

Jackson County Water Trail Plan



Jackson County, Iowa

Final
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Jackson County Board of Supervisors

Larry McDevitt
Mike Steines
Jack Willey

Jackson County Conservation Board

Mike Griffin
Jim England
Larry McDevitt
Lori Rolling
Kathy Wosoba

Plan Steering Committee

Nathan Jones
Curt Kemmerer
Kevin Kuhlman
Larry McDevitt
Lori Roling
Sue Siems
Jessica Wagner

Iowa Department of Natural Resources Staff

John Wenck, Water Trails Coordinator

Jackson County Staff

Nathan Jones, Executive Director
Jess Wagner, Environmental Education Coordinator

LT Leon Staff

Zach Carnahan, Civil Engineer
Luis Leon, Principal

ECIA Staff

Dan Fox, Senior Planner
Daryl Parker, Senior Planner

Plan Prepared By

East Central Intergovernmental Association
7600 Commerce Park
Dubuque, Iowa 52002
www.ecia.org

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“MAQUOKETA RIVER KAYAKERS” BY JACKSON COUNTY CONSERVATION

INTRODUCTION

Jackson County is located along the Mississippi River in eastern Iowa and is home to approximately 20,000 people. The county prides itself on providing a diverse blend of agriculture, industry, and tourism.

Jackson County's landscape is characterized by rugged hills, bluffs, limestone outcroppings, and many streams and rivers. Most of these streams flow into the Maquoketa River and the North Fork of the Maquoketa. The two rivers converge near the center of the county then continue east emptying into the Mississippi River on the county's eastern boundary.

Both the Maquoketa and the North Fork provide excellent opportunities for recreation. The Maquoketa is an established water trail, used by locals and paddlers from the surrounding region. The Maquoketa River is the more developed of the two rivers with several regularly spaced access points and many acres of public lands along the route. The North Fork is less developed with fewer amenities and longer distances between accesses. The river, however, is well known by locals, and those that have paddled the North Fork claim that it is one of the most beautiful stretches of river in the state. Together, both rivers provide a range of experiences from beginner to expert.

Purpose

The Jackson County Water Trail Plan will provide the community with a guide for future decision making. The plan establishes a vision for the future of the Maquoketa River and the North Fork and identifies a set of actions that the community can take to realize that vision. To achieve the vision established in this plan, the

community must actively work to incorporate its recommendations into its policies and budgets.

COMMUNITY ENGAGEMENT

The purpose of the Jackson County Water Trail Plan is to present a vision for the future of the Maquoketa River and the North Fork that is agreed upon by the people that make up the community. To ensure that the plan represents the views of the community the plan was developed in conjunction with a community engagement process.

The majority of the work for this plan was conducted during the COVID-19 pandemic. The project team employed a variety of strategies to conduct community engagement activities while adhering to public health guidelines. Strategies included virtual meetings, online surveys, and communication through the project website and social media.

Using these strategies, the project team was able to cope with pandemic-related challenges and achieve the goal of giving members of the Jackson County community opportunities to provide their input and help shape the plan during its development.

Steering Committee

Development of the plan was guided by a project steering committee whose members were selected by the Jackson County Conservation Board based on their experience with river related issues and familiarity with the area. The committee met throughout planning process and reviewed plan progress, worked on goals and objectives, identified issues, and provided feedback on draft documents. The committee served as representatives of the broader community. Early in the process, the committee participated in

brainstorming sessions to identify areas needing improvement and develop projects to address these needs. As the planning process moved forward the committee's role shifted to reviewing and providing feedback on draft chapters.

Project Website and Social Media

As part of the public engagement process, ECIA created and hosted a project website called jacksoncountywatertrails.org and a Jackson County Water Trails Facebook Page. ECIA used the site and the page to distribute information about the planning process and collect community input. Notices surveys, meeting information, reports and other information were posted on the website and Facebook page. The website also included a short survey form that allowed people to submit input on the plan. ECIA used the Facebook page to post notices that other organizations with Facebook accounts, like Jackson County Conservation, could share with their followers.

Community Survey

ECIA conducted a community survey to collect public input for the plan. ECIA worked with the project steering committee and Iowa DNR staff to develop the survey questions and design the questionnaire. Survey responses were collected through a twenty question Survey Monkey online questionnaire.

ECIA and the project steering committee used various communications channels to publicize the survey including word of mouth, online, and local media. The survey was announced in a press release that was distributed to local media outlets including the Maquoketa Sentinel-Press, Bellevue Herald Leader, and KMAQ Radio. The project team published survey announcement on the project website and project Facebook page. Jackson County Conservation and a number of conservation and recreation groups also shared

the survey notices with their Facebook followers. ECIA also shared the announcement with several email distribution lists including the Iowa DNR's paddle craft registration list.

ECIA created the online questionnaire using Survey Monkey. The survey page on the website included a link to the Survey Monkey form and instructions on how to fill it out. Jackson County Conservation made paper forms available at the Hurstville Interpretive Center. The Survey was opened on January 26, 2021 and closed on February 25, 2021. The online questionnaire collected a total of 333 responses. A summary of the survey results is provided as Attachment A to this document.

Land Owner Survey

ECIA conducted a survey of landowners along the proposed water trail route to collect their input on future water trail development. The survey questionnaire was distributed by mail to landowners. The survey was conducted in May and June of 2021. A summary of the survey results is provided as Attachment B to this document.

Meetings

The COVID-19 pandemic limited opportunities for in-person meetings, but ECIA and the Steering Committee worked to find ways to balance the need to meet with the need to keep everyone safe and healthy. Throughout the process ECIA and the steering committee members met with project stakeholders including county conservation board and staff, paddling enthusiasts, and law enforcement officials. Some key meetings are listed below.

Jackson County conservation hosted a law enforcement and land manager meeting on January 27, 2021. The in-person meeting was held in-person at the Hurstville Interpretive Center. The Center's meeting room was large enough to allow for adequate social

distancing. The meeting included good discussion of safety issues on the river and opportunities for future coordination between land managers and law enforcement.

An online public workshop was held via zoom on February 15, 2021. The meeting included a presentation by ECIA staff with discussion on the plan. The meeting was attended by a group of local residents who provided their ideas for the future development of the county's water trails.

An in-person workshop was held on December 13, 2021. At the meeting the project team presented a draft of the water trail plan and collected input from members of the community.

VISION, GOALS, AND OBJECTIVES

After considering all the input collected from the community through the planning process, the Jackson County community developed the following vision for the future of the Maquoketa River and the North Fork of the Maquoketa River.

Vision

The Jackson County community will embrace new opportunities to improve the recreational experience for river users while striving to preserve the ecological integrity of the river and improve water quality.

To help the community achieve its mission, the plan includes the following goals and objectives. The goals and objectives represent the most important topics that emerged through public input sessions and work with the Steering Committee.

Goal One: Provide positive water trail experiences meeting user expectations

- Balance water trail experience options between urban and rural, landform region, historic and cultural resource context, and waterbody types.
- Provide information allowing water trail users to select routes meeting desired skill levels, time available and accessibility needs.
- Minimize limitations to water trail experiences based on users age and physical abilities.
- Enhance safety education for water trail users including skill-building and hazard avoidance.

Goal Two: Use water trail development to strengthen natural resources conservation

- Avoid impact from intensive use to known highly-sensitive aquatic and land-based species and habitats.
- Implement low- or no-impact design standards for water trail amenities including parking areas, trails, and launches.
- Foster a greater sense of public awareness of and inspire citizen participation in watershed and restoration efforts on Jackson County's waterways.
- Coordinate with other related existing programs to enhance conservation efforts including the Maquoketa River Watershed Management Authority.

Goal Three: Adapt water trail development techniques to the waterway's individual character

- Minimize avoidable damage to new launches by locating them with consideration of flooding patterns, stream channel evolution, borrowing techniques from the field of stream restoration, using Chapter 3 of *Developing Water Trails in Iowa* as a guide.
- Choose construction methods and materials relative to ability to maintain launch.
- Encourage broad stakeholder participation in trail planning, development, and maintenance including landowners, volunteer groups, and liveries to consider unique, existing local features and develop within that context.

Goal Four: Support public access to water for recreational purposes

- Promote close-to-home recreation opportunities for Jackson County Residents.
- Encourage healthy lifestyles related to exercise and relaxation.
- Provide recreational activities that encourage area tourism and support local businesses.

Goal Five: Create a robust, resilient system for developing and experiencing water trails

- Implement Iowa DNR's systematic signage system for water trail users.
- Implement Iowa DNR's comprehensive dam hazard warning signage system.

Goal Six: Encourage education in outdoor settings

- Integrate historic and cultural resources awareness with recreational opportunities.
- Promote learning about landscape impacts resulting from land management choices, including water quality.

Goal Seven: Support positive water trail experiences by initiating strategies to manage intensively used areas

- Actively manage intensively-used areas at a high level
- Coordinate with emergency responders, law enforcement, and liveries for hazard mitigation, user conflicts and litter control.
- Maintain water trail accesses and signage to Iowa DNR's minimum requirements, and finalize water trail sponsor agreement.

EXISTING CONDITIONS

The following section provides an overview of the county, its rivers, and the surrounding area.

Jackson County Overview

Jackson County is located along the Mississippi River in eastern Iowa and is home to approximately 20,000 people. The county prides itself on providing a diverse blend of agriculture, industry, and tourism.

The county has thirteen incorporated cities. Maquoketa is the county seat and the most populous city with over 6,100 residents. It is located on the county's south side near the confluence of the Maquoketa River and the North Fork. Bellevue is the second largest city with about 2,100 residents and is located on the Mississippi River. Preston is the third largest community with around 1,000 people. The ten remaining communities have populations under 600. About forty percent of the county's population lives outside cities in its unincorporated areas.

Throughout the second half of the 20th century and into the first part of the 21st, the county's population has stayed around 20,000. The population grew from 18,622 in 1950, to 22,503 by 1980. It then dipped down to 19,950 in 1990 and has stayed about the same in the years since.

After the Mississippi, the Maquoketa River and North Fork of the Maquoketa River are the County's next largest rivers. The rivers flow predominantly west to east across the county, eventually emptying into the Mississippi River which flows along the county's eastern boundary. The only areas of the county not drained by the Maquoketa and the North Fork flow directly into the Mississippi.

The topography of the county is one of steeply rolling hills with rock outcrops and karst topography in some areas. Agriculture is the primary land use and a key part of the economy. The majority of the county's agricultural land is planted to corn and soybeans. In areas with steeper slopes, especially along rivers and streams, land cover consists of a mixture of forests and grasslands. Grasslands are primarily used for animal grazing or are in the conservation reserve program.

The county's rolling landscapes with numerous rivers and streams, caves, and other unique natural features make it a regional destination for outdoor recreation. Many of these areas are owned by public agencies and are open for a variety of activities such as camping, hunting, fishing, and paddling. Figure 1 provides a map of Jackson County showing the locations of the Maquoketa River and the North Fork as well as the county's cities and public lands.

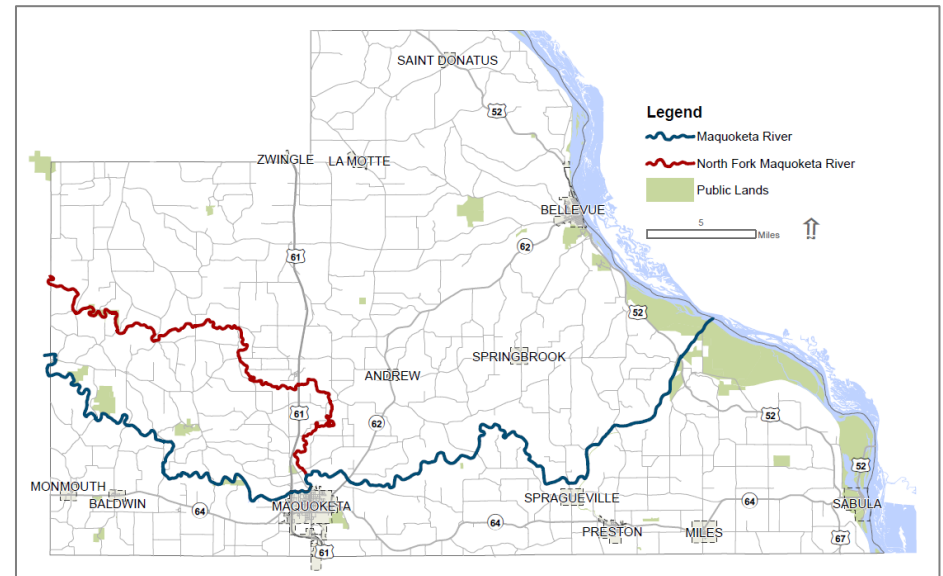


FIGURE 1. MAP OF JACKSON COUNTY



"MISSISSIPPI RIVER FROM BELLEVUE STATE PARK" BY ECIA

County History

The territorial legislature of Wisconsin acted to organize Jackson County in 1837, but archeological evidence suggests that humans have lived in the area for almost 13,000 years. According to a technical report produced by the University of Iowa's Office of the State Archaeologist:

Early settlers' accounts note large groups of Sauk, Meskwaki, and Ho-Chunk groups, of which some had moved to this area from the Wisconsin area due to European encroachment from the east. Some of the early European settlers to the Maquoketa area noted several large Native American camps and villages, which may have been established in the late eighteenth century. Prehistoric occupation around Maquoketa and near the confluence of the Maquoketa and North Fork Maquoketa rivers is also evident by multiple archaeological sites recorded in that area, some dating to the Archaic Period.¹

The earliest European settlers began arriving in Iowa in 1834 and 1835 and their numbers grew rapidly after the area was surveyed for settlement in 1838 and 1839. The United States Congress established the Territory of Iowa in 1838 and eight years later, in 1846, Iowa became state. After achieving statehood, Iowa's population expanded quickly. Early growth of Jackson County's communities was spurred by the extension of railroads which reached the city of Maquoketa in 1873.

The City of Maquoketa

The city of Maquoketa has historically served as a commercial and cultural center of the surrounding area. The area's first European settler, J.E. Goodenow, arrived in 1838 and established a village that he called Springfield. In 1850 a city was platted and recorded under the name Maquoketa. The City of Maquoketa was officially incorporated as a city by special act of the Iowa State Legislature in 1857. Maquoketa was established as the county seat of Jackson County in 1873. Prior to that, the county seat moved several times between the towns of Bellevue and Andrew.²

Today Maquoketa has a population of about 6,000 people. The community is rich in history and culture, surrounded by scenic natural beauty, and is home

to a strong arts community. The community's identity is intertwined in these qualities and is enhanced by the close-knit, small town feel.

The history of Maquoketa has been well preserved in a number of beautiful homes and structures. The city itself hosts nearly 40 sites listed on the National Register of Historic Places. In addition to the Maquoketa River, the community boasts many recreational facilities including Maquoketa Caves State Park, Prairie Creek Recreation Area, Hurstville Interpretive Center, and Horseshoe Pond Park. Cultural facilities include the Maquoketa Art Experience, the Ohnward Fine Arts Center, and the Old City Hall Gallery.

Maquoketa is historically an agricultural town, but light industry and distribution facilities are also important to the regional economy. As the county seat, many workers are employed in administrative and healthcare jobs that serve the surrounding region.



"DOWNTOWN MAQUOKETA" BY ECIA.

¹ See OSA Technical Report. 23

² See Historical Atlas of Iowa, 1875. 443

The City of Bellevue

Bellevue is located along the Mississippi River on the east side of Jackson County. The location along the river meant that the area was one of the first in the territory in that is now Iowa to be settled by Europeans, making Bellevue one of the state's oldest cities. The city is named after its first European settler, John D. Bell, who built a cabin in 1835.³ Early on, the city of Bellevue was a hub of economic activity and was named the county seat of Jackson County. Bellevue served this role until 1841 when county residents voted to move the seat to a more centralized location. The Bellevue area is home to Bellevue State Park, one of the oldest state parks in the Iowa. The original 47 acres of park land was donated to the State of Iowa in 1925.



“DOWNTOWN BELLEVUE AND MISSISSIPPI RIVER.” BY CITY OF BELLEVUE.

