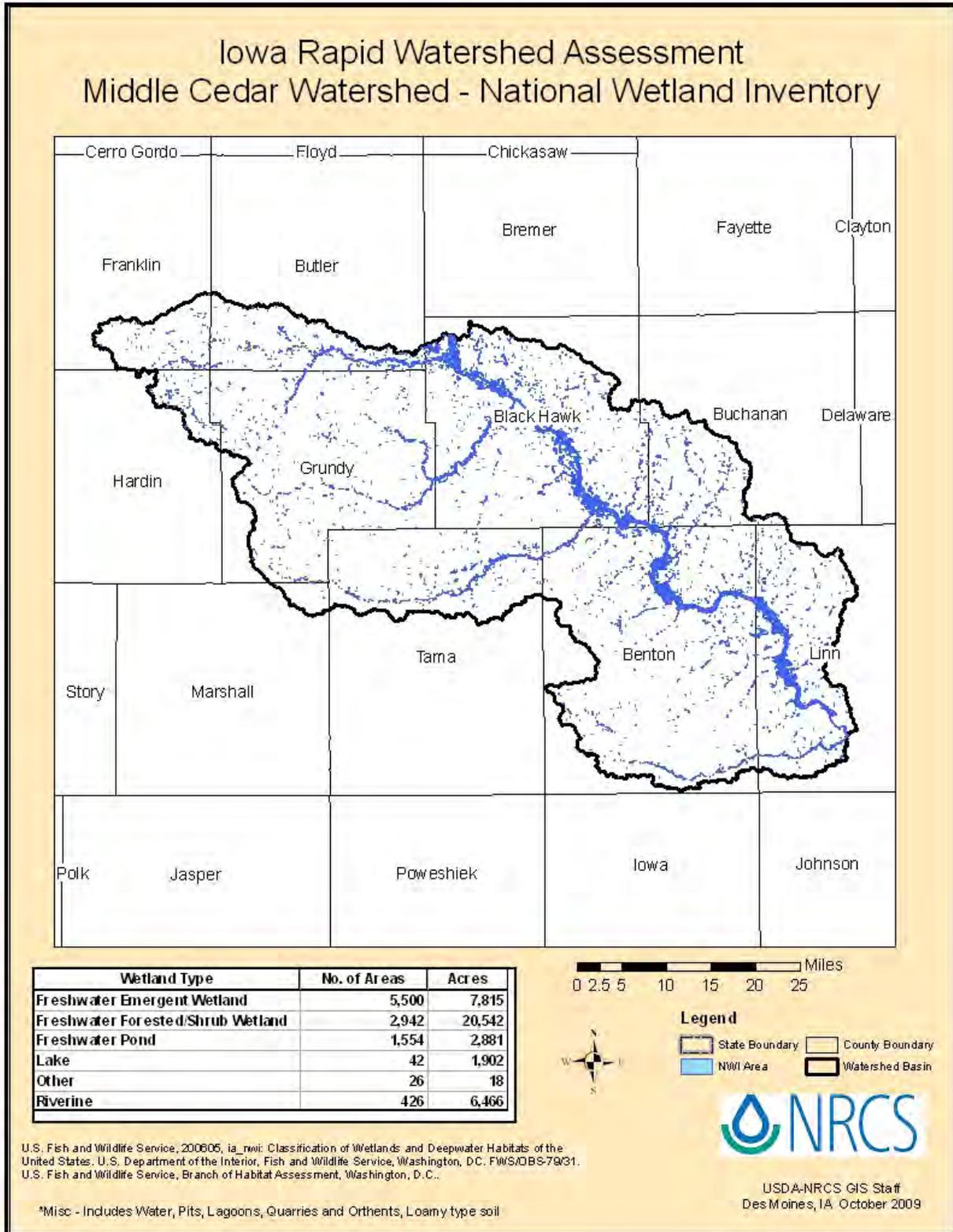
**Legend**

- Watershed Basin
  - County Boundary IA
  - State Boundary
- Percent Hydric Components**
- 0
  - 1 - 25
  - 26 - 50
  - 51 - 75
  - 76 - 100



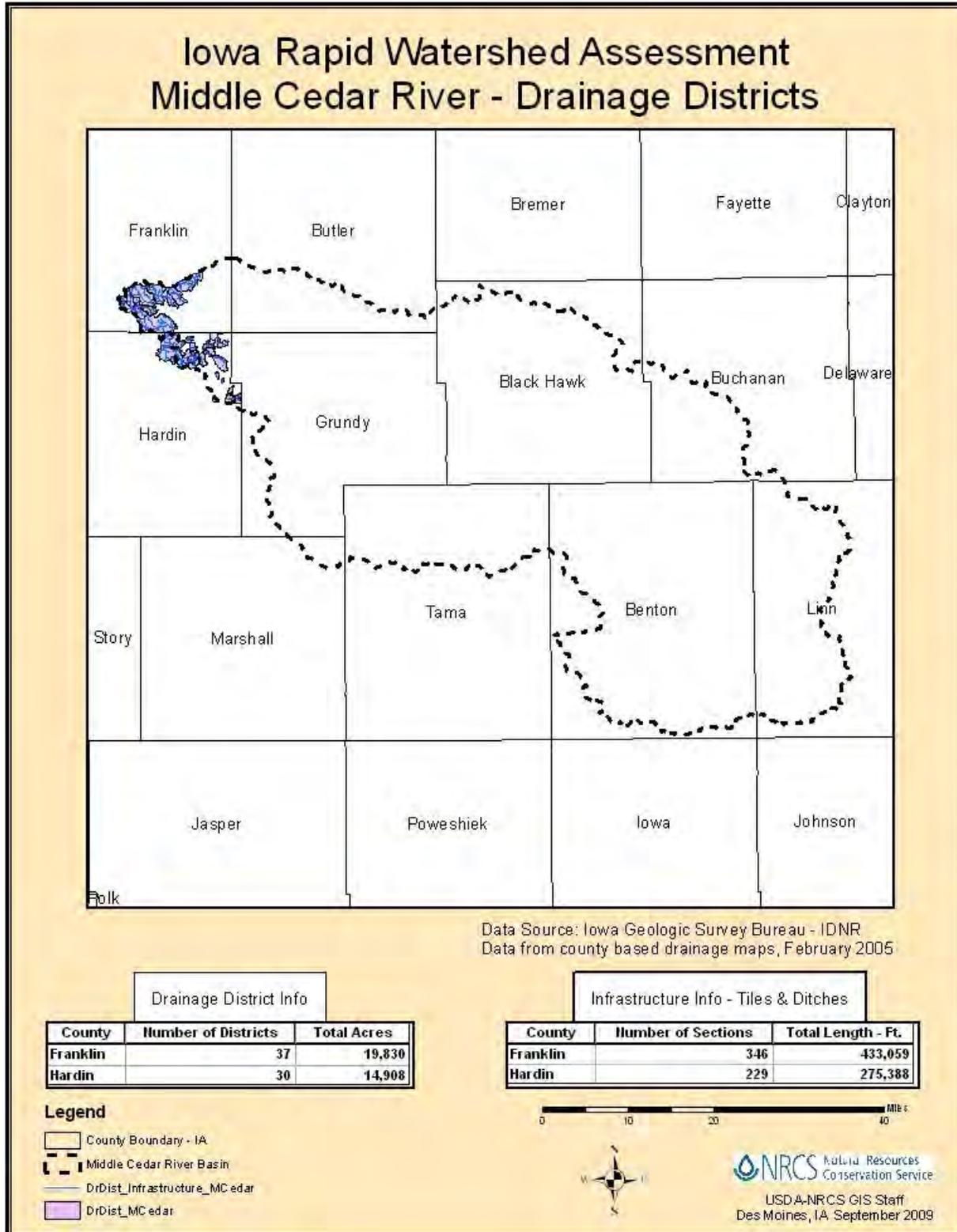
Data Source: Iowa USDA-NRCS Soil Survey  
 Des Moines, Iowa, July 2009, Summarized data  
 from individual County SSRUGO data sets.

**Physical Description (continued)**



**Physical Description (continued)**

There are 67 drainage districts in the northwest tip of the Middle Cedar River HUC. Fifty five percent of the districts are located in Franklin County and 45 percent in Hardin County (10).

