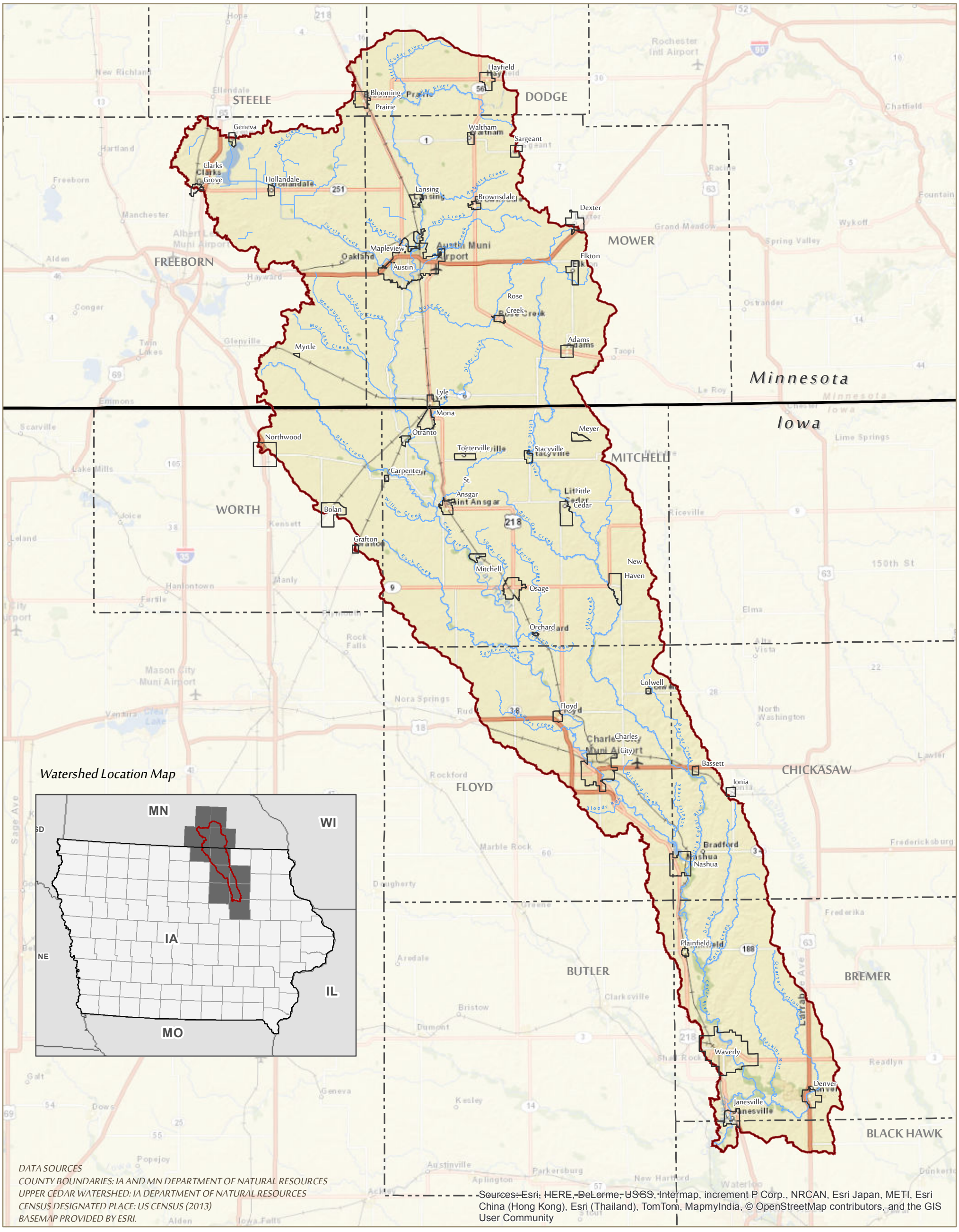


LOCATION MAP

FIGURE 2-1-1

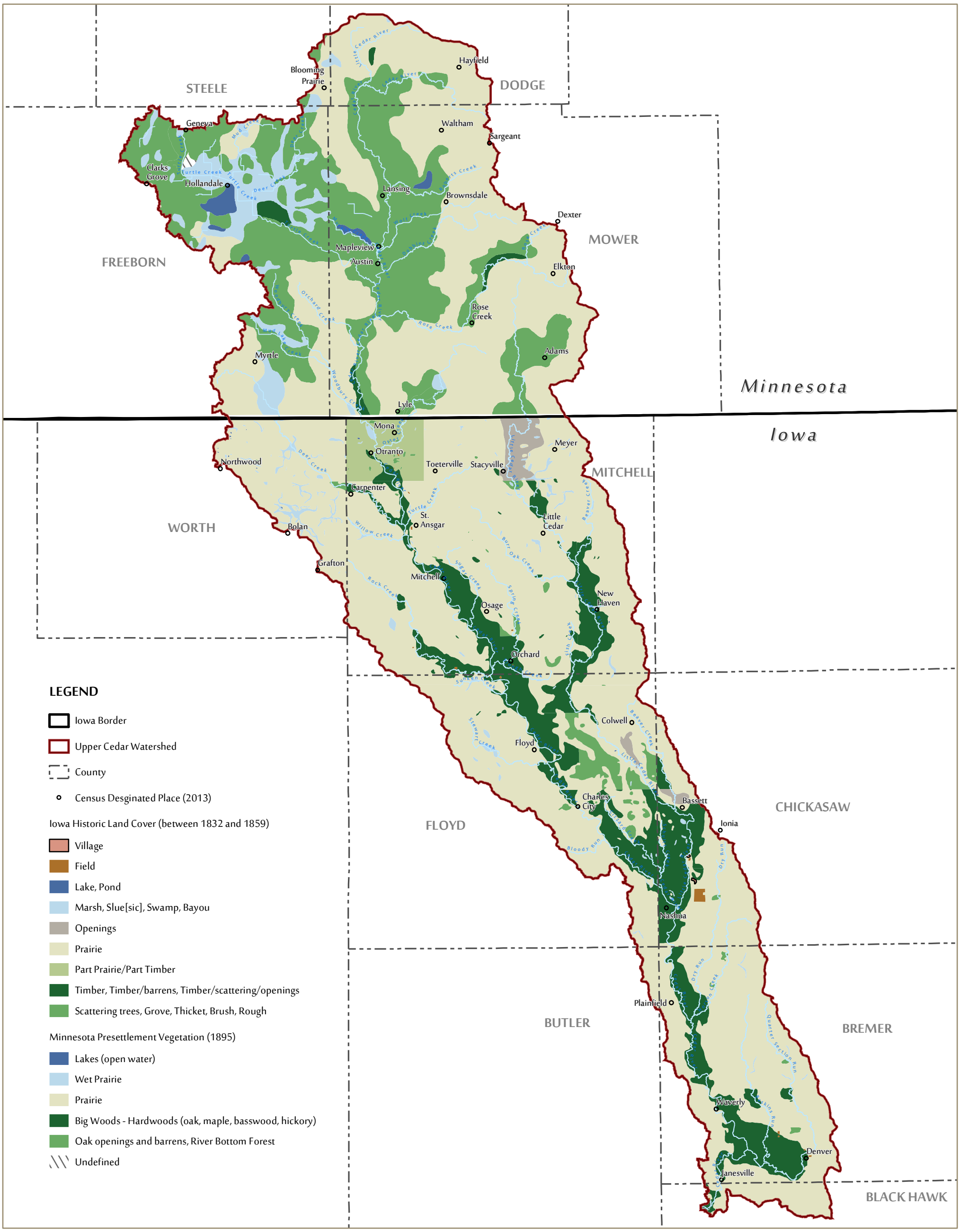
UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place

MSA PROFESSIONAL SERVICES

N

0 1.875 3.75 7.5 Miles



HISTORIC LANDCOVER

FIGURE 2-1-2

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)

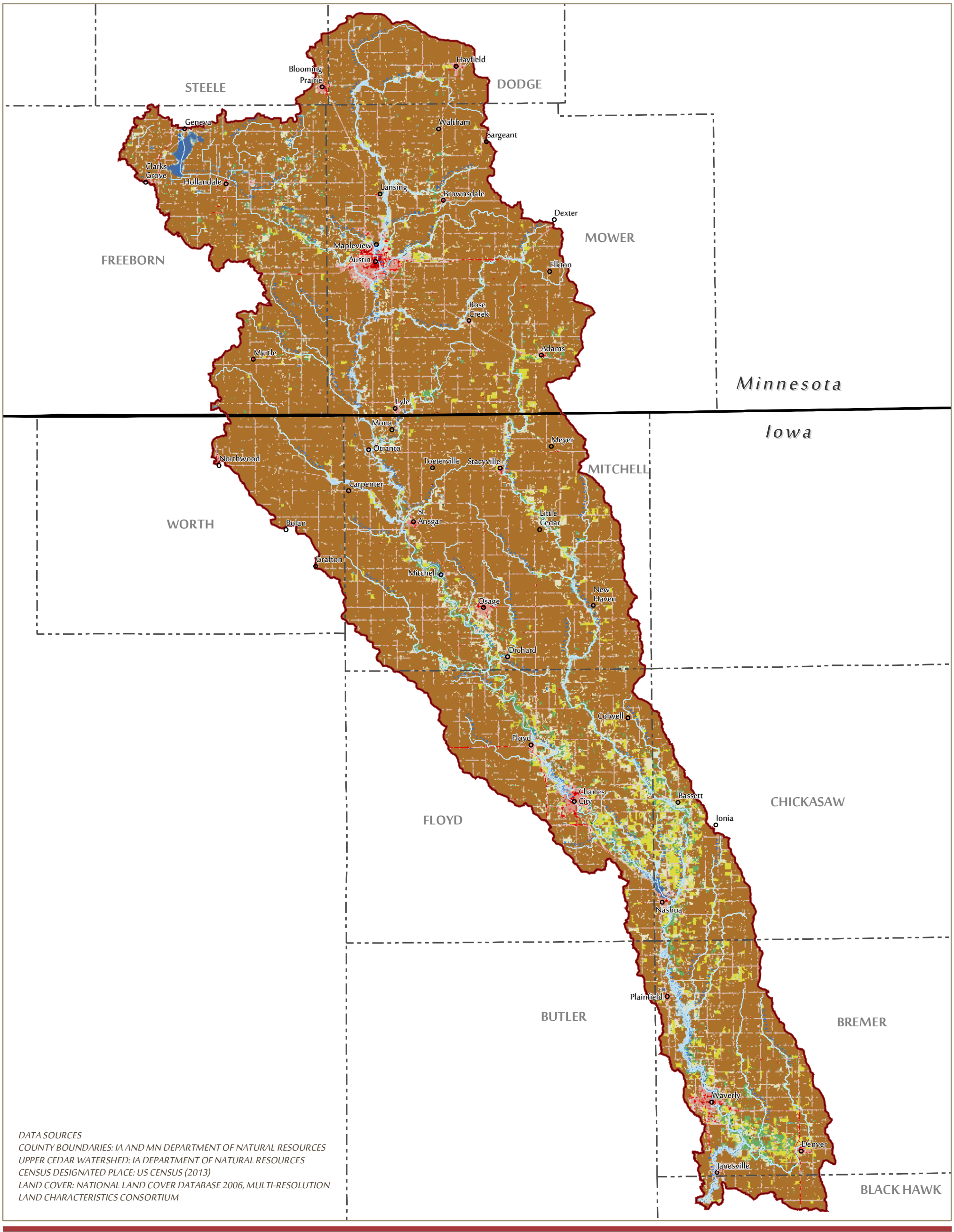
HISTORICAL LAND COVER: IA DEPARTMENT OF NATURAL RESOURCES, BASED ON THE GENERAL LAND OFFICE (GLO) SURVEY OF IOWA BETWEEN 1832 AND 1859.

PRESETTLEMENT VEGETATION: MN DEPARTMENT OF NATURAL RESOURCES, BASED MARSCHNER'S ORIGINAL ANALYSIS OF THE PULBC LAND SURVEY NOTES AND LANDSCAPE PATTERNS (1895).

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
LAND COVER: NATIONAL LAND COVER DATABASE 2006, MULTI-RESOLUTION LAND CHARACTERISTICS CONSORTIUM

2006 LAND COVER

FIGURE 2-1-3

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

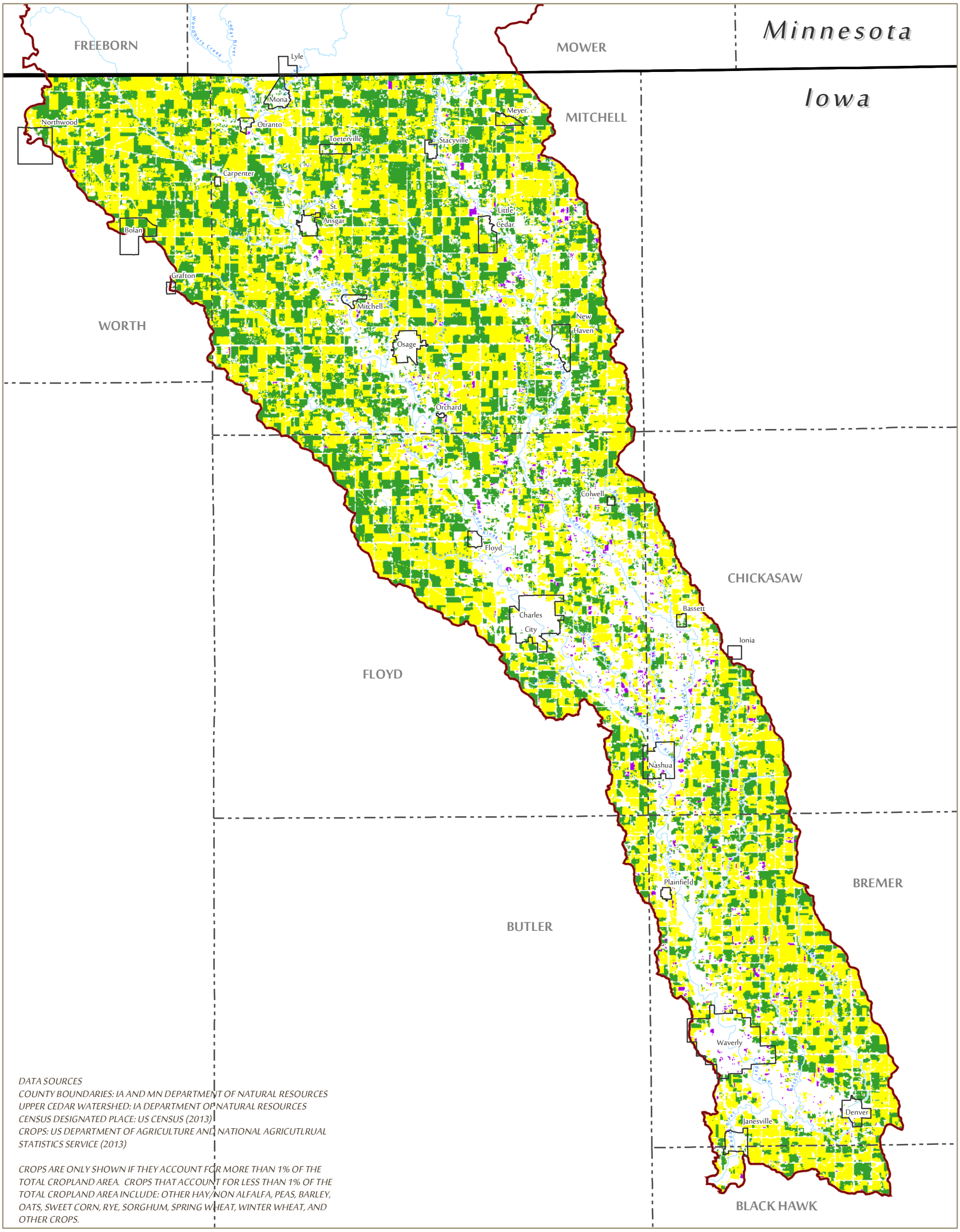
- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place (2013)