Hurstville Lime Kilns

The town of Hurstville, located near the confluence of the Maquoketa River and the North Fork, was the site of some early industry in the area. The Hurstville Lime Kilns heated locally-mined limestone to produce limestone mortar. Alfred Hurst constructed the first lime kilns in 1870 and by 1871 was producing 100 barrels of lime per week. By its peak, the company was producing 3,200 barrels per year and the town of Hurstville grew to include twenty-five to thirty houses, a boarding house, general store, post office, blacksmith shop, and a large farming operation with several buildings.⁴ With

³ See Historical Atlas of Iowa, 1875. 444

⁴ See Sauer. 2-3

⁵ See “Hurstville Lime Kilns”

the invention of Portland cement in 1914, sales of limestone mortar sharply declined and the kilns were closed permanently in 1930. The kilns sat vacant for many years, but in the 1970s and 80s, the community undertook a restoration and preservation effort. Today the Hurstville Lime Kilns historic site is owned by Jackson County and managed by the Jackson County Conservation Board.⁵



“HURSTVILLE LIME KILNS.” BY MAQUOKETA CHAMBER OF COMMERCE.

Located a half mile south of the lime kilns site, the Hurstville Interpretive Center offers a variety of indoor and out door exhibits and activities including a model of the historic town of Hurstville. The center also houses the offices of the Jackson County Conservation Department.



“HURSTVILLE INTERPRETIVE CENTER” BY GRANT WOOD LOOP

River Conditions

Maquoketa River

The headwaters of the Maquoketa River are located in the southeast corner of Fayette County near the town of Arlington and about 20 miles northeast of the city of Oelwein. The river flows in a southeasterly direction into Delaware County through the cities of Dundee, Manchester, and Hopkinton. In Jones County the river flows along the north side of the city of Monticello. The Maquoketa crosses into Jackson County near the town of Canton flowing east towards its confluence with the North Fork north of the city of Maquoketa. From there, the river continues east and northeast for another 30 miles before emptying into the Mississippi River on Jackson County's eastern boundary.

North Fork of the Maquoketa River

The North Fork of the Maquoketa River begins in Dubuque County near its northern boundary with Clayton County. The river flows south through the cities of Dyersville and Cascade cutting through the northeast corner of Jones County and passing into Jackson County near the Ozark Wildlife Area. The North Fork meanders in a southeasterly direction through Jackson County and empties into the Maquoketa River just north of the city of Maquoketa.

Maquoketa River Watershed

A watershed is an area of land that is drained by the same body of water. Within the watershed all rain water eventually ends up in the same river, lake, or ocean. Rivers and streams are hierarchical systems that begin where surface runoff flows into a small stream. The small stream then flows into a river that eventually empties into a larger river. This continues until the water reaches its final destination like an ocean or lake.

Like rivers, watersheds are also hierarchical systems with smaller watersheds nested inside larger watersheds. The watersheds of small streams that flow into the same river combine to make up the river watershed. Then, the river watershed combines with watersheds from other rivers to make up a larger watershed.

The Maquoketa River watershed covers 1,196,960 acres and touches parts of nine eastern Iowa counties. In 2010, around 59,000 people lived within the watershed boundary. Cities located in the watershed include Cascade,

Dyersville, Manchester, Maquoketa, and Monticello. The watershed is part of the larger Mississippi River Basin. Figure 2 maps the watershed.

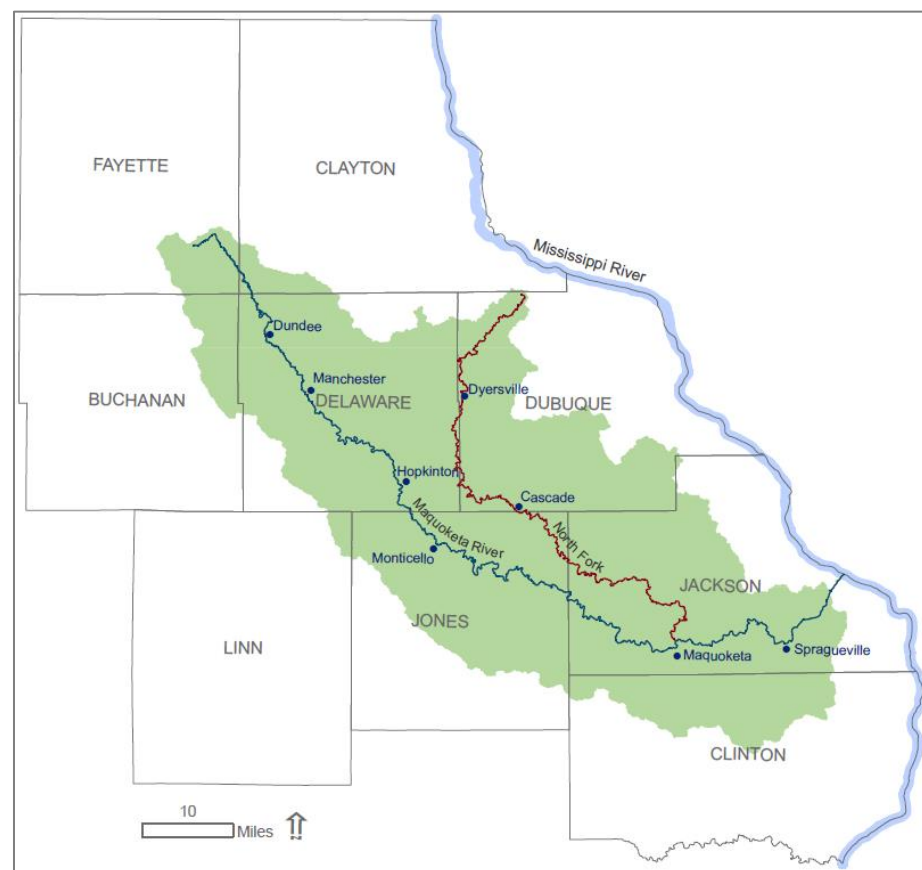


FIGURE 2. MAQUOKETA RIVER WATERSHED

Meandered and Non-Meandered Streams

In Iowa, people are allowed to paddle or navigate on any stream with enough flow to support a small watercraft (*navigable stream*). On some rivers people are allowed access to the stream beds and banks (*meandered stream*), while on others access is more restricted and people are only allowed to float on the water (*non-meandered streams*).

Under Iowa law, river usage rights are determined based on whether the river is designated as a *meandered* or *non-meandered stream*. It is important to understand that this legal terminology (navigable, meandered, and non-meandered) has nothing to do with the character of the river itself. Original public

land surveys, conducted before Iowa became a state, designated a number of the state's rivers as meandered. All other streams are designated as non-meandered. On meandered rivers, the streambed and banks up to the ordinary high-water mark (usually where vegetation begins) are held in public trust for all. River users are allowed unrestricted access to stream beds and can camp on sandbars without concern of trespass. However, on non-meandered rivers, which are the majority of rivers in the state, users are only allowed to float on the water's surface.

Questions lingered. What if you came upon a river-wide obstruction, such as a downed tree or an electric fence? What if we wanted to take a break on a sandbar, or fish? To answer these questions, the Attorney General's office offered Opinion No. 96-2-3 in 1996 stating "activities incident to navigation, including fishing, swimming, and wading" are allowed on non-meandered streams. The DNR has used this as guidance ever since.⁶

In Jackson County, the Maquoketa River is designated as meandered from the mouth at the Mississippi River, upstream 26 miles to the city of Maquoketa. The remaining portion of the Maquoketa River and the North Fork of the Maquoketa River are non-meandered. Figure 3 maps state-designated meandered streams in Iowa.⁷

River Flooding

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss in Jackson County. Eastern Iowa has experienced numerous flood events and the loss of millions of dollars in property and crop damage over the past 25 years.

Flooding is a regular occurrence on the Maquoketa River and North Fork. According to the Jackson County Multi-Jurisdictional Hazard Mitigation Plan, the Maquoketa River floods a minimum of four times annually.⁸

High water can be dangerous for paddlers. Rivers are constantly changing, and during a flood big changes can occur quickly. High water makes the river move faster and with much greater force. A flooded river can also be filled with tree branches and other debris that can be hazardous for paddlers. It is

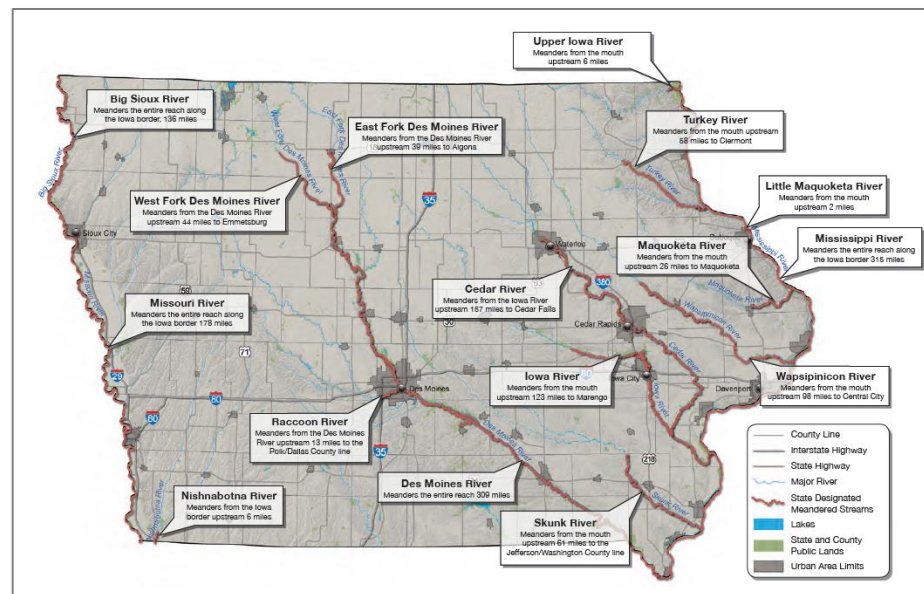


FIGURE 3. STATE-DESIGNATED MEANDERED STREAMS

important for paddlers to know the river and know the river level means for paddling conditions before going out on the water.

Flooding also creates maintenance issues for river accesses. Following a flood, land managers must clear the mud and debris deposited by the flood waters in boat ramps and parking areas. They must also replace signs, picnic tables, and other items that are carried away by flood waters.

The City of Maquoketa has an earthen levee that runs along the Maquoketa River. While the levee has not failed, it has been topped and the potential for failure exists. In 2010 the Lake Delhi Dam, upriver from Maquoketa in Delaware County, failed, and caused significant flooding in the City of Maquoketa. The Delhi Dam has since been reconstructed and City has worked to extend the levee to protect its wastewater treatment facility.

⁶ See "Iowa Attorney General's Opinion No. 96-2-3"

⁷ See "Developing Water Trails in Iowa" p 1-8.

⁸ See "Jackson County Multi-Jurisdictional Hazard Mitigation Plan"

Impaired Waters

Monitoring and improving water quality is a key aspect of water trail planning and development. Pollution can lead to water conditions that will drive recreational users away. Recreational users that experience water that is murky, green, and foul-smelling will probably find a different location for their next trip.

Pollution can also cause chemical and physical changes that are less obvious but no less important to stream condition. One example is the types of fish or other species present in the water. The specific species living in a stream segment depends on the chemical condition of water. The physical structure of the water body, such as layers of eroded soil in the bottom of the channel or lake, may also impact what is able to live there. For example, a river with impaired water quality may still contain invertebrates, but the collection of invertebrate species present will differ as compared to what lived there prior to the current levels of pollution.

The Clean Water Act requires states to submit a list of waters which do not meet state water quality standards. The failure to meet water quality standards might be due to an individual pollutant, multiple pollutants, "pollution," or an unknown cause of impairment. The list includes waters impaired by point sources and non-point sources of pollutants. The state also establishes a priority ranking for the listed waters, taking into account the severity of pollution and uses.

Iowa's most recent list of impaired waters was completed in 2018. The list includes lakes, wetlands, streams, rivers, and portions of rivers that do not meet all state water quality standards. These are considered "impaired waterbodies" and states are required to calculate total maximum daily loads (TMDLs) for pollutants causing impairments.⁹

The Iowa DNR's 2018 report identifies portions of the Maquoketa River and the North Fork as impaired. Figure 4 maps Jackson County's impaired waters.

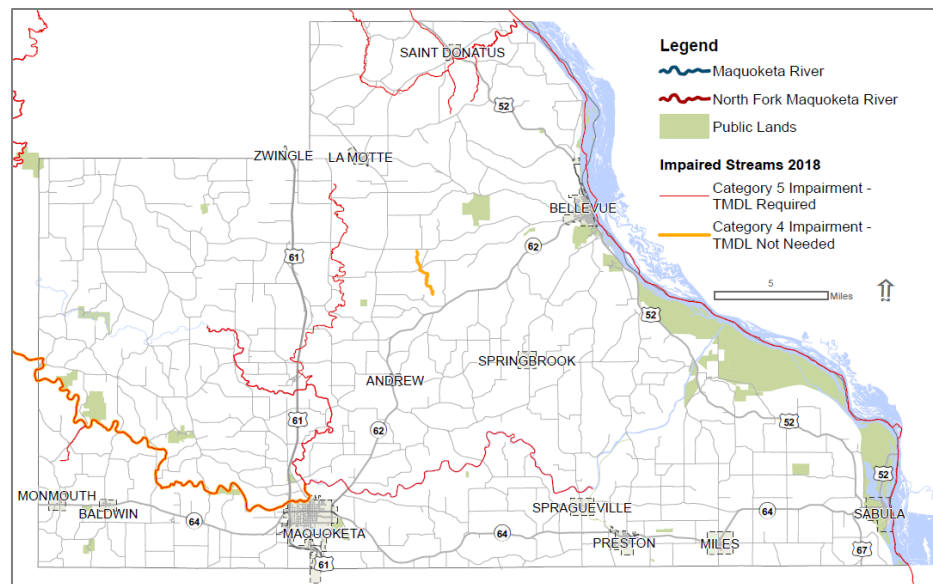


FIGURE 4. IMPAIRED WATERS IN JACKSON COUNTY

While segments of the Maquoketa River and the North Fork are listed as impaired, they are still safe for recreational use. According to the Iowa's State Water Trail Plan: "For water trail users, "impaired" water quality can range from having no bearing whatsoever on our experience to conditions that make people ill through contact with or ingestion of the water."

Maintaining safe and healthy rivers is key to the development of water trails in Jackson County. The communities of Jackson County should continue to monitor the quality of the county's waters and work with the Iowa DNR, landowners, and other partners to improve water quality.

⁹ See "Impaired Waters."

Natural Resources

Geology

The Maquoketa River watershed is part of a larger territory known as the Driftless Area, a 16,000 square mile region that includes portions of Iowa, Illinois, Minnesota, and Wisconsin. Over thousands of years, multiple continental glaciers expanded and receded flattening the landscape in most of the upper Midwest. During this ice age period, from about 2 million years ago to about 13,000 years ago, most of North America was covered repeatedly by massive continental glaciers, but they all missed the Driftless Area. With no glaciers to smooth the landscape, the area retains a rugged terrain that supports unique habitats, soils, and ecosystems. The name “driftless” refers to the lack of glacial drift, the dirt and rocks left behind when continental glaciers melted thousands of years ago. Geologists know that glaciers never made it to the area because glacial drift is not present in the area’s soils, hence the name driftless.¹⁰ Figure 5 illustrates the maximum extent of the most recent ice age glaciers.

Karst topography is one of the geologic characteristics that is found throughout the driftless area and in Jackson County. This terrain is characterized by the presence of easily dissolved bedrock (limestone and dolomite) near the ground surface. Because these rocks can be dissolved by groundwater, karst areas are often characterized by sinkholes, springs, and losing streams where some surface flow is lost to groundwater. The dissolvable bedrock present in the area led to the formation of the caves in Maquoketa Caves State Park and the limestone bluffs and outcroppings found along the area’s rivers. The photos to the right provide examples of some of the unique geological formations found in Jackson County. Figure 7 maps the exposed bedrock and geological points of interests along the Maquoketa and North Fork.

Over the years the name Driftless Area has grown beyond a term used exclusively by geologists, finding a place in the area’s popular culture. Numerous restaurants, festivals, a magazine, and a clothing brand have been named in honor of the region. Colloquial use of the term driftless speaks to the area’s uniqueness and cultural importance.

¹⁰ See “Driftless Area Landscape Conservation Initiative.”

