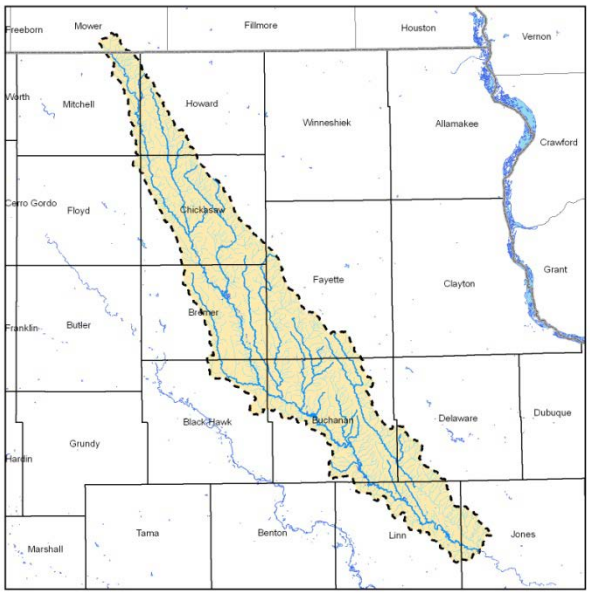
USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Iowa

Wapsipinicon River, Upper – 07080102 **October 2012**
8-Digit Hydrologic Unit Profile



The Wapsipinicon River, Upper, 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 Wapsipinicon River, Upper, 8-Digit Hydrologic Unit Code (HUC) watershed contains 1,002,746 acres *(1)*. Over twenty four percent of the watershed is in Buchanan County, 19.3 percent in Chickasaw County, 15.2 percent in Bremer County, 11.1 percent in Fayette County, 9.6 percent in Linn County, 6.0 percent in Howard County, 4.3 percent in Black Hawk County, 3.5 percent in Mitchell County, 3.2 percent in Delaware County, 2.4 percent in Jones County, and the remaining 1 percent is split between Mower County (MN) and Floyd County *(1)*.

Over ninety-four percent of the watershed is privately owned, 1.7 percent includes municipal areas, and the remaining 4 percent is split between public areas, railroads, and unincorporated areas *(2).*

Seventy-one and a half percent of the watershed is in cropland, 14.6 percent is pasture and/or hayland, 5.5 percent is woodland or natural areas, 6.3 percent is developed urban land use, and 2 percent is split between water and wetlands *(3)*.

Elevations range from 765 feet to 1,403 feet *(4)*. The average watershed slope is 2.4 percent (5). The primary Land Capability Class in the watershed is class 2. The Land Capability Class (LCC) breakdown for the watershed is: 9.8 percent in class 1; 71.5 percent in class 2; 7.5 percent in class 3; 4.2 percent in class 4; 4.4 percent in class 5; 1.3 percent in class 6; and the remaining 1.4 percent is split between classes 7, 8 and miscellaneous (*6*). Rainfall ranges from 35 to 37 inches per year *(7)*. The HUC includes no interstates highways, four US highways (18, 20, 63, 151), and eight state highways (3, 9, 13, 24, 93, 150, 188, 281) *(8)*.

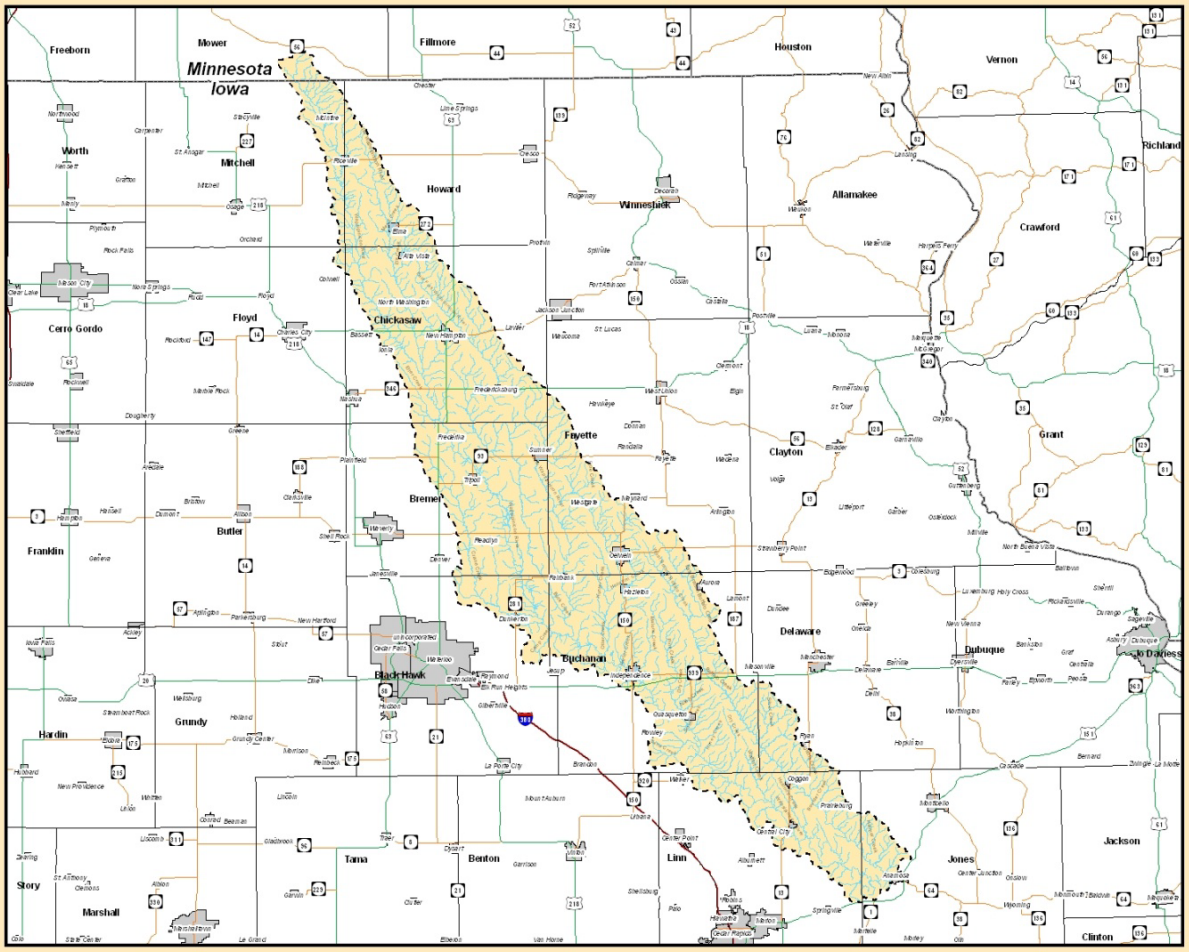
Conservation assistance is provided by twelve Soil and Water Conservation Districts (SWCD) and Natural Resources Conservation Service (NRCS) field offices located in Waterloo, Waverly, Independence, New Hampton, Manchester, West Union, Charles City, Cresco, Anamosa, Marion, Osage, and Austin. An office locator is found at http://offices.sc.egov.usda.gov/locator/app

The Wapsipinicon River, Upper, HUC includes 72 NRCS conservation easements totaling 6,299.2 acres. The easements include the Emergency Watershed Protection (EWP) program, Wetlands Reserve Program (WRP), and the Emergency Wetlands Reserve Program (EWRP). Over forty-two percent of the easement acres are in Bremer County, 16.7 percent in Chickasaw County, 16.5 percent in Buchanan County, 15 percent in Delaware County, 8.0 percent in Black Hawk County, and 1.6 percent in Fayette County. *(9)*.

Iowa

Physical Description

Iowa Rapid Watershed Assessment
Upper Wapsipinicon Watershed - Location Map



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

Total Area In Watershed: 1,002,746 Acres

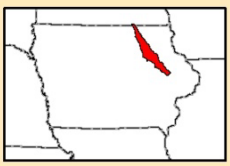
COUNTY	Acres	Percent
Black Hawk	43,270	4.32%
Bremer	152,371	15.20%
Buchanan	244,938	24.43%
Chickasaw	193,199	19.27%
Delaware	32,485	3.24%
Fayette	111,405	11.11%
Floyd	1,766	0.18%
Howard	59,680	5.95%
Jones	23,603	2.35%
Linn	96,502	9.62%
Mitchell	35,244	3.51%
Mower, MN	8,283	0.83%

0 5 10 20 30 40 50 Miles

Legend

ESRI Highway Iowa
TYPE
- INTERSTATE
- STATE
- US
- Rivers/Streams
- State Boundary
- County Boundary
- Cities/Towns In Iowa
- Upper Wapsi Basin