2006 Land Cover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grasslands/Herbaceous
- Pasture/Hay
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

N

0 1.75 3.5 7 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
CROPS: US DEPARTMENT OF AGRICULTURE AND NATIONAL AGRICUTLRUAL STATISTICS SERVICE (2013)

CROPS ARE ONLY SHOWN IF THEY ACCOUNT FOR MORE THAN 1% OF THE TOTAL CROPLAND AREA. CROPS THAT ACCOUNT FOR LESS THAN 1% OF THE TOTAL CROPLAND AREA INCLUDE: OTHER HAY/NON ALFALFA, PEAS, BARLEY, OATS, SWEET CORN, RYE, SORGHUM, SPRING WHEAT, WINTER WHEAT, AND OTHER CROPS.

2013 CROPS

FIGURE 2-1-4

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place

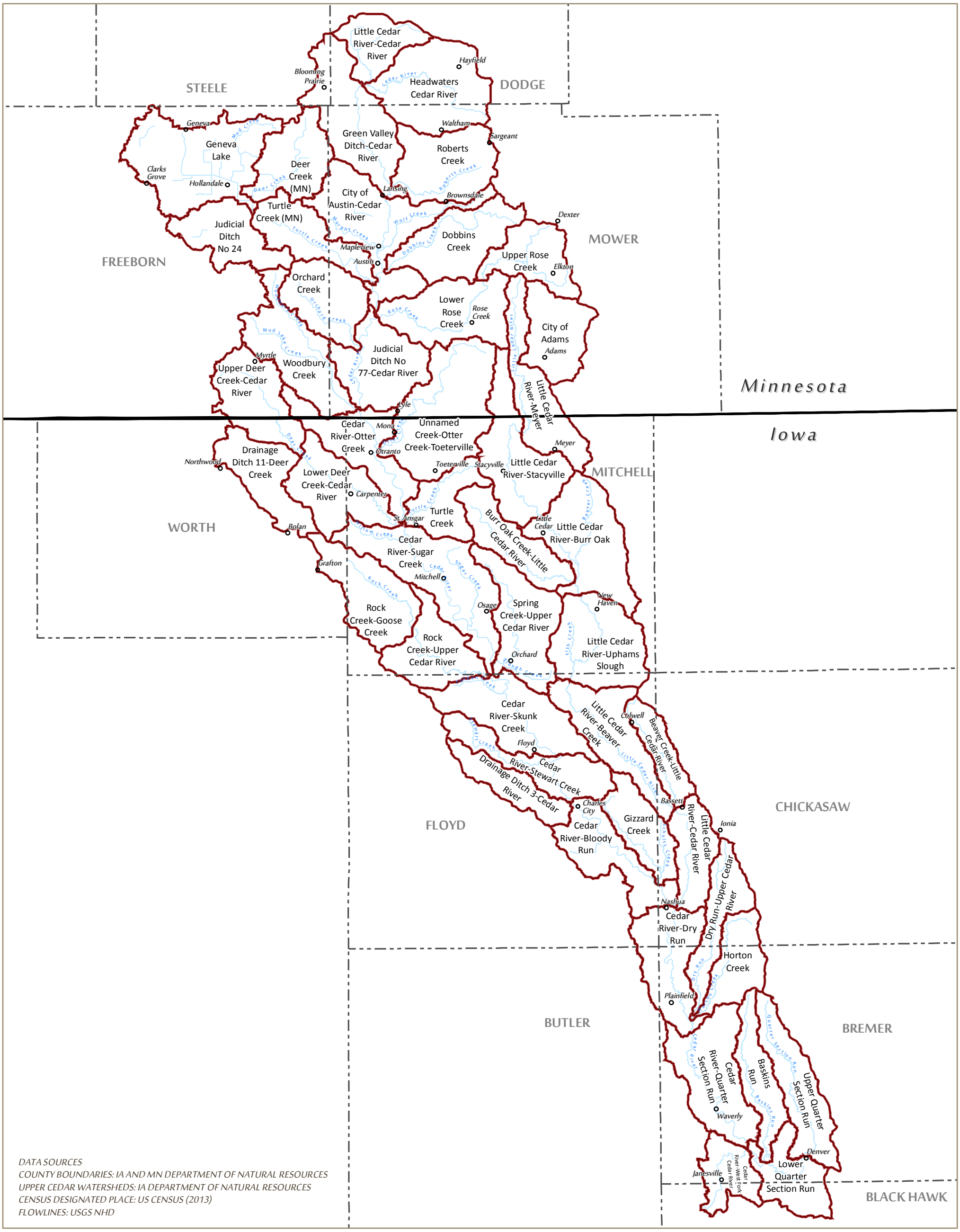
Crops (2013)

- Corn (57.3%)
- Soybean (41.0%)
- Alfalfa (1.2%)

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHEDS: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
FLOWLINES: USGS NHD

SUBWATERSHEDS

FIGURE 2-2-1

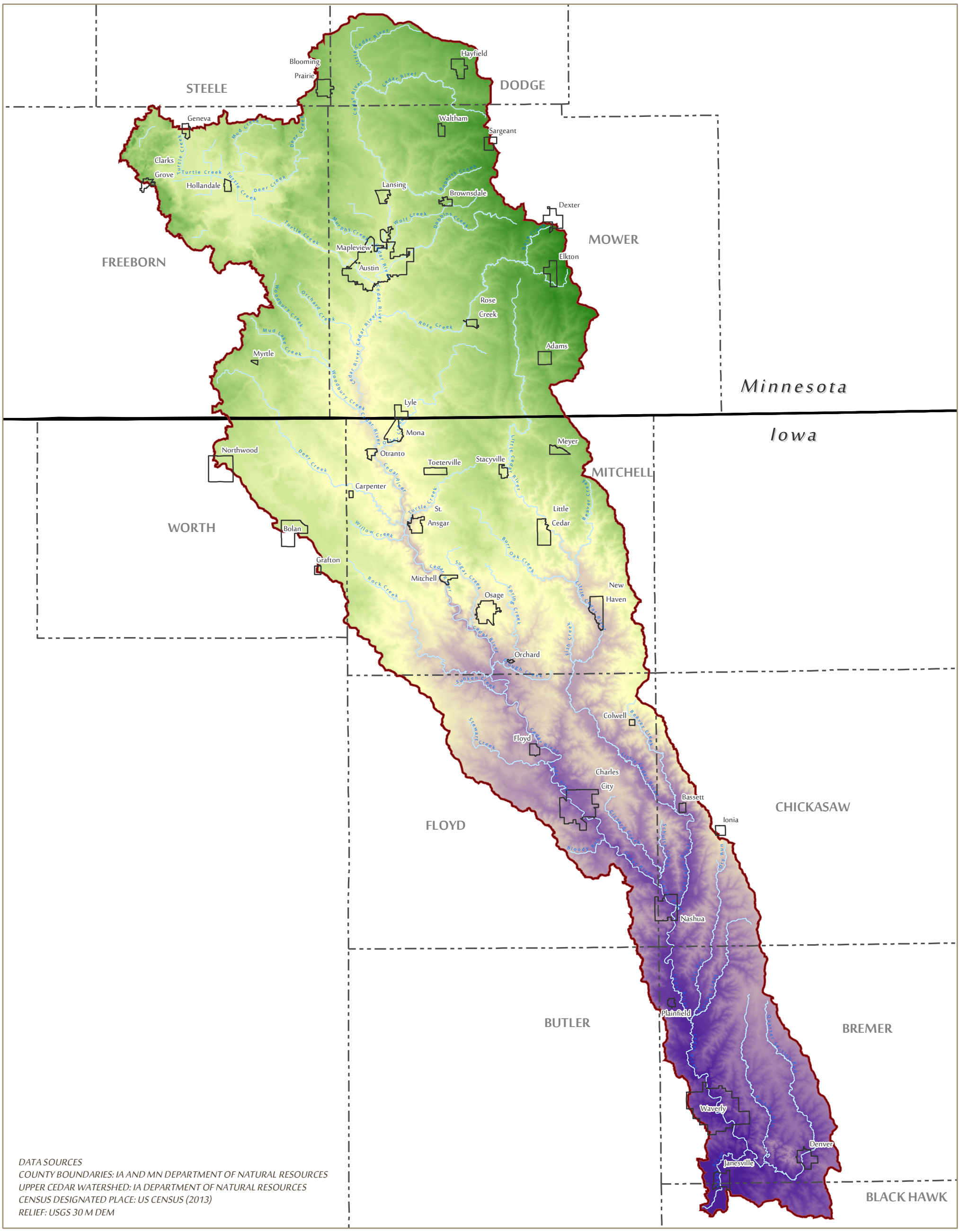
UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- County
- Census Desginated Place (2013)
- Subwatershed (HUC 12)
- Named Flowline

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



ELEVATION RELIEF

FIGURE 2-4-1

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

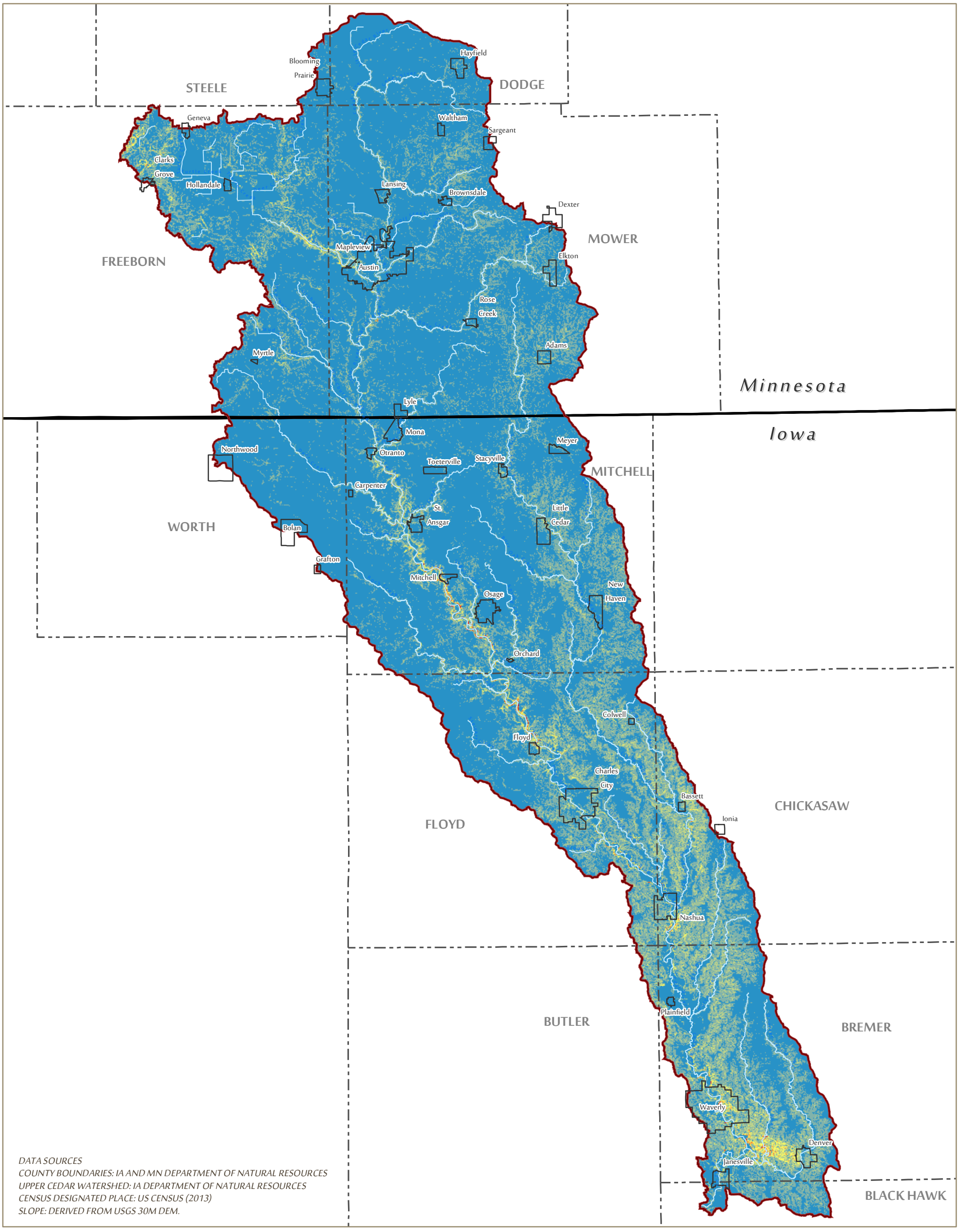
Iowa Border
Upper Cedar Watershed
County
Census Desginated Place

Relief
High (1441 ft)
Low (854 ft)