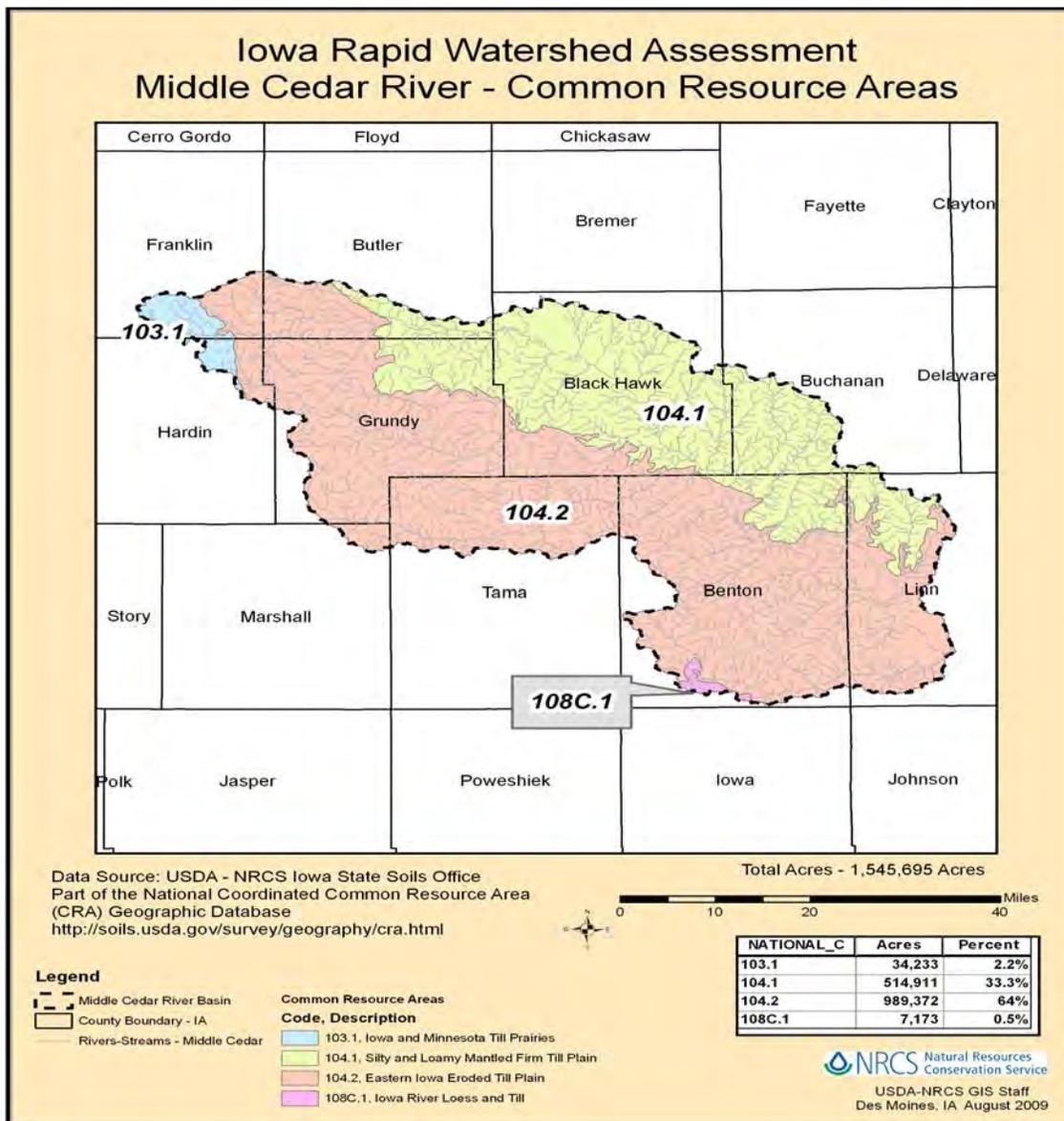


**Physical Description (continued)**

**Common Resource Areas**

The Middle Cedar River HUC includes portions of four National Common Resource Areas (CRA): 103.1; 104.1; 104.2; and 108C.1. Sixty-four percent of the watershed is in CRA 104.2, 33.3 percent in 104.1, 2.2 percent in 103.1, and 0.5 percent in 108C.1 (13, 14).

The CRAs delineated below for the Middle Cedar 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 CRA (General Manual Title 450, Subpart C, §401.21) (13, 14).



### **Common Resource Area Descriptions (13, 14)**

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.

#### 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.

#### 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.

#### 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.

#### 108C.1 – Iowa River Loess and Till

This area consists of silty soils on ridge tops and highly dissected side slopes with drainage ways and streams. Glacial till soils dominate the steeper side slopes. Native vegetation was prairie on the ridge tops with thin bands of timber in the valleys and ravines. Common crops are corn and soybeans with some hay. Swine and poultry operations are numerous. Resource concerns are soil erosion, soil quality, nutrient management, water quality and wildlife habitat.

## Geology

This watershed is drained by the Cedar River and its tributaries, Beaver Creek, Dry Run Creek, Black Hawk Creek, Elk Run Creek, Poyner Creek, Indian Creek, Miller Creek, Mud Creek (one in Black Hawk County, one in Benton County), Wolf Creek, Rock Creek, Spring Creek, Lime Creek, Bear Creek, Pratt Creek, Hinkle Creek, Prairie Creek, Dry Creek, Otter Creek, and Silver Creek. Soils and landforms of the watershed formed in deposits laid down by ice, water, and wind during the Pleistocene and Holocene Epochs. Beneath the unconsolidated deposits is Paleozoic bedrock—predominantly Mississippian dolomite in southeast Franklin, southwest Butler, and northwest Grundy counties; Devonian dolomite and limestone with some shale throughout the majority of the watershed; and Silurian dolomite in the southeast portion of the watershed. Bedrock is rarely exposed except in quarries and in localized instances where stream downcutting has eroded the overlying Quaternary sediments.

The landscape of the Middle Cedar RWA area is primarily in the lowan Surface landform region, and consists primarily of gently sloping till plain dissected by narrow and shallow stream valleys. The southeastern portion of the watershed (primarily Benton and Linn counties) lies in the Southern Iowa Drift Plain landform region, which consists of a landscape of steeply rolling hills and integrated drainage networks. Elevations range from about 750 to 1,060 feet in the watershed.

The upper half of the watershed is part of the lowan Erosion Surface, which is a multi-leveled erosional surface developed on and cut into Pre-Illinoian till as a result of the intense periglacial conditions and strong winds during a more recent (Wisconsinan) period of glaciation. The erosion left behind a lag deposit called a “stone line,” which is covered by loamy sediments of variable thickness. Loess mantles the till on isolated topographic highs that survived the widespread erosion. The portion of the watershed contained in the Southern Iowa Drift Plain landform region consists of Pre-Illinoian till and Pleistocene loess that was largely unaffected by the Wisconsinan erosion. Outcroppings of Devonian and Mississippian limestone are locally common (primarily in Butler and Franklin counties), typically within stream valley walls that have cut down into the older formations.

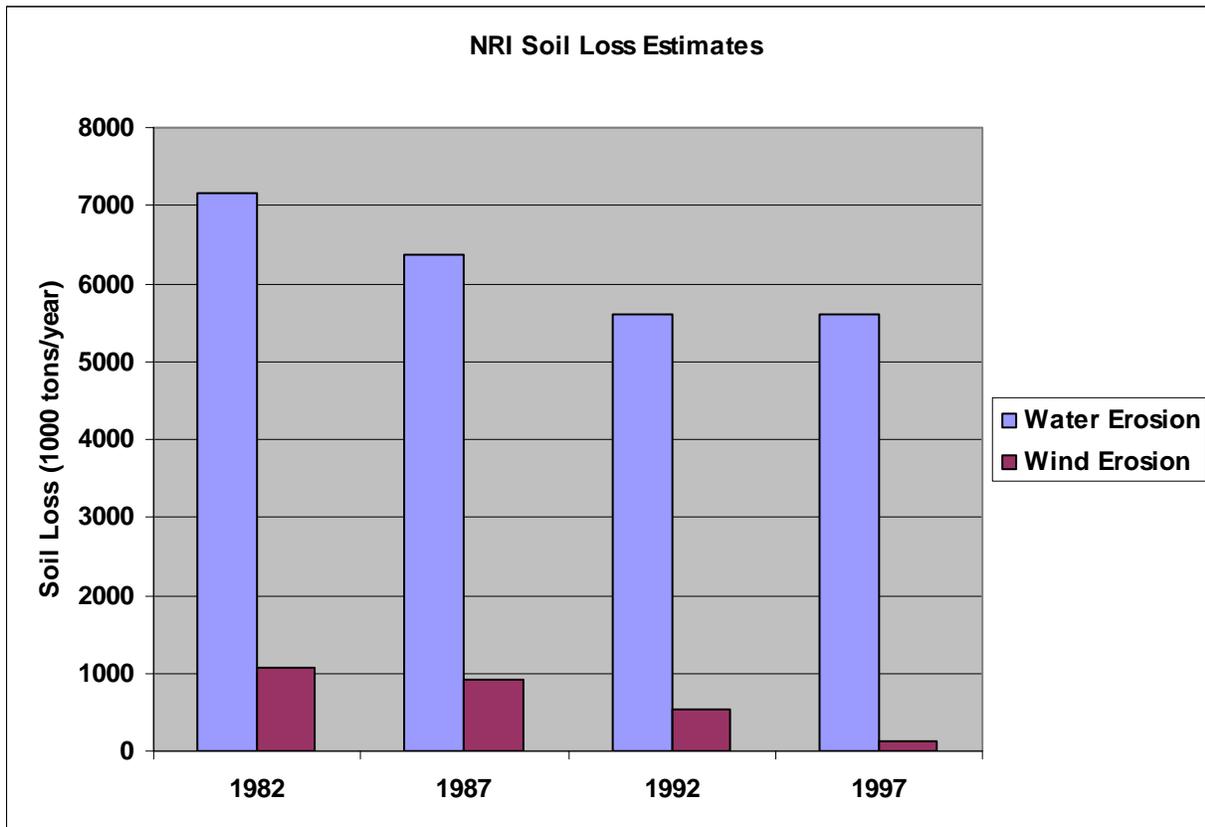
Soils throughout the watershed consist of variable loams (sandy loam, sandy clay loam, clay loam, silty clay loam, and silt loam). These soils formed primarily in glacial till, but are also derived from loess and alluvial deposits, and in some cases from the local bedrock. Throughout most of the watershed soils within the Cedar River valley are derived primarily from loess and glacial till. In the central portion of the watershed (primarily Black Hawk and Buchanan counties) soils have developed from eolian sand deposits, typically on the knobs of hills at the slope breaks. Localized areas in the upper portion of the watershed have soils derived from shallow exposures Devonian dolomite and limestone bedrock (Butler County) and exposures of Mississippian shale (Franklin County). Drainage class of the soils ranges from poorly-drained to well-drained and is largely dependent on landscape position. (35)

**Physical Description (continued)**

**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 (22).

National Resource Inventory (NRI) estimates for sheet and rill erosion by water on cropland and pastureland decreased by approximately 1565.4 tons (22 percent) of soil loss between 1982 and 1997. NRCS estimates indicate wind erosion rates decreased by 960.5 tons (89 percent) between 1982 and 1997 (22).



