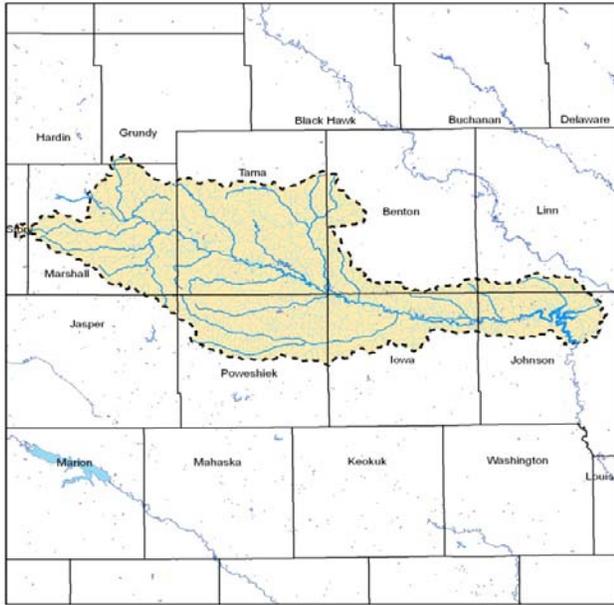


Iowa



The Iowa River, Middle, 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 Iowa River, Middle, 8-Digit Hydrologic Unit Code (HUC) watershed contains 1,509,903 acres (1). Thirty percent of the watershed is in Tama County, 21 percent in Marshall County, 15.5 percent in Poweshiek County, 13.5 percent in Iowa County, 9.7 percent in Johnson County, 6.7 percent in Benton County, 2.5 percent in Linn County, and the remaining 1.1 percent is split between Grundy, Jasper and Story counties (1).

Almost ninety-one percent of the watershed is privately owned, 2.6 percent includes municipal areas, and the remaining 3.8 percent is split between public areas, railroads, and unincorporated areas (2).

Almost fifty-seven percent of the watershed is in cropland, 23.4 percent is pasture or hayland, 8.8 percent is woodland or natural areas, 8.8 percent is developed urban land use, and 2.4 percent is split between water and wetlands (3).

Elevations range from 674 feet to 1,151 feet (4). The average watershed slope is 4.8 percent (5). The primary Land Capability Class in the watershed is class 2. The Land Capability Class (LCC) breakdown for the watershed is: 7.2 percent in class 1; 37.0 percent in class 2; 33.1 percent in class 3; 7.4 percent in class 4; 3.6 percent in class 5; 6.1 percent in class 6; and the remaining 5.6 percent is split between classes 7, 8 and miscellaneous (6). Rainfall ranges from 35 to 37 inches per year (7). The HUC includes interstates highway (380) and (80), four US highways (6, 30, 63, 151), and eleven state highways (1, 8, 14, 21, 96, 146, 212, 229, 311, 330, 965) (8).

Conservation assistance is provided by ten Soil and Water Conservation Districts (SWCD) and Natural Resources Conservation Service (NRCS) field offices located in Grundy Center, Iowa City, Malcom, Marion, Marshalltown, Nevada, Newton, Toledo, Vinton, and Williamsburg. An office locator is found at <http://offices.sc.egov.usda.gov/locator/app>

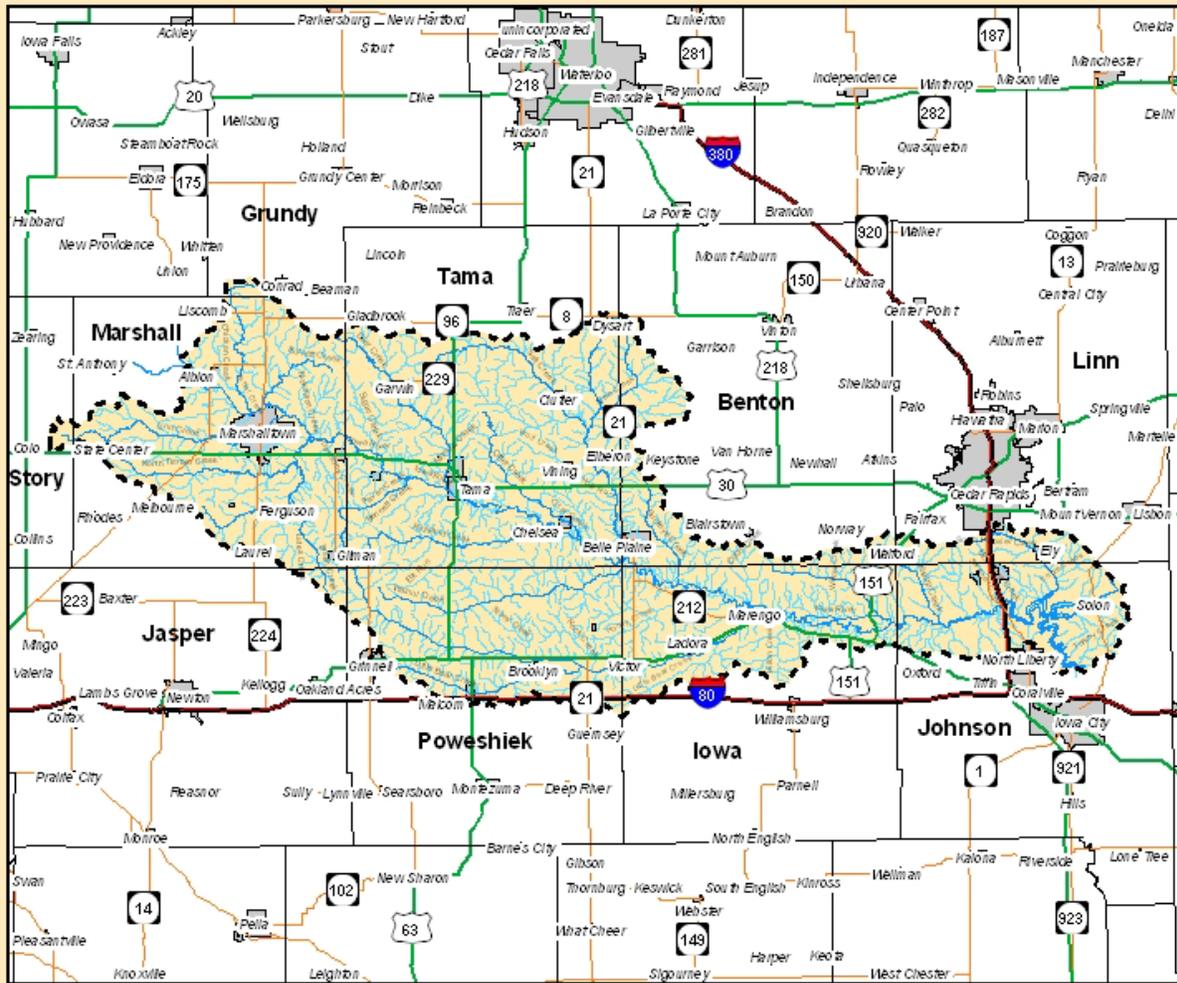
The Iowa River, Middle, HUC includes 136 NRCS conservation easements totaling 16,637.5 acres. The easements include the Emergency Watershed Protection (EWP) program, Wetlands Reserve Program (WRP), and the Emergency Wetlands Reserve Program (EWRP). Thirty-eight percent of the easement acres are in Tama County, 33 percent in Iowa County, 16 percent in Benton County, 7 percent in Marshall County, and the remaining 6 percent in Johnson and Story 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).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Physical Description

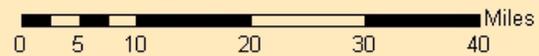
**Iowa Rapid Watershed Assessment
Iowa River, Middle, Watershed - Location Map**



Data Source: Project Area based on USDA-NRCS Watershed Boundary Dataset, 2008

Total Area In Watershed: 1,059,903 Acres

COUNTY	Acres	Percent
Benton	70,802	6.7%
Grundy	2,845	0.3%
Iowa	143,074	13.5%
Jasper	5,698	0.5%
Johnson	102,790	9.7%
Linn	26,097	2.5%
Marshall	222,944	21.0%
Poweshiek	164,516	15.5%
Story	2,882	0.3%
Tama	318,254	30.0%



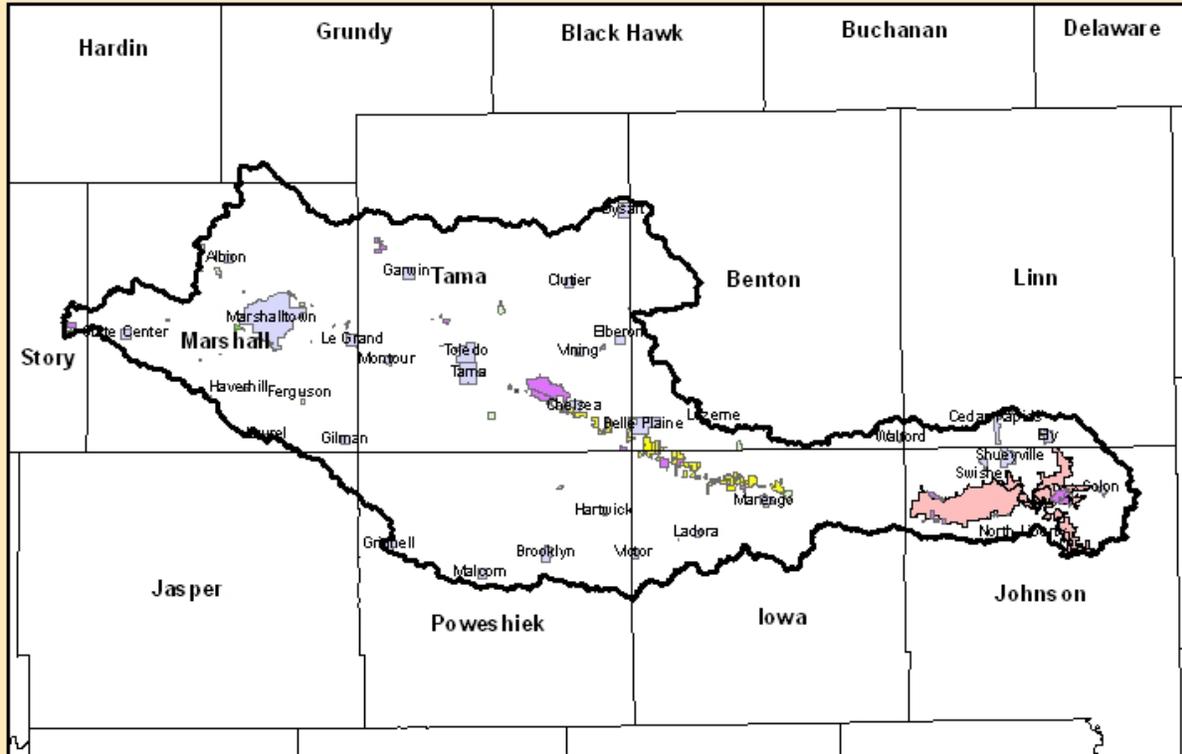
Legend

- ESRI Highway Iowa TYPE**
- INTERSTATE
 - STATE
 - US
- Rivers/Streams**
- State Boundary
 - County Boundary
 - Cities/Towns In Iowa
 - Iowa River, Middle, Basin



Physical Description (continued)

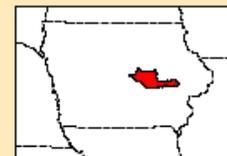
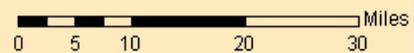
Iowa Rapid Watershed Assessment
Iowa River, Middle - Ownership/Stewardship



Total Acres in Iowa River, Middle Watershed - 1,059,903
Municipal City Boundary Acres - 27,678 (2.6% of basin)
GAP Stewardship Acres - 40,639 (3.8% of basin)
Private Agricultural Land Acres- 961,751 (90.7%)

Stewardship data identifies ownership and management boundaries for conservation and recreation areas in the study area.
Data Source: Iowa Gap Analysis Program, 01/01/2002, Iowa DNR & Iowa DOT INCORP Data Set, 1997