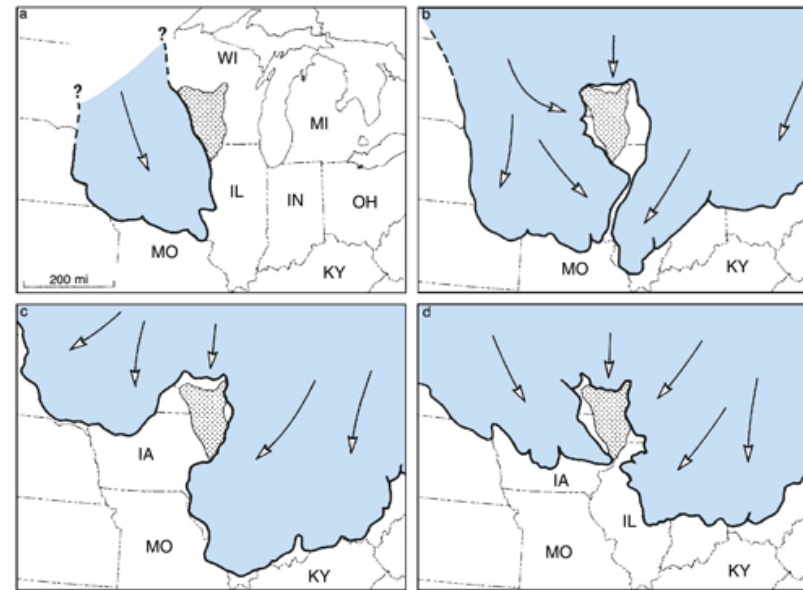


FIGURE 5. MAXIMUM EXTENT OF PLEISTOCENE EPOCH GLACIERS, DRIFTLESS AREA SHOWN BY STIPPLED PATTERN; ARROW INDICATES DIRECTION OF ICE MOVEMENT; (A) EARLY PRE-ILLINOIS GLACIAL EPISODE (1,000,000± YEARS AGO); (B) LATE PRE-ILLINOIS GLACIAL EPISODE (600,000± YEARS AGO); (C) ILLINOIS GLACIAL EPISODE (250,000± YEARS AGO); (D) LATE WISCONSIN GLACIAL EPISODE (22,000 YEARS AGO) SEE “GLACIERS SMOOTH THE SURFACE”



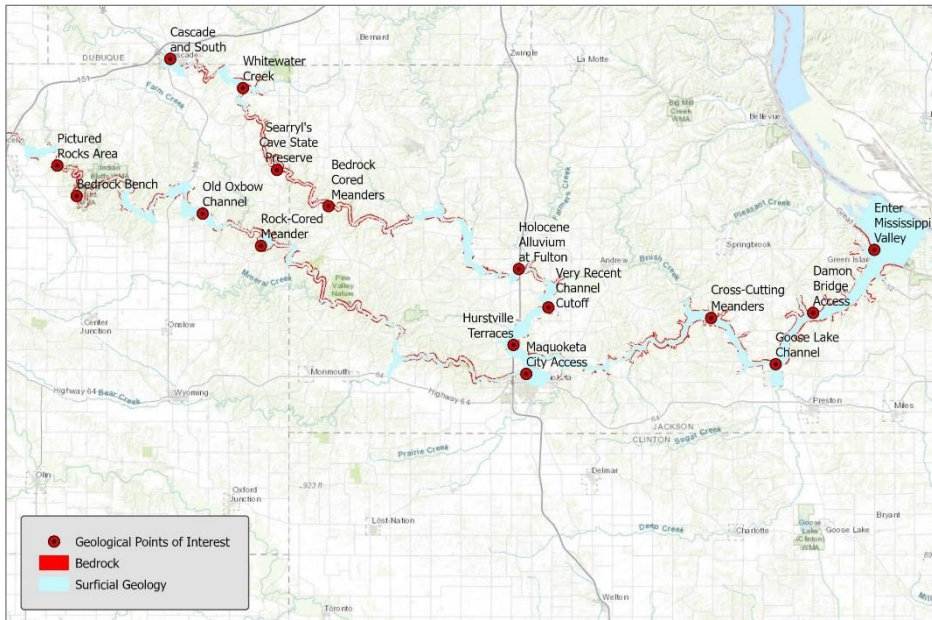


FIGURE 7. EXPOSED BEDROCK AND GEOLOGICAL POINTS OF INTEREST

Aquatic Life

A diverse collection of fish and other aquatic animals not only makes a river a good fishing spot, it is also an important indicator of stream health. Streams with clean, healthy water provide good habitats for aquatic life, while streams impaired by pollution do not. Researchers with the Iowa DNR collect samples of fish and other small animals such as insects, crustaceans, leeches, and snails from the state's streams and rivers. The DNR then uses an online application called BioNet to collect and analyze this biological information and make it available for public use.

To collect samples, researchers use devices that generate an electric current to temporarily stun the fish and other aquatic animals so they can be netted, examined, counted, and released back into the water. The researchers then combine many individual measurements to create an index of general stream health. Iowa DNR reports two indexes: the Fish Index of Biotic Integrity (FIBI) and the Benthic Macroinvertebrate Index of Biotic Integrity (BMIBI). Benthic Macroinvertebrates refer to non-fish aquatic animals such as insects, crustaceans, leeches, and snails. Figure 6 maps the most recent IBI scores for

¹¹ Cohen, Dan p 17.

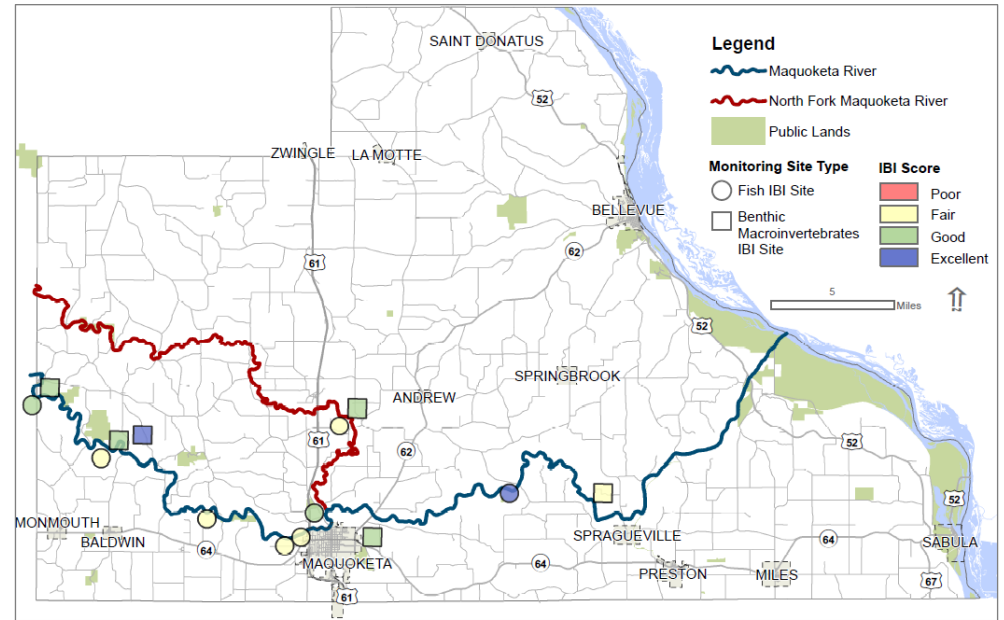


FIGURE 6. IBI MONITORING SITE SCORES

monitoring sites on the Maquoketa River and the North Fork in Jackson County. Scores on the Maquoketa and the North Fork range from fair to excellent.

Vegetation and Wildlife

The Maquoketa River, North Fork, and surrounding area provide unique landscapes and excellent opportunities for wildlife viewing and birdwatching. The range of landscapes found across Jackson County provide habitats for a diverse population of wildlife.

Biological reconnaissance reports commissioned by the Iowa DNR described the area along the North Fork of the Maquoketa River as a “diverse mix of woodlands, open areas, and cropland.”¹¹ The report identified a large variety of bird species in the area trials including, turkey vultures, eagles, belted kingfishers, wood ducks, sandpipers, and red-bellied woodpeckers. In addition to birds, the reconnaissance reports also observed a variety of animals and insect species present in the area including deer, racoon, muskrat, and butterflies.¹²

¹² See Cohen, Dan for the full biological reconnaissance report.

The Green Island Wildlife Management and the Upper Midwest Mississippi Wildlife Refuge are considered some of the best birdwatching locations in the entire state of Iowa. The area's 4,000 acres of wetlands and wooded uplands hosts more than 250 species of birds. Some consider it to be the "crown jewel of Iowa wetlands."¹³ The U.S. Fish and Wildlife Service manages migratory birds based on the migration routes they take between nesting and wintering areas. The project area is located in the Mississippi Flyway, one of four administrative areas established in North America to facilitate the management of Migratory Birds.¹⁴

According to the Audubon society, more than 325 species of birds use the Mississippi flyway as a migration route from nesting grounds in Canada and the northern U.S. to their wintering grounds in the Gulf of Mexico and in Central and South America.¹⁵

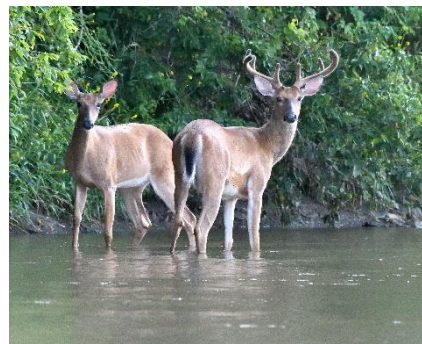
The photos below represent some of the wildlife that paddlers can expect to see along the water trail.



"DAMSELFLY AMERICAN RUBYSPOOT"



"LOCUST GRASSHOPPER"



"BUCK AND DOE LOOK BACK"



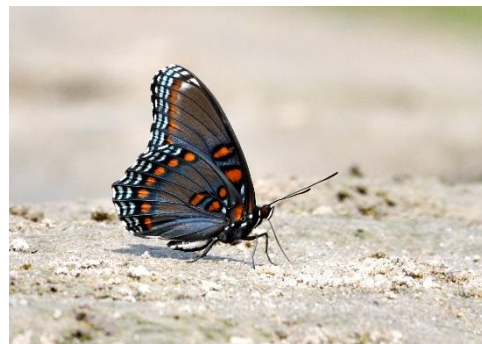
"WOOD DUCK HEN OPEN BEAK"



"ADULT BALD EAGLE PERCHED"



"INDIGO BUNTING SINGS"



"BUTTERFLY - RED-SPOTTED PURPLE"



"SANDPIPER MARCHES"

PHOTOS TAKEN ON THE NORTH FORK OF THE MAQUOKETA RIVER BY DAN COHEN, JULY 24-25, 2021.

¹³ See Caswell, Brandon.

¹⁴ See "Flyways."

¹⁵ See "Mississippi Flyway."

River Management

Rivers and streams in Jackson County are managed by a collection of conservation and public safety agencies that are charged with law enforcement and emergency response on the county's rivers. The list of agencies includes:

- Jackson County Conservation Officers
- Jackson County Sheriff
- Jackson County Emergency Management Agency
- Iowa Department of Natural Resources Conservation Officers
- Maquoketa Fire Department
- Maquoketa Police Department
- Preston Fire Department
- Bellevue Fire Department

The project team convened a meeting with law enforcement agencies and area land managers on January 27, 2021 at the Hurstville Interpretive Center. The law enforcement agencies reported that most calls for service on the rivers are for search and rescue. Many times, people don't know how long it will take to float a stretch of river and are reported missing by friends and family when they don't return on time. In most cases search and rescue personnel are able to locate the missing river users quickly, but in some locations the closest boat ramp can be a good distance away, slowing the process. The group also noted that law enforcement is also called to the river for reports of trespassing, vandalism, and underage drinking.

Jackson County Conservation manages and maintains the majority of the public lands and river accesses along the Maquoketa and the North Fork. The City of Maquoketa manages one access within city limits. Iowa DNR manages the Green Island Wildlife Management Area near the mouth of the Maquoketa.

Overall, Jackson County's land managers and law enforcement agencies have worked closely in the past and have pledged to continue to do so in the future. The Maquoketa and the North Fork have been used as water trails for many years and while there is always room for improvement, no agency has raised major objections to the continued development of Jackson County's water trails.

Public Lands Near the Water Trail

The Maquoketa River and North Fork water trails feature a number of public lands that are immediately adjacent to the river or within few miles. These lands provide a variety of options for outdoor recreation for paddlers looking to venture out of the river's banks.

State Parks

Jackson County is home to two popular state parks: Bellevue State Park and Maquoketa Caves State Park. The state also owns the 4,000-acre Green Island Wildlife Management Area on the east side of the county.

Bellevue State Park

Just south of the city of Bellevue along US Highway 52, Bellevue State Park encompasses a total of 770 acres divided between two separate tracts of land. The Nelson Unit is located immediately adjacent to the Bellevue city limits atop a 300-foot limestone bluff. The Dyas Unit is located two miles farther south on US Highway 52.

The park features scenic views of the Mississippi River, timbered walking trails, a unique butterfly sanctuary, and an enclosed nature center. The park offers a number of camp sites with electrical hook ups, modern restrooms, showers, and a sanitary dump station. The park's four miles of hiking trails feature scenic overlooks, a stream, bird and wildlife viewing, and woodland and prairie landscapes. The South Bluff Nature Center contains a variety of educational exhibits on the plants, animals, and geology of the park. The park's southern boundary is located about five miles north of the Maquoketa River.

Green Island Wildlife Management Area

The Green Island Wildlife Management Area is a 4,000-acre state-managed area located in eastern Jackson County just south of the Maquoketa River's confluence with the Mississippi. The Iowa DNR partnered with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and Ducks Unlimited to help design and develop the area. The area includes a mix of mostly wetlands with some wooded uplands and is a popular location for bird watching, duck and deer hunting, and paddling. In recent years Green Island has seen an increase in use by paddlers. Jackson County Conservation leads organized events for paddlers of various skill levels in the area.

Maquoketa Caves State Park

Maquoketa Caves State Park is located on Iowa Highway 428 (Caves Rd) seven miles northwest of Maquoketa. The park's caves, limestone formations and rugged bluffs make it one of Iowa's most unique state parks.

The park contains more caves than any other state park in Iowa. The caves are all different sizes and shapes. Some can be explored by walking while others can best be seen by crawling. A six-mile trail system links the park's caves, formations, and overlooks while providing an exciting hiking experience. Trail highlights include the dramatic "Natural Bridge" which stands nearly fifty feet above Raccoon Creek, and the seventeen-ton "Balanced Rock."

The park's interpretive center contains detailed information about the geology of cave formations, park history, and a background of the early inhabitants of the park. Other features include bird watching, camping, hiking, picnic shelters, playground, restrooms, and showers.



"NATURAL BRIDGE AT MAQUOKETA CAVES STATE PARK" BY ECIA

County Parks

Jackson County Conservation manages thirty-eight individual parks, natural areas, timber preserves, historic sites, river accesses, and campgrounds; encompassing over 2,200 acres across the county. The County's areas provide both primitive and modern facilities including the Hurstville Interpretive Center, two modern campgrounds, bike trail, marina, and historical structures such as a one-room schoolhouse and the Hurstville Lime Kilns. In addition,

the county maintains trails, shelters, boat ramps, and primitive campsites. This section includes a description of the county's parks and facilities that are located within two miles of one of the water trail routes.

Black Hawk Wildlife Area

Blackhawk Wildlife area is a 180-acre public hunting area located on the Maquoketa River. Jackson County purchased the area in four different parcels, including a former Boy Scout Camp and a YMCA camp. The area includes a two-mile system of hiking trails and is open for equestrian use June – August.

Area Features: hiking trails, cross country skiing, public hunting, equestrian use (June-August), and bird watching

Buzzard Ridge Wildlife Area

Buzzard Ridge Wildlife Area's 237-acres include a variety of unique landscapes that include limestone outcroppings, upland timber, flood plain, wildlife, and panoramic scenery. The area is located on the Maquoketa River and has a primitive camping area with restrooms on the river's edge. The area can be accessed from the river or by hiking trail. The river is about a one-mile hike from the nearest parking lot. The area is a frequently used stop for canoeists and kayakers traveling along the river. Jackson County Conservation maintains a number of wildlife food plots throughout the area that help wildlife survive harsh winters.

Area Features: bird watching, boating, hiking (two miles of trail), hunting, picnicking, pit toilets primitive camping (walk-in, tent only) stream fishing, and wildlife viewing.



