



DES MOINES RIVER AND LIZARD CREEK WATER TRAILS AND CORRIDOR PLAN

Webster County & Fort Dodge, Iowa – May 2017

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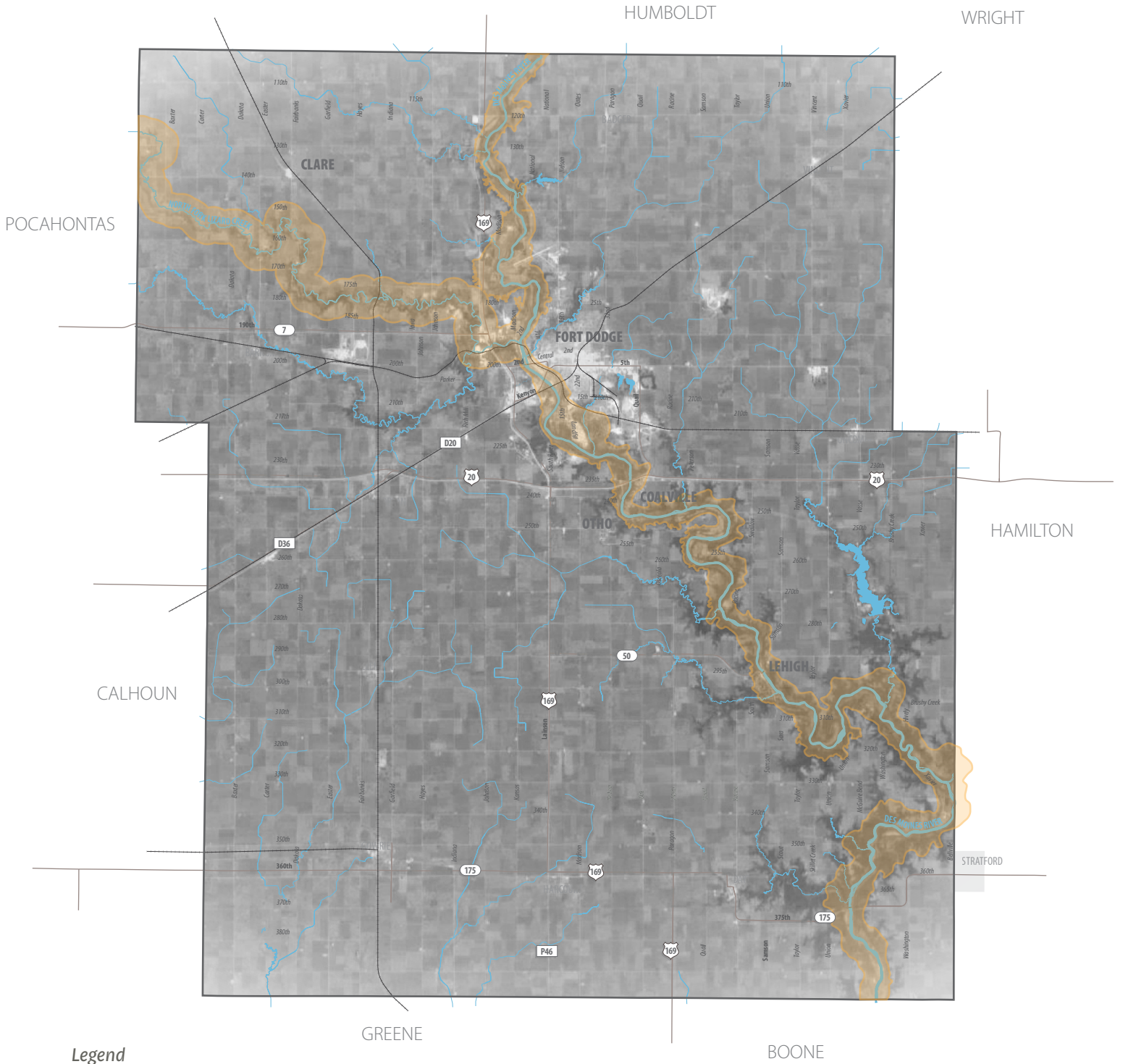
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INTRODUCTION

The Des Moines River corridor and its many tributaries provide important and unique environmental and recreational resources within Webster County. This document, entitled the Des Moines River and Lizard Creek Water Trails and Corridor Plan, represents the result of a collaborative planning process designed to establish a 15 to 20-year vision for the Des Moines River and North Lizard Creek corridors to ensure their long-term value and enjoyment by Webster County residents and visitors. The process was funded through a grant provided by the Iowa Department of Natural Resources (IDNR), and was therefore guided by IDNR with assistance from American Rivers, City of Fort Dodge, and Webster County Conservation Board.

PROJECT AREA





The Des Moines River and Lizard Creek Water Trails and Corridor Plan serves as a long-term management plan for the Des Moines River and North Lizard Creek corridors, which include the waterways and adjacent lands. The Plan provides guidance for the IDNR, Webster County, and local riverfront communities to achieve a county-wide vision for water trails, land use and development, riverfront access, parks and recreation, historically and culturally significant sites, and use of riparian corridors.

The Des Moines River and Lizard Creek Water Trails and Corridor Plan is the result of a year-long process completed in conjunction with Re-Envision 2030, the Comprehensive Plan for the City of Fort Dodge. To assist with the process, a Riverfront Plan Steering Committee (RPSC), consisting of riverfront users and/or property owners throughout Webster County, was formed. The RPSC helped to identify key stakeholders and property owners, review preliminary technical analysis, and provide feedback on recommendations prior to public review and adoption.

The Des Moines River and Lizard Creek Water Trails and Corridor Plan planning process engaged more than 200 members of the public through targeted outreach, focus groups, interviews, community meetings, and online questionnaires and mapping software.

It should be noted that the intent of the Des Moines River and Lizard Creek Water Trails and Corridor Plan is not to impose policies or development constraints on incorporated municipalities along the river and creek corridors. Rather, the Plan will provide best practices for local consideration that could then be implemented through municipal policies and regulations at the discretion of each community.



2 VISION

The Des Moines River and Lizard Creek Water Trails and Corridor Plan Vision Statement

The Des Moines River and Lizard Creek Corridor are an important part of our natural and cultural heritage as well as a regional destination for eco-tourism and outdoor recreation. Through planning, protection, restoration, and creative collaboration, the Corridor will offer a balance that will re-connect our citizens with the water and the natural world that surrounds them for the benefit of people, wildlife, and future generations.



The Vision for the Webster County Corridor is a collective community outlook for the future of the Des Moines River and North Lizard Creek. Within the next 15–20 years, these natural resources will serve as regional destinations that will offer a favorable balance of environmental, educational, recreational, and economic opportunities.

Fifteen years following the adoption of the Des Moines River and Lizard Creek Water Trails and Corridor Plan...

...the Des Moines River and Lizard Creek Corridors provide a variety of natural and urban experiences, and offer a favorable balance of environmental, educational, recreational, and economic opportunities.

Starting at the north Webster County line, the Des Moines River provides a unique water trail experience between Humboldt County and Boone County. The Deer Creek Area, located 3.7 miles downriver from the Humboldt County line, offers river access for paddlers and boaters alike to the north section of the river in Webster County, which is approachable for families and groups. Webster County has worked closely with property owners living adjacent to the Des Moines River to reduce impacts to water quality, resulting in cleaner water and healthy riparian habitats.

As the Des Moines River meanders south, the river transitions into a gateway and challenge water trail experience. Users can disembark at a new access point prior to being greeted by Breen's rapids. The new access utilizes universal design standards, allowing all levels of river users to enter the Des Moines River.

Educational signage provides informative material about the local ecology and conservation efforts. Those needing to recover from the challenge of the rapids can utilize the Becker Wildlife access.

As the River enters the City of Fort Dodge, it provides a myriad of recreational opportunities. New fishing spots for anglers are provided by a redesigned Loomis Park and Hydro-Electric Park as part of the Hydroelectric Dam project. The removal of the Hydroelectric Dam has not only improved the River's recreational experience, but also improved water quality and local aquatic life. In addition, daylighting projects have improved storm-water management, further improving the quality of the water. Paddlers and fishermen alike benefit from the improved water quality and increased diversity of aquatic species. On the banks of the river, an extensive trail system of hard and soft trails provides opportunities for walkers, cyclists, and hikers to interact with the Des Moines River and its natural surroundings, or take in scenic views from designated outlook areas. Recreational activities extend year-round, with trails being used for winter sports such as cross-country skiing and snowmobiling.

Prior to the Des Moines River passing through Downtown Fort Dodge, it meets North Lizard Creek. Webster County and the Iowa Department of Natural Resources worked with local



landowners and stakeholders to classify the corridor as a state-designated water trail from its convergence with the Des Moines River to the Pocahontas County line. This designation required the removal of a low head dam and the construction of an additional access on North Lizard Creek.

From the Lentsch Access to the Des Moines River, North Lizard Creek provides a challenge experience for users, with class I and II rapids. Cooperative efforts from land owners to reduce impacts to North Lizard Creek, along with additional preservation of adjacent open space areas have improved water quality and preserved the scenic and natural beauty of North Lizard Creek. As the corridor nears the Des Moines River, it merges with the South Branch of Lizard Creek. South Lizard Creek is in the process of becoming a state-designated water trail, further creating a regional hub for recreation within Webster County.

Downriver from the convergence of North Lizard Creek into the Des Moines River is downtown Fort Dodge. This area of the riverfront has transformed into an epicenter of activity. From fishing to playing on the banks of the river to hiking on Duck Island via a new under-deck connection under Karl King Bridge, new development on the east side of the river has brought people to spend time in the area. Community events are regularly hosted at a riverfront public gathering area

and include seasonal activities such as ice skating. A promenade connecting to pedestrian trails allows for scenic riverfront strolls, and allows users to access a fishing outcrop and interactive riverfront area. Infrastructure within the floodplain is floodable and riverfront developments have either mitigated or avoided the floodplain to allow the river to flow naturally.

Traveling south under the Karl King Bridge, well-maintained housing on the west bank overlooks Sunkissed Meadows. With the modification of the Little Dam, this stretch of the Des Moines River continues the recreational experience with ample fishing spots and opportunities to access and interact with the river. Sunkissed Meadows in particular has become a space for both recreation and education. The park continues to be used as a disc golf course, while a dog park to the north provides an additional amenity, as does the learning park inside Sunkissed Meadows that complements the educational signage placed along the river and at access points on North Lizard Creek and the Des Moines River. The areas around the Little Dam continue to be utilized by anglers while new step-down access areas have opened the riverfront for increased interaction. Further, the Karl King Bridge and Kenyon Road Bridge are brightly lit at night, creating a river experience that is also a form of public art.

The urban experience of the Des Moines River transitions to a more peaceful, recreational experience as it travels past Coalville and Otho-Kalo, where an additional public water trail access has been constructed. Users can then access Camp WaNoKi and Dolliver State Park prior to reaching the City of Lehigh. Severe erosion on the riverbank has been restored, and additional land in this area has been preserved by the Webster County and IDNR through acquisition and easements.

Once the Des Moines River passes through Lehigh, it transforms into a wilderness experience. Along this section of the river, users experience a peaceful setting among the natural landscape of Webster County. The area includes critical natural and recreation areas including Deception Hollow, Brushy Creek State Recreation Area, Boone Forks Wildlife Management Area, and the Carlson Recreation Area. Webster County and the Iowa Department of Natural Resources have actively expanded these areas, preserving critical habitats and restoring streambanks, which has improved water quality and aquatic life all the way to Boone County.

The Corridor serves as an 84-mile scenic, recreational, and natural resource. Through preservation, protection and restoration, the Corridor has been improved over past 15 years to provide a variety of natural and urban experiences, as well as a sense of connectivity, pride, and quality of life that will be enjoyed by many generations to follow.



RIVER PROFILE

An understanding of the riverfront context, current policies, existing land use, environmental conditions, and recreational opportunities provides the foundations for potential Des Moines River and Lizard Creek Water Trails and Corridor Plan recommendations. This chapter provides an overview and analysis of the Des Moines River and Lizard Creek corridors through Webster County by summarizing the issues, challenges, and assets that have shaped the Des Moines River and North Lizard Creek waterfronts through Webster County, including:

- Existing Land Use & Development
- Parks & Natural Areas
- Access
- Water Trails
- Trails
- Cultural & Historic Resources
- Infrastructure
- Environment
- River Species

The information within this chapter is a summary of the Existing Conditions Synthesis Report released in August 2015 as part of the planning process. It is based on information provided by the City of Fort Dodge, IDNR, and Webster County.



PROJECT AREA

The project area for the Des Moines River and Lizard Creek Water Trails and Corridor Plan encompasses land and waters within the boundaries of Webster County, with a special focus on North Lizard Creek and the Des Moines River, including the River's confluence with Soldier Creek, Holiday Creek, Brushy Creek and the Boone River at the Webster/Hamilton County line. The focus of the project area consists of the "valley top-to-valley top", which is defined by the immediate topography along the Des Moines River and Lizard Creek corridors. The river corridor and its many tributaries are viewed as important and unique environmental and recreational resources within Webster County.

THE DES MOINES RIVER

The Des Moines River corridor extends 525 miles from southern Minnesota to the Mississippi River in southeast Iowa. As the lifeline for Native American tribes and early settlers, the river became the foundation for the growth of Des Moines, Fort Dodge, Humboldt, and other communities throughout Iowa. The River travels for approximately 56 miles through Webster County; passing through a mix of upland and alluvial plains, as well as the communities of Fort Dodge, Coalville, Otho-Kalo, and Lehigh. The upland land-forms border the lower-lying, flat alluvial landforms, which were created by many years of sedimentation with deposits dating between 12,000 – 14,000 years ago.

NORTH LIZARD CREEK

North Lizard Creek is a primary tributary of the Des Moines River, flowing from northwest to southeast, and meeting the Des Moines River in Fort Dodge. Originating approximately four miles east of Laurens, Iowa in Pocahontas County, Lizard Creek is an important resource for wildlife. Within Webster County, North Lizard Creek follows a southeasterly direction, primarily traveling through agricultural land. It traverses 28 miles through Webster County before joining the Des Moines River in Fort Dodge.

SOUTH LIZARD CREEK

South Branch Lizard Creek is a tributary of the North Lizard Creek. South Lizard Creek converges with North Lizard Creek just west of the City of Fort Dodge. This stream travels through several natural areas including the Lizard Creek State Recreation Area and Bob Hay Memorial Conservation Area. South Lizard Creek is viewed and maintained as a significant regional asset that bears consideration for future study; however, it is not studied in detail within this Plan.



COMMUNITY PROFILES

FORT DODGE

Fort Dodge is the largest municipality in Webster County in both land area (16.3 square miles) and population (24,956 – 2014 estimate). The Des Moines River flows for approximately 6.4 miles through Fort Dodge, and fronts several key sites and environmental features. This stretch of the river includes the decommissioned Hydroelectric Dam and Little Dam. Both dams are low head dams that present safety concerns for river users. The Des Moines River through Fort Dodge converges with two tributaries, which include Solider Creek and Lizard Creek. Parks, open space, and recreational facilities that line the riverbanks include Loomis Park, Hydro-Electric Park, Phinney Park, Sunkissed Meadows, and Duck Island.

COALVILLE

Named after the area's coal mines, Coalville is an unincorporated, Census-designated place that had a 2013 population of 705. Coalville is accessible by US 20 and includes 3.2 miles of Des Moines Riverfront.

OTHO

Otho is a city of 593 people that lies on less than one-half square mile on the west side of the Des Moines River. The area of study within this Plan is commonly referred to as Otho-Kalo, which references a former settlement just east of Otho, along the Des Moines River. Although the official municipal boundary of Otho does not touch the Des Moines River, the City's unincorporated areas are used as informal access points to the River.

LEHIGH

Lehigh was originally settled in the 1850s as a mill town. It quickly grew and gained momentum as a coal production and brick manufacturing hub with the construction of the Illinois Central Railroad. The City of Lehigh has a total area of 2.15 square miles and a 2013 population of 423. Lehigh includes a 1.5-mile stretch of the Des Moines River and Crooked Creek runs through the southern portion of the city, meeting the Des Moines River at its west bank.

Lehigh includes an area of rock dam rapids, which were created by local residents over a seven-year period. The dam is intended to maintain water levels but also create Class II rapids.

RELEVANT PLANS & STUDIES

The Des Moines River and Lizard Creek Water Trails and Corridor Plan aims to build upon past riverfront plans and policies. A firm understanding of previous policy documents informed the goals within this Plan, as an analysis of these policies assisted in determining which policies and initiatives were still relevant and those that needed modification to reflect the vision for the riverfront.

VISION: PARKS TO PEOPLE (TO BE COMPETED IN 2017)

This park system strategic plan for the State of Iowa is being developed through the Governor's Green Ribbon Commission, the Iowa Department of Natural Resources, and the Iowa Parks Foundation. The plan will provide goals and strategies for three counties: Boone, Webster, and Hamilton. They will be aimed at enhancing community and cultural vitality, employing partnerships and grassroots support, identifying dependable funding strategies, leveraging local planning, and letting current and future park users help define Iowa's parks for the future.

RE-ENVISION 2030: A COMPREHENSIVE PLAN FOR THE CITY OF FORT DODGE (2016)

Re-Envision 2030 serves as the Fort Dodge Comprehensive Plan and sets forth the City's long-range plan for community improvement, development, and growth. It is the official policy guide for physical improvement and development. The Plan includes goals, objectives, and policies to guide both short- and long-range planning initiatives aimed at improving quality of life in the community. With regard to the Des Moines River and Lizard Creek Water Trails and Corridor Plan, Re-Envision 2030 includes goals and objectives that ensure the community balances growth and development with the preservation of the unique recreational and environmental assets presented by the Des Moines River and North Lizard Creek.

CAMP WaNoKi MASTER PLAN (2016)

The Camp WaNoki Master Plan provides a vision for the 77-acre site on the Des Moines River that is owned by Webster County. The plan includes an inventory of the site's natural resources and facilities, and provides concepts for future programming, as well as a phasing plan and potential partnerships.

NORTHWEST RIVER DISTRICT REVITALIZATION PLAN (2015)

This plan focuses on the enhancement of the 3rd Avenue NW/Hawkeye Avenue corridor through four key focus areas. Potential actions include enhanced gateways, recreational amenities, streetscaping, improved infrastructure, and increased access and use of the Des Moines River and North Lizard Creek, among others.

FORT DODGE HYDROELECTRIC AND WHITEWATER PASSAGE FEASIBILITY (2010)

This study analyzes the feasibility of several alternative scenarios for the Hydroelectric Dam at Hydro-Electric Park. The study found that the benefits of recommissioning the dam for functional hydroelectric use do not justify the investment. Keeping the dam and replacing the gates for flood control is also considered a costly investment due to the required maintenance and safety risks of the existing ogee crest spillway. Additional alternatives considered within this study include an in-river bypass channel, an off-river channel, and full river passage. Initial cost estimates indicate the full river passage alternative as the best cost option to provide both recreational activities and fish passage.

FORT DODGE COMMUNITY NEEDS ASSESSMENT AND PARKS MASTER PLAN (2009)

The parks plan focused on three key themes: sustain, enhance, and expand. The goal is to ensure existing facilities maintain sufficient, if not optimal levels of performance and maintenance. From there, the city could look to specific parks to enhance services and expand programming and facilities.

FORT DODGE DOWNTOWN PLAN (2008)

The downtown plan established a vision for the entire downtown area in Fort Dodge, including a redevelopment concept plan for the riverfront at the foot of Central Avenue. This concept includes areas of ecological restoration, trail improvements, recreation, and structures that could host park-related activities or commerce.

A MASTER PLAN FOR LOOMIS PARK (2005)

This plan includes an analysis of issues affecting Loomis Park, identifies key goals based on community input, and outlines three scenarios to enhance the park. The preferred scenario proposes a phased approach to increase accessibility and safety through improved parking, trails, and lighting. A greater sense of place will be achieved through signage, the installation of an amphitheater, and creation of a riverfront lookout point.

BRUSHY CREEK STATE RECREATION AREA RECREATION USE PLAN

This plan sets a goal to enhance outdoor recreation and educational experiences, increase health and wellness, and protect natural resources for the 6,500-acre Brushy Creek State Recreation Area. It identifies five issues and proposals to remedy the issues, which include signage, overnight facilities, equestrian campgrounds, and space for equipment storage. The plan concludes with a list of priority projects for implementation. IDNR is currently in the process of developing a Master Plan for Brushy Creek.

DOLLIVER STATE PARK RECREATION AREA RECREATION USE PLAN

This plan sets a goal to enhance outdoor recreation and educational experiences, increase health and wellness, and protect natural resources for the Dolliver State Recreation Area. It identifies six issues and solutions that include maintenance of historically significant structures, wayfinding signage, renovation of overnight facilities, picnic area updates, playgrounds, and flood prevention. The plan concludes with a list of priority projects for implementation. IDNR is currently in the process of developing a Master Plan for Dolliver.

FORT DODGE RIVERFRONT MASTER CONCEPT PLAN (1999)

This plan presents recommendations for significant investment along the Des Moines Riverfront within the City of Fort Dodge, transforming it from an underutilized asset into a park-rich recreational destination. The key development site stands at the western terminus of Central Avenue, where the plan recommends the construction of a Community Festival Lawn to host events. The site includes a scenic overlook and use of monument statues. Additional recommendations include a pedestrian or "unity" bridge over the river and improvements to Loomis Park, Volunteer Park (historically known as Dragon Boat Park, located on the north end of Sunkissed Meadows), and Oleson Park. The plan presents an initial estimate of \$8.51 million (\$12 million in 2015 dollars) in riverfront development costs as well as potential funding sources.

EXISTING LAND USE & DEVELOPMENT

The Des Moines River project area includes a variety of land uses that affect the use and environmental features of the riverfront. Developed areas with more intense land uses such as commercial, industrial, and residential development are concentrated in established municipalities such as Fort Dodge, Coalville, and Lehigh. However, the vast majority of the planning area consists of agricultural land.

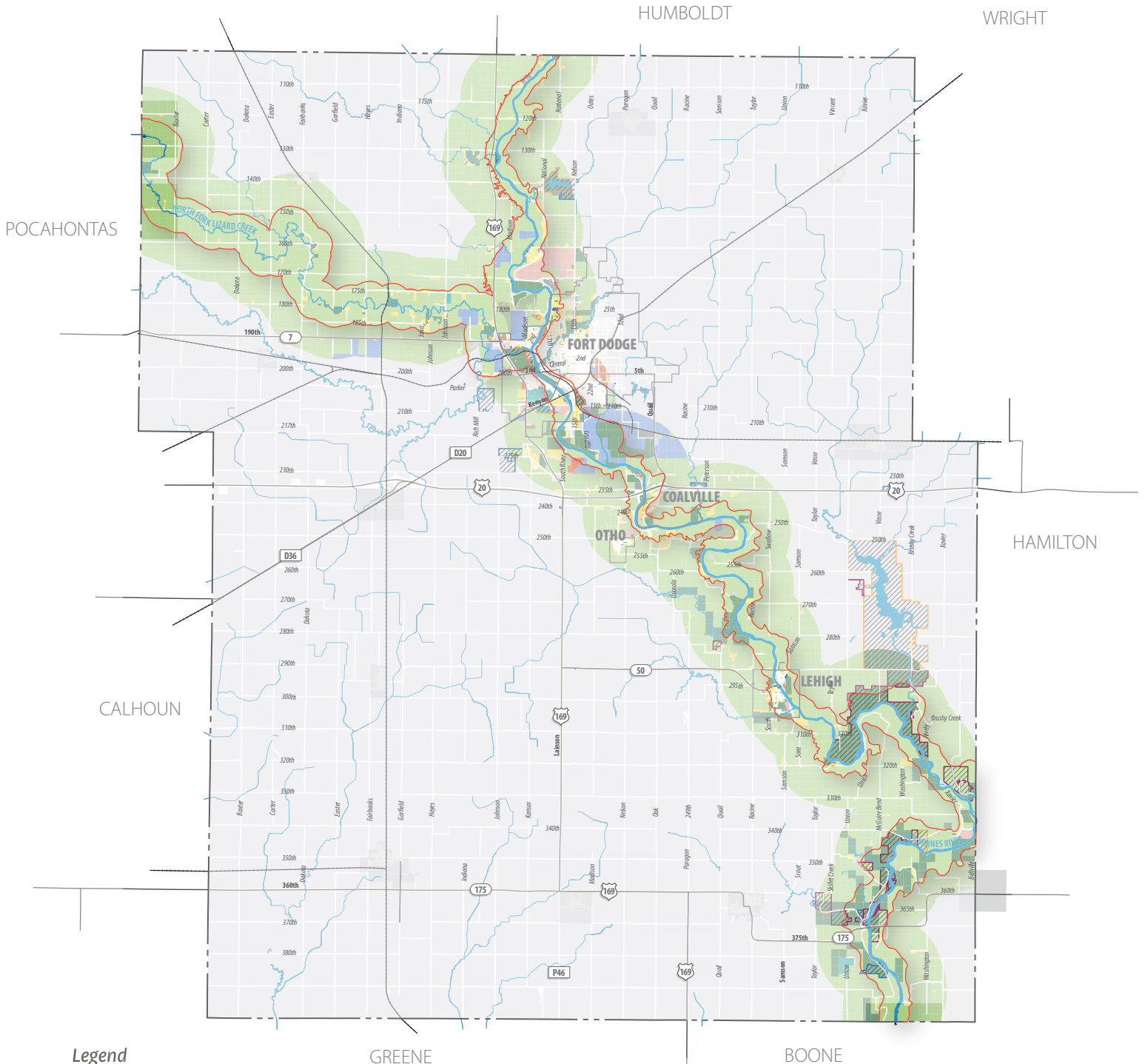
Land uses in the project area were documented through an inventory based on fieldwork reconnaissance conducted in the fall of 2014. These land uses apply to both public and privately-owned parcels. All parcels within the project area have been designated under one of the following 12 existing land use categories:

- Agriculture
- Rural Residential
- Residential
- Mobile Homes
- Commercial
- Mixed Use
- Public/Semi-Public
- Parks/Open Space
- Transportation/Utilities
- Light Industrial
- Heavy Industrial
- Vacant

Lands along each waterway are both publicly and privately owned, which can affect the type of existing and future land use. Public land owners include the State of Iowa, Webster County (County), and the City of Fort Dodge.

