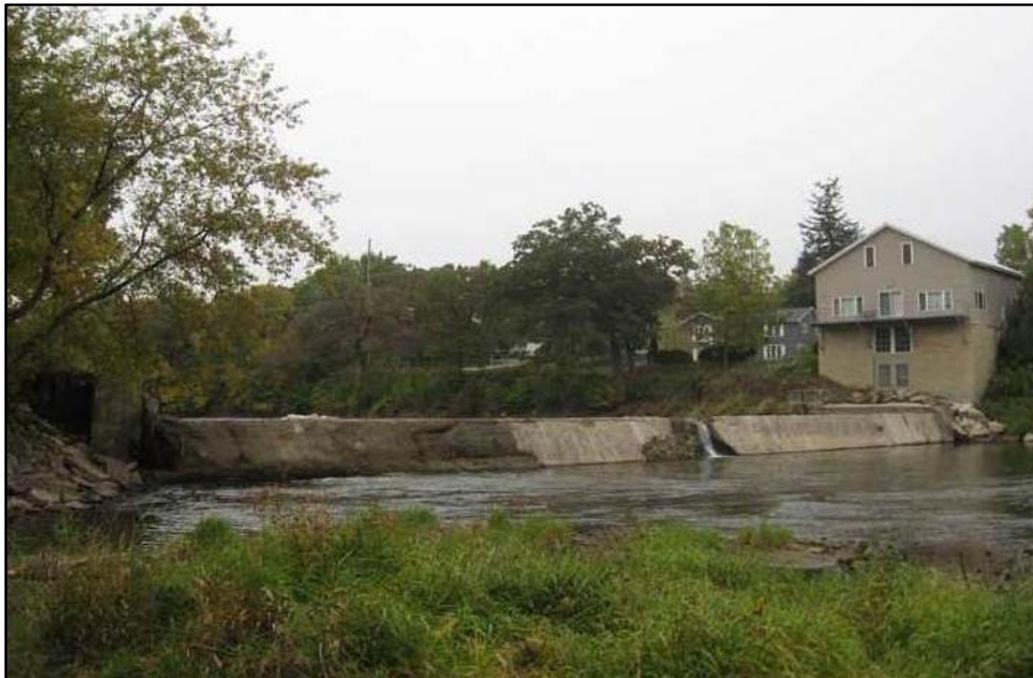


## **DRAFT ENVIRONMENTAL ASSESSMENT**

### **ROCKFORD DAM REMOVAL ON THE SHELL ROCK RIVER, IOWA**



#### **U.S. Fish and Wildlife Service**

La Crosse Fish and Wildlife Conservation Office  
555 Lester Avenue  
Onalaska, WI 54650

**September 2013**

## **Draft Environmental Assessment Rockford Dam Removal on the Shell Rock River, Iowa**

### **Executive Summary**

The La Crosse Fish and Wildlife Conservation Office of the U.S. Fish and Wildlife Service (USFWS) has prepared this assessment of the environmental effects that may result from the proposed removal of Rockford Dam on the Shell Rock River, Floyd County, Iowa. The purpose of the proposed action is to improve fish passage through the Rockford river reach and eliminate the public safety hazard associated with the dam. This action involves removal of the dam, stabilization of the west bank upstream of the dam, lowering of a 250 ft. long berm adjacent to the dam on the west bank, and revegetation of the disturbed areas. The Environmental Assessment provides information to the USFWS Regional Director on the potential effects of the proposed action for development of a Finding of No Significant Impact (FONSI). This assessment addresses the need and purpose for the proposed action, identification of alternatives, description of the affected environment, examination of the environmental consequences for each alternative, and the coordination, consultation, and involvement of the public through the process.

Efforts to comply with Section 106 of the National Historic Preservation Act are in progress. Rockford Dam was determined to be eligible for the National Historic Register of Places by the Iowa State Historic Preservation Office (SHPO) under criterion D, for its potential to provide architectural information. All or a portion of the timber cribbing used to construct the original dam in 1872-1873 is encased within the current day concrete dam. A Memorandum of Agreement (MOA) will be drafted and signed between the USFWS, Floyd County, U.S. Army Corps of Engineers (COE), and the Iowa SHPO outlining agreed-upon measures that will be implemented to mitigate for the adverse effects of removing an eligible historic property. Consultation and coordination will continue with SHPO through project approval and execution of the terms within the MOA.

A mussel survey was conducted throughout a 1.5 mile stretch of river near Rockford in August 2012. Over 460 mussels were collected, representing 11 species. Two of the eleven species collected were state-listed as threatened. To comply with an Iowa Department of Natural Resources (DNR) environmental review stipulation to avoid impacts to mussels, mussels will be moved from the impoundment and relocated to an approved area determined by the Iowa DNR. The relocation effort will occur in October 2013, when water levels are low. Mussels collected will be identified to species, aged, and sex determined. A final report of the relocation effort will be provided to the Iowa DNR, USFWS, and COE to satisfy agency compliance conditions.

The proposed action to remove the dam will restore the river through the Rockford reach to its natural state reconnecting 21.5 miles of the Shell Rock River and the lower Winnebago River. The proposed action will allow fish unimpeded access to seasonal habitats to carry out their biological needs and will improve distribution, abundance, and diversity of the native mussel community including state threatened cylindrical papershell and creeper. The proposed removal of Rockford Dam will eliminate the public safety hazard associated with the risk of dam failure and potential drowning from recirculating currents below the dam. The proposed action will also eliminate repair costs needed to maintain state dam safety standards.

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- Appendix A. Maps and photographs.
- Appendix B. Project plans: Existing conditions, Shell Rock River at Rockford, Iowa.
- Appendix C. Public meeting questions and comments.

**List of Abbreviations and Acronyms**

APE	Area of Potential Effect
AQI	Air Quality Index
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOI	Department of Interior
DNR	Department of Natural Resources
EPA	Environmental Protection Agency
EA	Environmental Assessment
ERNS	Emergency Response Notification System
FEMA	Federal Emergency Management Authority
FONSI	Finding of No Significant Impact
MOA	Memorandum of Agreement
NAAPS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NREPA	Natural Resources Environmental Protection Act
NRHP	National Register of Historic Places
OSA	Office of the State Archaeologist
SHPO	State Historic Preservation Officer
TRI	Toxic Release Inventory
COE	US Army Corps of Engineers
USC	United States Code
USFWS	US Fish and Wildlife Service

## **1.0 INTRODUCTION**

The U.S. Fish and Wildlife Service (USFWS) has prepared an Environmental Assessment (EA) to evaluate the proposed removal of Rockford Dam on the Shell Rock River located in Floyd County, Iowa. The proposed project has received National Fish Passage Program funds from the USFWS and dam safety funds from the Iowa Department of Natural Resources (DNR). Because of the funding sources, this project must comply with the National Environmental Policy Act (NEPA), (42 United States Code [USC] § 4321-4347), the National Historic Preservation Act, and the Iowa Administrative Code Chapter 13; lands and waters subject to environmental review of natural resources by the Iowa DNR. The NEPA requires federal agencies to integrate an interdisciplinary environmental review process that evaluates a range of alternatives including the No Action alternative as part of the decision-making process. The NEPA is intended to foster informed decision making by federal governmental agencies and public participation in the process, as appropriate. Because federal funds administered by the Department of Interior are anticipated for use in removal of Rockford Dam, the USFWS is the lead federal agency for this proposed action.

### **1.1 Scope of Document**

The format of this EA follows the guidelines set forth in the USFWS NEPA Reference Handbook (USFWS 2003). The Alternatives section provides a thorough description of the No Action alternative and the proposed action. The Affected Environment section outlines existing environmental conditions including area and site descriptions, air quality, noise, water quality, sediment transport, floodplain and flooding, fish, mussels, wildlife, vegetation, threatened and endangered species, wetlands, cultural and historic resources, socioeconomic resources, environmental justice, aesthetics, recreation, and public safety. The Environmental Consequences section reviews the potential effects for each of the proposed alternatives. The Cumulative Impact section examines past, current, and future actions on the Shell Rock River for potential positive or negative environmental impacts, incrementally. The Coordination, Consultation and Public Involvement section describes the coordination among the project work group, agencies, and public awareness and participation.

### **1.2 Location**

The proposed action would occur at Rockford Dam, located on the Shell Rock River in Floyd County, Iowa (Figure 1 and Figure 2). The dam is situated in the town of Rockford at T95N R18W Section 14. The dam is 341 feet east of 3<sup>rd</sup> Street SE and 0.14 miles south of the Main Street bridge (Highway 147).

### **1.3 Background**

Rockford Dam is approximately 170 feet in length and has a structural height of 8 feet with a 7 foot hydraulic head (Hoogeveen and Olson 2011). The purpose of the original 1872 dam was to power a flour mill. The current day dam functions as a run-of-the river structure with no ability to diminish flood flows. In 2010, piping of water through the west end of the dam was reported to the Iowa DNR Dam Safety Division by the Floyd County Conservation Board, owner of the dam. The dam was examined shortly thereafter by Dam Safety staff. In an inspection letter addressed to the Floyd County Conservation Board, the DNR indicated that the dam was in poor condition and was likely to fail in the future. The DNR recommended that the County breach the dam to relieve the structural pressure from river flows to keep the dam from failing and causing downstream destruction until the dam could be removed or repaired. Discussions regarding the deterioration of the structure and a

course of action to take have been on-going since 2003. Based on the recommendation proposed in the DNR’s 2010 inspection letter, the Floyd County Conservation Board council reached a decision to remove the failing dam because of the danger to public safety and the liability it posed.

## 2.0 PURPOSE AND NEED

Purpose of the project is to eliminate the public safety hazard associated with the unsound structure and restore natural hydrological function, connectivity, and fish passage through the river reach. The need for the proposed action is critical and necessary. Due to the dam’s poor structural condition, it is at risk to fail and cause unknown harm to the general public. During a majority of river flows, the dam is a barrier to upstream and downstream movement to fish accessing seasonal habitats. Removal of the dam will improve river and floodplain habitat for 39 species of native fish and 11 species of mussels including two state threatened mussel species.

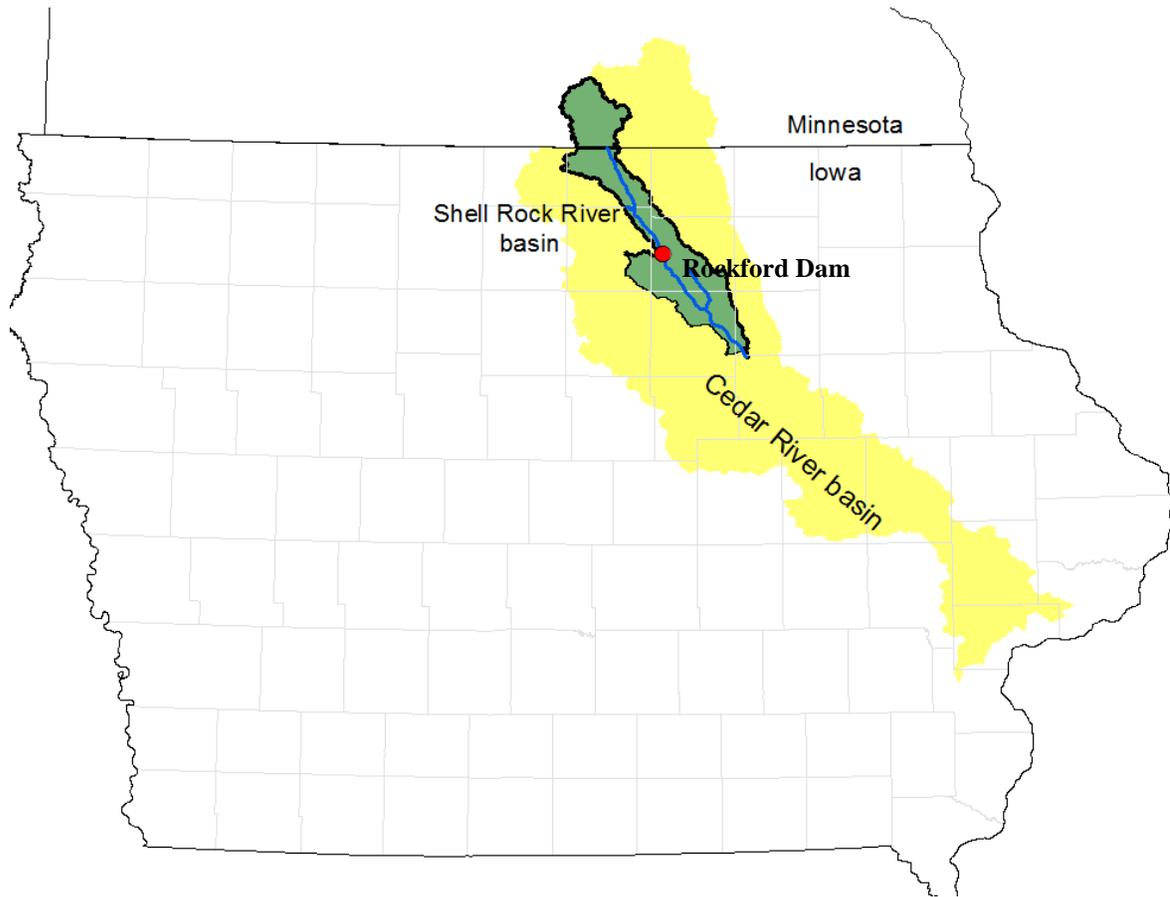


Figure 1. Location of the Shell Rock River watershed in Iowa.