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



SLOPE

FIGURE 2-4-2

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

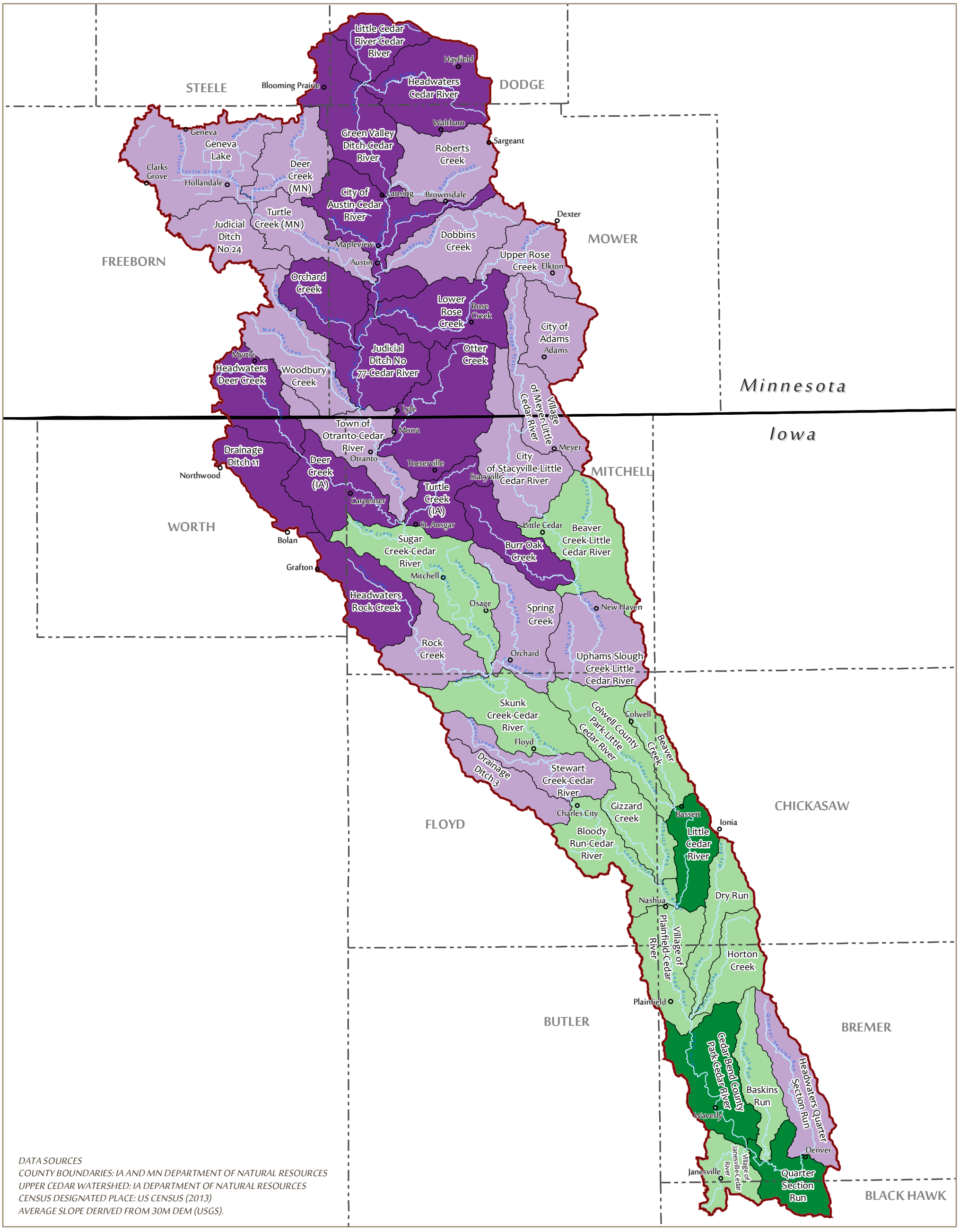
Iowa Border
Upper Cedar Watershed
County
Census Desginated Place

Slope
0 - 2 %
2 - 5 %
5 - 9 %
9 - 14 %
14 - 18 %
18 - 25 %
25+ %

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
AVERAGE SLOPE DERIVED FROM 30M DEM (USGS).

SLOPE BY SUBWATERSHED

FIGURE 2-4-3

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place (2013)

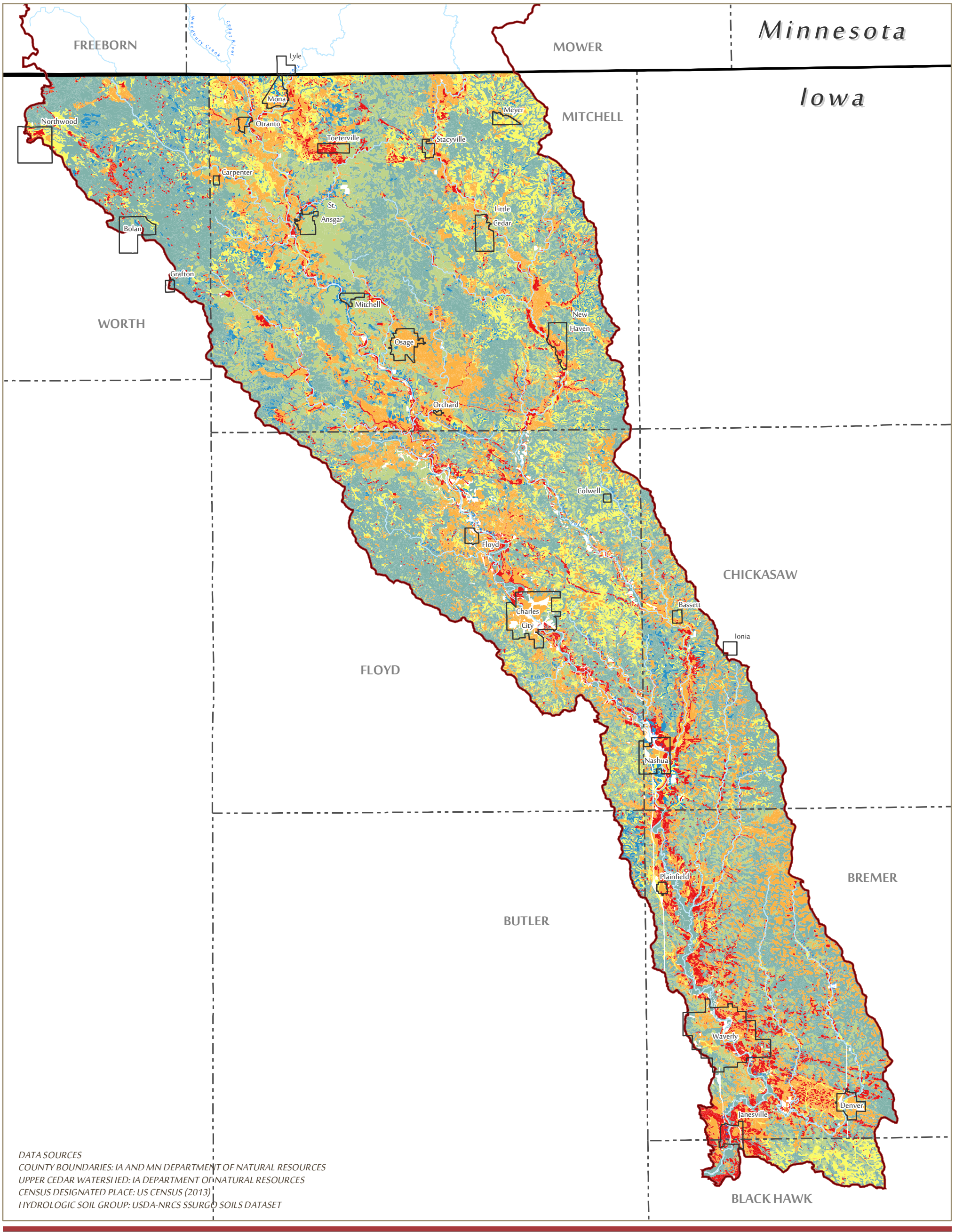
HUC 12: Average Slope

- 0.67% - 1.5%
- 1.5% - 2.5%
- 2.5% - 3.5%
- 3.5% - 4.2%

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
HYDROLOGIC SOIL GROUP: USDA-NRCS SSURGO SOILS DATASET

HYDROLOGIC SOIL GROUP

FIGURE 2-5-1A

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

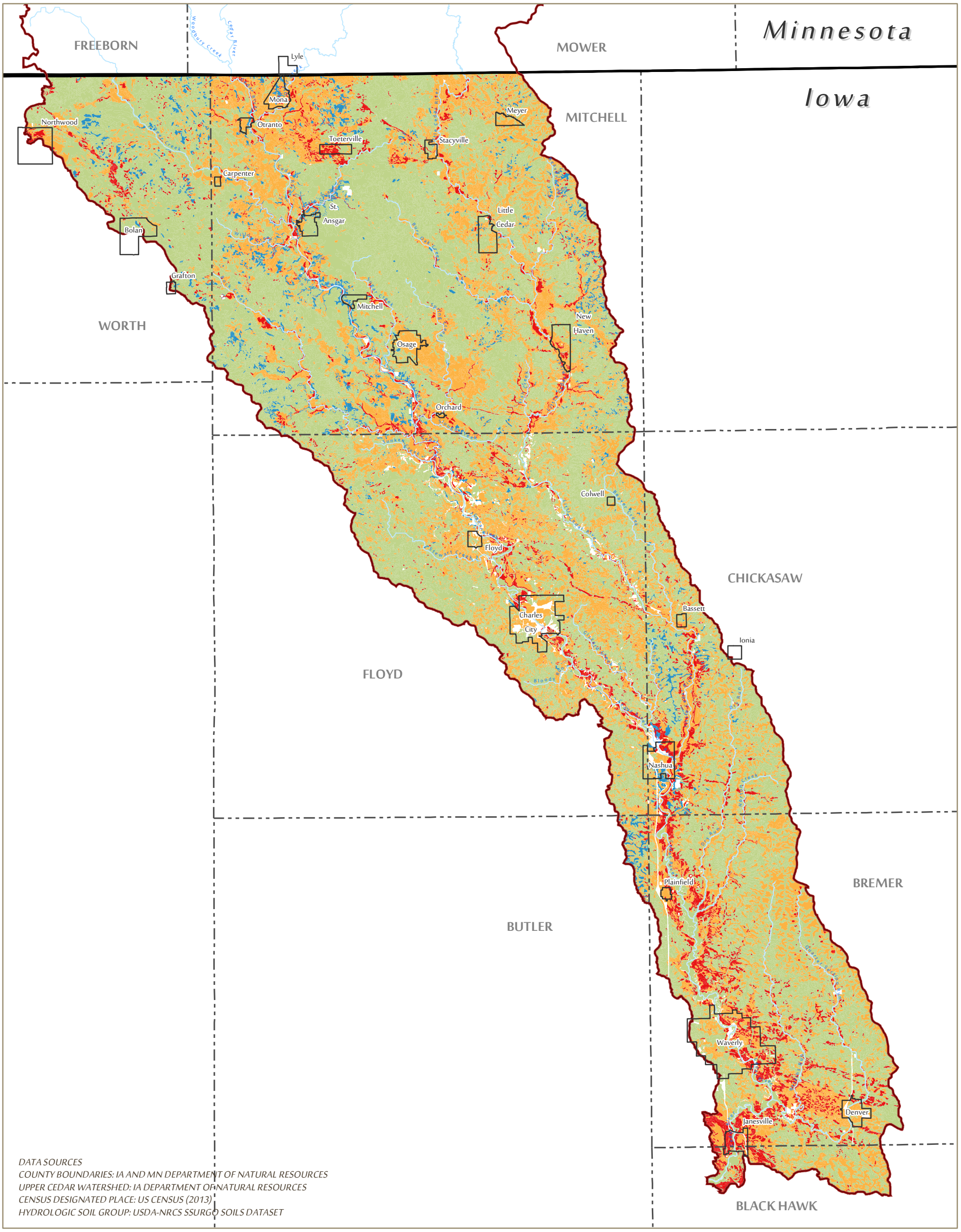
Iowa Border
Upper Cedar Watershed
County
Census Desginated Place

Soils: HSG
A
A/D
B
B/D
C
C/D
D

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
HYDROLOGIC SOIL GROUP: USDA-NRCS SSURGO SOILS DATASET

HYDROLOGIC SOIL GROUP DRAINED CONDITION

FIGURE 2-5-1B

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

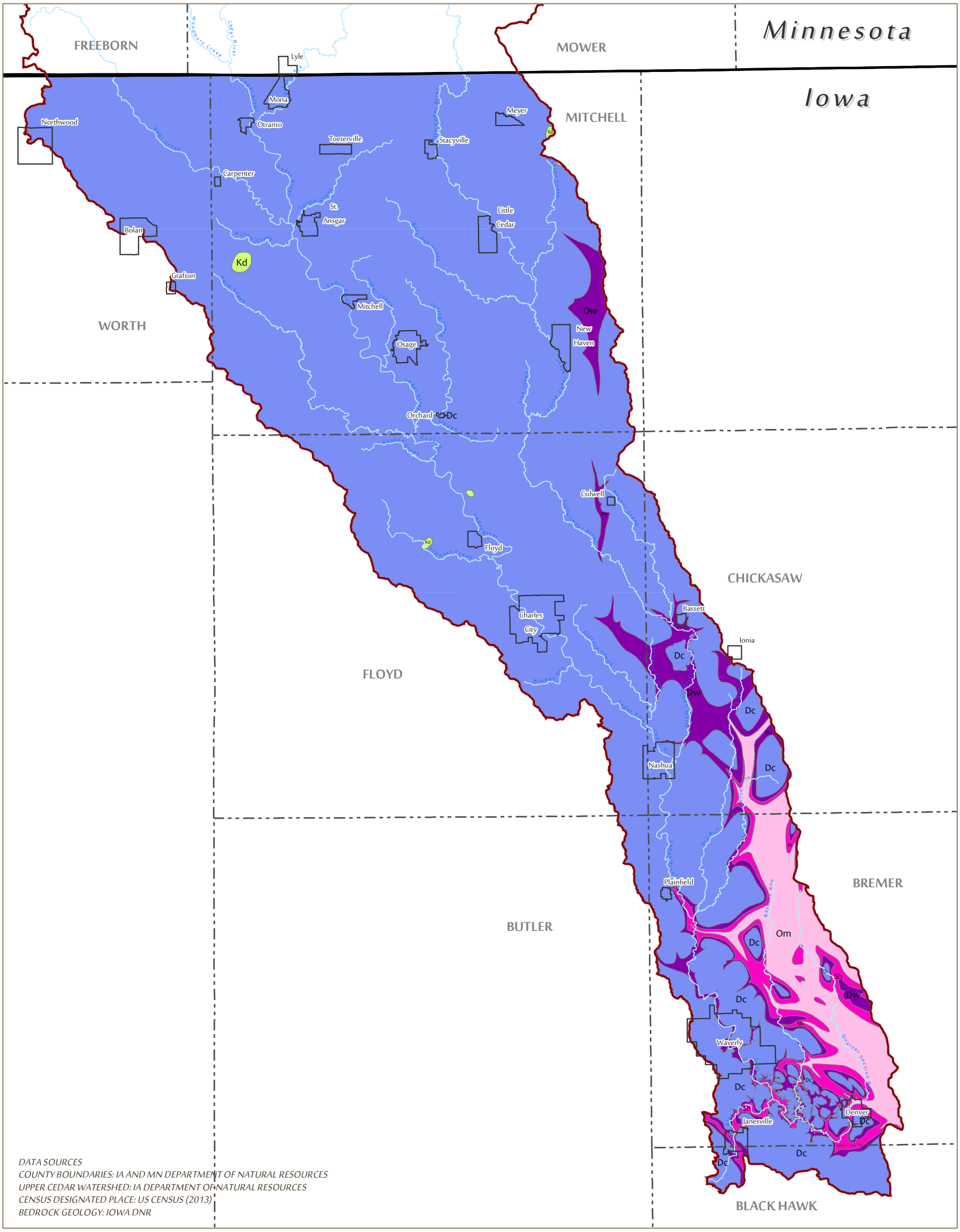
Iowa Border
Upper Cedar Watershed
County
Census Desginated Place