Public and private land ownership has an effect on the use of both the Des Moines River and North Lizard Creek. For example, the Des Moines River is designated as public land; therefore, camping is allowed on sand bars for the length of the Des Moines River in Webster County. In contrast, public camping is prohibited on North Lizard Creek as the creek and adjacent property are privately owned.

EXISTING LAND USE



Legend

Valley Top-to-Valley Top Project Area

Land Use

- Agriculture
- Commercial
- Transportation / Utilities
- Rural Residential
- Mixed Use
- Light Industrial
- Residential
- Public / Semi-Public
- Heavy Industrial
- Mobile Homes
- Parks / Open Space
- Vacant

Public Land Jurisdiction

- Iowa Department of Natural Resources
- Webster County
- State of Iowa
- City of Fort Dodge

PARKS & NATURAL AREAS

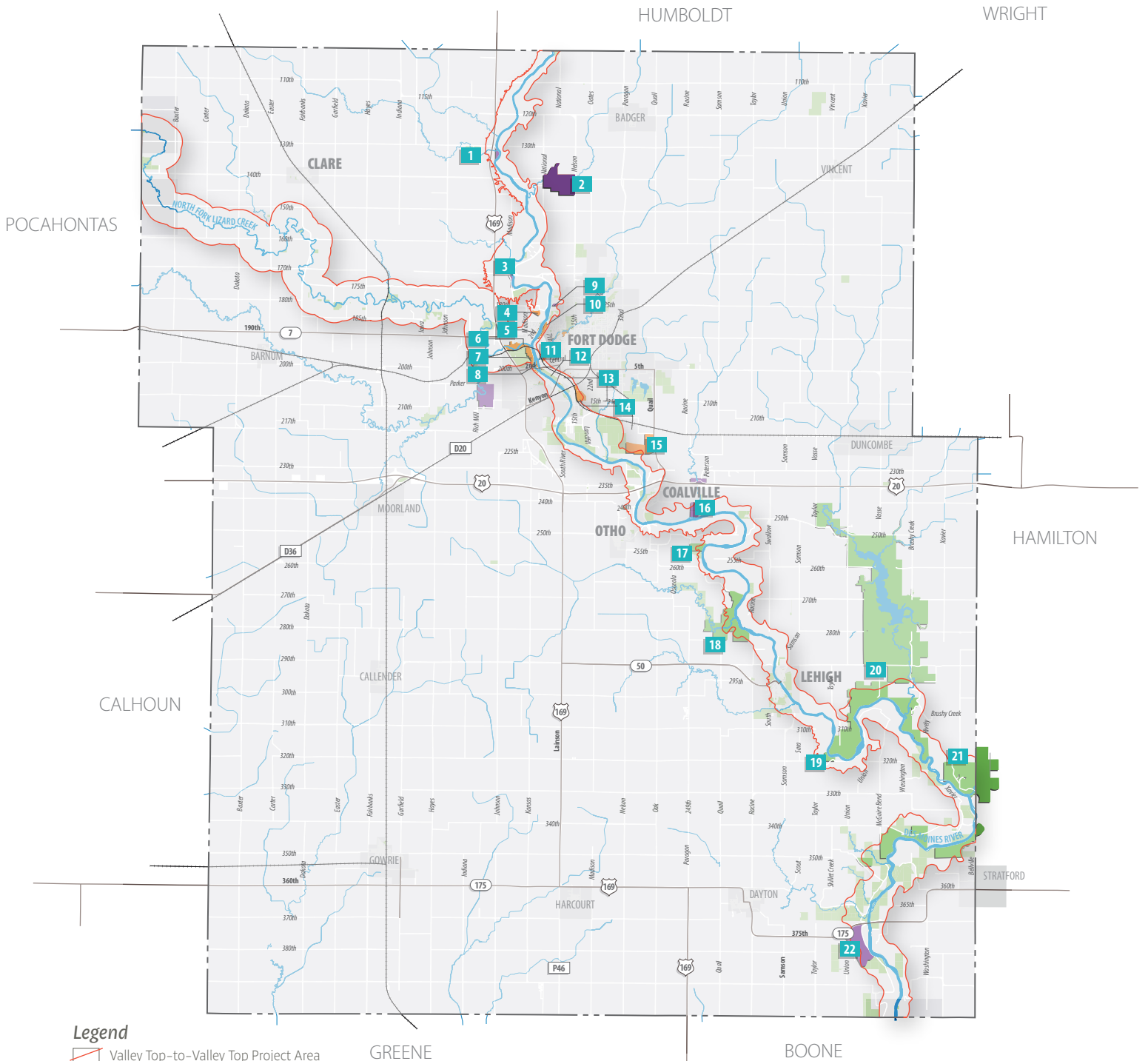
The project area includes 24 designated parks and natural areas that constitute more than 13,300 acres. Each area is owned and managed by IDNR, Webster County, or the City of Fort Dodge. Parks and natural areas include a combination of active and passive uses, which may include athletic fields, playgrounds, and preservation areas. In addition, many of the parks include wooded areas, wetlands, bodies of water, steep slopes, and other natural features that are important components of the local environment. Several parks and natural areas allow for public access to the Des Moines River. The full list of parks and amenities located within the project area is presented in the adjacent table.

STATE & COUNTY PARKS & NATURAL AREAS			
Name	Acres	Amenities and Uses	Owner
Deer Creek	17	Water trail access, fishing, hunting, birding, wildlife photography	Webster County
John F. Kennedy Memorial Park	400	Camping, boating, swimming, golf, trails, enclosed and open shelters	Webster County
Becker Wildlife Area	10	Fishing, water trail access	Webster County
The Diggings	7	Soft walking trails, birding	Webster County
Gypsum City OHV Park	800	65 miles of motorized trails, open shelter, campground, fishing	Webster County Improvement Corporation
Camp WaNoki	80	Wildlife, nature camp, enclosed shelter	Webster County
Woodman Hollow State Preserve	63	Hiking, wildlife	IDNR
Dolliver Memorial State Park	596	Camping, picnicking, fishing, trails, historic sites, water trail access, enclosed shelters	IDNR
Deception Hollow	39	Hunting, water trail access	IDNR
Brushy Creek State Recreation Area	6,500	45 miles of mixed use trails, swimming, boating, fishing, camping, hunting, open shelter	IDNR
Boone Forks Wildlife Management Area	4,456	Hunting, birding, wildlife photography, water trail access	IDNR
Carlson Recreation Area	126	Hunting, birding, wildlife photography, fishing	Webster County

CITY OF FORT DODGE PARKS & RECREATIONAL AREAS		
Name	Acres	Amenities and Uses
McCarville Park	14.9	Natural resource area
Loomis Park	30.8	Playground, trail, enclosed shelter, restroom, fishing
Hydro-Electric Park	9.4	Playground, ball field, basketball courts, volleyball, pickleball, restroom, enclosed shelter, horseshoes, water trail access
Lizard Creek Recreation Area	76	Natural resource area, water trail access
Phinney Park	56.9	Trail, open shelter
Duck Island	13	Natural resource area
Sunkissed Meadows	42	Trail, Disc Golf, Remote-control Race track (private), water trail access
Mini Park	0.7	Playground, open shelter, basketball court
Oleson Park	69.4	Playground, splash pad, trail, enclosed shelter, open shelter, restroom, animal enclosure, bandshell

Des Moines River and Lizard Creek Water Trails and Corridor Plan

PARKS & NATURAL AREAS



Legend

Valley Top-to-Valley Top Project Area

Land Jurisdiction

- Iowa Department of Natural Resource
- Webster County
- City of Fort Dodge

Parks & Natural Areas

- 1 Deer Creek
- 2 John F. Kennedy Memorial Park
- 3 Becker Wildlife Area

- 4 McCarville Park
- 5 Hydro-Electric Park
- 6 Lizard Creek Recreation Area
- 7 Phinney Park
- 8 Duck Island
- 9 The Diggings
- 10 Loomis Park

- 11 Soldier Creek Nature Trail
- 12 Sunkissed Meadows
- 13 Mini Park
- 14 Oleson Park
- 15 Gypsum City OHV Park
- 16 Camp WaNoKi
- 17 Woodman Hollow State Preserve

- 18 Dolliver Memorial State Park
- 19 Deception Hollow Wildlife Mangement Area
- 20 Brushy Creek State Recreation Area
- 21 Boone Forks Wildlife Management Area
- 22 Carlson Recreation Area



Becker Wildlife Area Access



Hydroelectric/Upper Dam Access



Sunkissed Meadows Access

TRAILS

Trails provide non-motorized access to various points of the Des Moines River and North Lizard Creek. The existing trail system in Fort Dodge serves as the backbone for Webster County. Trail types include gravel, concrete, and asphalt surfaces that are typically constructed within old railroad rights-of-way or parallel to roadways.

There are approximately 26 miles of pedestrian and bicycle trails throughout Webster County; as well as 45 miles of multi-use trails for horseback riding, hiking, snowmobiling, cross country skiing, and mountain biking, situated in the Brushy Creek State Park; and 60 miles of trails for use by ATVs, side-by-sides, and off-road motorcycles in the Gypsum City Off-Highway Vehicle Park. Trails within the Fort Dodge section of the project area include the Phinney Park Trail, Loomis Park Trail, Kenyon Road Trail, Soldier Creek Nature Trail, and Riverfront Trail.

WATER TRAILS

Water trails are signed routes that follow navigable waters. According to IDNR, water trails “help re-connect Iowans to their waterways’ history, heritage, geology, fisheries, and wildlife.” They provide opportunities for canoeing, kayaking, and other forms of water recreation that follow a marked route that indicates nearby amenities, campsites, and historic and cultural resources. The length of the Des Moines River through Webster County and 14 miles of North Lizard Creek are designated water trails by IDNR.

SIGNAGE

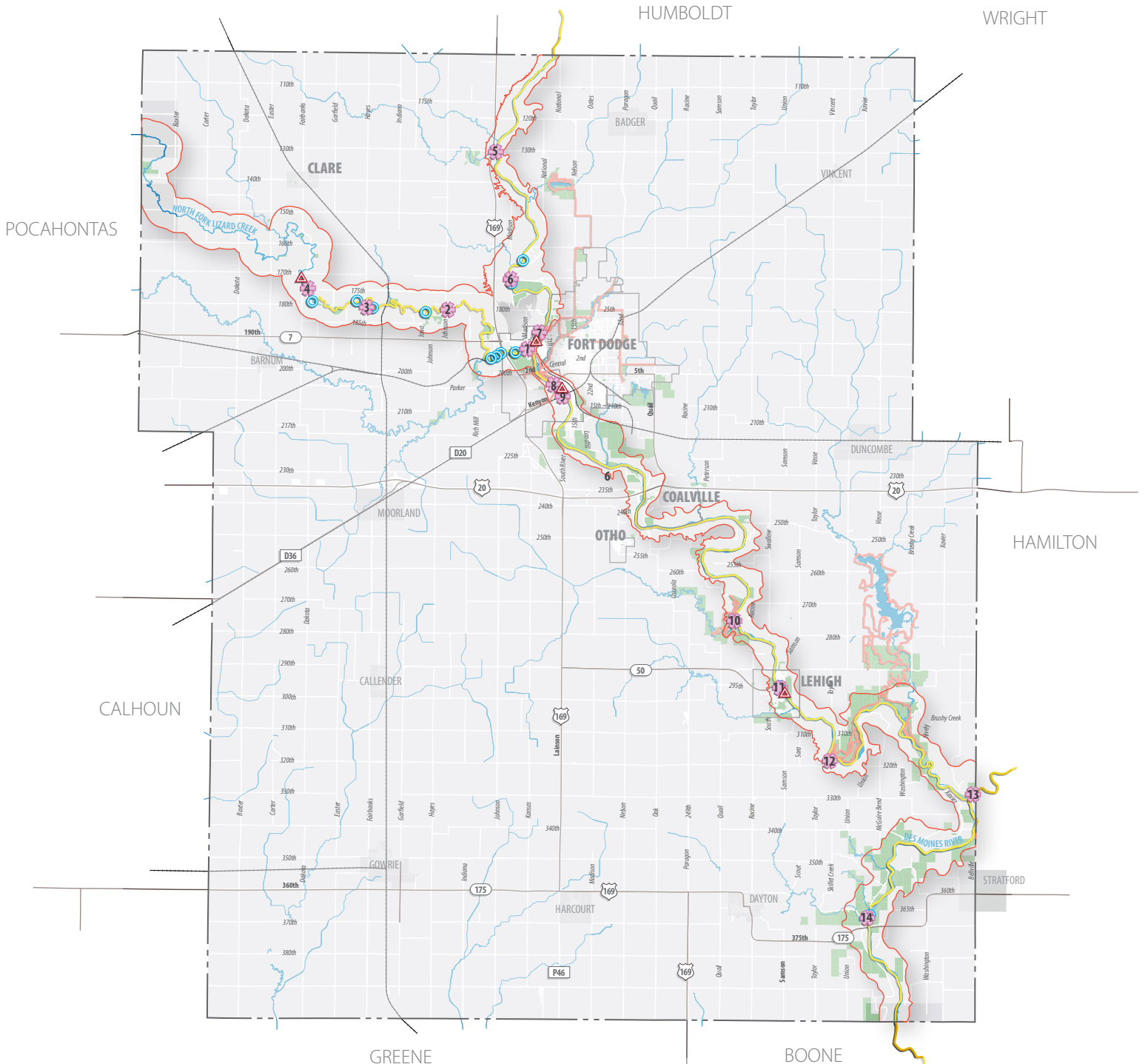
The Des Moines River water trail and North Lizard Creek water trail are generally well-marked using official signage as directed by the IDNR manual entitled *Developing Water Trails in Iowa*. Adjacent roadways display signs that indicate access points and amenities. Access signage directs users to various parks and amenities along the Des Moines River.

HAZARDS & WATER TRAIL CHALLENGE AREAS

Water trails within Webster County include several hazards and challenges that can be dangerous for users. The Des Moines River is home to the Hydroelectric Dam and Little Dam, both of which are low-head dams that pose significant safety hazards for river users. Additional hazards that may pose threats to river users include unstable streambeds due to erosion, log jams, and debris.

In addition, the Des Moines River and North Lizard Creek water trails include challenging obstacles. Both have several class I-II rapids that may be hazardous for beginner-level kayakers and canoers. Existing bridges and old pilings from former bridge crossings have the potential to form dangerous eddies. This occurs when water circulates around an object creating a reverse current.

TRAILS AND ACCESS



Legend

- Valley Top-to-Valley Top Project Area
- Existing Water Trail
- Existing Trail
- River Hazards
- Water Trail Challenge Areas

Lizard Creek Access Points

- 1 Lizard Creek
- 2 Rasch
- 3 Cunningham
- 4 Lentsch

Des Moines River Access Points

- 5 Deer Creek
- 6 Becker Wildlife Area
- 7 Hydroelectric Dam
- 8 Sunkissed Meadows
- 9 Lower Dam
- 10 Dolliver Memorial State Park
- 11 Lehigh
- 12 Deception Hollow
- 13 Boone Forks Wildlife Area
- 14 Skillet Creek



Dolliver Memorial State Park Access



Lehigh Access



Cunningham Access

ACCESS

The project area includes 15 public points of access for the Des Moines River (11) and North Lizard Creek (4). They are managed by the Webster County Conservation Board (WCCB), IDNR, or City of Fort Dodge. The majority of access points within the valley top-to-valley top project area require users to carry down their boats and equipment, with varying levels of difficulty. The Des Moines River access points include seven concrete ramps that promote ease of access and allow river users to launch larger watercraft such as small boats. Several of the access points along Lizard Creek are carry down access, and established through public easements provided by private land owners.

In addition to the officially designated access points, there are several informal access points along the riverfront. These include access points that are used by members of the public, but are not sanctioned by IDNR, WCCB, or local municipalities. These informal access points occur on both private property and public land and present opportunities to analyze the potential for more formal access at or near these locations.

DES MOINES RIVER & NORTH LIZARD CREEK ACCESS POINTS

Name (IDNR Access #)	City	Access Type/Description	Ease of Access	Distance to next access (mi)	Owner	Amenities
Des Moines River						
Deer Creek (308)	Fort Dodge	Carry down	Easy	4.8	Webster CCB	
Becker Wildlife Area (303)	Fort Dodge	Concrete boat ramp	Easy	3.6	Webster CCB	
Hydroelectric Dam/Upper Dam (300)	Fort Dodge	Concrete boat ramp	Easy	2.0	Fort Dodge	Playground, restrooms, cabin, softball/baseball, volleyball, basketball, horseshoes, pickleball
Sunkissed Meadows	Fort Dodge	Concrete boat ramp	Easy	0.5	Fort Dodge	Disc Golf, trail
Lower Dam (289)	Fort Dodge	Concrete boat ramp	Easy	15.1	Fort Dodge	
Dolliver Memorial State Park (282)	Lehigh	Concrete boat ramp	Easy	2.9	IDNR	Lodges, dining hall, modern restrooms, cabins, tent pads, rv pads, rv hook-ups, showers, electrical hook ups
Lehigh (280)	Lehigh	Carry down	Easy	3.4	Lehigh	
Deception Hollow (276)	Lehigh	Concrete boat ramp	Easy	15.4	IDNR	
Boone Forks Wildlife Area Skillet Access (261)	Dayton	Concrete boat ramp	Easy	10.9	IDNR	
Lizard Creek						
175th Street Access/Lentsch Access (14)	Clare	Carry down	Easy	5.6	Webster CCB	Trails, shelter
Hayes Avenue Access/Cunningham Access (12)	Clare	Carry down	Easy	5.4	Webster CCB (lease)	
Johnson Avenue Access/Rasch Access (6)	Fort Dodge	Carry down	Easy	5.4	Webster CCB (lease)	
Lizard Creek/Phinney Park Access (1)	Fort Dodge	Concrete boat ramp	Easy	5.6	Fort Dodge	Trails, shelter
Boone River						
Boone Forks Wilderness (1)	Stratford	Boone River access to Des Moines River, boat, carry down	Easy	N/A	IDNR	



CULTURAL & HISTORIC RESOURCES

The project area review of cultural and historic resources focuses primarily upon archaeological resources within the Des Moines River valley and within upland landforms overlooking the river channel. Based on findings from *A Cultural Resource Overview Study for the Proposed Des Moines River Valley Top-to-Valley Top Project, Webster County, IA*, conducted by Consulting Archaeological Services, Webster County includes a total of 625 officially reported prehistoric and historic archaeological site locations. As of spring 2015, there were 249 recorded archaeological sites within the Valley Top-to-Valley Top project area. The majority of these sites are within the Brushy Creek vicinity, which is the only location within the project area that received a detailed archaeological analysis over the span of several decades; however, the project area has a high potential for additional sites.

In order to protect the integrity of the sites and property owners, the exact location of existing sites is not provided. Landowners may formally request information from the State Historical Preservation Office on property that they own. However, given the high likelihood of historical sites within the project area in addition to existing historic sites, future development may require site-specific archaeological studies. Well-known cultural and historic sites include the existing and former coal and gypsum mines that dot Webster County, Skillet Creek Indian Mounds, and Boneyard Hollow.

INFRASTRUCTURE

Key infrastructure within the project include the low-head dams and bridge crossings. The Hydroelectric Dam is a low-head dam that was constructed in 1916 on the Des Moines River and generated electricity until it was decommissioned in 1971. The Little Dam is a low head dam located just south of Kenyon Road Bridge, that was built in 1922. Like the Hydroelectric Dam, it poses a safety hazard for river users. The Little Dam was constructed by Fort Dodge Gas and Electric to provide cooling for the turbines in a power plant built at the same time.

Additional river infrastructure includes 10 bridges that cross the Des Moines River, including two rail bridges. North Lizard Creek includes 19 bridge crossings in Webster County.



ENVIRONMENT

WATER QUALITY

Water quality in the Des Moines River is an important environmental consideration both locally and regionally. The section of the Des Moines River that traverses Webster County is a Section 303(d) impaired water for bacteria as identified in Iowa's 2014 Draft Integrated Report: Category 5: EPA-Approved Section 303(d) Impaired Waters. A Section 303(d) Impaired Water designation indicates that the water body does not meet the minimum state water quality standards. The Des Moines River is classified as a Class A1 (primary contact recreation), Class B (WW-1), and Class HH water. It is identified in the IDNR Non-point Source Plan as a primary source for drinking water, and is a major recreation asset. North Lizard Creek is also identified as a Section 303(d) impaired water for low biotic index.

Contributing factors to reduced water quality in these waterways include runoff carrying fertilizers, herbicides, and suspended solids in both agricultural and urbanized settings. Reduced water quality impacts the natural environment by decreasing micro and macro fauna, fish populations, increased algal blooms, increased bacteria levels, and reduced oxygen levels. Waterways with poor water quality may be discolored and have foul odors. They can also be a threat to humans causing contact dermatitis and intestinal discomfort if ingested.

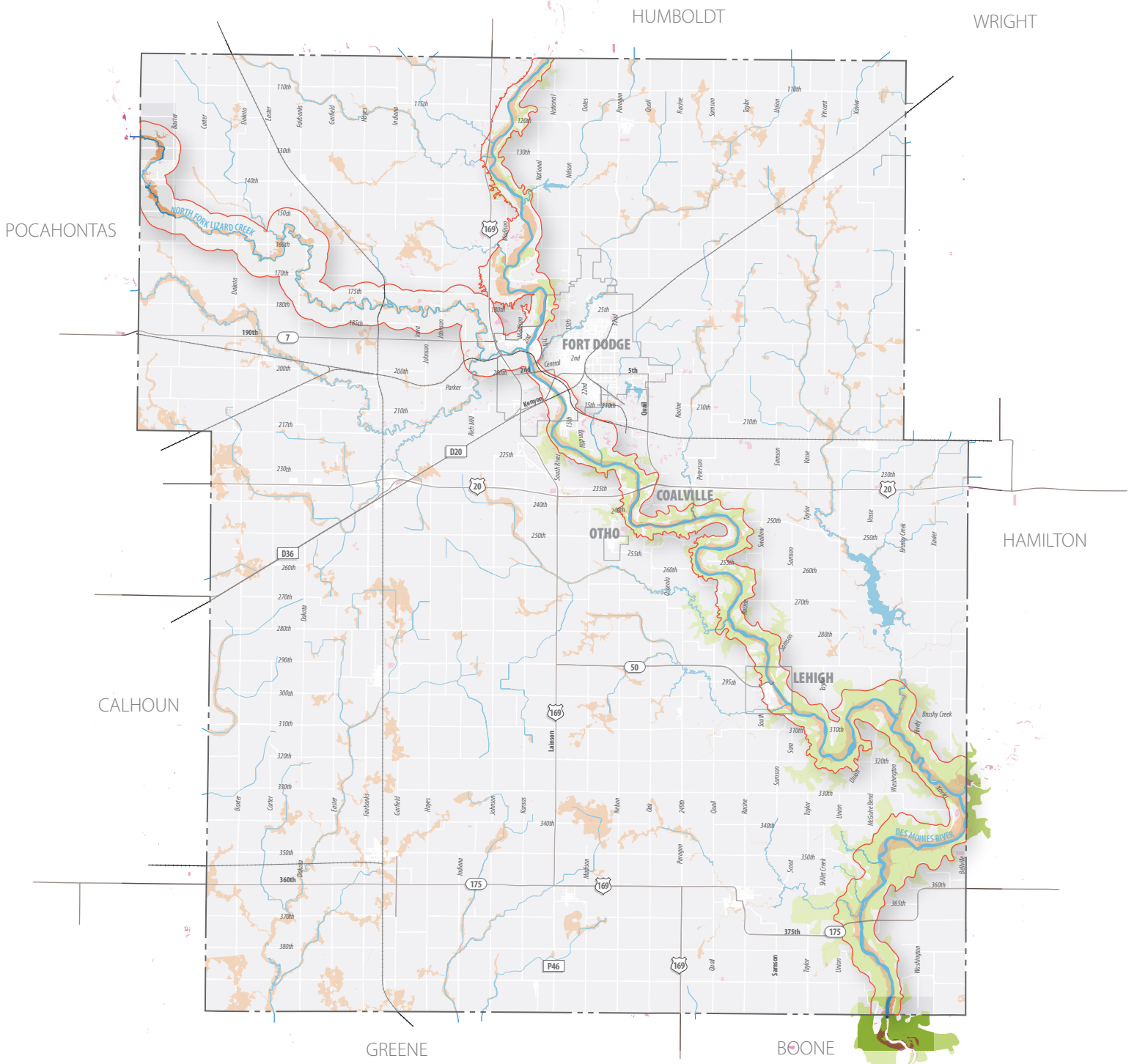
FLOODPLAINS & WETLANDS

Floodplains and wetlands are the lifeblood of riparian corridors, marshes, and other natural areas. The floodplains in the project area often vary in size and many areas have been altered by human activities such as agriculture, road and utility construction, and the addition of water due to runoff caused by urban development.