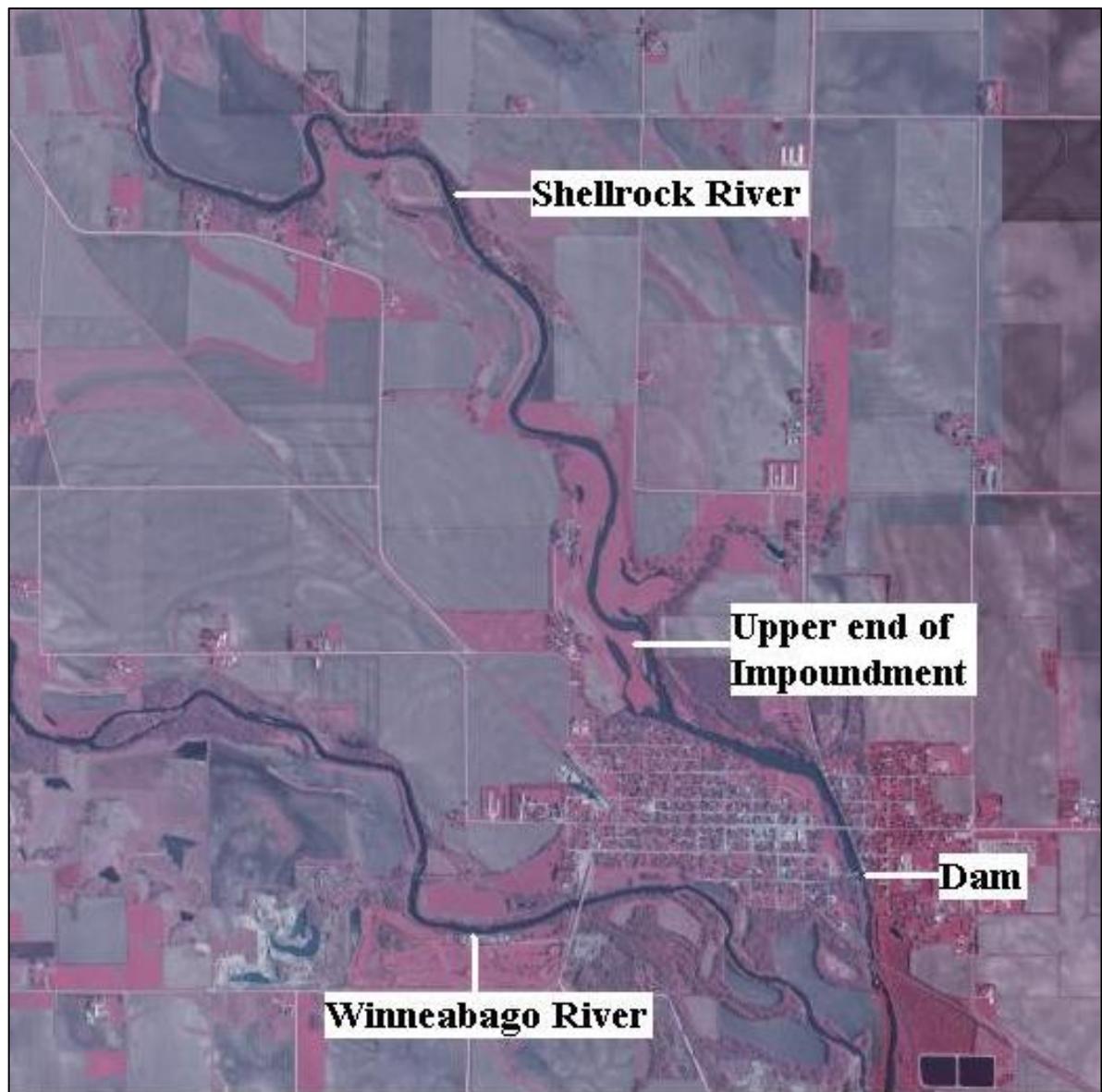


Figure 2. Location of Rockford Dam project on the Shell Rock River in Rockford, Iowa.

### **3.0 ALTERNATIVES**

#### **3.1 Alternative A-No Action**

The “No Action” alternative represents what would happen if a proposed action did not take place. Leaving the Rockford Dam in place would maintain current conditions with the continuation of existing trends as described in Section 4.0- Affected Environment. This alternative provides a basis for understanding the positive and negative impacts of the proposed action. The dam would continue to be impassable for fish during a majority of flows. Fragmentation of the river in this reach would continue to limit access to spawning, rearing, and overwintering habitat needed by fish during different times of the year. The public safety hazard would remain due to the potential for the dam to fail and cause unknown property and environmental damage. The liability of owning a high hazard dam would also remain for the county under this alternative. Cost of major repair work, future maintenance, and periodic inspections would have to be made in order to meet and maintain state safety standards.

#### **3.2 Alternative B-Proposed Action**

The proposed action alternative is to remove the dam and restore connectivity to the floodplain on the west side of the river. This alternative was selected by the Floyd County Conservation Board and supported by the Iowa DNR, USFWS, and American Rivers. The proposed action includes removing Rockford Dam, resloping the stream bank on the west side of the river upstream of the former dam, and removing the berm to promote floodplain-river connectivity. Removal of the dam provides the greatest potential to restore fish passage and in-stream habitat within the impoundment and channel downstream of the dam. Dam removal would allow navigation for canoeists and kayakers and would provide the most beneficial public safety alternative for anglers and water recreationists. This alternative was also chosen because the owner of the dam did not wish to make costly repairs or reconstruct the dam to bring the dam into compliance with state dam statutes and codes. Generally, there is marked difference between dam removal and dam repair costs. In a review of dam project costs across the country, Interfluve (2009) found that dam removals, on average, cost about 60% less than dam repairs. Removal of the Rockford Dam was estimated to cost less than the total amount to contract an engineer to design the reconstruction of the dam and the labor and materials to do so (American Rivers 2011).

From an ecological, financial, and liability standpoint, removal of the dam and restoration of the west stream bank is the desired alternative. The proposed alternative was therefore selected for the following reasons:

- Restores passage for fish and other aquatic organisms
- Improves connectivity and natural flows in the river reach
- Improves aquatic habitat and water quality in the impounded area above the existing dam
- Eliminates the public safety hazard associated with the failing dam
- Eliminates potential drowning hazard associated with dams
- Eliminates repairs and maintenance costs associated with upkeep of the dam
- Improves river access for anglers, paddlers and other water recreationists
- Costs less than the “No action” alternative over the long-term

## **Proposed Action Description**

**Dam Removal-**The project area boundary or area of potential effect (APE) is shown in Figure 3. The staging area includes the city-owned lot and county-owned gravel drive on the west side of the river adjacent to the dam. The entire dam will be removed except for the east abutment (Figure 4). The east abutment and the rip rap between the abutment and the millhouse foundation will be left intact as to not destabilize the foundation of the residence. The abutment will be separated from the dam prior to deconstruction activities to reduce vibrations to the mill house. The dam will then be physically removed utilizing heavy equipment. The removal of the dam will be designed by Barr Engineering, an environmental consulting firm experienced in design and engineering of dam removals in Minnesota and other states throughout the Midwest. Construction is expected to begin in late fall or winter. A silt fence will be placed along the construction area where appropriate to serve as an erosion control measure. Demolition debris will be removed from the site by dump truck and hauled to Allied Construction in Charles City, Iowa, for recycling. All other material will be hauled to the local landfill.

**Berm Removal and West Bank Restoration-**Adjacent to the dam on the west side of the Shell Rock River is an earthen berm that extends approximately 250 feet from the dam to 3<sup>rd</sup> Street SE. This berm is elevated three to five feet above the existing upstream floodplain elevation. The berm will be reduced in height to restore floodplain function and will match the existing upstream floodplain elevation. The berm is constructed primarily of dirt and clay materials. The dirt/clay materials from the top three to five feet of the berm will be physically removed and placed on the downstream slope of the berm. If other materials such as refuse and demolition materials are found in the berm, they will be removed from the site, hauled and deposited at the local landfill. A small number of boxelder, elm, and hackberry trees on the downstream side of the berm will be removed.

The west bank of the Shell Rock River, both adjacent to the dam and upstream of the dam for approximately 300 feet will be resloped to increased bank stability, floodplain function, and provide easier access for anglers approaching the river. All disturbed areas will be seeded to a permanent vegetative cover.

## **Significance of Risk/Unknowns**

There are no significant unknowns associated with this alternative. Dam removal results are highly predictable. Natural processes are improved, restoring stream hydrology and morphology within the project river reach. Hundreds of dams have been removed throughout Minnesota and Wisconsin under state regulatory guidelines (Minnesota DNR 2010, River Alliance of Wisconsin 2005).

## **Significance of Precedent**

This action is not precedent setting. Removal of this dam will improve aquatic habitat and protect public rights in navigable waters.

## **Permitting**

Several permits, authorizations, and compliance reviews need to be obtained to implement the proposed action authorized under Iowa Administrative Code 567, chapter 71. A Flood Plains permit application was co-submitted and reviewed by the Iowa DNR Floodplains Division and the U.S. Army Corps of Engineers (COE). Permits and approvals required for the proposed action are listed in Table 1.