N W E S



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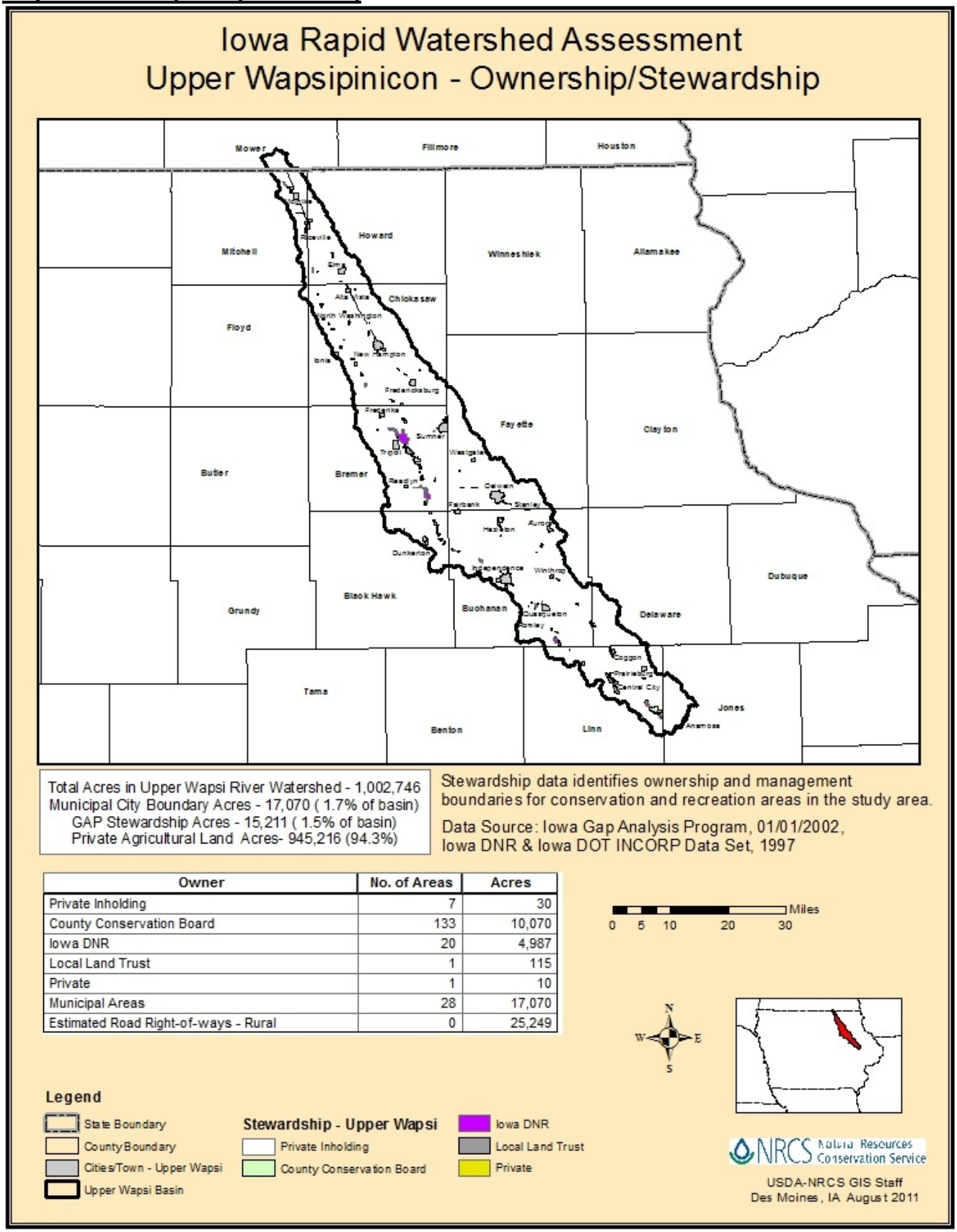
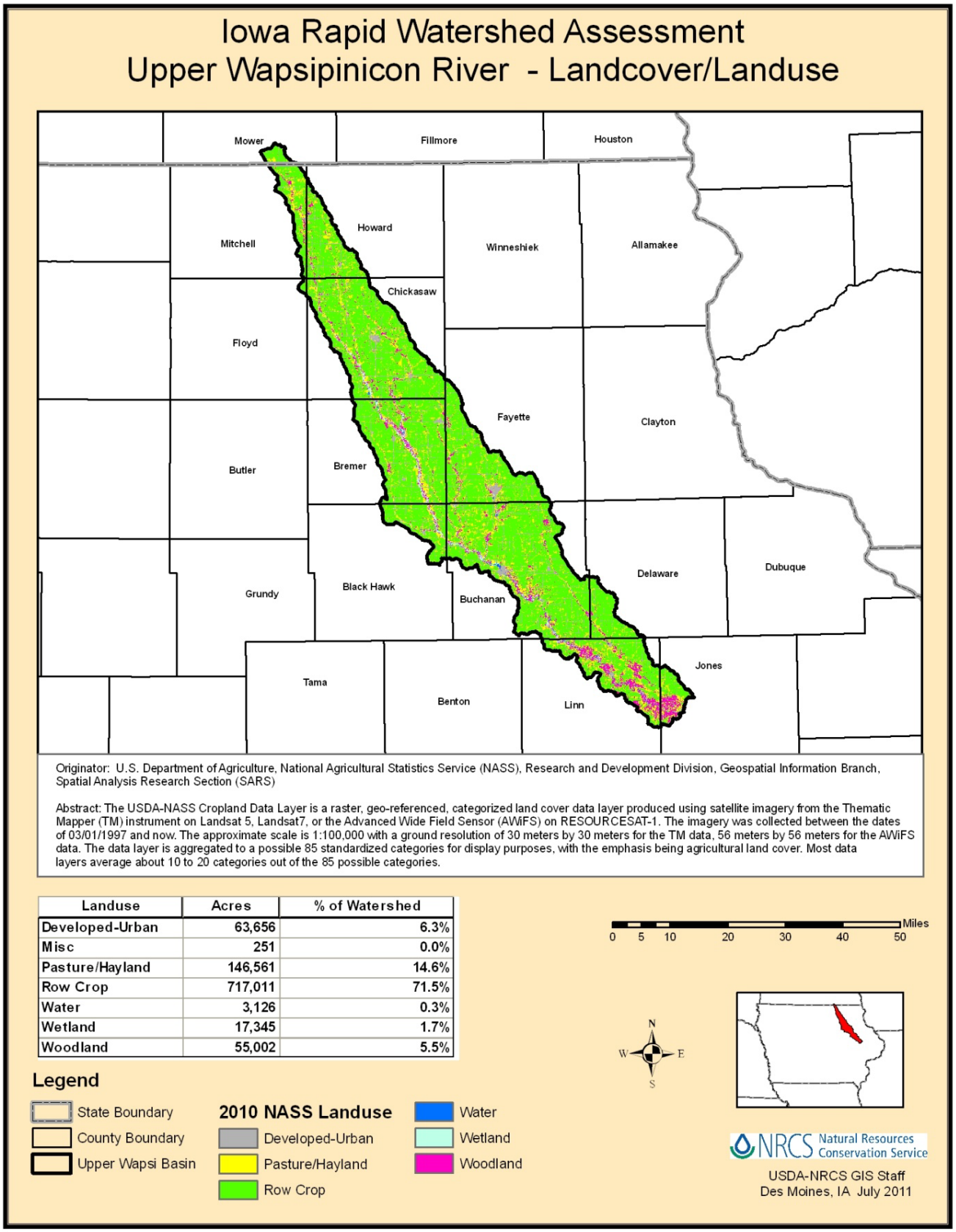
Des Moines, IA June 2011

Physical Description (continued)



Owner	No. of Areas	Acres
Private Inholding	7	30
County Conservation Board	133	10,070
Iowa DNR	20	4,987
Local Land Trust	1	115
Private	1	10
Municipal Areas	28	17,070
Estimated Road Right-of-ways - Rural	0	25,249

Physical Description (continued)



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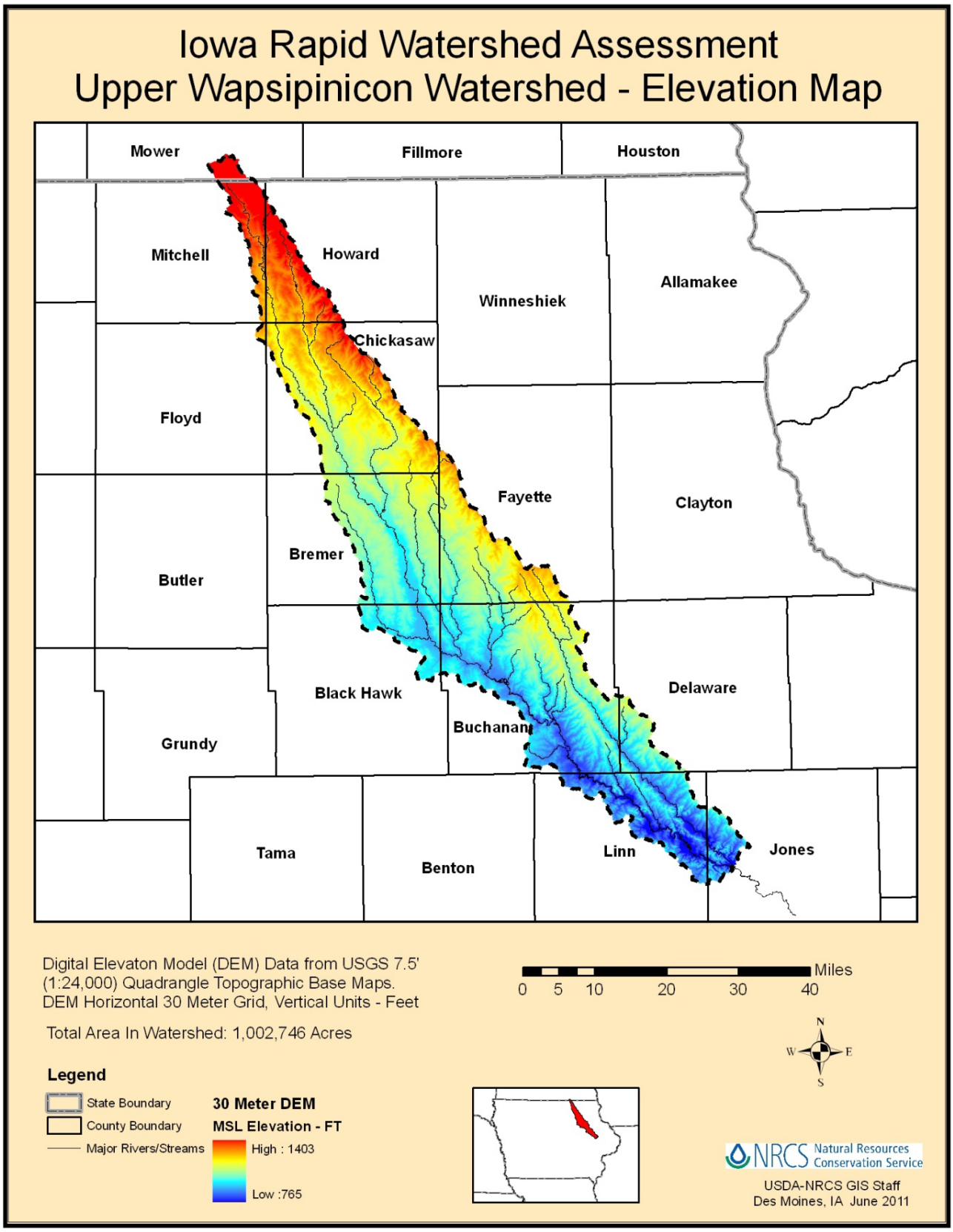

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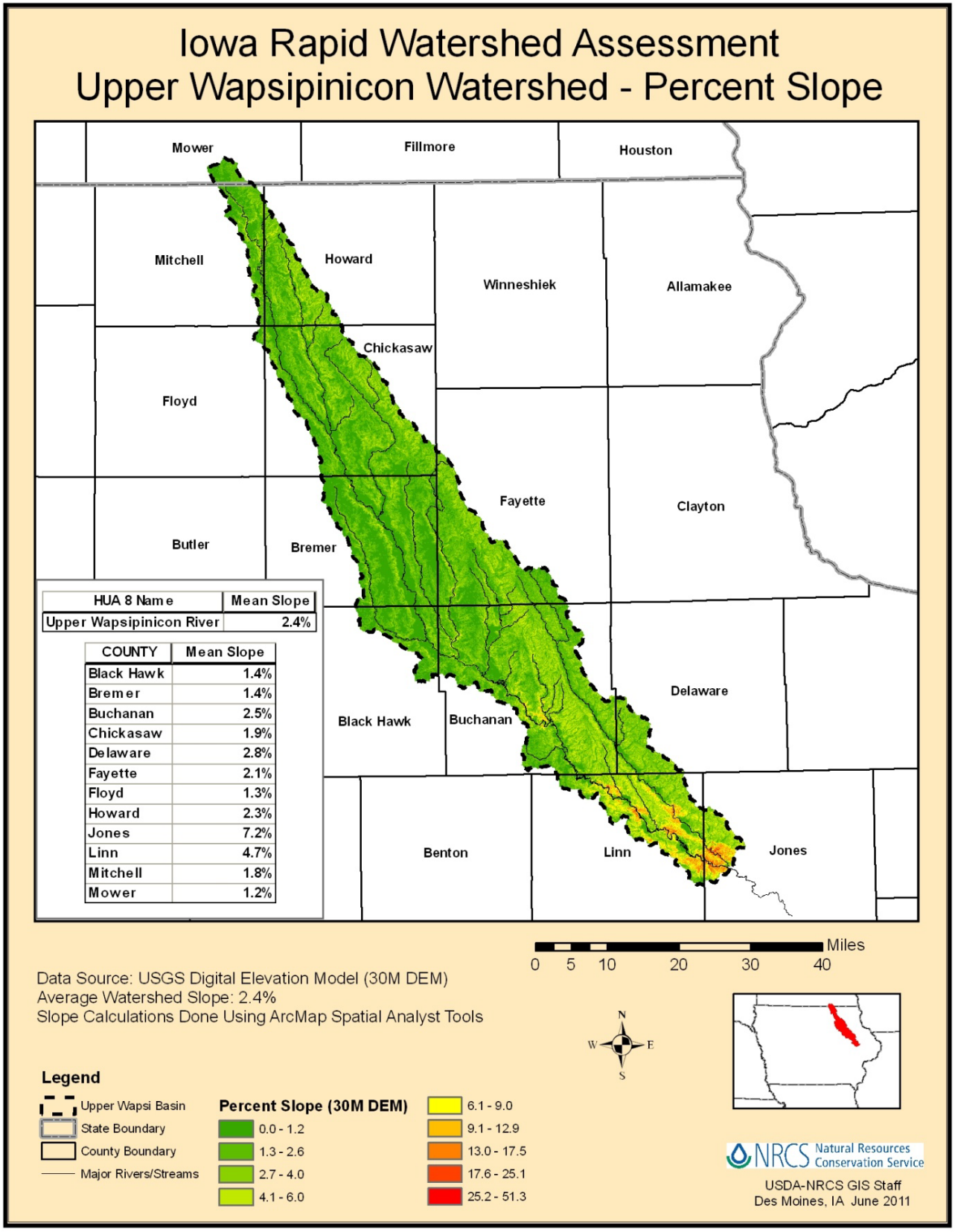