"MAQUOKETA RIVER VIEWED FROM OVERLOOK AT BUZZARD RIDGE" BY ECIA

Frazier Wildlife Area

An eight-acre area downstream from Chenelworth Access. South of Bluff Lake Catfish Farm and 0.3 miles SW of Maquoketa Caves. Owned by Jackson County Conversation.

Hurstville Interpretive Center

The Hurstville Interpretive center provides a variety of education and recreation opportunities and serves as the headquarters of Jackson County Conservation. The center is located on US Highway 61 about a mile north of Maquoketa and about a half mile west of the North Fork of the Maquoketa River. The center houses the offices of the Jackson County Conservation Department along with twenty indoor and outdoor exhibits and activities including an enclosed bee hive, live reptiles, resident trumpeter swans, and a railroad model of the historic town of Hurstville. The center has staff on hand to provide visitors with information on natural resources and other attractions in Jackson County. The center's community room is used for board meetings and can be reserved for group meetings and events. The center is located on forty-eight acres that include a fifteen-acre restored prairie, an eighteen-acre wetland with boardwalk, observation deck, and bird blind, and a half-mile hiking trail. An additional twenty-acre area with a fishing pond is on the west side of US Highway 61. The Hurstville Lime Kilns site is located about half a mile north of the Interpretive Center.

Bear River Recreation Trail

The 3.8-mile Bear River Recreation Trail follows old railroad right-of-way beginning in Spragueville, runs along the Maquoketa River, and ends at 435th Avenue. The trail has a crushed limestone surface, parking areas at both ends, and is open for biking, hunting, and cross-country skiing. Scenic overlooks along the trail provide views of the Maquoketa River valley and its limestone bluffs. The trail also connects to the two-and-a-half-mile Copper Creek Trail that runs south from Spragueville to Preston.

Joinerville Park

Joinerville Park is located along the Maquoketa River about four miles west of Maquoketa. The park is a popular river access and is a major recovery point for paddlers that float down the river. The six-and-a-half-acre park is open for day use year-round. A special use permit is required for overnight camping.



"CHILD PADDLING AT HURSTVILLE POND" BY JACKSON COUNTY CONSERVATION

Area Features: Maquoketa River access, concrete boat ramp, and gravel parking.

Ozark Wildlife Area

Two miles north and a half mile east of Canton is a 323-acre wildlife area on one of Iowa's most scenic waterways, with steep limestone bluffs and rolling hills. The North Fork of the Maquoketa River winds through the entire area with the remote undeveloped land providing excellent wildlife habitat for deer, turkeys, squirrels, and many non-game species. This public hunting area has a developed trail system and a primitive backpack campground. The area can be accessed at three locations: 40th Avenue, 60th Avenue, and 187th Street. The North Fork river access is located near the 60th Avenue entrance.

Area Features: hiking trails (5 miles of trail), stream fishing forest hunting, primitive camping, access to North Fork of the Maquoketa River, bird watching, and wildlife viewing.

Pine Valley Nature Area

Pine Valley Nature Area's 676 acres encompass some of the most diverse resource areas in Jackson County. The area features high-quality woodlands, rare plants and animals, historical past, scenic quality, and archeological

significance. Visitors can explore the area using its eight miles of hiking trails. Several streams run through the area including Pine Creek. The Maquoketa River runs along a portion of the area's southern boundary, but the area does not have a developed access. The closest access is about a half mile upstream at Millertown.

Area features: hiking trails and forest and upland hunting.

[Prairie Creek Recreation Area](#)

Prairie Creek Recreation Area is a 273-acre property located on the southeast side of Maquoketa. Jackson County Conservation accepted the land by donation in 2014 and has made several improvements to the area since taking ownership. The park features a picnic pavilion with fireplace and restrooms, over five miles of hiking trails, a two-acre fishing pond, archery hunting, and one and a half miles of Prairie Creek. After exiting the north side of the park, Prairie Creek flows another 1.3 miles north before emptying into the Maquoketa River.

[Richardson Timber Preserve](#)

Richardson Timber Preserve is a 20-acre tract of land that the County is preserving as an example of a typical Iowa oak/hickory forest. The park features hunting, hiking trails, and a diverse collection of wildlife and flowers.

City Parks

Maquoketa has nine parks that offer a variety of recreational amenities. A five-member park board oversees the City's parks related activities.

[Fifth Ward Park](#)

Fifth Ward Park is located on W. Summit Street. The park features playground equipment, tennis courts, a softball field, a picnic shelter, and restrooms.

[First Ward Park](#)

Maquoketa's First Ward Park is located on E. Quarry Street between Eliza Street and Otto Street. The park features playground equipment, a picnic shelter, basketball courts, and restrooms.

[Horseshoe Pond Campground](#)

Horseshoe Pond Campground is located on S. Main Street on Maquoketa's south side. Originally constructed by the Izaak Walton league in the 1930s, the park's two-acre pond was acquired by the City of Maquoketa in 1985.

The park's campground has twenty-two electrical sites and five primitive sites. In addition to camping and fishing, the park also features playground equipment, picnic shelters, and volleyball.

[Maquoketa City Ball Park and Skate Park](#)

The park is located on the north side of on Old Highway 61 adjacent to the Maquoketa River. The park is located on the Maquoketa River Trail near the city of Maquoketa River access and near the Maquoketa River bicycle and pedestrian trail and bridge over the Maquoketa River.

[Second Ward Park – Little Bear Park](#)

Located on W. Quarry Street next to Briggs Elementary School, Little Bear Park features a playground that was redesigned and rebuilt by the Maquoketa community in 2013. The park also features horseshoes, a picnic shelter, paved parking and restrooms.

Upper Mississippi Wildlife Refuge

Public Lands along the Mississippi River are part of the Upper Mississippi Wildlife Refuge. The refuge is located in parts of the states of Minnesota, Wisconsin, Iowa, and Illinois. The refuge covers over 240,000 acres along 261 river miles between Chippewa River in Wisconsin to Rock Island Illinois. About 15,500 acres of the area are located within Jackson County. The refuge encompasses one of the largest blocks of floodplain habitat in the lower 48 states. Bordered by steep wooded bluffs that rise 100 to 600 feet above the river valley, the Mississippi River corridor and refuge offer scenic beauty and productive fish and wildlife habitat unmatched in the heart of America.

Existing Water Trails

While not currently included in the Iowa DNR's state-wide water trail network, the Maquoketa River and the North Fork of the Maquoketa River in Jackson County are regarded by many paddlers to be among the top destinations in the state for canoeing and kayaking. Over many years Jackson County Conservation has worked to acquire land along the rivers and install access points with boat ramps and other amenities like parking, camping, and restrooms. This section includes a description of the existing conditions on the Maquoketa and North Fork water trails.

Current Water Trail Map

Water trail maps and a brochure for the Maquoketa River in Jones and Jackson Counties were developed in 2008. The maps show access points and provide descriptions of amenities available along the river. The brochure and maps are available to download on the Iowa DNR and Jackson County websites. Large versions of the maps are also posted at river accesses in Jackson County. The current water trail map is shown in Figure 8.

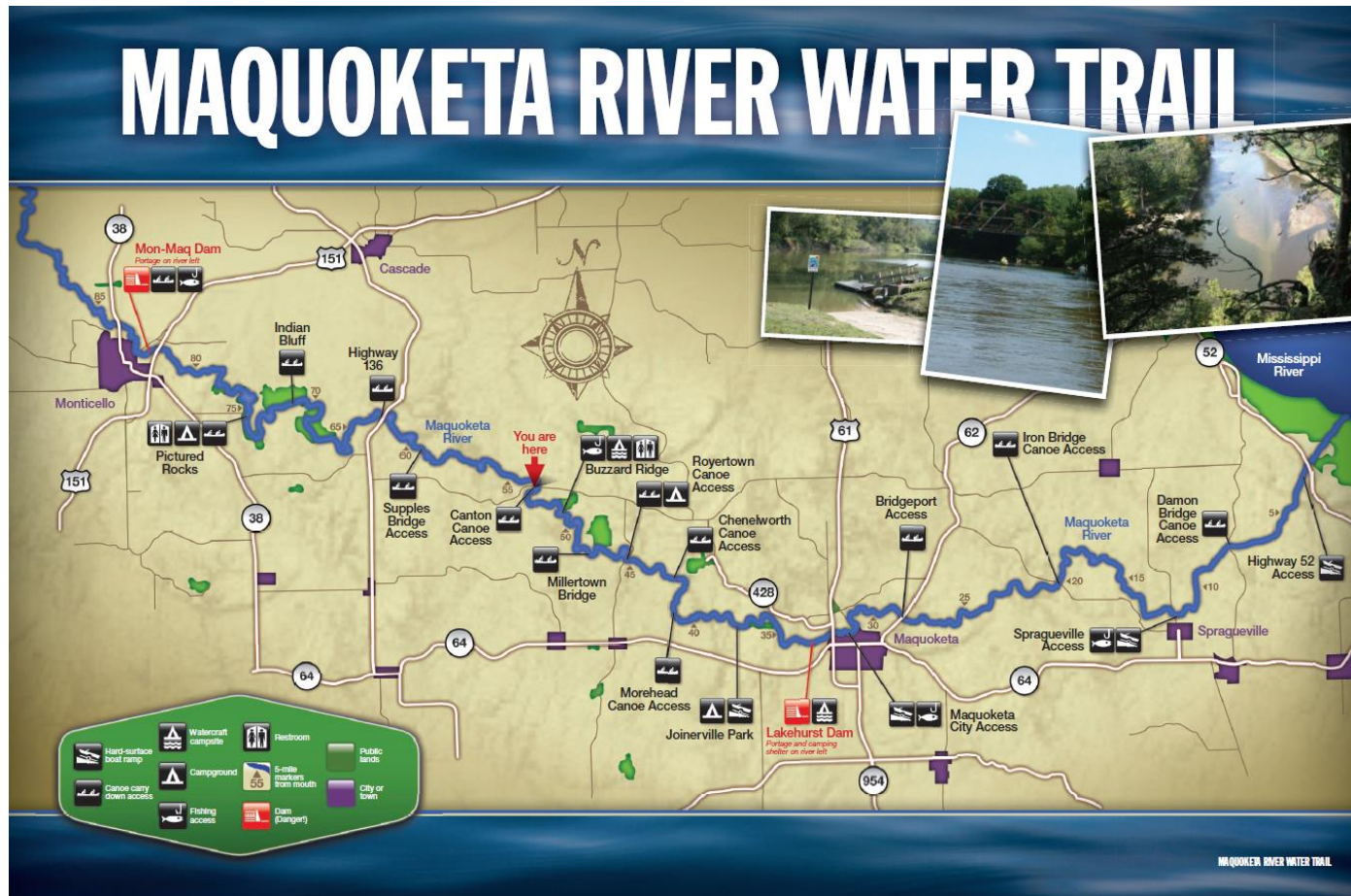


FIGURE 8. 2008 MAQUOKETA RIVER WATER TRAILS MAP



“MAQUOKETA RIVER WATER TRAIL SIGN” BY ECIA

Existing Plans

Development of the Maquoketa River Jackson County as state-designated water trail, would add to the already designated sections of the river in Delaware and Jones counties and will dovetail with existing area recreation plans and projects.

Maquoketa River Water Trail

Designating the Jackson County portion of the Maquoketa River as a state water trail would extend the existing trail that includes the cities of Manchester and Monticello, and amazing natural areas such as Backbone State Park in Delaware County, and Pictured Rocks County Park in Jones County. Designating the Jackson County portion, would add over fifty miles of river the twenty-six miles of previously designated river, for a total of seventy-six river-miles across the three counties.

The Iowa DNR has developed trail plans for the Maquoketa River in Jones County and in Delaware County. The water trails in both counties have been very popular with paddlers and have been recreational and economic assets for nearby communities. Unique features along the Maquoketa River Water Trail include the Manchester White Water Park and Pictured Rocks Park.

Manchester Whitewater Park

The Manchester White Water Park opened in June 2015. The 800-foot-long whitewater course in downtown Manchester includes six eighteen inch in-stream drop features, increased fish habitat, improved bank restoration, terracing, programmed fishing holes, fish passage and improved river access. The project removed a failing low-head dam and replaced it with a unique recreation feature that is free and open to the public.

Quaker Mill Dam Removal and River Restoration Project

The Quaker Mill Dam was located along the Maquoketa River northwest of Manchester in Delaware County. Between 1852, when the original dam was constructed, and 2017, when the dam was demolished, the location had been the site of several dams that served various purposes including a hydroelectric generator. The hydroelectric plant closed in 1967, but recreational use of the dam and pond continued. In 2010, an earthen portion of dike broke and the pond had become shallow due to siltation. The Iowa DNR helped form a partnership among several landowners and Delaware County to develop a new plan for the dam site. After years of community engagement, planning, design, and permitting, the partners decided to remove the dam and excavate a channel through the old lake bed. Construction was completed in December 2019. In place of the dam, a series of rapids allows paddlers and fish to traverse the river as it runs wild again.

Pictured Rocks Park

In Jones County, the Maquoketa River passes through Pictured Rocks, a 726-acre wildlife management area that takes its name from the steep limestone bluffs that enclose the narrow river valley. The Park offers a variety of activities, but is best known for rock climbing. The park's river access features a large



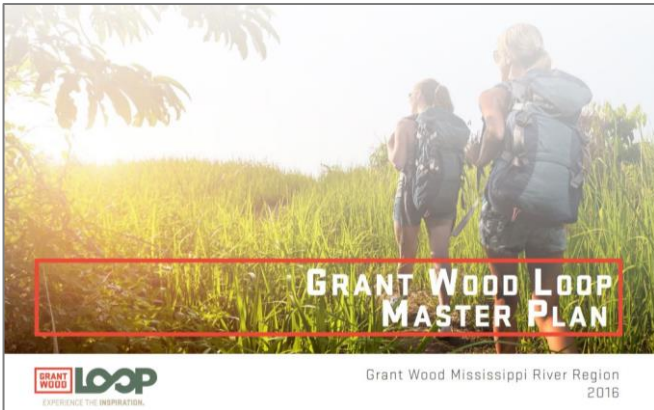
"MANCHESTER WHITewater PARK" BY ECIA



"ROCK CLIMBING AT PICTURED ROCKS PARK" BY JASON STIERMAN



"QUAKER MILL DAM AND BRIDGE, CIRCA 1900-1910" BY ROBERT UNGS.



“GRANT WOOD LOOP MASTER PLAN” BY GRANT WOOD MISSISSIPPI RIVER REGION



“RIVER CLEAN UP” BY MAQUOKETA RIVER WMA



“MAQUOKETA RIVER RENTAL” BY MAQUOKETA RIVER RENTAL

wide boat ramp constructed of native stone, along with bathrooms, drinking water, a new shelter, improved traffic flow with ample parking, and interpretive panels.

Grant Wood Loop Master Plan

In addition to the area’s existing water trail plans, development of the Maquoketa River and North Fork of the Maquoketa River Water Trails would dovetail with the region’s existing recreation plans. One such plan is the Grant Wood Mississippi River Region (GWMRR) Master Plan.

The Iowa Parks Foundation and the State of Iowa chose the Jackson, Jones, and Dubuque county region to serve as the pilot region for the Parks to People initiative. This initiative hopes to establish public private partnerships to create a regional recreation, arts, and cultural destination. The Grant Wood Mississippi River Region has worked to foster public and private collaboration across three counties. The region has raised or secured over \$17 million toward an ambitious \$21 million plan. The GWMRR Master Plan is a roadmap for collaboration toward a shared vision within the region to enhance, promote, sustain, and connect our region’s cultural, natural, and parks and other recreation assets over the next 20 years.

Future Opportunities

There is potential to extend the North Fork of the Maquoketa River Water Trail upstream from Jackson County to include sections of the river in Jones, Delaware, and Dubuque Counties. The water trail planning process is set to start soon in Dubuque County and should be completed in the next two years. DNR accepts applications for planning services annually, but only selects one county-wide project per year.

River Organizations and Businesses

While not yet part of a state-designated water trail, the Maquoketa River in Jackson County is a much-appreciated natural resource that has spurred the creation of river advocacy organizations and supports local businesses. Continued development of the Maquoketa River Water Trail will further the goals of these organizations and will continue to support the economic development of the communities in Jackson County.

Maquoketa River Watershed Management Authority

In 2017 residents of seven eastern Iowa counties came together to form the Maquoketa River Watershed Management Authority (WMA). The WMA’s mission includes protecting local drinking water, reducing flooding, supporting recreation, and improving overall water quality. The WMA advocates for the river and coordinates a variety of river improvement activities including water quality sampling and volunteer river cleanup events.