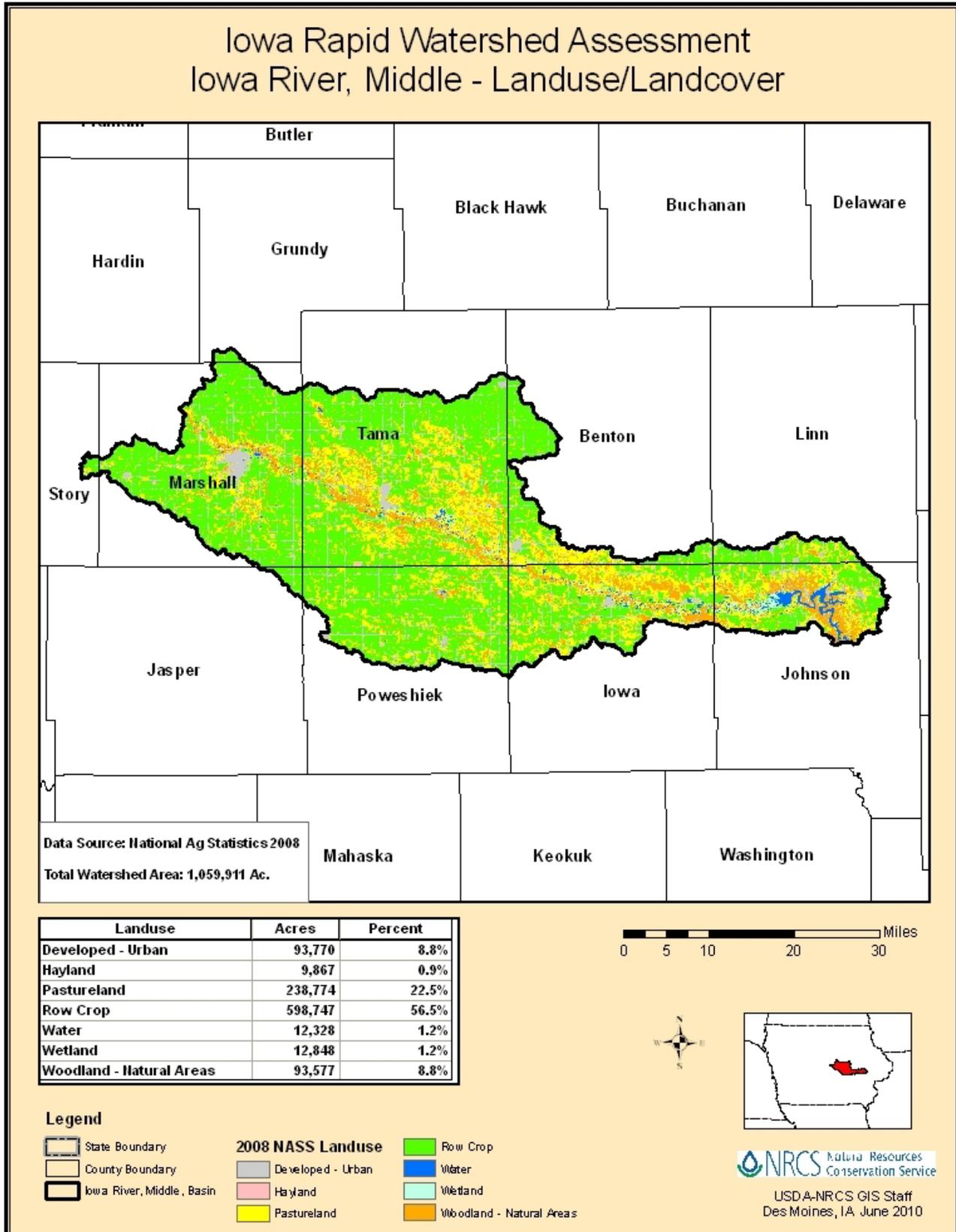
Owner	No. Of Areas	Acres
Private Inholdings	8	172
ACE	9	24,336
County Conservation Board	30	1,976
FWS	44	6,835
Iowa DHR	36	7,049
Local Land Trust	2	231
Private	1	18
State Land	1	1
The Nature Conservancy	1	23
Municipal Areas	40	27,678
Estimated Road Right-of-ways - Rural	0	29,835
Private Agricultural Land (Including Homesteads)	0	961,751



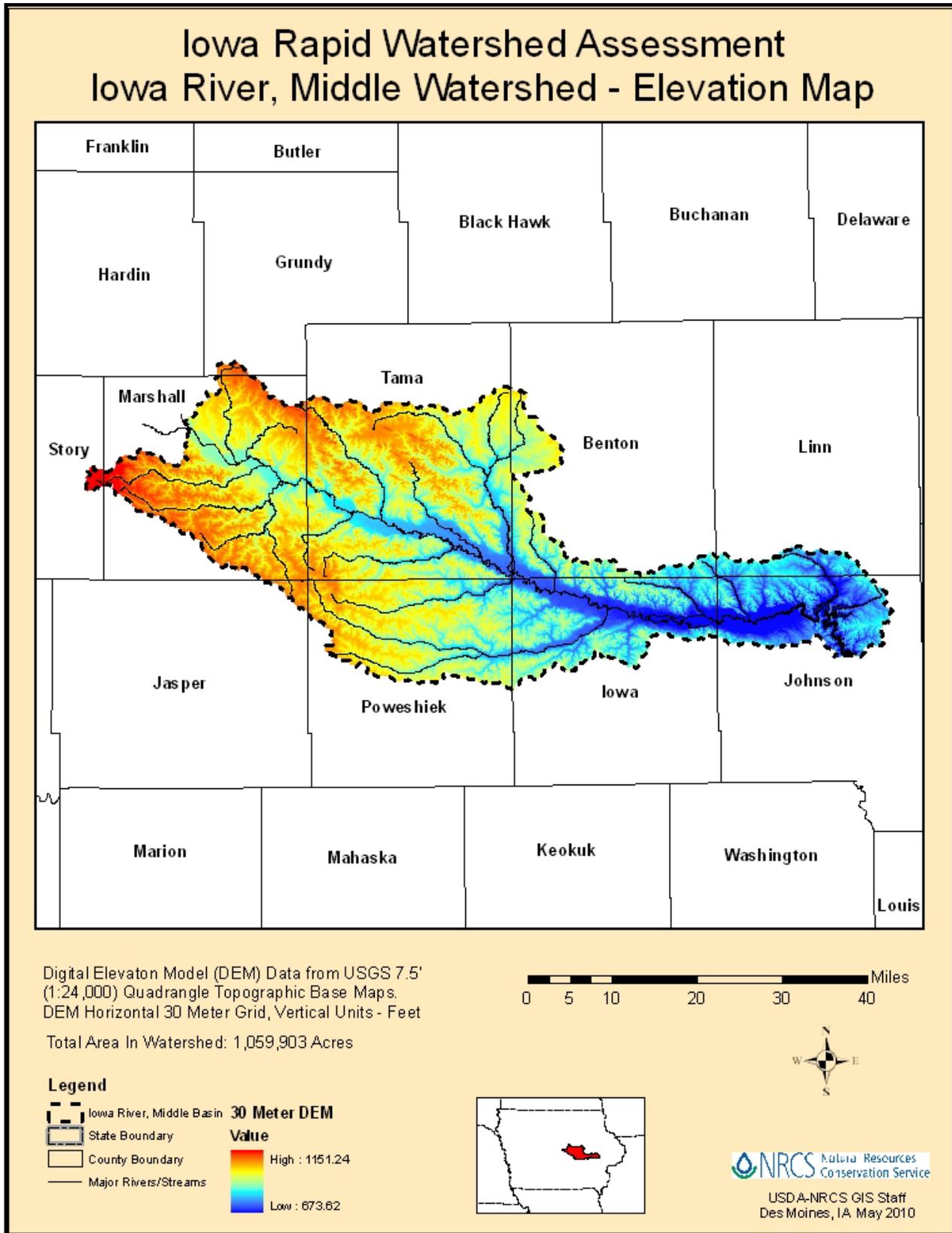
Legend

- County Boundary
- State Boundary
- Iowa River, Middle, Basin
- Cities-Towns Iowa River, Middle
- Stewardship - M. Iowa Private Inholding
- Private
- ACE
- County Conservation Board
- FWS
- Iowa DNR
- Local Land Trust
- State Land
- The Nature Conservancy

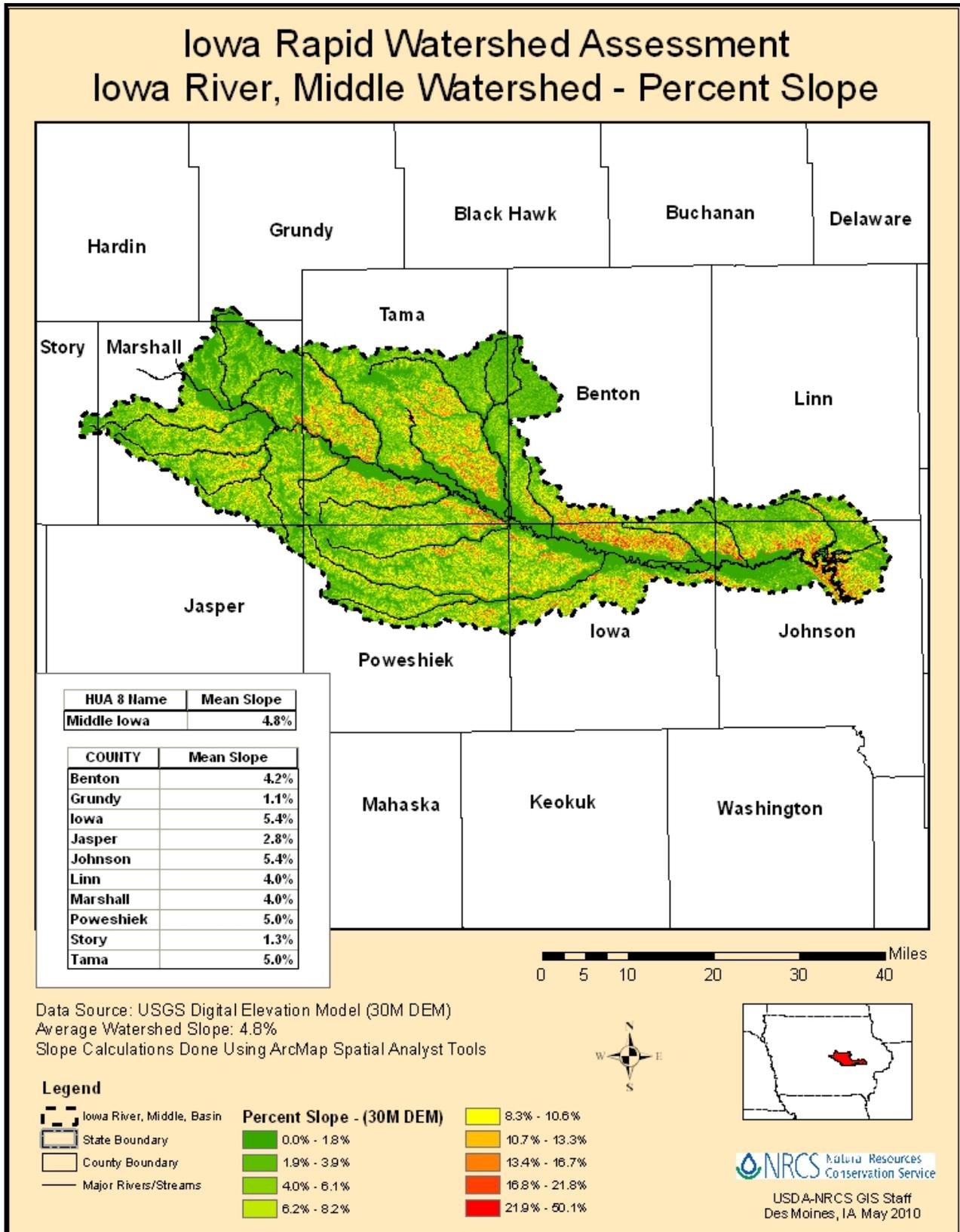
Physical Description (continued)