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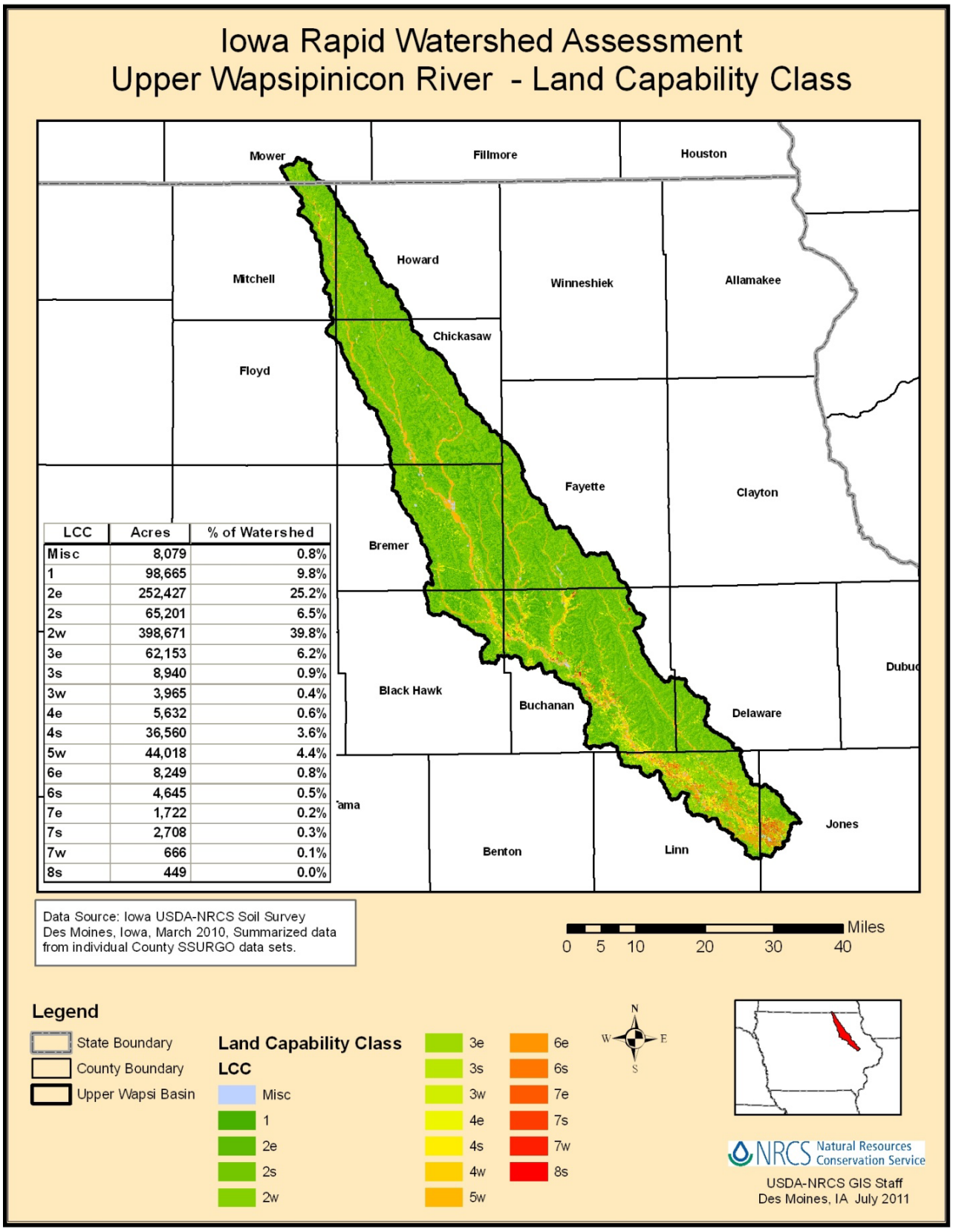

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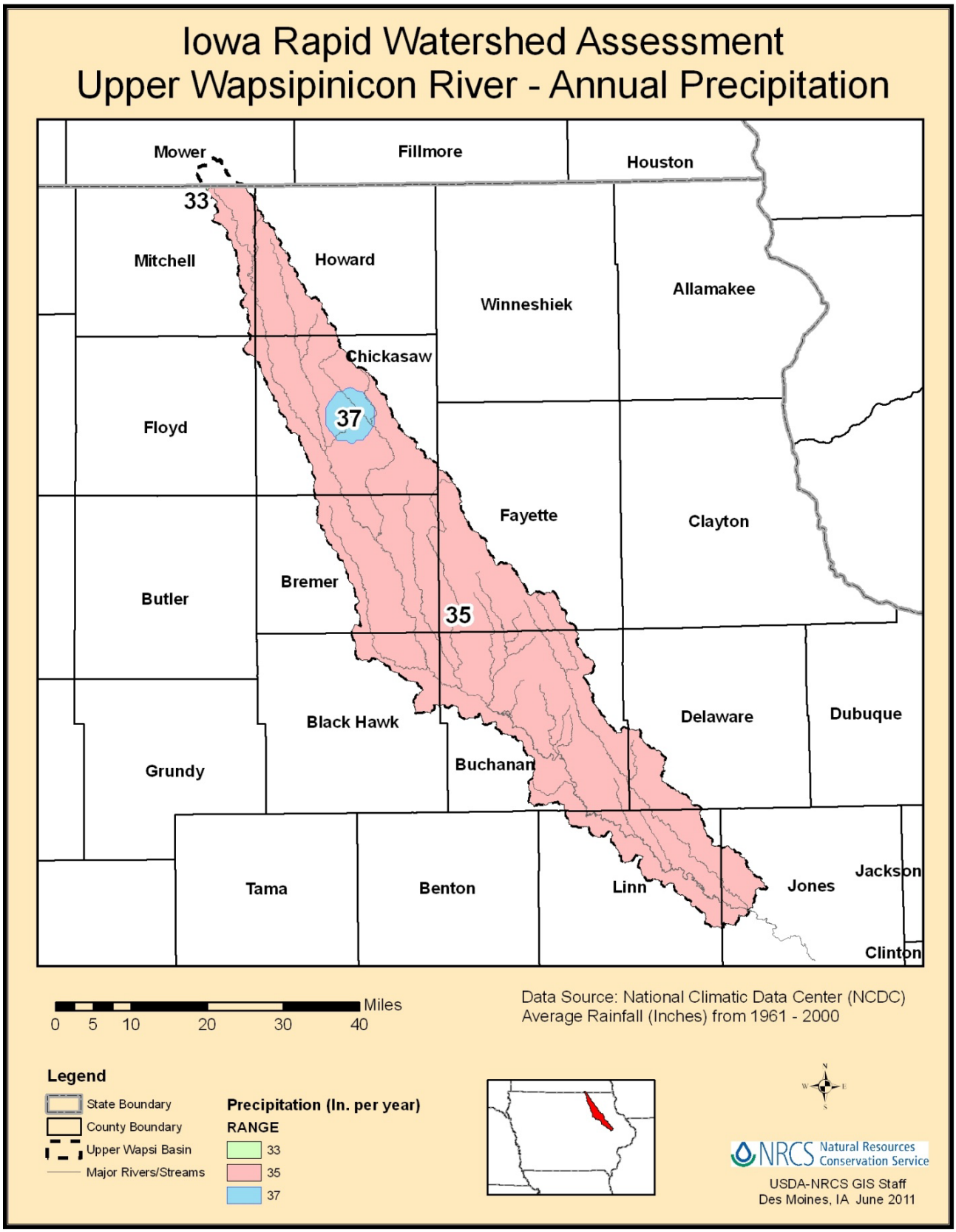

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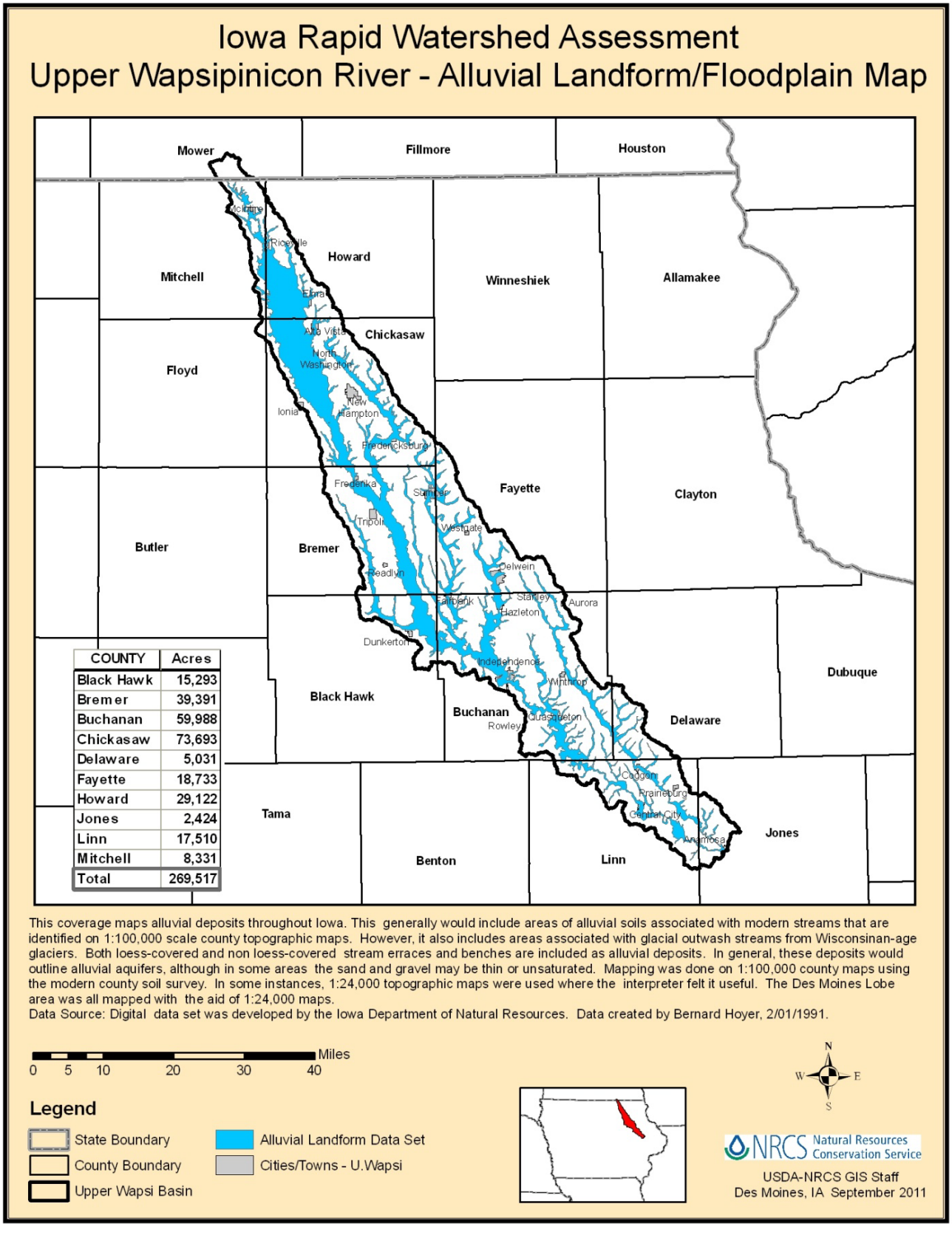
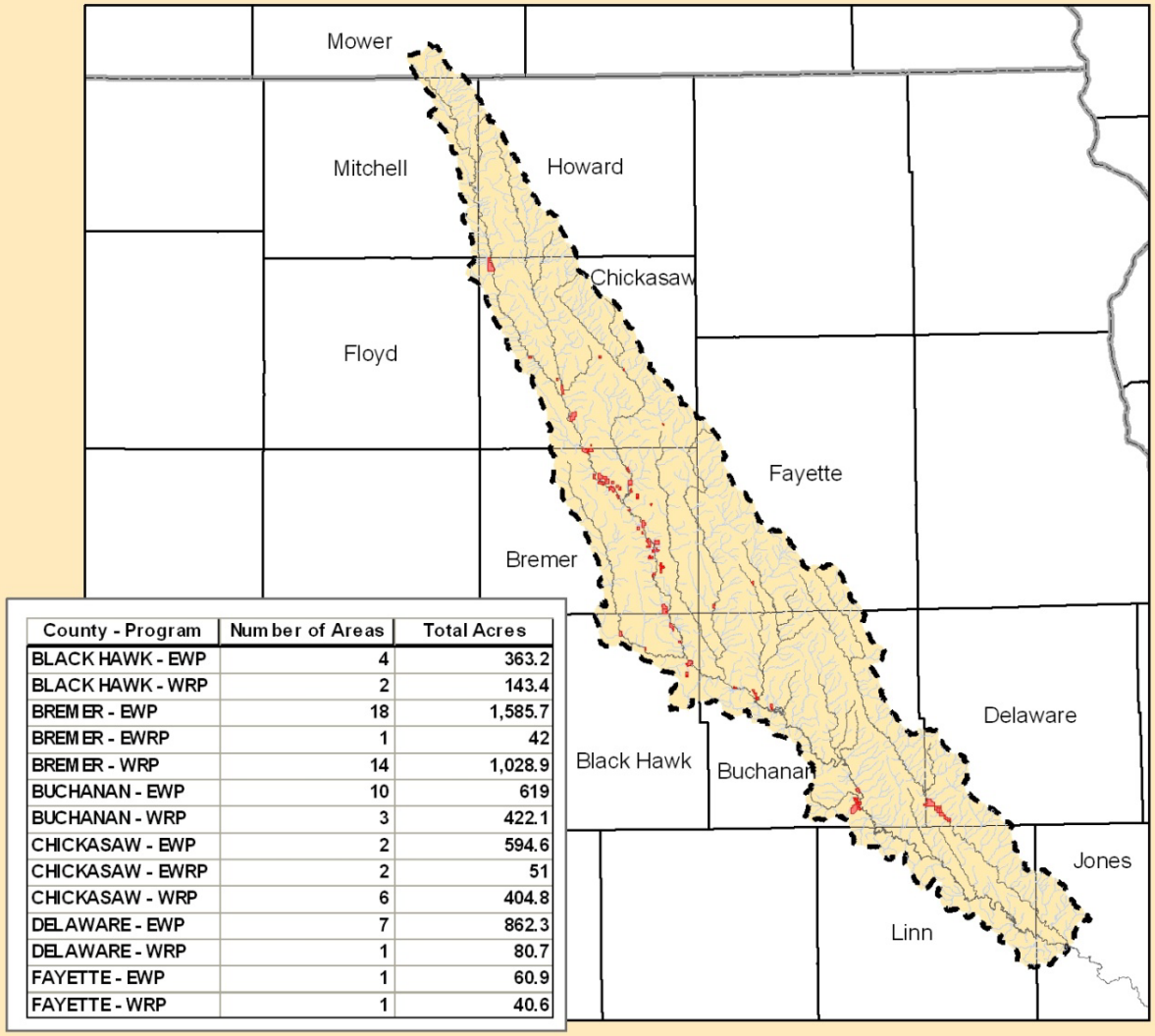