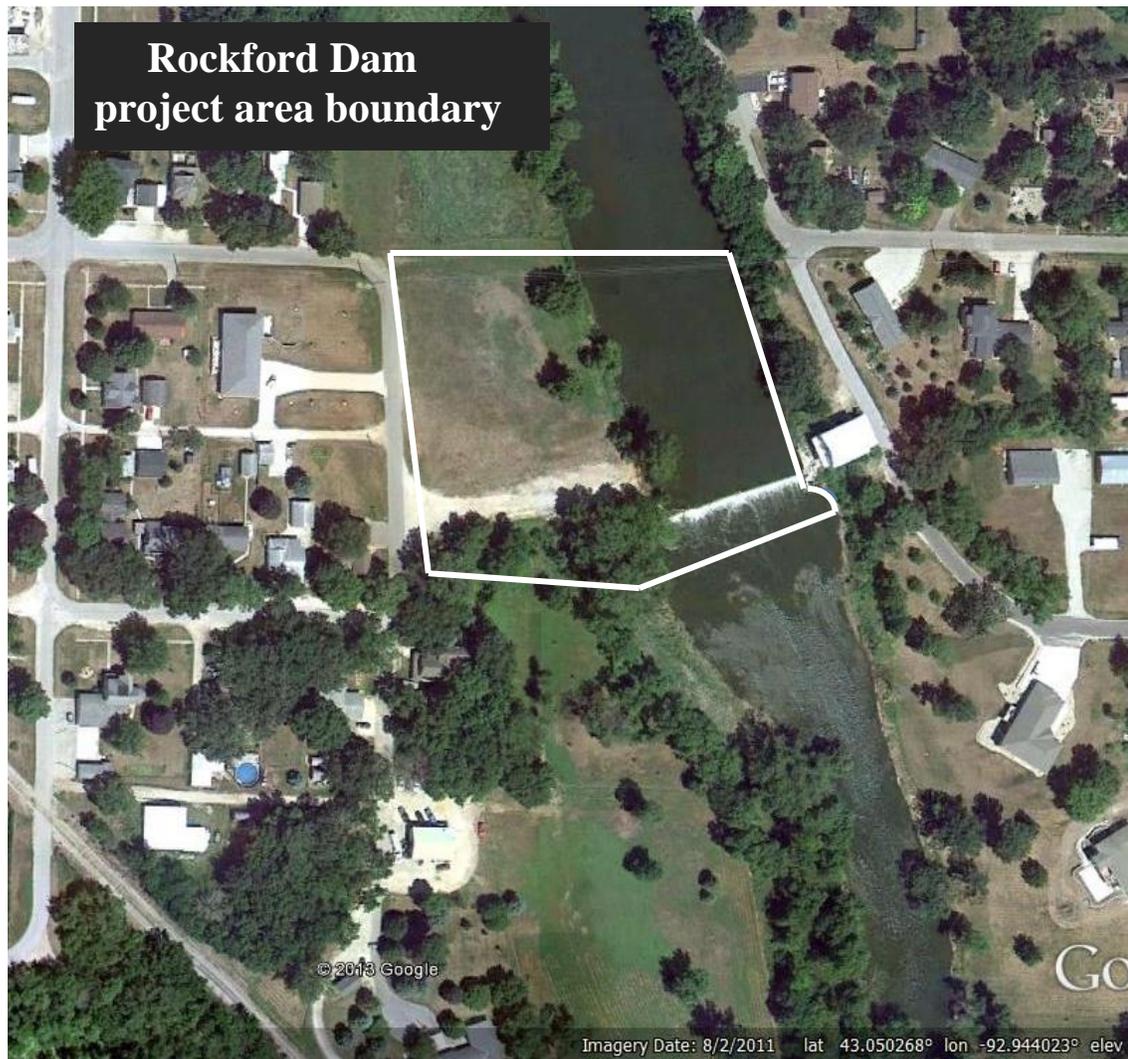


Figure 3. Aerial view of project area boundary or area of potential effect (APE). The APE includes the dam, the west stream bank above and below the dam, the berm (embankment), the city-owned lot, and the county-owned gravel drive.

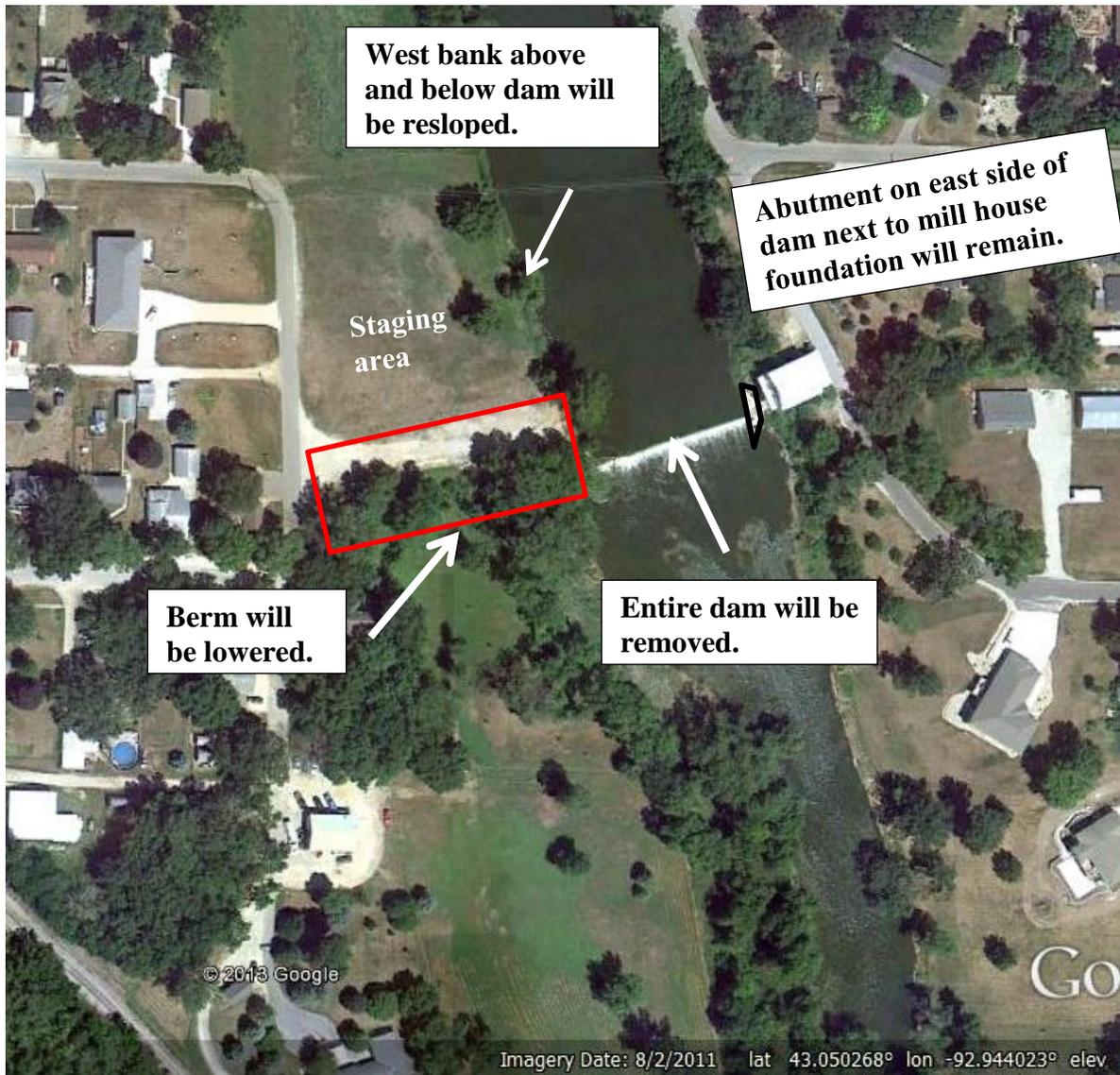


Figure 4. Proposed dam removal and west stream bank restoration activities on the Shell Rock River at Rockford, IA.

**Table 1.** Permits and approvals required for the Rockford Dam removal activities.

<b>Agency</b>	<b>Authority</b>	<b>Requirement</b>	<b>Activity Covered</b>
Iowa DNR	Iowa Administrative Code 567 chapter 71		Warning signage, portage trail construction, and modifications to or removals of low-head dams.
Iowa DNR	571 State of Iowa Administrative Code chapter 13	Flood Plains Permit	Activities in inland lakes and streams, fill placement/stream channel changes.
Iowa DNR	571 State of Iowa Administrative Code chapter 61	Section 401 (CWA) water quality certification	Issued for the 2012 Nationwide permits for projects that meet the listed conditions
Iowa DNR		Environmental Review	Review of state threatened and endangered species in project area.
Iowa State Historic Preservation Office	National Historic Preservation Act	Section 106	Consultation and clearance regarding potential effect to historic/cultural properties.
U.S. Army Corps of Engineer	Federal Clean Water Act Under Section 404	Nationwide permit	Activities in streams, wetlands and other waters in the U.S. Issued for projects that have a minimum impact on the aquatic environment.
U.S. Fish and Wildlife Service	Endangered Species Act	Threatened and Endangered species review	Review of federally listed threatened and endangered species in project area.
U.S. Fish and Wildlife Service	National Environmental Policy Act	NEPA compliance	Environmental Assessment with Finding of No Significant Impact determination

### **3.3 Other Alternatives Considered**

#### **Dam Repair**

Repairing the dam was considered. The dam has received repeated repairs since the 1960s with major repair work completed in 1960 and 1972. Most recent repair work occurred in 2005. Despite repair work to the dam over the decades, the structure would continue to impede fish movement under most river flows, restricting upstream and downstream access to needed seasonal habitats. Over the long-term, the County Conservation Board would have unpredictable expenses for dam repairs to keep the dam up-to-date with state safety standards. To have the dam properly repaired to meet state code, a structural engineer would have to be contracted to design the repair work. The structure would also remain a safety and insurance liability to the county as a potential drowning hazard from recirculating currents created immediately below the dam. This alternative was not carried out for further analysis.

## **4.0 AFFECTED ENVIRONMENT**

The following section describes the physical, biological, and socioeconomic environments that have the potential to be affected by the proposed action.

### **4.1 Area Description**

The Shell Rock 8-Digit Hydrologic Unit Code (HUC) subbasin lies within Iowan Surface of northeast Iowa. The Iowan Surface was formed during the Wisconsin period by intense cold-climate weathering and erosion on Pre-Illinoian landscapes, and is characterized by low relief, dendritic drainage systems, stepped hillslopes, and widespread distribution of erratic boulders (Kendall and Carlson 2013). Rock outcrops and karst topography are common surface characteristics in the northern part of the Iowan Surface.

The Upper Shell Rock River originates from southern Minnesota in Albert Lea Lake, Freeborn County and flows south, some 120 miles through Floyd County where the Winnebago River joins the Shell Rock. The Shell Rock River flows into the Cedar River in Blackhawk County and from there, turns southeasterly to the Mississippi River. There are seven mainstem dams that currently fragment the Shell Rock River. There is a lowhead dam 11 river miles upstream of Rockford at Nora Springs and another dam, 10.5 miles downstream at Marble Rock. Removal of Rockford Dam will reconnect 21.5 miles of mainstem and several small tributaries. A Union Pacific railroad bridge crosses the river south of town about 0.25 miles downstream of the dam (Appendix A). The Main Street bridge crosses the river in town, approximately 0.14 miles upstream of the dam. The bridge is currently being replaced. Construction began in early April 2013 and is expected to go through November 2013.

The Shell Rock watershed is 692,700 acres and has an average elevation of 1,080 feet above mean sea level (Natural Resource Conservation Service (NRCS) 2010). Land use in the watershed is primarily in row crops (76%) and pasture/hay (7.4%) with other land uses in residential/commercial development (8.4%), forest (2.2%), and wetlands (2.1%). Land ownership is 98% private and 1.2% state-owned (NRCS 2010). Soils in the watershed are highly productive and suited for agricultural uses. Soils in the county near the project area are predominantly well drained and are Calco silty clay loam, Du Page loam, Shellwood loam, and Saude loam (Kendall and Carlson 2013).

### **4.2 Site Description**

The 170 ft long dam impounds about 40 surface acres and a 2011 DNR hydrologic survey indicates the length of the impoundment is approximately 4,850 feet. The original dam was built in 1872-1873 and was constructed of timber (Kendall and Carlson 2013). Recent review of the history of the dam by the Iowa Office State Archaeologist (OSA) indicates that the dam was never completely rebuilt from previous flooding. The timber cribbing was later encased in concrete, though the time period is uncertain. The dam has had multiple patchwork repairs and reinforcements since it was encased in concrete, with major repair work reported in 1960 and 1972 (Kendall and Carlson 2013). Pictures of the dam's deteriorating condition are shown in Appendix A.

The dam originally was constructed to power a grist mill, with a mill house constructed on the east side of the river. When the flour industry moved from the general area in the 1880s and 1890s, the dam and mill were no longer needed for grinding flour. The current day dam does not serve a practical purpose. The water the structure impounds is not large

enough to aid in flood storage, only having a maximum storage capacity of 153 surface acres. Because of the small size of the impoundment, opportunities for recreation such as boating and fishing are minimal.

### **4.3 Air Quality**

The Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAPS) to protect public health as required by the Clean Air Act. The air quality index (AQI) is an indication of how clean or polluted the air is, and what associated health effects are of concern. The index focuses on health effects that may be experienced within a few hours or days after breathing polluted air. The five major air pollutants that are regulated include ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in the U.S. On a scale of 0-500, the higher the number, the greater the health risk. The 2010 AQI for Rockford was 31.6. The score falls into the “good” category with little to no health risk.

### **4.4 Noise**

There is existing ambient or background noise associated with the dam. Varying noise level is dependent upon the volume of water flowing over the structure.

### **4.5 Water Quality**

Section 404 of the Clean Water Act (CWA), authorizes the COE to issue general permits on a state, regional or nationwide basis for categories of activities where such activities will have minimal adverse effects. Section 401 of the CWA requires that before the COE can issue a Section 404 permit, the state water quality agency must certify that the proposed activity will not violate state water quality standards. The Iowa DNR has issued its Section 401 water quality certification for the 2012 Nationwide permits. The COE will be issuing a nationwide permit for the proposed action, as long as the project meets the conditions outlined in the Iowa Administrative Code, Environmental Protection 567, Chapter 61 “Water Quality Standards”.