Wetlands are able to hold and cleanse large amounts of water and aid in replenishing water to aquifers. The National Wetlands Inventory maps have been used to identify areas that may contain potential wetlands. It should be noted that the wetlands identified on the map may not have been field checked by the U.S. Fish and Wildlife Service. While not as prevalent today along the waterways in Webster County due to tiling and down cutting of the rivers and streams, wetlands are sometimes associated with the Des Moines River and North Lizard Creek floodplains.

Wetlands and floodplains serve an important role as repositories that hold water during rain events. The loss of wetlands and floodplains along waterways increases the chances of flooding away from the waterways. Construction within the 100-year floodplains requires permitting from IDNR, as well as any applicable local permits. Wetlands and waters of the US are protected under the Clean Water Act and require authorization from the US Army Corps of Engineers prior to being impacted.

ENVIRONMENTAL FEATURES



Legend

-  Valley Top-to-Valley Top Project Area
-  Floodplain
-  Wetlands
-  Potential Threatened/Endangered Animal Habitat*

* Note: At the time of drafting this document, information on specific locations of all threatened/endangered habitats was unavailable.



Barn Owl, State Threatened Species
Photo: Andrew Mercer, Flickr



Northern Long-Eared Bat, Federal Threatened Species
Photo: USDA



Western Prairie Fringed Orchid, State Threatened Species
Photo: USDA

EROSION AND SEDIMENTATION

Sedimentation, or the act of particles settling out of a liquid suspension, is the result of both natural and man-made actions that allow particles to rest against a barrier or their weight is great enough that water current cannot carry the particles. Erosion and stormwater outfalls are the major contributors of sediment into the Des Moines River and North Lizard Creek. Human activities including agricultural practices, construction, and development expose soil that is washed away during a rain event. Stormwater outfalls deliver sand, salt, and other debris directly into drainageways, streams, and rivers. This sedimentation, which generally consists of soil, sand, salt, herbicides, pesticides, and other constituents contribute to decreased water quality in the waterways.

A 2014–2015 IDNR survey of erosion conditions within the project area indicate several locations with severe erosion conditions. These are areas that have a visible lack of streambank vegetation or exhibit general bank failure.

FORESTS

Iowa State University Forestry Extension estimates that approximately 6% of the state, or 3,000,000 acres, consists of forest areas. Webster County is fortunate to have approximately 1,300 acres of forest adjacent to the Des Moines River and North Lizard Creek. These forested buffers play a significant role in river health by filtering potential pollutants in stormwater and agricultural runoff (sediment, nutrients, pesticides, pathogens, etc.) from reaching the water body. They are home to many terrestrial plant and animal species that use the forest for feeding, nesting, rearing of young, and migration. Forests also aid in regulating water temperature.

RIVER SPECIES

The project area includes more than 750 aquatic and bird species. Several species of catfish, panfish, bass, and carp are commonly sought and caught by anglers fishing the Des Moines River in Webster County. These areas are also of global significance as the Des Moines River is a major migratory flyway for numerous bird species traveling from North America to South America. In addition, songbirds, waterfowl, shorebirds, and raptors utilize the corridor for roosting, nesting, and feeding.

IDNR has identified bighead carp and silver carp as invasive fish species known to occupy the Des Moines River. Invasive fish species are a detriment to the aquatic ecosystem because they can displace and diminish native species and their habitat. This causes an imbalance in the native population, decreasing the quality of the river's health.



THREATENED AND ENDANGERED SPECIES

The IDNR Natural Area Inventory (NAI) database was accessed to identify plant and animal species that are given state and/or federal status for being threatened or endangered. The NAI database listed 42 plant and animal species. Four of these species are both state and federal listed species. The full list is located within the Appendix.

EROSION



Legend

-  Valley Top-to-Valley Top Project Area
-  Very Severe Erosion Conditions



PUBLIC OUTREACH

Extensive public outreach with more than 250 Webster County residents and stakeholders was undertaken to determine how the community views and interacts with the Des Moines River and North Lizard Creek. This chapter provides a summary of the public outreach activities that took place over the course of the planning process. Outreach events and programs included:

- Focus Groups & Key Stakeholder Interviews
- Informational Community Meeting
- Visioning Workshop
- Working Group Meeting
- Community Workshop
- North & South Riverfront Workshops
- Open House
- Project Website
- sMap Online Mapping Application
- Riverfront Survey

The results of the Riverfront Community Workshop featuring Key Pad Polling and the Online Riverfront Survey are available within the Appendix of this document.



OUTREACH ACTIVITIES

FOCUS GROUPS & KEY STAKEHOLDER INTERVIEWS

To kick off the public outreach process for the Des Moines River and Lizard Creek Water Trails and Corridor Plan, the IDNR hosted a series of focus groups and interviews in October 2014. Facilitated by Don Broshar, an instructor at Iowa State Extension, the interviews were used to gather input from residents regarding potential river improvements that may enhance residents' quality of life. The focus group discussions were arranged by topic and areas of expertise, which included: emergency service staff, city/county/recreation staff, business ventures, residential and commercial neighbors, elected officials, winter sports, parks and recreation commission/foundation, public utility services, fishermen, and paddlers. Additional interviews were held with individuals with knowledge in geology, civil engineering, and finance.

INFORMATIONAL COMMUNITY MEETING

A community meeting was held in November 2014 to provide an opportunity for residents and stakeholders to learn the results of the focus group exercises as well as learn about the Des Moines River via briefing from the IDNR. The meeting was structured as a question and answer format, with an opportunity for residents to provide general comments at the end. The majority of questions posed to City of Fort Dodge staff and IDNR representatives focused on the future of the dams.

VISIONING WORKSHOP

Approximately 80 members of the community attended a Visioning Workshop in February 2015. This open house forum allowed Webster County residents to discuss issues and opportunities related to the Des Moines River. The workshop opened with a brief overview of the plan and process, then allowed residents to identify issues and opportunities on a map with regard to three different topic areas: Access & Nearby Development, Environment & Ecology, and Recreation & Amenities.

WORKING GROUP MEETING (FORT DODGE COMPREHENSIVE PLAN)

On an evening in May 2015, a series of small working group sessions took place to shape the direction of the Fort Dodge Comprehensive Plan. Each working group covered a topic specific to Fort Dodge, with one of them focusing on the Des Moines River. Participants included planning professionals, City staff, representatives of the Comprehensive Plan Advisory Committee (CPAC), and Fort Dodge residents with specific knowledge of relevant topics. Working in groups of 4-8 people, participants discussed and developed initial goals and objectives that addressed topics previously identified during public outreach activities.

COMMUNITY WORKSHOP

Webster County residents and stakeholders attended a community workshop in August 2015 to learn about the current direction of the Des Moines River and Lizard Creek Water Trails and Corridor Plan and offer more detailed input with regard to the future of the Des Moines River, North Lizard Creek, and other riparian corridors in the County.



Sixty members of the Webster County community convened at Iowa Central Community College and were led through a brief presentation of the existing conditions. Preliminary objectives were then presented, which were a culmination of previous stakeholder input and public outreach engagements. Following the presentation of key objectives and a guiding framework, participants were presented with preliminary recommendations for the future of the Hydroelectric Dam and Little Dam.

Following the presentation, participants utilized a key pad polling system to provide input by voting on 20 questions. Responses captured the audience's demographic characteristics and use patterns of the Des Moines Riverfront and North Lizard Creek, as well as specific types of uses that should occur at seven focused opportunity areas.

NORTH & SOUTH RIVERFRONT WORKSHOPS

In July 2015, nearly 50 residents gathered for a North Riverfront Workshop and about seven residents attended for a South Riverfront Workshop. These focused workshops were held in Fort Dodge's Kennedy Park and Dooliver Memorial State Park, respectively. Par-

ticipants shared their opinions in response to more focused questions that were designed to address important issues that had emerged through earlier outreach.

OPEN HOUSE

The Greater Fort Dodge Growth Alliance hosted a community open house event in June 2016. The open house format allowed members of the public to review and provide comment on the overall vision for the Des Moines Riverfront corridor as well as the more specific strategies and recommendations, which were developed through previous public input meetings and workshops.

ONLINE OUTREACH

Project Website

A project website was created to provide a single source for all information related to both the Des Moines River and Lizard Creek Water Trails and Corridor Plan and Fort Dodge Comprehensive Plan. The website contained information about both planning efforts, public meeting notices and summaries, riverfront questionnaire, and a web-based mapping tool.

sMap

sMap is an online mapping tool that allows users to identify, map, and provide comments in an interactive format. The sMap application was established as part of the Comprehensive Plan and Des Moines River and Lizard Creek Water Trails and Corridor Plan process. Participants identified approximately 160 points that provided insight to riverfront uses, access, and assets.

Riverfront Survey

Following the Riverfront Community Workshop that featured Key Pad Polling, an online riverfront survey was made available on the project website. The survey asked respondents about their general use of the Des Moines River and North Lizard Creek, as well as focused on seven sites that have the potential for future development and/or preservation. The results of the survey helped inform several of the recommendations included in the Corridor Plan.



ISSUES, CONCERNS & STRATEGIES

Webster County residents voiced their concerns regarding a range of issues and offered potential actions for specific project areas; however, many comments centered on key themes. For the purposes of this summary, the identified issues and potential solutions were consolidated into broad categories.

ACCESS

Participants frequently noted the need for improved access to the Des Moines River. Where access points do exist, they tend to be poorly maintained with litter and debris. Future access points should avoid areas prone to flooding and make accommodations for the elderly. Participants identified nearly a dozen access points for boating and fishing in and around Fort Dodge. Additional access points were suggested near Dolliver State Park, the Fort Dodge Regional Airport, at D14, and C56. Several participants suggested the addition of a pedestrian bridge and the creation of scenic trails so that the Des Moines River can become a travel destination.

SIGNAGE

There are several “no trespassing” signs near the Hydroelectric Dam, which are source of confusion for fishermen and riverfront visitors. Furthermore, the perceived lack of signage along the river corridor may inhibit safe access. Participants suggested using signs in certain areas that say, “Danger, enter at your own risk,” and utilizing signs to indicate river access points as well as hazardous areas. In order to access the river’s recreational offerings, participants suggested installing way-finding signs and maps for tourists and residents to find their way.

RIVERFRONT USE

Several participants noted that many residents have no reason to access the river. While the scenic beauty and recreational opportunities are a draw for some, the river requires more activities and amenities to bring people to its banks. Suggestions to increase riverfront usage include increased views of the river, hosting a variety of seasonal activities and events such as winter and summer festivals. Commercial development along certain areas of the riverbanks was also noted as a key strategy that would bring more people to the river and foster a sense of ownership.

DAMS

The Hydroelectric Dam and Little Dam in Fort Dodge were a topic of discussion at every public outreach event. Participants noted that the dams limit access for boating, tubing, kayaking, and other recreational uses. However, it was acknowledged that they also provide fishing spots. Solutions to the dam issue varied between removing them completely, reconstructing them as white water trails, or returning the hydroelectric dam to its original state as a power-producing structure with working gates. Some residents expressed great concern with regard to changes in water level that may accompany any potential modifications to the Hydroelectric Dam.

SAFETY

Major safety concerns near the Des Moines River include the Hydroelectric Dam and Loomis Park. There are concerns that the dam does not adequately prevent people from walking on it, which could lead to dangerous consequences. Loomis Park was also identified by participants as a public area with potential safety concerns.



DEVELOPMENT

Participants would like to see increased development at the Des Moines River in Fort Dodge. Suggestions included constructing restaurants along the banks and creating campgrounds at the former Sunkissed Meadows Golf Course. Additional suggestions for the site included an upgraded park, event and festival venue, and business district with shops, restaurants, a casino, and boardwalk. The other highly noted priority development site included land at the western terminus of Central Avenue. Suggestions for this area are similar to Sunkissed Meadows, but with a greater emphasis to use the space as an event venue.

With regard to areas surrounding North Lizard Creek and the Des Moines River in both north and south Webster County, there was a preference for natural preservation and limited development. Participants do not wish to see too much development in areas south of Fort Dodge. If development is necessary, it should be based in agritourism.

TRASH & ILLEGAL DUMPING

One significant issue regarding the environment is the amount of trash and illegal dumping that occurs along the riverfront. Several areas of the river are relatively isolated, which has led to illegal dumping activities. Those that visit the river regularly noted the amount of trash and debris. Participants would like to see more regular maintenance and cleanup.

RECREATIONAL OPPORTUNITIES

Participants contributed a wealth of ideas and suggestions to improve the recreational component of the Des Moines River. Several participants would like to see the dams transformed into water trails and rapids and others would like the dams removed completely. The trail system was noted as an asset that should be extended north and south along the riverfront. With this, there are opportunities to take advantage of the area's history through the use of historical markers and guided tours. Participants also identified areas for a potential concert venue, recreation center, ball fields, and camping.

NATURAL PRESERVATION

Participants overwhelmingly supported preserving Lizard Creek's natural state and maintaining good water quality. With the exception of adding a few more public access points, participants felt that Lizard Creek should remain undeveloped as a scenic river for light recreation including fishing, canoeing, and kayaking.

APPEARANCE

The Hydroelectric Dam and Hydro-Electric Park is considered by some participants as eyesores that are in need of an overhaul with benches and play equipment. The Sunkissed Meadows site is considered an area with poor appearance while better landscaping could help the appearance of the industrial site in the Pleasant Valley neighborhood. Overall, it was noted that natural screening should be added to reduce the visual impacts of development sites and other areas of poor appearance along the Des Moines River.



RIVERFRONT IMPROVEMENT PLAN

The Riverfront Improvement Plan lays the foundation for land use and provides a detailed vision and recommendations for the Des Moines River and North Lizard Creek. The Plan presents general policies and considerations for six distinct uses within the Des Moines River Valley Top-to-Valley Top and North Lizard Creek half-mile buffer, collectively called the Project Area. These policies are intended to aid the decision making process with regard to land use and development, natural land preservation, riverfront access, and parks and open space.

This chapter of the Corridor Plan also identifies the locations of recommended improvements and key strategies. The segment-by-segment application of these improvements reflects the established land use framework, ensuring Webster County's most influential environmental and recreational assets achieve the area's shared vision for their future.

Corridor Goals

The Des Moines River and Lizard Creek Water Trails and Corridor Plan is guided by six core riverfront goals that establish the context for all recommendations included in the Plan. These values are paramount to achieving the vision of the Des Moines River and North Lizard Creek as defined by Webster County residents and stakeholders. Some of the general strategies identified within these goals may be noted multiple times, as they address multiple goals. All actions undertaken along the riverfront should be weighed against their ability to achieve these goals.

1. PROTECT THE NATURAL ENVIRONMENT

The Des Moines River and its tributaries support approximately 650 aquatic and bird species as well as numerous plant species. The well-being of the natural environment that supports these species can have far-reaching effects on the economic and ecological health of Webster County. All actions should aim to create a healthy river environment. This includes preserving wetlands and animal habitats, maintaining riparian corridors in their natural state, promoting native river species, and educating the public on the importance of the natural environment.

General Strategies:

- Ownership of publicly-owned land will be maintained to conserve the natural resources that exist on those lands
- Land will be acquired and protected along the Corridor as it becomes available
- Creek corridors will be restored with native prairie landscapes



2. IMPROVE WATER QUALITY

Water quality is vital to riparian ecosystems, local water supply, and the recreational use of the Des Moines River and North Lizard Creek. Both the Des Moines River and North Lizard Creek are designated as 303(d) and 305(b) impaired waters, which indicates water quality is affected by pollutants. All actions should seek to mitigate and eliminate source and non-point source pollution that threaten water quality in the Des Moines River and its tributaries.

General Strategies:

- Streambanks will be restored
- Floodplain areas will continue to be acquired by public agencies
- Stormwater best management practices will be utilized throughout the Corridor



3. IDENTIFY & ENHANCE RECREATIONAL OPPORTUNITIES

Fishing, kayaking, camping, and bicycling are popular recreational activities in Webster County; however, these activities represent only a small portion of the myriad of recreational opportunities on or along the Des Moines River and its tributaries. The Plan seeks to improve upon existing recreational activities and establish additional opportunities. All actions should seek to identify recreational activities where appropriate to maximize the use of the Des Moines River and Lizard Creek as recreational amenities.

General Strategies:

- Recreational opportunities will be expanded along the length of the corridor
- High-use recreation areas will be clustered to create distinct destinations
- Access points will be improved



4. IMPROVE ACCESS TO THE RIVER

The Des Moines River and its tributaries contain many economic, ecological, and recreational assets. Providing access to these assets through trails, outcrops, and boat ramps ensures the river can be enjoyed to its fullest extent while encouraging increased interaction with nature. All actions should seek to provide access to and along the Des Moines River and North Lizard Creek.

General Strategies:

- Increased access will provide a multitude of opportunities to interact with nature and the Des Moines River
- Additional access points will be constructed in identified areas
- Existing access points will be improved
- ADA access will be accommodated where appropriate



5. PROMOTE SUSTAINABLE DEVELOPMENT

Portions of the Des Moines riverfront and adjacent municipalities are well-positioned for development that can increase access to the river and serve as economic development drivers. Increased use of the river will likely generate additional demand for businesses and services that complement and take advantage of river corridor views, environmental amenities, and recreational attractions. All actions should strive to utilize Des Moines River and North Lizard Creek as assets that encourage future development in areas suitable for such, as identified in this plan.

General Strategies:

- Development will be limited within the 100-year floodplain
- Development will be concentrated in urban areas
- Development will avoid natural areas and redevelopment will be encouraged outside of the floodplain
- Infrastructure will be floodable



6. PROTECT THE NATURAL CORRIDOR OF THE RIVER VALLEY

The Des Moines River and North Lizard Creek project area includes a number of open spaces, parks, and natural preserves. These areas create the framework for a greenbelt system, which is a continuous sequence of natural areas protected from development. Conserving and protecting these natural and open space areas and linking them through additional greenspace and trails support the creation of a corridor-wide greenbelt.

General Strategies:

- Interpretive signage will be located along trails and viewpoints
- Development that strives to protect or plan for the corridor will be promoted
- Land will be acquired and protected along the Corridor as it becomes available





RIVERFRONT AREAS & PLANNING CONTEXT

The Des Moines River and Lizard Creek include a total of approximately 84 miles of waterway in Webster County. For the purposes of the Riverfront Improvement Plan, the project area has been subdivided into six distinct areas. Each riverfront area captures a distinct portion of the planning area and has a unique vision. Each riverfront area includes objectives and strategies with regard to the following:

- Water trail classification
- Responsible party
- Land use functional classification
- Toolbox improvement strategies

WATER TRAIL CLASSIFICATIONS

Water trail classifications provide a guide for the design of specific water trail experiences and allow users to select a riverfront segment that is suited to their ability level. State-designated water trails fall under the following classifications:

Gateway Experience Water Trails are intended to expose the greatest number of new users to water trails. Access points have universal design standards, parking, hard-surface launches, and amenities. These should be located at frequent intervals (less than six miles between access points). The Gateway Experience should include relatively few hazards and include several educational components.

Recreational Experience Water Trails offer the typical Iowa water trail experience. This includes river corridors with various hazards, need for boat control, and access points that are less developed than gateway experiences. The water trail should be approachable for family and group experiences, with the corridor traveling through urban edge and rural settings.

Challenge Experience Water Trails are suited for experienced and highly skilled water users. They include primitive launch sites that may include steep slopes and are only accessible by foot trails. Challenge Experience Water Trails may include fast-moving water with a variety of rapids, portages, and hazards.

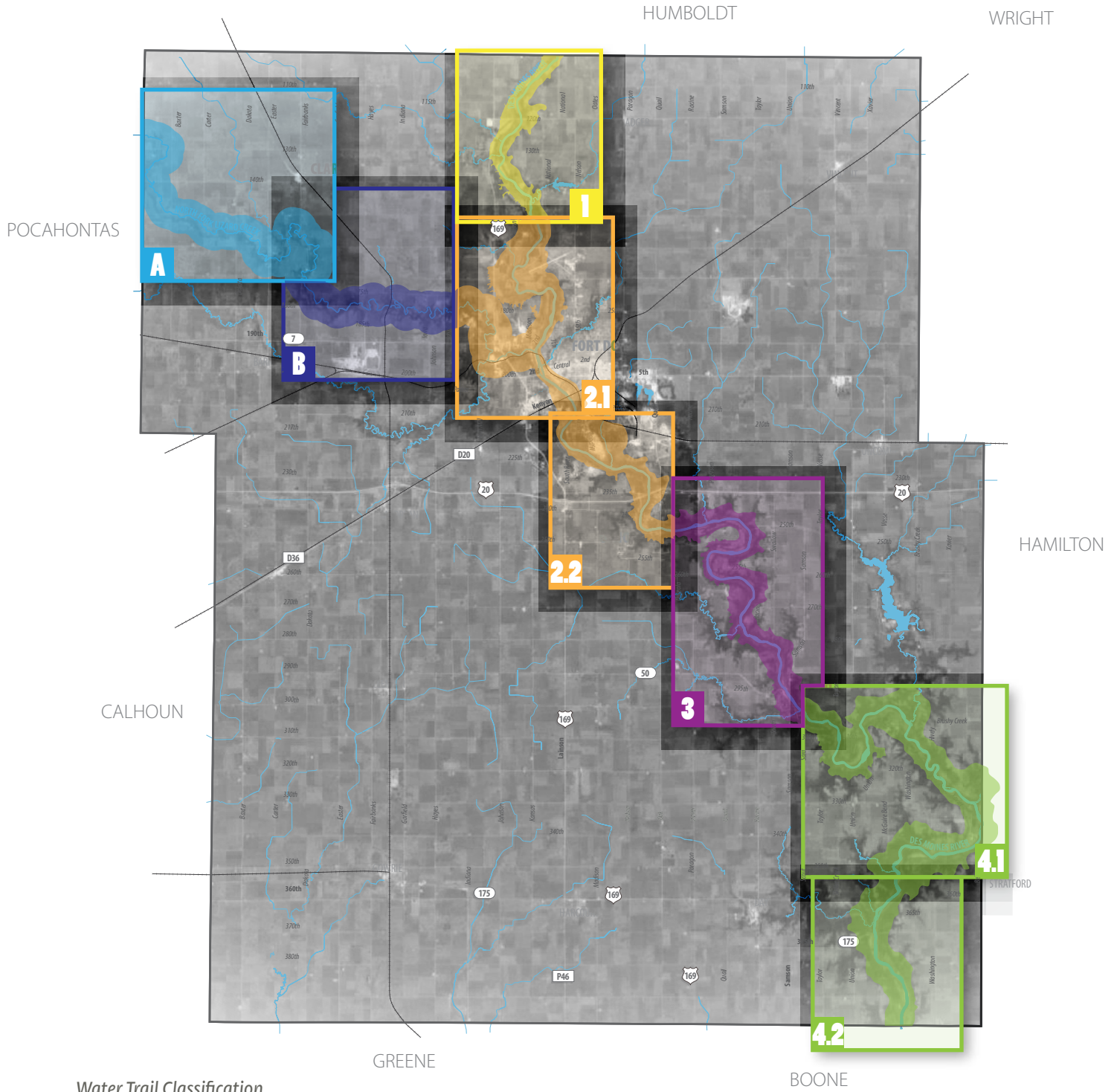
Wilderness Experience Water Trails are intended to provide a quiet experience for the viewing and appreciation of wildlife. Access points are primitive and lack wayfinding in order to discourage unnecessary development. These water trails are focused on the conservation and management of natural areas, and may include "challenge" elements such as log jams, rapids, and others.

A context map establishing these designations in Webster County is shown on following page.

RESPONSIBLE PARTY

The Des Moines River and North Lizard Creek flow through a number of jurisdictions and land ownership scenarios. As such, each project area is assigned to a responsible party; a public sector entity that should be spearheading recommendations within that project area.