COUNTY	Acres
Black Hawk	15,293
Bremer	39,391
Buchanan	59,988
Chickasaw	73,693
Delaware	5,031
Fayette	18,733
Howard	29,122
Jones	2,424
Linn	17,510
Mitchell	8,331
Total	269,517

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 Wisconsinan-age glaciers. Both loess-covered and non loess-covered stream erraces 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.

Physical Description (continued)

Iowa Rapid Watershed Assessment
Upper Wapsipinicon - NRCS Conservation Easements



County - Program	Number of Areas	Total Acres
BLACK HAWK - EWP	4	363.2
BLACK HAWK - WRP	2	143.4
BREMER - EWP	18	1,585.7
BREMER - EWRP	1	42
BREMER - WRP	14	1,028.9
BUCHANAN - EWP	10	619
BUCHANAN - WRP	3	422.1
CHICKASAW - EWP	2	594.6
CHICKASAW - EWRP	2	51
CHICKASAW - WRP	6	404.8
DELAWARE - EWP	7	862.3
DELAWARE - WRP	1	80.7
FAYETTE - EWP	1	60.9
FAYETTE - WRP	1	40.6

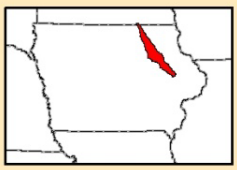
Data Source: USDA - NRCS Easement Programs Team.
Upper Wapsipinicon River Total Easement Acres: 6,299.2
Digitized Easement Areas reflect completed/closed easements as well as enrolled/pending easements.

Miles
0 5 10 20 30

Legend
- Conservation Easements
- Major Rivers/Streams
- Rivers/Streams
- Upper_Wapsi_Counties
- Upper Wapsi Basin
- State Boundary
- County Boundary

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



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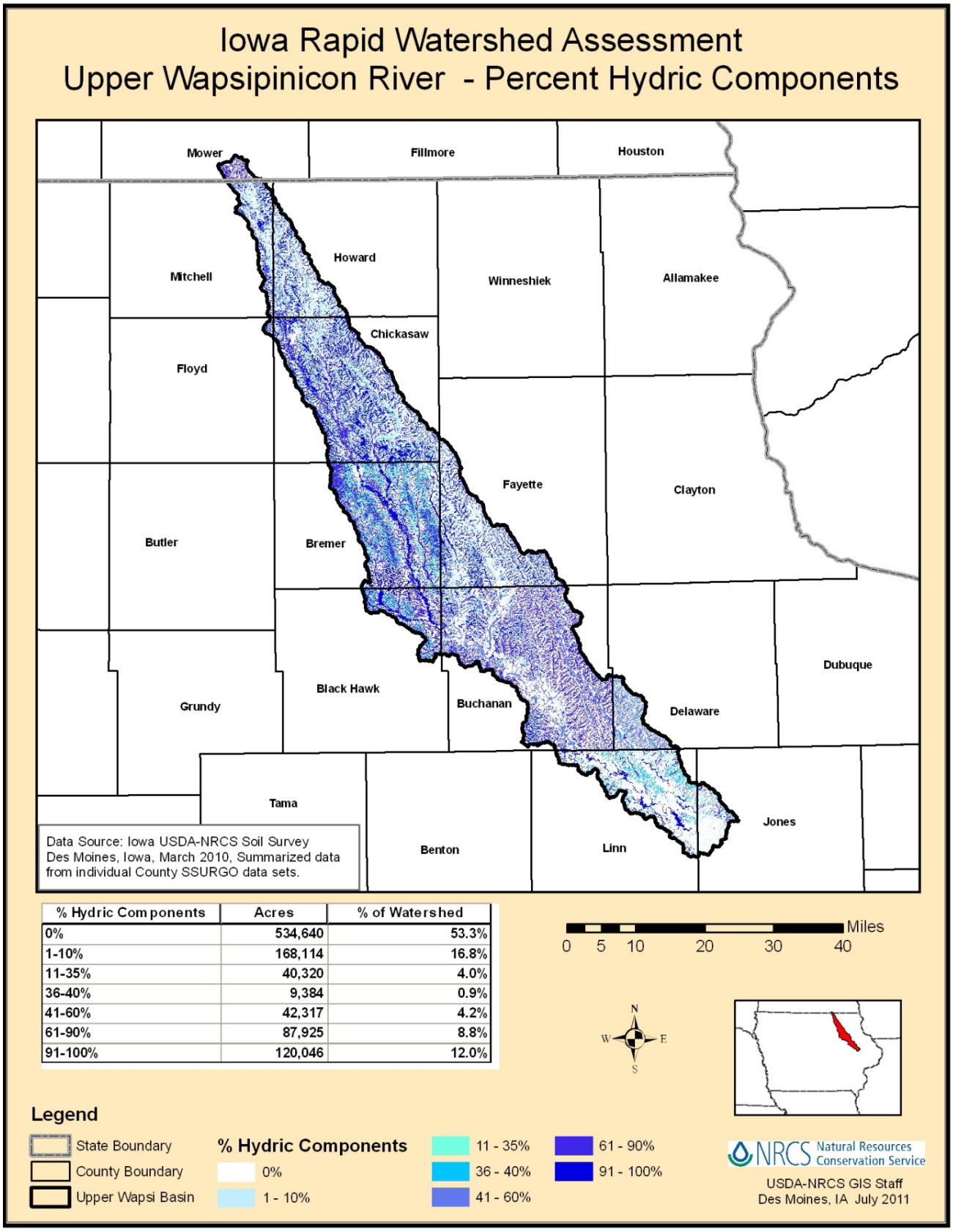
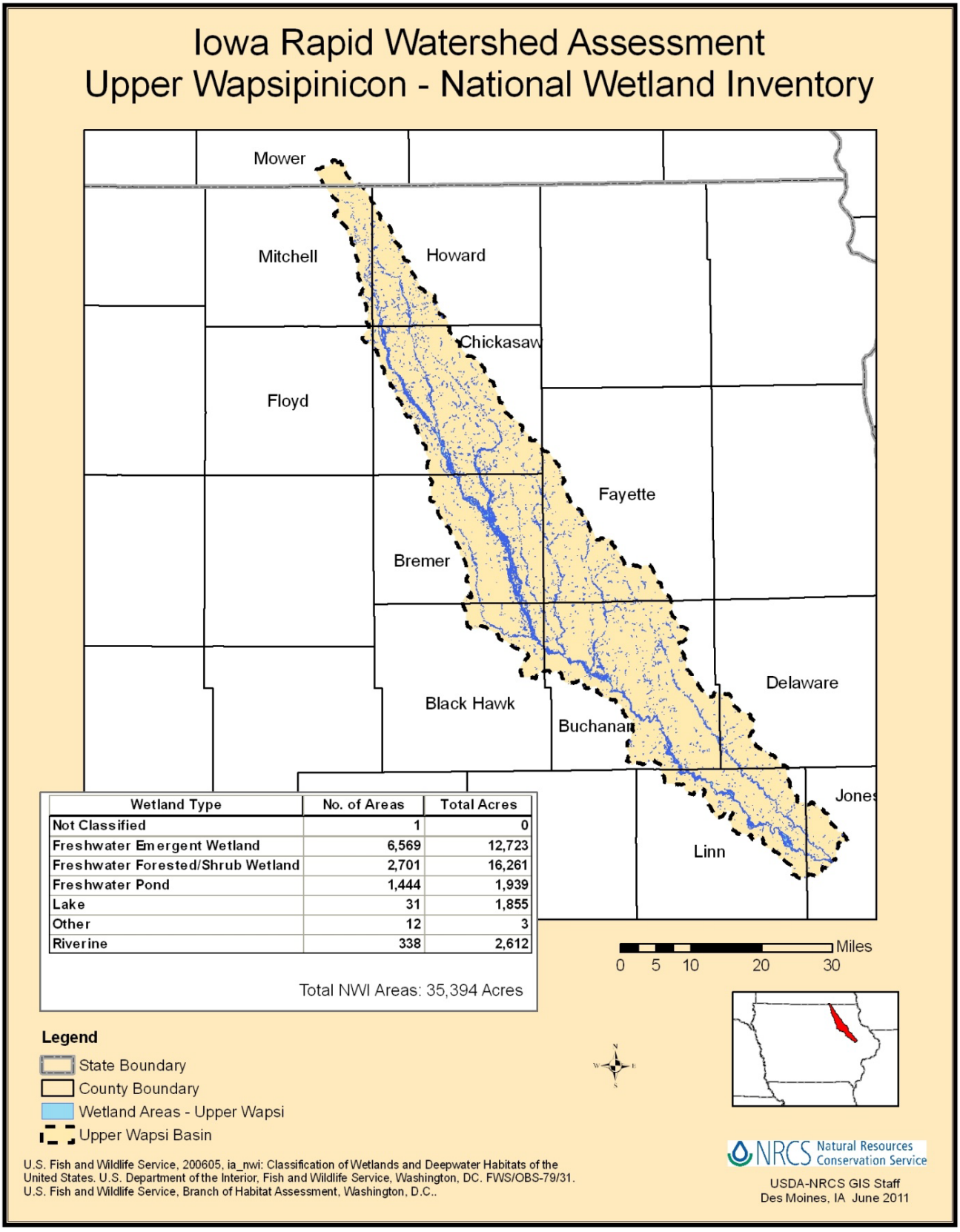
Des Moines, IA June 2011

Physical Description (continued)



% Hydric Components	Acres	% of Watershed
0%	534,640	53.3%
1-10%	168,114	16.8%
11-35%	40,320	4.0%
36-40%	9,384	0.9%
41-60%	42,317	4.2%
61-90%	87,925	8.8%
91-100%	120,046	12.0%

Physical Description (continued)



Wetland Type	No. of Areas	Total Acres
Not Classified	1	0
Freshwater Emergent Wetland	6,569	12,723
Freshwater Forested/Shrub Wetland	2,701	16,261
Freshwater Pond	1,444	1,939
Lake	31	1,855
Other	12	3
Riverine	338	2,612