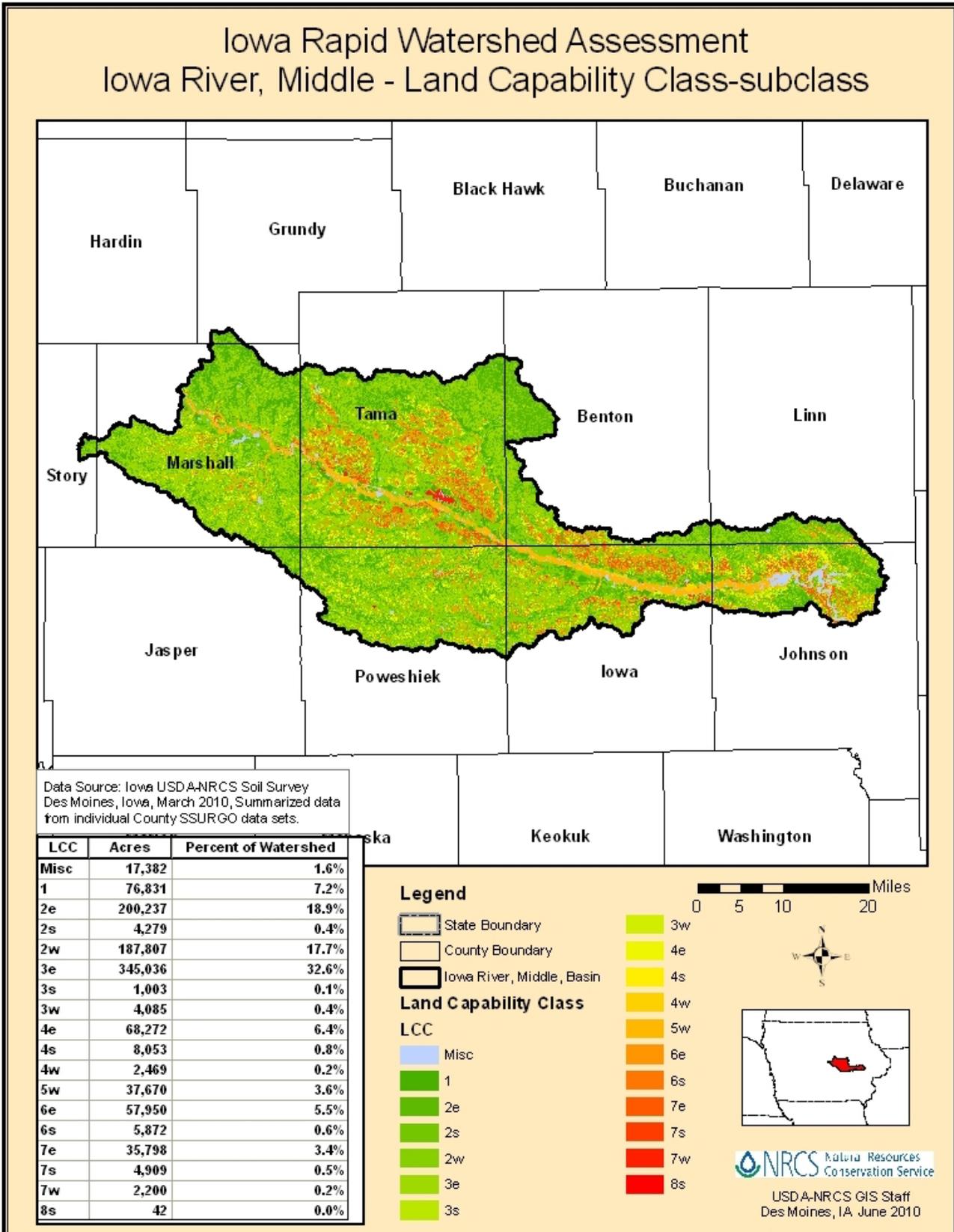
Physical Description (continued)



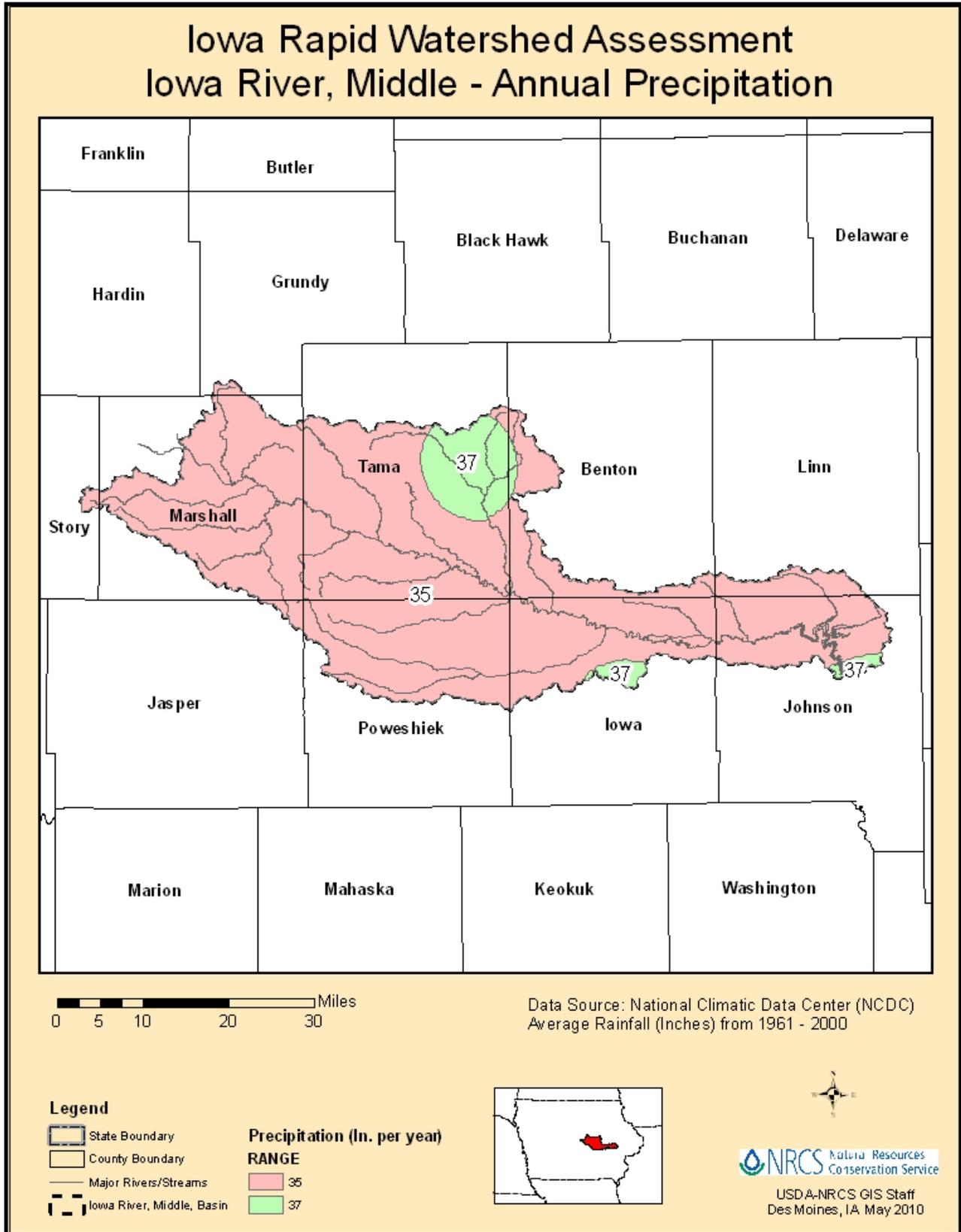
Physical Description (continued)



Physical Description (continued)

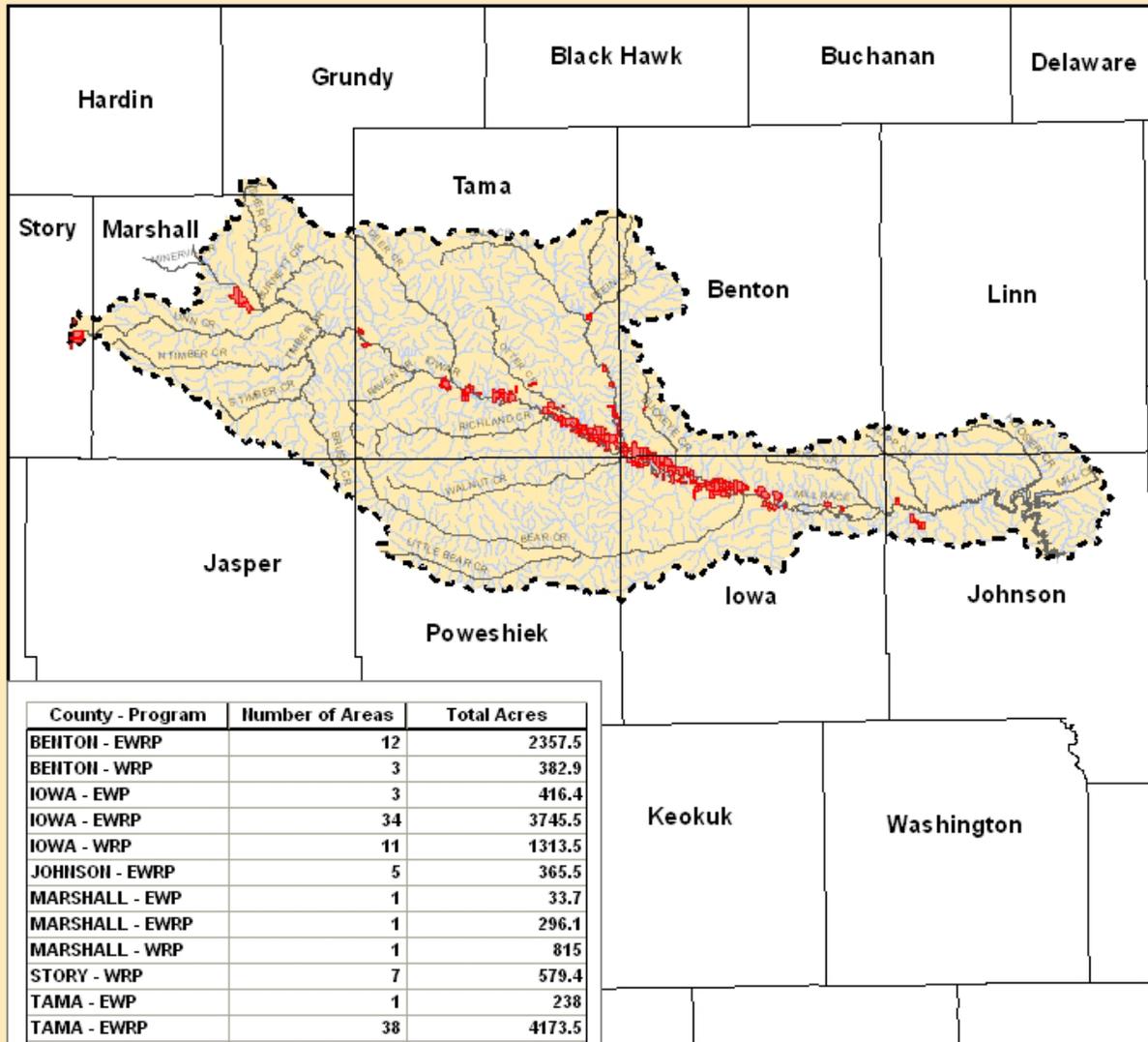


Physical Description (continued)



Physical Description (continued)

Iowa Rapid Watershed Assessment Iowa River, Middle - NRCS Conservation Easements



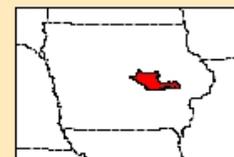
Data Source: USDA - NRCS Easement Programs Team.
Iowa River, Middle Total Easement Acres: 16,637.5
Digitized Easement Areas reflect completed/closed easements as well as enrolled/pending closed easements.