## **Water Quality**

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 water bodies" and states are required to calculate total maximum daily loads (TMDLs) for pollutants causing impairments (15).

Bacteria, nutrients, and biological pollutants and their affects are the major pollutants impacting surface waters of the Middle Cedar 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 groundcover has resulted in flashy stream flows, thus contributing to stream down cutting and increased stream bank 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 (24).

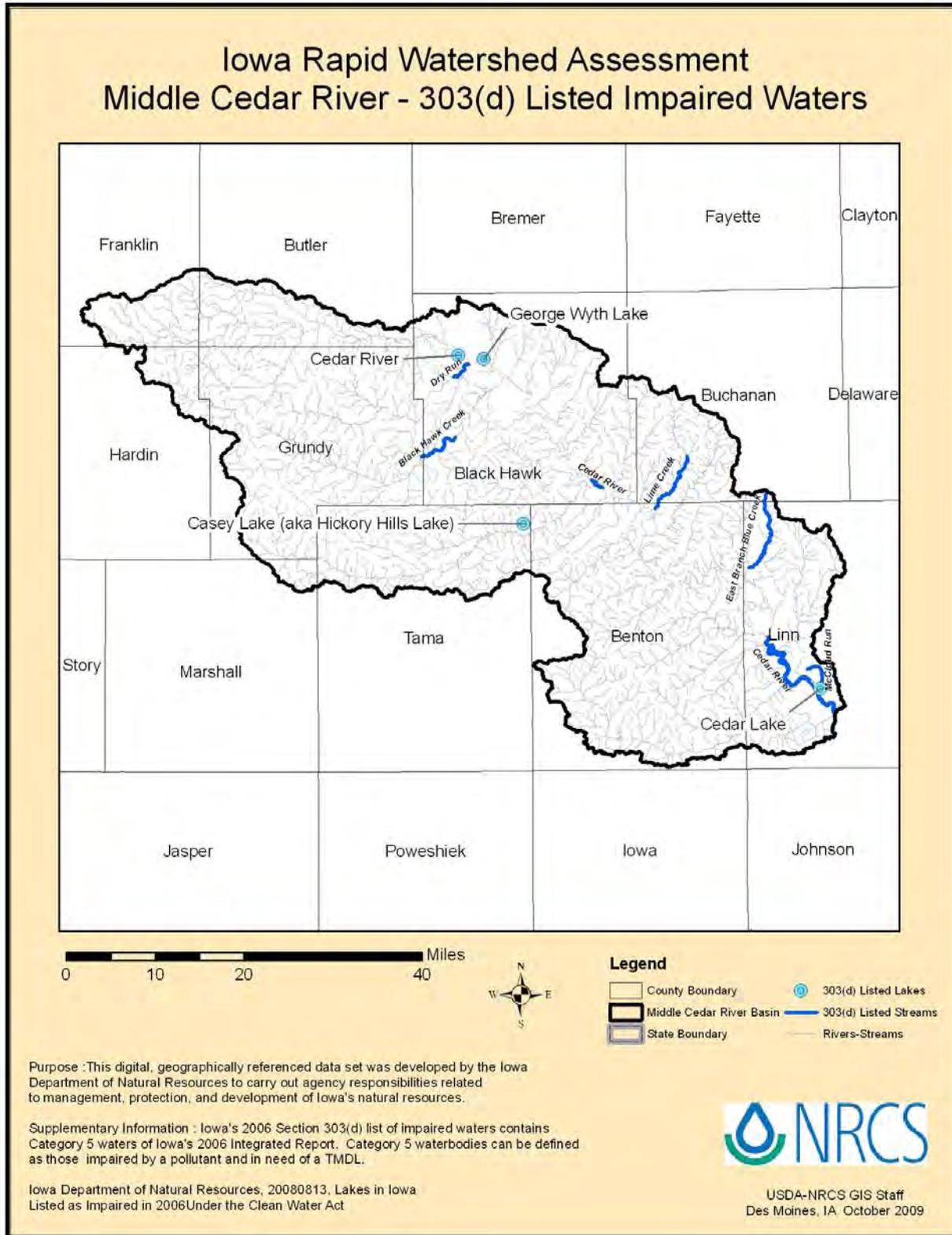
For more information on water quality and the Iowa Department of Natural Resources (IDNR) Water Quality Index, go to the following website:  
<http://www.igsb.uiowa.edu/wqm/wqi/wqi.asp>.

For more information on water quality and IDNR's Regional Watershed Assessment Tool go to the following website: <http://programs.iowadnr.gov/iowawaterweb/rwa.aspx>

This assessment tool should be beneficial to watershed stakeholders who are interested in improving water resources at the watershed scale. The first DNR regional watershed assessment covers nutrients. Assessments of other issue areas will follow as they are developed. Note that the text for each HUC-8 assessment is the same, but the data, charts, and maps provided are specific to the individual watershed. For locating the watershed on the website type the watershed name in the "For" box and click on Go.

*This website is a work in progress so not all watersheds and issue areas are completed yet.*

**Water Quality (continued)**



**Water Quality (continued)**

**Water Quality Concerns Data Graph/Table (23, 36)**

Impaired Water Bodies	Algae	pH	Biological	Bacteria	Nutrients	Turbidity	Siltation	Fish Kill
Black Hawk Creek (CED-0370_1)				X				
Black Hawk Creek (CED-0370_2)			X	X				
Cedar Falls Impoundment (CED-0050-L_0)				X				
Cedar River (CED-0070_0)				X				
Cedar River (CED-0040_1 and 0040_2)				X				
Cedar River (CED- 0060_1 and 0060_2)				X				
Cedar River (CED-0030_3)				X				
Dry Run Creek (CED-0390_0)			X	X				
East Branch Blue Creek (CED-0234_0)								X
George Wyth Lake (CED-00485-L_0)				X				
Lime Creek (CED-0270_1)			X					
Meyer Lake (CED-00460-L_0)	X							
Prairie Creek (CED-0220_2)								X

Impaired Water Bodies	Algae	pH	Biological	Bacteria	Nutrients	Turbidity	Siltation	Fish Kill
South Branch Dry Run Creek (CED-0391_0)				X				
University Branch Dry Run Creek (CED-0392_0)				X				
Wolf Creek (CED-0300_0)				X				
Casey Lake (aka Hickory Hills Lake) (CED-03060-L_0)	X	X				X		
Beaver Creek (CED-010_2)			X					
Beaver Creek (CED-0400_0)				X				
Black Hawk Creek (CED-0380_0)				X				
Holland Creek (CED-0385_0)				X				
Middle Fork South Beaver Creek (CED-0432_1)					X		X	
North Black Hawk Creek (CED-0383_0)				X				