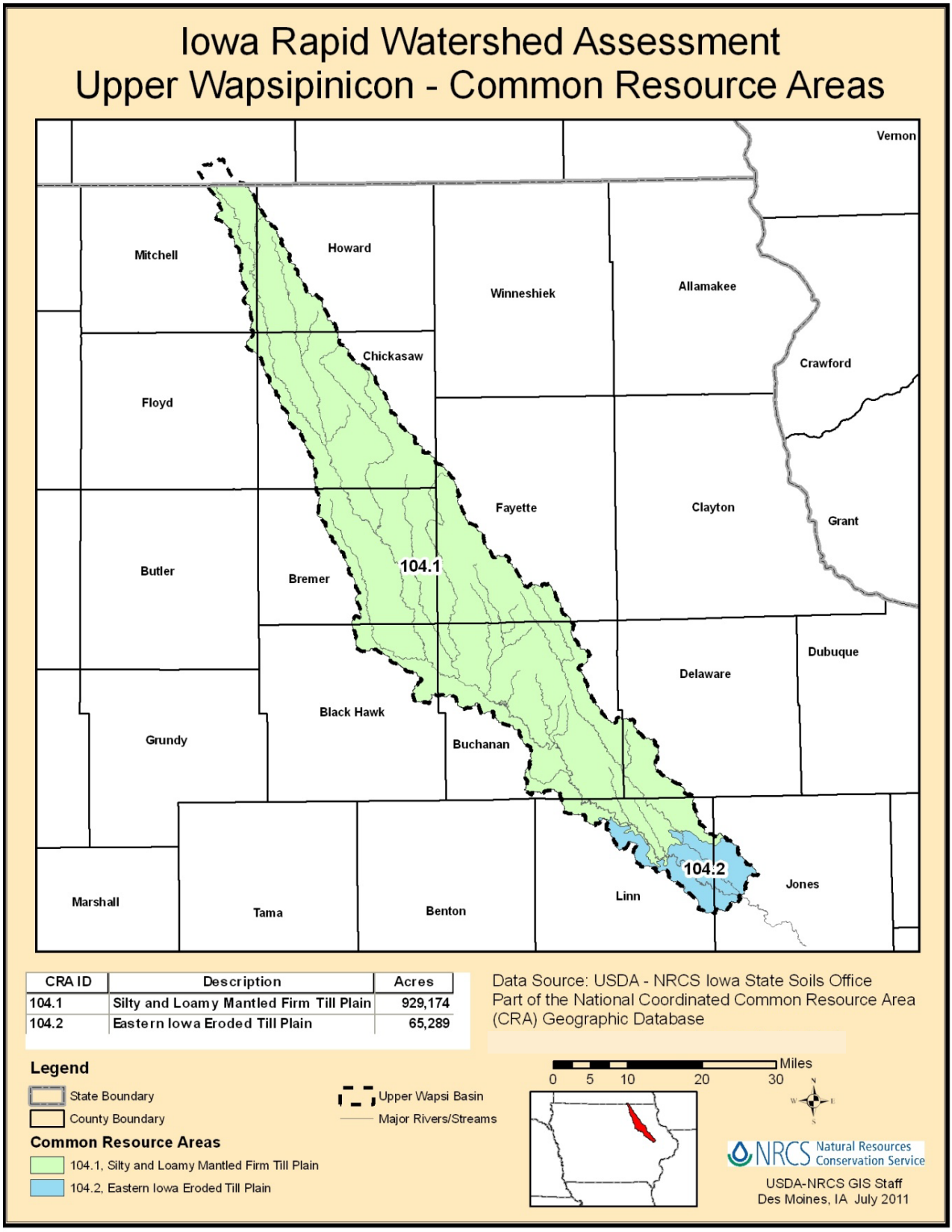
Physical Description (continued)

Common Resource Areas

The Wapsipinicon River, Upper, HUC includes portions of two National Common Resource Areas (CRA): 104.1; and 104.2 (*10, 11*).

The CRAs delineated below for the Wapsipinicon River, Upper, HUC are described in the next section (for additional information, see http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053635)
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)



Physical Description (continued)

Common Resource Area Descriptions (*10, 11*)

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.

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 forestland 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.

Physical Description (continued)

Geology *(12)*

This watershed is drained by the Wapsipinicon River and its major (10-digit HUC) tributaries, which are Watson's Creek, Elk Creek, East Branch of the Wapsi, Crane Creek, Buck Creek, Otter Creek (the largest), Buffalo Creek, and Heatons Creek. Soils and landforms of the watershed formed in deposits laid down by ice, water, and wind during the Pleistocene and Holocene Epochs. Beneath these unconsolidated deposits lies Paleozoic bedrock, consisting of predominantly Cedar Valley Group (Devonian) limestone and dolomite in Howard, northern Chickasaw, and Buchanan counties; mainly Maquoketa Formation (Ordovician) shale and Silurian cherty dolomite and limestone in the middle portion of the watershed (southern Chickasaw, Bremer, and Fayette counties); and predominantly Silurian dolomite and limestone in the southernmost portion of the watershed (Delaware, Linn and Jones counties). A small outlier of Cretaceous-aged Dakota sandstone is found in the northern tip of the watershed in Mitchell County. Depth to the mainly carbonate bedrock is less than 25 feet throughout significant portions of the watershed, and sinkholes are found sporadically in the northern half of the watershed, particularly in Howard and Chickasaw counties. There are approximately fifty active and inactive rock quarries in the watershed, and sand and gravel pits are scattered throughout.

Elevations in the watershed range from about 1,403 to 765 feet above sea level. The landscape of the Upper Wapsipinicon Watershed is part of the Iowan Surface landform region, and consists primarily of gently sloping till plain dissected by narrow and shallow stream valleys. The Iowan Surface is an 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 (stone line), which is covered by loamy sediments of variable thickness. Glacial boulders are scattered across the landscape, and northwest to southeast trending loess-mantled hills (paha) that survived the erosion stand above the surrounding plain in Linn and Buchanan counties.

The southeastern portion of the watershed, covering portions of Linn and Jones counties, laps into the East Central Iowa Drift Plain landform region. This landform region is similar to the Southern Iowa Drift Plain, consisting of a landscape of steeply rolling hills and integrated drainage networks cut into till deposited more than 500,000 years ago. However, east central Iowa has bedrock closer to the surface and more bedrock outcrops than what occurs in southern Iowa.

Soils in the watershed are dominated by deep, moderately well-drained to poorly drained loams developed in glacial till (Kenyon, Floyd and Clyde series), and very deep, moderately well-drained to somewhat poorly drained loams developed in medium-textured alluvium (Spillville, Saude, Marshan). Soils in the southeast portion of the watershed in Linn and Jones counties developed in till mantled by thin loess deposits (Fayette, Chelsea). In Buchanan County, windblown (eolian) sand deposits occur on terraces and as dunes on either side of the Wapsipinicon River valley. These deep, excessively drained soils (Sparta,Dickenson) formed in glacial outwash and alluvium reworked by wind.

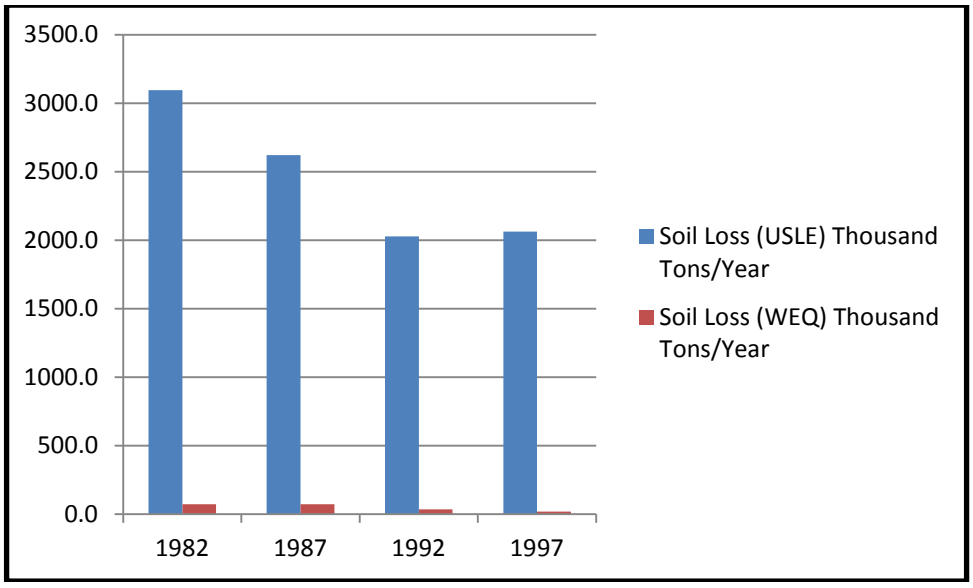
Physical Description (continued)

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 in Wapsipinicon, Upper, Watershed decreased by approximately 1,032,200 tons (33 percent) of soil loss between 1982 and 1997. NRCS estimates indicate wind erosion rates (WEQ) decreased by 54,800 tons (74 percent) between 1982 and 1997 (*22*). The standard error for the USLE estimate is 142,400 tons for 1997(USLE) and 176,700 tons for 1982 (USLE). The standard error for the WEQ estimate is 11,600 tons for 1997(WEQ) and 36,300 tons for 1982 (WEQ). The margin of error at the 95% confidence limit is obtained by multiplying the standard error by 1.96. (*13*)

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 *(14)*.

Bacteria and biological pollutants and their affects are the major pollutants impacting surface waters of the Wapsipinicon, Upper, 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.

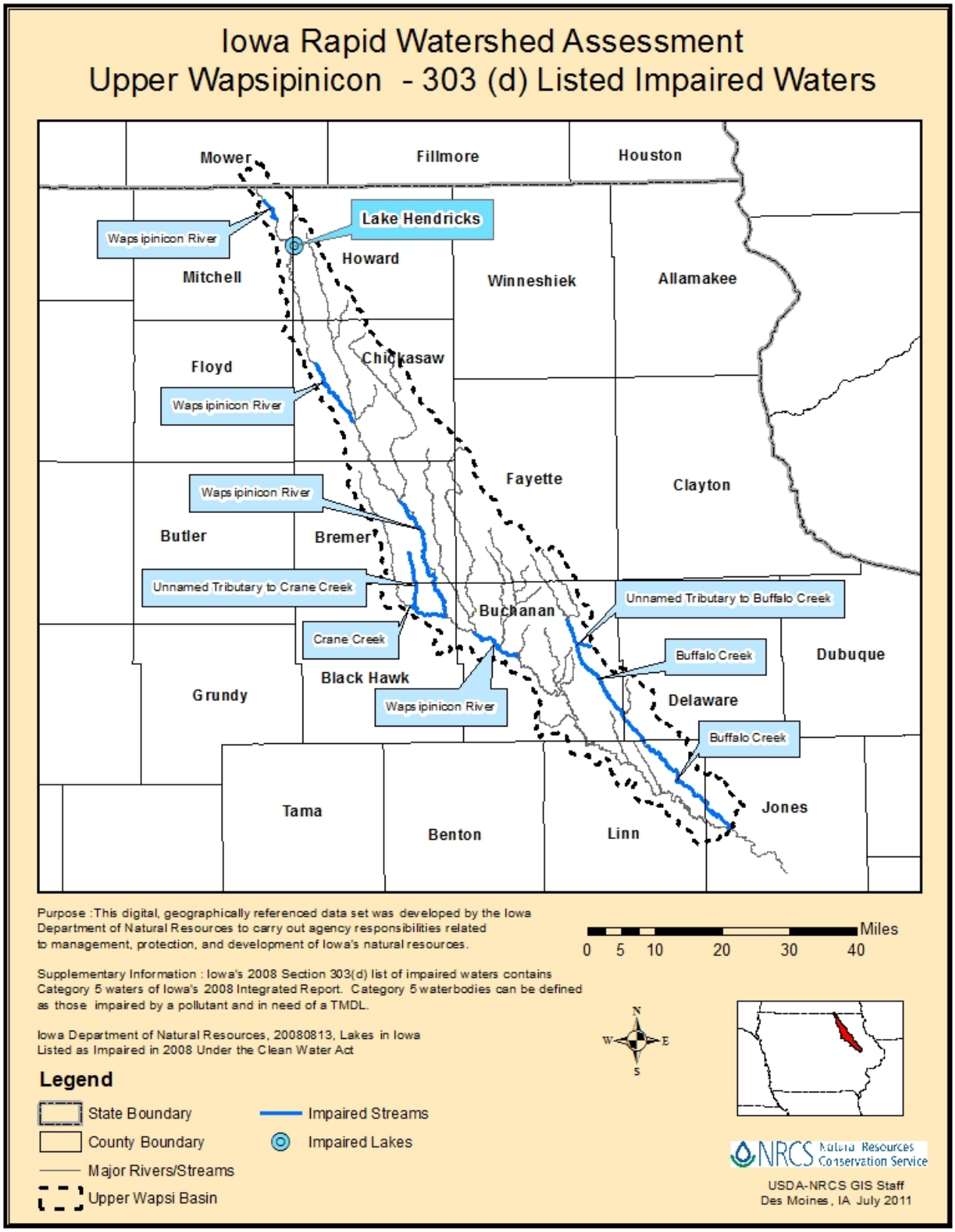
Conservation practices that can be used to address these water quality issues include erosion control structures, residue management, nutrient management, riparian buffers, drainage control structures, wetland restoration, urban Best Management Practices (BMPs), and improved septic systems *(15)*.