Water quality from the upper portion of the Rockford impoundment downstream to the railroad bridge is considered good, supporting a variety and abundance of mussels. Review of EPA Superfund Sites, Toxic Releases (TRI), and Emergency Response Notification System (ERNS) indicate no presence of contamination in the Shell Rock River watershed upstream or near the Rockford area (<http://www.epa.gov/enviro/facts/sysdatasearch.html>). A National Pollutant Discharge Elimination System (NPDES) permit issued to the Rockford wastewater facility located downstream of the dam along the river indicates no contamination concern (<https://programs.iowadnr.gov/wwpie>).

Iowa’s final 2012 list of 303d impaired waters (Clean Water Act Section 303d) was checked for river and stream segments within the Shell Rock River watershed that do not meet state water quality standards. Segments of rivers and streams have state designated uses such as drinking water, swimming, recreation, aquatic life, etc. If the water body does not fully meet its designated use, it is considered impaired and placed on the 303d list. The Shell Rock River reach, from the confluence of the Winnebago River in Floyd County to the northern border of Cerro Gordo County, is not listed on the 303d impaired waters list. This river segment encompasses the

Rockford River reach. Other Shell Rock River segments and the Winnebago River are currently on the 303d list. The causes of these impairments include bacteria, low dissolved oxygen, and presence of mercury in fish tissue. There are no fish consumption advisories issued for mercury in the Rockford river reach. However, there are fish consumption advisories in other portions of the watershed (Iowa DNR 2013).

#### **4.6 Sediment Transport**

Sediment transport is an important river function for riparian and riverine habitats and species. River flows can transport and redistribute small and large sediments, gravel, cobble, and boulders which can create diverse habitats. Dams typically block movement of sediment within a river, allowing sediment to be deposited behind the dam, altering the river's habitat upstream and downstream of the dam. The Rockford Dam has created a small 40 acre impoundment that exhibits a lentic or pond-like environment during normal flows.

A substrate survey was conducted by the Iowa DNR in the summer of 2012. Substrate composition from the 2012 pre-construction survey will be compared with substrate composition after removal of the dam to evaluate changes. Transects were set up in three sample reaches: the impoundment above the dam, the dam downstream to the railroad bridge, and the railroad bridge to the confluence of the Winnebago River. Pre-construction survey results showed that substrate in the upstream impoundment was composed primarily of silt and sand (Gelwicks 2013). Substrate composition from the immediate downstream reach consisted of gravel, cobble, and sand. Limestone bedrock was also recorded in this sample reach. The railroad bridge to Winnebago River sample reach contained gravel and sand with some presence of silt. Substrate composition in the impoundment, post dam removal, is expected to shift and become more similar to the composition present in the two downstream sample reaches.

The Cedar River basin coordinator from the NRCS calculated the amount of sediment delivered to the Shell Rock River upstream of Rockford, in 2010. This was done to provide some context as to the amount of sediment that enters the Shell Rock River each year compared to the amount of sediment that has been deposited in the Rockford Dam impoundment, over time. In the form of sheet and rill erosion, it was estimated that 80,386 tons of sediment was delivered from the 470 mi<sup>2</sup> watershed upstream of Rockford each year (Kiel 2010). Based on a 2011 Iowa DNR sediment volume analysis of the impoundment, the total amount of sediment estimated to be present in the impounded area immediately above Rockford Dam was less than 33,000 tons (Hooegeven and Olson 2011). This suggests that river flows transport sediment through the river reach with low deposition through the narrow impoundment.

#### **4.7 Floodplain and Flooding**

Executive Order 11988 requires Federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Federal agencies need to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by floodplains.

Rockford has a long history of flood impacts from the Shell Rock River. A July 19<sup>th</sup>, 1999 rainfall of eight inches resulted in flash flooding throughout Rockford. On June 7<sup>th</sup> and 8<sup>th</sup>, 2008 extensive

flooding from the Shell Rock River occurred with 40 homes damaged. Ten homes that were within the flood hazard zone were purchased and demolished through a Federal Emergency Management Agency (FEMA) buyout after this flood. This buyout resulted in only two homes remaining in the flood hazard zone. Most recent flooding occurred in Rockford in June of 2013. River levels peaked at 18.0 feet in mid-June. Figure 5 shows the flood hazard zone for the Rockford area. A hydraulic model run by Barr Engineering will be used to confirm that removal of the dam will not increase the 1% (100-year) flood event.



Figure 5. Flood hazard zone (green) for the Rockford area along the Shell Rock and Winnebago rivers. Source: <http://beacon.schneidercorp.com/site=Floyd CountyIA>

#### **4.8 Fish**

The Shell Rock River in Floyd County has a state water use designation of *Primary contact recreational use* (Class “A1”). It is a Class “B (WW)” Warm water, in which water temperature, flow, and other characteristics are suitable for a warm water fish population and invertebrate species (Iowa DNR 2010). Thirty-nine fish species were identified in a 2012 Shell Rock River electrofishing survey conducted by the Iowa DNR (Table 2). The 2012 survey included the lower Winnebago River, the dam downstream to the Winnebago River confluence, and a reach upstream of the dam. The survey showed that smallmouth bass, walleye, and channel catfish were the dominant sport fish downstream of the dam, along with redhorses and a variety of darters and minnows. Black and yellow bullhead, common carp, and bigmouth buffalo were more common in the impounded area above the dam, indicative of species having a preference for a pond-like environment. Thirteen of the thirty-nine species collected in the 2012 survey were collected below the dam, but not in the upstream reach of the dam. Smallmouth bass, rock bass, golden redhorse, and four darter species were among those absent in collections upstream of the barrier.

**Table 2.** List of fish species collected by the Iowa Department of Natural Resources on the Shell Rock and Winnebago rivers.

SPECIES NAME	Scientific Name	WINNEBAGO RIVER	BELOW DAM PRESENCE	UPSTREAM OF DAM PRESENCE
<b>Banded darter</b>	<i>Etheostoma zonale</i>	X	X	
<b>Bigmouth buffalo</b>	<i>Ictiobus cyprinellus</i>	X	X	X
<b>Bigmouth shiner</b>	<i>Notropis dorsalis</i>	X	X	X
<b>Black bullhead</b>	<i>Ameiurus melas</i>	X	X	X
<b>Blackside darter</b>	<i>Percina maculata</i>	X	X	
<b>Bluegill</b>	<i>Lepomis macrochirus</i>		X	X
<b>Bluntnose minnow</b>	<i>Pimephales notatus</i>	X	X	X
<b>Central stoneroller</b>	<i>Campostoma anomalum</i>	X	X	X
<b>Channel catfish</b>	<i>Ictalurus punctatus</i>	X	X	X
<b>Common carp</b>	<i>Cyprinus carpio</i>	X	X	X
<b>Common shiner</b>	<i>Luxilus cornutus</i>	X	X	X
<b>Creek chub</b>	<i>Semotilus atromaculatus</i>	X	X	
<b>Fantail darter</b>	<i>Etheostoma flabellare</i>	X	X	
<b>Golden redhorse</b>	<i>Moxostoma erythrurum</i>	X	X	
<b>Green sunfish</b>	<i>Lepomis cyanellus</i>	X	X	X
<b>Highfin carpsucker</b>	<i>Carpionodes velifer</i>		X	
<b>Hornyhead chub</b>	<i>Nocomis biguttatus</i>	X	X	X
<b>Johnny darter</b>	<i>Etheostoma nigrum</i>	X	X	X
<b>Logperch</b>	<i>Percina caprodes</i>	X	X	
<b>Northern hog sucker</b>	<i>Hypentelium nigricans</i>	X	X	
<b>Northern pike</b>	<i>Esox lucius</i>		X	X
<b>Orangespotted sunfish</b>	<i>Lepomis humilis</i>		X	X
<b>Pumpkinseed</b>	<i>Lepomis gibbosus</i>		X	
<b>Quillback</b>	<i>Carpionodes cyprinus</i>	X	X	X
<b>Rock bass</b>	<i>Ambloplites rupestris</i>	X	X	
<b>Rosyface shiner</b>	<i>Notropis rubellus</i>	X	X	
<b>Sand shiner</b>	<i>Notropis stramineus</i>	X	X	X
<b>Shorthead redhorse</b>	<i>Moxostoma macrolepidotum</i>	X	X	X
<b>Silver redhorse</b>	<i>Moxostoma anisurum</i>	X	X	X
<b>Slenderhead darter</b>	<i>Percina phoxocephala</i>	X	X	
<b>Smallmouth bass</b>	<i>Micropterus dolomieu</i>	X	X	
<b>Spotfin shiner</b>	<i>Cyprinella spiloptera</i>	X	X	X
<b>Stonecat</b>	<i>Noturus flavus</i>	X	X	X
<b>Suckermouth minnow</b>	<i>Phenacobius mirabilis</i>	X	X	X
<b>Tadpole madtom</b>	<i>Noturus gyrinus</i>		X	X
<b>Walleye</b>	<i>Sander vitreus</i>	X	X	X
<b>White sucker</b>	<i>Catostomus commersonii</i>	X	X	X
<b>Yellow bullhead</b>	<i>Ameiurus natalis</i>		X	X
<b>Yellow perch</b>	<i>Perca flavescens</i>		X	X

#### 4.9 Mussels

A qualitative mussel survey was conducted in the Rockford river reach August 6, 2012 to determine what species of mussels were present in the APE and their distribution. The Iowa DNR conducted the survey with assistance from Floyd County Conservation Board staff and USFWS. Over 460 mussels representing 11 species were collected throughout the river reach (Table 3). White heelsplitter, fatmucket, and plain pocketbook were the most common mussel species collected. Two species were collected below the dam, but not above and four species were collected above the dam, but not below.

Mussels are good indicators of water and substrate quality. Their distribution is dependent, in part, upon fish which serve as hosts for a portion of their life cycle. The life cycle of a mussel involves a parasitic larval stage in which the larvae, known as glochidia, attach to the gills of specific species of fish to feed for a short period of time. At the appropriate time of development the juvenile mussel drops off the fish, preferably in suitable habitat where it grows to an adult.

Table 3. Mussel species collected in the Rockford Dam reach of the Shell Rock River, August 2012.

Species	Scientific Name	Location	
		Upstream of dam	Downstream of Dam
Black sandshell	<i>Ligumia recta</i>		X
Cylindrical papershell	<i>Anodontooides ferussacianus</i>	X	
Creeper	<i>Strophitus undulatus</i>	X	X
Elktoe	<i>Alasmidonta marginata</i>		X
Fatmucket	<i>Lampsilis siliquoidea</i>	X	X
Giant floater	<i>Pyganodon grandis</i>	X	X
Lilliput	<i>Toxolasma parvus</i>	X	
Mucket	<i>Actinonaias ligamentina</i>	X	
Plain pocketbook	<i>Lampsilis cardium</i>	X	X
Wabash pigtoe	<i>Fusconaia flava</i>	X	
White heelsplitter	<i>Lasmigona complanata</i>	X	X

Mussels identified by Iowa DNR malacologist.

#### 4.10 Wildlife

Terrestrial wildlife along the Shell Rock River include white-tailed deer, raccoons, squirrels, rabbits, mink, blue heron, Canada geese, and a variety of birds.

#### 4.11 Vegetation

A narrow riparian corridor is dotted with trees upstream of the dam with a wider forested corridor downstream of the dam on the west side of the river. Composition consists of mixed floodplain trees such as cottonwood, American elm, hackberry, and boxelder. Understory vegetation near the

dam include reed canary grass, bluestem, and other grasses and sedges. Upland vegetation adjacent to the dam and the city-owned lot is primarily grass.

#### 4.12 Threatened and Endangered Species

The USFWS Threatened and Endangered Species Database System was reviewed to identify the potential presence of listed species in the project area. Candidate species were also reviewed as they receive the same protections as threatened and endangered species. In the on-line FWS county search ([http://www.fws.gov/midwest/endangered/lists/iowa\\_cty.html](http://www.fws.gov/midwest/endangered/lists/iowa_cty.html)), two threatened plant species were listed in the county of Floyd, the prairie bush clover (*Lespedeza leptostachya*) and western prairie fringed orchid (*Platanthera praeclara*).