Impaired and TMDL Needed

Impaired, TMDL Complete & Approved

Impaired, TMDL Scheduled 2009

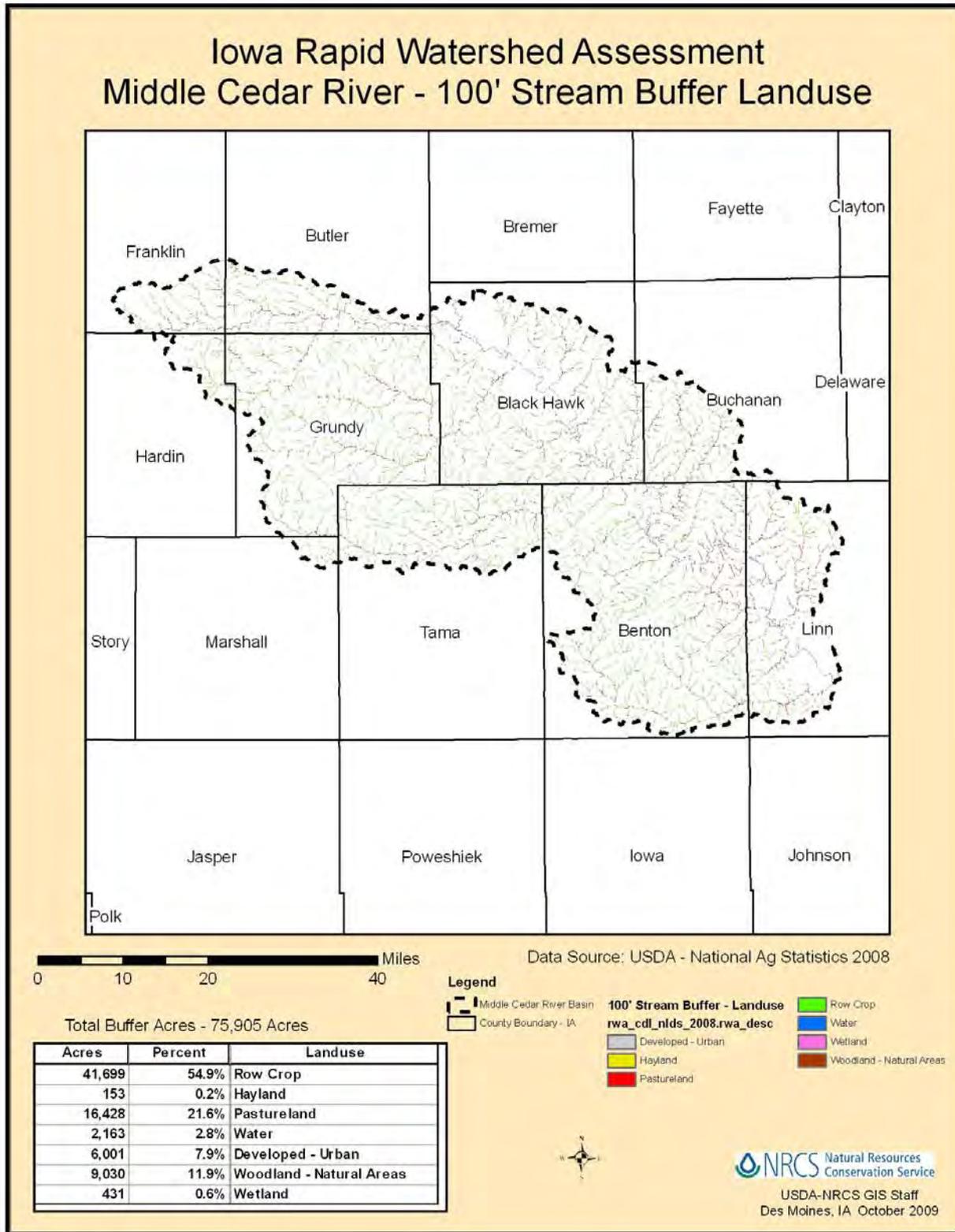
Impaired, TMDL Scheduled 2011 (Subject to change)

**Water Quality (continued)**

Watershed Projects, Plans, Studies, and Assessments *	
(36, 37)	
<b>Iowa Watershed Improvement Review Board (WIRB) Projects</b>	<b>IDNR TMDLs</b>
(2006) <b>Lime Creek Non-Point Source (NPS) Project</b> , Linn County	<b>George Wyth Lake</b> , Black Hawk County <b>Middle Fork South Beaver Creek</b> , Grundy County <b>Dry Run Creek</b> , Black Hawk County (2009) <b>Lime Creek</b> , Buchanan County (2009) <b>Casey Lake (aka Hickory Hills Lake)</b> , Tama County (2011, subject to change)
(2006) <b>Lower Coldwater-Palmer Creek</b> , Butler County	<b>IDNR 319 Projects</b>
	<b>Dry Run Creek</b> , Black Hawk County <b>Hickory Hills Water Quality Project</b> , Tama and Black Hawk Counties

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

**Water Quality (continued)**



**Threatened and Endangered Species** (21)

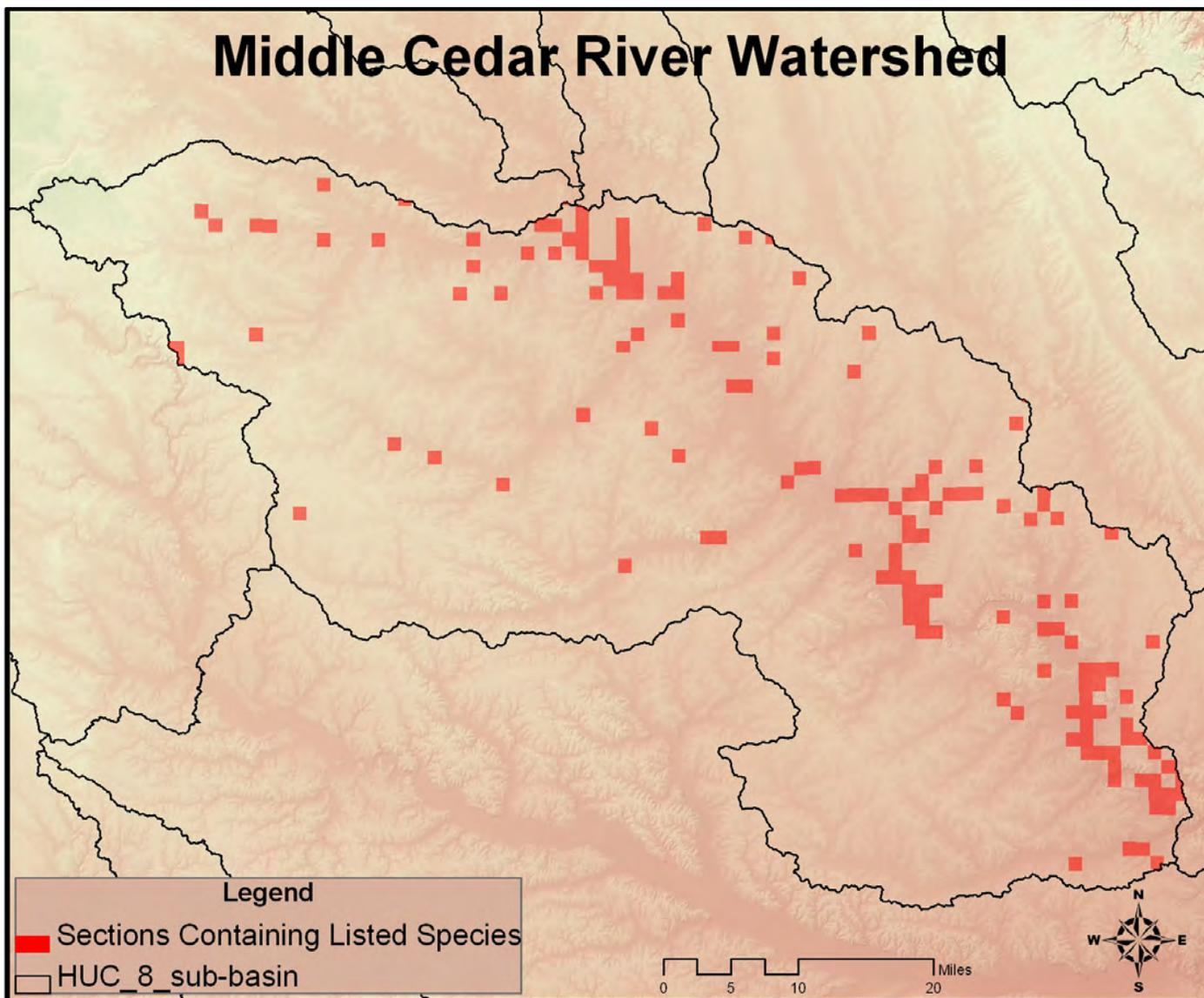
	SPECIES	Status	
		State	Federal
Animals	Slippershell Mussel ( <i>Alasmidonta viridis</i> )	E	
	Blue-spotted Salamander ( <i>Ambystoma laterale</i> )	E	
	Western Sand Darter ( <i>Ammocrypta clara</i> )	T	
	Henslow's Sparrow ( <i>Ammodramus henslowii</i> )	T	
	Pearly Everlasting ( <i>Anaphalis margaritacea</i> )	S	
	Cylindrical Papershell ( <i>Anodontoides ferussachianus</i> )	T	
	Red-shouldered Hawk ( <i>Buteo lineatus</i> )	E	
	Swamp Metalmark ( <i>Calephelis mutica</i> )	S	
	Wood Turtle ( <i>Clemmys insculpta</i> )	E	
	Blanding's Turtle ( <i>Emydoidea blandingii</i> )	T	
	Wild Indigo Dusky Wing ( <i>Erynnis baptisiae</i> )	S	
	Grass Pickerel ( <i>Esox americanus</i> )	T	
	Orangethroat Darter ( <i>Etheostoma spectabile</i> )	T	
	Dion Skipper ( <i>Euphyes dion</i> )	S	
	Zebra Swallowtail ( <i>Eurytides Marcellus</i> )	S	
	Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	E	
	American Brook Lamprey ( <i>Lampetra appendix</i> )	T	
	Yellow Sandshell ( <i>Lampsilis teres</i> )	E	
	Smooth Green Snake ( <i>Liochlorophis vernalis</i> )	S	
	Purplish Copper ( <i>Lycaena helloides</i> )	S	
	Black Redhorse ( <i>Moxostoma duquesnel</i> )	T	
Mudpuppy ( <i>Necturus maculosus</i> )	T		
Central Newt ( <i>Notophthalmus viridescens</i> )	T		
Blacknose Shiner ( <i>Notropis heterolepis</i> )	T		