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 (*16*)

Impaired Water Bodies	Algae	pH	Biological	Bacteria	Nutrients	Turbidity	Siltation	Fish Kill	Low DO
Wapsipinicon River (IA 01-WPS-0020_4)				X					
Wapsipinicon River (IA 01-WPS-0020_6)			X						
Wapsipinicon River (IA 01-WPS-0030_1)			X						
Wapsipinicon River (IA 01-WPS-0030_5)			X					X	
Lake Hendricks (IA 01-WPS-00375-L_0)	X	X							
Buffalo Creek (IA 01-WPS-0110_1)			X						
Buffalo Creek (IA 01-WPS-0110_2)			X						
Buffalo Creek (IA 01-WPS-0110_3)			X						
Buffalo Creek (IA 01-WPS-0130_1)			X						
Buffalo Creek (IA 01-WPS-0130_2)			X						
Unnamed Tributary to Buffalo Creek (IA 01-WPS-0270_0)			X					X	

The schedule of TMDL development can be found at:
http://www.iowadnr.gov/Environment/WaterQuality/WatershedImprovement/WatershedResearchData/WaterImprovementPlans/PlanSchedule.aspx

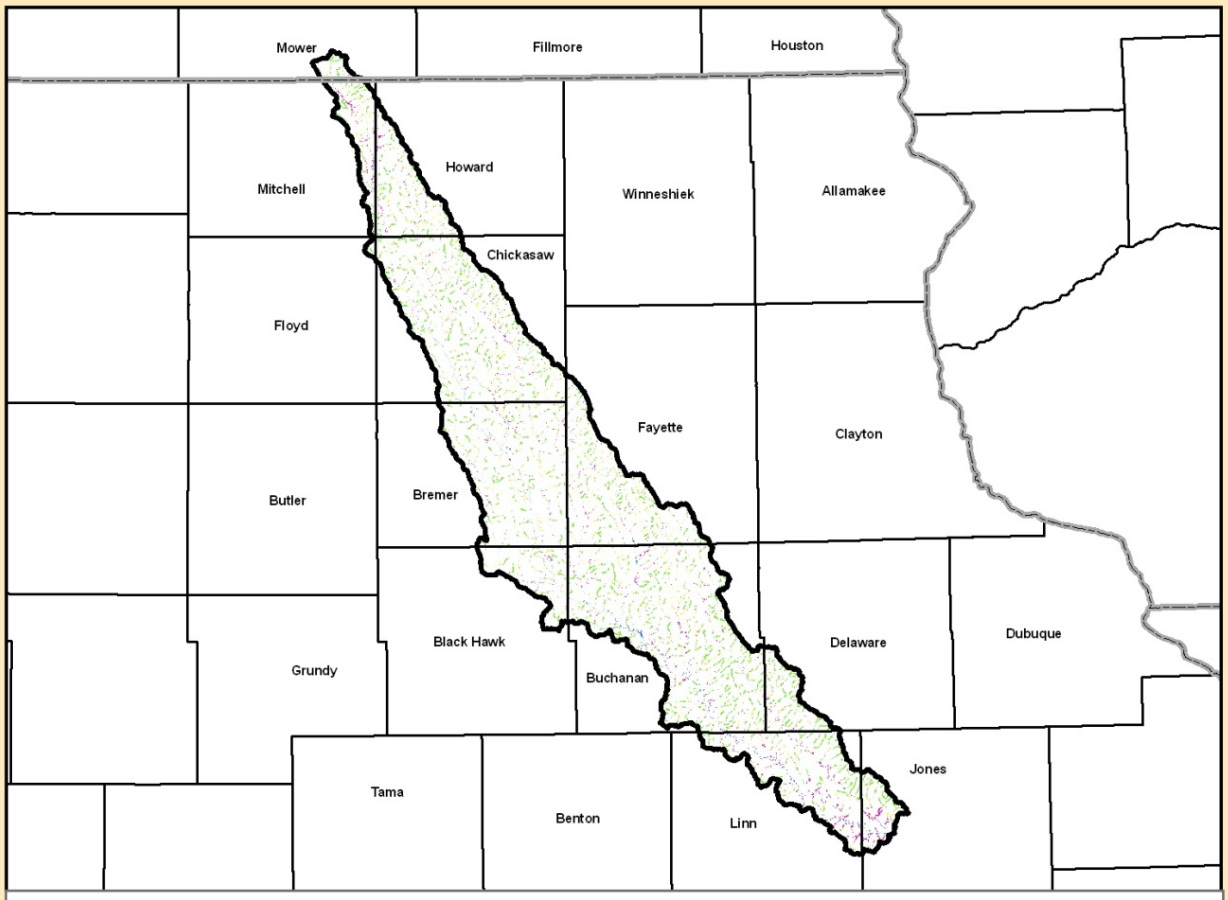
Water Quality (continued)

Watershed Projects, Plans, Studies, and Assessments	
Iowa Watershed Improvement Review Board (WIRB) Projects (*17*)	**IDNR TMDLs** (*16*)
Funded 2009 **9007-004 Upper Buffalo Creek (Buchanan County)**	**Scheduled** **Stressor Identification Projects 2012-2013: Wapsipinicon River Mitchell County Biological** **Completed** **None**
Water Quality Improvement Projects* (*18*)	
Cedar Rapids Area Urban Water Quality Project (Linn County) Completed **Lake Hendricks Watershed Project (Howard County) Active** **Cedar Rapids Area Urban Water Quality Project Linn County) Completed** **Jones County Urban-Rural Watersheds Project (Jones County) Completed** **Mitchell County Devonian Aquifer Protection Project (Mitchell County) Completed** **Mitchell County Supplemental Evaluation Methods (Mitchell County) Completed** **PURE Water Quality Project (Linn County) Completed**	

***** 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)

Iowa Rapid Watershed Assessment
Upper Wapsipinicon River - 100' Stream Buffer Landuse



Originator: U.S. Department of Agriculture, National Agricultural Statistics Service (NASS), Research and Development Division, Geospatial Information Branch, Spatial Analysis Research Section (SARS)

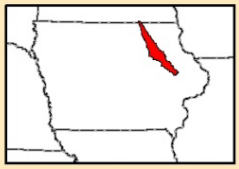
Abstract: The USDA-NASS Cropland Data Layer is a raster, geo-referenced, categorized land cover data layer produced using satellite imagery from the Thematic Mapper (TM) instrument on Landsat 5, Landsat7, or the Advanced Wide Field Sensor (AWiFS) on RESOURCESAT-1. The imagery was collected between the dates of 03/01/1997 and now. The approximate scale is 1:100,000 with a ground resolution of 30 meters by 30 meters for the TM data, 56 meters by 56 meters for the AWiFS data. The data layer is aggregated to a possible 85 standardized categories for display purposes, with the emphasis being agricultural land cover. Most data layers average about 10 to 20 categories out of the 85 possible categories.

Landuse	Acres	% Total Stream Buffers
Developed-Urban	2,211	4.2%
Pasture/Hayland	18,844	35.9%
Row Crop	18,471	35.2%
Water	1,228	2.3%
Wetland	4,383	8.4%
Woodland	7,374	14.0%

NHD Stream Layer buffered 100' on each side to develop a single polygon shape that was used to extract the 2010 NASS Landuse

Miles
0 5 10 20 30 40

N W E S



Legend

State Boundary
County Boundary
Upper Wapsi Basin

100' Stream Buffer Landuse
Developed-Urban
Pasture/Hayland
Row Crop
Water
Wetland
Woodland

NRCS Natural Resources Conservation Service
USDA-NRCS GIS Staff
Des Moines, IA July 2011

Threatened and Endangered Species *(19)*

	SPECIES		Status	
			Federal	State
	SCIENTIFIC NAME	COMMON NAME		
Animals	*Lampetra appendix*	American Brook Lamprey		T
	Haliaeetus leucocephalus	Bald Eagle		S
	Euphydryas phaeton	Baltimore		T
	Moxostoma duquesnei	Black Redhorse		T
	Emydoidea blandingii	Blanding's Turtle		T
	Poanes viator	Broad-winged Skipper		S
	Problema byssus	Byssus Skipper		T
	Notophthalmus viridescens	Central Newt		T
	Lasmigona compressa	Creek Heelsplitter		T
	Strophitus undulatus	Creeper		T
	Anodontoides ferussacianus	Cylindrical Papershell		T
	Euphyes dion	Dion Skipper		S
	Sistrurus catenatus	Eastern Massasauga	C	E
	Venustaconcha ellipsiformis	Ellipse		T
	Lampsilis higginsi	Higgin's-eye Pearly Mussel	E	E
	Myotis sodalis	Indiana Bat	E	E
	Discus macclintocki	Iowa Pleistocene Snail	E	E
	Sistrurus catenatus catenatus	Eastern Massasauga Rattlesnake	C	E
	Necturus maculosus	Mudpuppy		T
	Circus cyaneus	Northern Harrier		E
	Etheostoma spectabile	Orangethroat Darter		T
	Terrapene ornata	Ornate Box Turtle		T
	Buteo lineatus	Red-shouldered Hawk		E
	Asio flammeus	Short-eared Owl		E
	Alasmidonta viridis	Slippershell Mussel		E
	Opheodrys vernalis	Smooth Green Snake		S
	Calephelis mutica	Swamp Metalmark		S
	Ammocrypta clara	Western Sand Darter		T
	Lampsilis teres anodontoides	Yellow Sandshell		E