Legend

- State Boundary
- County Boundary
- Conservation Easements
- Iowa River, Middle, Basin
- Major Rivers/Streams
- Streams

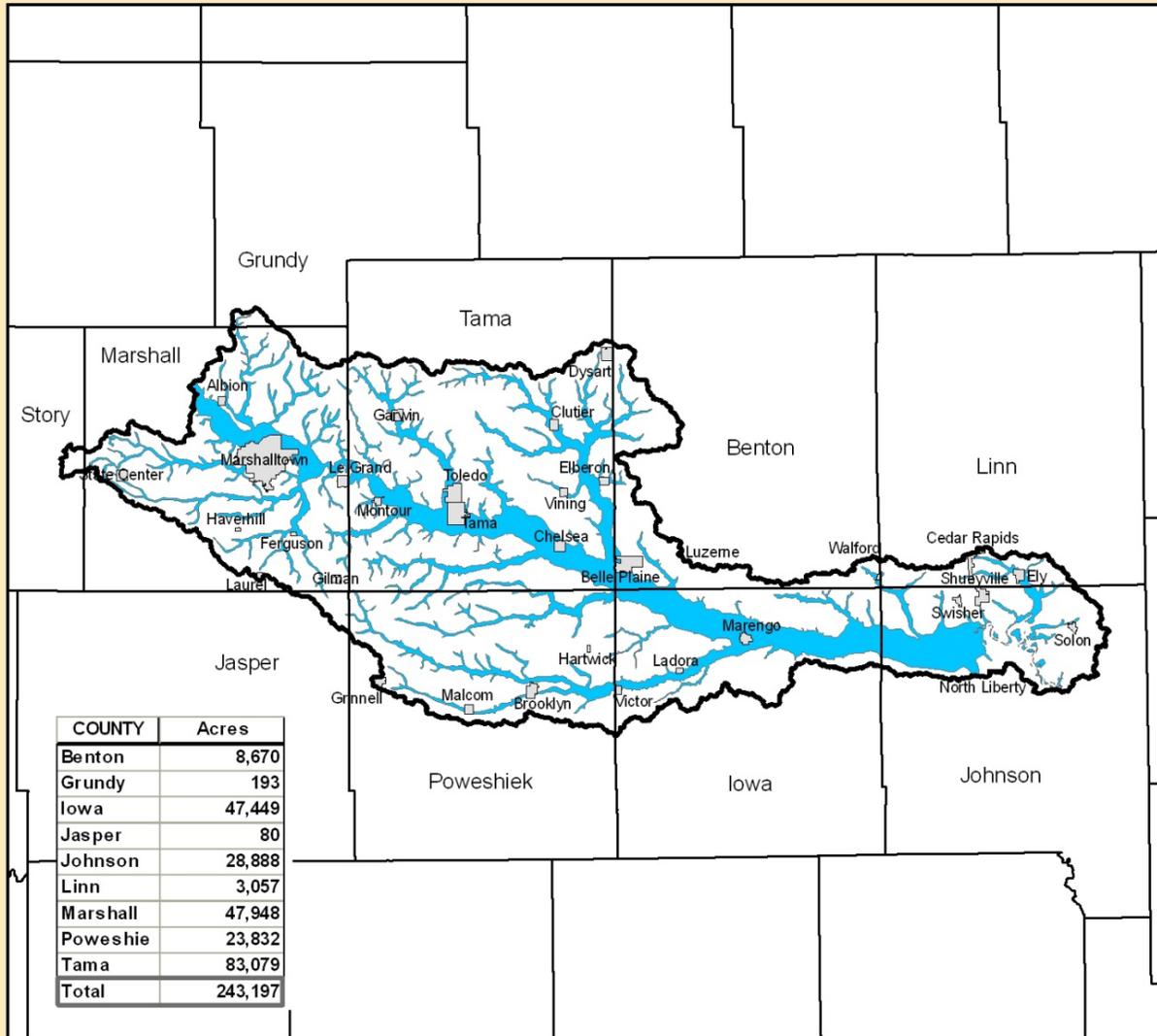
NRCS Conservation Easement Programs

- EWP** - Emergency Watershed Protection Program - Floodplain Easements
- EWRP** - Emergency Wetlands Reserve Program
- FRPP** - Farm and Ranch Lands Protection Program
- GRP** - Grassland Reserve Program
- WRP** - Wetlands Reserve Program



Physical Description (continued)

**Iowa Rapid Watershed Assessment
 Middle Iowa River - Alluvial Landform/Floodplain Map**



This coverage maps alluvial deposits throughout Iowa. This generally would include areas of alluvial soils associated with modern streams that are identified on 1:100,000 scale county topographic maps. However, it also includes areas associated with glacial outwash streams from Wisconsin-age glaciers. Both loess-covered and non loess-covered stream terraces and benches are included as alluvial deposits. In general, these deposits would outline alluvial aquifers, although in some areas the sand and gravel may be thin or unsaturated. Mapping was done on 1:100,000 county maps using the modern county soil survey. In some instances, 1:24,000 topographic maps were used where the interpreter felt it useful. The Des Moines Lobe area was all mapped with the aid of 1:24,000 maps.
 Data Source: Digital data set was developed by the Iowa Department of Natural Resources. Data created by Bernard Hoyer, 2/01/1991.

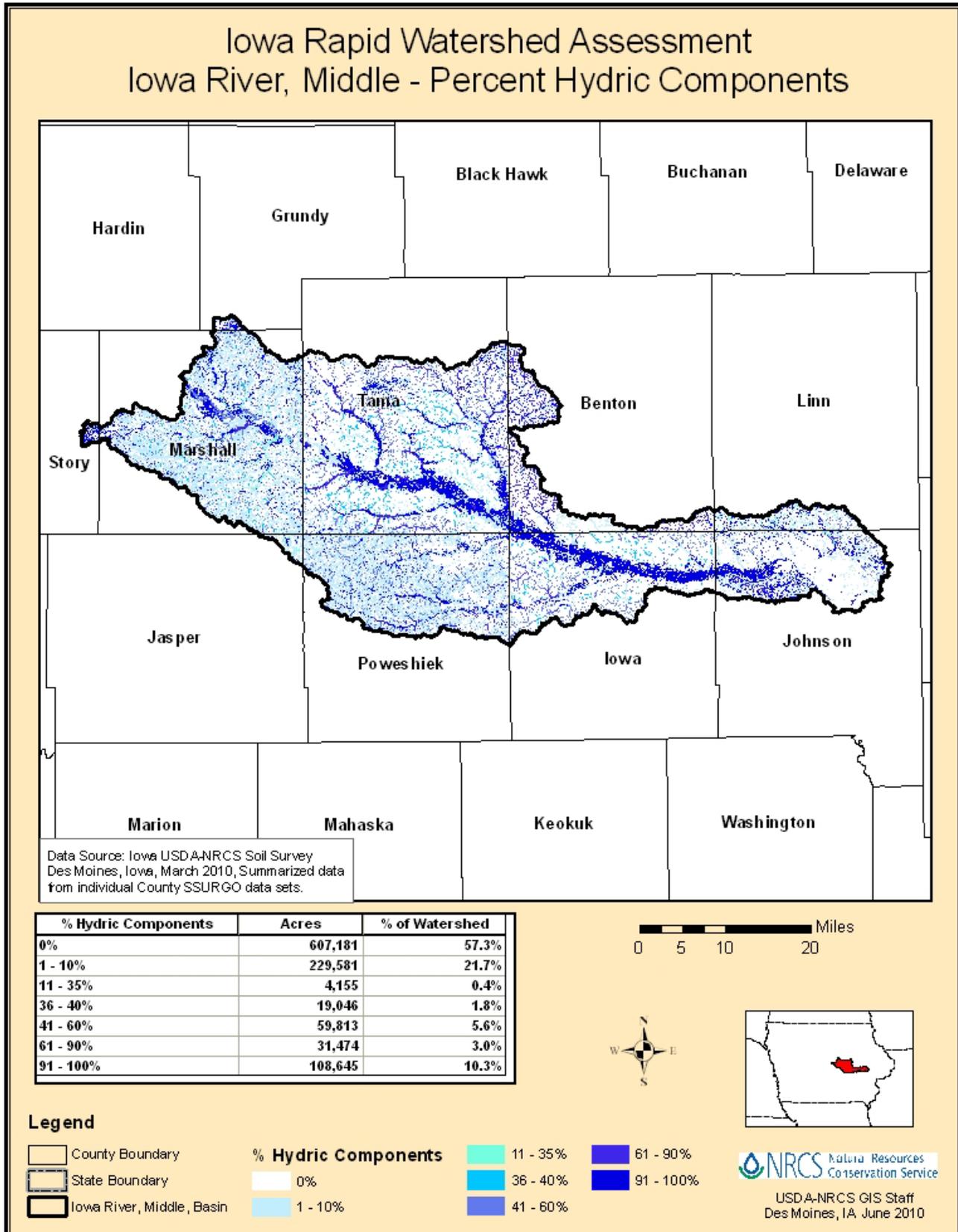


Legend

- State Boundary
- County Boundary
- Middle Iowa River Basin
- Alluvial Landform Data Set
- Cities/Towns - Middle Iowa

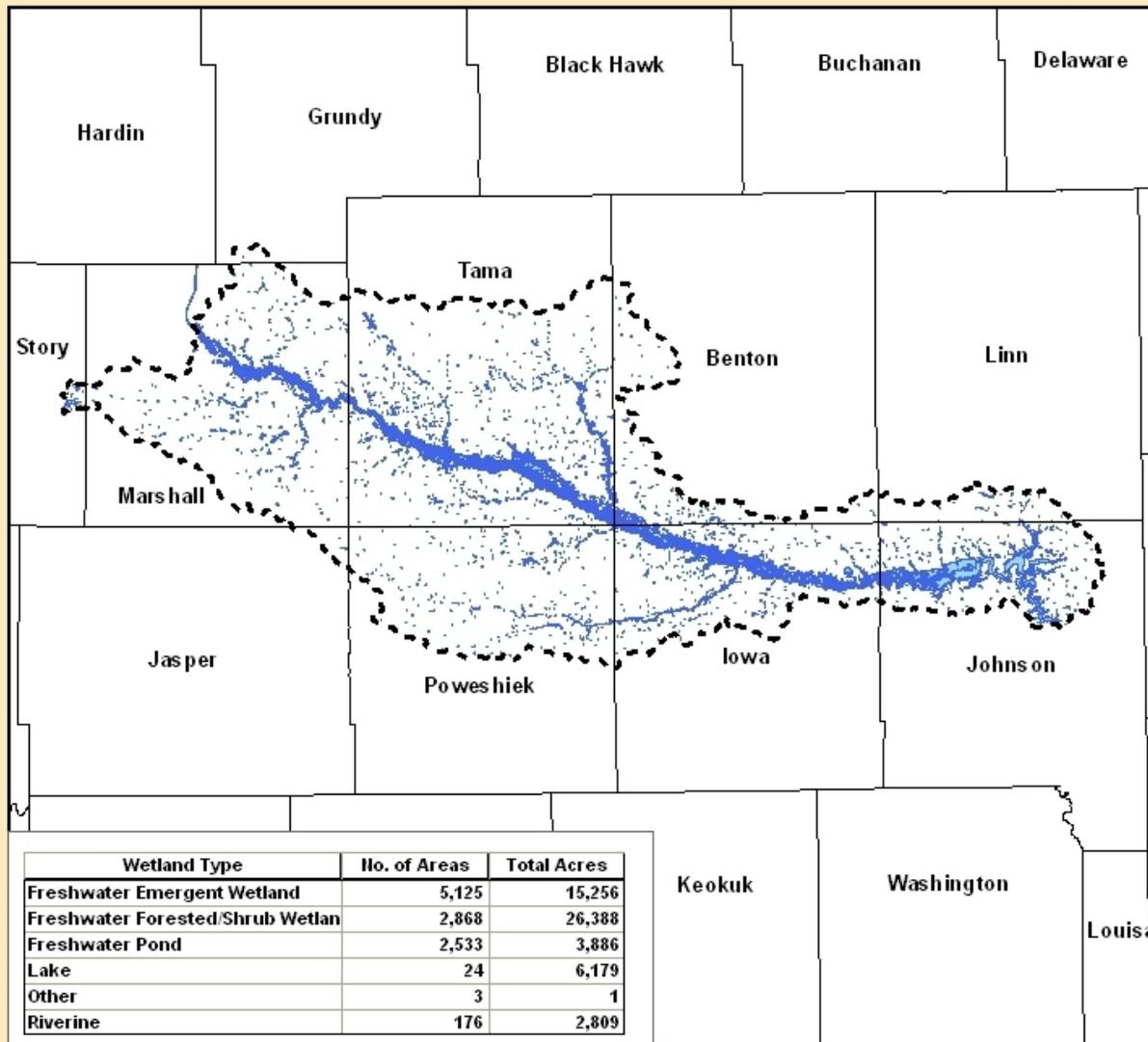


Physical Description (continued)



Physical Description (continued)