	SPECIES	Status	
		State	Federal
Animals	Weed Shiner ( <i>Notropis texanus</i> )	E	
	Plains Pocket Mouse ( <i>Perognathus flavescens</i> )	E	
	Bullsnake ( <i>Pituophis catenifer sayi</i> )	S	
	Broad-winged Skipper ( <i>Poanes viator</i> )	S	
	Zabulon Skipper ( <i>Poanes zabulon</i> )	S	
	Byssus Skipper ( <i>Problema byssus</i> )	T	
	Spotted Skunk ( <i>Spilogale putorius</i> )	E	
	Ornate Box Turtle ( <i>Terrapene ornate</i> )	T	
	Ellipse ( <i>Venustaconcha ellipsiformis</i> )	T	
Plants	Slender Copperleaf ( <i>Acalypha gracilens</i> )	S	
	Muskroot ( <i>Adoxa moschatellina</i> )	S	
	Flat Top White Aster ( <i>Aster pubentior</i> )	S	
	Bent Milk-vetch ( <i>Astragalus distortus</i> )	S	
	Kitten Tails ( <i>Besseya bullii</i> )	T	
	Bog Birch ( <i>Betula pumila</i> )	T	
	Leathery Grape Fern ( <i>Botrychium multifidum</i> )	T	
	Little Grape Fern ( <i>Botrychium simplex</i> )	T	
	Water Shield ( <i>Brasenia schreberi</i> )	S	
	Sweet Indian Plantain ( <i>Cacalia suaveolens</i> )	T	
	Glomerate Sedge ( <i>Carex aggregata</i> )	S	
	Field Sedge ( <i>Carex conoidea</i> )	S	
	Slender Sedge ( <i>Carex leptalea</i> )	S	
	Richardson Sedge ( <i>Carex richardsonii</i> )	S	
	Slender Sedge ( <i>Carex tenera</i> )	S	
Deep Green Sedge ( <i>Carex tonsa</i> )	S		

	SPECIES	Status	
		State	Federal
Plants	Slippershell Mussel ( <i>Alasmidonta viridis</i> )	E	
	Hill's Thistle ( <i>Cirsium hillii</i> )	S	
	Swamp Thistle ( <i>Cirsium muticum</i> )	S	
	Hawksbeard ( <i>Crepis runcinata</i> )	S	
	Pretty Dodder ( <i>Cuscuta indecora</i> )	S	
	Small White Lady's Slipper ( <i>Cypripedium candidum</i> )	S	
	Silky Prairie Clover ( <i>Dalea villosa</i> )	E	
	Northern Panic-grass ( <i>Dichanthelium boreale</i> )	E	
	Woodland Horsetail ( <i>Equisetum sylvaticum</i> )	T	
	Tall Cotton Grass ( <i>Eriophorum angustifolium</i> )	S	
	Tawny Cottongrass ( <i>Eriophorum virginicum</i> )	S	
	Orange Grass St. John's Wort ( <i>Hypericum gentianoides</i> )	E	
	Winterberry ( <i>Ilex verticillata</i> )	E	
	Sort Rush ( <i>Juncus effuses</i> )	S	
	Green's Rush ( <i>Juncus greenei</i> )	S	
	Narrowleaf Pinweed ( <i>Lechea intermedia</i> )	T	
	Prairie Bush Clover ( <i>Lespedeza leptostachya</i> )	T	T
	Silver Bladderpod ( <i>Lesquerella ludoviciana</i> )	S	
	Bog Clubmoss ( <i>Lycopodium inundatum</i> )	E	
	Buckbean ( <i>Menyanthes trifoliata</i> )	T	
	Yellow Monkey Flower ( <i>Mimulus glabratus</i> )	T	
	Glade Mallow ( <i>Napaea dioica</i> )	S	
	Small Sundrops ( <i>Oenothera perennis</i> )	T	
	Northern Adder's-tongue ( <i>Ophioglossum pusillum</i> )	S	
Brittle Prickly Pear ( <i>Opuntia fragilis</i> )	T		

	SPECIES	Status	
		State	Federal
Plants	Cleft Phlox ( <i>Phlox bifida</i> )	S	
	Small Green Woodland Orchid ( <i>Platanthera clavellata</i> )	S	
	Western Prairie Fringed Orchid ( <i>Platanthera praeclara</i> )	T	T
	Purple Fringed Orchid ( <i>Platanthera psycodes</i> )	T	
	Crossleaf Milkwort ( <i>Polygala cruciata</i> )	E	
	Pink Milkwort ( <i>Polygala incarnate</i> )	T	
	Racemed Milkwort ( <i>Polygala polygama</i> )	E	
	Eastern Jointweed ( <i>Polygonella articulata</i> )	E	
	Toothcup ( <i>Rotala ramosior</i> )	S	
	Sage Willow ( <i>Salix candida</i> )	S	
	Bog Willow ( <i>Salix pedicellaris</i> )	T	
	Low Nut Rush ( <i>Scleria verticillata</i> )	T	
	Ledge Spikemoss ( <i>Selaginella rupestris</i> )	S	
	Ragwort ( <i>Senecio pseudoreus</i> )	S	
	Great Plains Ladies'-tresses ( <i>Spiranthes magnicamporum</i> )	S	
	Oval Ladies-tresses ( <i>Spiranthes ovalis</i> )	T	
	Earleaf Foxglove ( <i>Tomanthera auriculata</i> )	S	
	Valerian ( <i>Valeriana edulis</i> )	S	
	Marsh-speedwell ( <i>Veronica scutellata</i> )	S	
	Smooth Black-haw ( <i>Viburnum prunifolium</i> )	S	
	Lance-leaved Violet ( <i>Viola lanceolata</i> )	S	
	Violet ( <i>Viola macloskeyi</i> )	S	
Yellow-eyed Grass ( <i>Xyris torta</i> )	E		
E = Endangered Species T = Threatened Species S = Candidate/Species of Concern			

**Threatened and Endangered Species**

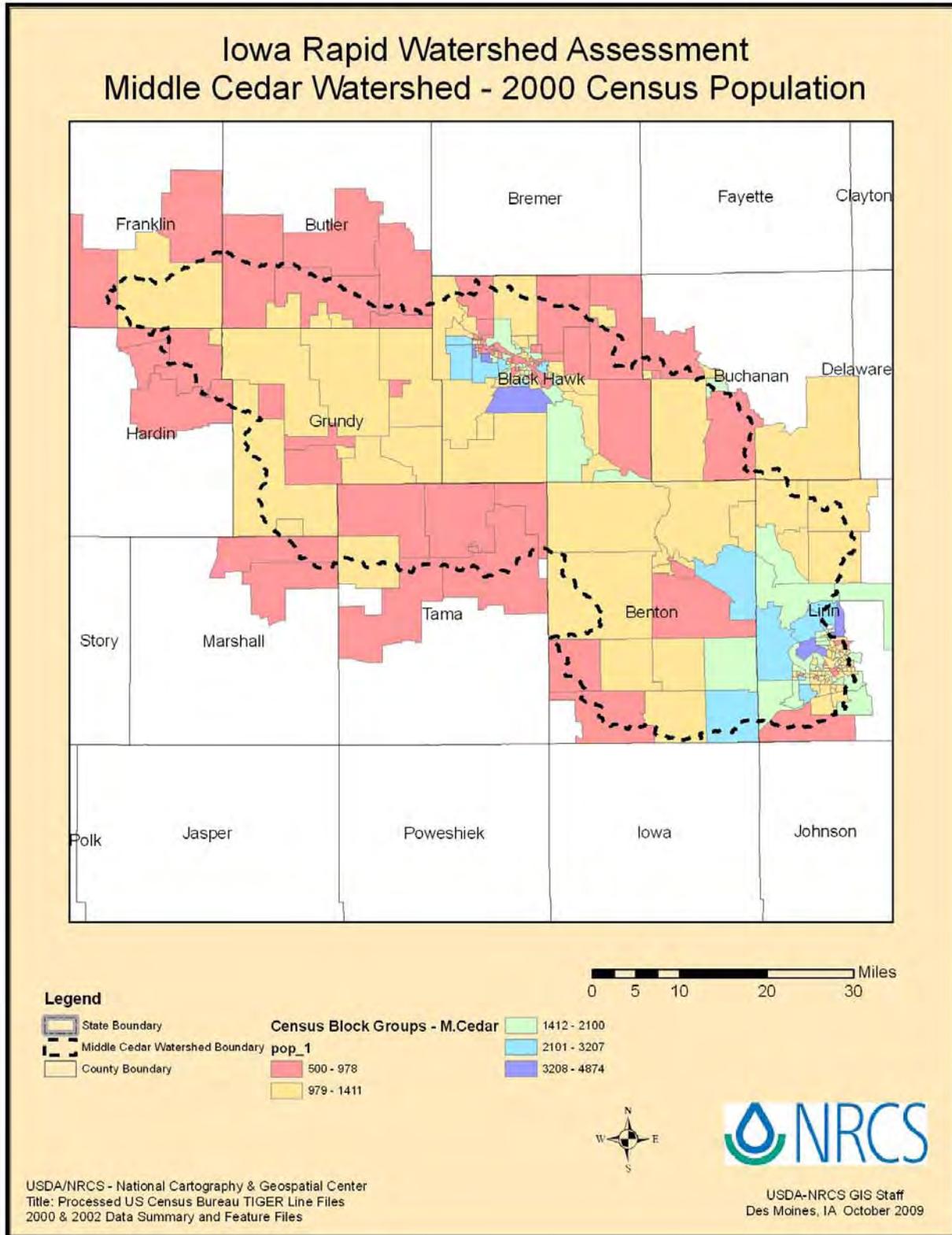


## **Census and Social Data**

There are 6,088 total farm operators in the watershed. Of these, 4,595 are male and 1,492 are female. Eighty-one percent of the farm operators in the watershed are full time farmers (27).