RIVERFRONT CONTEXT MAP



Water Trail Classification

- ▬ Area 1: Recreational
- ▬ Area 2: Gateway & Challenge
- ▬ Area 3: Recreational
- ▬ Area 4: Wilderness
- ▬ Area A: Potential Water Trail Extension
- ▬ Area B: Challenge



LAND USE FUNCTIONAL CLASSIFICATION

The land uses adjacent to the Des Moines River and North Lizard Creek perform a variety of functions that dictate the use of the riverfront in different portions of the project area. Given the existing landscape, conditions, and areas of opportunity, land within the project area is designated under one of six land use functional classifications:

- Preservation
- Open Space
- Recreation
- Agriculture
- Edge Development
- Urban Development

This framework lays the foundation for more detailed recommendations and provides land use policies that are intended to aid the decision making process with regard to land use and development, natural land preservation, riverfront access, and parks and open space. The functional classifications serve as a land use policy overlay on top of existing County and City land use plans. They ensure that Webster County's most influential environmental and recreational assets achieve the area's shared vision for their future.

Preservation

Preservation areas include the highest level of environmental protection within the planning area. These areas may include wildlife habitats including habitats for threatened and endangered species, woodlands, cultural and historical resources, and other environmental assets. Preservation areas are either privately held areas containing environmental features that should be prioritized for preservation, or under some form of control or ownership by a public/government agency, which may include the IDNR, Webster County Conservation Board, City of Fort Dodge, City of Coalville, or City of Lehigh.

Preservation Land Use Policies

- Webster County Conservation and IDNR should prioritize property acquisition in these areas where there are documented habitats for threatened and endangered species, historic resources, heavily wooded areas, or other environmental assets.
- Webster County and local municipalities should be encouraged to work with local property owners to adopt or amend zoning designations to include preservation districts on important properties with known environmental assets. These districts should regulate permitted uses and modifications to natural assets.

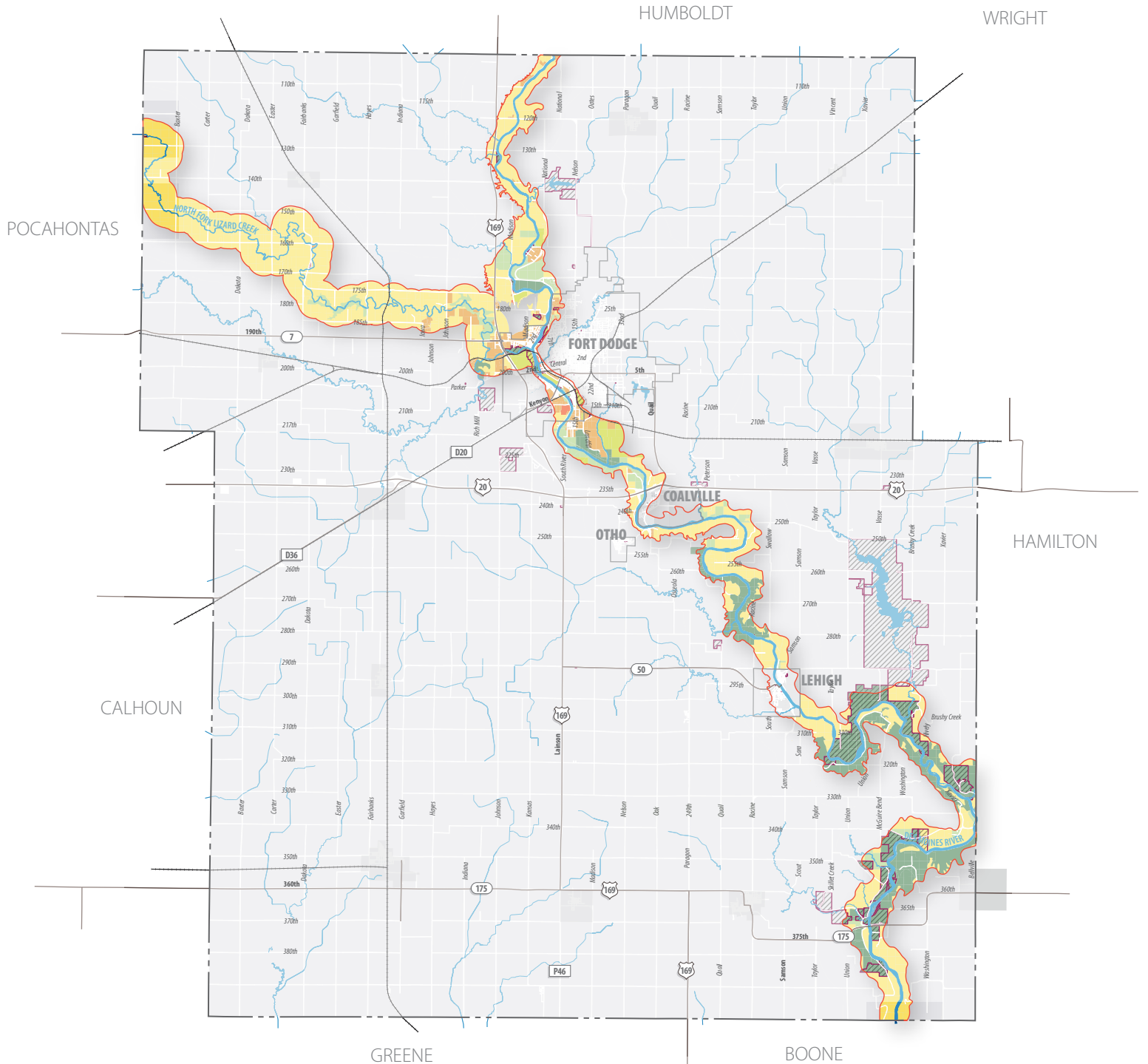
Open Space

Open Space areas include land that is not part of a designated park or natural area, but consist of undeveloped land that contain features such as wooded areas, wetlands, bodies of water, steep slopes, and other natural features. These are important components of the riparian environment and may be unsuitable for development. These areas may be integrated with residential and agricultural land uses.

Open Space Land Use Policies

- Property owners should be encouraged to provide conservation easements and enroll in the Conservation Reserve Program as well as other conservation programs.
- Future development should be limited to areas outside of the flood plains.

LAND USE FRAMEWORK



Legend

- Valley Top-to-Valley Top Project Area
- Public Land

Functional Classification

- Preservation
- Open Space
- Agriculture
- Edge Development
- Urban Development

Recreation

Recreation areas include programmed parks and open space areas that are owned and operated by municipal entities or private organizations. Areas within this classification accommodate active and passive recreational activities. The majority of water access points within the project area are located within public parks or natural reserves.

Recreation Land Use Policies

- Every public park or natural area that abuts the Des Moines River or Lizard Creek should have a water access point, waterfront interaction area, or scenic viewing area.
- Recreation areas should have safe and efficient multi-modal connections to adjacent neighborhoods.
- These areas should create an integrated recreational system, which link existing and emerging recreational opportunities.
- Commercial development should be limited to businesses that provide or support recreational services.

Agriculture

Agriculture areas include land that is used to cultivate and raise crops and livestock, or supporting uses such as crop storage or farmsteads. This classification may also include environmental assets, such as wooded areas or steep slopes, within the context of agricultural activity.

Agriculture Land Use Policies

- Agricultural runoff should be regularly monitored for water quality to ensure all State of Iowa laws, protocols, and best practices are followed.
- Agricultural activities should be restricted within 100 feet of the Des Moines River and its tributaries.

- Agricultural property owners should be encouraged to participate in the Farm Service Agency Conservation Reserve Program in areas near the river corridor.
- Agricultural property owners should be encouraged or incentivized to cultivate non-critical open space areas within their property in exchange for increased buffers and open space protection for land adjacent to riparian corridors.

Edge Development

Edge Development areas include developed parcels adjacent to the Des Moines River or Lizard Creek, though the developed site maintains a natural transition to the waterway. The intent of this classification is to allow for low density development that maintains the river in its natural state, while reducing adverse risks of flooding and erosion from adjacent development.

Edge Development Land Use Policies

- The Webster County Zoning Ordinance and local municipal ordinances should be adopted and/or amended to include development regulations intended to concentrate development in portions of the site so as to avoid flood plains, slopes that would result in excessive stormwater runoff towards waterways, steep slopes, forested areas, or other environmental assets.
- Development should be encouraged or required to follow stormwater best management practices to reduce runoff and pollution, including on-site detention, bioswales, native plantings, permeable surfaces, and others.
- Development should generally be limited to low density housing.

Urban Development

Urban Development areas are limited to parcels where developed portions of the site directly abut the waterfronts or modify it from its natural state. These are located near the center of Fort Dodge where existing industry or potential future commercial or entertainment uses take advantage of adjacency to the Des Moines River.

Urban Development Land Use Policies

- The City of Fort Dodge should amend its zoning regulations to restrict untreated stormwater from being discharged directly into waterways.
- New development or redevelopment should integrate public trails and waterfront access as recommended in this plan.
- Development should integrate site design principles that preserve views to the river from surrounding portions of Fort Dodge.
- Any reinforced banks should include design elements that mimic the transition from the natural grade to shallow waters at the edge of the river.
- Site design and landscaping should integrate natural elements and materials found in the native river environment.



RIVERFRONT CORRIDOR TOOLBOX

Several specific strategies or projects can be put into action in order to achieve the guiding principles established in this plan. The following recommendations provide a “toolbox” of actions that can be implemented by one or more stakeholders in order to improve water quality, preserve environmental areas, enhance access, and strengthen the riverfront as a recreational asset.

The following toolbox improvements may be used throughout the riverfront; however, some are specifically identified as a Corridor Toolbox Improvement in each riverfront segment.

- **Stream Bank Restoration** uses vegetation and engineered structures for streambank protection and erosion control using natural channel design.
- **Development Buffers** may be used to reduce the impacts of urbanized areas by limiting development within a set distance from the river.
- **Transfer of Development Rights** is a regulatory tool to preserve environmentally sensitive areas, open space, and agricultural areas.
- **Conservation Easements** are legal agreements between the conservation easement holder and private property owners that place permanent restrictions on the development or use of land for the purpose of preservation.
- **Trail Easements** are legal agreements between a grantor and grantee that provides a prescribed level of access to private land.
- **Open Space Requirements** are a regulatory tool that requires a specified amount of land for new development to be used for parks and/or open space.
- **Land Acquisition** involves the purchase of private property by a governmental agency to preserve natural areas, create trails, and allow for desired development.
- **Monitoring Programs** are used to gauge the effectiveness of improvement projects with regard to water quality, species diversity, sedimentation, and other parameters.
- **Incentives** motivate private property owners to protect, conserve, and expand open space areas.
- **Public Education** is an action used to inform residents, businesses, and landowners about their role in improving water quality, preserving riparian habitats, and reducing erosion and sedimentation. Public education may also include providing outreach and forming partnerships between landowners, Webster County (and cities within), NRCS, Soil and Water Conservation Districts (SWCD) and others to reduce the impact of non-point sources of pollution.
- **Stormwater Ordinance** is a regulatory tool used to establish minimum stormwater management requirements.
- **Pollution Enforcement** involves the use of law enforcement to enforce littering and illegal dumping laws.
- **Development Best Management Practices** are used by property owners to help achieve site-specific stormwater management goals and sustainability objectives.

More detailed descriptions of each toolbox action can be found in Chapter 5 – Implementation.

AREA A

NORTH LIZARD CREEK

Water Trail Experience Classification Goal: *Potential Water Trail Extension*
Responsible Party: *Webster County Conservation Board*

AREA A VISION

This segment of Lizard Creek will remain a heavily wooded stream corridor lined with natural wildlife.

OBJECTIVES

- Work with landowners to reduce watershed impacts
- Explore opportunities to preserve wooded and natural areas within the floodplain
- Explore potential for access on county-owned property
- Work with area landowners to identify and create potential access sites
- Designate the segment of North Lizard Creek within Area A as a water trail

TOOLBOX IMPROVEMENTS

- Conservation Easements
- Trail Easements
- Land Acquisition
- Monitoring Programs
- Streambank Restoration
- Public Education

STRATEGIES

WATER TRAIL CONSIDERATIONS

This segment of North Lizard Creek lies outside of the designated North Lizard Creek Water Trail. Although the surrounding land uses are predominantly agricultural, the remoteness and lack of development make the segment a potential candidate for a Wilderness Experience water trail. The Webster County-owned parcel at 130th Street provides a potential access point location, as the next access point is more than 13 miles downstream at the Lentsch Access. Webster County should work with IDNR, landowners along this segment of North Lizard Creek, and other organizations to submit a pre-planning application, which begins the initial process of designating the segment an official water trail.

DAM REMOVAL

This section of North Lizard Creek includes a low head dam located just south of the 170th Street bridge. To increase safety, water quality, and ecological benefits, the County should work with IDNR to remove the dam.

MONITORING

This segment of North Lizard Creek runs through agricultural land with few areas of dense tree stands. Because this segment feeds directly to the start of the North Lizard Creek Water Trail, Webster County should work with Natural Resources Conservation Service (NRCS) to install a monitoring system within this segment to understand the impact of agricultural runoff into the water body and monitor the effectiveness of potential mitigation efforts.







LIZARD CREEK

Area A

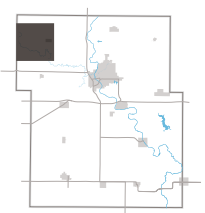
Legend

-  Public Land: Webster County
-  Low Head Dam

Functional Classification

-  Preservation
-  Open Space
-  Recreation
-  Agriculture
-  Edge Development
-  Urban Development

POCAHONTAS



AREA B

NORTH LIZARD CREEK

Water Trail Experience Classification Goal: *Challenge*
Responsible Party: *Webster County Conservation Board*

AREA B VISION

On-water recreation will continue to draw visitors to the area's challenging rock riffles and rapids. The water trail experience will feature consistent stream flow and protected streambanks that maintain the natural scenery.

OBJECTIVES

- Maintain the North Lizard Creek water trail and access points
- Explore opportunities to preserve wooded and natural areas
- Improve water quality and control streambank erosion

TOOLBOX IMPROVEMENTS

- Conservation Easements
- Land Acquisition
- Monitoring Programs
- Streambank Restoration
- Public Education

STRATEGIES

NORTH LIZARD CREEK WATER TRAIL

The North Lizard Creek Water Trail was designated in 2012. It is considered one of the top five most challenging paddles in the State of Iowa. As a challenge experience trail, Webster County and Fort Dodge should regularly update the risk management plan to ensure proper emergency response resources are available to respond to potential water trail hazards.

LENTSCH ACCESS

The Lentsch Access serves as the headwaters for the 14-mile North Lizard Creek Water Trail. Due to the nature of the trail, the access and launch site should remain relatively low-impact, maintaining its existing gravel launch.

CUNNINGHAM ACCESS

Similar to the Lentsch Access, the Cunningham Access and launch point should be maintained as a rural, low-impact access point and launch. The Cunningham Access is located less than three miles downstream of the Lentsch Access. As such, there will likely be no need for additional amenities. Webster County should focus on routine maintenance of the existing access and ensure interpretive signage is up-to-date. In addition, the County should renew the 10-year lease when it expires in 2020 or purchase the property from the land owner.

RASCH ACCESS

The Rasch Access is located at a midpoint between the headwaters and terminus of the North Lizard Creek Water Trail. The distance between the Rasch Access and next and final access point along the creek corridor is the longest stretch of the water trail. The County should consider adding amenities. Further, the County should renew the 10-year lease when it expires in 2020 or purchase the property from the land owner.

PRESERVATION

The North Lizard Creek Corridor between the Lentsch Access and the Cunningham Access includes large expanses of dense tree areas. These wooded areas provide significant environmental benefits to the creek corridor as well as enhance the natural experience for water trail users. The County should work with property owners to ensure these areas are preserved and maintained as forested open space areas. The County should explore the use of conservation easements and/or acquire land along North Lizard Creek as it becomes available.







LIZARD CREEK

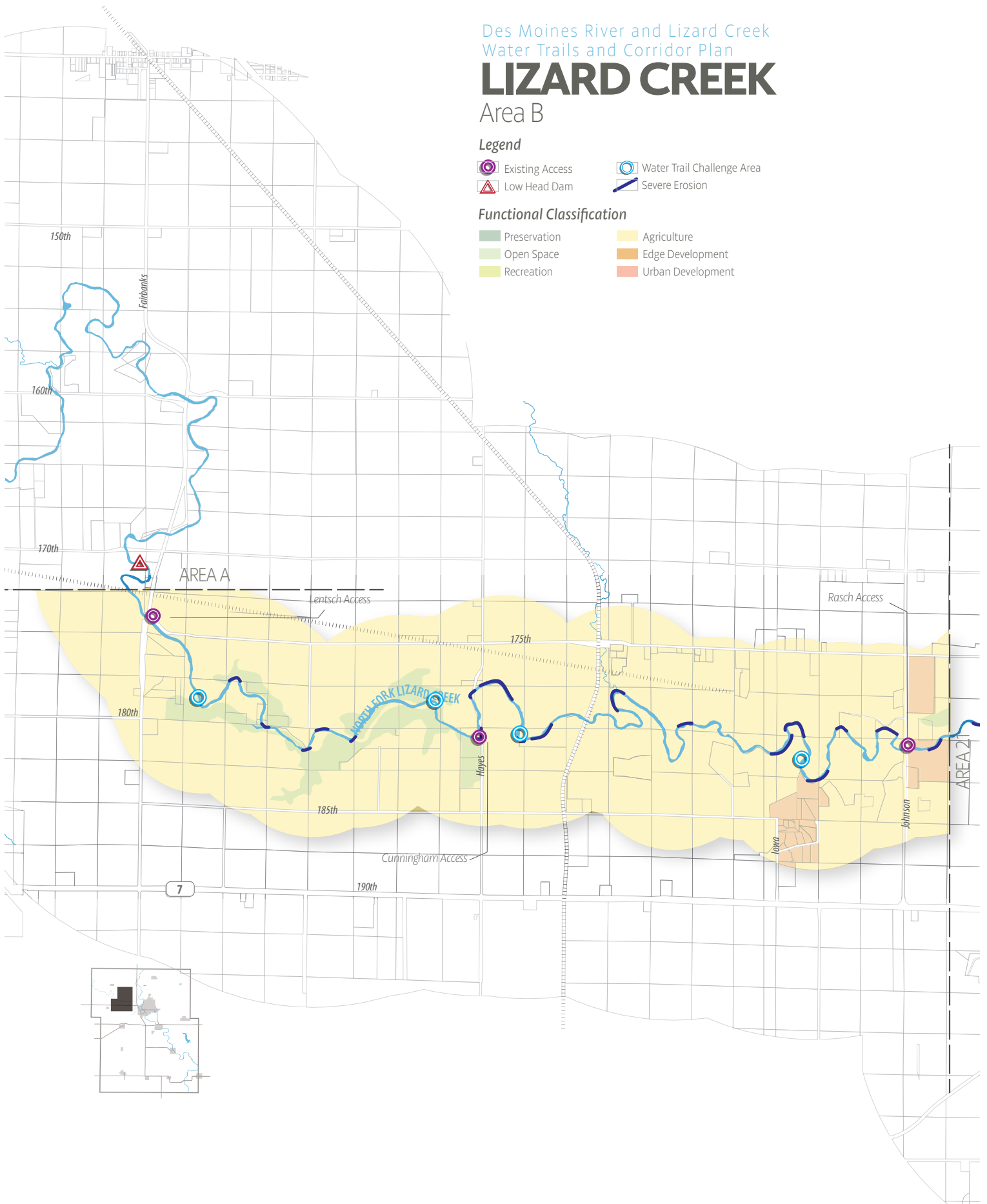
Area B

Legend

-  Existing Access
-  Low Head Dam
-  Water Trail Challenge Area
-  Severe Erosion

Functional Classification

-  Preservation
-  Open Space
-  Recreation
-  Agriculture
-  Edge Development
-  Urban Development



AREA 1

DES MOINES RIVER

Water Trail Experience Classification Goal: Recreational
Responsible Party: Webster County Conservation Board

AREA 1 VISION

This segment of the Des Moines River will support active on-water recreation that connects Gotch State Park in Humboldt County to downtown Fort Dodge. Streambanks will be restored and buffered to improve the watershed, while scenery will be protected and public access enhanced.

OBJECTIVES

- Work with landowners to reduce watershed impacts
- Expand and improve the Deer Creek access
- Establish a water trail designation into the City of Humboldt

TOOLBOX IMPROVEMENTS

- Conservation Easements
- Land Acquisition
- Monitoring Programs
- Public Education
- Streambank Restoration

STRATEGIES

NORTHERN WATER TRAIL EXTENSION

Extending the water trail north to the City of Humboldt would create a more robust river experience, allowing users to connect between two urban settings: the City of Humboldt and the City of Fort Dodge. Existing river access points, hazards, and mix of wooded and agricultural land make this stretch of the Des Moines River an ideal candidate for a recreational experience. Webster County, with assistance from IDNR, should collaborate with the City of Humboldt and Humboldt County to create a Recreational Experience water trail between the City of Humboldt and 150th Street. Initial steps include creating a partnership between agencies and submitting a pre-planning application, that outlines the interest of the parties, established goals, and physical conditions.


DEER CREEK AREA

Deer Creek is the headwaters for the Des Moines River Water Trail. The 17-acre site is a popular area for launching small water craft such as canoes and kayaks, as well as fishing and photography. As the beginning of the Des Moines River Water Trail, the County should consider expanding and improving the site. This includes the construction of an expanded parking area and small picnic area to create a gateway access. Improvement projects may require easements or acquisition from adjacent landowners.







DES MOINES RIVER

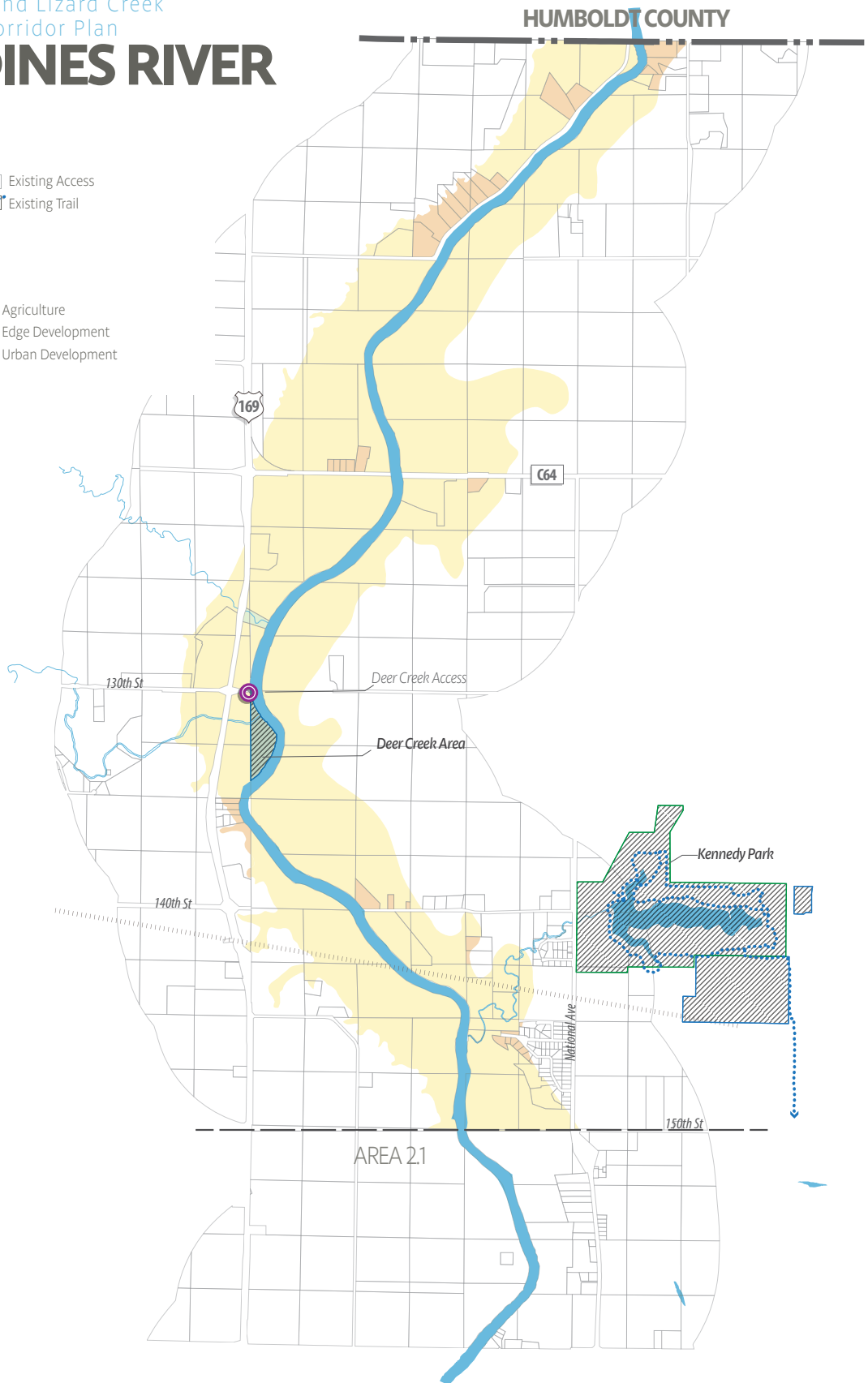
Area 1

Legend

-  Public Land: City of Fort Dodge
-  Public Land: Webster County
-  Existing Access
-  Existing Trail

Functional Classification

-  Preservation
-  Open Space
-  Agriculture
-  Edge Development
-  Recreation
-  Urban Development



AREA 2

DES MOINES RIVER

Water Trail Experience Classification Goal: Gateway & Challenge
Responsible Parties: City of Fort Dodge & Webster County Conservation Board

AREA 2 VISION

This area of the Des Moines River will emerge as a leader in the Midwest for river-based recreational activity. Active on-water recreation will increase due to the addition of access points and removal of the Hydroelectric Dam. Scenic viewpoints, educational and historical markers, fishing outcrops, and active and passive recreational opportunities on adjacent parkland will be connected through a comprehensive network of multi-purpose trails. This area of the corridor will utilize green infrastructure practices and low-impact development among other best management practices to improve river water quality.