Soils: HSG in Drained Condition
A
B
C
D

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
BEDROCK GEOLOGY: IOWA DNR

BEDROCK GEOLOGY

FIGURE 2-6-1

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place

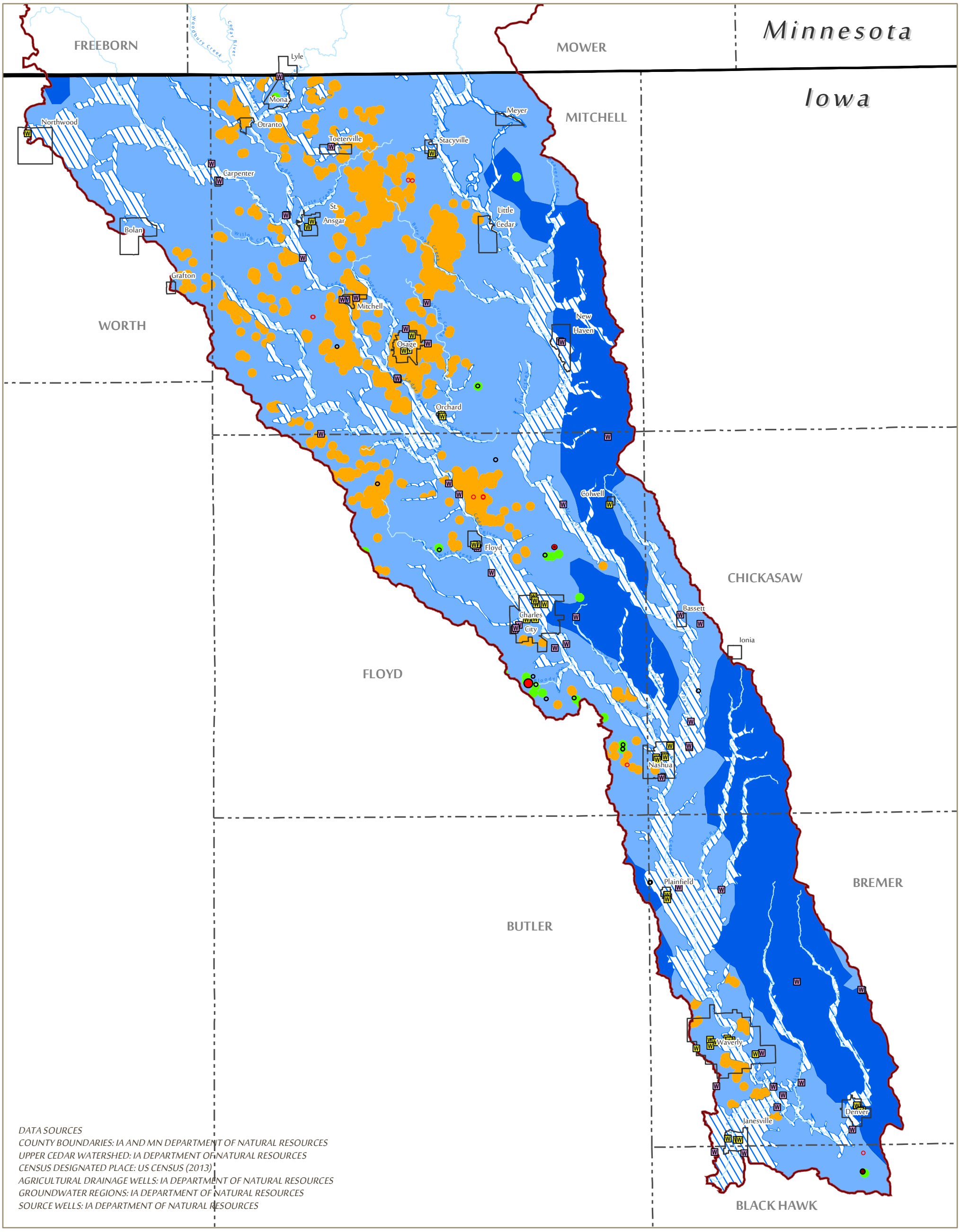
Bedrock Geology

- Kd: Dakota, Windrow (Mid Cretaceous)
- Dw: Wapsipinicon Group (Middle Devonian)
- Dc: Cedar Valley Group (Middle to Upper Devonian)
- Om: Maquoketa Formation (Upper Ordovician)
- Sh: Hopkinton, Blanding, Tete des Morts, Mosalem (Lower Silurian)

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



GROUNDWATER

FIGURE 2-6-2

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desgnated Place
- Non-Municipal Source Water Well
- Municipal Source Water Well

Agricultural Drainage Well

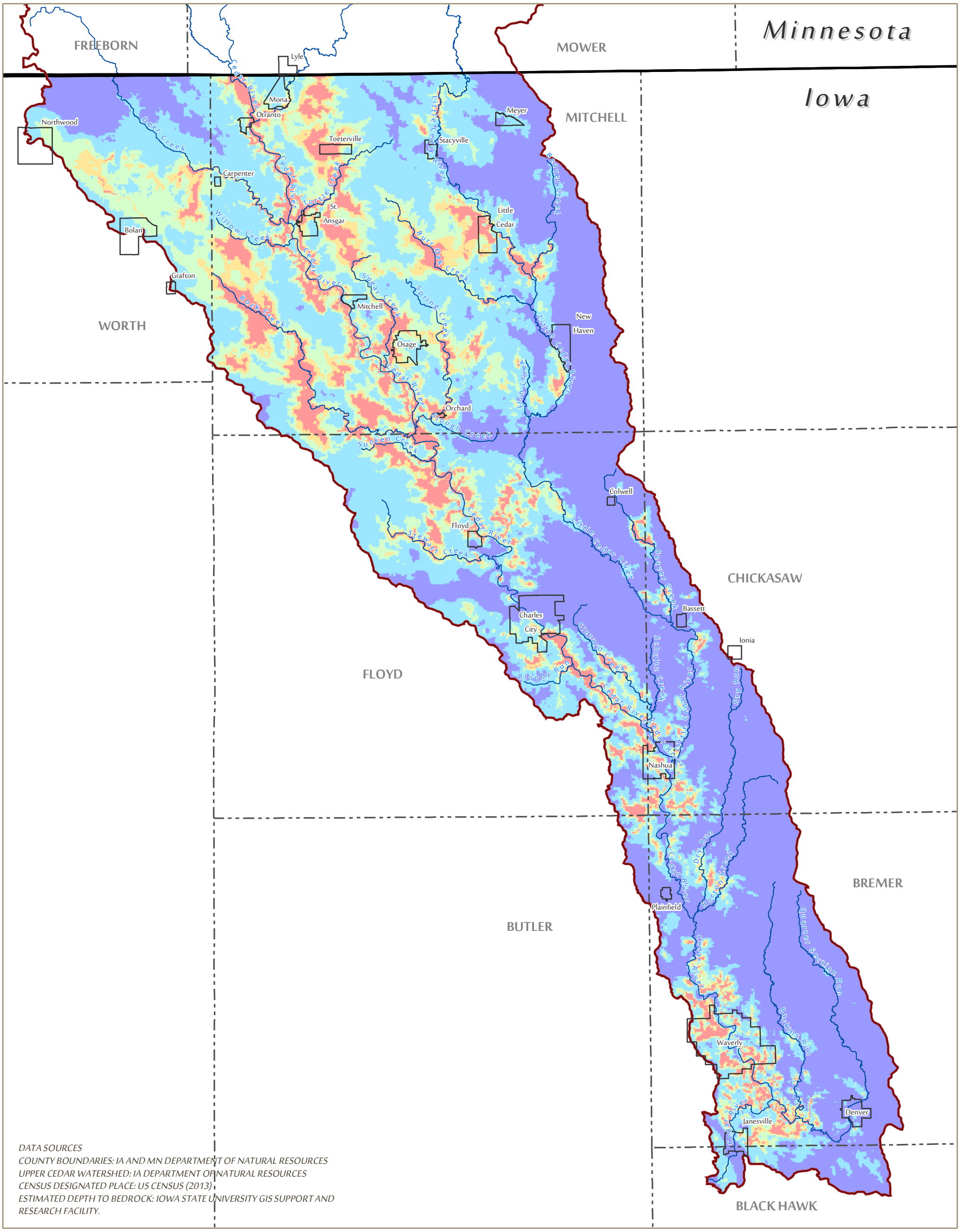
- Closed
- Closed or Reclassified
- Not Functioning
- Fully Functional

Groundwater Vulnerability Regions

- Good bedrock aquifers; moderate drift confinement
- Good bedrock aquifers; thin drift confinement
- Alluvial aquifers
- Agricultural Drainage Wells (400 meter radius around each is shown)
- Sinkholes (400 meter radius around each is shown)

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
ESTIMATED DEPTH TO BEDROCK: IOWA STATE UNIVERSITY GIS SUPPORT AND RESEARCH FACILITY.

DEPTH TO BEDROCK

FIGURE 2-6-3

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place

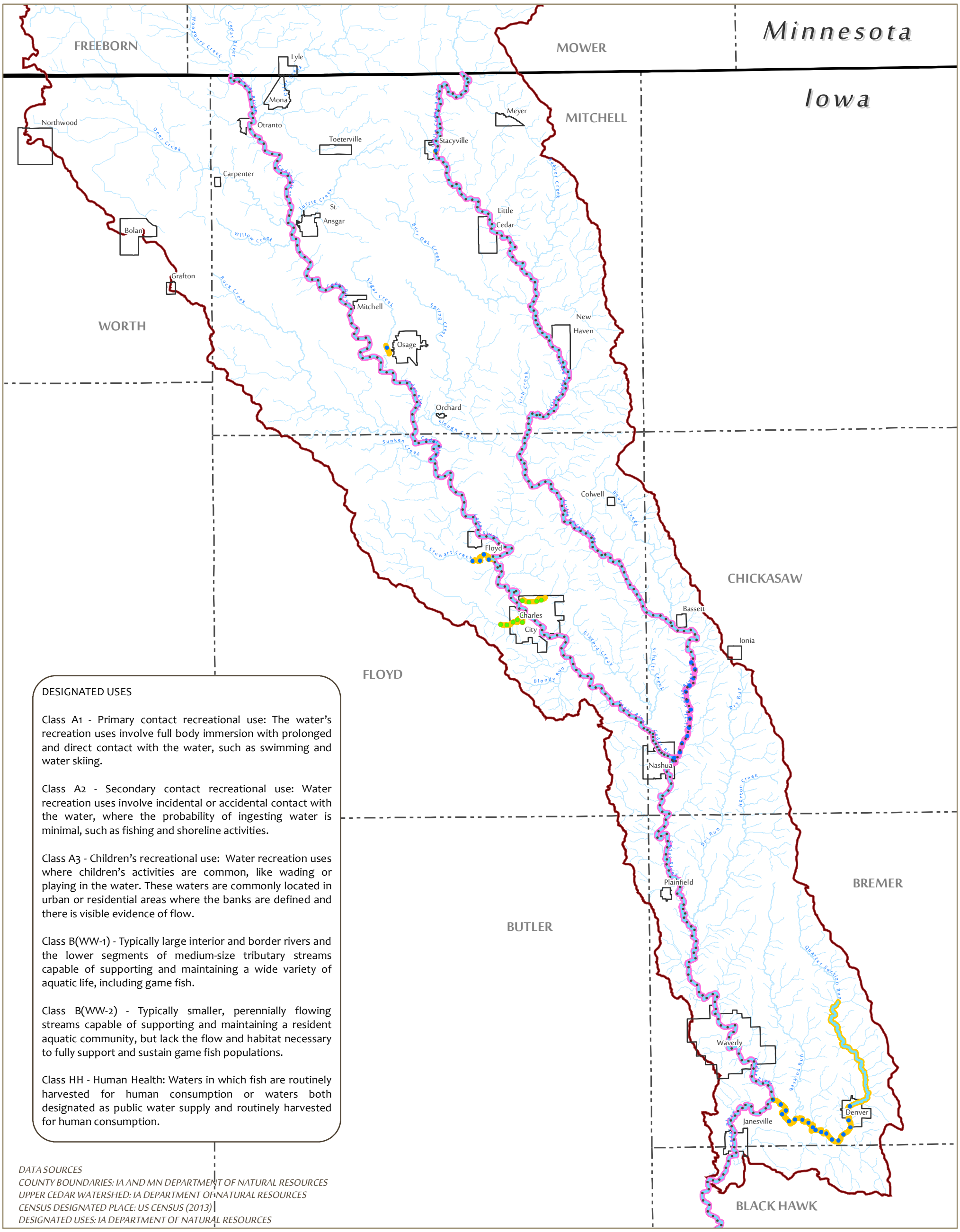
Estimated Depth to Bedrock (ft)

- 0 - 3
- 3 - 10
- 10 - 20
- 20 - 50
- 50 - 360

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DESIGNATED USES

Class A1 - Primary contact recreational use: The water's recreation uses involve full body immersion with prolonged and direct contact with the water, such as swimming and water skiing.