There are 4,192 farms in the Middle Cedar River Watershed with farm size ranging from one acre to over 1,000 acres. Size of farms: 12 percent are 1-9 acres; 19 percent are 10-49 acres; 25 percent are 50-179 acres; 23 percent are 180-499 acres; 13 percent are 500-999 acres; and 8 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 (27).

**Census and Social Data (continued)**



**Census and Social Data (continued)**

## Total Farms By Size Per County Middle Cedar Watershed

COUNTY	Acres	% Co. In Wtshd	1 - 10 Acres	10 - 50 Acres	50 - 179 Acres	180 - 499 Acres	500 - 999 Acres	> 1000 Acres	Total Farms
BENTON	388,704	25.00%	117	180	276	265	144	81	1,063
BLACK HAWK	305,552	20.00%	87	165	186	199	97	56	790
BUCHANAN	84,683	5.00%	40	51	65	62	35	18	271
BUTLER	79,798	5.00%	30	64	60	53	28	20	255
FRANKLIN	49,674	3.00%	12	24	25	22	25	11	119
GRUNDY	293,178	19.00%	124	114	155	159	105	72	729
HARDIN	26,020	2.00%	7	15	14	14	10	7	67
LINN	164,197	11.00%	49	123	144	110	45	23	494
MARSHALL	10,184	1.00%	3	6	6	7	3	3	28
TAMA	143,705	9.00%	32	55	111	90	57	31	376
<b>Total</b>	<b>1,545,695</b>	<b>100.00%</b>	<b>501</b>	<b>797</b>	<b>1042</b>	<b>981</b>	<b>549</b>	<b>322</b>	<b>4,192</b>

Data Source: 2007 National Ag Statistics  
County numbers obtained by correlating the percent county which lies within the watershed to determine an estimated number (shown in table).

USDA-NASS Quickstats Query  
Weblink - <http://quickstats.nass.usda.gov/>  
Sector: Economics  
Community: Farm Operations  
Data Item: Farm Operations  
Domain: Area Operated  
Locale: County State: Iowa Counties: Select All

**Census and Social Data (continued)**

## NASS Farm Operators Per County Middle Cedar Watershed

COUNTY	Acres In Wtshd	% Co. In Wtshd	Operators	Female Operators	Male Operators	Part-Full Time Operators	Full Time Op	Part Time Op
Tama	143,705	9.00%	532	126	405	598	433	165
Marshall	10,184	1.00%	39	9	30	44	32	12
Linn	164,197	11.00%	713	187	526	799	582	217
Hardin	26,020	2.00%	92	20	73	107	77	30
Grundy	293,178	19.00%	1071	243	828	1178	886	292
Franklin	49,674	3.00%	175	39	135	193	139	54
Butler	79,798	5.00%	370	90	280	415	298	117
Buchanan	84,683	5.00%	400	110	290	442	314	128
Black Hawk	305,552	20.00%	1149	280	869	1303	948	355
Benton	388,704	25.00%	1547	388	1159	1686	1240	446
<b>Total</b>	<b>1,545,695</b>	<b>100.00%</b>	<b>6088</b>	<b>1492</b>	<b>4595</b>	<b>6765</b>	<b>4949</b>	<b>1816</b>

\* Full Time Operators - On Farm Operators > 200 days per year

Data Source: 2007 National Ag Statistics  
County numbers obtained by correlating the percent county which lies within the watershed to determine an estimated number (shown in table).

USDA-NASS Quickstats Query  
Weblink - <http://quickstats.nass.usda.gov/>  
Sector: Demographics  
Community: Operators  
Data Item: Operators (All), Operators - Female  
Domain: Total  
Locale: County State: Iowa Counties: Select All  
Year: 2007

USDA-NASS Quickstats Query  
Weblink - <http://quickstats.nass.usda.gov/>  
Sector: Demographics  
Community: Operators  
Data Item: Operators, Principal  
Domain: Primary Occupation  
Locale: County State: Iowa Counties: Select All  
Year: 2007

## **Resource Concerns**

### **Resource Concerns by Land Use**

#### **Pasture (16)**

Vegetation typically consists of introduced cool season forage. Predominant species are introduced cool season forages, including 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 evidence of a small amount of 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 systems.

#### **Hayland (16)**

Hayland has been seeded to introduce species, including predominantly Smooth Bromegrass and Alfalfa. There also exists Orchardgrass and Red Clover, to a lesser extent. Erosion is not typically a problem on hayland. Nutrient and pest management are often under-utilized. Typically, three cuttings of hay are taken from May through early September.

#### **Cropland (17, 18, 19)**

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

The average slope is 6.3 percent. Predominant resource concerns on cropland include soil erosion (sheet and rill, gully, and wind); soil compaction; soil eutrophication; weed infestation; and decrease in soil carbon. Over-application of nutrients (commercial and manure-based) and pesticides typically does not meet Iowa NRCS standards. In recent years, no-till systems on soybean acres have increased, although no-till on corn acres has decreased.

### Natural Areas/Woodland (20)

Natural areas in Iowa consist mostly of poor quality woodlands, degraded meadow found mostly in odd areas along property corners, fence lines, or abandoned pastures. In many locations, these areas include steeper slopes than cropland and pasture. Vegetation includes a mix of native trees and shrubs with increasing undesirable populations of introduced and often noxious species of woody or non-woody plants. Predominant resource concerns include invasive species, classic gully erosion, habitat fragmentation, increasing homogeneity, and land use conversion to cropland.

## **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 Conservation Reserve Program (CRP) and contract extensions to protect sensitive lands; application of comprehensive nutrient management plans; pest management plans; and water monitoring through IOWATER (Iowa's volunteer water monitoring program).

Urban erosion has created increased natural resource concerns related to soil erosion and water quality. Focus on these issues, especially in areas of substantial development, has resulted in increased technical assistance in the urban arena.

On a statewide basis, increase in ethanol plant manufacturing utilizes crop residues which adversely affects soil quality and increases soil erosion. This creates more of a need for increased conservation efforts.

### **Resource Concerns that Require Ongoing Attention**

Technical assistance and attention will continue regarding soil erosion by water, especially on cropland. Ongoing efforts are needed to increase utilization of conservation tillage, no-till, and contoured buffer strips. Educational activities are needed to promote extension of expiring CRP contracts.

In the Middle Cedar River Watershed, urban natural resource concerns will be an ongoing issue. Urban Best Management Practices (BMPs) will be implemented and increased education of developers, cities, and urban residents will continue (28).

A resource concern that will draw increasing attention and need for technical assistance in the future is the topic of renewable energy and biomass systems, now a highlight of the current Farm Bill. This includes the need for alternative and renewable energy resources such as wind and geothermal systems (39).

In addition, there is increased interest and productivity in agricultural diversification and market support for alternative crops, including specialty and organic crop production, direct and local marketing opportunities, and non-traditional needs for technical assistance. The region has the soils, climate and resources to produce and add value to a wide variety of alternative agriculture crops and products. (39, 40)

The loss of pasture and hay on highly erodible lands is a trend that has resulted in significant increases in soil erosion, sedimentation, and run off requiring technical assistance (29).

Underground storage tanks create resource issues due to storage of substances, primarily petroleum products (30).

Other concerns that will be addressed in the future include the preservation, protection, and enhancement of natural areas, including rare plant and animal species. This will require species inventories and an educational campaign. (28)