The prairie bush clover is a member of the pea family (Fabaceae), with 40 members of the genus *Lespedeza* worldwide and 12 species native to North America. It is found in only four Midwestern states - Iowa, Illinois, Minnesota and Wisconsin. Only scattered remnants of prairie can be found in Iowa. The "core" area for the species is in the Des Moines River and Little Sioux River basins, with populations concentrated in northwest Iowa and southwest Minnesota. "Peripheral" populations are found in other parts of Iowa, Minnesota, Wisconsin, and Illinois. The prairie bush clover favors dry to mesic prairies with gravelly soils. The plant persists on lightly grazed prairie pastures, haylands, and prairie remnants. It is a perennial plant that reproduces by seed often colonizing open habitats. Habitat characteristics of core populations are fairly consistent - primarily north facing gentle slopes, and fine silty loam, fine sandy loam or clay loam substrates. Recent distribution maps developed by the Iowa Department of Agriculture and Land Stewardship show that the plant is no longer found in Floyd County (<http://www.iowaagriculture.gov/livingOnTheEdge/prairieBushClover.asp>).

The western prairie fringed orchid is perennial and distinguished by large, white flowers that come from a single stem. The western prairie fringed orchid occurs most often in remnant native prairies and meadows, but has also been observed at disturbed sites like old fields and roadside ditches. It prefers dry slopes with moist soil, as well as warm climates. The prairie plant also prefers to grow in direct sunlight, and rarely flowers in dry areas or in times of drought. In the southern parts of its range the plant is more likely to be found in mesic upland prairies and in the north, it is found more frequently in wet prairies and sedge meadow. In a USFWS 5-yr review: summary and evaluation of the western prairie fringed orchid, no extant populations were found in Floyd County (USFWS 2009).

The proposed project was reviewed by the Iowa DNR for impacts to state threatened and endangered plant and animal species. Recent fish and mussel survey data were used to aid in the environmental review. Two species collected in the mussel survey were listed as state threatened, the cylindrical papershell (*Anodontoidea ferussacianus*) and creeper (*Strophitus undulates*). The cylindrical papershell is a thin shelled mussel, elliptical in shape and usually yellowish green to green or brown in color. The creeper is an oval shaped mussel that is usually dark brown or black in older individuals. Both species of mussel inhabit small to medium size rivers like the Shell Rock and are found in gravel, mud, or sand substrates (Cedar Valley RC&D 2002). Bluegill, bass, spotfin shiner, and black crappie are the noted host species for the cylindrical papershell. The creeper has a broader range of host species that include the fantail darter, sand shiner, and walleye; all collected in the Rockford river reach.

### 4.13 Wetlands

Wetlands occur in areas between terrestrial and aquatic systems and “are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (Federal Interagency Committee for Wetland Delineation 1989). Executive Order 11990 directs federal agencies to avoid, to the extent possible, both short-term and long-term adverse impacts associated with the modifications of wetlands. The USFWS National Wetland Inventory data was reviewed to provide context on potential impacts to wetlands. The review revealed no bogs, marshes, swamps, etc. within the APE. Low lying areas of the floodplain may be found downstream of the dam on the west bank. A private consultant was contracted to determine and delineate any wetlands within the APE. Survey results show that the majority of the area west of the dam was non wetland (Figure 6). Only a 0.02 acre parcel located on the west bank below the berm was delineated as wetland. Vegetation identified in that wetland area were reed canary grass and sedges. Vegetation in the non wetland area consisted of reed canary grass, bluegrass, and an overstory of cottonwood and boxelder trees. The contractor noted that the soil in this area contained silt loam and sand.

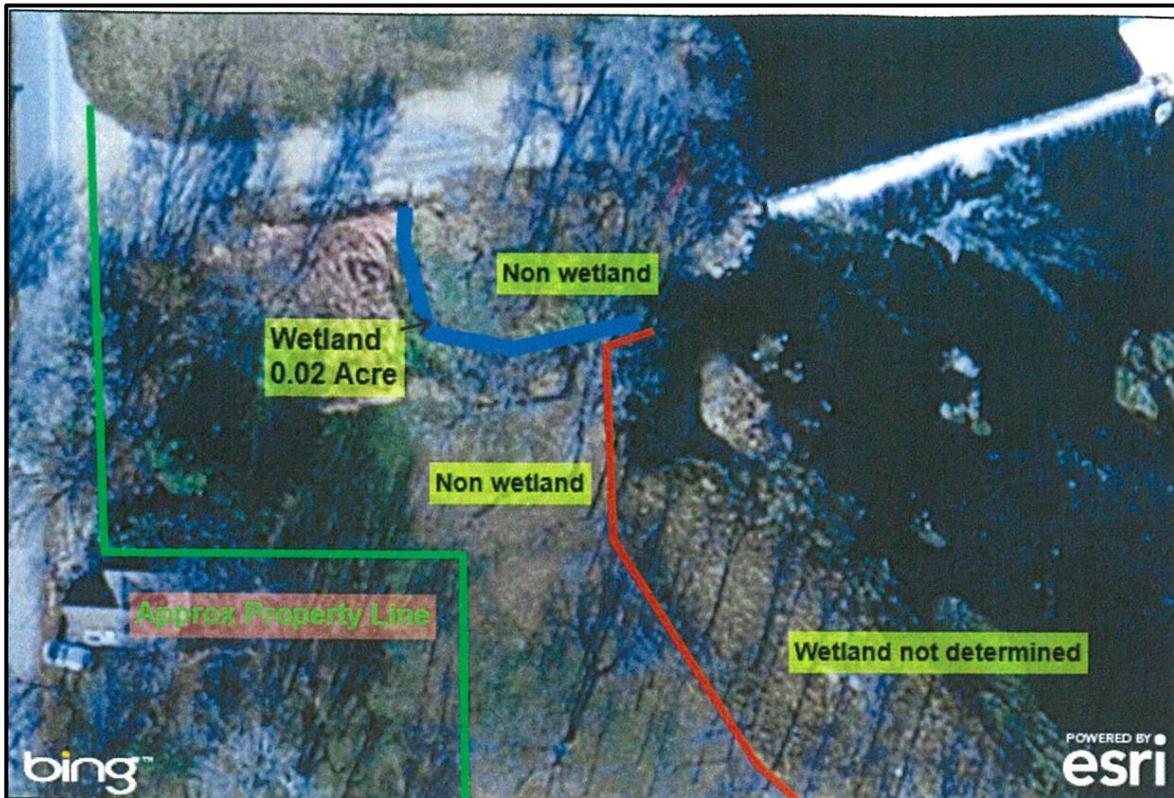


Figure 6. Wetland delineation determined for west bank adjacent to Rockford Dam (Muff 2012).

### 4.14 Cultural and Historic Resources

The USFWS and COE have proceeded with steps to comply with the National Historic Preservation Act (NHPA) of 1966, as amended. Under Section 106 of the NHPA, federal agencies are required to take into account the effect of their proposed undertakings on properties listed in or eligible for inclusion in the National Register of Historic Places

(NRHP). A Phase I survey was conducted by the University of Iowa’s Office of the State Archaeologist (OSA) to identify historic properties that exist within the APE. Three areas were addressed: 1) the west stream bank upstream of the dam, 2) the berm extending parallel to the dam on the west bank, and 3) the dam itself. The mill house was also re-evaluated for its current eligibility status on the NRHP. Though the mill house was added to the study, it falls outside of the APE. Planning and design of the dam removal however, will include taking measures to avoid impacts to the foundation of the historic property and residence. A geotechnical and structural evaluation was conducted by Barr Engineering, in August 2013, to document current conditions of the mill house foundation. Monitoring and precautionary measures recommended in the report will be explained and approved by the residence owner. The recommended actions will be implemented as appropriate through completion of the project.

The National Register is administered by the National Park Service (NPS) under the Secretary of Interior. Criteria used to determine whether a property within the proposed project APE is eligible for the National Register would be based on age, physical integrity and significance (NPS 1995). The structure or site would need to be 50 years and older, in good condition, and have quality of significance. The third criteria refers to quality of significance in American history, architecture, archeology, engineering, and culture that possess integrity of location, design, setting, materials, workmanship, feeling, or association *and* that falls into one or more of the criterion described below:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of significant persons in our past; or
- C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. That have yielded or may be likely to yield, information important in history or prehistory.

Other interested parties were contacted regarding the proposed project. Letters were submitted to the Floyd County Historical Society Museum and the Meskwaki tribal preservation office describing the proposed construction activities and the project area. Any pertinent archaeological and historical/cultural information and potential concerns of the proposed project that would assist with findings and decision making were requested by the USFWS.

#### **4.15 Socioeconomic Resources**

The population of Rockford in 2010 was 861, with minority groups constituting 1% of the town’s population (Table 4). Median household income in the town was estimated to be \$36,088 during the 2007-2011 American Community Survey period (US Census Bureau 2011). Median household values during this period was \$81,544 (US Census Bureau 2011). In the last 12 months of the Survey year, an estimated 15.2% of all individuals were reported to have income below the poverty level (US Census Bureau 2011).

The 2007-2011 American Community Survey listed the most common industry in Rockford as education services, health care and social assistance (24.9%), manufacturing (15.9%), retail trade (9.9%), wholesale trade (9.7%), and construction (28%) (US Census Bureau 2011).

**Table 4.** Demographic characteristics of Rockford, Iowa from the 2007-2011 American Community Survey (US Census Bureau 2011).

<b>Category</b>	<b>Year covered</b>	<b>Estimate</b>
Total Population	2010	861
Median Household value	07-11	\$85,000
Mean Household Income (12 mo)	07-11	\$45,145
Per capita income	07-11	\$18,467
Median real estate taxes paid for units with mortgage	07-11	\$1,162
Race- White	2009	99%
Race-Other	2009	1%
Unemployment rate over age 16	07-11	3.8%
People of all ages in poverty (12mo)	07-11	15.2%

#### 4.16 Environmental Justice

Civil Rights legislation and Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, direct federal agencies to analyze the proposed alternatives as they relate to ethnic minorities, people with disabilities, and low-income groups. The principles of environmental justice require that populations are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high and adverse manner by, government programs and activities affecting human health or the environment. It requires that “each federal agency identify and address, as appropriate, disproportional high and adverse human health or environmental effects of its programs, policies, and activities on minority populations” (CEQ 1997). A review was conducted of several environmental factors, demographics, health, and public facilities within the Rockford area using an EPA environmental justice assessment tool (<http://www.epa.gov/environmentaljustice/mapping.html>).

#### 4.17 Aesthetics

The project area contains a combination of human created and natural features that contribute to the overall visual composition of the site. The installation of the Rockford Dam altered the flow of the Shell Rock River and created a pond-like environment that reshaped the surrounding natural viewscape. Limestone bluffs that border the river near Rockford provide a picturesque view to local residents and visitors.

Cracks in the dam structure and missing pieces of concrete on the downstream face of the dam are visible. Voids in the dam where water has been piping through have been observed over the past several years by the County and DNR. Orange snow fencing and road barricades are present in the on the west side of the river bank adjacent to the dam.

#### **4.18 Recreation**

The beauty of the Shell Rock River is attributed to limestone bedrock that borders the river. This provides a scenic float trip along its river course. Several stretches throughout the river’s length contain deep pools, riffles, and rapids giving some challenges for fishing and canoeing. Campgrounds and access points dot the river for paddlers and other watercraft offering ample recreational opportunities for the public. A city campground and boat ramp located upstream of Rockford Dam provides local access along the west bank of the river. The Rockford Dam area is not known to be a heavily popular area for fishing. Walleye, channel catfish, and an occasional northern pike can be caught upstream of the dam.

#### **4.19 Public Health and Safety**

Rockford Dam was reported to be in a “state of failure” from a structural inspection conducted by the Iowa DNR Water Resources Section of the Dam Safety Division on August 3, 2010. Since 2010, water has been observed by county staff piping through and/or underneath the dam at different time periods. The current integrity of the dam presents a high public safety risk. The pressure on the deteriorating structure during high river flows could cause the dam to fail resulting in downstream damage. Lowhead dams are also known to have dangerous recirculating currents below the structure which present a public drowning hazard (Iowa DNR 2010). To date, no deaths have been associated with the Rockford Dam. Orange fencing and street barricades have been placed adjacent to the dam to warn the public from approaching the dam on foot. However, even with visible warnings to stay off the dam, youth have been observed walking across the structure when exposed during low water levels.

### **5.0 ENVIRONMENTAL CONSEQUENCES**

This section describes the environmental and socioeconomic effects associated with the No Action and proposed action alternatives.