OBJECTIVES

- Create trails for multiple purposes including cycling, walking, hiking, mountain biking, and cross-country skiing along the riverfront
- Maintain and enhance existing public lands
- Encourage low-impact riverfront development near downtown Fort Dodge
- Create new and enhance existing opportunities to increase public use and interaction with the Des Moines River and North Lizard Creek
- Make infrastructure improvements to reduce watershed impacts and enhance recreational opportunities
- Explore the feasibility to classify South Lizard Creek as a water trail

TOOLBOX IMPROVEMENTS

- Trail Easements
- Development Best Management Practices
- Incentives
- Public Education
- Stormwater Ordinance
- Pollution Enforcement
- Monitoring Programs
- Streambank Restoration
- Development Buffers
- Land Acquisition
- Open Space Requirement

GENERAL STRATEGIES

The following strategies apply to multiple areas throughout Area 2.

DEVELOPMENT BUFFER

The Corridor within Area 2 is the most likely to experience development pressure. The City of Fort Dodge should require new development to not only avoid the floodplain, but maintain a generous buffer between developed areas and both the North and South Branch of Lizard Creek to aid in stormwater management and water quality preservation.

NATURAL RESOURCE PRESERVATION

This segment of the corridor contains a number of publically-owned parks and natural areas. These natural areas are not only recreational assets, but also serve an important role with regard to stormwater management and reducing watershed impacts. The City of Fort Dodge and Webster County should continue to maintain ownership and maintenance of public land to conserve the natural resources that exist on those lands. In addition, the City and County should consider acquiring additional land along the riverfront as it becomes available and is feasible.

STORMWATER ORDINANCE

As development occurs in Fort Dodge, new impervious surfaces will place additional demand on stormwater infrastructure, potentially resulting in localized flooding and impacting the watershed. Currently, the City has no regulations related to on-site stormwater management. The City should adopt a stormwater ordinance that would prescribe the amount of stormwater to be managed on a given site, the duration of release into the public infrastructure system, and types of alternative management practices that would result in on-site filtration. The ordinance should reflect the six minimum control measures outlined in the U.S. EPA's National Menu of Best Management Practices for Stormwater Phase II. These measures include public education, public involvement, illicit discharge detection & elimination, construction, post-construction, and pollution prevention/good housekeeping.

OPEN SPACE REQUIREMENT

Open space requirements require new developments to dedicate a certain amount of land to open space, therefore reducing the overall development footprint. This provides additional natural areas for recreation and/or natural land preservation and aids in stormwater management by reducing the amount of impervious surfaces on the development site. The City of Fort Dodge should consider requiring or incentivizing developers to dedicate a certain percentage of land to open space, for either preservation or public use.

TRAIL NETWORK

The City of Fort Dodge is continuously expanding and improving its trail network and is in the process of developing a comprehensive trail master plan that will focus on future trail expansions. These improvements, when combined with partnerships, can create a continuous network of linear and loop trails along the Des Moines Riverfront. Efforts to expand the trail network should be led by the City of Fort Dodge, Webster County, and IDNR. As new trails are constructed and existing trails are improved, they should include wayfinding signage and riparian interpretive signage where appropriate. Signs should follow the designs as presented in the *Webster County Conservation and City of Fort Dodge Wayfinding Design Guidelines*.

Dragoon Trail

The Dragoon Trail follows the historic route of the 1835 U.S. Dragoons, the country's first mounted infantry unit. The trail begins in Fort Dodge and follows the Des Moines River corridor to Stratford, then on to Des Moines and the Red Rock Dam. As future trails are developed, Webster County and IDNR should strive to follow the Dragoon Trail where feasible.

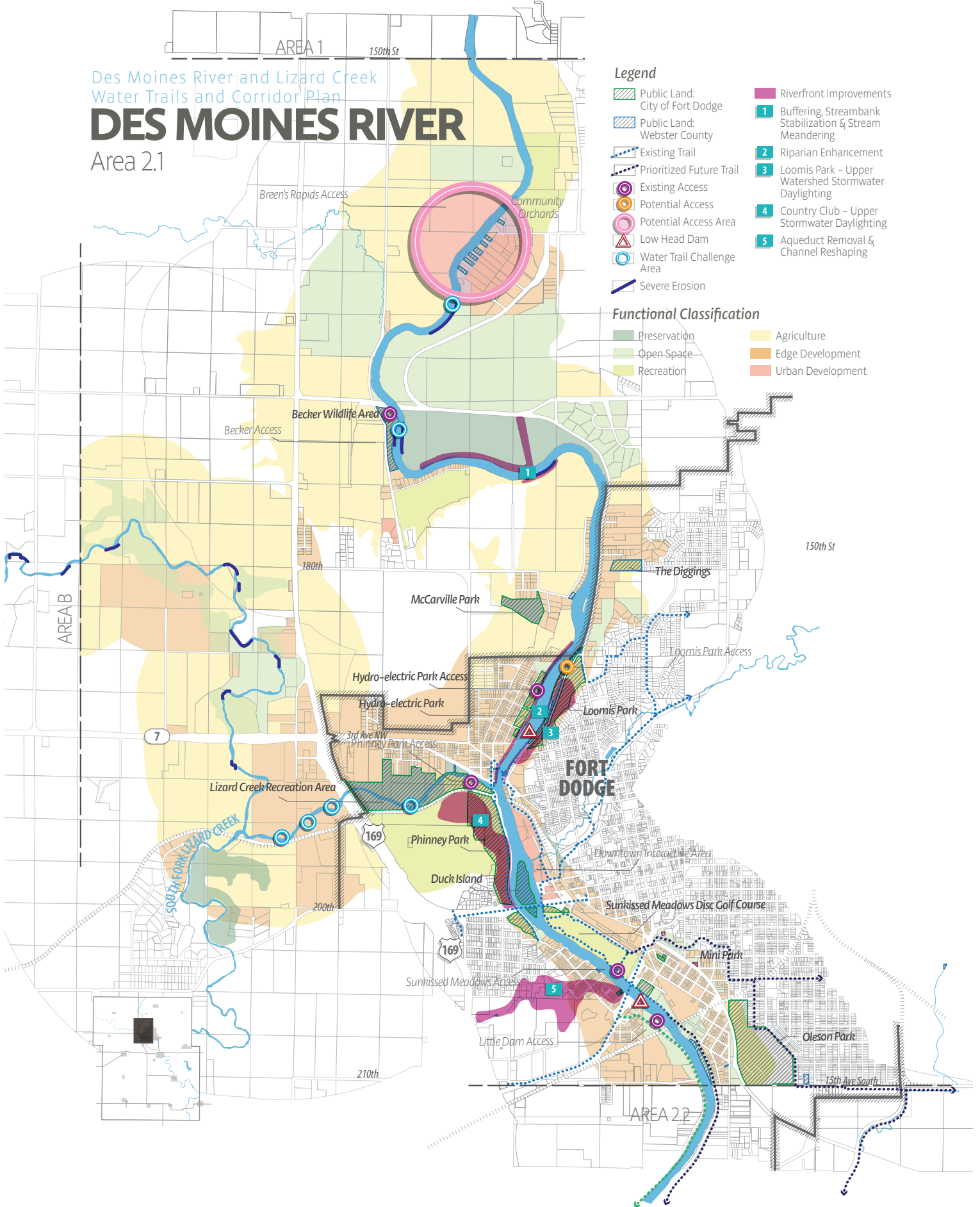
FISHING

With its role as a recreational hub, Area 2 of the Des Moines river should create fishing opportunities throughout the area. This includes creating designated fishing spots, working with IDNR to create in-river fish improvements, and expanding parking areas to bring anglers closer to the riverfront. The maps for the specific area strategies within Area 2 identify potential fishing areas.

SOUTH LIZARD CREEK

The South Fork of Lizard Creek may have the potential to be designated as a water trail. South Lizard Creek flows through the Lizard Creek State Recreation Area and Bob Hay Memorial Conservation Area, offering paddlers access to two significant natural areas in the County. To receive state designation as a water trail, projects require careful planning and coordination with land owners and government entities. The Iowa Water Trails Program estimates most projects take between three and five years for state designation. The County should work with IDNR to explore the feasibility of a water trail designation. In addition, Webster County should work with IDNR to develop a formal assessment of South Lizard Creek to identify key areas for preservation, erosion mitigation, and other improvement strategies.

Des Moines River and Lizard Creek
Water Trails and Corridor Plan
DES MOINES RIVER
Area 2.1





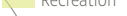



DES MOINES RIVER

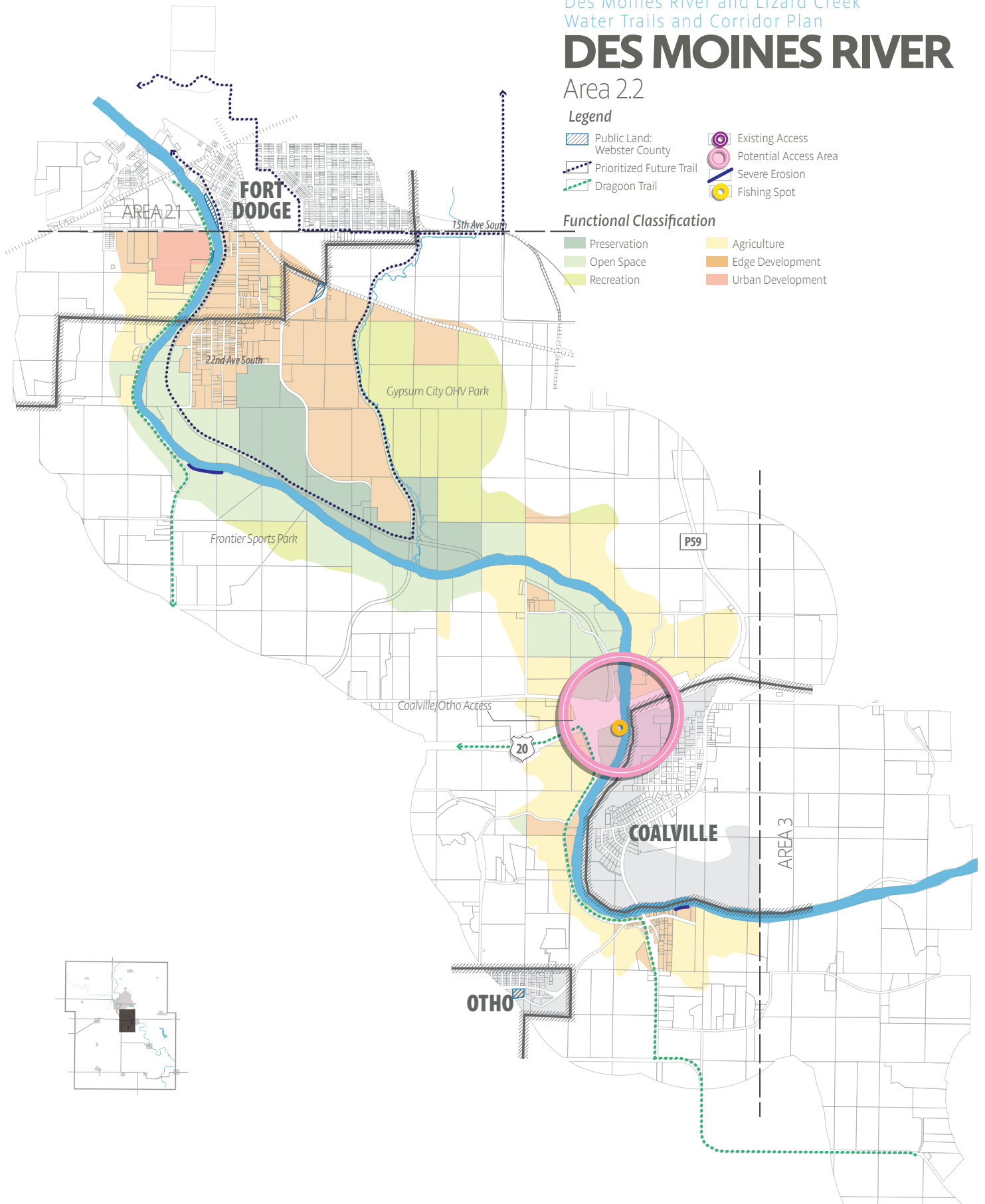
Area 2.2

Legend

-  Public Land: Webster County
-  Prioritized Future Trail
-  Dragoon Trail
-  Existing Access
-  Potential Access Area
-  Severe Erosion
-  Fishing Spot

Functional Classification

-  Preservation
-  Open Space
-  Recreation
-  Agriculture
-  Edge Development
-  Urban Development

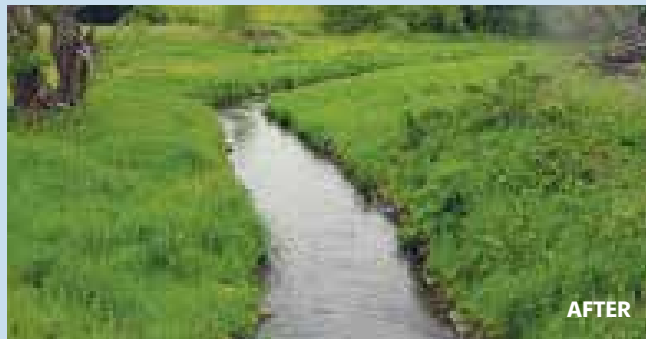
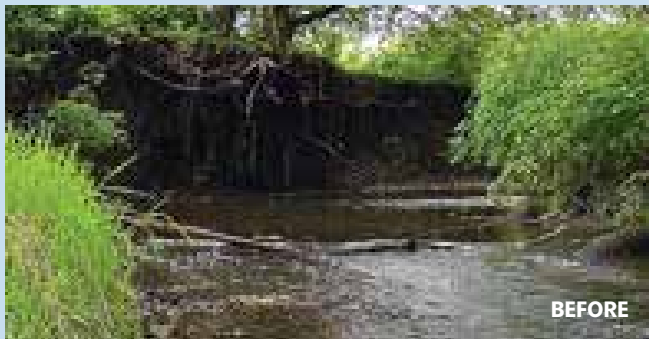


WATER QUALITY IMPROVEMENT: STREAMBANK REHABILITATION

West Branch Sugar River, Dane County, WI

The West Branch Sugar River in Wisconsin experienced impaired water quality due to agricultural and other sources of pollution. To remediate the River, Dane County stabilized 20,000 feet of riprap and reshaped 58,000 feet of streambank. The streambank was seeded with native grasses to create a buffer from runoff and the streambank buffers themselves were widened through 66 foot-wide easements purchased and donated by a nonprofit group.

The project successfully improved water quality and was removed from the Environmental Protection Agency's list of impaired waters. The continued success of the project has been made possible through not only streambank rehabilitation, but also cooperation from adjacent landowners to reduce runoff and erosion. This is an example of a project that could be implemented in portions of the project area with high levels of erosion.



GEOGRAPHICALLY-BASED STRATEGIES

The following strategies apply to specific locations within Area 2. Strategies are organized from north to south along the Des Moines River.

BREEN'S RAPIDS ACCESS

The Breen's rapids section of the Des Moines River is designated as Class III rapids by American Whitewater. As a highly-rated paddling area, the County should work with IDNR and property owners to develop a new access in the Breen's rapids area.

RIVERFRONT IMPROVEMENT PROJECT #1

Buffering, Streambank Stabilization, and Stream Meandering

Located southwest of the Fort Dodge Regional Airport lies a channelized dredgeway used to collect runoff from the airport and adjacent agricultural land. The dredgeway drains into the Des Moines River and contains invasive species. Invasive species can have a significant impact to water quality based on their inability to control erosion on streambanks and resulting sedimentation. As such, projects to remediate the dredgeway include implementation of an invasive species program, bank stabilization, and additional buffering. The County should work with the City of Fort Dodge and property owners to reduce stormwater impacts within these areas. In addition, the County should work with the City of Fort Dodge to preserve the parcel on which the dredgeway lies as a natural buffer and consider revegetation and tree planting of open space areas.

RIVERFRONT IMPROVEMENT PROJECT #2

Riparian Enhancement: Hydroelectric Dam & Little Dam

A great deal of discussion prior to and throughout the Corridor Plan process has focused on the future of the Hydroelectric Dam. Given the results of the *Fort Dodge Hydroelectric and Whitewater Passage Feasibility* report, as well as preliminary analysis on the anticipated effects of the dams on water quality, species diversity, sedimentation of the river corridor, and recreational opportunities, it is recommended that the Hydroelectric Dam be removed and the Little Dam be removed or modified to create a Gateway Experience Water Trail that provides a safe and unique experience for all water trail users.

DAM MODIFICATION: LOW HEAD DAM TO ROCK ARCH RAPIDS

Vernon Springs Dam, Turkey River, Cresco, IA

Completed in 2010, the Vernon Springs Dam Modification involved the removal of an 8-foot high dam to improve fish passage. The dam was replaced by rock arch rapids, which not only allow for fish passage, but create Class I and II rapids. The removal of the dam also provided an opportunity for IDNR to quantify the effects of dam modification/removal on river fish communities.

Based on detailed fish counts, surveys, monitoring, and inventories, the results of the IDNR study indicate several fish species have begun to travel to areas upstream of the former dam. In addition, two species were found upstream of the former dam that were not previously present. The former Vernon Springs Dam now serves as safe passage for fish and recreational users, as well as eliminates the liability of the former dam owner.



Removal of the Hydroelectric Dam provides opportunities for improved water quality and increased safety and recreational activities. Riverfront improvements following dam removal may consist of several scenarios that support riparian enhancement. Each scenario will improve the water quality of the river; however, it should be noted that returning the Des Moines River to its most natural state is the most effective scenario to accomplish this singular goal. Nevertheless, each scenario should be considered for its impact to riparian enhancement as well as access and recreational opportunities.

All scenarios should, at a minimum, include the following design considerations:

- Public access (boat ramp, interactive water area and/or fishing spot);
- Invasive species removal/native vegetation;
- River passage for paddling and aquatic species;
- Rolled erosion control products,
- Rock riffles; and,
- Channel improvements.

The City of Fort Dodge should work closely with IDNR and the community to develop a reconstruction plan that meets the needs of the Des Moines River community.

Hydroelectric Dam Modification

The scenarios on the following two pages provide three options for the future of the Hydroelectric Dam. All options remove the ogee crest, gates, and powerhouse, while providing areas for a scenic overlook and future low-impact development on the west bank. A stepped spillway could be a possible first phase of a potential whitewater course. Alternatively, the dam removal area could be designed as a naturalistic rock fish ramp to allow for fish passage and for the safe passage of boats and other river users. A developed shoreline on the west bank will provide a formal setting for an anglers, viewsheds, parking, and other river-oriented, low-impact development for public use.



HYDROELECTRIC DAM OPTION 1

Partial Removal – Spillway 4' Tall & Two Gates Remain

All renderings of the Hydroelectric Dam options are courtesy of Shive-Hattery



Option 1 – West Side | Powerhouse Pavilion and Riverwalk



Option 1 – East Side | Loomis Overlook and River Access



HYDROELECTRIC DAM OPTION 2

Partial Removal – Spillway 2’ Tall & Gates Removed



HYDROELECTRIC DAM OPTION 3

Full Removal and New River’s Edge Access



Option 3 – West Side | New Access and Edge Treatment



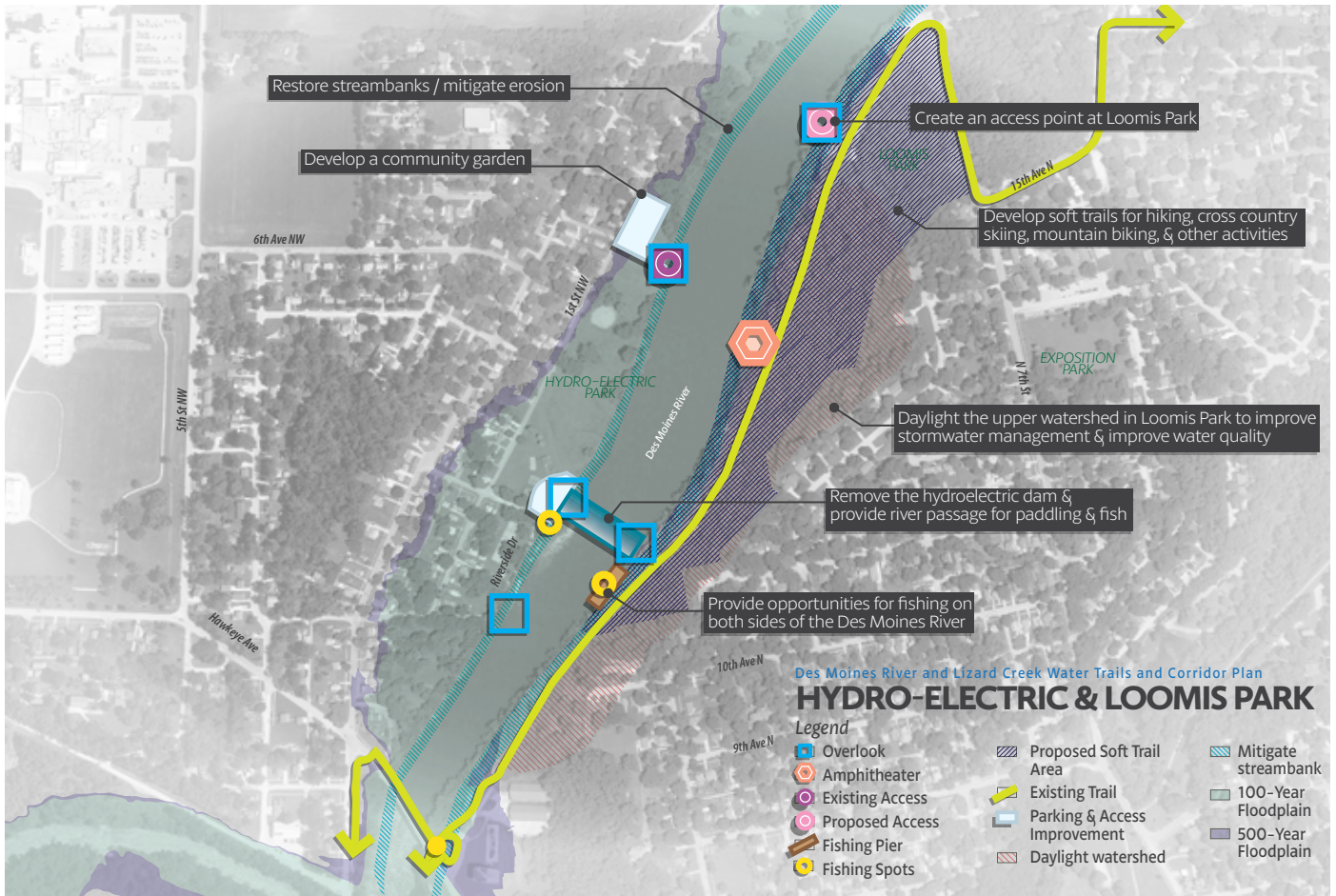
LOOMIS PARK ACCESS & IMPROVEMENTS

The Loomis Park Master Plan provides a framework for improvements to this large, riverfront park. The recommendations within the Master Plan continue to be applicable to the Corridor Plan. Key improvements include:

- **Port Loomis.** The northern end of the Loomis Park should be developed to include a river access point that allows for canoe and kayak traffic. A lookout point would provide views of the river, while integrating the nearby historic WPA structures.
- **Amphitheater.** This programmed space provides an area for public events and educational activities.

- **Loomis Lookout.** This structure near the southern entrance of the park is intended to be the destination of casual park users. Equipped with a pier, this location provides the ideal setting for anglers.
- **Enhanced Signage.** The master plan recommends a number of improvements to signage. Remaining improvements include the installation of interior signage such as wayfinding, and information on additional park amenities and river access points. Also remaining is the installation of entrance signage to south Loomis, which could be incorporated into trailhead improvements.

The City of Fort Dodge should take steps to implement the Loomis Park Master Plan. This will complement removal of the Hydroelectric Dam, creating a more active riverfront for this section of the Corridor.