Iowa Rapid Watershed Assessment Iowa River, Middle - National Wetland Inventory



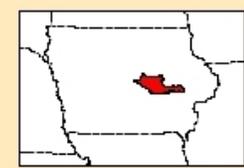
Wetland Type	No. of Areas	Total Acres
Freshwater Emergent Wetland	5,125	15,256
Freshwater Forested/Shrub Wetland	2,868	26,388
Freshwater Pond	2,533	3,886
Lake	24	6,179
Other	3	1
Riverine	176	2,809

Total NWI Areas: 54,519



Legend

- State Boundary
- County Boundary
- Iowa River, Middle, Basin
- Wetland Areas - Iowa River, Middle



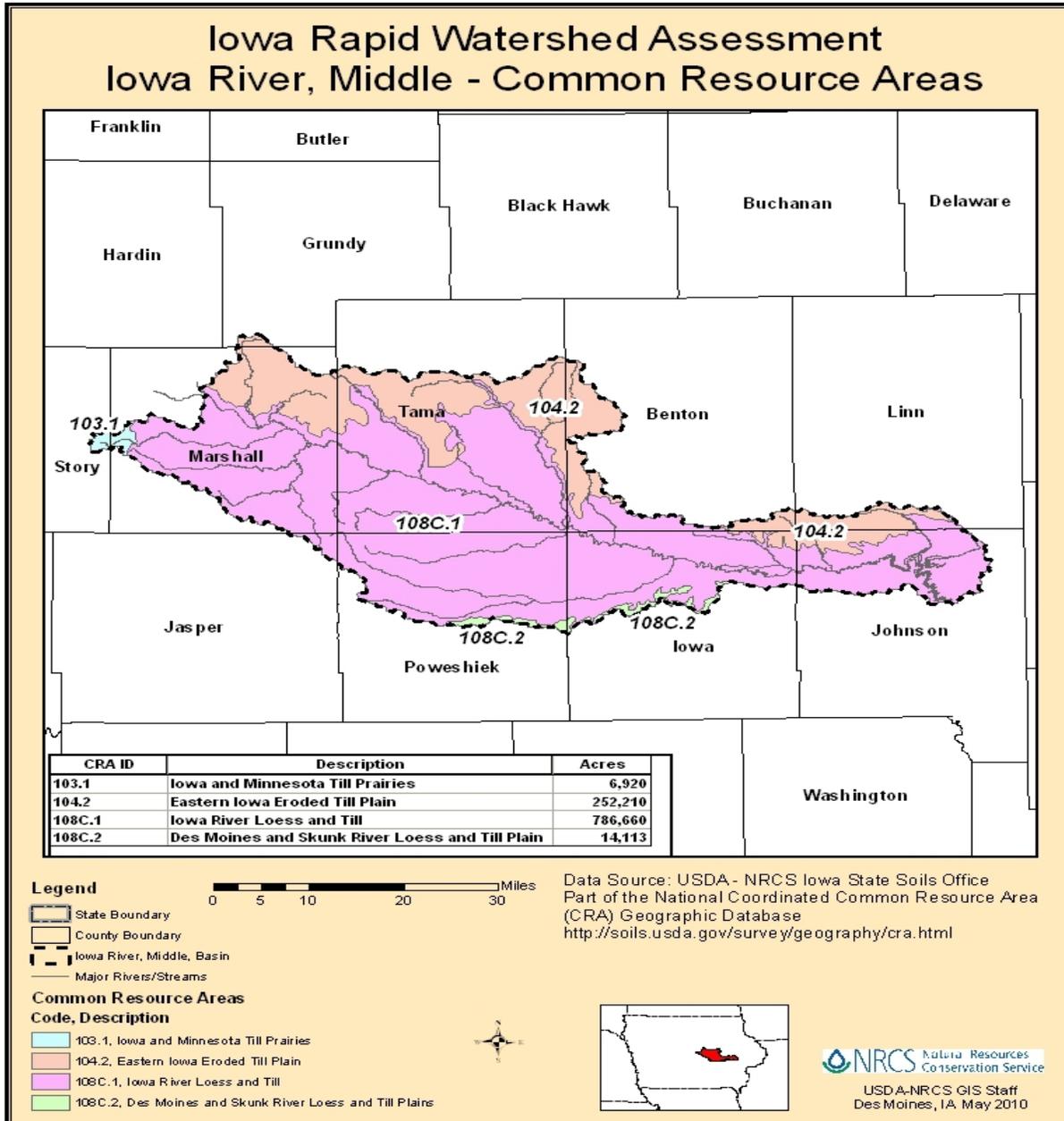
U.S. Fish and Wildlife Service, 200605_ia_nwi: Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, DC. FWS/OBS-79/31. U.S. Fish and Wildlife Service, Branch of Habitat Assessment, Washington, D.C..

Physical Description (continued)

Common Resource Areas

The Iowa River, Middle, HUC includes portions of four National Common Resource Areas (CRA): 103.1; 104.2; 108C.1; and 108C.2. Seventy-four percent of the watershed is in CRA 108C.1, 23.8 percent in 104.2, 1.3 percent in 108C.2, and 0.7 percent in 103.1 (10, 11).

The CRAs delineated below for the Iowa River, Middle, 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) (10, 11).



Physical Description (continued)

Common Resource Area Descriptions

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.

104.2 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.

108C.2 Des Moines and Skunk River Loess and Till Plains

This area consists of gently sloping to steep, silty soils on connected ridge tops and highly dissected side slopes with drainage ways and streams. Glacial till soils dominate the steeper side slopes with paleosols occurring on shoulder slopes that cause side-hill seeps. Native vegetation was mixed prairie with deciduous forest on steeper slopes. Common crops are corn and soybeans with some forage crops. Resource concerns are soil erosion, soil quality, water quality, and nutrient management.

Physical Description (continued)

Geology

This drainage area consists of the central portion of the Iowa River watershed. Several major tributary channels drain to this stretch of the Iowa River, the largest of which are Bear Creek, Salt Creek, and Timber Creek. Soils and landforms of the watershed formed in deposits laid down by ice and water over the last two million years during the Pleistocene and Holocene Epochs. Beneath the unconsolidated deposits is Paleozoic bedrock, which becomes younger from east to west. In Johnson County, it consists mainly of Devonian dolomite and limestone. To the west, the major part of the watershed (Iowa, Poweshiek and Tama counties) is underlain by slightly younger Devonian rocks—mainly shale but also including some siltstone, dolomite and limestone. Outliers of Pennsylvanian shale and sandstone are found in northeast Iowa County, and Mississippian dolomite and limestone occurs in northwest Poweshiek County. In the western portion of the watershed (Marshall County), the bedrock is made up predominantly of Mississippian limestone and dolomite, with smaller areas of Pennsylvanian shale and sandstone. With a few exceptions, the bedrock across the watershed is buried beneath a hundred feet or more of overburden. Limestone occurs near the surface or is exposed in quarries in west-central Tama County and east-central Marshall County. Dolomite and limestone is exposed in the Iowa River Valley in Johnson and Iowa Counties.

The landscape of the Middle Iowa RWA area falls into two of Iowa's seven physiographic provinces (landform regions). Most of the southern half of the watershed is in the Southern Iowa Drift Plain. Here, windblown silty loess several feet thick blankets an old glacial surface composed of thick, dense Pre-Illinoian till deposited beneath a few thousand feet of ice at least a half million years ago. The landscape is steeply rolling and highly dissected by a well-established, dendritic drainage network. Channels carved deeply into the land surface have since been partially filled by Holocene alluvial sediments of the DeForest Formation. Between valleys, narrow upland divides represent the highest and oldest areas of land, remnants that have experienced little erosion since the till was deposited. Elevations from the head to the mouth of the watershed range from about 1,130 to 720 feet.

Northern portions of the watershed, including a large part of Tama County, are part of the Iowan Erosion Surface. This is a landscape that developed on the older Pre-Illinoian till as a result of the intense periglacial conditions and strong winds associated with the Late Wisconsinan glacial advance that formed the Des Moines Lobe to the west. In many places, 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.

Soils on the uplands are mainly silty clay loam soils of the Tama Series. On the lower slopes, silt loam soils of the Fayette and Downs series dominate. All three soil series were formed in loess and are well-drained. There are also significant areas of well-drained silty clay loam soils of the Dinsdale series, which formed in thin loess and the underlying till. Till soils generally occur only on strongly sloping hillsides. Loess-derived silty clay loam (Colo and Bremer) and silt loam (Nodaway and Lawson) soils dominate in the Iowa River valley, and vary from poorly drained to well-drained.

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.

National Resource Inventory (NRI) estimates for sheet and rill erosion (USLE) by water on cropland and pastureland decreased by approximately 3,966,100 tons (48 percent) of soil loss between 1982 and 1997. NRCS estimates indicate wind erosion rates (WEQ) decreased by 864,800 tons (93 percent) between 1982 and 1997. The standard error for the USLE estimate is 324,879 tons for 1997(USLE) and 574,257 tons for 1982 (USLE). The standard error for the WEQ estimate is 20,455 tons for 1997(WEQ) and 74,601 tons for 1982 (WEQ). The margin of error at the 95% confidence limit is obtained by multiplying the standard error by 1.96 (12).

NRI Soil Loss Estimates



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 (13).

Bacteria and biological pollutants and their affects are the major pollutants impacting surface waters of the Iowa River, Middle, Watershed. Surface waters, especially lakes and ponds, have a repeated history of algal blooms and concern of pH, bacteria and turbidity. A variety of human activities contribute directly to pollutant loads in the water bodies, including intensive row crop agriculture; urban storm runoff; 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 (14).

For more information on water quality and the Iowa Department of Natural Resources (IDNR) Water Quality Index, go to the following website:

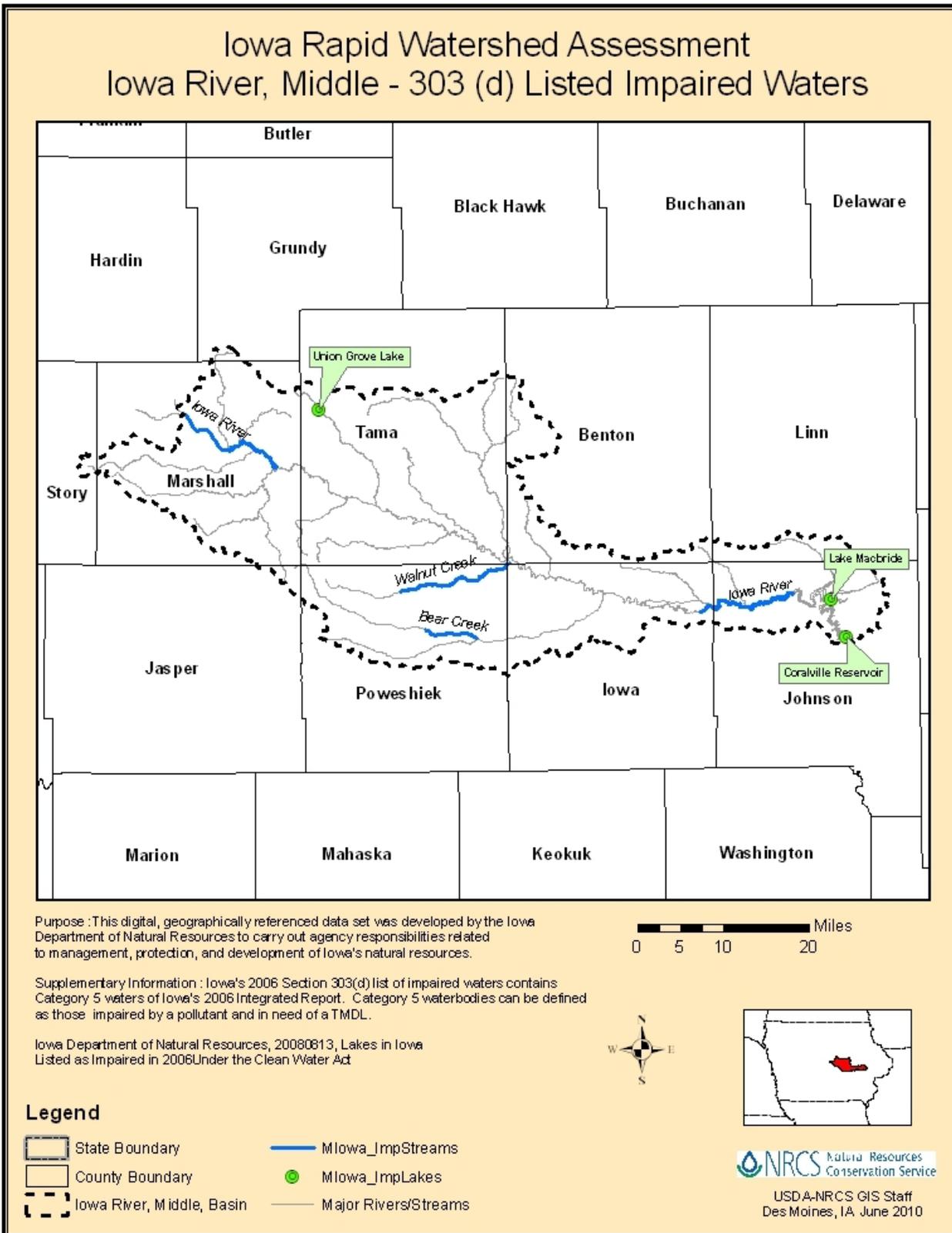
<http://www.igsb.uiowa.edu/wqm/Data/WQI/WQI.htm>