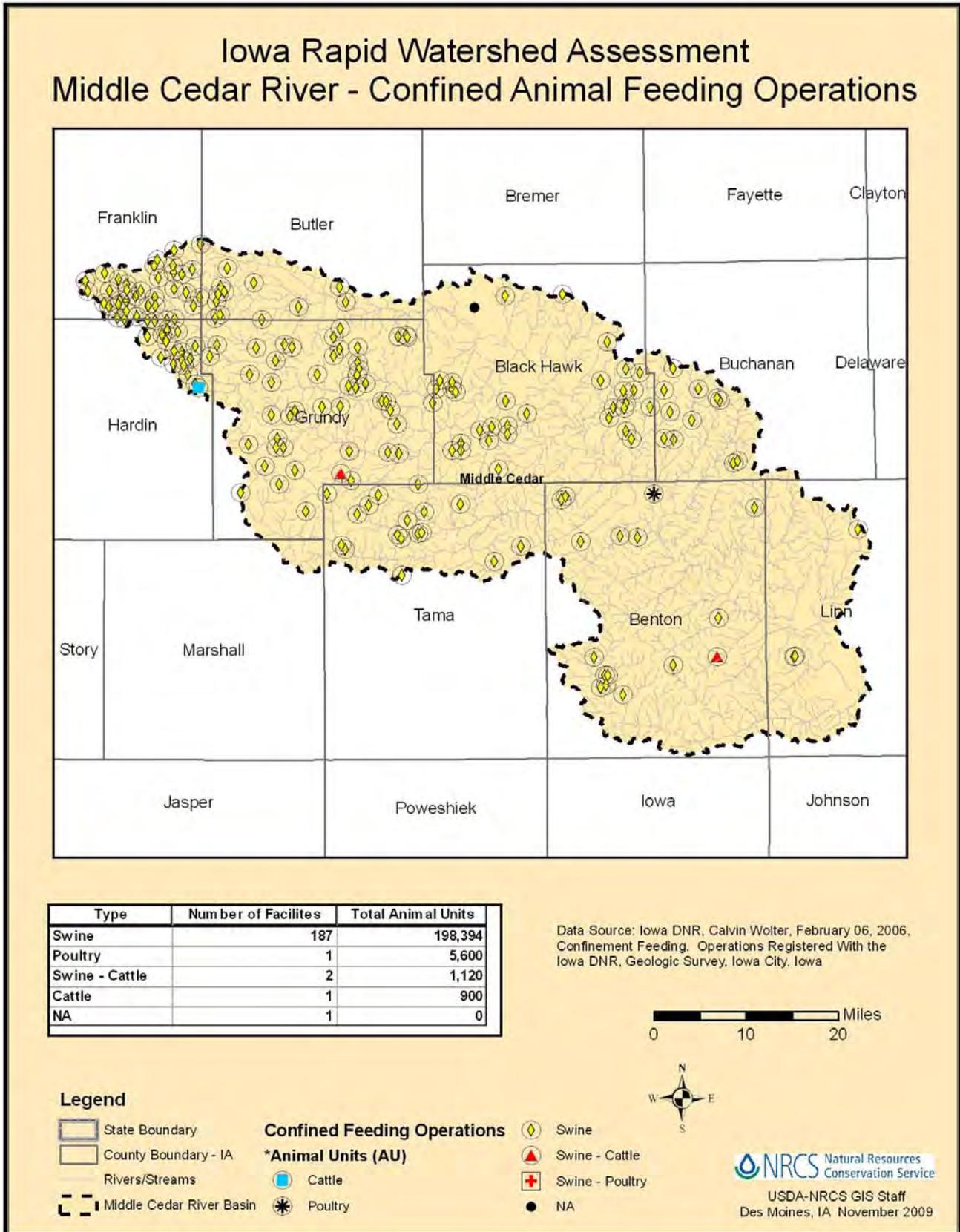
In the state of Iowa, as of October 2009, there were approximately 57 biofuel plants that are in operation or under construction. At this time, there is one ethanol plant that is under construction in the Middle Cedar River Watershed, located in Cedar Rapids. It is reported that 2 - 4 gallons of water is required for every gallon of biofuel produced, creating a concern about water quantity (31).

Two counties in the Middle Cedar River Watershed (Black Hawk and Tama) are involved in the outreach project entitled Women, Land and Legacy<sup>sm</sup> and have gathered information from women landowners and operators, including resource concerns. Some of the concerns shared by this customer group includes: hog confinements; chemical use; need for increased renewable energy sources; water quality; air quality; need for increased use of conservation practices; and urban sprawl effects on natural resources. (38)

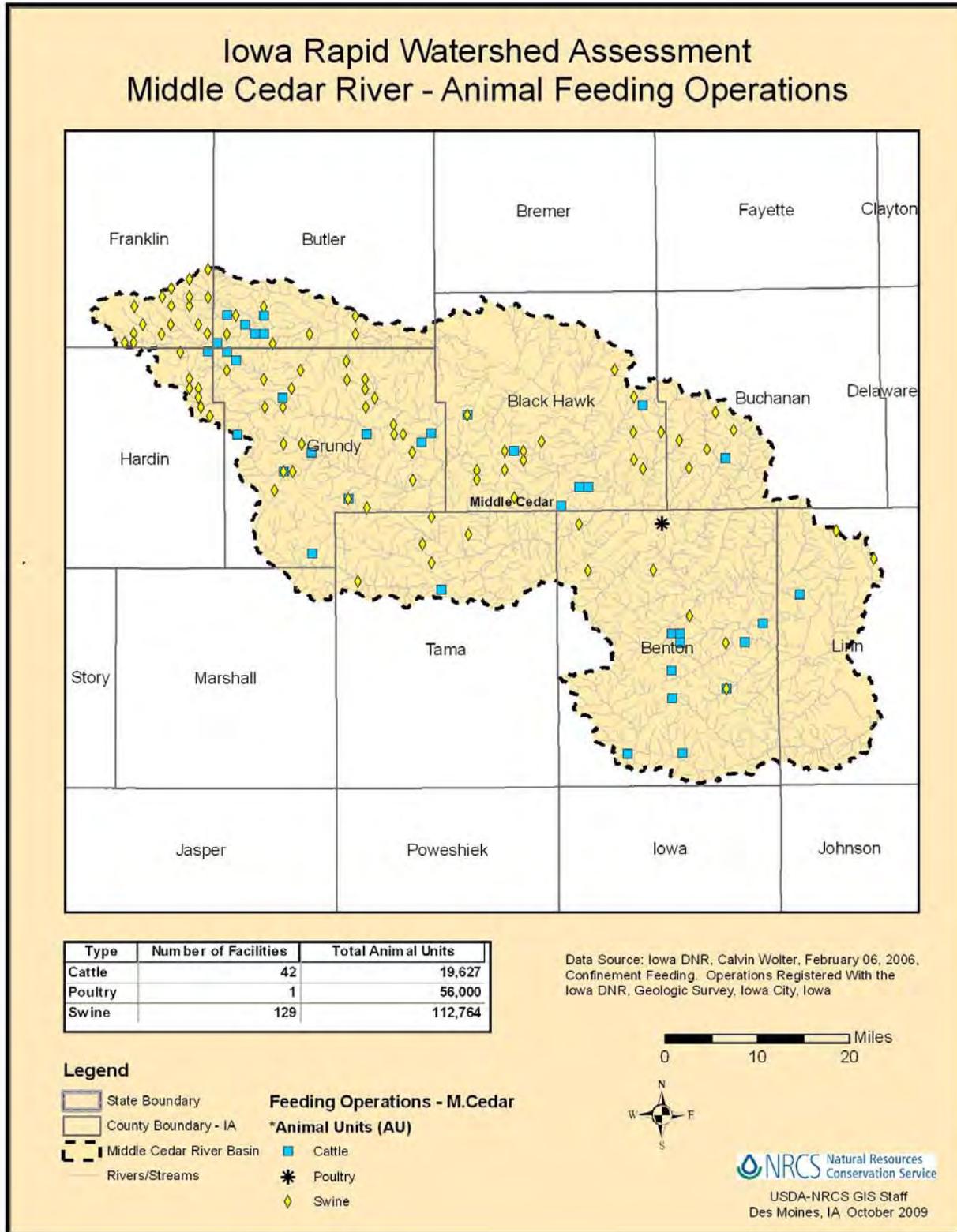
Water quality concerns are increased by manure from livestock that is commonly spread on cropland as fertilizer. Using manure as a fertilizer creates potential water quality challenges from bacteria and nutrients delivered through runoff and subsurface drainage. Steam bank erosion in the region has been related to livestock overgrazing of the stream and river banks (28, 29).

The primary natural resource concerns with animal feeding operations are water and air pollution. Manure contains the nutrients nitrogen and phosphorus, which, when not managed properly on agricultural land, can pollute nearby streams, lakes, and other waters. EPA's regulation of Animal Feeding Operations (AFOs) and Confined Animal Feeding Operations (CAFOs) provide pollution prevention and environmental protection, while maintaining the country's economic and agricultural competitiveness. (32) There are 191 Confined Animal Feeding Operations (CAFO) in the watershed, with a total of 206,014 animal units. Ninety-eight percent of the CAFOs are swine and the remaining 2 percent are split between swine-cattle operations, poultry, and cattle. There are 172 Animal Feeding Operations (AFO) in the watershed, with a total number of 188,391 animal units. Seventy-five percent of the AFOs are swine, 24 percent cattle, and 1 percent poultry (33, 34).

**Resource Concerns (continued)**



**Resource Concerns (continued)**



### Resource Concerns Table

The table below lists the resource concerns and priorities of stakeholders and landowners in the watershed. The concerns were summarized from the Environmental Quality Incentive Program (EQIP) resource concerns developed in each county. (26)

Resource Concerns/Issues by Land Use					
SWAPA *	Specific Resource Concerns/Issues	Cropland	Pasture	Natural Areas	Urban
Soil Erosion	Sheet and Rill	X			
	Ephemeral Gully	X			
	Classic Gully			X	X
	Streambank		X		
	Wind	X			
	Shoreline			X	
Water Quality, Surface	Suspended Sediment & Turbidity	X			X
	Pesticides	X			
	Excessive Nutrients & Organics	X	X		
	Pathogens		X		
Water Quality, Ground	Excessive Nutrients & Organics	X			
	Pesticides	X			
	Pathogens		X		
Water Quantity	Excessive Runoff, Flooding or Ponding				X
	Excessive Seepage	X			X
Soil Condition	Animal Waste & Other Organics (N,P,K)	X			
	Organic Matter Depletion	X			
	Compaction	X			
	Subsidence	X			
Plant Condition	Damage from Soil Depletion	X			
	Productivity, Health, and Vigor		X	X	
	Palatability		X		
	Noxious and Invasive Species			X	
Domestic Animals	Inadequate Quantity & Quality Feed & Forage		X		
	Inadequate Stock Water		X		
	Stress and Mortality		X		
Air Quality	Particulates, CO2				X
	Objectionable Odors				X
	Undesirable Air Movement				X
	Chemical Drift	X			X
	Adverse Air Temp				X
Wildlife	Inadequate cover & shelter			X	
	T & E Species			X	
	Inadequate Food, Water and Space			X	

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

**Resource Concerns (continued)**

**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 conversion to other uses, such as wildlife habitat. Long term benefits should result from increased soil health, benefits to water quality, improved domestic livestock, air quality, and wildlife habitat. Other considerations by humans in the watershed may include recreation, rural and urban perceptions, market trends and how they relate to conservation practice costs, profitability, and current high land values.