SOFT TRAIL DEVELOPMENT

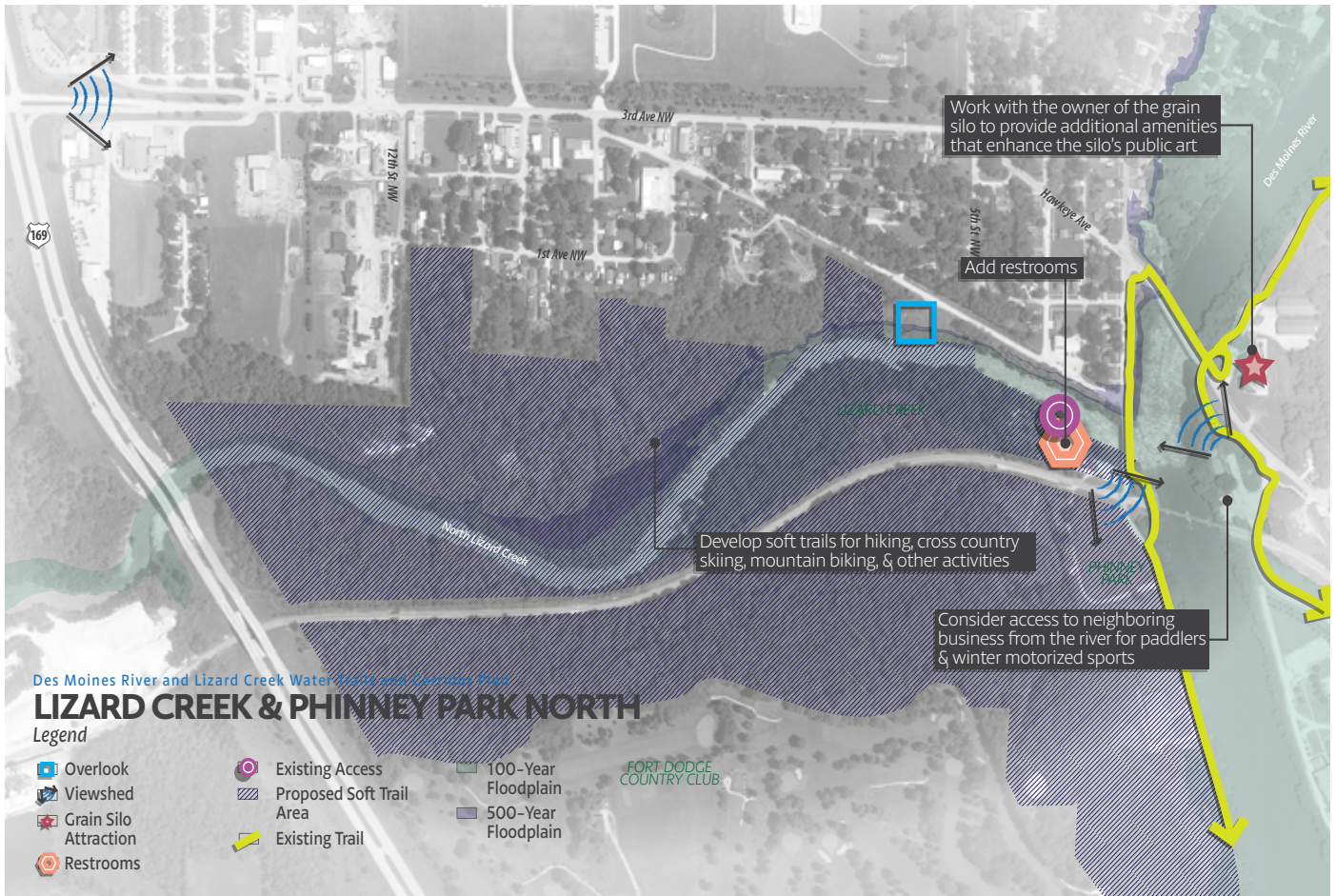
Area 2 of the Corridor Plan provides several opportunities for soft trail development. These trails allow for multiple uses, which may include cycling, walking, hiking, mountain biking, and cross-country skiing, among others. The Loomis Park Plan calls for crushed limestone for durability and to maintain the natural character of the park. Trails within other parts of the corridor will require individual analysis for proper materials and trail alignments. The City of Fort Dodge should explore opportunities to extend its existing trail network to incorporate soft trails that allow for multiple, year-round use.

RIVERFRONT IMPROVEMENT PROJECT #3

Loomis Park Upper Watershed Stormwater Daylighting

Loomis Park is located on the east side of the Des Moines River within the floodplain upland. The area consists of steep forested slopes and relatively flat floodplains prior to reaching the banks of the Des Moines River. Stormwater runoff from an existing neighborhood located adjacent to Loomis Park is causing significant erosion on steep, forested slopes lacking vegetation to adequately stabilize the side slopes. Daylighting, or the act of redirecting a stream to an above-ground channel, allows for greater stormwater filtration, which in turn can result in less erosion at channel outlets.

Proposed actions include identifying areas within the neighborhoods and locations along the channels where blue and green infrastructure best management practices can be implemented (bioswales, check dams, vegetated buffers) and stabilizing the steep slopes where erosion is occurring. As the City of Fort Dodge implements the **2005 Loomis Park Master Plan**, the City should prioritize the redesign of the stormwater system within Loomis Park.



NORTHWEST RIVER DISTRICT

The *Northwest River District Neighborhood Revitalization Plan* outlines several improvement strategies for this segment of North Lizard Creek, one of which includes the establishment of the Lizard Creek Recreation Area, a natural area that contains soft trails for multiple recreation uses. Additional components of the Plan that would positively impact the North Lizard Creek Water Trail include:

- **Overlooks.** Multiple overlooks are proposed that will take advantage of the area's topography to provide views of North Lizard Creek and the Des Moines River.
- **Trail Expansion.** Trails throughout the area would increase non-motorized transportation as well as access to local businesses.

- **Grain Silo.** The Fort Dodge Grain Terminal (grain silo) will serve as a beacon for the Northwest River District by serving as a canvas for public art. Other improvements to provide amenities should be considered and will require coordination with the current property owner.

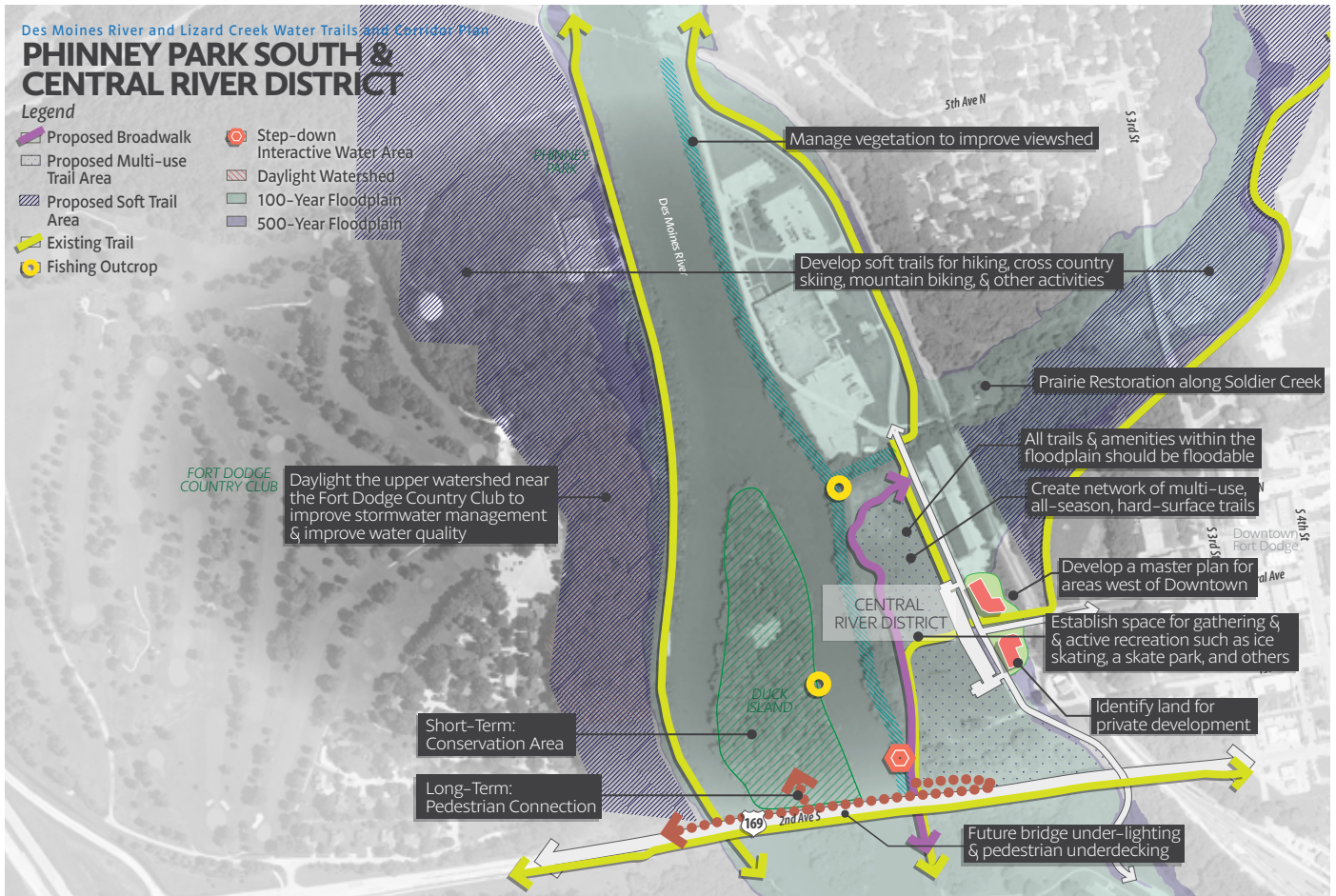
PHINNEY PARK ACCESS

The Phinney Park Access serves as both the terminus of the North Lizard Creek Water Trail as well as an access point for users of the Des Moines River Water Trail. Located at the confluence of Lizard Creek and Des Moines River, the access is used for its launch as well as trails that extend to the north and south. Given the heavy use of this access site, the County should work with the City of Fort Dodge and IDNR to provide additional amenities that may include running water and public restrooms, in addition to the shelter already in place.

RIVERFRONT IMPROVEMENT PROJECT #4

Country Club Upper Watershed Stormwater Daylighting

Located on the west bank of the Des Moines River near US 169 in Fort Dodge, the Fort Dodge Country Club includes several piped channels that aid with drainage of side slopes that range from 5 to 75 percent. Concentrated flows have resulted in erosion of the channel outlets near Phinney Park and Phinney Park Trail, contributing to river sedimentation. The City of Fort Dodge should first identify locations along the stormwater pipes where daylighting will be most beneficial to water quality, and design the project for check dams, vegetated swales, riparian areas, installation of rolled erosion control products, and stabilization of the steep slopes where erosion is occurring. Once the project has been constructed, the City should work with IDNR to monitor water quality.



DUCK ISLAND

Duck Island is a 14-acre parcel owned by the City of Fort Dodge. It is crossed by the 2nd Avenue South Bridge, and can only be accessed via water. In the short-term, the City of Fort Dodge should maintain the island as a conservation area. As recreational use of the river increases, the City may consider integrating trails for hiking and nature appreciation. In the long-term, the City should evaluate the potential to construct a pedestrian connection to the island from the Central River District/Sunkissed Meadows via underdecking of the Karl King Bridge.

CENTRAL RIVER DISTRICT DEVELOPMENT

In order to balance the need for water quality and stormwater management, future development adjacent to the river should be

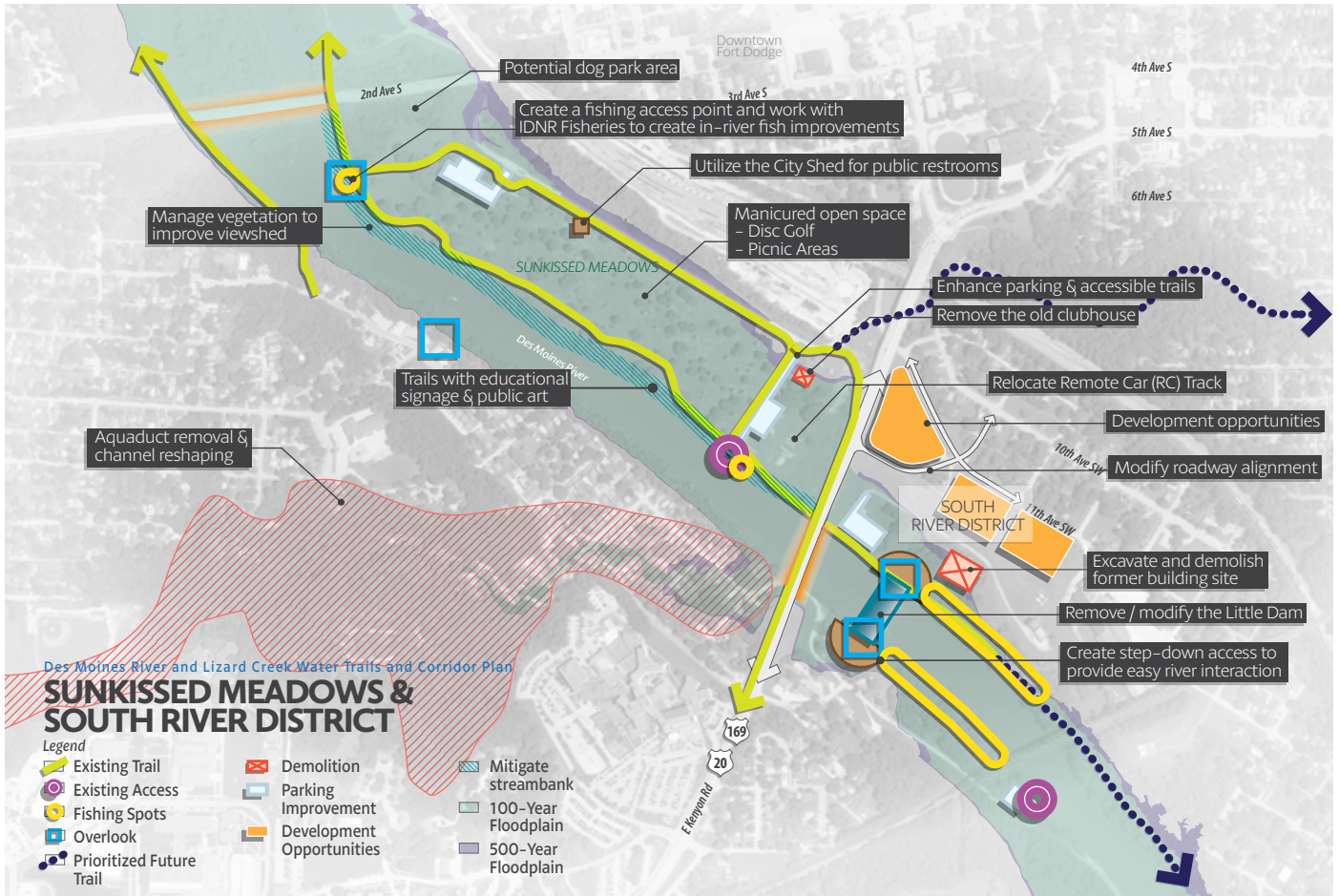
prohibited. This does not; however, preclude future development in Fort Dodge or other municipalities from taking advantage of river views and adjacency as demonstrated in the *Fort Dodge Downtown Plan*. Unlike the Plan; however, development of commercial uses in the Central River District are suitable east of 1st Street to avoid the floodplain. Designs should consider an elevated pathway and restaurants that enjoy river views. The City should encourage recreational retail sales/rental uses. Further, development should include a flexible space that can be used as a community gathering area and can accommodate recreational activities such as ice skating as well as local events that may include pop-up markets, food trucks, and live music.

The floodplain itself should be used as a passive park space that allows low-impact use of land that should include floodable infrastructure, vegetation and streambank

management, fishing opportunities, interactive water access, and community gathering places. Examples of these amenities can be found on pages 60–61.

CENTRAL RIVER DISTRICT MASTER PLAN

The area west of downtown Fort Dodge, identified as part of the Central River District, holds the potential to bridge Downtown to the Des Moines River. As Downtown continues to develop through the completion of the Cross-town Connector, a clear plan must be put in place to understand the role of the area. The City of Fort Dodge should develop a master plan for the area west of downtown to guide future land use and development, identify strategies to connect Downtown to the Des Moines River, as well as utilize conceptual renderings to demonstrate potential development scenarios.



SUNKISSED MEADOWS

Once the home of a municipal golf course, Sunkissed Meadows is now an open space area that features a disc golf course. The site's location within a floodplain limits development, but provides an opportunity for additional recreational amenities. The City of Fort Dodge should consider adding picnic areas to the site, as well as a dog park and designated fishing areas. Trails provide opportunities for educational signage and learning areas that discuss stormwater management and the local ecology. The Karl King Bridge should be retrofitted with pedestrian underdecking to increase access. Both the Karl King Bridge and Kenyon Road Bridge should be retrofitted with under-lighting to create a unique sense of place.

The City of Fort Dodge should work with IDNR to create a site-specific plan that analyzes appropriate structures and programming for Sunkissed Meadows. Consideration should be given to creating public restroom facilities, enhancing parking, relocating the RC track and removing the existing clubhouse. Regardless of future programming, vegetation along the Sunkissed Meadows riverbank should be well-managed to improve viewsheds.

FISHING OPPORTUNITIES

Currently, the Little Dam area provides popular fishing spots for local anglers. Riverfront improvements within this area should consider the needs of the fishing community, and create areas that serve anglers. This includes expanding the number of designated fishing spots, working with IDNR to create in-river fish improvements, and expanding parking areas to bring anglers closer to the riverfront.

LITTLE DAM

Similar to the Hydroelectric Dam, the little Little Dam, located two miles downstream, is a low-head dam that impacts water quality and poses a community safety hazard. The Little Dam, however, does not include a powerhouse or gates. As such, modification options for the Little Dam include the addition of rock rapids to eliminate the ogee crest spillway, aiding in fish passage while creating a recreational river amenity, or complete removal of the dam and naturalization of the river (See case study examples of the Vernon Springs Dam and Rockford Dam). As the City of Fort Dodge implements potential modifications of the Little Dam, it should also consider excavating a former building site located adjacent to the Little Dam on the east bank of the Des Moines River. As this river area draws more visitors, attention should be given to this site to ensure its safety for the community.

DAM MODIFICATION: LOW HEAD DAM TO NATURAL RESTORATION

Rockford Dam, Shell Rock River, Rockford, IA

The Rockford Dam Modification project involved the complete removal of a dam and restoration of natural river flow. The project included the demolition of the 8-foot low-head Rockford Dam and revegetation of native landscaping. Following project completion, IDNR reported a 280% increase in species upstream.

With regard to the effect on water levels, water levels in the impoundment area (upstream of dam) decreased by less than 1 foot, while water level downstream of dam decreased by approximately 4 inches.



COALVILLE/ KALO ACCESS

Following the Lower Dam access point, the next access is located fifteen miles downriver at Dolliver Memorial State Park. Based on the recreational and gateway experience of this section of the Des Moines River Water Trail, Webster County should work with IDNR to establish an access point in the Coalville/Otho area. Currently, points along the river within this area are used as informal accesses. A formal access would provide more safe and efficient access to the Des Moines River.

A potential access point may be constructed in one of two design typologies. One such design involves a fully developed access with a concrete drive into the water, allowing motorized boats into the water. These access points require vehicular access, parking, and ample space to maneuver vehicles. Alternatively, the access point may have more basic amenities. These “unimproved” accesses require minimal parking and include walk-down paths to launch small crafts such as canoes and kayaks.

RIVERFRONT IMPROVEMENT PROJECT #5

Aqueduct Removal and Channel Reshaping

An aqueduct was constructed in the 1900s as a means to quickly convey water from what are now the Iowa Central Community College and UnityPoint Hospital campuses. Over the years, the college and hospital campuses have grown in size, and additional commercial development has taken place. The impervious surfaces created by this growth has resulted in significant runoff that has put pressure on the natural drainageways that traverse the steep wooded areas to the north. As a result, the drainageways have experienced erosion and cutting within the channel.

Sediment traveling through these drainageways makes its way to the aqueduct, providing a streamlined conduit for sediment to reach the Des Moines River. The overall length of the aqueduct is approximately 1,600 linear feet and consists of two box culverts and an 84-inch pipe. To reduce sedimentation and improve water quality, the City of Fort Dodge should identify locations along the aqueduct where removal will be most beneficial to water quality and areas along drainageways suitable for reshaping. Vegetated swales, grass channels, and riparian areas should work in concert and steep slopes where erosion is occurring should be stabilized.

AREA 2 IMPROVEMENTS

Area 2 of the Des Moines River includes a number of detailed recommendations regarding infrastructure improvements and recreational amenities. The following examples demonstrate potential design solutions that would be appropriate for this segment of the Des Moines River.

BOARDWALK & FLOODABLE INFRASTRUCTURE

A boardwalk that showcases the riverfront, as well as hard trails and other park amenities should be “floodable” and resilient.



VEGETATION & STREAMBANK MANAGEMENT

Development of Area 2 will require coordination of floodplain management to remove visual obstructions to the water, such as large trees and brush, while maintaining stabilized banks.



Photo: James River Association, Flickr

INTERACTIVE WATER ACCESS

Development should integrate opportunities to interact with the Des Moines River through rock outcrops and step-down infrastructure. This infrastructure should provide wading areas that allow for play and physical connections to the water.



Photo: David Prasad, Flickr

FISHING OPPORTUNITIES

Fishing outcrops and inlets should be integrated within new riverfront infrastructure to accommodate anglers. Fishing areas should be designed to allow for easy access and consider the use of structures that will support productive fish habitats such as rock and boulder pockets and eddies.



Photo: USFWS midwest, Flickr

PEDESTRIAN UNDERDECKING

The Karl King Bridge and Kenyon Road Bridge provide opportunities for community identity, public art, and increased riverfront access. Both bridges could be lit from underneath, illuminating the water below and serving both as identifiable riverfront infrastructure and public art. The design of the Karl King Bridge may also allow for pedestrian underdecking, connecting Downtown Fort Dodge to the Phinney Park Trail and Duck Island.



PUBLIC GATHERING SPACE

The Central River District provides an opportunity for active riverfront use, which should include a flexible public gathering space. This space should be designed for a myriad of uses that may include outdoor concerts and events. It could also be designed to accommodate recreational uses such as ice skating. Similar to other infrastructure within the Central River District that lies within the floodplain, the gathering space should be designed to withstand potential flooding.



Photo: Toronto Star

SOFT TRAILS

Soft trail infrastructure is recommended within Loomis Park, the Lizard Creek Natural Area, Phinney Park, and the Soldier Creek area. Soft trails consist of unpaved walking, hiking, and birding trails that provide access to both nature and recreation. Their natural setting serves to both protect the natural environment as well as provide opportunities for education.



CENTRAL RIVER DISTRICT DEVELOPMENT

The Central River District serves as the western terminus of Downtown Fort Dodge. In addition to providing a public gathering space, future development within the Central River District should avoid and/or mitigate the floodplain, while taking advantage of riverfront views.



AREA 3

DES MOINES RIVER

Water Trail Experience Classification Goal: Recreational

Responsible Parties: Iowa Department of Natural Resources & Webster County Conservation Board

AREA 3 VISION

This segment of the Des Moines River will support active on-water recreation that connects Coalville to Lehigh. Streambanks will be restored and buffered to improve the watershed, while scenery will be protected and public access enhanced.

OBJECTIVES

- Provide safe bicycle and pedestrian access between Coalville, Otho, and Lehigh
- Upgrade existing access points to meet IDNR Water Trail Guidelines
- Expand conservation and recreational areas
- Stabilize streambanks to mitigate erosion

TOOLBOX IMPROVEMENTS

- Trail Easements
- Conservation Easements
- Land Acquisition
- Stream Bank Restoration

STRATEGIES

PRESERVATION AREAS

This segment of the Des Moines River includes a significant amount of limestone bluffs and forested areas. To bridge Woodman Hollow and Dolliver State Park, and provide a significant buffer between the river and adjacent agricultural areas, the County should utilize conservation easements and acquisition to ensure this area remains in a natural state, protected from future development.

WOODMAN HOLLOW

Given its proximity to Dolliver State Park and surrounding land uses that are candidates for preservation, Woodman Hollow should be expanded utilizing land acquisition and/or conservation easements. The primary strategy, however, is to preserve its integrity as a preserve.