Class A2 - Secondary contact recreational use: Water recreation uses involve incidental or accidental contact with the water, where the probability of ingesting water is minimal, such as fishing and shoreline activities.

Class A3 - Children's recreational use: Water recreation uses where children's activities are common, like wading or playing in the water. These waters are commonly located in urban or residential areas where the banks are defined and there is visible evidence of flow.

Class B(WW-1) - Typically large interior and border rivers and the lower segments of medium-size tributary streams capable of supporting and maintaining a wide variety of aquatic life, including game fish.

Class B(WW-2) - Typically smaller, perennially flowing streams capable of supporting and maintaining a resident aquatic community, but lack the flow and habitat necessary to fully support and sustain game fish populations.

Class HH - Human Health: Waters in which fish are routinely harvested for human consumption or waters both designated as public water supply and routinely harvested for human consumption.

DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
DESIGNATED USES: IA DEPARTMENT OF NATURAL RESOURCES

DESIGNATED USES

FIGURE 2-7-1

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

Iowa Border
Upper Cedar Watershed
County
Census Desginated Place

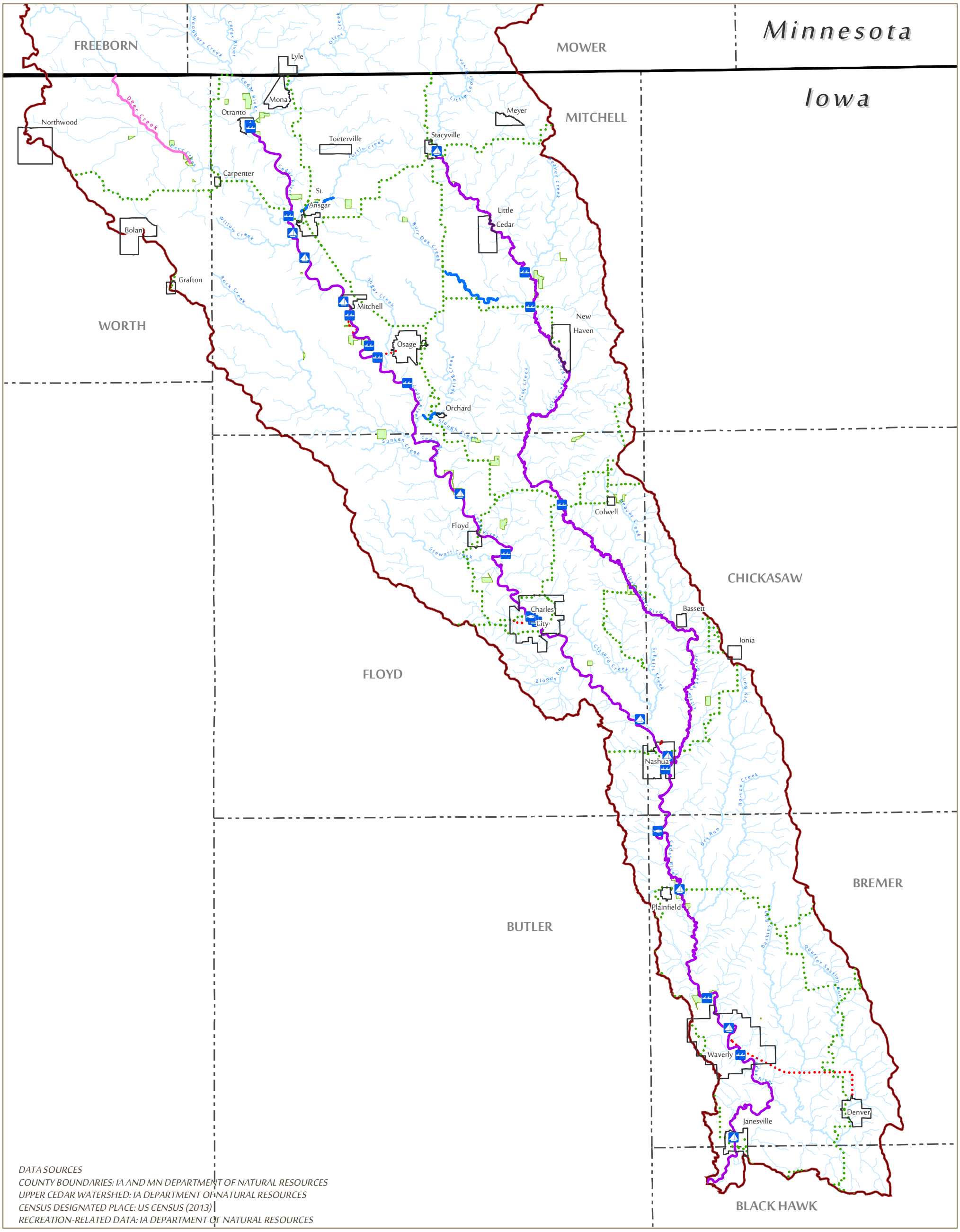
River/Streams
Named Flowline
Unnamed Flowline

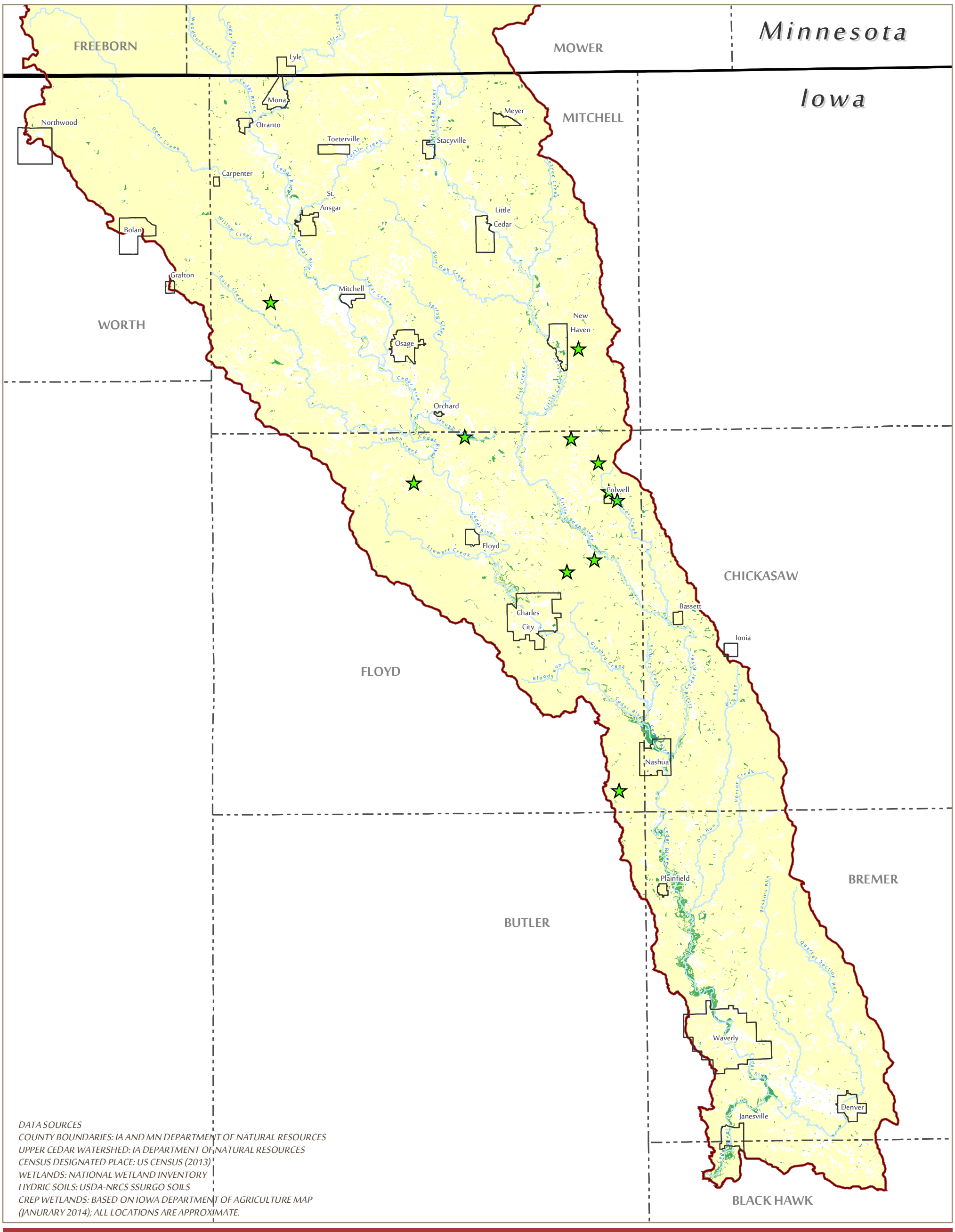
Designated Use
A1
A2
A3

B(WW-1)
B(WW-2)
HH

N

0 1.25 2.5 5 Miles


Minnesota
Iowa
FREEBORN
MOWER
MITCHELL
WORTH
FLOYD
CHICKASAW
BUTLER
BREMER
BLACK HAWK
Lyle
Mona
Otranto
Northwood
Meyer
Toeterville
Stacyville
Carpenter
St. Ansgar
Little Cedar
Bolan
Grafton
Mitchell
New Haven
Osage
Orchard
Colwell
Floyd
Charles City
Bassett
Ionia
Nashua
Plainfield
Waverly
Janesville
Denver
Deer Creek
Cedar River
Willow Creek
Rock Creek
Sugar Creek
Bur Oak Creek
Spring Creek
Fish Creek
Sunken Creek
Stewart Creek
Bloody Run
Gizzard Creek
Schultz Creek
Dry Run
Horton Creek
Baskins Run
Quarter Section Run
Beaver Creek
Little Cedar River
Little Cedar Creek
Little Cedar Slough
Slough Creek
Little Cedar Creek
Little Cedar River
Little Cedar Creek
Little Cedar River
Little Cedar Creek
Little Cedar River



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
WETLANDS: NATIONAL WETLAND INVENTORY
HYDRIC SOILS: USDA-NRCS SSURGO SOILS
CREP WETLANDS: BASED ON IOWA DEPARTMENT OF AGRICULTURE MAP (JANURARY 2014); ALL LOCATIONS ARE APPROXIMATE.

WETLANDS

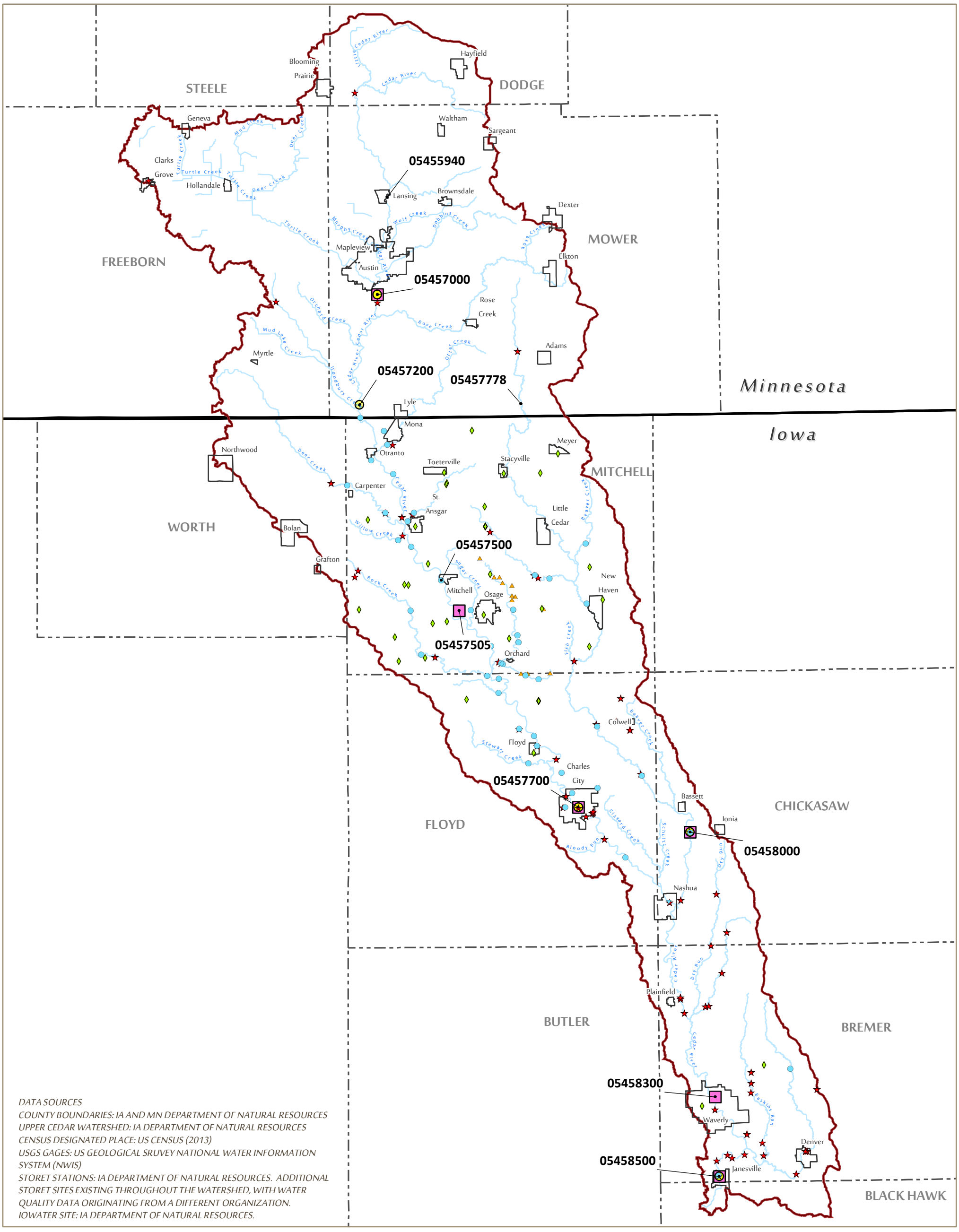
FIGURE 2-10-1

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place
- Named Flowline
- Wetland
- Hydric Soil
- Conservation Reserve Enhancement Program (CREP) Wetland

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
USGS GAGES: US GEOLOGICAL SRUVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)
STORET STATIONS: IA DEPARTMENT OF NATURAL RESOURCES. ADDITIONAL STORET SITES EXISTING THROUGHOUT THE WATERSHED, WITH WATER QUALITY DATA ORIGINATING FROM A DIFFERENT ORGANIZATION.
IOWATER SITE: IA DEPARTMENT OF NATURAL RESOURCES.