Maquoketa River Rental

Maquoketa River Rental is a canoe and kayak outfitter located in Maquoketa. The business offers canoe, kayak, paddleboard, and innertube rentals. In addition, Maquoketa River Rentals offers guided tours and transportation to and from the river.

River Accesses and Segments

River accesses are an important part of a successful water trail. The primary purpose of a water trail access point is to provide a location to launch and land boats. A basic river access will typically have a gravel boat ramp and a small parking area, while a more heavily-used access may have a concrete boat ramp and other amenities such as paved parking areas, restrooms, information kiosks, and picnic areas. Iowa DNR requires a formal parking area with enough space for a minimum of five vehicles in order to qualify as an official water trail access.

A total of fifteen existing access points are located along the Maquoketa River and the North Fork of the Maquoketa River water trails in Jackson County. For water trail planning purposes access points are used to divide the river into segments.

Of the two rivers, the Maquoketa is the most developed with the most access points. The river has thirteen accesses spaced at average distance of 3.5 miles. The County Conservation Board maintains an access at every bridge crossing along the river. Most of the accesses along the Maquoketa provide parking areas and are easily accessible off of paved county roads. The North Fork is less developed with two accesses, fewer amenities, and longer distances between accesses.

The Jackson County Conservation Board manages fourteen of the fifteen official accesses. The County owns the land for all but the Davison Bridge and Iron Bridge locations where it leases the land from private property owners. The remaining access is located inside Maquoketa city limits and is owned and managed by the City.

Figure 9 maps the locations of accesses on the Maquoketa River and the North Fork. Table 1 and Table 2 provide additional information about river accesses and stream segments.

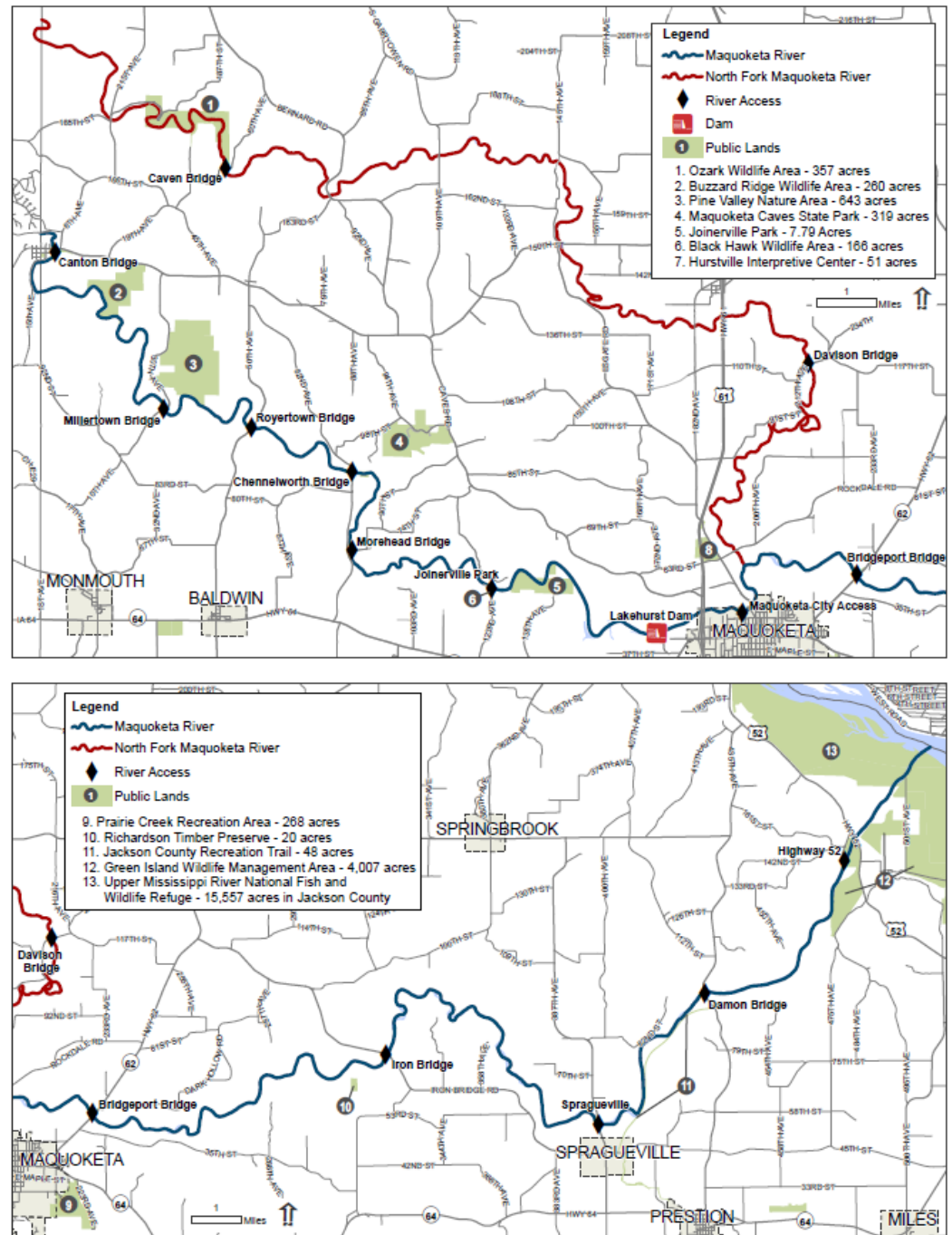


FIGURE 9. ACCESSES ALONG THE MAQUOKETA RIVER WATER TRAIL

TABLE 1. MAQUOKETA RIVER SEGMENTS

Maquoketa River Accesses	Managed By	Owned By	MI to Next Access	Primitive Camping	Toilets P = Pit F = Flush	Hard Surface Boat Ramp	Parking Lot	Information Kiosk
Canton Bridge	JCCB	JCCB	5.86	x		x	x	x
Millertown Bridge	JCCB	JCCB	2.63				x	
Royertown Bridge	JCCB	JCCB	2.29	x			x	x
Chennelworth Bridge	JCCB	JCCB	1.87	x			x	
Morehead Bridge	JCCB	JCCB	3.47				x	
Joinerville Park ¹	JCCB	JCCB	5.79	x ²		x		
Maquoketa City Access ¹	City of Maq.	City of Maq.	2.40			x	x	x
Bridgeport Bridge	JCCB	JCCB	8.15				x	x
Iron Bridge	JCCB	Private/ JCCB Lease	8.33				x	
Spragueville	JCCB	JCCB	4.09			x	x	
Damon Bridge	JCCB	JCCB	4.49				x	
Highway 52	JCCB	JCCB	2.91			x	x	
Mississippi River								

¹ Joinerville to Maquoketa City Access excluded from water trail because Lakehurst dam Portage does not meet Iowa DNR standards.

² Camping available by special permit only

TABLE 2. NORTH FORK OF THE MAQUOKETA RIVER SEGMENTS

North Fork of the Maquoketa River Accesses	Managed By	Owned By	MI to Next Access	Primitive Camp- ing	Toilets P = Pit F = Flush	Hard Surface Boat Ramp	Parking Lot	Information Kiosk
Caven Bridge	JCCB	JCCB	16.7				x	x
Davison Bridge	JCCB	Private/ JCCB Lease	9.0				x	
Bridgeport (Maquoketa River)	JCCB	JCCB					x	x

¹⁶ See “Maquoketa Hydro Plant Dam.”

Lakehurst Dam

The dam is owned by Iowa Hydro LLC and managed by Renewable World Energies. RWE manages 20 hydroelectric dams across Iowa, Illinois, Michigan, and Wisconsin.¹⁶

The dam and hydroelectric plant were constructed in 1923 and purchased by Iowa Hydro in 2006. The concrete gravity dam is 700 ft long and 26 ft high. The plant’s two generators have a maximum generating capacity of 1,200 kilowatts and can generate up to 6,355 megawatt-hours annually.



“LAKEHURST DAM” BY MAQUOKETA CHAMBER OF COM-

In addition to generating electricity, Lakehurst Dam provides a local attraction that is known for its beautiful views and provides a good fishing spot for anglers. Iowa Hydro owns eighteen acres of land around the plant.

For paddlers coming down the river, the dam presents a potentially dangerous situation and should be approached with extreme caution. The county signage posted upstream from the dam advises paddlers use the canoe portage on the north side (river left). However, the existing signage is not within Iowa DNR standards for a state water trail. Paddlers using the north side portage route can exit the water about 100 feet upstream, walk over the earthen levy portion of the dam, and reenter the river on a sandbar below the dam. Total walking distance is approximately 400 feet. This portage level works well when the water is high, but this route gets more difficult as the river level drops. As a general rule, the Iowa DNR recommends exiting the river no less than 300 feet upstream from a dam. The river bank on the north side of the dam is marshy with mud and tall grass. During low water, paddlers would need to walk through deep mud to use this route. The dam’s south side (river right) has been used as a portage route, but is unsafe due to the proximity of the dam which is only twenty feet away. Additional information about the Lakehurst Dam including management contact information is available at www.renewableworldenergies.com.

Existing Water Trail Usage

Based on discussions with land managers and river users, the project team developed a usage estimate of the current water trails in Jackson County. Overall, the Maquoketa is more utilized for paddling than the North Fork. On the Maquoketa, the Canton Bridge Access to Royertown Bridge Access and the Maquoketa City Access to Bridgeport Bridge access are the most used water trail segments in Jackson County.

Table 3 classifies each stream segment as low, medium, or high use based on its estimated level of paddling use.

TABLE 3. WATER TRAIL SEGMENT USAGE

Maquoketa River Segment	Usage
Canton Bridge Access to Millertown Bridge Access	High
Millertown Bridge Access to Royertown Bridge Access	High
Royertown Bridge Access to Chennelworth Bridge Access	Medium
Chennelworth Bridge Access to Morehead Bridge Access	Medium
Morehead Bridge Access to Joinerville Park Access	Medium
Maquoketa City Access Bridgeport Bridge Access	High
Bridgeport Bridge Access to Iron Bridge Access	Medium
Iron Bridge Access to Spragueville Access	Medium
Spragueville Access to Damon Bridge Access	Medium
Damon Bridge Access to Highway 52 Access	Medium
Highway 52 Access to Mississippi River	Medium

North Fork of the Maquoketa River Segment	Usage
Caven Bridge Access to Davision Bridge Access	Low
Davision Bridge Access to Maquoketa River	Low

Existing Water Trail Management Level and Skill Level Classification

The design considerations in *Developing Water Trails in Iowa*, the state’s water trail development guide, are organized around the idea of providing water trail experiences that appeal to the full range of the paddling community. Some paddlers are just starting out and looking for a comfortable and predictable experience, while other, more experienced, paddlers may be looking for opportunities to challenge themselves and improve their skills.

This section classifies Jackson County’s water trail segments based on existing conditions. Later in the plan, the water trail development concept discusses

the desired future classifications for the water trails and describes the projects that need to be implemented to achieve the desired classification.

Existing Management Level

State-designated water trails in Iowa are classified by one of four management categories: Gateway, Recreational, Challenge, and Wilderness. The management categories describe how land managers are currently maintaining the water trail. These categories let paddlers know what to expect before they start out on the water trail. *Developing Water Trails in Iowa* provides the following descriptions of each management category.

Gateway segments: At normal flow conditions, these segments provide the most predictable experiences for paddlers. They tend to either be in urban areas or the more scenic and attractive segments in rural areas. Portage around major hazards is usually not required, but whitewater parks are considered Gateway. These segments are intended for high use levels. Launch construction includes stable surfaces, such as concrete, often with gentle slopes. Amenities are often available near launches, and parking surfaces are generally paved. Water accesses are highly developed and designed with Universal Design standards. Gateway segments are the flagship segments of the water trail.

Recreational segments: Recreational segments generally require more skill and experience compared with Gateway segments. At normal flow conditions, some boat maneuvering around hazards may be needed. Short portages are also possible. Launch locations may be more difficult to access from parking areas or may have been constructed with less stable materials such as gravel. Amenities are sometimes present near launch parking areas.

Challenge segments: These segments are not for beginners. At normal flow conditions, paddlers will experience a moderate to high number of hazards including logjams, rapids, or other elements such as larger lakes with long open-water crossings and the potential for high waves or limited egress. Multiple short or long portages may be required. Access spacing varies considerably, and amenities are usually not available. Launch areas are usually more difficult to access from parking areas. Maintenance is minimal in these areas.

Wilderness experience segments: While some contend that Iowa includes no wilderness, the goal of this classification is to provide users with what is

possible in the state in terms of a paddling experience with minimal human-made distractions and amenities. Launch design and spacing between access points assumes above-average physical condition. Overnight primitive camping facilities may be present, as paddlers on these routes are often looking for multiple-day experiences. Any facilities present are minimal, primitive, and without signage.

Skill Level

Iowa DNR has also identified paddler skill level as an important consideration when planning for water trails. Water trails in Iowa are classified in three Skill Level categories: Beginner, Intermediate, and Advanced. Table 4 provides a description of each level.

TABLE 4. WATER TRAIL SKILL LEVEL

Beginner	Intermediate	Advanced
Segments are generally less than six miles. Hazards are few and easy to avoid in normally slow-moving currents. Users can easily access these segments from parking areas, and will not need to portage, except to walk a boat around some shallow riffles or make the going easier around an obstacle.	Segments are generally less than nine miles. Users should have the ability to recognize and avoid hazards in moderate river flow. The need to portage is rare, but users should be able and willing to carry boats and gear a short distance. Access to the river may involve a short portage, and the launch or take-out may be a bit difficult.	Segments may exceed nine miles. Hazards are likely and often occur in fast-moving water. The need to portage may be frequent or may involve carrying boats and gear a long distance. Access to the river may involve a long portage, and the launch or take-out may be from steeper banks or faster moving water.

Existing Segment Classifications

Based on an assessment of existing conditions information collected through the planning process, including input from Iowa DNR staff, land managers, river users, and other stakeholders, the project team assigned existing Skill Level and Management Level classifications to the existing water trail stream segments. Table 5 lists the segment classifications.

TABLE 5. EXISTING WATER TRAIL SEGMENT CLASSIFICATIONS

Maquoketa River Segment	Skill Level	Management Level
Canton Bridge Access to Millertown Bridge Access	Beginner	Recreational
Millertown Bridge to Royertown Bridge Access	Beginner	Recreational
Royertown Bridge to Chennelworth Bridge Access	Beginner	Recreational
Chennelworth Bridge to Morehead Bridge Access	Beginner	Recreational
Morehead Bridge Access to Joinerville Park Access	Beginner	Recreational
Joinerville Park Access to Maquoketa City Access	Segment excluded from trail	
Maquoketa City Access to Bridgeport Bridge Access	Beginner	Recreational
Bridgeport Bridge Access to Iron Bridge Access	Intermediate	Recreational
Iron Bridge Access to Spragueville Access	Intermediate	Recreational
Spragueville Access to Damon Bridge Access	Beginner	Recreational
Damon Bridge Access to Highway 52 Access	Beginner	Recreational
Highway 52 Access to Mississippi River	Beginner	Recreational

North Fork of the Maquoketa River Segment	Skill Level	Management Level
Caven Bridge Access to Davison Bridge Access	Advanced	Challenge
Davison Bridge Access to Maquoketa River	Advanced	Challenge

Most segments on the Maquoketa River are consistent with the characteristics of the Beginner and Recreational classifications. Access points are spaced at regular intervals along the river and under normal conditions hazards are limited. The Bridgeport Bridge to Iron Bridge and Iron Bridge to Spragueville segments are classified as Intermediate skill level due to their length. Both segments are over eight miles between accesses. The Joinerville Park to Maquoketa City Access segment is excluded from the water trail. This segment includes the Lakehurst Dam, which lacks a portage route that meets the minimum requirements for a state designated water trail. This segment will be excluded from the designated water trail route until an adequate portage is established.

Both segments of the North Fork have been classified as Advanced for Skill Level and Challenge for Management Level. The trail's classifications are due to the lack of access points, river segment length, and lack of amenities along the route. The classifications of the North Fork trail could be changed if additional accesses were added.