#### **5.1 Air Quality**

##### *Alternative A - No Action*

There would be no change in air quality under the No Action alternative.

##### *Alternative B – Dam removal*

The operation of heavy equipment during the construction period may result in a short-term localized reduction in air quality, in the form of dust and exhaust emissions. These will be minor impacts associated with deconstruction of the dam, removing the berm, and resloping of the west bank. The project will require dump trucks to transport concrete material and other nonhazardous waste material from the dam site to the approved disposal areas. It is estimated that construction activities will take 2-4 weeks under ideal weather and river level conditions during fall/winter and another 2-4 weeks the following spring, for site cleanup.

## 5.2 Noise

### *Alternative A - No Action*

Street traffic from the upstream bridge can generally be heard in the parking lot near the top of the dam. There will be some temporary noise from a bridge replacement project that is projected to span from April through November 2013.

Sounds of a waterfall would remain in the vicinity of the dam when water levels are high enough to flow over the structure. General sounds of flowing water would remain under the No Action alternative.

### *Alternative B – Dam removal*

Temporary impacts due to increased construction noise may be experienced by adjacent homeowners on both sides of the river during the removal of the dam and construction on the west bank of the river. Construction activities will require the use of heavy construction equipment including backhoes, excavators, loaders, dump trucks, and concrete cutting equipment. Road traffic will temporarily increase with dump trucks entering and leaving the project site. Noise will only be generated during daylight hours. No long-term adverse noise impacts will be associated with construction activities.

The ambient noise of the flow over the dam should be replaced by the sound of water rushing over and through riffles, boulders, and rocks. In a study conducted at Dillsboro Dam on the Tuckaseegee River in North Carolina, the principal investigator found that the decibel levels of sound do not change significantly with flow, except right at the dam (Hooper 2002). It was determined that sound levels diminish quickly as one moves away from the dam and that riffles on the river were louder than the dam under high and low flow conditions. Hooper (2002) also concluded that the riffles generated a more constant sound than the dam.

## 5.3 Water Quality

### *Alternative A - No Action*

Water quality over time would likely deteriorate with water temperatures rising and D.O levels dropping in the immediate upstream area of the dam, particularly during summer months.

### *Alternative B – Dam removal*

The proposed action will have no long-term impact on water quality in the Rockford river reach. Water clarity may be reduced for a short period during deconstruction of the dam. Dam removal will flush some sediment from the impoundment downstream. From the sediment volume analysis, the Iowa DNR indicated that the small amount of sediment moving through the river reach will settle out over a distance downstream (Hoogeveen and Olson 2011). Reshaping the west bank in the immediate former dam area to a 4:1 slope and revegetating the disturbed area will stabilize the bank, preventing head cutting and erosion over time. Also, by reconnecting the river to its floodplain, some sediment will settle out across the west bank area downstream of the former dam. There are no indications of water quality issues in this stretch of river.

## 5.4 Sediment Transport

### *Alternative A - No Action*

Deposition of sediment in the lower impoundment immediately above the dam would continue to accumulate and attract species such as common carp and bullheads.

### *Alternative B – Dam removal*

Removal of the dam will result in temporary disturbance of sediment which has been deposited in the lower end of the impoundment. In the sediment volume analysis portion of the DNR hydrologic study, a maximum 25,000 cubic yards (33,000 tons) is estimated to be present in the impoundment above the dam (Hoogeveen and Olson 2011). A smaller amount is expected to be released comparable to the width of the river above the impoundment (Hoogeveen and Olson 2011). Based on estimates from the 2011 study, the DNR indicates impact of sediment transport down river will be low. The first high water event following dam removal will flush additional sediment from the formerly impounded area to the downstream river channel.

The amount of impoundment sediments that are transported downstream, total suspended solids, and turbidity levels will gradually diminish with distance and will not be discernible from naturally occurring sediment. Each subsequent high water event will have decreasing sediment concentrations. Eventually, the amount of sediment in the river reach will stabilize with normal river flows. From the 2011 study, the DNR suggests that due to the slope of the channel bed, chances of headcutting would be low (Hoogeveen and Olson 2011). Approximately 300 ft of the west bank above the dam will be reshaped to a 4:1 slope and revegetated to improve river-floodplain connectivity and prevent erosion.

Removal of the dam is planned for fall or winter when water levels are low so that a minimal amount of sediment will be released downstream. Some movement will occur in the spring and as water levels drop during the summer the sediment in the impoundment will be exposed and revegetated with seed carried in from the river. There are no indications of contaminated sediment in the Rockford Dam area.

In the long-term, removal of the dam will restore more natural processes to include sediment transport. Specifically, the transportation of sediment over time from the Rockford Dam will depend on the rate of discharge and volume of water discharging from natural events in the form of precipitation.

## 5.5 Floodplain and Flooding

### *Alternative A – No Action*

Flood impacts remain unchanged under the No action alternative with exception of a dam failure during a flood event.

### *Alternative B – Dam removal*

Removal of Rockford Dam will not increase upstream or downstream flooding. The dam is a “run of the river” dam and has no significant impact on the volume of water flowing in the river as a whole. Flood model efforts by Barr Engineering indicate that flood levels in future 1% flood events are not expected to be worse than previous events. The river channel is expected to become narrower upstream of the dam through the impounded reach. Water levels may rise more slowly

and be reduced in height due to reconnection of the river to its floodplain on the west bank above and below the former dam. The downstream reach will benefit from improved sediment transport.

## 5.6 Fish

### *Alternative A - No Action*

Leaving the dam in place would continue to have a negative impact on the Shell Rock River fishery in the Rockford river reach. The dam would continue to serve as a barrier to fish movement and fragment the local river ecosystem. Sport fish such as walleye, channel catfish, smallmouth bass, and darters and minnows have limited movement upstream and downstream to access needed seasonal habitats. Continued habitat degradation in the lower impoundment would increase numbers of less desirable fish species such as common carp and bullheads.

### *Alternative B – Dam removal*

The removal of the dam will eliminate the barrier to upstream and downstream movement and allow fish to freely move throughout this reach and more easily between the Winnebago and Shell Rock rivers. The 2012 fish survey showed that 13 species were not collected above the dam including smallmouth bass, rock bass, and 4 of 6 darter species. This suggests that the dam may be a velocity barrier to some species preventing their upstream journey. There may also only be a short window of time during high water events when the dam is submerged enough to allow all fish species to move through without being hindered by the structure itself or strong velocities.

The reach of river immediately above the dam will be the most affected through removal of the dam. Dam removal can enable the return of native species by restoring pre-dam, riverine processes and habitats on which native species depend. For example, following the removal of Woolen Mills Dam in Wisconsin, high densities of non-native common carp declined, while populations of native species such as smallmouth bass increased (Kanehl and Nelson 1997). In the case of removing the Rockford Dam, we expect that common carp, black bullhead, and green sunfish will become less common as conditions improve for more desirable riverine species such as smallmouth bass, walleye, rock bass, redhorse, darters, and minnows.

## 5.7 Mussels

### *Alternative A - No Action*

Mussel diversity above and below the dam would likely retain the same species composition and remain a discontinuous community under the No Action alternative. Because fish are needed as hosts to complete the life cycle of mussel, fragmentation of the mussel community will continue to occur, like that of the fish community. Mussels reproduce at various times during the year depending on species. If river flows are not high enough to allow fish to move upstream and downstream over the dam at the appropriate time, mussels will not encounter their fish hosts to release their glochidia.

### *Alternative B – Dam removal*

Removal of the dam will bolster host fish encounters with mussel glochidia because the barrier would no longer be present to impede upstream and downstream movement through

this river reach. This would result in increased species diversity, distribution, and abundance. The mussel community would shift from a fragmented community (species composition) to a more contiguous community.

## **5.8 Wildlife**

### *Alternative A - No Action*

Under the No Action alternative, there would be no changes to wildlife unless there is response to natural changes in habitat or vegetation communities over time. Maintaining the dam would continue to segregate the river reach causing discontinuity between wildlife habitats.

### *Alternative B – Dam removal*

There may be some temporary displacement of small mammals, reptiles, amphibians, insects, and songbirds from construction noise and activity. No long-term impacts are anticipated. Short-term impacts will be minor and may involve disrupted use of the adjacent upland bank area for resting or feeding. Terrestrial organisms are expected to return following completion of the project. Native vegetation including prairie plants, shrubs, and several species of trees planted in the disturbed areas along the west bank will enhance wildlife habitat.

## **5.9 Vegetation**

### *Alternative A - No Action*

Under the No Action alternative, there would be no changes to the plant community unless there is a response to natural changes in habitat over time.

### *Alternative B – Dam removal*

After construction, ground cover will be placed along the west stream bank to protect the bank from erosion. Desired native shrubs, grasses, and forbs will be planted in spring/summer of 2014. Natural vegetation will provide easy access to the river for the general public, anglers, and other recreationists and is more aesthetically pleasing than rip rap. Native prairie vegetation will also be planted downstream of the dam in the former berm area. Reconnection of the river to the floodplain in the former berm area downstream of the dam may also bring in seed stock from the sediment that settles out there. Once the sediment is exposed to sunlight and oxygen, the area will germinate quickly, re-establishing the plant community. A planting design plan will be completed by Barr Engineering to determine placement and provide species recommendations. Tree species that could potentially be planted throughout the project area include burr oak, chokecherry, prickly ash, persimmon, and other bottomland species. Grasses, rushes, and sedges that may be planted along the stream bank may include Indian grass, bluestem, and prairie cordgrass. Prairie vegetation planted in the project area could include ironweed, smooth blue aster, cardinal flower, and black-eyed Susan.

There will be no significant adverse impact to the area's vegetation. Natural revegetation and planned plantings of native trees, shrubs, sedges, grasses, etc., will be beneficial for the local ecosystem.

## 5.10 Threatened and Endangered Species

### *Alternative A - No Action*

No federally or state endangered or threatened species would be negatively affected by the No Action alternative.

### *Alternative B – Dam removal*

Habitat required by the prairie bush clover and western prairie fringe orchid may be present within the project area. However, field verification was conducted in August 2013 to support a conclusion that the plant species were not present within the action area of the project along the west bank of the river. A “no effect” determination is expected for the prairie bush clover and western prairie fringe orchid.

The Iowa DNR environmental review was completed in April 2013. The project was approved with the condition that mussels in the area of impact be relocated. To comply with the DNR’s stipulation, mussels that can be collected in the impounded area will be moved to another location on the river as directed by DNR malacologists. Mussels will be relocated in October 2013. The distribution and abundance of the cylindrical papershell and creeper are expected to increase with improved habitat conditions and unimpeded movement of host fish species throughout the 21.5 mile stretch of the Shell Rock River and the lower Winnebago River.

## 5.11 Wetlands

### *Alternative A - No Action*

Wetland delineated from a 2012 survey will remain unaffected by the No Action alternative.

### *Alternative B – Dam removal*

The berm on the west bank behind the dam will be lowered to floodplain elevation. In the short-term, the 0.02 acre of wetland behind the berm may be negatively impacted. This disturbed area will be planted with prairie plants that do well in full sun and can tolerate wet soils during spring. Reconnection of the floodplain to the river during the growing season will bring in some seed stock in addition to the planned plantings (See Section 5.9- Vegetation). This transitional zone is expected to expand providing habitat for invertebrates, amphibians, reptiles, and birds. In the long-term, there would be a net gain in wetland habitat. The wetland delineation report was submitted to the COE for review. Because of the expected positive impacts to wetlands, the COE responded with no concerns to the proposed activities.

## 5.12 Cultural and Historic Resources

### *Alternative A - No Action*

Under the No Action alternative, no archaeological or historical properties would be affected.

### *Alternative B – Dam removal*

A Phase 1 archaeological and historic architectural investigation of the direct APE was completed by OSA in spring 2013. Findings and recommendations were provided in a

detailed report. The OSA reported no archaeological concerns for the 0.8 hectare area of the west bank section upstream of the dam and did not recommend the berm as eligible for the NRHP (Kendall and Carlson 2012). The OSA did identify Rockford Dam (site 34-00695) as a historic structure that is potentially eligible for listing on the NRHP (Kendall and Carlson 2012).