WATER MONITORING

FIGURE 2-11-1

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place

STORET Station Type (Iowa DNR sites only)
- Stream
- Ground Water
- Tile Line
- Lake

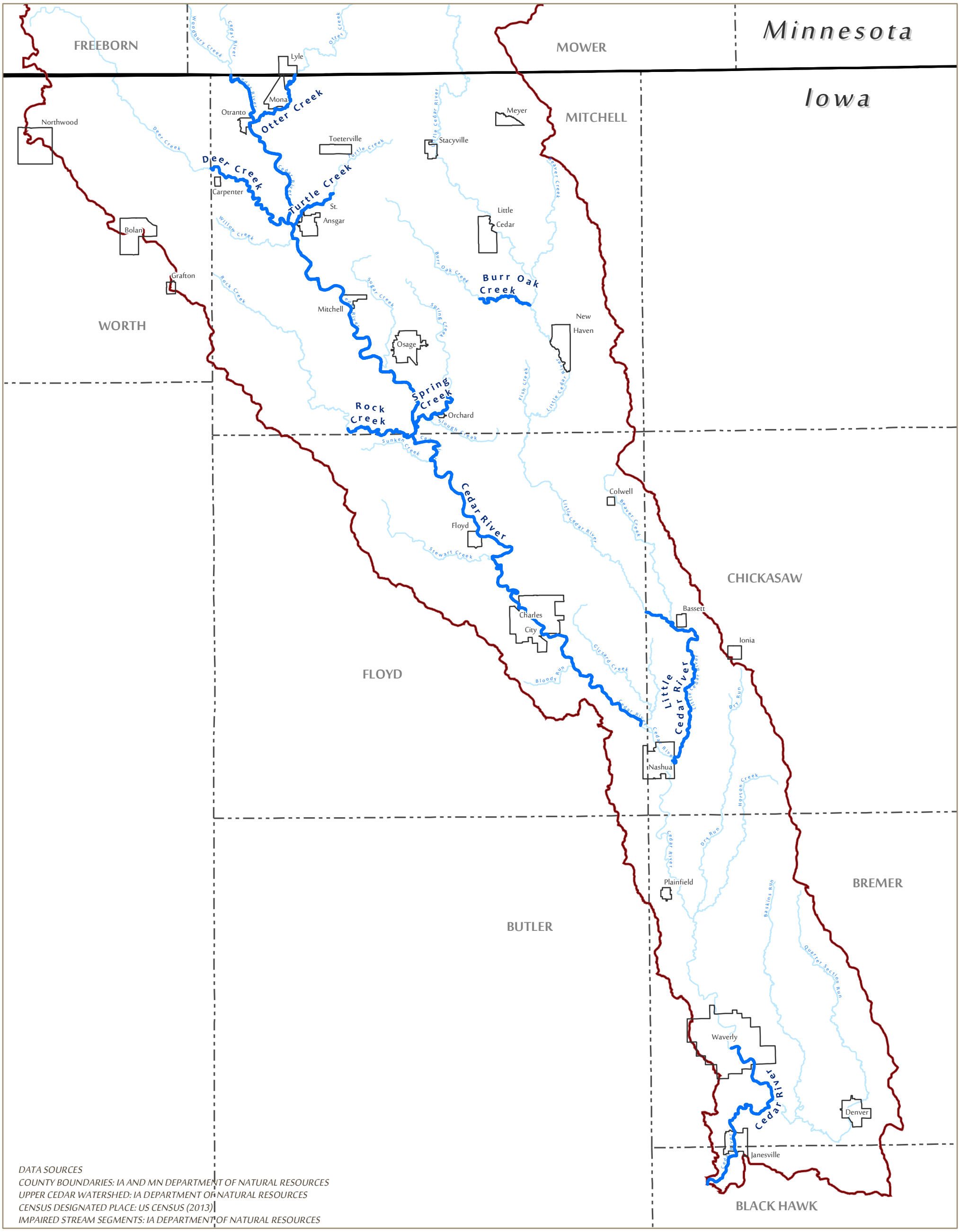
USGS Gage
- Historical Flow Data Only
- Water Quality Samples Only
- Discharge Data Collection Ongoing
- Discharge Data Collection Ongoing and Water Quality Samples

- IOWATER Site
- Named Flowline

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
IMPAIRED STREAM SEGMENTS: IA DEPARTMENT OF NATURAL RESOURCES

IMPAIRED WATERS

FIGURE 2-12-1

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

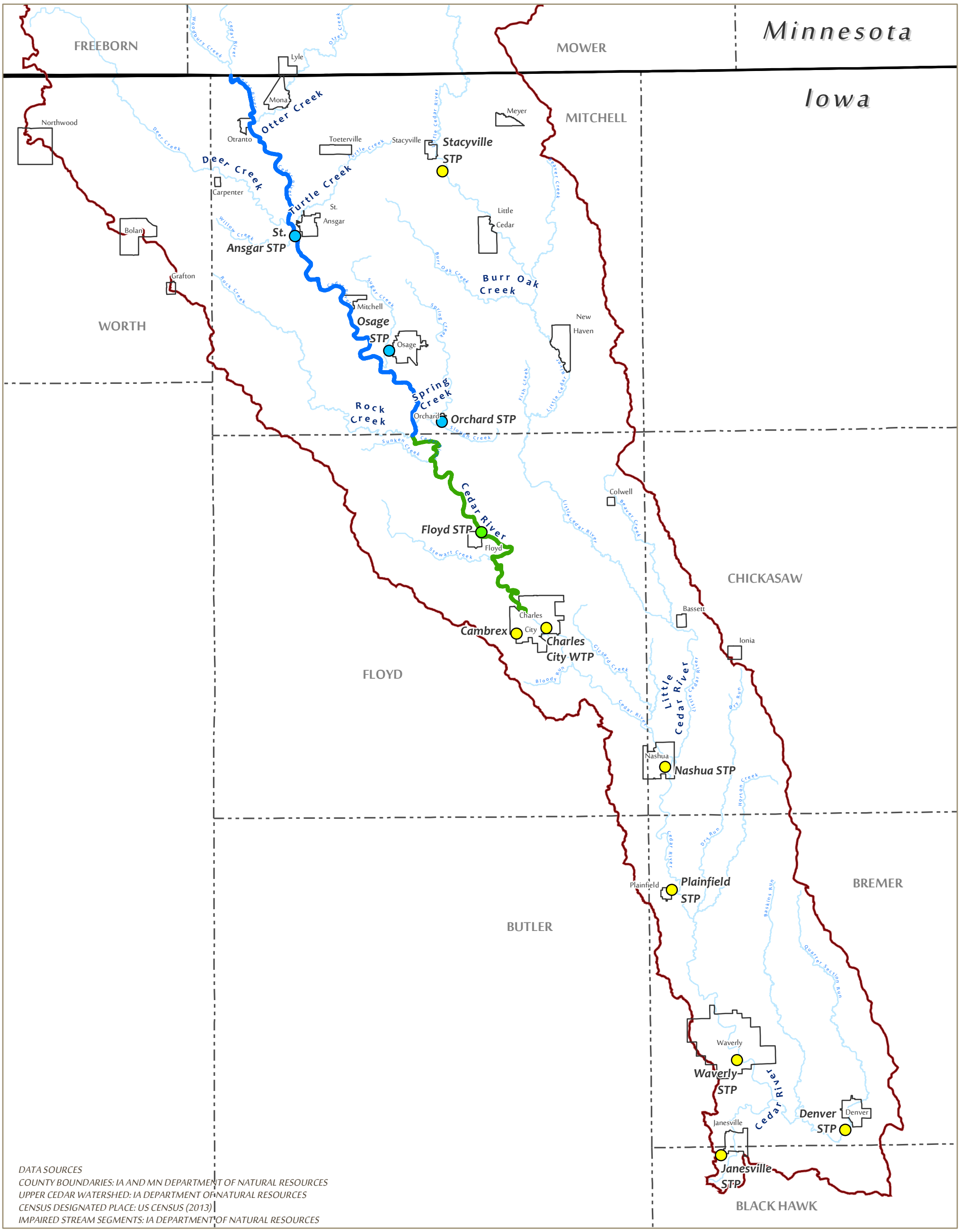
- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place
- Named Flowline
- Impaired Stream Segment (Category 5, 2012)

NOTE THAT OTHER STREAM SEGMENTS WITHIN THE UPPER CEDAR WATERSHED COULD BE IMPAIRED, BUT THE IMPAIRMENT IS CURRENTLY UNKNOWN DUE TO

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
IMPAIRED STREAM SEGMENTS: IA DEPARTMENT OF NATURAL RESOURCES

E. COLI TMDL: NPDES PERMITTED SITES WITH WLAS

FIGURE 2-12-2

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

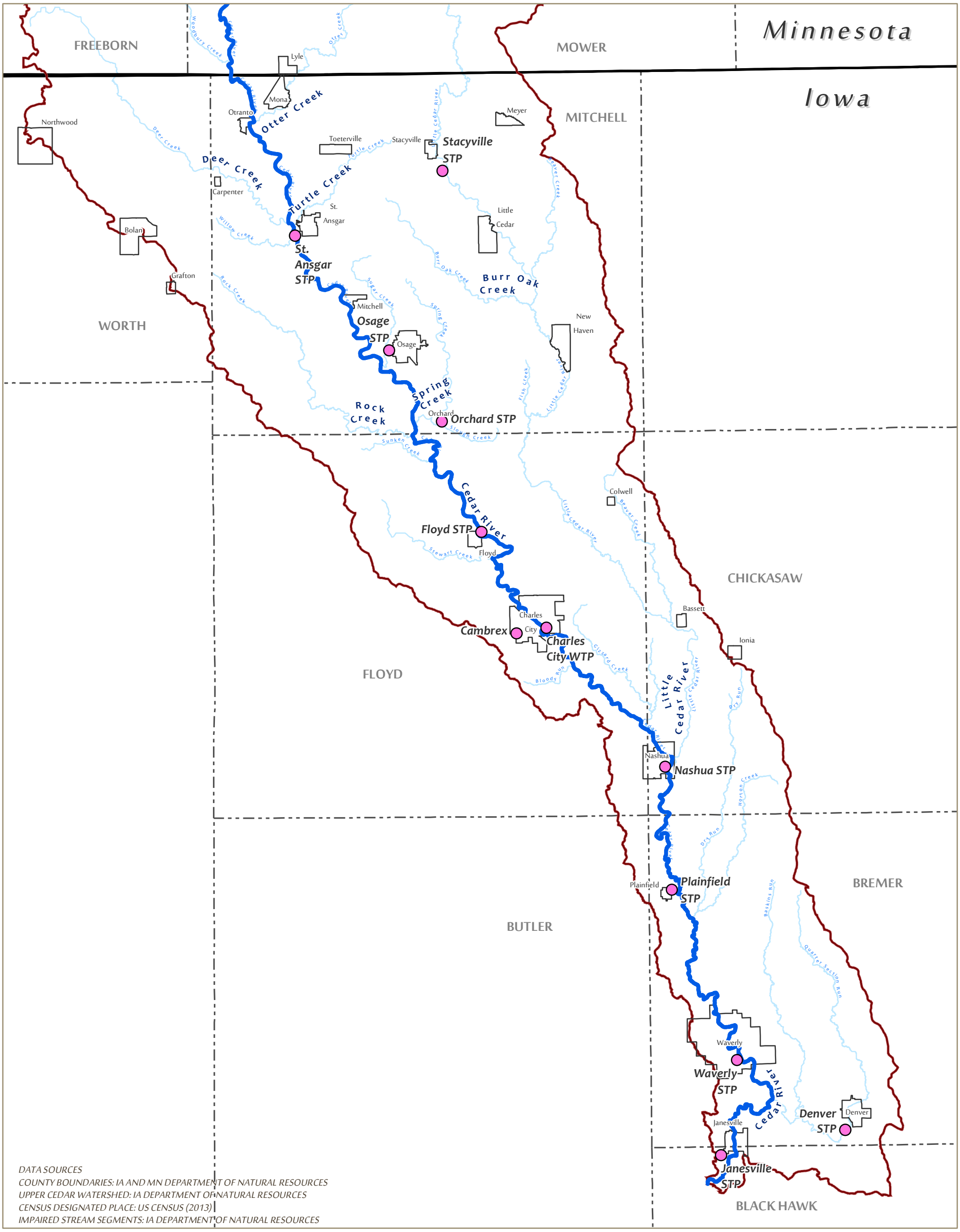
- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place
- Named Flowline

Impaired Waters Stream Segment
- IA 02-CED-0110_3
- IA 02-CED-0110_2

NPDES Permits with WLA For E. Coli
- TMDL Drainage Area for IA 02-CED-0110_3
- TMDL Drainage Area for IA 02-CED-0110_2
- TMDL Drainage Area further downstream, outside of the Upper Cedar