WATER TRAIL DEVELOPMENT

The previous sections of this plan have shown that Jackson County is home to a unique landscape that provides many opportunities for outdoor recreation. Over many years the County Conservation department along with its partners at the state and local level have worked to enhance the area's natural gifts, acquiring land and adding the amenities and facilities required to provide excellent outdoor experiences to residents and visitors.

The Maquoketa River and the North Fork of the Maquoketa River water trails have been, and will continue to be, a central piece of the County's outdoor recreation offerings. The county has worked to develop the trails by acquiring, developing, and maintaining access points along the rivers. As a result of this work, Jackson County has become one of the top paddling destinations in the state of Iowa.

The Water Trail Development section of this plan will provide a concept for future development of the county's water trails that will help the county take the next step and maximize the potential of these important water resources. The concept will include a general vision for the future of the trails along with a prioritized list of future projects that, when implemented, will help the county achieve its water trail development goals.

Design Considerations

To develop a useful water trail development concept, the Project Steering Committee worked with the Iowa DNR and closely followed the design considerations contained in the state's water trail development guide. *Developing Water Trails in Iowa* provides guidance for local land managers to use when developing water trails. The following section highlights some of the key design criteria from *Developing Water Trails in Iowa*. The full version of *Developing Water Trails in Iowa* with additional detail and illustration can be downloaded from lowadnr.gov.¹⁷



"DEVELOPING WATER TRAILS IN IOWA"

Water Trail Development Goals

The Management Level and Skill Level classifications from *Developing Water Trails in Iowa* that were introduced in the previous section will be a key component of the water trail development concept. The water trail concept will map out a strategy that will guide the development of the trail from its existing conditions to the desired future development goals.

Design and Maintenance

Long term maintenance of water trail infrastructure is another key consideration identified in *Developing Water Trails in Iowa*. Boat ramps and other types of water trail infrastructure help transition people from land to water. To serve this purpose, these structures must be placed in or very near the water. Rivers are dynamic and flood events are common. Powerful currents can easily wash away structures that are not properly designed and fortified to withstand such forces.

¹⁷ See "Developing Water Trails in Iowa."

Developing Water Trails in Iowa provides guidance for designing common water trail structures including boat ramps, parking areas, walking paths, and other amenities such as restrooms. A few key design considerations and guidelines are listed below and Figure 10 illustrates some typical launch design concepts.

Armoring: Launch edges require protection from scour and erosion caused by stream currents and high flows. Vegetation is used in conjunction with specific-sized rock as armor to resist erosion and launch failure. Use the minimum amount of armoring necessary, as excessive rock is expensive and can impact river function and biology. Class D or E riprap is generally used. Specific native grasses, such as prairie cordgrass (*Spartina pectinata*), are also used above the bankfull elevation for slope stabilization.

Slope of Launch Ramp: The change in elevation from the top of the launch to the bottom is described by percent of change. Percent slope is calculated by dividing the difference in height by the length of the launch (usually in feet). Water trail launch slopes should be as close to 8 percent as possible, with the exception of the lowest sections, known as push-in sections, which are steeper. The steeper the slope, the more important a roughened surface becomes for traction.

Push in Section: The push-in section of the launch is the bottom-most section of the transition zone. It is made of either pre-cast concrete or concrete cast higher on the bank and then pushed into place with mechanical equipment. A push-in section may not be needed if a stream bed is rocky.

Transition Zone: The transition zone of a launch is the section transitioning from dry to submerged. The slope is steeper (14 percent to 16 percent, not to exceed 18 percent) for this section than for other parts of the launch.

Horizontal Alignment: The horizontal alignment of the launch refers to the angle of the launch compared with the stream edge. For most stream applications, the launch edge should be constructed at a 30 degree to 45-degree downstream angle from the water flow. This alignment minimizes maintenance and creates a reasonable launching eddy.

Parking: All launch sites for state-designated water trails require designated off-road parking for a minimum of five vehicles. General guidelines for paddler friendly parking include: 1) Consider including loading lanes. 2) Allow generous-sized parking stalls to ease movement between vehicles and water. 3) Place staging areas either adjacent to parking or near the water's edge. These areas are used to assemble gear and put on personal flotation devices. 4) Route walking trails between parking areas and launches that make it easy to carry gear and boats. Parking design should also give special consideration to stormwater drainage. Storm water from the parking area should not drain into the stream through the launch ramp. Storm water management practices should be considered to protect water quality.

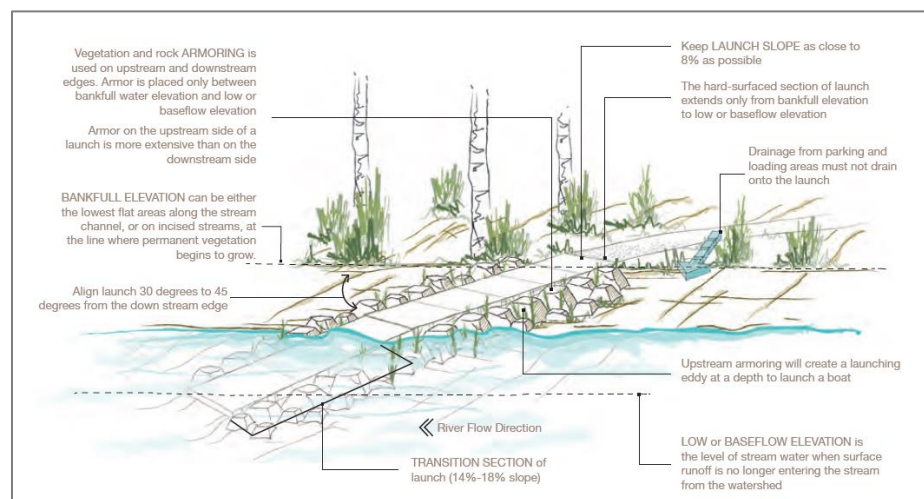


FIGURE 10. TYPICAL LAUNCH DESIGN CONCEPTS¹⁸

In addition to the guidance provided by *Developing Water Trails in Iowa*, the Project Steering Committee also had assistance from a civil engineering firm with experience in designing water trail accesses. Iowa DNR contracted with LT Leon Associates Inc. of Des Moines to provide concept designs and cost estimates for a number of the key access sites identified by the Project Steering Committee through the planning process.

¹⁸ See "Developing Water Trails in Iowa" p 3-8.

Archaeological Considerations

Historically, humans have used the resources provided by rivers and have many times chosen to live and build their settlements close to rivers. The historical relationship between humans and rivers means that river environments are often times rich in significant archeological resources. Because of the increased probability of encountering archeological resources in river environments, it is important to consider their conservation when planning for future water trail improvements.

In 2017, The University of Iowa's Office of the State Archeologist conducted a Phase IA archaeological reconnaissance survey along the Maquoketa River and North Fork of the Maquoketa River through Delaware, Dubuque, and Jackson Counties. The resulting report, referred to as OSA Technical Report 556, summarizes previously documented archeological resources and discusses the potential for previously unidentified archeological resources along the water trail corridors. The OSA team identified 121 previously recorded archaeological prehistoric and historic sites in the study area including 27 prehistoric rock shelters and nine historical cemeteries.¹⁹

The report provides recommendations for future work along the water trail corridor. In general, the OSA report concludes that:

The existing access points along the rivers express varying levels of archaeological potential. Where improvements are confined to already disturbed areas, previously surveyed areas, or areas with extremely low potential to contain significant materials (e.g., former sandbars), no additional archaeological investigation would be recommended prior to proposed construction activities. However, if an area is undisturbed, unsurveyed, and located on higher potential landforms (typically, terraces), a Phase I investigation would be required.²⁰

The OSA report concludes that a Phase I archaeological investigation would likely be required for the Canton Bridge Access, Chennelworth Bridge Access, Morehead Bridge Access, Joinerville Park Access, Ozark Wildlife Campsite, and Ozark Wildlife Access. For the Millertown Bridge Access, Royertown Bridge Access, Maquoketa City Access, Bridgeport Bridge Access, Iron Bridge Access, Spragueville

Access, Damon Bridge Access, and the Highway 52 Access the OSA report recommends no further archaeological investigation.²¹

Signage

A successful paddling experience requires consistent wayfinding and communication. *Developing Water Trails in Iowa* establishes signage standards that ensure that signs used on state-designated water trails in Iowa are intentionally consistent in color, size, and graphics. Sign standards help to create a seamless recreational experience for users across jurisdictions.

Developing Water Trails in Iowa establishes sign standards for the following sign categories: 1) On Land Navigational Signage 2) On-Water Navigational Signage 3) Low-Head Dam Warning Signage

A water trail sign plan was developed as part of previous water trail planning efforts on the Maquoketa River in Jackson County. Signage is currently in place at a number of Maquoketa River accesses and wayfinding signage has also been placed along many county roadways. A sign plan has not been developed for the North Fork of the Maquoketa River. Jackson County land managers should work with the Iowa DNR to conduct an inventory of the county's existing water trail signage develop and updated water trail sign plan for the county that complies with state guidelines.



"EXISTING WATER TRAIL SIGNAGE AT CANTON" BY ECIA



"EXISTING WAYFINDING SIGNAGE ON IOWA HWY. 64 AT BALDWIN" BY ECIA

¹⁹ See OSA Technical Report 556. p 10-11.

²⁰ See OSA Technical Report 556. p 27.

²¹ See OSA Technical Report 556. p 16-23.

Water Trail Development Concept

The general concept for the future is to make improvements that improve experience for all river users. The concept will plan for future water trails that provide a range of experiences for paddlers ranging from beginner to expert. The county's future water trail plans will encourage economic development and tourism by making Jackson County a regional paddling destination. Figure 11 includes a map of the future water trail.

Maquoketa River

Historically, the Maquoketa River has been the most developed water trail in Jackson County and has been the most popular with paddlers. For years the county conservation board has maintained accesses at every bridge crossing along the river.

General Development Concept

The Maquoketa River Water Trail will be developed as a mix of recreational and gateway stream segments that cater to beginner and intermediate paddlers. The trail will have two Gateway segments: Canton Bridge Access to Royertown Bridge Access and Maquoketa City Access to Bridgeport Bridge Access. The remaining segments will be classified as recreational.

Improvement projects along the Maquoketa will focus on improving existing access points. Maquoketa river projects include: repairing or replacing existing boat ramps with concrete ramps, expanding and hard surfacing parking areas and access roads, and adding key amenities like restrooms and camping areas.

Segment Concept - Maquoketa City Access to Bridgeport Access

The Maquoketa City Access to Bridgeport segment will be designed to accommodate beginning paddlers. This segment is an ideal gateway to paddling for beginners because it has access points located on paved roadways, predictable float times, and a nearby outfitter in Maquoketa. The City Access boat ramp is concrete and is in good condition. The existing gravel boat ramp at the Bridgeport access is in poor condition.

The Maquoketa City Access to Bridgeport Bridge Access segment is currently designated as Skill Level: Beginner and Maintenance Level: Recreational. To achieve the desired Gateway Development goal, the project team plans to make improvements to the Bridgeport Bridge Access. The proposed

improvements at Bridgeport include a concrete access ramp, improved parking area and access road, a restroom, and other amenities. See Bridgeport design concept on page 35 for additional details on the proposed improvements.

Segment Concept – Canton Access to Royertown Access

The scenic beauty of the Canton to Royertown segment makes it another excellent gateway on the Maquoketa River. Predictable float times and few hazards make this segment good for beginners, but its remote setting and longer distance between access points make this segment slightly more challenging than the Maquoketa to Bridgeport segment. This segment will be an attractive next step for beginning paddlers looking to take on a new challenge.

The Canton Access to Royertown segment is currently designated as Skill Level: Beginner and Management Level: Recreational. To achieve the desired Gateway Management Level development goal, the project team plans to make improvements to the Canton Bridge and Royertown Bridge Accesses. Proposed improvements include concrete boat ramps, improved parking areas and entrance roadways, and other amenities. See the Canon Bridge Design Concept on page 38 and Royertown Bridge Design Concept on page 42 for additional details on the planned access improvements.

Segment Concept – Joinerville Park Access to Maquoketa City Access

The Joinerville Park Access to Maquoketa City Access is currently excluded from the Maquoketa River Water Trail because the Lakehurst Dam does not have a portage that meets Iowa DNR standards. To include this segment in the water trail, the project team plans to improve the portage route at the Lakehurst Dam. See the Lakehurst Dam Design Concept on page 46 for additional details on the proposed portage improvements.

North Fork of the Maquoketa River

While generally less developed and less popular with novice paddlers than the Maquoketa River, the North Fork of the Maquoketa River has provided a unique experience for more seasoned paddlers looking for a more challenging route with less river traffic. Regular North Fork paddlers report that the natural beauty of this stretch of river more than makes up for the longer distances between access and lack of amenities.

General Development Concept

The long-term goal for the North Fork is to develop the river as a recreational water trail that provides an enjoyable experience for intermediate and experienced paddlers. Improvement projects along the North Fork will focus on property acquisition and access development. Accesses on the North Fork will be primitive, but the project list includes basic amenities such as parking spaces.

To achieve the desired Recreational Management Level development goal, the long-term goal would be to have accesses spaced at regular intervals along the North Fork. There are a number of roadway bridge crossings along the North Fork that could be potential river access locations. The locations that are ultimately developed as accesses will depend on a property owner's interest in selling land. The County may also be able to combine an access acquisition and development project with a roadway bridge reconstruction project. Possible access locations include: Teeters Bridge, Ozark Bridge, 109th Ave, Crab Town Bridge, and US Highway 61.

Table 6 summarizes the Existing Skill Level and Management Level classification along with the future development goals for each water trail segment.

See Table 7 and Table 8 for a list of water trail improvement projects. For additional details on some of the County's top priority projects, see the Design Concepts section beginning on page 35.

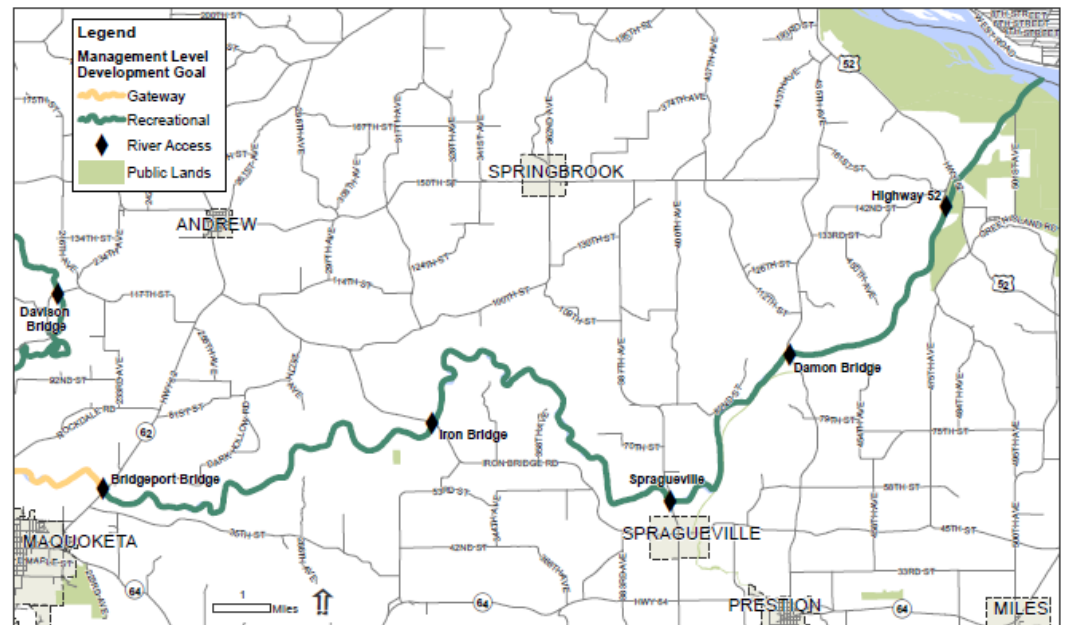
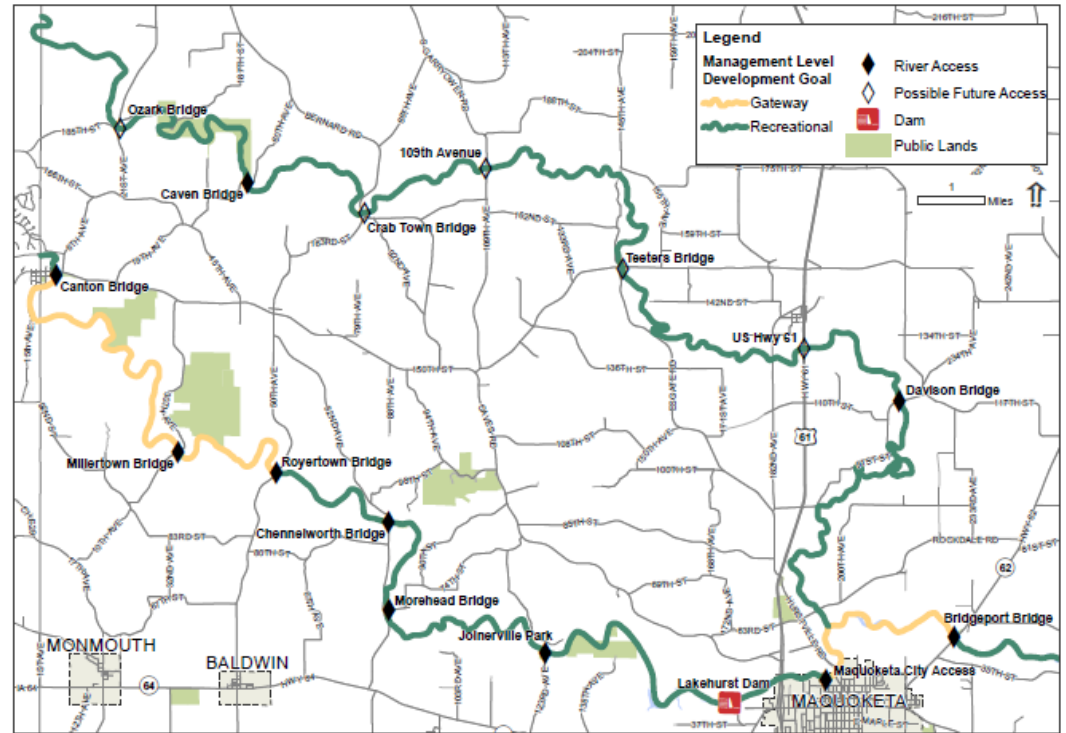