The USFWS submitted a determination letter to the Iowa SHPO in Des Moines for review and comment August 1, 2013. The letter outlined the proposed project activities, the OSA archaeological/historical report, and pertinent maps. Due to the presence of the original timber encased in the dam, the USFWS in consultation with the COE recommended that Rockford Dam be eligible for the NRHP for its architecture under Criterion D, for its purpose to yield or may be likely to yield, architectural information important in history.

The Iowa SHPO concurs with the recommendation that the dam be eligible for the NRHP in an initial response. Following the guidelines of Section 106, alternatives to avoid or minimize the alteration of the characteristic of the eligible historic property were explored. The consulting parties agreed that it was not feasible to avoid or minimize the adverse effects on the dam in order to eliminate the public safety hazard and provide fish passage. Because the proposed action will cause adverse effects on an eligible historic property, a Memorandum of Agreement (MOA) will be drafted and signed by the Iowa SHPO, Floyd County, USFWS, and COE outlining agreed-upon measures that will be implemented to mitigate for the adverse impacts. Consultation and coordination will continue with the Iowa SHPO to satisfy and conclude the Section 106 process.

### **5.13 Socioeconomic Resources**

#### *Alternative A - No Action*

There would be no impacts to the demographic characteristics of the resident population in the Rockford area under the No Action alternative.

#### *Alternative B – Dam removal*

No negative impacts are expected to the local population, unemployment, median per capita income, and local industry of the Rockford area. The dam and the water it backs up, currently serves no major economic purpose. It does not provide power, electricity, irrigation water, municipal or industrial water supply, flood control benefits or significant wildlife (ie waterfowl) benefits. The dam is also an area that is not heavily utilized by anglers. Therefore, removal of the dam would not likely cause an economic disruption.

### **5.14 Environmental Justice**

#### *Alternative A - No Action*

Under the No Action alternative, no minority groups would be affected.

#### *Alternative B – Dam removal*

The proposed project is not located in a minority community and would not affect residents of low or moderate income. The proposed action would not pose an adverse impact or otherwise on the

human environment. Implementation of the proposed action would have beneficial social and economic effects and would generally affect all members of the public.

### **5.15 Aesthetics**

#### *Alternative A - No Action*

Visual quality of the altered pond-like environment against the backdrop of the limestone bedrock though the town of Rockford would remain unchanged under the No Action alternative.

At the dam site, view of orange fencing, concrete barricades, and other warning material in the parking lot adjacent to the dam would likely remain.

#### *Alternative B – Dam removal*

Visual quality of the river corridor against the limestone bedrock background through Rockford will be restored to its natural state due to the return of more natural flow conditions.

Site preparation and the removal and temporary placement of materials for the proposed alternative will result in a short-term intrusion on the visual quality of the site. Visual aesthetics at the dam site will improve as the deteriorating structure will be removed. The west bank would be resloped and the disturbed area planted with native vegetation so that erosion does not occur. The low lying extent in the former berm area will also be revegetated, so there will be no areas of exposed soil.

### **5.16 Recreation**

#### *Alternative A - No Action*

Fishing upstream and downstream of the dam would remain marginal. Access to the river upstream and downstream of the dam would remain the same for anglers and paddlers. Paddlers would still have to portage around the structure.

#### *Alternative B – Dam removal*

Use of the campground upstream of the dam including the boat ramp will not be inconvenienced during construction. Construction activities may necessitate complete closure of the city lot which will be utilized as a staging area during construction. Deconstruction of similar dam removal projects have occurred during low flows in summer, fall, and winter. Short-term noise and turbidity may temporarily impact fishing near and downstream of the dam. Given logistical challenges of construction, flexibility is needed with regard to seasonal timing and river conditions. Once construction activities have ceased, any negative recreational impacts would subside. The proposed project will have no permanent long-term adverse impacts on the recreational environment.

Completion of project will have long-term recreational benefits. Canoists and kayakers will have a longer continuous stretch of river to paddle. Sport fishing is anticipated to improve. Smallmouth bass, walleye, rock bass, and other sport fish will have unimpeded movement from the lower Winnebago River through the Rockford river reach. Distribution of these species is expected to improve allowing enhanced opportunities to catch these species.

## **5.17 Public Health and Safety**

### *Alternative A - No Action*

The dam is currently categorized by the Iowa DNR Dam Safety Division as a significant hazard and is not in compliance with statutory requirements. If the dam were to remain in place the structure would continue to be a health and safety risk to the public. Major improvements would have to be made by the owner to bring the dam into compliance with state safety standards.

### *Alternative B – Dam removal*

Removal of the dam eliminates safety concerns related to the potential risk of structural failure, youth walking across on the structure during low water levels, and drowning from dangerous recirculating currents. Removal will allow for safe passage of watercraft navigating through this river segment and safer and easier access to the river for anglers.

## **5.18 Comparison of Environmental Consequences**

A comparison of environmental consequences for the No Action and proposed action alternatives are found in Table 5.

Table 5. Summary of environmental consequences for each alternative proposed in the Rockford Dam project.

<b>Affected Environment</b>	<b>No Action</b>	<b>Dam Removal</b>	
Air Quality	No Impact	Minor temporary impact	Emissions from heavy equipment.
Noise	No Impact	Minor temporary impact	Noise from heavy equipment at site, leaving and entering construction zone.
Water Quality	No Impact	Minor temporary impact	Short term turbidity
Sediment Transport	No Impact	Minor temporary impact	Temporary increase in transport. Restores natural process.
Floodplain-Flooding	Status Quo	Beneficial	Reduces flood intensity and height. Improves river - floodplain connectivity.
Fish	Impedes movement	Beneficial	Improves upstream and downstream access to seasonal habitats including the Winnebago River. Improves species diversity and distribution.
Mussels	Impedes movement	Beneficial	Provides unimpeded upstream and downstream movement of fish hosts through reach resulting in increased mussel distribution, diversity, and abundance.
Vegetation	No Impact	Beneficial	Provides food and habitat for wildlife.
Wildlife	No Impact	Beneficial	Improves habitat for insects, herptiles, birds, etc.
Wetlands	No Impact	Beneficial	Expansion will slow floodwaters, reduce flood heights and bank erosion. Provides habitat & food for fish and wildlife.
Threatened and Endangered Species	No Impact	No Impact- Federally listed Beneficial- State listed	State listed mussel species expected to increase in distribution and abundance.
Historical and Cultural Impacts	No Impact	No Significant Impact	Dam removal will cause an adverse impact on historic property. Mitigation measures will be implemented.
Socioeconomics	No Impact	No negative impact	Some increase in local recreation due to safer river conditions and improved fishery.

Environmental Justice	No Impact	No Impact	All individuals equally benefit from proposed action.
Aesthetics	No Impact	Beneficial	Deteriorating structure is removed. Visual quality of area (river and bluff) restored to its natural state.
Recreation	No Impact	Beneficial	Improves fishing, safer for anglers and paddlers.
Public Health and Safety	Risk of dam failure & drowning hazard	Beneficial	Eliminates risk of dam failure, drowning hazard, & owner liability

## 6.0 CUMULATIVE IMPACTS

Cumulative impacts on the environment are the result of the incremental impacts of past actions, the proposed project, and reasonably foreseeable future actions (CEQ 1997). Changes to the local environment will be made through removal of the dam. No barrier related projects have occurred on the mainstem of the Shell Rock River in the past and none are planned for the near future, to our knowledge. The proposed project is intended to provide long-term improvements to the environment through improved hydrological connectivity, fish passage, and biological integrity and diversity. The proposed project will also improve long-term safety at the project site and eliminate the potential risk of dam failure and drowning. Effects of the proposed project would be positive towards maintaining the quality of the human environment. Deconstruction of the Rockford Dam is the first barrier to be removed for fish passage on the mainstem of the Shell Rock River.

## 7.0 COORDINATION, CONSULTATION AND PUBLIC INVOLVEMENT

The County Conservation Board has engaged the public several times over a 10-year period. These meetings were held to inform the public of dam stability, safety, and the potential to have the structure removed. The Rockford City council has been aware of and apprised of the situation over this period of time. Public input has been a component of planning activities associated with the Rockford Dam project with first meetings dating back to 2003. General input from the public has been solicited regarding potential removal of the dam. A list of council and public meeting dates and other important events are provided in Table 6. County, agency, and American Rivers representatives have been available at public meetings to answer questions. Concerns and comments from the 2012 public meeting have been addressed in the draft EA. Concerns and comments from the 2012 meeting included transport of sediment, enhancement of the local fishery, natural regeneration of plant life, and expected river conditions after dam removal. Questions, concerns, comments, and responses from the public meeting held May 7, 011, are provided in Appendix C.

A final public meeting was held September 17, 2013 to present final dam removal plans, provide updates on permits, compliance, and answer questions. The Draft EA has been made available for public review and comment for a 30-day period. Hard copies of the EA can be reviewed at the Rockford library, the County Conservation Board office, city hall, the court house, and on-line at <http://www.fws.gov/midwest/lacrossefisheries/rockford-dam.html>

Parties that participated in the process included:

- Floyd County Conservation Board
- Iowa Department of Natural Resources
- U.S. Fish and Wildlife Service
- American Rivers
- Barr Engineering
- U.S. Army Corps of Engineers
- Iowa State Historic Preservation Office
- University of Iowa Office of the State Archaeologist

The above parties will continue to work together to obtain necessary permits and satisfy appropriate regulatory requirements. Consultation and coordination will continue through the Section 106 process, project construction activities, plantings, and monitoring.

Consultants and contributors to the Environmental Assessment:

- Jeff Muff-wetland consultant
- Adam Kiel-Natural Resource Conservation Service
- Bill Kalishek-Iowa DNR- Fisheries Program
- Nate Hoogeveem- Iowa DNR- Water Trails Program
- John Garton- Iowa DNR- Dam Safety Program
- Daryl Howell- Iowa DNR-Conservation and Recreation Division
- Melody Pope-University of Iowa Office of the State Archaeologist
- Ralph Christian-Iowa State Historic Preservation Office
- James Myster-U.S. Fish and Wildlife Service-Regional Historic Preservation Officer
- Brant Vollman- U.S. Army Corps of Engineers Rock Island District-Archaeologist
- Louise Mauldin-U.S. Fish and Wildlife Service-Fisheries
- Sara Strassman-American Rivers- Upper Midwest River Restoration Director
- Laura Elfers- Floyd County Conservation Board-Deputy Director
- Doug Schroeder- Floyd County Conservation Board-Director
- Barr Engineering team- Design and engineering
- Jennifer Kurth- Iowa DNR- Malacologist
- Scott Gritters- Iowa DNR- Fisheries/Malacologist

**Table 6.** List of important dates regarding Rockford Dam project.

<b>DATE</b>	<b>Public meetings, important dates</b>
Aug. 5, 2003	FCCB meeting approximately 50 citizens in attendance
Sept. 9, 2003	FCCB meeting which 2 citizens in attendance
July 13, 2004	Rockford City Council meeting
August 10, 2004	Rockford City Council meeting
August 2010	Inspection of dam by the Iowa Department of Natural Resources Dam Safety Division
May 9, 2011	Rockford City Council meeting
Aug. 6, 2012	Floyd County Supervisors meeting and Public meeting, approximately 45 citizens in attendance
February 2013	Submission of DNR floodplains and COE nationwide permits
April 2013	Iowa Flood Plains permit received
June 2013	Iowa Environmental Review complete-project approval with stipulation to relocate mussels
August 1, 2013	USFWS determination letter to SHPO
September 17, 2013	Draft Environmental Assessment available for 30-day public review
September 17, 2013	Final public meeting

## **8.0 COMPLIANCE WITH LAWS AND REGULATIONS**

The proposed action complies with Federal environmental laws, executive orders, and policies, including the National Environmental Policy Act of 1969, as amended; the Council on Environmental Quality Regulations (40 CFR 1500-1508); Clean Air Act, as amended; the Clean Water Act of 1977, as amended; the Endangered Species Act of 1973, as amended; the Land and Water Conservation Fund Act of 1965, as amended; the National Historic Preservation Act of 1966, as amended; Archaeological Resources Protection Act of 1979, as amended; Executive Order 11988, Floodplain Management; Executive Order 11990, Protection of Wetlands; Executive Order 12898, Environmental Justice; and the Department of Interior Departmental Manual 516. The proposed project would not result in the conversion of agricultural lands to nonagricultural purposes. Therefore, the provisions of the Farmland Protection Policy Act of 1981 do not apply.