N

0 1.25 2.5 5 Miles



NITRATE TMDL: NPDES PERMITTED SITES WITH WLAS

FIGURE 2-12-3

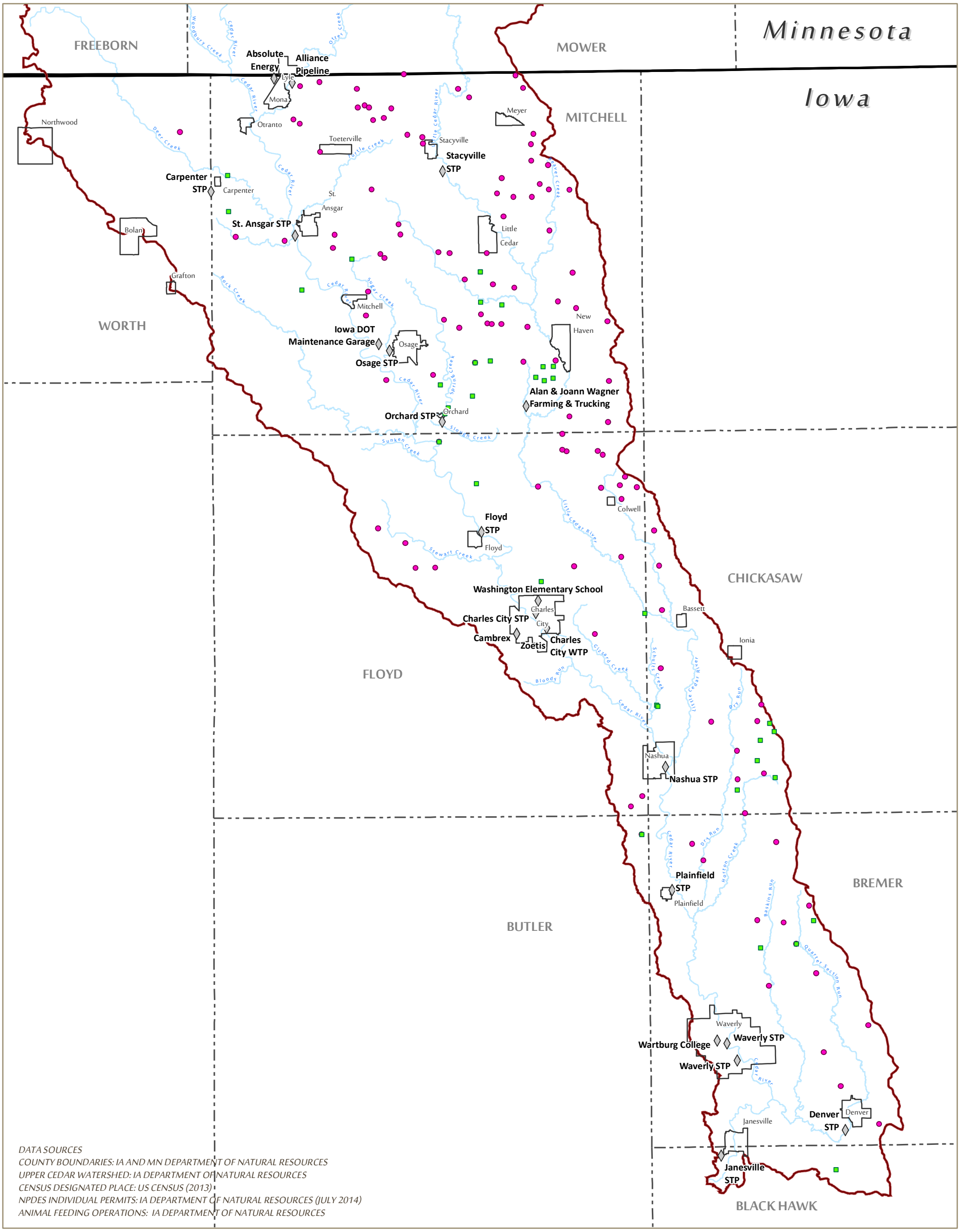
UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place
- Cedar River
- Named Flowline
- NPDES Permit with WLA for Nitrate

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
NPDES INDIVIDUAL PERMITS: IA DEPARTMENT OF NATURAL RESOURCES (JULY 2014)
ANIMAL FEEDING OPERATIONS: IA DEPARTMENT OF NATURAL RESOURCES

POINT SOURCES

FIGURE 2-13-1

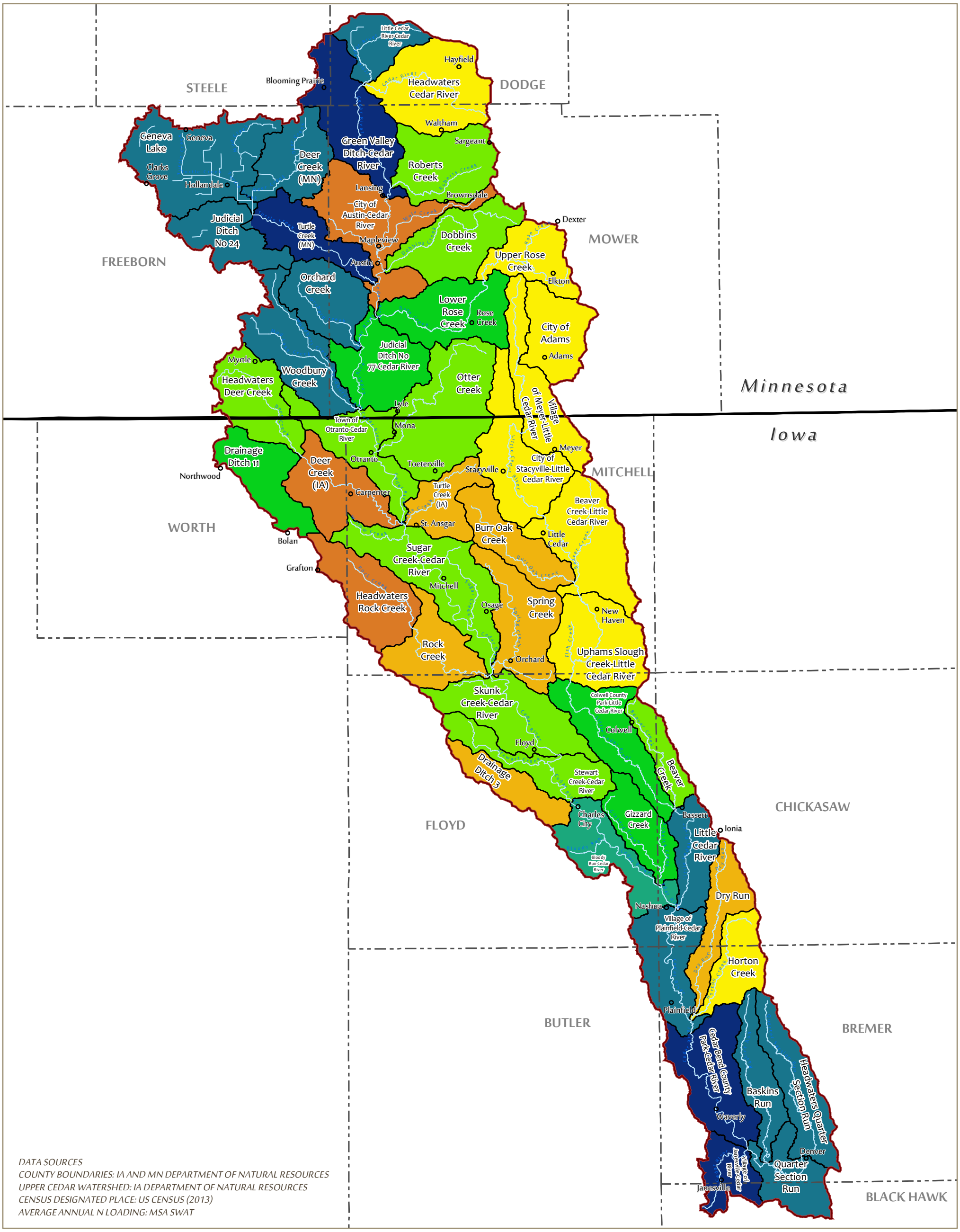
UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desgnated Place
- Named Flowline
- NPDES Individual Permit
- Animal Feeding Operation: Open Feedlot
- Animal Feeding Operation: Confinement

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
AVERAGE ANNUAL N LOADING: MSA SWAT

ANNUAL TOTAL N LOAD

FIGURE 2-14-1

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desgnated Place (2013)

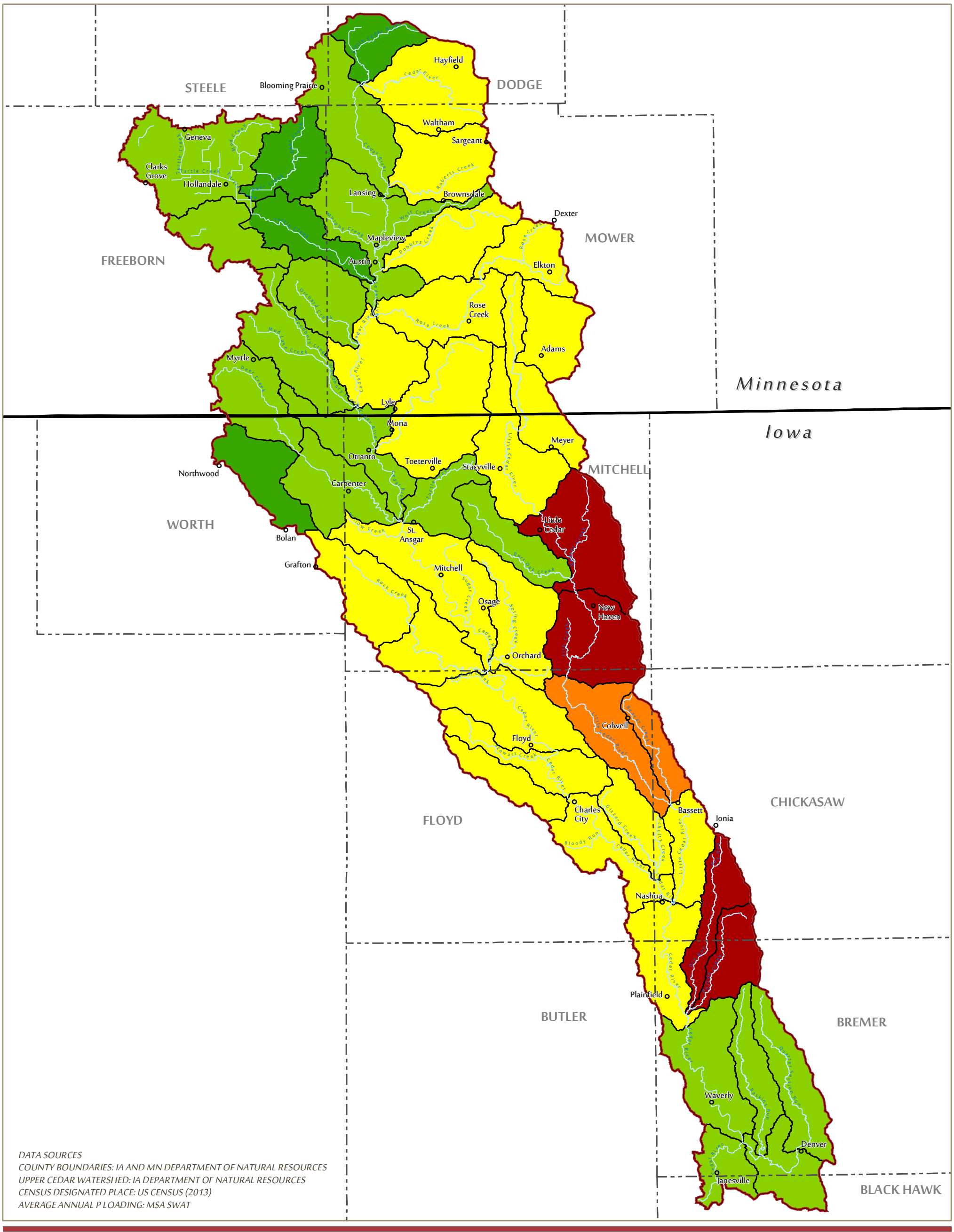
Average Annual N Loading (lb N /acre)

- 5 - 15
- 16 -20
- 21 - 25
- 26 - 30
- 31 - 35
- 36 - 40
- 41 - 45
- 46 - 50

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
AVERAGE ANNUAL P LOADING: MSA SWAT

ANNUAL TOTAL P LOAD

FIGURE 2-14-2

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place (2013)

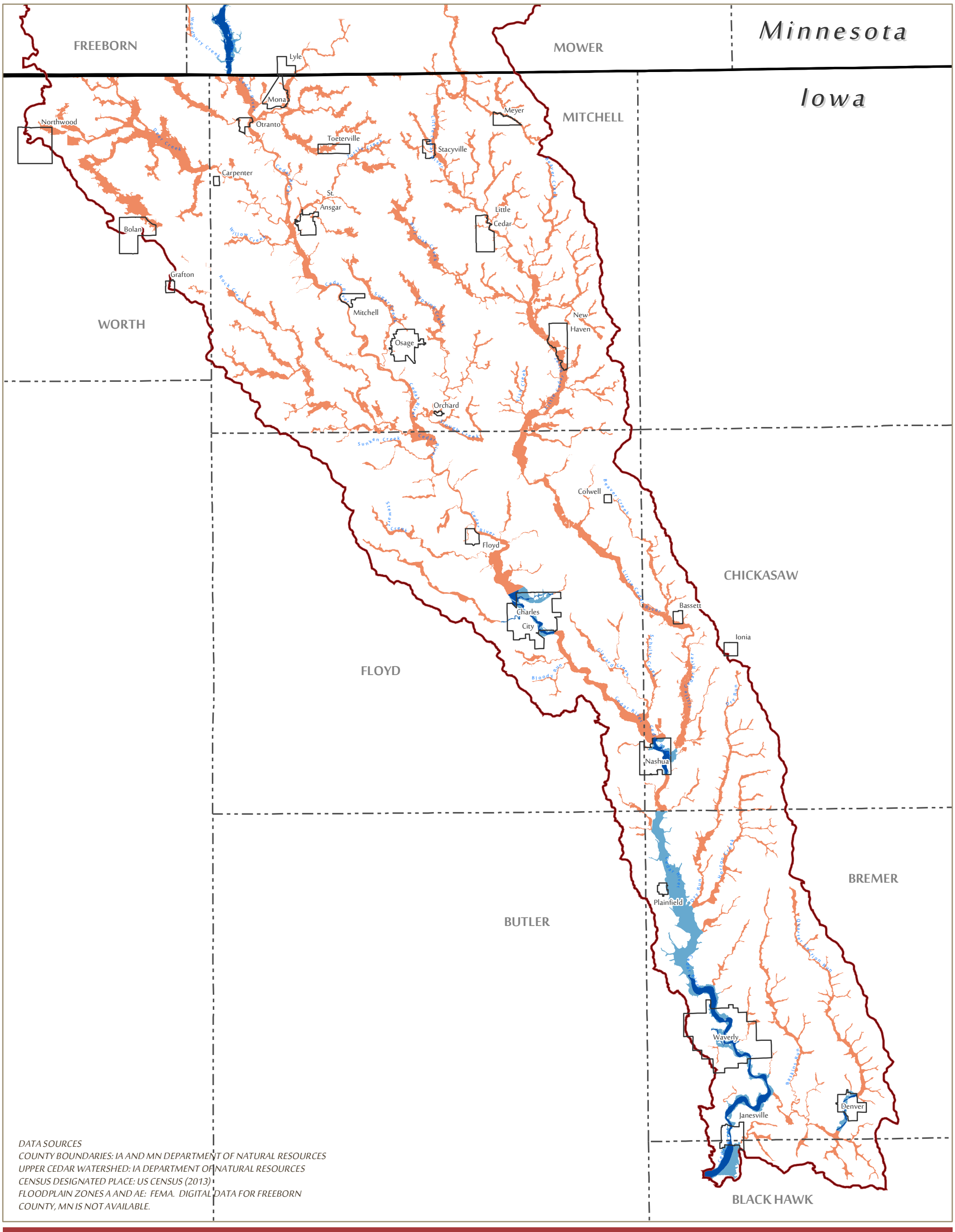
Average Annual P Loading (lb P/acre)