FIGURE 11. WATER TRAIL CONCEPT MAP

TABLE 6. EXISTING SKILL LEVEL AND MANAGEMENT LEVEL CLASSIFICATIONS AND FUTURE DEVELOPMENT GOALS

Maquoketa River Segment	Existing Skill Level	Existing Management Level	Skill Level Development Goal	Management Level Development Goal
Canton Bridge Access to Millertown Bridge Access	Beginner	Recreational	NC	Gateway
Millertown Bridge to Royertown Bridge Access	Beginner	Recreational	NC	Gateway
Royertown Bridge to Chennelworth Bridge Access	Beginner	Recreational	NC	NC
Chennelworth Bridge to Morehead Bridge Access	Beginner	Recreational	NC	NC
Morehead Bridge Access to Joinerville Park Access	Beginner	Recreational	NC	NC
Joinerville Park Access to Maquoketa City Access	Segment excluded from trail		Intermediate	Recreational
Maquoketa City Access Bridgeport Bridge Access	Beginner	Recreational	NC	Gateway
Bridgeport Bridge Access to Iron Bridge Access	Intermediate	Recreational	NC	NC
Iron Bridge Access to Spragueville Access	Intermediate	Recreational	NC	NC
Spragueville Access to Damon Bridge Access	Beginner	Recreational	NC	NC
Damon Bridge Access to Highway 52 Access	Beginner	Recreational	NC	NC
Highway 52 Access to Mississippi River	Beginner	Recreational	NC	NC

North Fork of the Maquoketa River Segment	Skill Level	Management	Skill Level Development Goal	Management Level Development Goal
Caven Bridge Access to Davision Bridge Access	Advanced	Challenge	Intermediate	Recreational
Davision Bridge Access to Maquoketa River	Advanced	Challenge	Intermediate	Recreational

NC = No Change

To achieve the Intermediate Skill Level and Recreational Management Level development goals on the North Fork, new access points will need to be added, shortening the length of the trail segments.

Improvement Projects

Throughout the planning process, the Project Steering Committee collected input from stakeholders, river users, and the general public. The committee evaluated the existing conditions of the water trails and other nearby recreational amenities. They also reviewed trail development guidance and considered advice from experts in water trail development.

Using all the information they had collected, the Project Steering Committee developed a list of improvement projects for Jackson County’s water trails. After compiling the project list, the committee then took to the task of assigning cost estimates and prioritizing projects. The Committee organized its projects into two groups: Top Priority Projects and Opportunity Projects. The following section lists all the projects identified along with preliminary cost estimates. The section also describes how projects were ranked and organized into groups.

Top Priority Projects

The projects in the Top Priority group are the most important projects for the future development of the water trail and the projects that should be implemented first. Top Priority projects should be considered short to medium term objectives that should be targeted for implementation over the next fifteen years. Project cost estimates are preliminary. The Committee ranked its Top Priority projects most important to least important. Table 7 lists Jackson County’s Top Priority Projects

Opportunity Projects

The projects in the Opportunity group are projects that will help move the County closer its long-term water trail goals, but are not considered an immediate need. Opportunity projects are to be considered long-term objectives, that would be implemented between fifteen and twenty-five years down the road. However, the implementation timeline can be moved up if an opportunity presents itself. For example, a bridge reconstruction project could provide the opportunity to add a new access. Opportunity projects are not ranked and the cost estimates provided are preliminary. Table 8 lists Jackson County’s opportunity projects.

TABLE 7. TOP PRIORITY PROJECTS

Priority Rank	River	Area	Project Description	Estimated Cost
1	MR	Bridgeport	Paved Access Ramp/ Parking/ Roadway/ Restroom	\$275,000
2	SF	Canton	Paved Access Ramp/ Parking/ Roadway/ Restroom	\$200,000
3	SF	Royertown	Paved Roadway/ Parking/ Access Ramp	\$200,000
4	SF	Joinerville Park	Replace Boat Ramp/ Parking	\$50,000
5	NF	Teeters Bridge	Acquisition/ Primitive Access/ Parking Lot	\$40,000
6	NF	Ozark Bridge	Acquisition/ Primitive Access/ Parking Lot	\$40,000
7	MR	Hwy 52	Develop Parking Area/ Fix or Replace Ramp Undercut	\$50,000
8	MR	Iron Bridge	Acquisition/ Access Ramp Parking Lot	\$125,000
9	NF	109th Ave	Acquisition/ Primitive Access/ Parking Lot	\$40,000
10	MR	Spragueville	Pave Access/ Parking/ Stabilize Ramp Embankment	\$50,000
Total				\$1,070,000

NF - North Fork of the Maquoketa River

SF- South Fork, Maquoketa River, Canton to N. Fork confluence

MR – Maquoketa River, Confluence of N. Fork & S. Fork to Mississippi River.

TABLE 8. OPPORTUNITY PROJECTS

River	Area	Project Description	Estimated Cost
MR	Bridgeport	Install Restroom	\$50,000
SF	Chennelworth	Relocate and Reconstruct Access	\$50,000
NF	Crab Town Bridge	Develop Primitive Access/ Parking Lot	\$50,000
MR	Damon Bridge	Pave Access Parking Lot	\$75,000
NF	Hwy 61	Develop Primitive Access/ Parking lot	\$75,000
SF	Joinerville Park	Install Restroom	\$50,000
SF	Lakehurst Dam	Develop Primitive Access/ Parking Lot	\$50,000
SF	Lakehurst Dam	Develop a portage trail on the N. side of river	\$100,000
SF	Millertown	Pave Access/ Parking	\$100,000
SF	Morehead Bridge	Pave Access/ Parking	\$50,000
SF	Royertown	Install Restroom	\$50,000
Total			\$700,000

Design Concepts

The project budget for the Jackson County Water Trails master plan included funding to develop concept designs for some of the area's top priority projects. The plan includes concept designs for the Bridgeport Access, Canton Access, Royertown Access, and Joinerville Access. This section of the plan includes a description of existing conditions at each access, a summary of the needs identified at each location, and the concept designs and cost estimates for the three locations.

Bridgeport Access Design Concept

The area's top priority is the Bridgeport access. The access is owned and maintained by the Jackson County Conservation Board. The 4.30-acre site is very popular with paddlers because it is the first access down river from the Maquoketa City Access. The distance between the two is about 3.4 river-miles. Bridgeport is frequently used by Maquoketa River Rentals, the outfitter located in Maquoketa, because it is a reliable two-hour float from the City Access. City Access to Bridgeport is a good trip for beginning paddlers and tubers. Bridgeport's location on Iowa Highway 62 makes it easily accessible by car. The access is about a five-minute drive from downtown Maquoketa. Figure 12 provides photos of the Bridgeport Access.

Bridgeport Needs

PAVED BOAT RAMP – The existing gravel boat ramp is poorly designed and difficult to use, especially for the novice paddlers and tubers that typically use it. The hill down the ramp is steep and uneven, and the angle of the existing ramp makes taking out difficult.

LARGER PARKING AREA – Bridgeport is very popular and more parking is needed. In addition, parking is not defined or delineated, leading to confusion and congestion on busy weekends when decent water levels and weather attract increased use of the areas.

Bridgeport Recommended Improvements

Recommended improvements for Bridgeport include a 16' wide concrete boat ramp, paved parking area, and paved entrance road. See Figure 13 for a rendering of the concept. Table 9 includes a preliminary cost estimate for the recommended improvements.



FIGURE 12. BRIDGEPORT ACCESS PHOTOS. PHOTOS BY ECIA, AUGUST 2020.



FIGURE 13. BRIDGEPORT ACCESS CONCEPT PLAN RENDERING.
 PREPARED BY LT LEON.

TABLE 9. BRIDGEPORT ACCESS CONCEPTUAL PLAN, PRELIMINARY COST ESTIMATE

BASE BID

ITEM NO.	DESCRIPTION	UNIT	Quantity	Unit Price	Total Cost
1	MOBILIZATION	LS	1	\$ 10,000.00	\$ 10,000.00
2	NPDES GENERAL PERMIT #2 & SWPPP	LS	1	\$ 5,000.00	\$ 5,000.00
3	CLEARING AND GRUBBING	LS	1	\$ 5,000.00	\$ 5,000.00
4	EXCAVATION	CY	1400	\$ 10.00	\$ 14,000.00
5	SUBGRADE PREPARATION, 12-INCH	SY	4055	\$ 7.00	\$ 28,000.00
6	MODIFIED SUBBASE, 6-INCH	CY	621	\$ 60.00	\$ 37,000.00
7	CLASS 'A' CRUSHED STONE	TON	104	\$ 35.00	\$ 4,000.00
8	MACADAM STONE	TON	166	\$ 40.00	\$ 7,000.00
9	CLASS 'E' RIPRAP	TON	502	\$ 60.00	\$ 30,000.00
10	REINFORCED PCC BOAT RAMP TRANSITION SECTION, 6-INCH	SY	36	\$ 65.00	\$ 2,000.00
11	REINFORCED PCC BOAT RAMP, 6-INCH	SY	295	\$ 65.00	\$ 19,000.00
12	NON-REINFORCED PCC, 6-INCH	SY	3724	\$ 55.00	\$ 205,000.00
13	PAVEMENT STRIPING AND ADA SIGNAGE	LS	1	\$ 2,000.00	\$ 2,000.00
14	LANDSCAPE BOULDERS	TON	38	\$ 500.00	\$ 19,000.00
15	CONSTRUCTION STAKING	LS	1	\$ 5,000.00	\$ 5,000.00
16	SEEDING/FERTILIZING/MULCHING	AC	1.0	\$ 2,000.00	\$ 2,000.00
17	ROLLED EROSION CONTROL PRODUCT	SY	556	\$ 5.00	\$ 3,000.00
18	STRAW WATTLE	LF	130	\$ 2.50	\$ 300.00
19	PARK BENCH	EA	1	\$ 1,000.00	\$ 1,000.00
SUBTOTAL					\$ 398,000.00
CONTINGENCY (15%)					\$ 60,000.00
PRELIMINARY CONSTRUCTION COST ESTIMATE					\$ 458,000.00

ALTERNATE BID 1

ITEM NO.	DESCRIPTION	UNIT	Quantity	Unit Price	Total Cost
1	MOBILIZATION	LS	1	\$ 10,000.00	\$ 10,000.00
2	NPDES GENERAL PERMIT #2 & SWPPP	LS	1	\$ 5,000.00	\$ 5,000.00
3	CLEARING AND GRUBBING	LS	1	\$ 5,000.00	\$ 5,000.00
4	EXCAVATION	CY	1400	\$ 10.00	\$ 14,000.00
5	SUBGRADE PREPARATION, 12-INCH	SY	4055	\$ 7.00	\$ 28,000.00
6	CLASS 'A' CRUSHED STONE	TON	104	\$ 35.00	\$ 4,000.00
7	MACADAM STONE	TON	453	\$ 40.00	\$ 18,000.00
8	CLASS 'E' RIPRAP	TON	502	\$ 60.00	\$ 30,000.00
9	REINFORCED PCC BOAT RAMP TRANSITION SECTION, 6-INCH	SY	36	\$ 65.00	\$ 2,000.00
10	REINFORCED PCC BOAT RAMP, 6-INCH	SY	295	\$ 65.00	\$ 19,000.00
11	NON-REINFORCED PCC, 6-INCH	SY	50	\$ 55.00	\$ 3,000.00
12	PAVEMENT STRIPING AND ADA SIGNAGE	LS	1	\$ 2,000.00	\$ 2,000.00
13	GRAVEL, 8"	TON	1572	\$ 40.00	\$ 63,000.00
14	LANDSCAPE BOULDERS	TON	38	\$ 500.00	\$ 19,000.00
15	CONSTRUCTION STAKING	LS	1	\$ 5,000.00	\$ 5,000.00
16	SEEDING/FERTILIZING/MULCHING	AC	1.0	\$ 2,000.00	\$ 2,000.00
17	ROLLED EROSION CONTROL PRODUCT	SY	556	\$ 5.00	\$ 3,000.00
18	STRAW WATTLE	LF	130	\$ 2.50	\$ 300.00
19	PARK BENCH	EA	1	\$ 1,000.00	\$ 1,000.00
SUBTOTAL					\$ 233,000.00
CONTINGENCY (15%)					\$ 35,000.00
PRELIMINARY CONSTRUCTION COST ESTIMATE					\$ 268,000.00

Prepared by LT Leon
12/1/2020

Notes:

1. Assumes 1200 CY of spoils can be spoiled on stie.
2. Base Bid includes concrete drives, parking and ramp
3. Alternate bid 1 includes gravel drives and parking and concrete ramp

Canton Access Design Concept

The Canton Access is located on the Maquoketa River on the western edge of Jackson County. The 2.3-acre county-owned access is popular with paddlers and frequently used by the County Conservation Department for activities. Canton is also the starting point for the Timber City Adventure Race, an annual 25.1-mile adventure triathlon that includes paddling, biking and running. The access is the beginning point of the planned Canton to Royertown gateway water trail segment. The access is located just downstream from the Canton Bridge. Across the river is the unincorporated town of Canton. The town is home to a few residences and a 1950s themed restaurant called The Hop.

Canton Access Needs

PAVED BOAT RAMP – The existing gravel boat ramp is difficult for conservation staff to maintain. The end of the ramp near the water tends to wash out and the entire ramp frequently becomes silted in.

LARGER PARKING AREA – the existing gravel parking area is in good condition but can fill up on a busy day. The county owns additional land to the east that could be used for overflow parking.

Figure 14 provides photos of the existing conditions at the Canton Access.

Canton Recommended Improvements

Canton Bridge Access to Royertown Bridge Access is one of the most popular stretches of the Maquoketa River for paddling. The concept aims to improve the access by adding a concrete boat ramp, paved parking area, and a pit restroom. The concept also sets aside space for additional future improvements including primitive campsites and an additional parking area. Figure 15 and Figure 16 illustrate the concept. Table 10 provides a preliminary cost estimate for the recommended improvements



CANTON BOAT RAMP



ENTRANCE SIGN AT CANTON ACCESS



PARKING LOT AND INFORMATION KIOSK



THE HOP



WASHED OUT SECTION AT END OF RAMP



GRAVEL BOAT RAMP SURFACE

FIGURE 14. CANTON ACCESS PHOTOS. PHOTOS BY ECIA, AUGUST 2019.