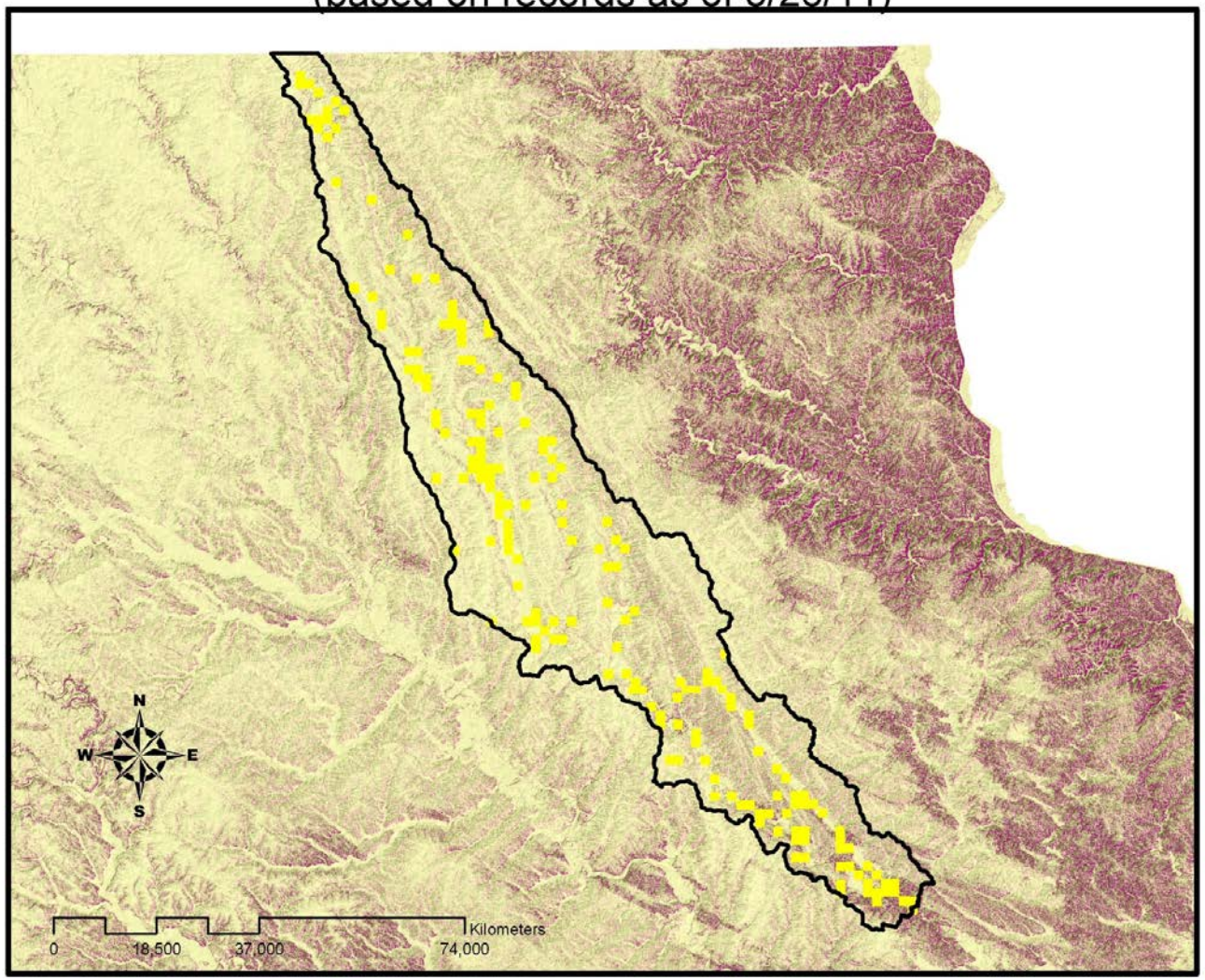
	SPECIES		Status	
			Federal	State
	SCIENTIFIC NAME	COMMON NAME		
Plants	*Triglochin maritimum*	Arrow Grass		T
	Rhynchospora capillacea	Beakrush		T
	Opuntia macrorhiza	Bigroot Prickly-pear		E
	Gaylussacia baccata	Black Huckleberry		T
	Galium labradoricum	Bog Bedstraw		E
	Betula pumila	Bog Birch		T
	Salix pedicellaris	Bog Willow		T
	Menyanthes trifoliata	Buckbean		T
	Scirpus pedicellatus	Bulrush		S
	Lycopodium digitatum	Crowfoot Clubmoss		S
	Tomanthera auriculata	Earleaf Foxglove		S
	Aster pubentior	Flat Top White Aster		S
	Calopogon tuberosus	Grass Pink		S
	Spiranthes magnicamporum	Great Plains Ladies'-tresses		S
	Juncus greenii	Green's Rush		S
	Lechea villosa	Hairy Pinweed		T
	Cirsium hillii	Hill's Thistle		S
	Besseya bullii	Kitten Tails		T
	Viola lanceolata	Lance-leaved Violet		S
	Viola incognita	Large-leaf White Violet		E
	Botrychium multifidum	Leathery Grape Fern		T
	Selaginella rupestris	Ledge Spikemoss		S
	Botrychium simplex	Little Grape Fern		T
	Calystegia spithamaea	Low Bindweed		S
	Scleria verticillata	Low Nut Rush		T
	Lechea intermedia	Narrowleaf Pinweed		T
	Ophioglossum vulgatum	Northern Adder's-tongue		S
	Dichanthelium boreale	Northern Panic-grass		E
	Hypericum boreale	Northern St. John's-wort		E
	Potamogeton epihydrus	Nuttall Pondweed		S
	Platanthera flava	Pale Green Orchid		E
	Polygala incarnata	Pink Milkwort		T
	Lespedeza leptostachya	Prairie Bush Clover	T	T
	Botrychium campestre	Prairie Moonwort		S
	Chimaphila umbellata	Prince's Pine		T
	Angelica atropurpurea	Purple Angelica		S
	Platanthera psycodes	Purple Fringed Orchid		T
	Filipendula rubra	Queen-of-the-prairie		T
	Senecio pseudaureus	Ragwort		S

	SPECIES		Status	
			Federal	State
	SCIENTIFIC NAME	COMMON NAME		
Plants	*Salix candida*	Sage Willow		S
	Amelanchier sanguinea	Shadbush		S
	Salix lucida	Shining Willow		T
	Cypripedium reginae	Showy Lady's Slipper		T
	Triglochin palustris	Slender Arrow Grass		T
	Carex leptalea	Slender Sedge		S
	Gentianopsis procera	Small Fringed Gentian		S
	Oenothera perennis	Small Sundrops		T
	Cypripedium candidum	Small White Lady's Slipper		S
	Geum vernum	Spring Avens		S
	Cirsium muticum	Swamp Thistle		S
	Cacalia suaveolens	Sweet Indian Plantain		T
	Eriophorum angustifolium	Tall Cotton Grass		S
	Juncus bufonius	Toad Rush		S
	Penstemon tubiflorus	Tunnel-formed Penstemon		S
	Valeriana edulis	Valerian		S
	Potamogeton vaseyi	Vasey Pondweed		S
	Scutellaria nervosa	Veined Skullcap		S
	Viola macloskeyi	Violet		S
	Myriophyllum heterophyllum	Water Milfoil		S
	Brasenia schreberi	Water Shield		S
	Callitriche heterophylla	Water Starwort		S
	Platanthera praeclara	Western Prairie Fringed Orchid	T	T
	Ilex verticillata	Winterberry		E
	Equisetum sylvaticum	Woodland Horsetail		T
	Mimulus glabratus	Yellow Monkey Flower		T
	Xyris torta	Yellow-eyed Grass		E

E = Endangered Species
T = Threatened Species
S = Special Concern
C = Federal Candidate

Threatened and Endangered Species (continued)

Upper Wapsipinicon
Natural Areas Inventory Threatened and Endangered Species Sections
(based on records as of 5/26/11)

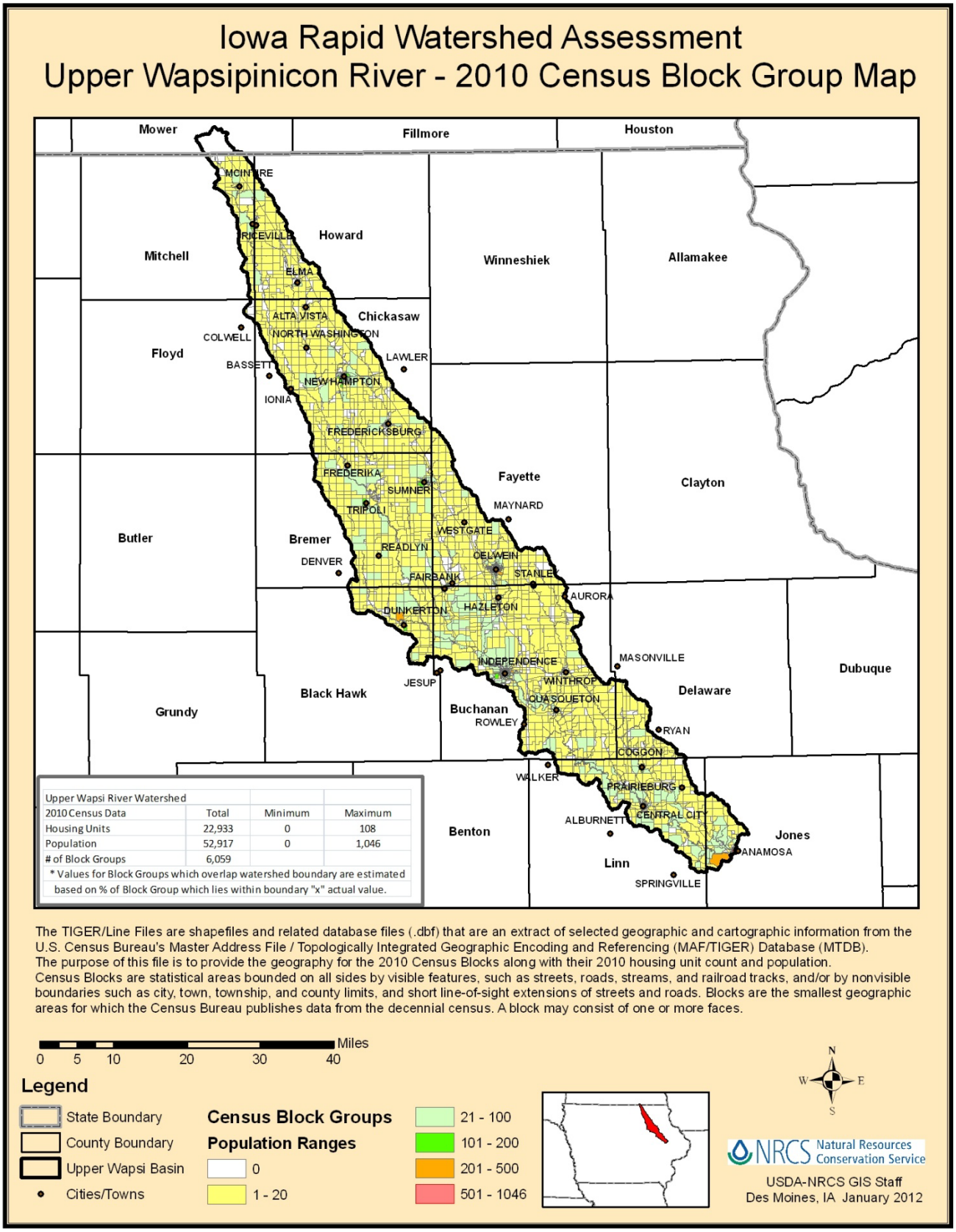


Census and Social Data

There are 4,733 total farm operators in the watershed. Of these, 3,462 are male and 1,270 are female. Severnty-eight percent of the farm operators in the watershed are full time farmers (*20*).

There are 3,184 farms in the Wapsipinicon River, Upper, Watershed with farm size ranging from one acre to over 1,000 acres. Size of farms: 11.6 percent are 1-9 acres; 20.6 percent are 10-49 acres; 26.3 percent are 50-179 acres; 24.6 percent are 180-499 acres; 11.2 percent are 500-999 acres; and 5.8 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 (*20*).

Census and Social Data (continued)



Census and Social Data (continued)

NASS Farm Operators Per County
Upper Wapsipinicon River Watershed

COUNTY	Acres	% of Watershed	Operators (M/F)	Female Operators	Male Operators	Part-Full Time Op	Full Time Op	Part Time Op
Mitchell	35,244	3.5%	152	34	118	168	121	47
Linn	96,502	9.6%	424	111	313	475	346	129
Jones	23,603	2.4%	109	26	83	115	85	30
Howard	59,680	6.0%	255	71	184	275	200	75
Floyd	1,766	0.2%	9	2	6	10	7	3
Fayette	111,405	11.1%	480	121	359	536	389	146
Delaware	32,485	3.2%	199	56	143	205	147	57
Chickasaw	193,199	19.3%	942	266	676	1,009	713	296
Buchanan	244,938	24.4%	1,163	320	843	1,284	911	373
Bremer	152,371	15.2%	810	217	593	892	625	267
Black Hawk	43,270	4.3%	161	39	122	183	133	50
Mower, MN	8,283	0.8%	29	7	22	32	24	8
Total	1,002,746	100.0%	4,733	1,270	3,462	5,184	3,701	1,481

* 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

Census and Social Data (continued)

Total Operations By Size Per County
Upper Wapsipinicon River Watershed

COUNTY	Acres in Wtshd	% of Watershed	1 - 10 Ac	10 - 50 Ac	50 - 180 Ac	180 - 500 Ac	500 - 1000 Ac	> 1000 Ac	Estimated Total
Mitchell	35,244	3.5%	12	18	26	24	16	8	104
Linn	96,502	9.6%	29	73	86	65	27	14	294
Jones	23,603	2.4%	8	12	18	19	9	4	70
Howard	59,680	6.0%	10	39	53	41	18	12	173
Floyd	1,766	0.2%	0	2	2	1	1	1	7
Fayette	111,405	11.1%	28	63	89	94	40	19	333
Delaware	32,485	3.2%	16	25	36	37	13	4	131
Chickasaw	193,199	19.3%	66	133	156	161	67	36	619
Buchanan	244,938	24.4%	116	148	190	179	100	51	784
Bremer	152,371	15.2%	69	115	151	129	49	26	539
Black Hawk	43,270	4.3%	12	23	26	28	14	8	111
Mower, MN	8,283	0.8%	2	5	4	4	2	2	19
Total	1,002,746	100.0%	368	656	837	782	356	185	3,184

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 (*28*)

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 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 (*28*)

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, and Alfalfa. The average slope is between 2 and 3 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 hayland acres.