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



FLOODPLAIN

FIGURE 2-15-1

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

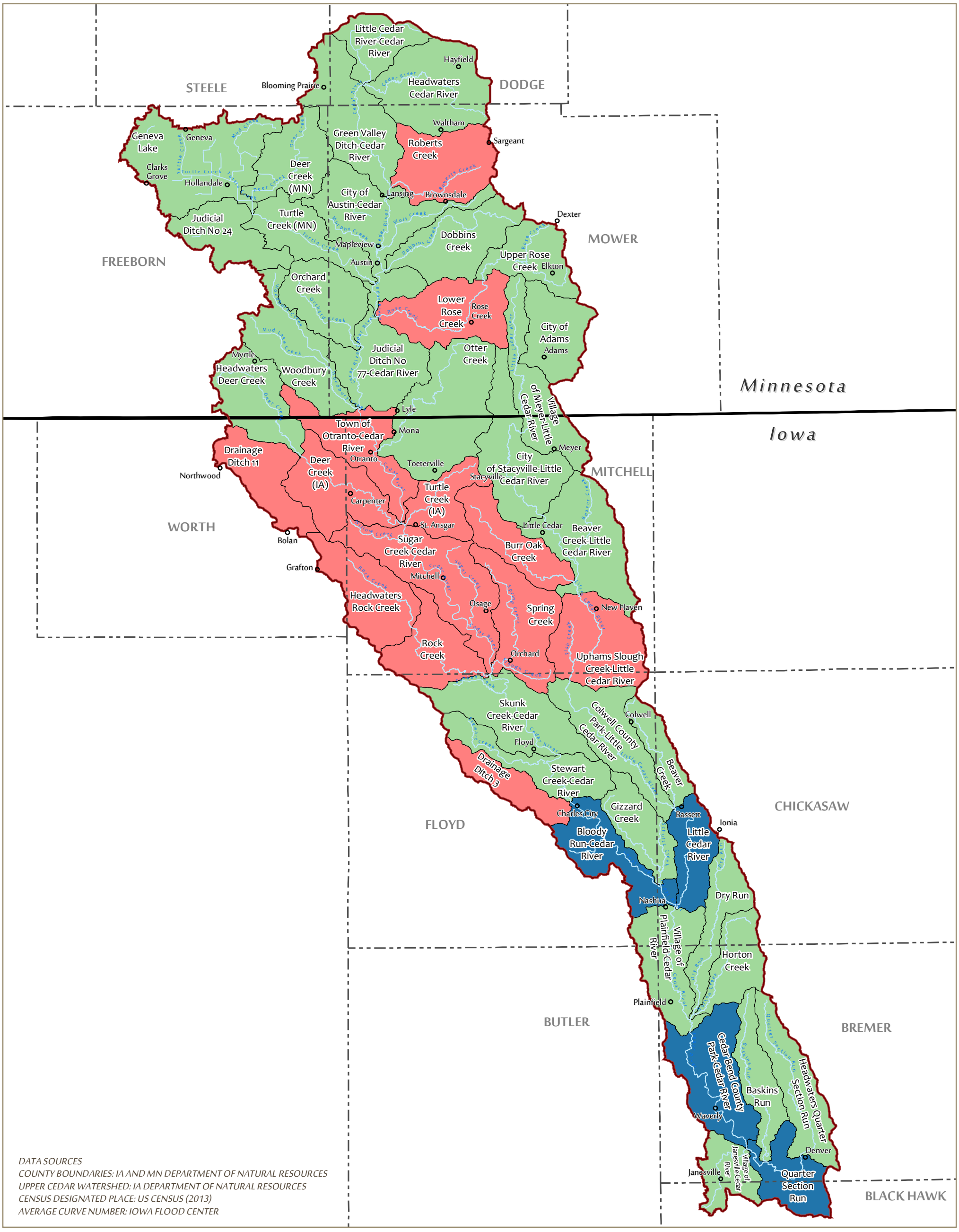
Iowa Border
Upper Cedar Watershed
County
Census Desginated Place

Special Flood Hazard Area
Zone AE - Floodway
Zone AE
Zone A

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
AVERAGE CURVE NUMBER: IOWA FLOOD CENTER

AVERAGE CURVE NUMBER

FIGURE 2-15-2

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place (2013)

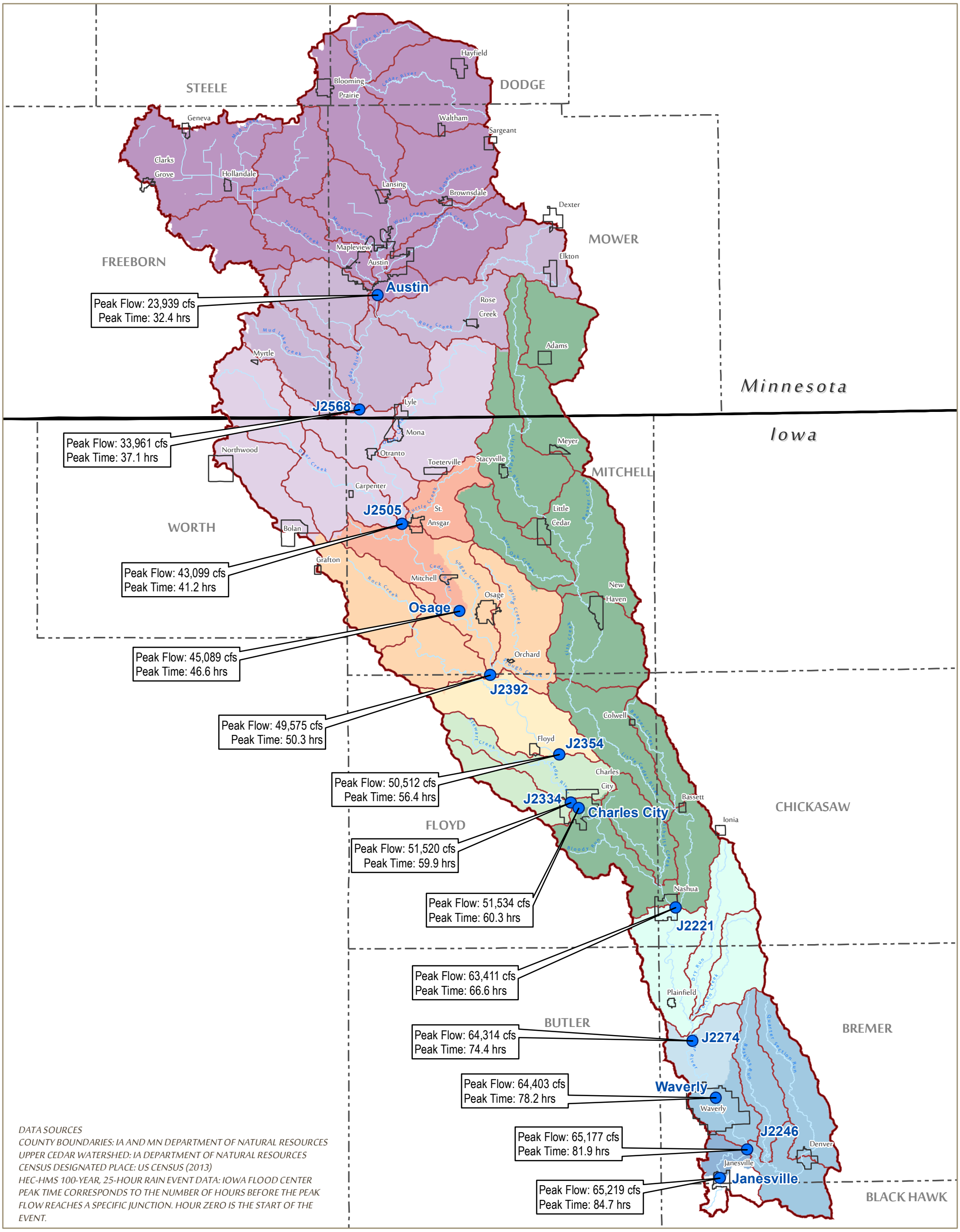
HUC 12: Average SCS Curve Number

- 70 - 73
- 74 - 77
- 78 - 80

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)
HEC-HMS 100-YEAR, 25-HOUR RAIN EVENT DATA: IOWA FLOOD CENTER
PEAK TIME CORRESPONDS TO THE NUMBER OF HOURS BEFORE THE PEAK FLOW REACHES A SPECIFIC JUNCTION. HOUR ZERO IS THE START OF THE EVENT.

HEC-HMS MODEL: 100-YEAR, 24-HOUR RAIN EVENT

FIGURE 2-15-3

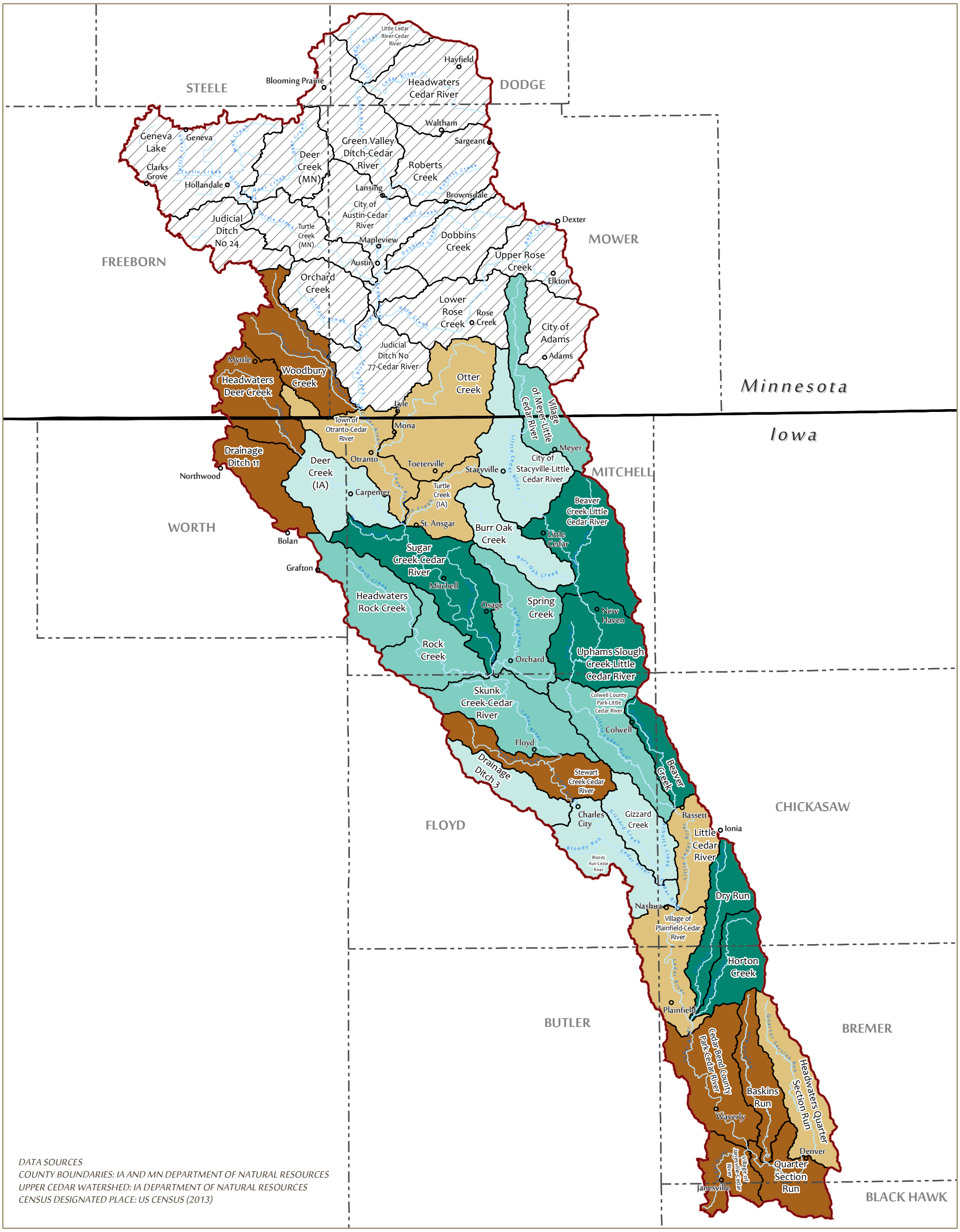
UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place
- HUC 12 Subwatershed
- Modeled Junction Locations on the Cedar River

MSA PROFESSIONAL SERVICES

N

0 1.25 2.5 5 Miles



DATA SOURCES
COUNTY BOUNDARIES: IA AND MN DEPARTMENT OF NATURAL RESOURCES
UPPER CEDAR WATERSHED: IA DEPARTMENT OF NATURAL RESOURCES
CENSUS DESIGNATED PLACE: US CENSUS (2013)

PRIORITIZED SUBWATERSHEDS

FIGURE 4-1-2

UPPER CEDAR WATERSHED MANAGEMENT AUTHORITY

- Iowa Border
- Upper Cedar Watershed
- County
- Census Desginated Place (2013)

PrioritySubwatershed_Rank

- 1 - 6
- 7 - 12
- 13 - 18
- 19 - 24
- 25 - 32

Subwatershed not included in ranking

MSA PROFESSIONAL SERVICES

N

0 1.75 3.5 7 Miles