DOLLIVER STATE PARK IMPROVEMENTS

Dolliver Memorial State Park is a popular recreational amenity in the County, with a well-used access. To further enhance the 594-acre park, IDNR should work closely with other public land managers and consider the following actions:

- Explore the potential for a trail corridor
- Expand the Dolliver recreation and conservation corridor
- Coordinate improvements with the Dolliver Park Master Plan
- Consider river access amenity improvements

DRAGOON TRAIL

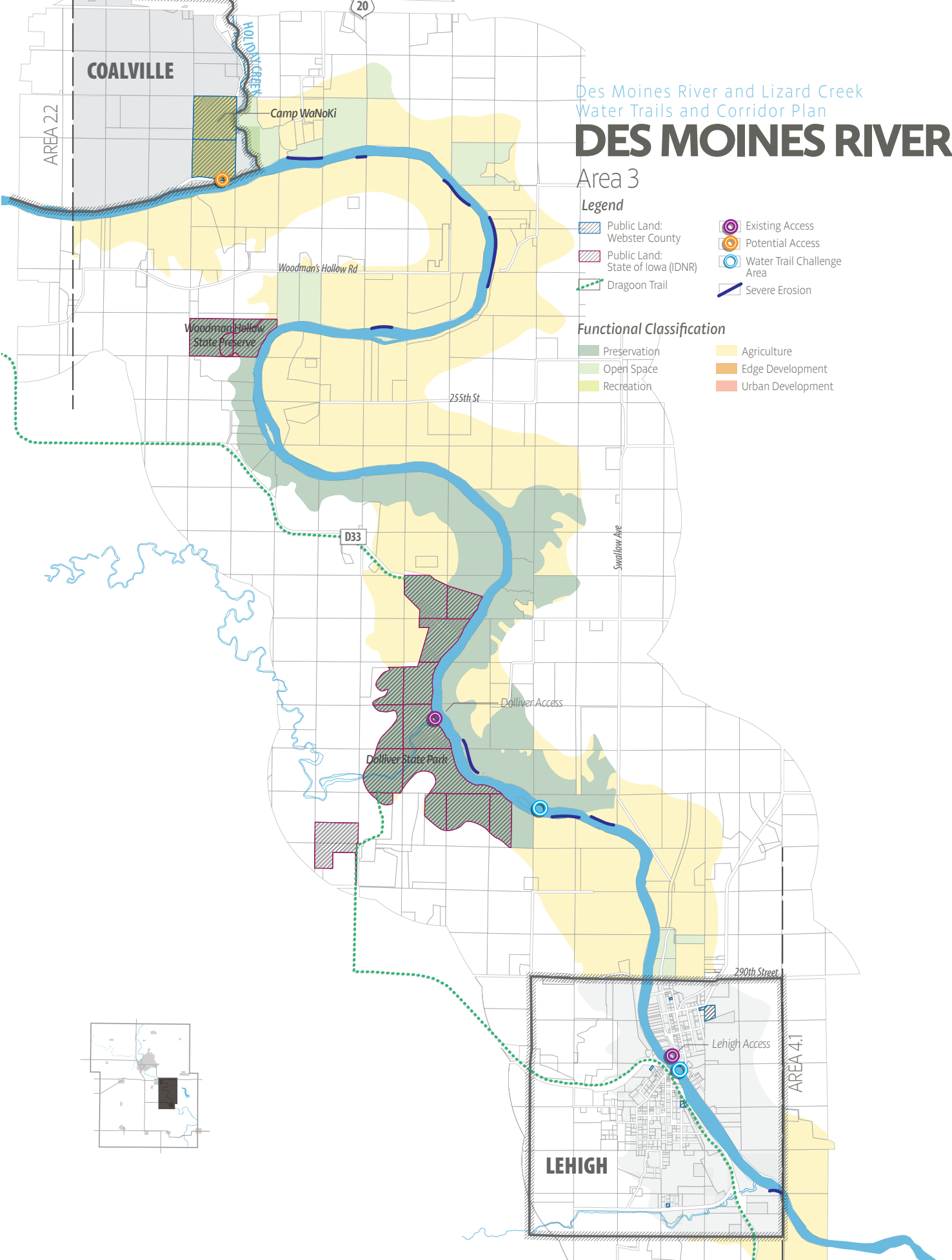
From Otho, the Dragoon Trail follows Webster County Road D-33 through Dolliver Memorial State Park, and the former Iowa 50 to Lehigh. Trails within this area may be in the form of shared roads, which serve both motorized and non-motorized vehicles and pedestrians. Given low traffic volumes in this area (between 800-400 average daily vehicles according to Iowa DOT 2011 traffic counts), shared lanes should be considered to connect Coalville to Otho and Dolliver State Park.

CAMP WANOKI & HOLIDAY CREEK

Camp WaNoKi is a 77-acre site that is envisioned for conservation, recreational programming, and educational uses. The Camp WaNoKi Master Plan provides recommendations for areas of the site that abut the Des Moines River that include an accessible walk-down access point and fishing area. In addition, the plan sets forth a concept for a creek walk along Holiday Creek. As the County implements the plan, it should also work with private landowners to explore opportunities to extend recreational use along the Holiday Creek.

LEHIGH IMPROVEMENT & ACCESS PLAN

With an existing access point and nearby commercial land uses, Lehigh has the potential to not only serve a significant amount of river users, but also have critical impacts to the Des Moines River. The County should work with the City of Lehigh and IDNR to develop an improvement and access plan for the Lehigh riverfront. The plan should include strategies to enhance the existing access point and address streambank stabilization and stormwater management.



AREA 4

DES MOINES RIVER

Water Trail Experience Classification Goal: Wilderness

Responsible Parties: Iowa Department of Natural Resources & Webster County Conservation Board

AREA 4 VISION

Area 4 stretches from Lehigh to the Webster County Line. The Des Moines River within this area is surrounded by conservation areas that create a wilderness experience for water trail users. Adjacent protected land provides opportunities for hunting and wildlife viewing, while the river can be used for long, quiet paddling segments, snowmobiling, and cross-country skiing.

OBJECTIVES

- Improve existing river access points at Deception Hollow, Boone Forks, and Skillet Creek
- Expand preservation areas, cultural amenities, and wildlife habitats
- Work with landowners to reduce watershed impacts
- Stabilize streambanks to mitigate erosion

TOOLBOX IMPROVEMENTS

- Conservation Easements
- Land Acquisition
- Trail Easement
- Monitoring Programs
- Public Education

STRATEGIES

DECEPTION HOLLOW ENHANCEMENTS

With nearly 40 acres of open space area, the Deception Hollow Wildlife Management Area is a popular site for hunting and includes a river access point. The site is located on the opposite bank of Brushy Creek State Park, amidst large tree stands and open space areas. Further, these forested areas extend for several miles along the river east of Deception Hollow, providing significant ecological benefits and a natural riverfront experience.

The County should work with IDNR to expand the Deception Hollow footprint to ensure the adjacent forested area is preserved and remains protected from agricultural or other development through acquisition and/or conservation easements. In addition, the roadway that leads into the site should be improved to provide safe and efficient access to the site.

The County should explore the possibility of moving the Deception Hollow access closer to McGuire Bend Road. By moving the river access and parking further downstream, the County could reduce road and access maintenance. Moving the access would also increase hunting opportunities.

BRUSHY CREEK IMPROVEMENTS

Brushy Creek State Recreation Area is the largest recreation area in the State of Iowa and home to 45 miles of multi-use trails. To further enhance this heavily used riverfront destination and recreation area, IDNR should work with the County and other public land managers to implement the following:

- Expand the Brushy Creek recreation and conservation corridor
- Explore the potential for a trail corridor
- Coordinate improvements with the Brushy Creek Master Plan

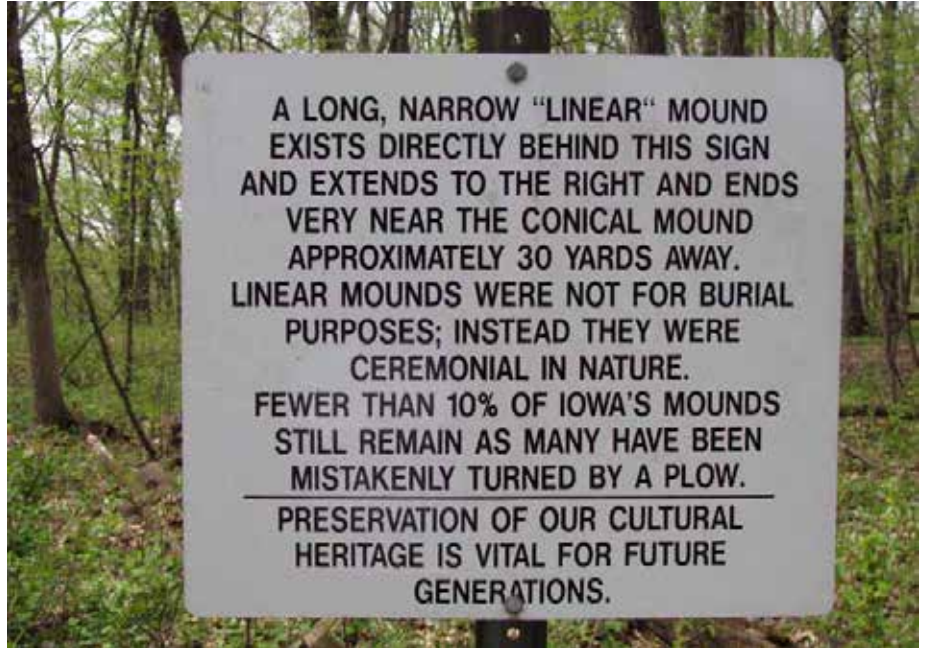
ACCESS IMPROVEMENTS

Area 4 includes three river access points: Deception Hollow, Boone Forks, and Skillet Creek. Webster County and IDNR should focus on routine maintenance of the existing accesses and ensure interpretive signage is up-to-date.



DRAGOON TRAIL

Within Area 4, the Dragoon Trail starts in Lehigh, and follows Webster County Road P-73; gravel roads (320th Street, McGuire Bend Road, 320th Street again, and Washington Avenue); and Webster County Road D-54 to Stratford. As trails are developed in this area, they should include both shared roadways and paths to provide a safe, non-motorized trail for pedestrians and cyclists between Lehigh and the Boone Forks Wildlife Management Area.



PRESERVATION

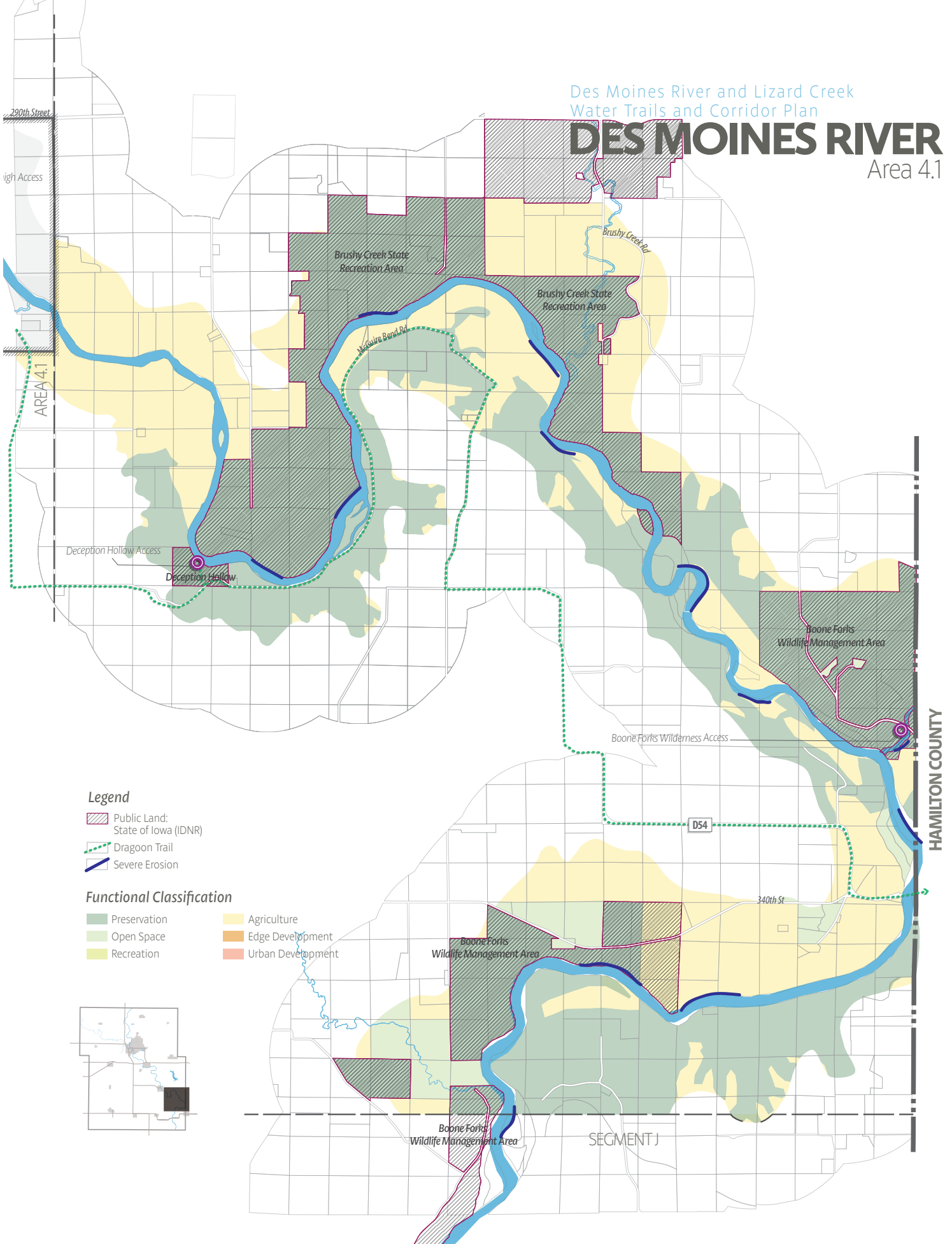
The Boone Forks Wildlife Management Area consists of 4,456 acres and is designated a Bird Conservation Area by IDNR. In addition, the Carlson Recreation Area consists of a 120-acre site managed by the Webster County Conservation Board. Given the forested nature of these areas, their use by hunters, anglers, hikers, and wildlife photographers, as well as the desire to create wilderness river experience, the County should work with IDNR to preserve areas that surround both the Boone Forks Wildlife Management Area and Carlson Recreation Area. Expansion of these areas may require land acquisition and/or easements and may also consist of re-vegetating existing agricultural land to create continuous wildlife expanses.

SKILLET CREEK INDIAN MOUNDS

The Skillet Creek Indian Mounds are a pre-historic Native American ceremonial ground located five miles east of Dayton, north of the Carlson Recreation Area. The area consists of five conical mounds, which are part of a larger mound group of nine conical and seven linear mounds built between 1,500 to 2,000 years ago. The mounds serve as burial grounds and include pottery, animal bones, tools, and weapons. It is believed that prehistoric Iowa Indians, known as the Late Woodland Culture, buried their dead at the top of a hill to be closer to the god(s) they worshiped. Given the historic and cultural significance of the site, Webster County should explore opportunities to acquire additional Indian Mounds.

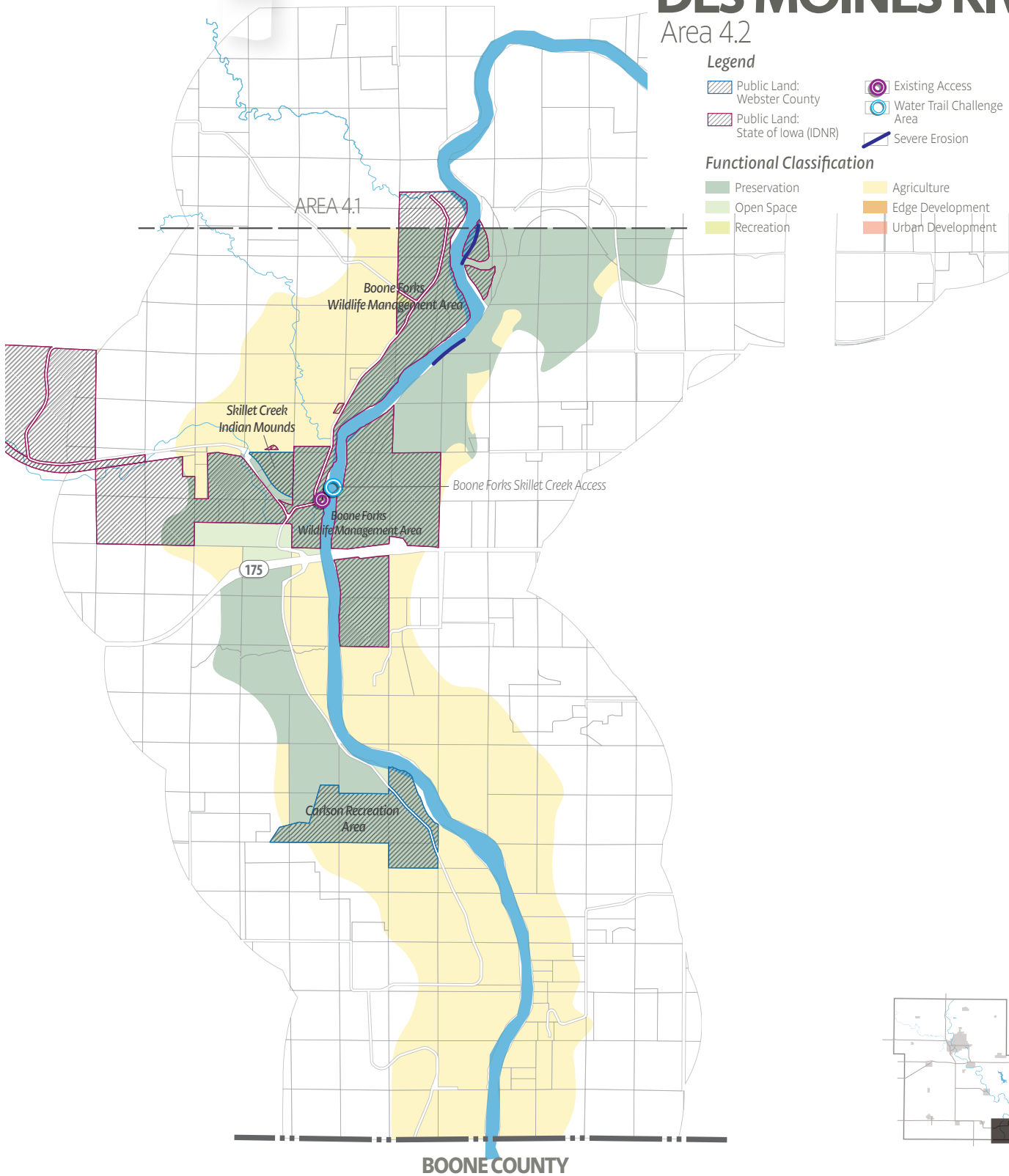
DES MOINES RIVER

Area 4.1



DES MOINES RIVER

Area 4.2





IMPLEMENTATION

The key strategies and recommendations presented within this document should be put into action in order to achieve the goals established in this plan. This section presents the actions needed to implement the key strategies of the Des Moines River and Lizard Creek Water Trails and Corridor Plan. The actions and toolbox improvements included in this section provide specific direction and serve as a guide for the evaluation of future projects and land uses.

RIVERFRONT IMPROVEMENT TOOLBOX SUMMARY

Action	Benefits						Jurisdiction/Responsibility
	Water Quality	Erosion Control	Sediment Control	Habitat Preservation	Stormwater Management	Riparian Access & Trails Integration	
Stream Bank Restoration/Erosion Mitigation	●	●	●		●		Public & Private
Development Buffer	●	●	●	●	●	●	Public
Transfer of Development Rights				●			Public & Private
Conservation Easement	●		●	●	●	●	Public & Private
Trail Easement						●	Public & Private
Open Space Requirement for New Development	●			●	●	●	Public
Pollution & Littering Enforcement	●			●			Public & Private
Land Acquisition	●		●	●	●	●	Public & Private
Monitoring Program	●						Public & Private
Public Education	●			●			Public & Private
Stormwater Ordinance	●	●	●		●		Public & Private
Incentives	●	●	●	●	●	●	Private
Development Best Management Practices	●	●	●	●	●		Public

RIVERFRONT IMPROVEMENT TOOLBOX

The following recommendations provide a “toolbox” of actions that can be implemented by one or more stakeholders in order to improve water quality, preserve environmental areas, enhance access, and strengthen the riverfront as a recreational asset. This toolbox can be used in coordination with IDNR’s Toolbox.

Chapter 4 – Riverfront Improvement Plan illustrates the recommended locations of these improvements.

STREAM BANK RESTORATION/EROSION MITIGATION

Stream bank restoration is the use of vegetation and engineered structures for stream-bank protection and erosion control using natural channel design. Streambank stabilization also offers opportunities for invasive species removal and revegetation of native species. While stream meandering and erosion can be a normal function of riparian corridors, stream bank erosion can cause the loss of land and potential damage to riverfront structures, roadways, and infrastructure. Common stream bank stabilization techniques include the use of structures such as riprap, soil bioengineering – which is the use of natural vegetation to stabilize soil without the use of structural controls – and a hybrid of structural controls and native vegetation. The type of stream bank stabilization technique is site dependent.

DEVELOPMENT BUFFER

Development buffers, also known as riparian buffers, are used to reduce the impacts of urbanized areas on the Des Moines River and its tributaries. Preventing development near riparian corridors allows for the natural flow of a stream and protection of riparian ecosystems while reducing the risks of flooding and erosion to urbanized areas. For erosion control, effective vegetated buffers should be a minimum of 30 feet, while buffers for aquatic habitat preservation and water quality range from 50 to 300 feet. The larger the buffer the higher the benefits for wildlife and water quality. As such, future development along the Des Moines River and watershed riparian corridors should be no closer than 100 feet measured from the mean high water line and from the edge of streams.



TRANSFER OF DEVELOPMENT RIGHTS

Transfer of development rights (TDR) is a regulatory tool to preserve environmentally sensitive areas, open space, and agricultural areas (known as “sending sites”) through the purchase of developments rights to be used to increase density, floor area allowances, and height limitations in other areas of a municipality or region (known as “receiving sites”). TDR can be an effective tool for preserving areas along the Des Moines Riverfront while maintaining economic benefits for property owners.

CONSERVATION EASEMENT

Conservation easements preserve significant natural, historical, and cultural resources from future development. Conservation easements are legal agreements between the conservation easement holder (Webster County or IDNR) and private property owners that place permanent restrictions on the development or use of land for the purpose of preservation. Once an easement is established, property owners must abide by certain rules and restrictions and the easement holder must ensure the property meets the conditions of the agreement. Property owners with conservation easements may also be eligible for federal tax credits.

TRAIL EASEMENT

A trail easement is a legal agreement between a grantor (landowner) and grantee (Webster County, IDNR or local municipality or organization) that provides a prescribed level of access to private land. The easement can allow full access, or stipulate the kind, place, and conditions of access. Trail easements can specify uses including hiking, cycling, equestrian, and multi-use trails. Once the easement is recorded, it is attached to the landowner’s deed, and remains with the property in perpetuity. In offering the easement, landowners are not responsible for liability or maintenance for trails. These obligations become those of the grantee.

OPEN SPACE REQUIREMENT FOR NEW DEVELOPMENT

Parks and open space areas provide for a high quality of life for Webster County residents and aid in stormwater management and water quality. An open space or parkland dedication ordinance is an effective strategy to increase open space areas and promote connectivity during the development process. Open space dedications can be required for residential, commercial, and industrial developments, as part of a municipality's powers to support public health, safety and welfare. The required amount of open space for new residential subdivisions can be a function of the level of service set by a parks and recreation master plan, or as a percentage of the total development area. In addition to the specified amount of parkland required by developments, open space dedication requirements should also include a provision for a fee-in-lieu alternative and park development fees to the land requirement. Should a developer choose to not provide parkland, or the development area is well-served by an existing open space areas, a fee-in-lieu of the open space should be accepted as an alternative. This would allow the governing jurisdiction to acquire open space areas along the Des Moines River and tributaries for preservation.

LAND ACQUISITION

The most effective action to control the use of land is to purchase it. Public land acquisition involves the purchase of private property by a governmental agency at a fair market rate and from a willing seller. It would allow for Webster County and local municipalities to preserve natural areas, construct additional trails, and allow public access to the Des Moines River, North Lizard Creek, and tributaries.

POLLUTION & LITTERING ENFORCEMENT

Under Iowa Code 455B.307B, the County may appoint an illegal dumping enforcement officer whose sole duty is to enforce illegal dumping laws on county land as well as private land that is not within a municipality. Municipalities may utilize local law enforcement to enforce littering laws as well. Given the amount of illegal dumping that reportedly occurs within the Riverfront corridor, increased resources for County and local law enforcement are necessary to both deter such activity and punish those who are dumping illegally. This includes providing additional staff and enforcement officers to monitor dumping, as well as passing ordinances that increase penalties for illegal dumping.

MONITORING PROGRAM

Monitoring programs offer critical insight into the health and function of the Des Moines River and its tributaries. Current monitoring systems within Webster County include two USGS Streamflow Information Program Streamgates (05480500-Des Moines River at Fort Dodge and 05481300-Des Moines River near Stratford) and water quality monitoring by IDNR. An effective monitoring program to understand the effectiveness of improvement projects within the project area will require the identification of targeted monitoring sites, the establishment of monitoring objectives, sample parameters, sample frequency and duration, and data assessment and evaluation. Dependent upon the location of potential monitoring stations, Webster County may be required to work with private property owners for access and use of private land to establish monitoring sites.