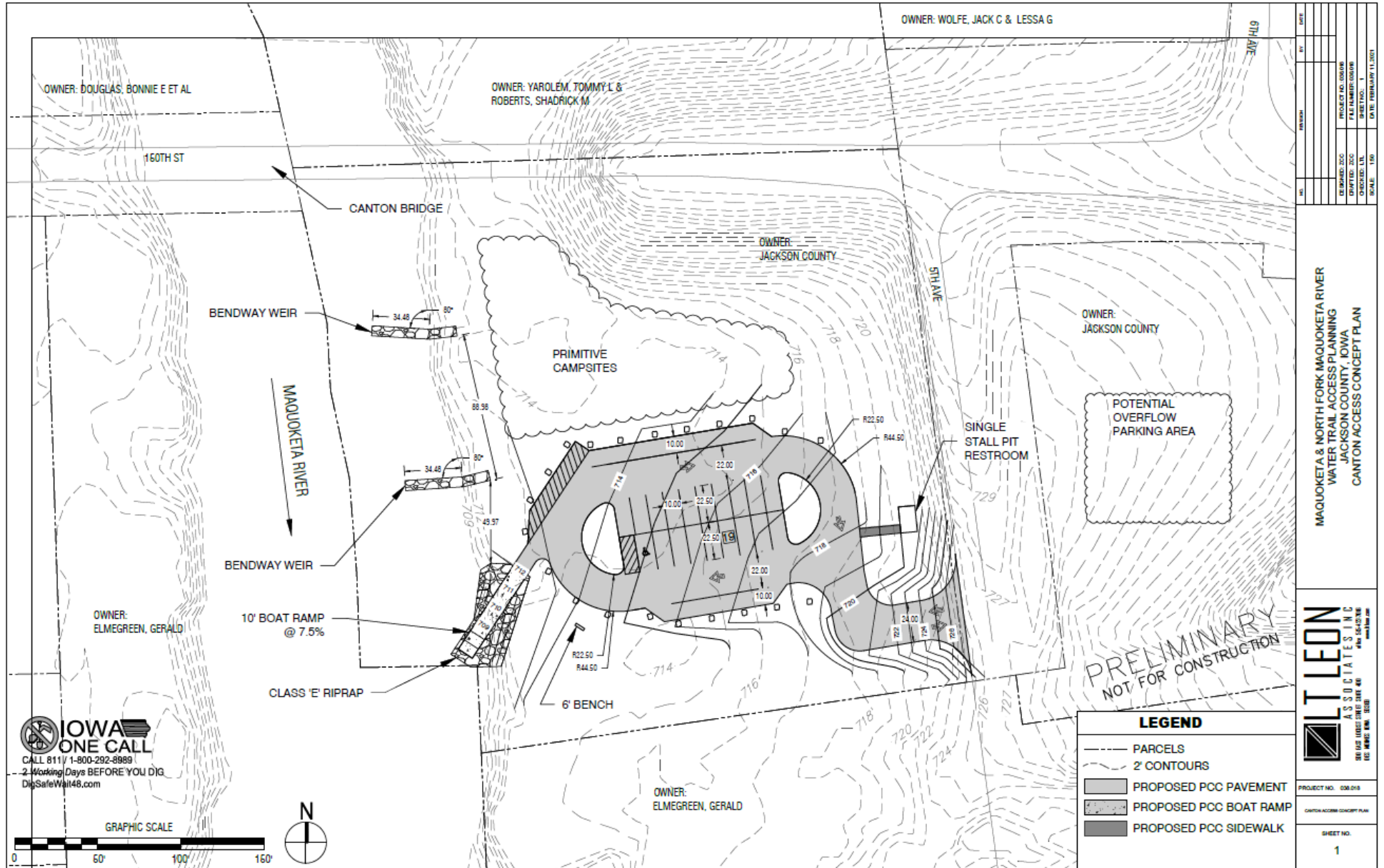


FIGURE 15. CANTON ACCESS CONCEPT PLAN
PREPARED BY LT LEON



FIGURE 16. CANTON ACCESS CONCEPT PLAN RENDERING
 PREPARED BY LT LEON

TABLE 10. CANTON ACCESS CONCEPTUAL PLAN, PRELIMINARY COST ESTIMATE

ITEM NO.	DESCRIPTION	UNIT	Quantity	Unit Price	Total Cost
1	CONSTRUCTION SURVEY	LS	1	\$ 5,000.00	\$ 5,000.00
2	MOBILIZATION	LS	1	\$ 5,000.00	\$ 5,000.00
3	SWPPP (EROSION CONTROL)	LS	1	\$ 5,000.00	\$ 5,000.00
4	CLEARING AND GRUBBING	LS	1	\$ 10,000.00	\$ 10,000.00
5	CLASS 10 EXCAVATION	CY	900	\$ 10.00	\$ 9,000.00
6	SUBGRADE PREPARATION, 12-INCH	SY	2209	\$ 7.00	\$ 15,000.00
7	MODIFIED SUBBASE, 6-INCH	CY	361	\$ 60.00	\$ 22,000.00
8	CLASS 'A' CRUSHED STONE	TON	20	\$ 35.00	\$ 1,000.00
9	MACADAM STONE	TON	41	\$ 40.00	\$ 2,000.00
10	CLASS 'E' RIPRAP	TON	177	\$ 60.00	\$ 11,000.00
11	REINFORCED PCC BOAT RAMP PUSH IN SECTION, 6-INCH	SY	22	\$ 65.00	\$ 1,000.00
12	REINFORCED PCC BOAT RAMP, 6-INCH	SY	44	\$ 65.00	\$ 3,000.00
13	NON-REINFORCED PCC, 6-INCH	SY	2164	\$ 55.00	\$ 119,000.00
14	SINGLE STALL PIT RESTROOM	EA	1	\$ 40,000.00	\$ 40,000.00
15	6' BENCH	EA	1	\$ 1,000.00	\$ 1,000.00
16	SALVAGE AND REINSTALL LANDSCAPE BOULDERS	LS	1	\$ 3,000.00	\$ 3,000.00
17	PAVEMENT STRIPING AND ADA SIGNAGE	LS	1	\$ 2,000.00	\$ 2,000.00
18	SEEDING/FERTILIZING/MULCHING	AC	1.0	\$ 2,000.00	\$ 2,000.00
19	STRAW WATTLE	LF	100	\$ 2.50	\$ 300.00
20	STABILIZED CONSTRUCTION ENTRANCE, MACADAM STONE	TON	20	\$ 50.00	\$ 1,000.00
PRELIMINARY CONSTRUCTION COST					\$ 257,000.00

*ADD \$80,000 IF STEPPED LIMESTONE OUTCROPPING STONES ARE USED IN LIEU OF CLASS 'E' RIPRAP.

Preliminary Cost Estimate
 Prepared by LT Leon
 3/31/2021

Royertown Access Design Concept

The Royertown Access is located on the Maquoketa River off of 50th Avenue on the upstream side of the Royertown Bridge. The access is owned and maintained by the Jackson County Conservation Board. The access is popular with paddlers and is used frequently by Jackson County Conservation for activities. Royertown is the end point of the planned 8.5-mile Gateway water trail segment that begins at the Canton access. The Canton to Royertown route is very picturesque and popular with paddlers. Figure 17 provides photos of the existing conditions at the Royertown Access

Royertown Access Needs

PAVED BOAT RAMP – The existing gravel access ramp is often silted in. A paved ramp with a general slope angled downstream that works with the river rather than against it would be easier for conservation staff to maintain as well as easier for river users to access the river.

NEW ENTRANCE ROADWAY – the existing gravel entrance roadway is very steep and prone to washouts. Currently drainage funnels to ramp area and causes erosion.

PARKING – Royertown is a heavily used access and plenty of parking is needed.

SEDIMENT - Lots of sand sediment on site due to location at inside of river bend.

Royertown Recommended Improvements

The Royertown access is heavily used and the end of a Gateway Stream segment. The Royertown development concept recommends paved entrance road, parking area, and access ramp. Paved surfaces will be less prone to washouts and will be easier to maintain following high water events. The access concept also recommends further protecting the parking area and ramp by diverting stormwater away from these areas. Figure 18 illustrates the concept for the Royertown Access.



ROYERTOWN PARKING LOT



ACCESS RAMP LOOKING UP STREAM



PARKING LOT LOOKING BACK FROM THE RAMP



ROYERTOWN ENTRANCE SIGN



EXISTING ACCESS RAMP



ENTRANCE ROADWAY

FIGURE 17. ROYERTOWN ACCESS PHOTOS. PHOTOS BY ECIA, AUGUST 2019.

Joinerville Access Design Concept

The Joinerville access is located in Joinerville Park, a six-and-a-half-acre county park that is located about 4 miles west of the city of Maquoketa at the end of 123rd Avenue. Joinerville is the last official access before the Lakehurst Dam and primarily serves as a pullout spot for paddlers. Some powerboats, mostly smaller fishing boats, put in at the access. Joinerville Park's bluffs are used for rock climbing and the neighboring Blackhawk Wildlife Area provides hiking and equestrian trails. Figure 19 provides photos of the existing conditions at the Joinerville Access

Joinerville Access Needs

PARKING – The access does not currently have any ADA accessible spaces. Additional parking will be needed.

ACCESS RAMP – A new access ramp is needed. The upper part of the existing concrete ramp is in good condition but the lower portion has been undercut by the current and has broken off.

DAM SIGNAGE – New upstream signage warning paddlers that the water trail ends and Joinerville is the last access before the Lakehurst Dam.

FISHING – The area upstream from the existing ramp could provide a good fishing area.

Joinerville Recommended Improvements

The Joinerville concept includes a 12' ramp with 8' wide walk. The parking area concept includes a paved ADA parking space that is connected to the access ramp by a paved walkway. The remaining parking area will be gravel. Upstream from the ramp, the concept includes a stream barb and bankfull bench to improve fishing at the site. Figure 20 illustrates the concept for the Joinerville Access.



PARKING AREA LOOKING NORTHEAST



PARKING AREA LOOKING SOUTHEAST



RIVER LOOKING UPSTREAM FROM ACCESS RAMP



ACCESS SIGNAGE



JOINERVILLE ENTRANCE SIGN



ACCESS RAMP

FIGURE 19. JOINERVILLE ACCESS PHOTOS. PHOTOS BY ECIA, AUGUST 2019.



FIGURE 20. JOINERVILLE ACCESS CONCEPT PLAN RENDERING.
PREPARED BY LT LEON

Lakehurst Dam Design Concept

The Lakehurst Dam is located on the Maquoketa River about four miles downstream from the Joinerville Park Access and a mile and a half upstream from the Maquoketa City Access. The dam is an active hydroelectric plant with a maximum generating capacity of 1,200 kilowatts.

Lakehurst Dam Needs

For paddlers coming down the river, the dam presents a dangerous situation and should be approached with extreme caution. The county signage posted upstream from the dam advises paddlers use the canoe portage on the north side (river left). However, the existing signage is not within DNR standards for a state water trail. Paddlers using the north side portage route can exit the water about 100 feet upstream, walk over the earthen levy portion of the dam, and reenter the river on a sandbar below the dam. Total walking distance is approximately 400 feet. This portage level works when the water is high, but this route gets more difficult as the river level drops. As a general rule, the Iowa DNR recommends exiting the river no less than 300 feet upstream of a dam. The river bank on the north side of the dam is marshy with mud and tall grass. During low water, paddlers would need to walk through deep mud to use this route.

The dam's south side (river right) has been used as a portage route, but it is unsafe due to the proximity of the dam, which is only 20 feet away.

Lakehurst Dam Recommended Improvements

The Joinerville to Maquoketa City Access has been excluded from the current water trail because none of the current portage options meet Iowa DNR standards. Iowa DNR commissioned LT Leon to investigate the feasibility of three potential portage routes around Lakehurst Dam. The potential routes are shown in Figure 21. The project steering committee evaluated the potential portage routes and determined that the Middle Portage Route was the preferred option. Implementation of the Middle Portage route will require construction of a berm extending from the existing dam. Jackson County should continue to investigate the feasibility of the portage. LT Leon's full memo is attached to this plan in Attachment C.

Lakehurst Dam Signage

The Iowa DNR requires warning signage for all dams and other hazards on state-designated water trails. *Developing Water Trails in Iowa* specifies types, sizes, and placement of warning signs. River users are minimally provided with two upstream warnings to prepare to leave the stream before reaching a drowning zone and dam. Iowa DNR has developed a warning sign plan for the Lakehurst Dam. The sign plan must be implemented before the river can be designated as a water trail. The full warning sign plan is attached to this plan in Attachment D.



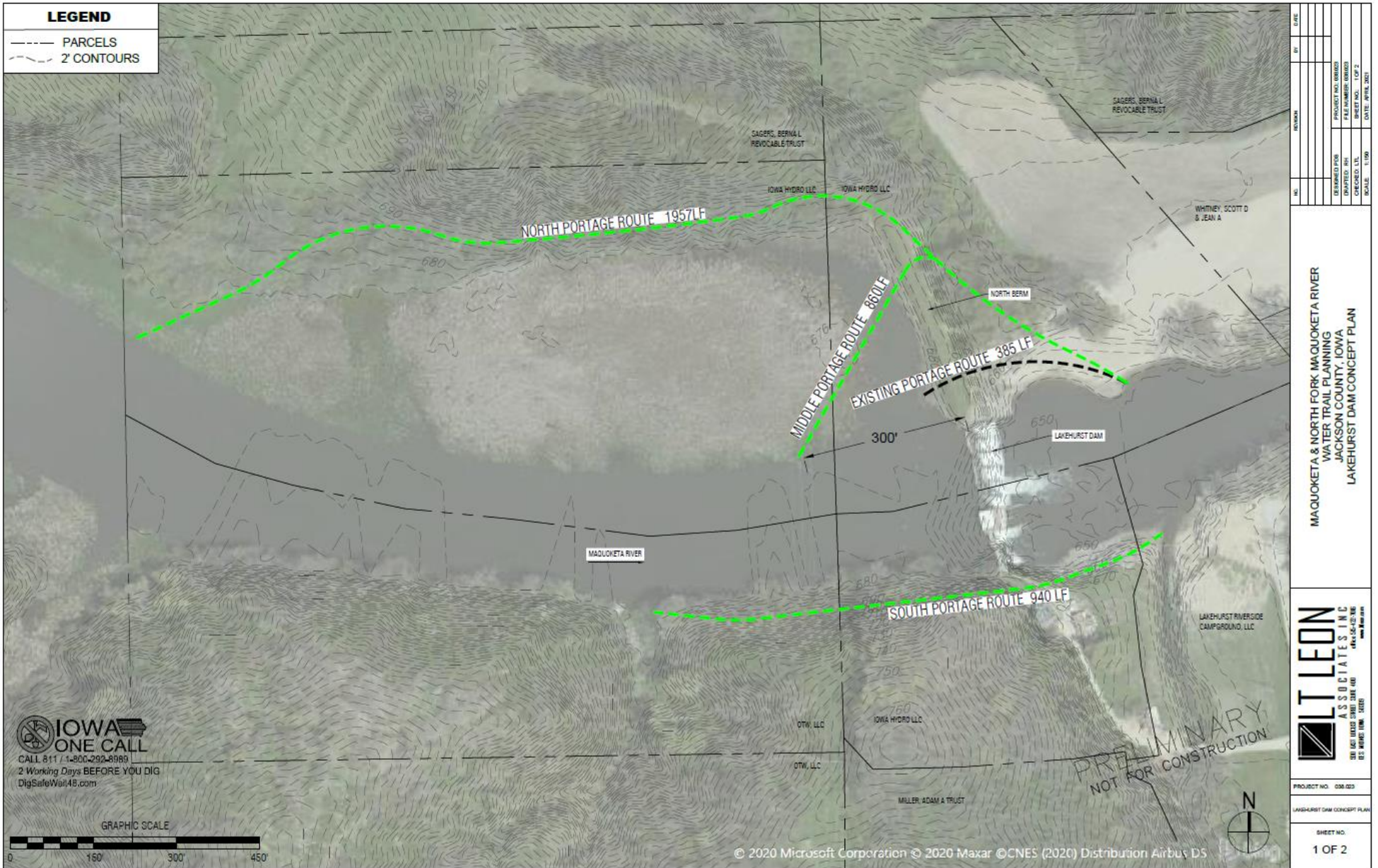


FIGURE 21. LAKEHURST DAM CONCEPT PLAN
 PREPARED BY LT LEON

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