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 (13)

Impaired Water Bodies	Algae	pH	Biological	Bacteria	Nutrients	Turbidity	Siltation	Fish Kill	Low DO
Bear Creek (IOW-0180_2)			X						
Bennett Creek (IOW-0213_0)									
Coralville Reservoir (IOW-0040-L_0)						X			
Green Castle Lake (IOW-00660-L_0)		X							
Hannen Lake (IOW-01810-L_0)	X	X							
Iowa River (IOW-0050_1)				X					
Iowa River (IOW-0060_4)				X					
Iowa River (IOW-0060_5)				X					
Lake Macbride (IOW-00390-L_0)	X	X		X					
Little Bear Creek (IOW-0185_1)			X						
Otter Creek Lake (IOW-02095-L_0)	X								
Price Creek (IOW-0175_2)				X					
Price Creek (IOW-0176_0)				X					

Impaired Water Bodies	Algae	pH	Biological	Bacteria	Nutrients	Turbidity	Siltation	Fish Kill	Low DO
Raven Creek (IOW-0215_0)				X					
Union Grove Lake (IOW-02195-L_0)	X	X		X		X			
Walnut Creek (IOW-0187_1)			X						
Walnut Creek (IOW-0187_2)			X						

The schedule of TMDL development can be found at:

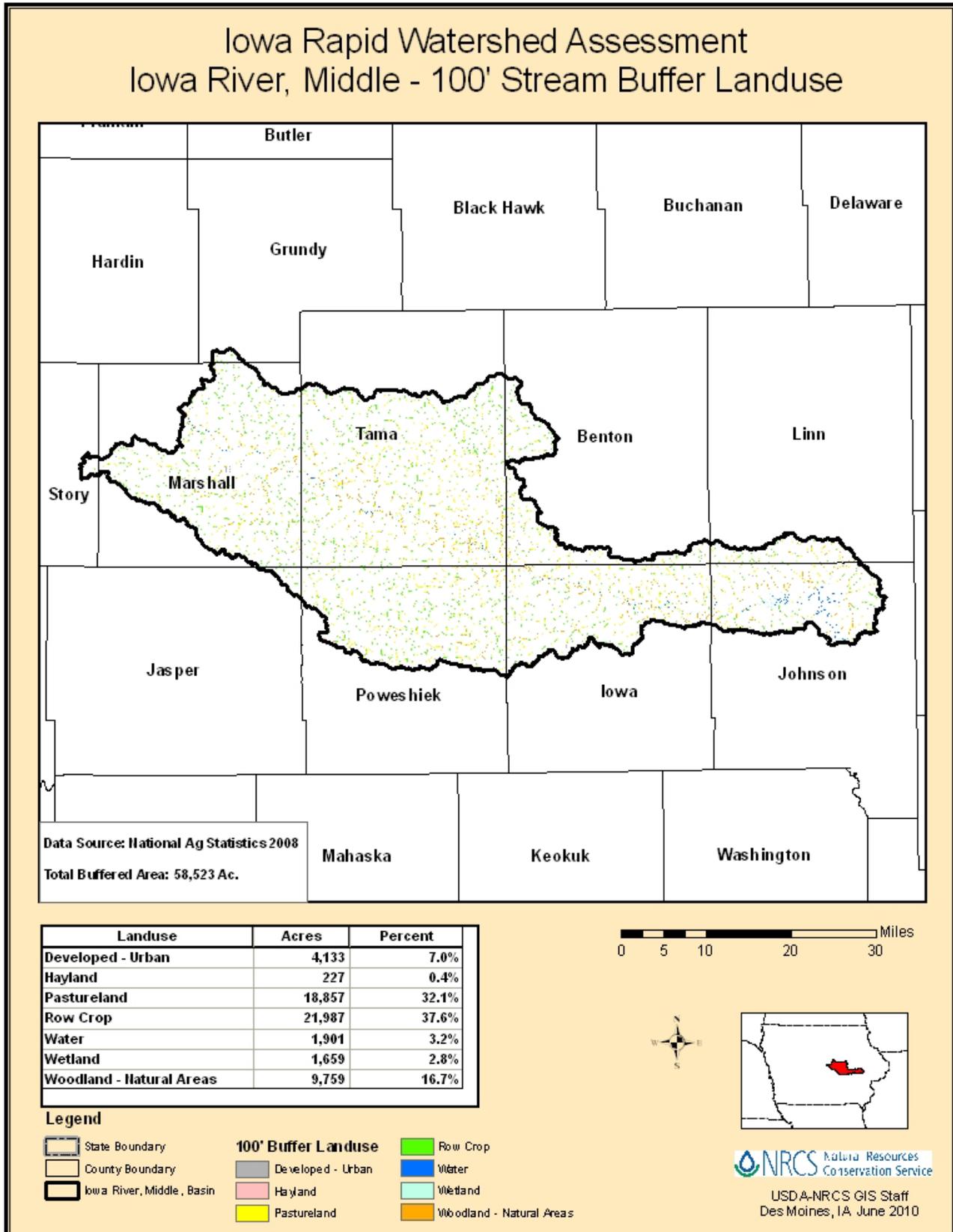
<http://www.iowadnr.gov/Environment/WaterQuality/WatershedImprovement/WatershedResearchData/WaterImprovementPlans/PlanSchedule.aspx>

Water Quality (continued)

Watershed Projects, Plans, Studies, and Assessments	
Iowa Watershed Improvement Review Board (WIRB) Projects (15)	IDNR TMDLs (16)
<p><u>Funded 2007</u> 71032 Macbride – Johnson SWCD</p> <p><u>Funded 2009</u> 9011-008 Walnut Creek Watershed, Poweshiek County</p>	<p><u>Scheduled 2011</u> Walnut Creek</p> <p><u>Scheduled 2012</u> Otter Creek Lake</p> <p><u>Scheduled 2014-2015</u> Coralville Reservoir Green Castle Lake Lake Macbride Price Creek Bennett Creek Raven Creek</p>
Water Quality Improvement Projects* (17)	
<p>Cedar Rapids Area Urban Water Quality Project (Linn County) Completed</p> <p>Hannen Lake Watershed Project (Benton County) Active</p> <p>Hoosier Creek Watershed Protection Project (Linn County) Completed</p> <p>Johnson County Urban Water Quality Project (Johnson County) Completed</p> <p>Johnson County Urban Conservationist Project (Johnson County) Active</p> <p>Lake Macbride Watershed Project (Johnson County) Active</p> <p>Otter Creek Lake Water Quality Project (Tama County) Completed</p> <p>Price Creek Water Quality Project (Iowa County) Active</p> <p>PURE Water Quality Project (Linn County) Completed</p> <p>Union Grove Lake NPS Watershed Project (Tama County) Active</p> <p>Walnut Creek Watershed Quality Improvement Project (Poweshiek County) Active</p>	

* Listing includes past efforts in the watershed, and ongoing studies and assessments. Projects funded through the following programs: Water Quality Protection Fund, Watershed Protection Fund, and IDNR 319 Program

Water Quality (continued)



Threatened and Endangered Species (18)

	SPECIES	Status	
		State	Federal
Animals	Short-eared Owl (<i>Asio flammeus</i>)	E	
	Dusted Skipper (<i>Atrytonopsis hianna</i>)	S	
	Red-shouldered Hawk (<i>Buteo lineatus</i>)	E	
	Northern Harrier (<i>Circus cyaneus</i>)	E	
	Wood Turtle (<i>Clemmys insculpta</i>)	E	
	Blanding’s Turtle (<i>Emydoidea blandingii</i>)	T	
	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	S	
	Dakota Skipper (<i>Hesperia dacotae</i>)	E	C
	Smooth Green Snake (<i>Liochlorophis vernalis</i>)	S	
	Purplish Copper (<i>Lycaena helloides</i>)	S	
	Indiana Bat (<i>Myotis sodalis</i>)	E	E
	Weed Shiner (<i>Notropis texanus</i>)	E	
	Topeka Shiner (<i>Notropis topeka</i>)	T	E
	Powesheik Skipperling (<i>Oarisma powesheik</i>)	T	
	Byssus Skipper (<i>Problema byssus</i>)	T	
	Ornate Box Turtle (<i>Terrapene ornate</i>)	T	
	Barn Owl (<i>Tyto alba</i>)	E	

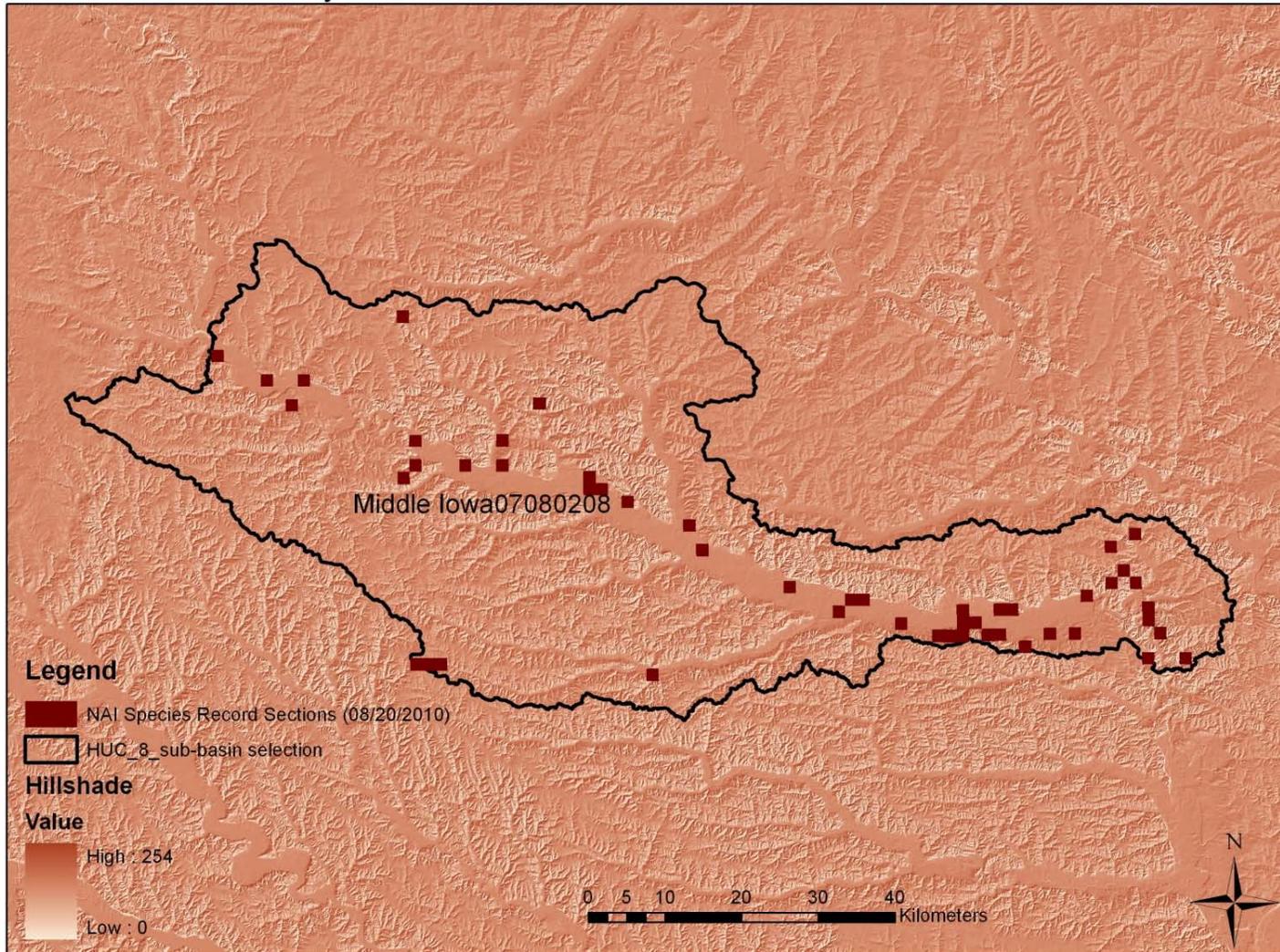
	SPECIES	Status	
		State	Federal
Plants	Muskroot (<i>Adoxa moschatellina</i>)	S	
	Saskatoon Service-berry (<i>Amelanchier alnifolia</i>)	S	
	Wooly Milkweed (<i>Asclepias lanuginosa</i>)	S	
	Flat Top White Aster (<i>Aster pubentior</i>)	S	
	Little Grape Fern (<i>Botrychium simplex</i>)	T	
	Water Shield (<i>Brasenia schreberi</i>)	S	
	Low Bindweed (<i>Calystegia spithamea</i>)	S	
	Fogg's Goosefoot (<i>Chenopodium foggii</i>)	S	
	Missouri Lambsquarters (<i>Chenopodium missouriensis</i>)	S	
	Hill's Thistle (<i>Cirsium hillii</i>)	S	
	Small White Lady's Slipper (<i>Cypripedium candidum</i>)	S	
	Showy Lady's Slipper (<i>Cypripedium reginae</i>)	T	
	Capitate Spikerush (<i>Eleocharis olivacea</i>)	S	
	Wolf Spike-rush (<i>Eleocharis wolfii</i>)	S	
	Woodland Horsetail (<i>Equisetum sylvaticum</i>)	T	
	Tall Cotton Grass (<i>Eriophorum angustifolium</i>)	S	
	Slender Fimbry (<i>Fimbristylis autumnalis</i>)	S	
	Rough Bedstraw (<i>Galium asprellum</i>)	S	
	Small Fringed Gentian (<i>Gentianopsis procera</i>)	S	
	Spring Avens (<i>Geum vernum</i>)	S	
Oak Fern (<i>Gymnocarpium dryopteris</i>)	T		
Ground Pine (<i>Lycopodium clavatum</i>)	E		