Natural Areas/Forestland (*28*)

The most common bottomland species in the Wapsipinicon River, Upper, would be in the following order of abundance: cottonwood, American elm, hackberry, boxelder, willow, walnut, silver maple, black ash, green ash, basswood, bur oak and river birch. The uplands are oak-hickory, or mixed hardwoods (a.k.a. Central Hardwoods) and maple-basswood.

In the bottomland floodplains, the trees are being severely impacted from scour erosion, river meandering and extreme sand and silt depositions from frequent flooding (probably ranging from 3 to 6 year intervals between floods that are so severe they could almost be called, “stand replacing disturbances”). Woody regeneration is also being moderately to severely impacted by heavy deer browsing and heavy herbaceous plant competition. The riparian zones are also being impacted by invasive exotic species like Asian hops, reed canary grass and Japanese knotweed. Most of the recruitment of young trees in the floodplain occurs after severe floods when cottonwood and willow seed germinate on the fresh bare alluvial

materials. The upland forests are in relatively good health except for the threat from Emerald Ash Borer.

More recently, we are losing many acres of forestland to row crop conversion because of high commodity prices.

Storm damage from ice, snow, wind and rain is the biggest negative impact on the health of Iowa's existing forests. However, evidence of these disturbances is usually short lived because most landowners will savage harvest any storm damaged trees that are merchantable very quickly after the storm event.

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; and the promotion of Conservation Reserve Program (CRP) contract extensions to protect sensitive lands. Continuous CRP has been used along stream and drainage ways, including waterways. Other priorities include: application of comprehensive nutrient and pest management plans; and the implementation of water quality improvement projects.

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 acres 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. Ongoing efforts are needed to increase utilization of conservation tillage, and no-till. Educational activities are needed to promote extension of expiring CRP contracts.

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.

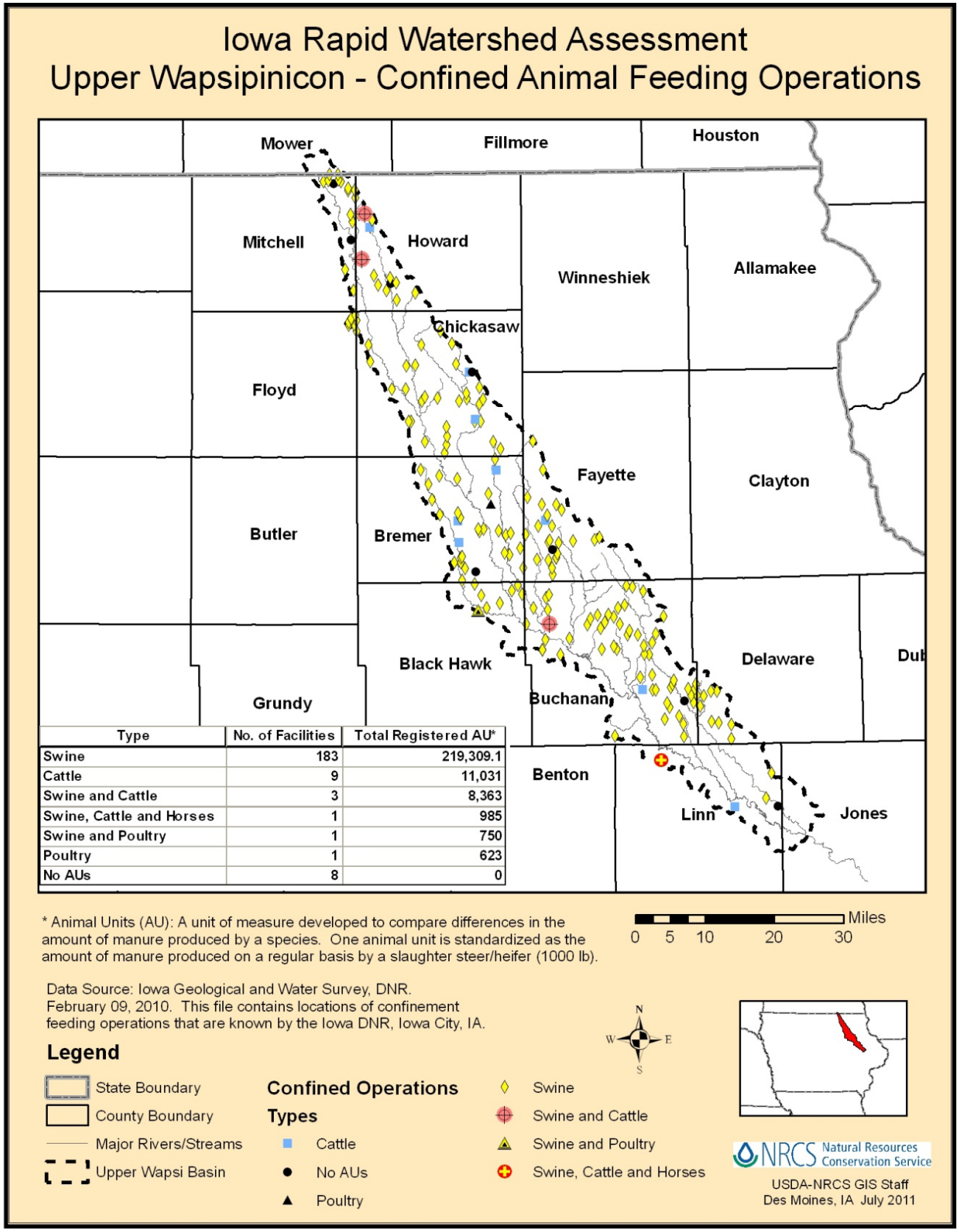
Other concerns that will be addressed in the future include the preservation, protection, and enhancement of natural areas, including rare plant and animal species. This will require species inventories and an educational campaign.

In the state of Iowa, as of October 2012, there were approximately 40 ethanol plants that are in operation. At this time, there are two ethanol plants that are operating in the Wapsipinicon River, Upper Watershed, located in Buchanan and Chickasaw Counties. These plants have the total capacity for the production of 240 million gallons ethanol. It is reported that 1-4 gallons of water is required for every gallon of biofuel produced, creating a concern about water quantity. At this time, there are not any biodiesel plants operating in the Watershed.

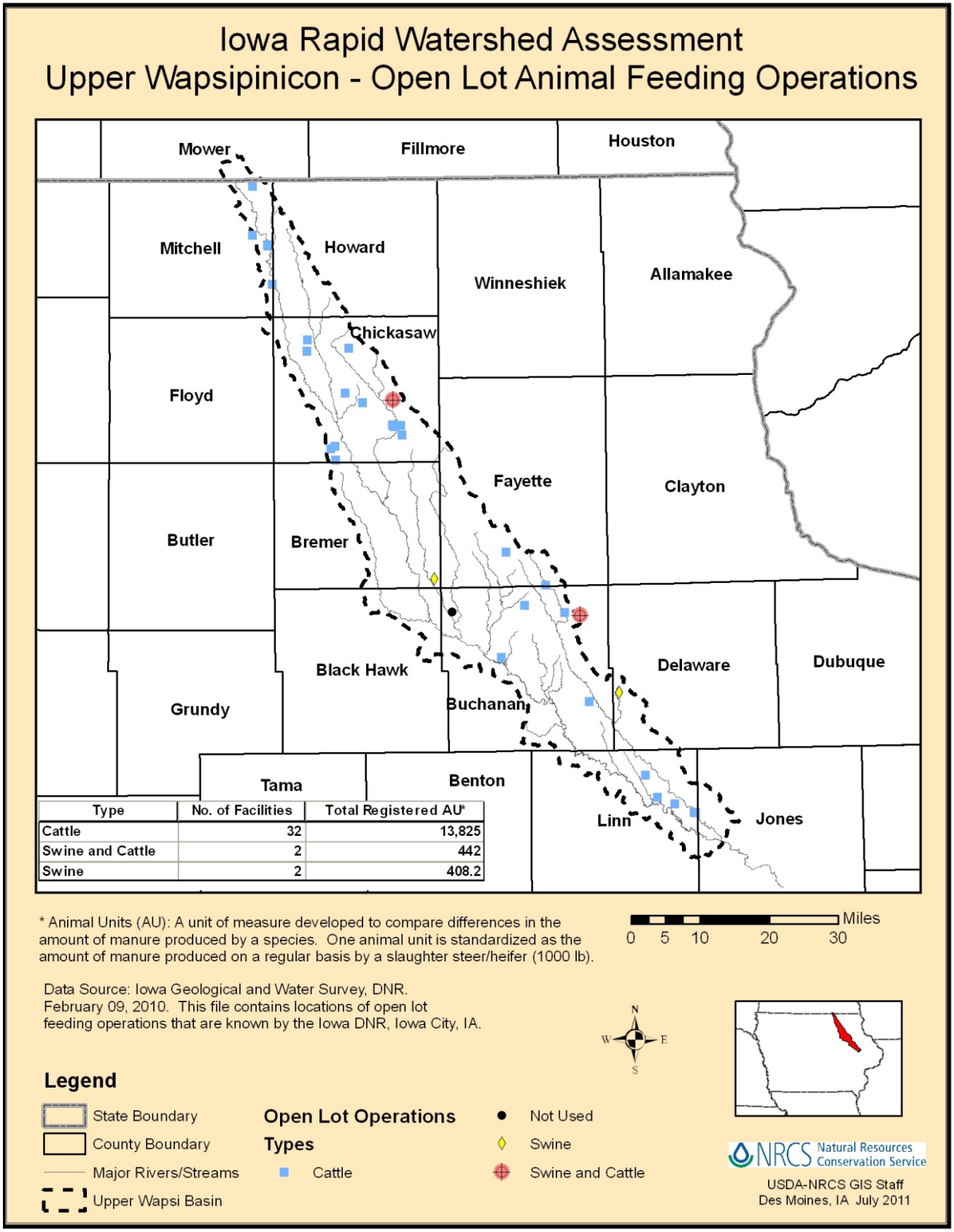
Water quality concerns are increased by manure from livestock that is commonly spread on cropland as fertilizer. Using manure as a fertilizer creates potential water quality challenges from bacteria and nutrients delivered through runoff and subsurface drainage. Steam bank erosion in the region has been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

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. There are 206 Confined Animal Feeding Operations (CAFO) in the watershed, with a total of 241,061 animal units. Eighty nine percent of the CAFOs are swine and the remaining eleven percent are split between swine & cattle, swine & cattle & horses, swine & poultry, and poultry. There are 36 Animal Feeding Operations (AFO) in the watershed, with a total number of 14,675 animal units. Eighty nine percent of the AFOs are cattle, and the remaining eleven percent are split between swine and cattle, and swine (*24, 25*).

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	X	
Water Quality, Surface	Suspended Sediment & Turbidity	X	X	X	
	Excessive Nutrients & Organics	X	X		
Water Quality, Ground	Excessive Nutrients & Organics	X	X		
Water Quantity	Excessive Runoff, Flooding or Ponding	X	X	X	
Soil Condition	Animal Waste & Other Organics (N,P,K)	X			
	Organic Matter Depletion	X			
Plant Condition	Productivity, Health, & Vigor	X	X	X	
	Forage Quality & Palatability		X		
	Noxious & Invasive Species			X	
Domestic Animals	Inadequate Quantity & Quality Feed & Forage		X		
	Inadequate Stock Water		X	X	
Wildlife	Inadequate cover & shelter	X	X	X	
	Plant Community Fragmentation			X	
	Inadequate Food, Water & Space			X	

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

Special Considerations

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 (*27*).

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”). *(27)*.

IDNR’s SWP Program has developed a list of Priority Community Water Supplies. The Wapsipinicon River, Upper, Watershed does not have any Priority SWP communities *(27)*. However, the watershed has three communities that have been 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.

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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