PUBLIC EDUCATION

Public education is an action used to inform residents, businesses, and landowners about their role in improving water quality, preserving riparian habitats, and reducing erosion and sedimentation. Public awareness campaigns should utilize a combination of advertisements in the form of brochures, social media, and signage; educational seminars; and community events. Partnering with local schools and educational institutions and engaging community groups, religious organizations, and business leaders are effective methods to target specific audience groups. A public education program should strive to meet the following objectives:

- Providing outreach and form partnerships between landowners, Webster County (and cities within), NRCS, Stormwater Conservation Districts (SWCD) and others to reduce the impact of non-point sources of pollution.
- Increase public awareness about the adverse impacts of stormwater runoff and water pollution.
- Increase public awareness of sustainable green recycling (yard waste, composting, etc.).
- Promote policies and management practices that reduce stormwater runoff and water pollution.
- Provide tools to implement best management practices (BMPs) to reduce stormwater runoff and water pollution in area creeks and streams.

STORMWATER ORDINANCE

The purpose of a stormwater ordinance is to establish minimum stormwater management requirements and controls to protect and safeguard the general health, safety, and welfare of the public residing in Des Moines River watersheds within Webster County. Stormwater ordinances could be adopted by Webster County and/or any of the municipalities in the project area. Components of a stormwater ordinance should, at a minimum, include the following provisions:

- Adequate buffers between land development and water bodies including riparian corridors and wetlands.
- Adequate developer's stormwater controls financial security requirements to cover both repairing "blown out" controls and remediation costs.
- A stormwater design manual that includes a list of acceptable stormwater treatment practices such as bioswales, permeable pavement, and rain gardens, among others, including the specific design criteria and operation and maintenance requirements for each stormwater practice.
- Performance criteria that defines maximum peak flow rates and establishes minimum removal of average annual post development total suspended solids load (TSS).
- Submission of a stormwater management plan for all developments.

INCENTIVES

Incentives can be provided by government and non-profit agencies to motivate private property owners to protect, conserve, and expand open space areas. Incentives that protect open space areas aid in stormwater management and water quality improvements. Potential incentives that can be used by Webster County and local municipalities include:

- Provide landowners with funding to improve stormwater management and water quality.
- Fund a landowner assistance program that assists private property owners with maintaining undeveloped lands.
- Establish local tax policies that serve as an economic incentive for property owners to conserve open space and natural areas.
- Promote the expansion of nature-based tourism and outdoor recreation industries to provide revenue and jobs from open space lands.

DEVELOPMENT BEST MANAGEMENT PRACTICES (BMP'S)

Other components of the toolbox describe ways to manage growth and overall subdivision to minimize impacts on the natural environment. However, there are several site-specific best-management practices (BMP's) that can be used by individual property owners to help achieve the objectives of this plan. These can be implemented most aggressively through zoning and subdivision regulations, though many communities rely on incentives or educational programs to gain voluntary participation from property owners. Appropriate BMP's include:

- On-site detention of stormwater through ponds that collect surface runoff into a centralized reservoir and either detain it on-site or slowly release it into municipal sewer systems.
- Permeable site surfaces (such as pervious pavers or landscaped areas) to allow stormwater to filtrate into the soil, thereby reducing site runoff and restoring underground aquifers.
- Native landscaping whose deep root systems can withstand localized flooding and erosion and cleanse stormwater before it is released into the soil or natural waterways.
- "Dark skies" lighting that reduces the amount of upward light pollution and minimized impacts on migratory species.
- Green corridor preservation that allows for natural stormwater and migratory corridors in order to reduce flooding and enhance local wildlife.

FUNDING SOURCES

The Des Moines River and Lizard Creek Corridor includes a variety of recommendations aimed at increasing access to the Des Moines River and North Lizard Creek, enhancing the natural environment, and increasing recreational opportunities. Many of the strategies listed will require additional funding beyond the capacity of local municipalities. The funding sources identified below provide a range of potential resources to implement the Des Moines River and Lizard Creek Water Trails and Corridor Plan. These resources, however, are subject to change as local, state, and federal programs evolve. They should be closely monitored and assessed to understand application deadlines and eligibility requirements.

CONSERVATION

Land & Water Conservation Fund (LWCF)

Land and Water Conservation Fund (LWCF), a program through the State of Iowa, grants are available to cities, counties, and school districts to be used for outdoor recreation projects. Projects require a 50% match and are taken under perpetuity by the National Park Service and must only be used for outdoor recreational purposes. Development and renovation projects must be maintained for a period of 25 years or the life of the manufactured goods. LWCF grants are managed by the IDNR and assistance ceilings are established by population.

More specific, statewide grants supporting conservation and recreation in Iowa can be found on Iowa's DNR website and include the following list:

- All-Terrain Vehicle Grant Program
- Educational Grants
- Fish Habitat Promotion For County Conservation Boards
- Iowa Water Trails Mini Grants
- Low-Head Dam Public Hazard Program
- Land And Water Conservation Fund
- REAP City Parks And Open Spaces Grant Program
- REAP Conservation Education
- REAP County Conservation Grant Program
- Snowmobile Trail Grant Program
- Solid Waste Alternatives Program
- State Comprehensive Outdoor Recreation Plan
- Water Recreation Access Cost-Share Program
- Watershed Improvement Grants
- Wildlife Habitat With Local Entities Grant Program

WATER QUALITY

Iowa State Revolving Fund Storm Water Loan Program

This program provides low-interest loans to public and private borrowers for water and wastewater infrastructure projects. Eligible projects must improve local water quality, and some public projects may be given up to 30% loan forgiveness.

Iowa State Revolving Fund Local Water Protection Program

The Local Water Protection Program (LWPP) is a low-interest loan program available to landowners in Iowa to control the runoff of sediment, nutrients, pesticides or other non-point source pollutants from entering Iowa waters. Loans range between \$5,000 to \$500,000 with a maximum term of 10 years and guaranteed interest rate not to exceed 3%.

Iowa State Revolving Fund Livestock Water Quality Program

This program provides low-interest loans to livestock producers to prevent, minimize, or eliminate non-point source pollution of Iowa's rivers and streams from animal feeding operations. Loans may be above \$10,000 for a 15 year term, with interest rates not to exceed 3%.

National Water Quality Initiative

This Iowa National Resource Conservation Service (NRCS) initiative provides financial and technical assistance to farmers interested in improving water quality and aquatic habitats in priority watersheds with impaired streams. While the Des Moines River watershed is not listed as a priority watershed for fiscal year 2017, it may be eligible in the future for funding.

AGRICULTURAL PRODUCTION & ENVIRONMENTAL QUALITY

Agricultural Conservation Easement Program

Administered by the NRCS, the Agricultural Conservation Easement Program (ACEP) provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. State and local governments and non-governmental organizations, and private landowners are eligible to receive financial and technical assistance to prevent the conversion of productive working lands to non-agricultural uses through agricultural land easements, and to restore, protect, and enhance wetlands through wetland reserve easements.

Conservation Stewardship Program

This voluntary program through NRCS provides financial and technical assistance to eligible producers to conserve and enhance soil, water, air, and related natural resources on their land. This includes cropland, grassland, prairie land, improved pastureland, rangeland, nonindustrial private forest lands, agricultural land under the jurisdiction of an Indian tribe, and other private agricultural land (including cropped woodland, marshes, and agricultural land used for the production of livestock) on which resource concerns related to agricultural production could be addressed.

Environmental Quality Incentives Program

The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance for agricultural producers to promote both agricultural production and improve environmental quality. Administered through NRCS, the voluntary program is open to all eligible agricultural producers.

Conservation Innovation Grants

Non-Federal governmental or non-governmental organizations, Tribes, and individuals are eligible for these grants, which are aimed at both environmental protection and agricultural production. The USDA-NRCS, CIG Program awards grants up to \$75,000.

TRAILS & RECREATION

Recreational Trails Program (Federal)

This program provides and maintains motorized and non-motorized recreational trails and trail-related projects. Public agencies, and non-profit or private organizations are eligible to sponsor – non-profit and private sponsorship will require a public agency co-sponsor. Qualifications for funding include:

- A minimum 20% match is required.
- Trails resulting from successful applications must be maintained as a public facility for a minimum of 20 years.

Iowa's Federal Recreational Trails Fund

The Federal Recreational Trails (FRT) Fund – also known as the National Recreational Trails (NRT) Fund – was established in the state in response to the Federal Inter-modal Surface Transportation Efficiency Act (ISTEA) of 1991. This is a national program to provide funds to states to allocate grants for trails and trail-related projects. The NRT Program was later reaffirmed in the Transportation Equity Act for the 21st Century (TEA-21) in 1998. The Federal Highway Administration (FHWA) administers the program. The Iowa department of Transportation (DOT) has been designated as the state agency responsible for the program in Iowa. The Iowa DOT and IDNR co-administer the program.

Water Trail Enhancement Grants

Competitive grant funding is available through IDNR to enhance state-designated water trails. Funds are provided at a 50% match and can be used for infrastructure or infrastructure improvement projects which may include, but are not limited to water accesses, parking areas, water trail campsites, etc.

Enhance Iowa

The enhance Iowa program consists of four funds intended to assist projects that will provide recreational, cultural, entertainment, and educational attractions. Eligible project include those that require funding for vertical infrastructure (land acquisition, construction, utilities, trails) and 50% of the project funds must be raised by the applicant.

IMPLEMENTATION ACTION MATRIX

The Des Moines River and Lizard Creek Water Trails and Corridor Plan provides a number of strategic actions and recommendations to achieve the community vision for the Des Moines River and North Lizard Creek. The following Implementation Action Matrix provides the City of Fort Dodge, Webster County, the Iowa Department of Natural Resources, and community stakeholders with an organized table summarizing the numerous recommendations of the Des Moines River and Lizard Creek Water Trails and Corridor Plan. The Implementation Action Matrix should reflect the most up-to-date implementation actions and priorities and be amended to provide more detailed department-level activities required to carry out specific strategies.

The Implementation Action Matrix consists of:

- Key strategies to be undertaken within each project area;
- Actions and applicable toolbox improvements to accomplish the strategy and/or contribute to the vision of the riverfront area;
- The public sector entity that should be spearheading the action; and
- The estimated cost for each strategy.

COST OPINION

The cost opinions listed in the Implementation Action Matrix are based on recent projects and best practices. All numbers utilize 2017 dollars. While the estimates aim to provide the most accurate interpretation of potential project costs, the estimates are subject to change. The cost opinions utilize general concepts, and detailed surveys and design development planning would need to be done as part of the next step toward preliminary cost estimating, final design, and implementation. In addition, the cost estimates do not include maintenance costs. For strategies without dollar amounts listed, the following legend guides their costs:

- **Admin.** These are strategies that require primarily administrative and internal staff time with tasks that include mostly regulatory changes, policy updates, or strategic partnerships with limited outside funding required. It also includes strategies that require more in-depth analysis or study, as well as modification of existing services provided by the City of Fort Dodge, IDNR, and/or Webster County.
- **Market.** These strategies cannot be assigned a dollar amount as the cost is based on current market values.
- **Varies.** These strategies include multiple components generally consist of actions within previously conducted plans and studies.

OBJECTIVE	TOOLBOX	STRATEGY	RESPONSIBLE PARTY	COST
Area A				
Work with landowners to reduce watershed impacts	Monitoring Programs	Install a monitoring system within this segment to understand the impact of agricultural runoff into the water body and monitor the effectiveness of potential mitigation efforts.	NCRS, IDNR, NRCS	Admin
	Streambank Restoration			
	Public Education			
Explore opportunities to preserve wooded and natural areas within the floodplain	Conservation Easements	Continue to acquire land along North Lizard Creek as it becomes available.	Webster County, IDNR	Market
	Land Acquisition			
Explore potential for access on county-owned property	Trail Easement		Webster County	Admin
	Conservation Easement			
Work with area landowners to identify and create potential access sites	Conservation Easement		Webster County	\$25,000/rural access
	Land Acquisition			
Designate the segment of North Lizard Creek within Area A as a water trail	Trail Easements	Submit a pre-planning application to IDNR to begin the water trail designation process.	Webster County, IDNR	Admin
		Remove the low head dam south of the 170th Street bridge.	Webster County, IDNR	\$120,000
Area B				
Maintain the existing North Lizard Creek water trail and access points	Land Acquisition	Webster County and Fort Dodge should regularly update the risk management plan to ensure proper emergency response resources are available to respond to potential water trail hazards.	Webster County, City of Fort Dodge	Admin
		Renew lease or acquire property from land owners for the Cunningham access.	Webster County	Market
		Renew lease or acquire property from land owners for the Rasch access.	Webster County	Market
Explore opportunities to preserve wooded and natural areas	Conservation Easements	Continue to acquire land along North Lizard Creek as it becomes available.	Webster County, IDNR	Market
	Land Acquisition			
Improve water quality and control streambank erosion	Monitoring Programs		Webster County, IDNR, NRCS	\$2000/monitor + Admin
	Streambank Restoration			\$115/linear foot
	Public Education			Admin

OBJECTIVE	TOOLBOX	STRATEGY	RESPONSIBLE PARTY	COST
Area 1				
Work with landowners to reduce watershed impacts	Streambank Restoration		Webster County, IDNR, NRCS	\$200/linear foot
	Public Education			Admin
	Monitoring Programs			\$2000/monitor + Admin
Expand and improve the Deer Creek access	Conservation Easements Land Acquisition	Expand and improve the Deer Creek access with a larger parking area and small picnic area to create a gateway access.	Webster County, IDNR	\$25,000
Work with Humboldt County Conservation to establish a water trail designation into the City of Humboldt		Submit a pre-planning application to IDNR to begin the water trail designation process.	Webster County, IDNR, Humboldt County Conservation, City of Humboldt	Admin
Area 2				
Create trails for multiple purposes including cycling, walking, hiking, mountain biking, and cross-country skiing along the riverfront	Trail Easement	Implement the Northwest River District Revitalization Plan.	City of Fort Dodge, IDNR	Varies
		Implement the Loomis Park Plan.	City of Fort Dodge, IDNR	Varies
		Follow the Dragoon Trail where possible when creating trail alignments	IDNR	Admin
		Underdeck the Karl King Bridge.	City of Fort Dodge	\$1M+
		Explore opportunities to extend the existing trail network to incorporate soft trails that allow for multiple, year-round use in the Northwest River District, Loomis Park, and Soldier Creek corridor.	City of Fort Dodge	\$5 - \$15/SF
Maintain and enhance existing public lands	Land Acquisition Open Space Requirements	Construct a "floodable" boardwalk near Downtown.	City of Fort Dodge	\$70,000
		Implement the Loomis Park Plan.	City of Fort Dodge, IDNR	Varies
		Continue to acquire land along the Des Moines River as it becomes available.	City of Fort Dodge, Webster County, IDNR	Market
		Preserve the parcel on which the channelized dredgeway lies (southwest of the Fort Dodge Regional Airport) as a natural buffer, implement an invasive species program, bank stabilization, and consider revegetation and tree planting	City of Fort Dodge	\$400,000
Encourage low-impact riverfront development near downtown Fort Dodge	Incentives Development Best Management Practices	Require or incentivize developers to dedicate a certain percentage of land to open space, for either preservation or public use.	City of Fort Dodge	Admin
		Implement the Northwest River District Revitalization Plan.	City of Fort Dodge	Varies
		Prioritize private commercial development outside of the floodplain in areas west of downtown and near existing commercial nodes.	City of Fort Dodge	Admin
		Implement the Loomis Park Plan.	City of Fort Dodge	Varies
		Manage vegetation to open river viewsheds.	City of Fort Dodge, Webster County, IDNR	Admin
		Develop a master plan for the area west of Downtown Fort Dodge.	City of Fort Dodge	\$75,000 - \$100,000
Realign S 7th Street.	City of Fort Dodge	\$250,000 - \$500,000		

OBJECTIVE	TOOLBOX	STRATEGY	RESPONSIBLE PARTY	COST
Create new and enhance existing opportunities to increase public use and interaction with the Des Moines River and North Lizard Creek	Public Education	Follow the designs as presented in the Webster County Conservation and City of Fort Dodge Wayfinding Design Guidelines.	City of Fort Dodge, Webster County	Admin
	Land Acquisition			
	Trail Easement	Explore opportunities to develop a new access in the Breen's rapids area.	Webster County, IDNR	\$50,000
		Integrate educational signs along the trails in Sunkissed Meadows.	City of Fort Dodge	\$800-\$1,000/sign
		Integrate fishing spots as part of the Hydroelectric Dam removal project and potential Little Dam removal/modification project.	City of Fort Dodge	*
		Integrate fishing spots as the Northwest River District Plan and Loomis Park Plan are implemented.	City of Fort Dodge, IDNR	*
		Provide opportunities for fishing through in-river fish improvements that may include fishing outcrops and productive fish habitats such as rock and boulder pockets and eddies.	City of Fort Dodge, IDNR	*
		Establish a central gathering space in the Central River District that includes a variety of recreational enhancements such as an ice skating area, outdoor entertainment venue, and event space, among others.	City of Fort Dodge	\$360,000
		Work with the owner of the grain silo to explore the potential for public or viewpoint uses for the structure and amenities to enhance public art.	City of Fort Dodge	†
		Under-light the Karl King Bridge and Kenyon Road Bridge.	City of Fort Dodge	\$100,000 - \$300,000
		Integrate public art along the trails in Sunkissed Meadows.	City of Fort Dodge	†
		Manage vegetation to open river viewsheds in Sunkissed Meadows.	City of Fort Dodge	Admin
		Explore the potential for a dog park at the north end of Sunkissed Meadows.	City of Fort Dodge	\$50,000
		Relocate the Remote Car (RC) Track.	City of Fort Dodge	Market
		Develop a community garden at Hydro-Electric Park.	City of Fort Dodge	\$5,000
		Utilize the City Shed in Sunkissed Meadows for public restrooms.	City of Fort Dodge	\$87,000
	Remove the old clubhouse in Sunkissed Meadows.	City of Fort Dodge	\$2,000-\$4,000	
	Establish a formal access in the Coalville/Otho area.	Webster County, IDNR	\$50,000	
	As projects are designed, engage the public and have discussions/receive feedback from necessary stakeholders.	City of Fort Dodge, Webster County, IDNR	Admin	

* The cost of fishing spots is dependent upon the type of construction. A pier/dock may range between \$20,000 - \$40,000, while a rock outcrop may be integrated as part of a larger infrastructure and/or stream stabilization project.

† Public art costs are dependent upon the size, scale, and desired work of the commissioning party. The City should set a budget that includes artist fees, fabrication, materials, installation, transportation, construction documents, approvals and reviews by other design professionals, and insurance required of the artist. Budgets should also be established for future maintenance and management of the artwork.

OBJECTIVE	TOOLBOX	STRATEGY	RESPONSIBLE PARTY	COST
Make infrastructure improvements to improve water quality and enhance recreational opportunities	Pollution Enforcement	Adopt a stormwater ordinance.	City of Fort Dodge	Admin
	Public Education	Identify locations along the aqueduct where removal will be most beneficial to water quality and areas along drainage-ways suitable for reshaping.	City of Fort Dodge	Admin
		Explore partnership opportunities with the airport, which may include strategies to mitigate and monitor stormwater discharge and other projects as appropriate.	Webster County, City of Fort Dodge, Fort Dodge Regional Airport	\$2000/monitor + Admin
	Monitoring Programs	Daylight the Loomis Park upper watershed.	City of Fort Dodge	\$200,000 - \$300,000
	Stormwater Ordinance	Daylight the Country Club upper watershed.	City of Fort Dodge	\$100,000 - \$200,000
	Development Buffers	Monitor water quality of Country Club upper watershed after daylighting.	City of Fort Dodge, IDNR	\$2000/monitor + Admin
	Streambank Restoration	Restore prairie landscaping along Soldier Creek.	City of Fort Dodge	\$5,000/acre
		Implement the Buffering, Streambank Stabilization, and Stream Meandering Riverfront Improvement Project on the east bank of the river near the Becker Wildlife Area.	Webster County	\$2,900,000‡
		Require new development to not only avoid the floodplain, but maintain a generous buffer between developed areas and both the North and South Branch of Lizard Creek to aid in stormwater management and water quality preservation.	Webster County, City of Fort Dodge	Admin
		Prioritize the redesign of stormwater system within Loomis Park.	City of Fort Dodge	Admin
		Enhance the Phinney Park access area to include running water and public restrooms.	City of Fort Dodge, IDNR	\$87,000
		Create step-down and interactive water accesses in the Central River District and South River District.	City of Fort Dodge, IDNR	‡
		Improve the parking lots at Hydro-Electric Park, Sunkissed Meadows, and the South River District.	City of Fort Dodge	\$50,000
		Remove the Hydroelectric Dam.	City of Fort Dodge, IDNR	\$120,000+
		Following the removal of the Hydroelectric Dam, develop a reconstruction plan that meets the needs of the community	City of Fort Dodge, IDNR	\$2,900,000‡
	Remove and/or modify the Little Dam.	City of Fort Dodge, IDNR	\$120,000	
	Excavate, demolish, and properly mitigate the former building site and any other abandoned structures located adjacent to the Little Dam	City of Fort Dodge, IDNR	\$10,000 - \$20,000	
Explore the feasibility to classify South Lizard Creek as a water trail	Trail Easement	Develop a formal assessment of South Lizard Creek to identify key areas for preservation, erosion mitigation, and other improvement strategies.	Webster County, IDNR	Admin
Area 3				
Provide safe bicycle and pedestrian access between Coalville, Otho, and Lehigh	Trail Easement	Work with the Iowa Department of Transportation to create and design a safe and efficient roadway alignment and design that can accommodate non-motorized transportation such as bicycles and pedestrians.	Webster County, Iowa DOT	Admin
		Create a trail alignment that follows the Dagoon Trail.	Webster County, Iowa DOT	Admin
		Explore the potential for a trail corridor in Dolliver State Park.	IDNR	\$5 - \$15/SF

‡ Included as part of a riparian enhancement project. \$2,900,00 is the project total.

OBJECTIVE	TOOLBOX	STRATEGY	RESPONSIBLE PARTY	COST
Upgrade existing access points to meet IDNR Water Trail Guidelines		Consider access amenity improvements at Dolliver Memorial State Park.	IDNR	\$5,000 – \$100,000
		Develop an improvement and access plan for the City of Lehigh.	IDNR, Webster County, City of Lehigh	\$15,000 – \$25,000
		Establish a new access as part of the Camp WaNoKi Master Plan.	Webster County, IDNR	\$50,000
		Improve the entrance at the northwest corner of Woodman Hollow on Woodman Hollow Road to ensure safe park access.	IDNR	\$60,000
Expand conservation and recreational areas	Land Acquisition	Implement the Camp WaNoKi Master Plan.	Webster County	Varies
	Conservation Easement	Explore opportunities to extend recreational use along Holiday Creek.	Webster County	Admin
		Expand the footprint of Woodman Hollow and Dolliver Memorial State Park to preserve additional riverfront land.	IDNR	Market
		Coordinate improvements to Dolliver Memorial State Park with the Dolliver Park Master Plan.	IDNR	Admin
Stabilize streambanks to mitigate erosion	Streambank Restoration		Webster County, IDNR	\$200/linear foot
Area 4				
Improve existing river access points at Deception Hollow, Boone Forks, and Skillet Creek		Explore the possibility of moving the Deception Hollow access closer to McGuire Bend Road.	IDNR	\$50,000
		Perform routine maintenance for the Boon Forks access and ensure interpretive signage is up-to-date.	IDNR	Admin
		Improve the roadway that leads into Deception Hollow to provide safe and efficient site access.	IDNR	\$60,000
Expand preservation areas, cultural amenities, and wildlife habitats	Land Acquisition	Expand the footprint of Deception Hollow via conservation easements and land acquisition.	IDNR	Market
	Conservation Easement	Expand the Brushy Creek recreation and conservation corridor via conservation easements and land acquisition.	IDNR	Market
	Trail Easement	Explore the potential for a trail corridor through Brushy Creek.	IDNR	\$5 – \$15/SF
		Coordinate Brushy Creek improvements with the Brushy Creek Master Plan.	IDNR	Admin
		Expand the Boone Forks Wildlife Management Area via conservation easements and land acquisition.	IDNR	Market
		Expand the Carlson Recreation Area via conservation easements and land acquisition.	Webster County	Market
		As the Dragoon Trail develops, ensure it provides safe infrastructure for bicycles and pedestrians.	Webster County, IDNR	Admin
Work with landowners to reduce watershed impacts	Public Education		Webster County, IDNR, NRCS	Admin
	Monitoring Programs			\$2,000/monitor + Admin
Stabilize streambanks to mitigate erosion	Streambank Restoration		Webster County, IDNR	\$200/linear foot

APPENDIX

Threatened and Endangered Species List

Key Pad Polling Results. *Riverfront Plan Community Meeting*. August 17, 2015.

Des Moines River and Lizard Creek Water Trails and Corridor Plan Online Survey Results. August 26 – October 27, 2015.

Sellars, Jonathan R., and Leslie A. Ambrosino. *A Cultural Resource Overview Study for the Proposed Des Moines River Vally Top-to-Valley Top Project, Webster County, Iowa*. Report CAS-1068. 2015.