Iowa

	SPECIES	Status	
		State	Federal
Plants	Crowfoot Clubmoss (<i>Lycopodium digitatum</i>)	S	
	Green Adder's Mouth (<i>Malaxis unifolia</i>)	S	
	Pinesap (<i>Monotropa hypopithys</i>)	T	
	Northern Adder's-tongue (<i>Ophioglossum pusillum</i>)	S	
	Tunnel-formed Penstemon (<i>Penstemon tubiflorus</i>)	S	
	Pale Green Orchid (<i>Platanthera flava</i>)	E	
	Eastern Prairie Fringed Orchid (<i>Platanthera leucophaea</i>)	E	T
	Western Prairie Fringed Orchid (<i>Platanthera praeclara</i>)	T	T
	Meadow Bluegrass (<i>Poa wolfii</i>)	S	
	Pink Milkwort (<i>Polygala incarnate</i>)	T	
	Large-leaf Pondweed (<i>Potamogeton amplifolius</i>)	S	
	Sensitive Briar (<i>Schrankia nuttallii</i>)	S	
	Bur-reed (<i>Sparganium androcladum</i>)	S	
	Slender Ladies'-tresses (<i>Spiranthes lacera</i>)	T	
	Oval Ladies'-tresses (<i>Spiranthes ovalis</i>)	T	
	Earleaf Foxglove (<i>Tomanthera auriculata</i>)	S	
	Humped Bladderwort (<i>Utricularia gibba</i>)	S	
	Softleaf Arrow-wood (<i>Viburnum molle</i>)	S	
Violet (<i>Viola macloskeyi</i>)	S		
E = Endangered Species T = Threatened Species S = Candidate/Species of Concern			

Threatened and Endangered Species (continued)

Iowa Natural Areas Inventory Threatened, Endangered, and Special Concern Species
Records by PLSS Section for Middle Iowa HUC 8 07080208

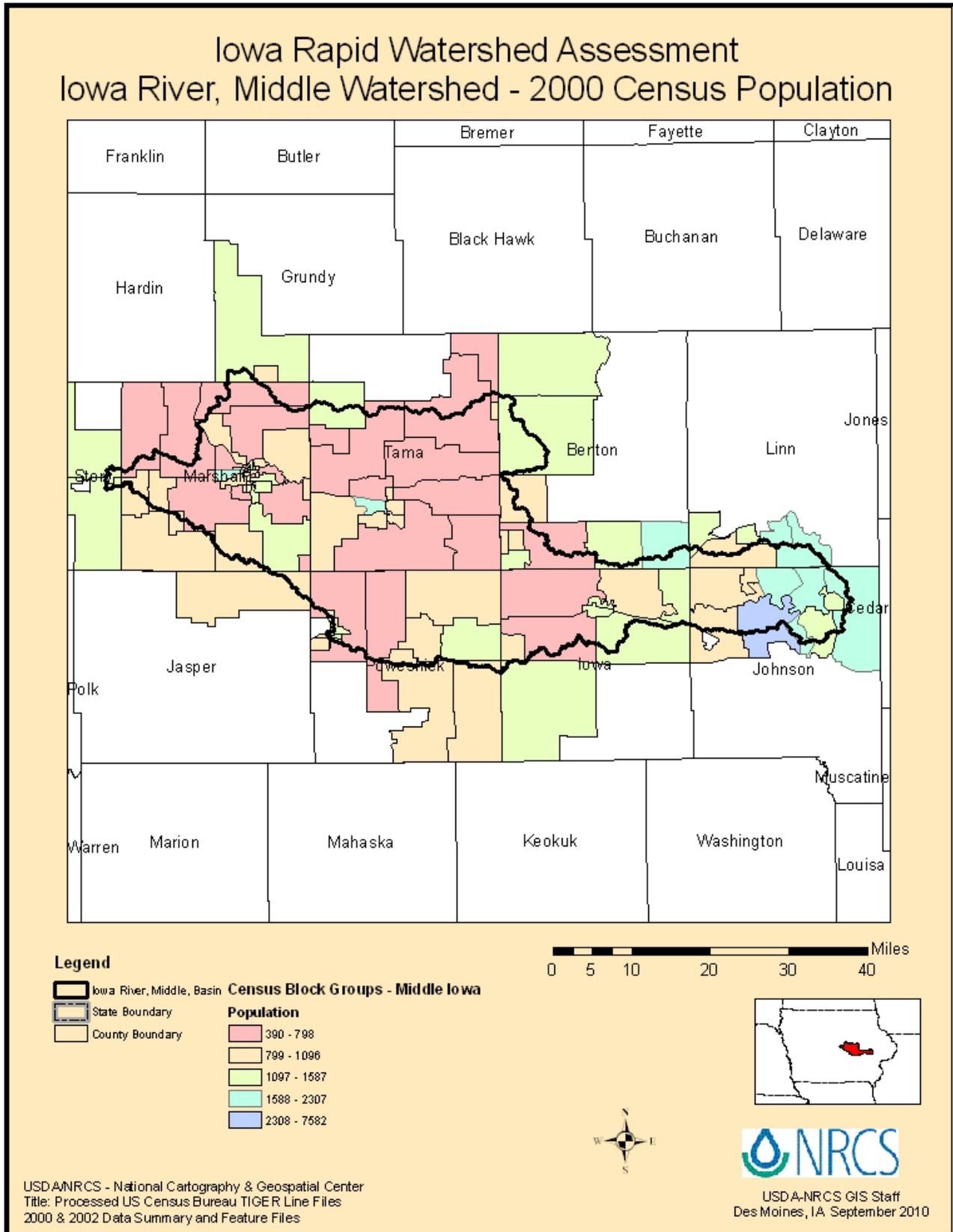


Census and Social Data

There are 1,607 total farm operators in the watershed. Of these, 1,208 are male and 397 are female. Eighty-one percent of the farm operators in the watershed are full time farmers (19).

There are 2,881 farms in the Iowa River, Middle, Watershed with farm size ranging from one acre to over 1,000 acres. Size of farms: 9 percent are 1-9 acres; 19 percent are 10-49 acres; 28 percent are 50-179 acres; 24 percent are 180-499 acres; 12 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 (19).

Census and Social Data (continued)



Census and Social Data (continued)

NASS Farm Operators Per County Middle Iowa Watershed

COUNTY	Acres	Percent	Operators	Female Operators	Male Operators	Full-Part Time Operators	Full Time Op	Part Time Op
Benton	70,802	6.70%	122	31	91	133	98	35
Grundy	2,845	0.30%	4	1	3	4	3	1
Iowa	143,074	13.50%	227	60	166	251	184	67
Jasper	5,698	0.50%	8	2	6	9	7	2
Johnson	102,790	9.70%	185	48	138	205	150	54
Linn	26,097	2.50%	51	13	38	57	42	16
Marshall	222,944	21.00%	274	61	213	308	227	82
Poweshiek	164,516	15.50%	216	58	157	235	172	63
Story	2,882	0.30%	5	1	4	5	4	1
Tama	318,254	30.00%	515	122	392	579	419	159
Total	1,059,902	100.00%	1,607	397	1,208	1,786	1,306	480

* 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

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Census and Social Data (continued)

Total Farms By Size Per County Iowa River, Middle Watershed

COUNTY	Acres	% of Watershed	1 - 10 Ac	10 - 50 Ac	50 - 179 Ac	180 - 499 Ac	500 - 999 Ac	> 1000 Acr
BENTON	70,802	6.7%	21	33	50	48	26	15
GRUNDY	2,845	0.3%	1	1	2	2	1	1
IOWA	143,074	13.5%	37	78	131	124	42	25
JASPER	5,698	0.5%	1	3	3	3	2	1
JOHNSON	102,790	9.7%	17	81	122	65	32	16
LIHH	26,097	2.5%	8	20	23	18	7	4
MARSHALL	222,944	21.0%	57	119	131	133	67	57
POWESHIEK	164,516	15.5%	39	85	108	93	49	36
STORY	2,882	0.3%	1	2	2	2	1	1
TAMA	318,254	30.0%	72	121	246	200	127	68
Total	1,059,902	100.0%	254	543	818	688	354	224

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

Resource Concerns

Resource Concerns by Land Use

Pasture (20)

Typical vegetation consists of introduced cool season species. Predominant grass species are Tall Fescue, Orchard grass, Smooth Brome grass, and possibly Kentucky Bluegrass. Legumes present include White and Red Clover, Birdsfoot Trefoil or Alfalfa. Management regimes are diverse and range from continuous overgrazing to ultra-high density intensively managed grazing systems. Classic gully erosion may be present on abusively grazed areas and are generally follow areas that receive excess surface runoff. Stream bank erosion may be significant where livestock have access to streams and particularly where endophyte infected fescue is the predominant forage causing livestock to spend excessive time cooling in water bodies. In time, undesirable species such as locust and other trees, thistles and other native and non-natives may invade pastures and decrease the productivity of the forage. Soil compaction and disturbance on cattle paths and around water sources can increase soil erosion and create a niche for undesirable plant species. Lack of watering systems is the primary barrier to developing rotational grazing systems.

Cropland (21, 22)

Cropland is intensively used, primarily for corn and soybeans production, with less than one percent in hay as part of a rotation. Hayland consist of introduced species, predominantly Smooth Bromegrass, Orchardgrass, Red Clover and Alfalfa. The average slope is 4.8 percent. Soil erosion (sheet and rill, and ephemeral gully), over-application of nutrients (commercial and manure-based) and pesticides, and the effects of these on water quality are the primary resource concerns. Soybean acres have increased in recent years, compared to corn and hayland acres, due to increased grain prices.