## Special Considerations

With almost 12 percent of the watershed included in an urban land use, unique resource concerns exist. Resource concerns in urban and developing areas include ephemeral gully erosion, classic gully erosion, excessive suspended sediment and turbidity in surface water, excessive nutrients and organics in surface water, and excessive runoff, flooding or ponding. These concerns exist on developing, newly developed, and existing urban areas. According to the Environmental Protection Agency (EPA), non-porous urban landscapes impede runoff from slowly percolating into the ground, therefore, water remains above the surface, where it accumulates and runs off in large amounts (29).

Cities install storm sewer systems that quickly channel this runoff from roads and other impervious surfaces. When water leaves the storm water system and empties into a stream or river, large volumes of quickly flowing runoff erodes stream banks and damages streamside vegetation. Also, discharged storm water tends to have higher temperatures resulting from heating on impervious surfaces. Native fish and other aquatic species cannot survive in urban streams severely impacted by urban runoff. (29)

Urban runoff increases the variety and amount of pollutants transported to receiving waters. Sediment from development and new construction, oil, grease, toxic chemicals from automobiles, nutrients and pesticides from turf management and gardening, viruses and bacteria from failing septic systems, road salts, and heavy metals are examples of pollutants generated in urban areas. (29) Urban runoff most dramatically impacts urbanizing smaller watersheds with higher percentages of urban land compared to large watersheds (many times over 30%). These types of streams experience frequent localized flooding that is aggravated by urban runoff. (25)

Some of the conservation practices implemented on urban areas include: bio-retention (rain gardens); bio-swales; soil quality restoration; permeable pavements; storm water wetlands; wet detention ponds; and native landscaping. During active development or construction of new urban areas in which land use is being converted, practice implementation includes silt fence, sediment basins, temporary seeding, mulching, polymers, rolled erosion control products (i.e. blankets), and compost blankets. (25)

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 (11).

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 the County Board of Supervisors or Drainage District Trustees (11).

### **Special Considerations (continued)**

Iowa source water faces increasing pressure from development, pollution, land use changes, and growing demands for drinking water. Source water is a lake, stream, river, or aquifer where drinking water is obtained. Source Water Protection (SWP) is the act of preventing contaminants from entering public drinking water sources. SWP includes ground water (wellhead) protection and surface water protection (12).

Iowa Department of Natural Resources' (IDNR) SWP Program has developed two main phases to the SWP Program: SWP Assessment Reports (Phase 1) and the SWP Plan (Phase 2). In addition, the program has recently included implementation as part of the SWP planning (12).

IDNR's SWP Program has developed a list of Priority Community Water Supplies. The Middle Cedar River Watershed includes three Priority SWP communities, including the town of Conrad, which is located in Grundy County. The watershed also includes the Priority SWP communities of Cedar Falls and Waterloo, located in Black Hawk County. These communities are identified by the DNR SWP Program as three of the top 40 priority communities listed for high nitrates (12).

## Footnotes and Bibliography

1. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). Project Area base on Watershed Boundary Dataset (WBD), 2006. UTM Zone 15 Projection.
2. Iowa GAP Analysis Program (01/01/2002). Iowa Department of Natural Resources (IDNR) and Iowa Department of Transportation (IDOT). INCORP Dataset, 1997.
3. U. S. Department of Agriculture, National Agricultural Statistics Service (USDA-NASS). National Ag Statistics 2008.
4. U. S. Geological Survey (USGS). Digital Elevation Model (DEM). 7.5' (1:24,000) Quadrangle Topographic Base Maps.
5. U. S. Geological Survey (USGS). Digital Elevation Model (10M DEM). Calculations done using ArcMap Spatial Analyst Tools.
6. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). Soil Survey (August 2009). Summarized data from individual County SSURGO data sets. Des Moines, Iowa.
7. National Climatic Data Center (NCDC). Average Rainfall 1961 – 1990.
8. Iowa Department of Transportation (IDOT). Iowa Transportation Map (2008). Ames, IA. [www.iowadotmaps.com](http://www.iowadotmaps.com). *Last Accessed October 2009.*
9. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2009. Wetland Restoration Team. Des Moines, Iowa.
10. Iowa Department of Natural Resources (IDNR). Geological Survey Bureau, Iowa City, Iowa. Data from county based drainage maps (February 2005).
11. Iowa Drainage Guide, rev. (March 1987). Cooperative Extension Service, Iowa State University. Ames, Iowa.
12. Iowa Department of Natural Resources (IDNR). Watershed Improvement Section, Iowa. Source Water Protection. <http://www.iowadnr.gov/water/watershed/sourcewater.html>. *Last Accessed October 20, 2009.*
13. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). Part of the National Coordinated Common Resource Area (CRA) Geographic Database. *Last Accessed September 2009.*

14. National Coordinated Common Resource Area (CRA) Geographic Database. [ftp://ftp-fc.sc.egov.usda.gov/NSSC/CRA/national\\_cra\\_legend\\_v1.2\\_011604.xls](ftp://ftp-fc.sc.egov.usda.gov/NSSC/CRA/national_cra_legend_v1.2_011604.xls). National CRA Legend v1.2 on Iowa NRCS Shared Drive. *Last Accessed September 2009.*
15. Iowa Department of Natural Resources (IDNR). 20080813, Lakes in Iowa Listed as Impaired in 2006 under the Clean Water Act.
16. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2008. State Grassland Specialist. Des Moines, Iowa.
17. U. S. Department of Agriculture, National Agricultural Statistics Service (USDA-NASS).
18. Conservation Technology Information Center (CTIC). National Crop Residue Management Survey (2004).
19. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). Field Office Technical Guide, Section III.
20. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2008. Resource Conservationist. Des Moines, Iowa.
21. Iowa Department of Natural Resources (IDNR). Iowa Natural Areas Inventory (INAI) Database records in each watershed as of August 12, 2009. Reflects INAI records as of January 2009.
22. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). Natural Resources Inventory (NRI). <http://www.nrcs.usda.gov/technical/NRI/>.
23. Iowa Department of Natural Resources (IDNR). Final Regional Maps of 2008 303(d) Impaired Waters. <http://www.igsb.uiowa.edu/wqm/WQA/303d/2008/303dState.html> *Last Accessed October 20, 2009.*
24. Iowa Department of Natural Resources (IDNR). Iowa DNR Watershed Improvement. <http://www.iowadnr.gov/water/watershed/index.html>. *Last Accessed October 21, 2009.*
25. Iowa Department of Agriculture and Land Stewardship (IDALS). 2009. Urban Conservationist, Des Moines, Iowa.
26. 2009 Environmental Quality Incentive Program (EQIP) Work Group Plans and EQIP Resource Concerns. <http://www.ia.nrcs.usda.gov/programs/eqip>. *Last Accessed June 2009.*

27. U. S. Department of Agriculture, National Agricultural Statistics Service (USDA-NASS), 2007. Quickstats Query Weblink at <http://quickstats.nass.usda.gov/>. Last Accessed November 4, 2009.
28. Linn Soil & Water Conservation District (SWCD) 2008 – 2015 Long Range Plan. Marion, Iowa.
29. Northeast Iowa Resource Conservation & Development (RC&D) Inc. Area Plan 2009 – 2013. Postville, Iowa.
30. George, Gale (2003). Underground Storage Tanks in Iowa. Iowa City, IA: Iowa Department of Natural Resources. <http://www.igsb.uiowa.edu/nrgislibx/gishome.htm>. Last Accessed October 2009.
31. Des Moines Register. Iowa Biofuels Database. Interactive Map. <http://data.desmoinesregister.com/ethanol2/index.php>. Last Accessed October 22, 2009.
32. U. S. Environmental Protection Agency (EPA). 2008 October 31. New Requirements for Controlling Manure, Wastewater from Large Animal Feeding Operations.
33. Wolter, Calvin (February 6, 2006). Confinement Feeding Operations Registered With the Iowa Department of Natural Resources. Iowa Department of Natural Resources (IDNR), Geologic Survey Bureau. Iowa City, Iowa.
34. Clark, Kathryn (February 2005). Animal Feeding Operations under Regulation by the Department of Natural Resources in the State of Iowa. Iowa Department of Natural Resources (IDNR), Geologic Survey Bureau. Iowa City, Iowa.
35. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2009. State Geologist. Des Moines, Iowa.
36. Iowa Department of Natural Resources (IDNR). 2009. <http://www.iowadnr.gov/water/watershed/tmdl/schedule.html>. Last Accessed October 23, 2009.
37. Iowa Department of Agriculture and Land Stewardship (IDALS). 2009. <http://www.iowaagriculture.gov/IWIRB.asp>. Last Accessed October 23, 2009.
38. U. S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2009. State Outreach Coordinator. Des Moines, Iowa.
39. Prairie Winds Resource Conservation and Development (RC&D), Inc. 2008 – 2013 Area Plan. Garner, Iowa.
40. Limestone Bluffs Resource Conservation and Development (RC&D) Area Plan 2007 – 2012. Maquoketa, Iowa.