Natural Areas/Forestland (23)

Natural areas in the Iowa River, Middle Watershed consist of a mix of native trees and shrubs. Oaks and hickories dominate dry upland sites and occupy 48% of the forestland. Sugar maple-basswood, is increasing on upland sites due to individual tree selection timber harvesting techniques. Silver maple-cottonwood-American elm-green ash dominates the bottomland/floodplain forest sites. Overall, the health of forests is in relatively good condition, with minimal annual losses to oak wilt, Dutch elm disease and other pathogens. But forests are stressed from severe weather, livestock grazing, invasive species and poor logging practices. Severe weather has been the biggest impact on the health of Iowa's existing forests from ice storms, early wet heavy snow storms, strong winds/tornadoes and flooding over the last decade that break, blow down, uproot or kill trees. Resource concerns include noxious and invasive species, forestland productivity, health and vigor, and conversion of forestland 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 and pest management plans; and the implementation of water quality improvement projects.

Urban flooding, streambank erosion, and surface water quality are issues especially in areas of the rural-urban interface. These issues have resulted in increased technical assistance in urban areas

Resource Concerns that Require Ongoing Attention

Technical assistance and attention will continue regarding soil erosion by water, especially on cropland. Recent increases in grain prices have caused fewer CRP contracts to be renewed, and existing pasture and forestland to be brought into crop production. The loss of pastureland and forestland on highly erodible lands is a trend that has resulted in significant increases in soil erosion, sedimentation, and run off requiring technical assistance (22). 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 Iowa River, Middle, 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 (24, 25).

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.

There is increased interest 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 (26, 27).

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.

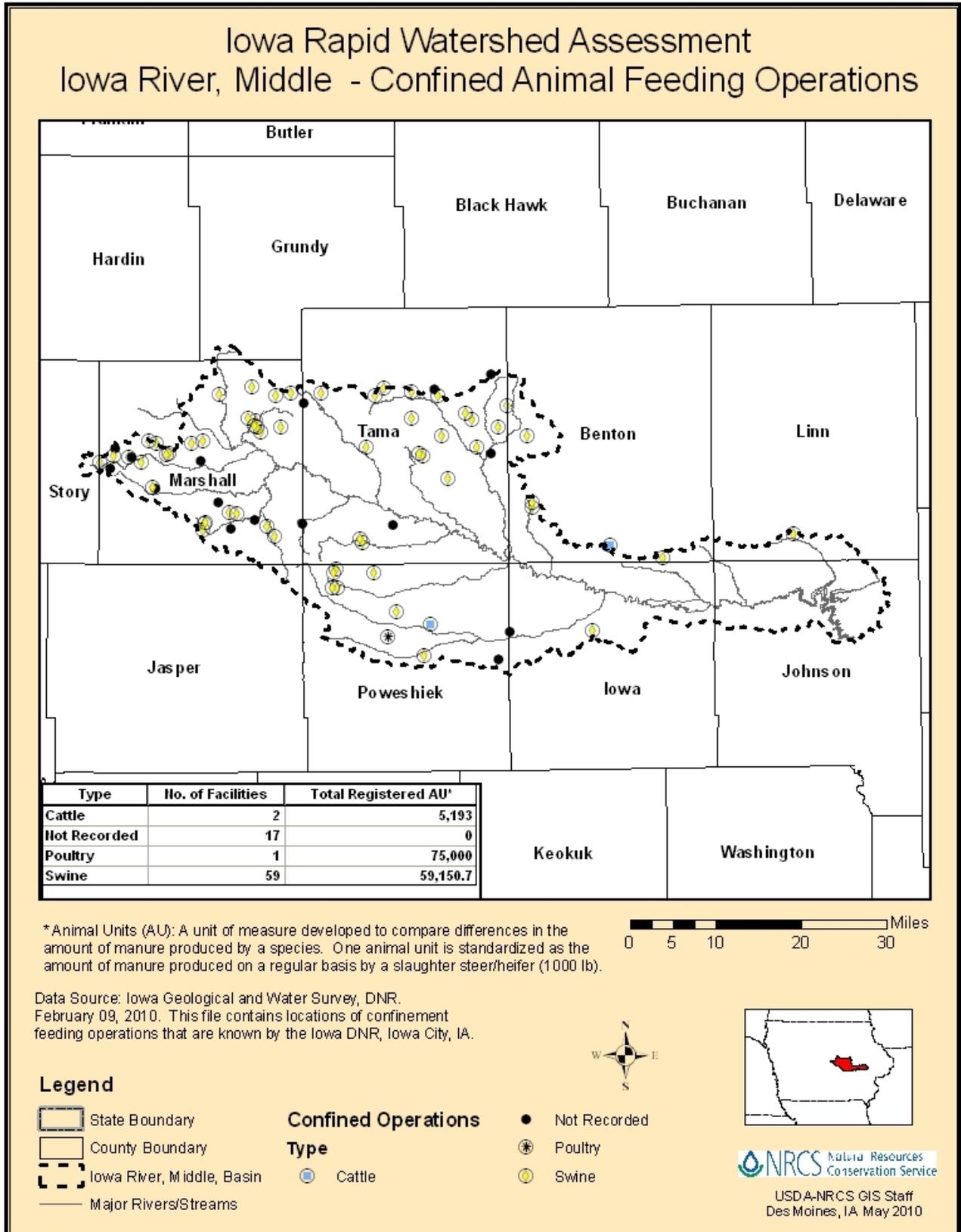
In the state of Iowa, as of October 2009, there were approximately 57 biofuel plants that are in operation or under construction. At this time, there is one ethanol plant that is under construction in the Iowa River, Middle Watershed, located in Tama. It is reported that 2 - 4 gallons of water is required for every gallon of biofuel produced, creating a concern about water quantity (28).

Two counties in the Iowa River, Middle Watershed (Marshall and Tama) are involved in the outreach project entitled Women, Land and Legacysm and have gathered information from women landowners and operators, including resource concerns. (29)

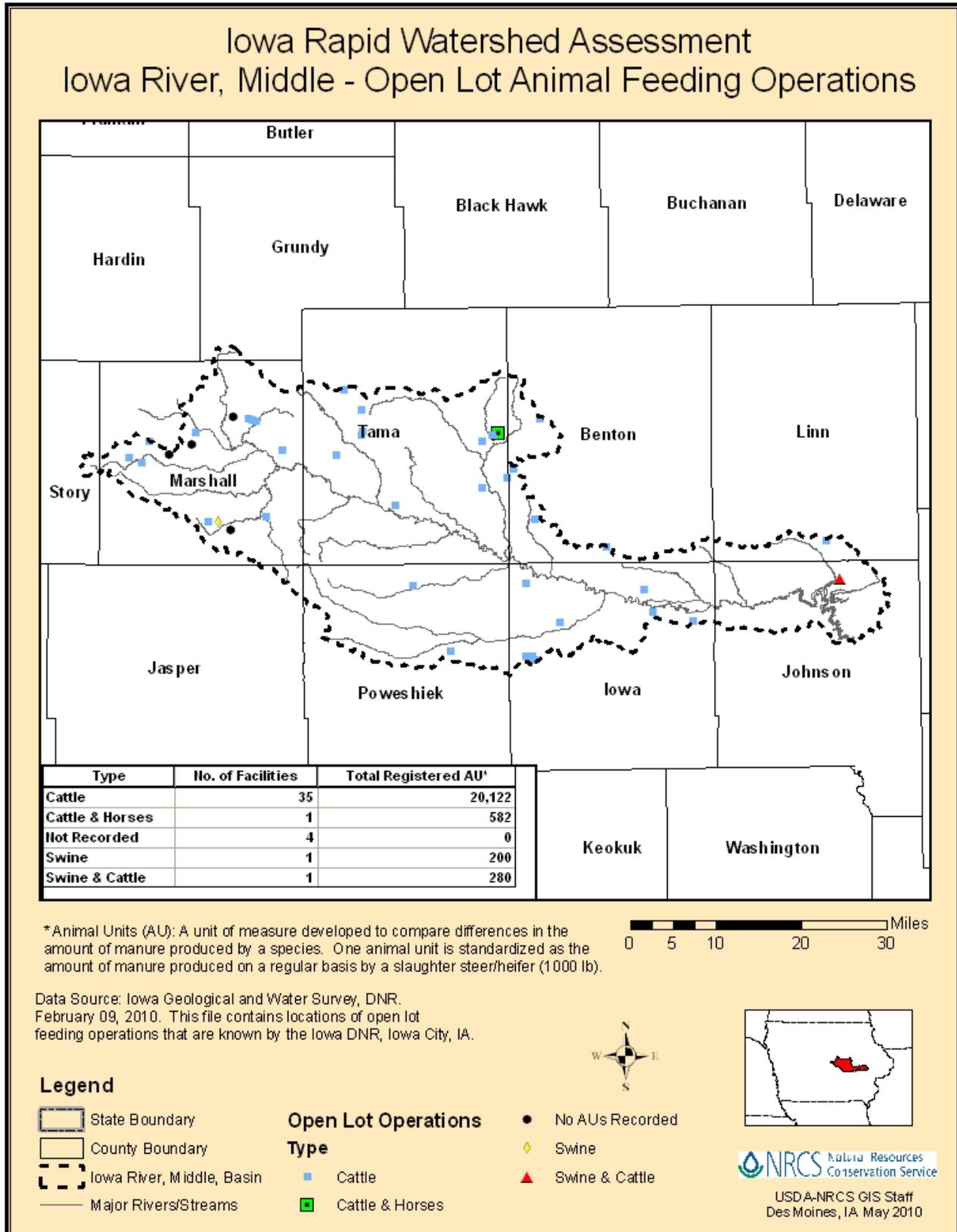
Water quality concerns are increased by manure from livestock that is commonly spread on cropland as fertilizer. Using manure as a fertilizer creates potential water quality challenges from bacteria and nutrients delivered through runoff and subsurface drainage. Stream bank erosion in the region has been related to livestock overgrazing of the stream and river banks (30).

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 (31). There are 79 Confined Animal Feeding Operations (CAFO) in the watershed, with a total of 139,344 animal units. Seventy-five percent of the CAFOs are swine and the remaining twenty-five percent are split between cattle, poultry and not recorded operations (32). There are 42 Animal Feeding Operations (AFO) in the watershed, with a total number of 21,184 animal units. Eighty-three percent of the AFOs are cattle, and the remaining seventeen percent are split between swine, swine and cattle, cattle and horses, and not recorded operations (33).

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. (34)

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			X
	Classic Gully	X	X	X	X
	Streambank		X		
	Wind	X			
	Shoreline			X	
Water Quality, Surface	Suspended Sediment & Turbidity	X	X		X
	Pesticides	X			
	Excessive Nutrients & Organics	X	X		X
	Pathogens		X		
Water Quality, Ground	Excessive Nutrients & Organics	X			
	Pesticides	X			
Water Quantity	Excessive Runoff, Flooding or Ponding	X	X		X
	Excessive Seepage	X			
Soil Condition	Animal Waste & Other Organics (N,P,K)	X			
	Organic Matter Depletion	X			
	Compaction		X		
	Subsidence		X		
	Damage from Soil Deposition	X			
Plant Condition	Productivity, Health, & Vigor		X	X	
	Forage Quality & Palatability		X		
	Noxious & Invasive Species		X	X	
Domestic Animals	Inadequate Quantity & Quality Feed & Forage		X		
	Inadequate Stock Water		X		
	Inadequate Shelter		X		
	Stress & Mortality		X		
Air Quality	Excessive Greenhouse Gas (CO ₂)				X
	Particulate Matter (PM 10&2.5)				X
	Objectionable Odors				X
	Undesirable Air Movement				X
	Chemical Drift	X			
	Adverse Air Temp				X
Wildlife	Inadequate cover & shelter			X	
	T & E Species			X	
	Inadequate Food, Water & Space			X	

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

Special Considerations

With almost nine 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.

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 (24).

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 (24). 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 (24).

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)

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 (35).

Special Considerations (continued)

Iowa Department of Natural Resources' (IDNR) SWP Program has three different phases to the SWP Program: SWP Assessments (Phase 1), the SWP Plan (Phase 2) and Implementation (Phase 3). In addition, the program has recently included implementation as part of the SWP planning. Communities will be targeted for developing a plan if their water supply systems have finished water with nitrate levels of 5 mg/L or greater and trending upward, and public wells not having a confining layer (termed as "shallow well"). (35)

IDNR's SWP Program has developed a list of Priority Community Water Supplies. The Iowa River, Middle, Watershed has no Priority SWP communities identified. However, the watershed has about 11 communities in the watershed identified as having possible highly susceptible systems. These communities are identified by the DNR SWP Program as highly susceptible based the geologic characteristics of the aquifer and is independent of well vulnerability. (35)

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.

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