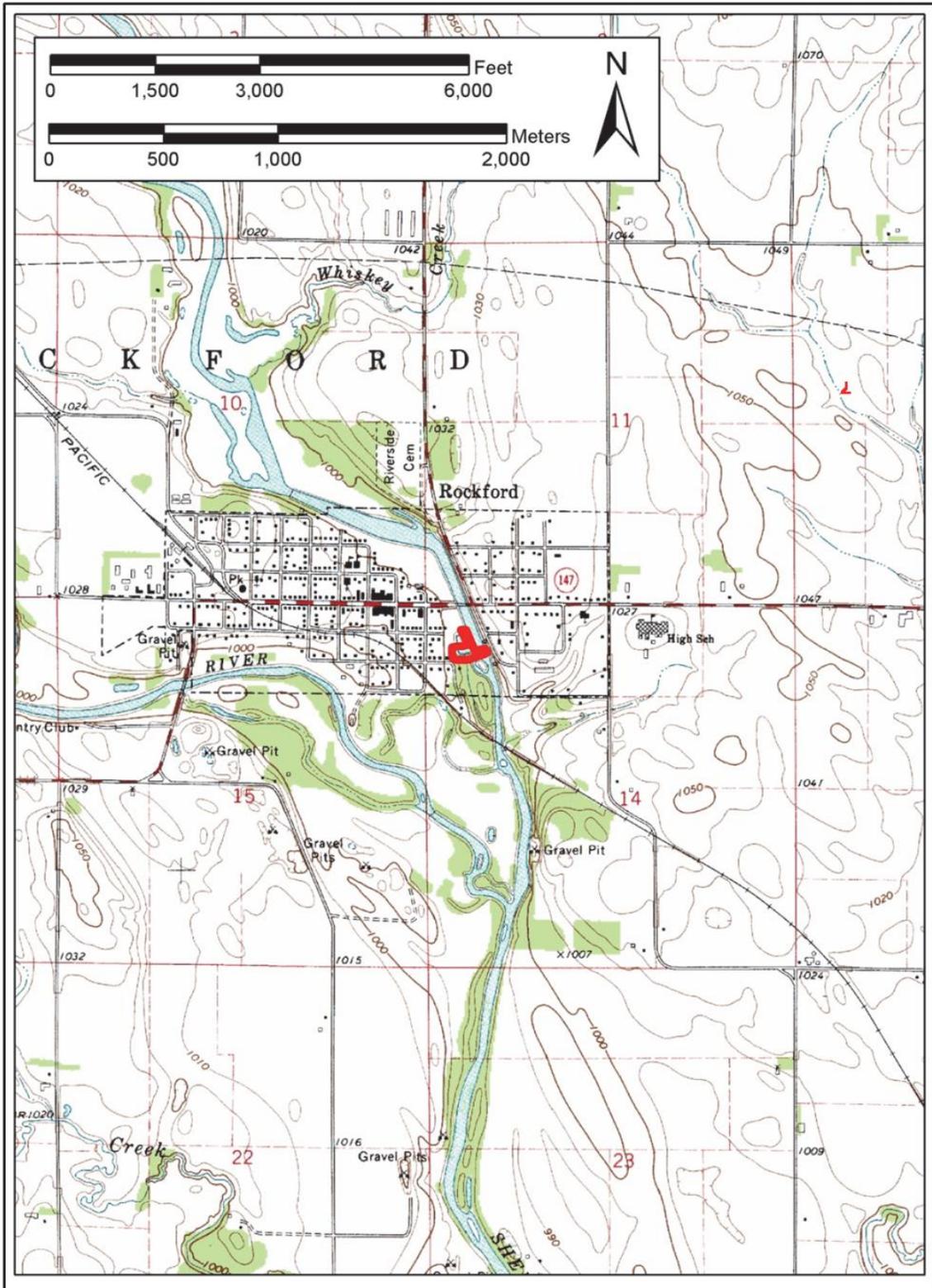
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## Appendix A:

Maps and photographs.



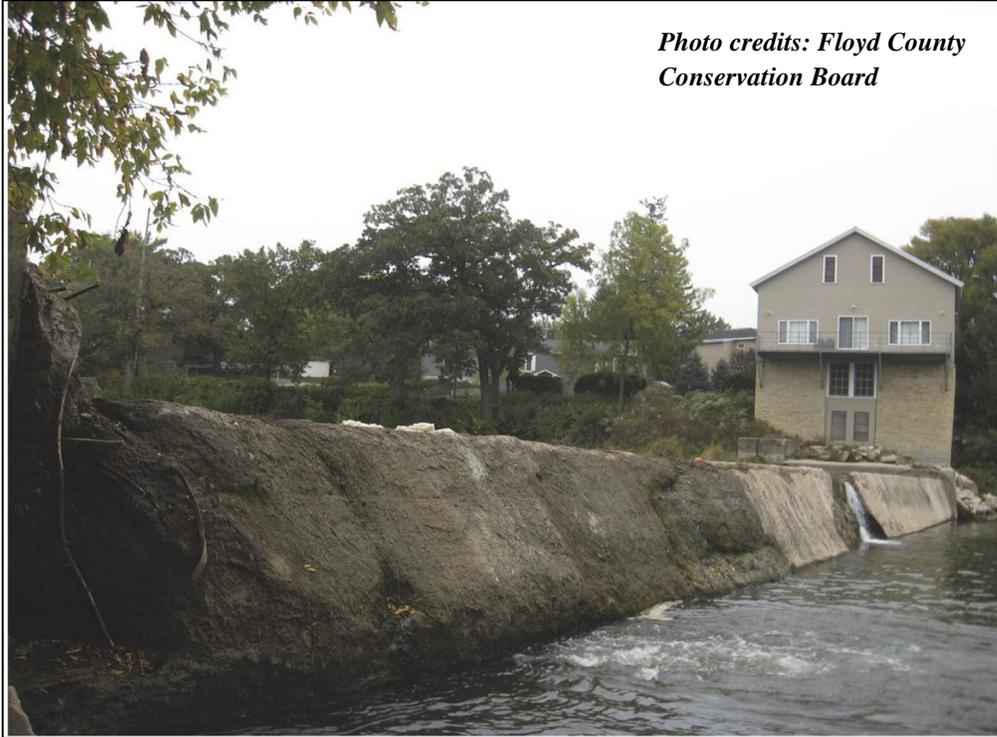
Rockford Dam vicinity on the Shell Rock River. USGS 7.5 minute topographic quadrangle 1:24,000 scale.



Photo of the Shell Rock River upstream of Rockford Dam. View of the Main Street bridge from the west river bank.



View of Shell Rock River downstream of Rockford Dam.



*Photo credits: Floyd County  
Conservation Board*

View of Rockford Dam, facing east-northeast. Millhouse on east side of dam. Photo taken September 28, 2011.

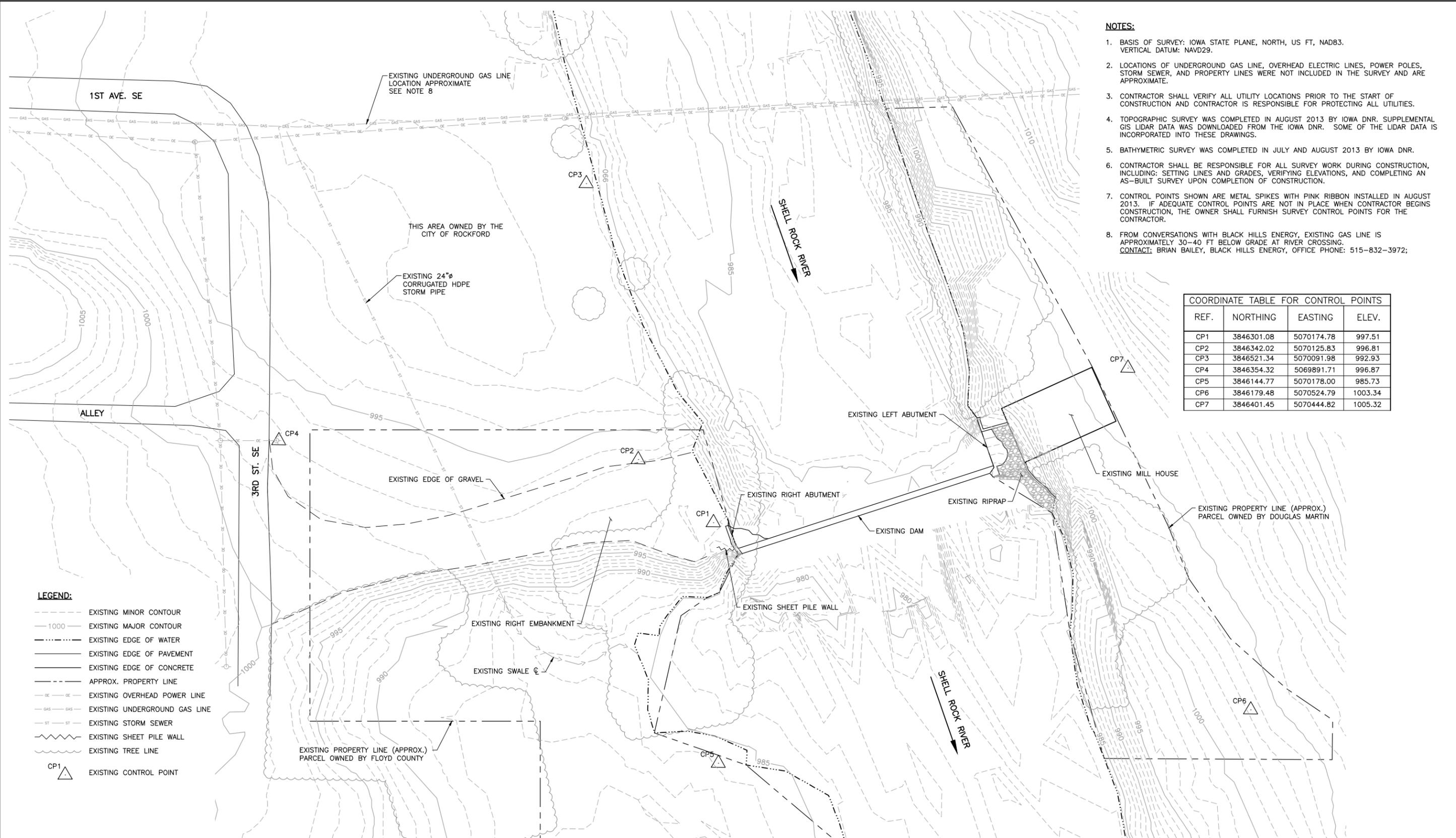


Original timber cribbing visible through a hole in the concrete of Rockford Dam.  
Photo taken in 2012.

## Appendix B:

Project plans: Existing site conditions, Shell Rock River at Rockford, Iowa.

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- NOTES:**
1. BASIS OF SURVEY: IOWA STATE PLANE, NORTH, US FT, NAD83. VERTICAL DATUM: NAVD29.
  2. LOCATIONS OF UNDERGROUND GAS LINE, OVERHEAD ELECTRIC LINES, POWER POLES, STORM SEWER, AND PROPERTY LINES WERE NOT INCLUDED IN THE SURVEY AND ARE APPROXIMATE.
  3. CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO THE START OF CONSTRUCTION AND CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL UTILITIES.
  4. TOPOGRAPHIC SURVEY WAS COMPLETED IN AUGUST 2013 BY IOWA DNR. SUPPLEMENTAL GIS LIDAR DATA WAS DOWNLOADED FROM THE IOWA DNR. SOME OF THE LIDAR DATA IS INCORPORATED INTO THESE DRAWINGS.
  5. BATHYMETRIC SURVEY WAS COMPLETED IN JULY AND AUGUST 2013 BY IOWA DNR.
  6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SURVEY WORK DURING CONSTRUCTION, INCLUDING: SETTING LINES AND GRADES, VERIFYING ELEVATIONS, AND COMPLETING AN AS-BUILT SURVEY UPON COMPLETION OF CONSTRUCTION.
  7. CONTROL POINTS SHOWN ARE METAL SPIKES WITH PINK RIBBON INSTALLED IN AUGUST 2013. IF ADEQUATE CONTROL POINTS ARE NOT IN PLACE WHEN CONTRACTOR BEGINS CONSTRUCTION, THE OWNER SHALL FURNISH SURVEY CONTROL POINTS FOR THE CONTRACTOR.
  8. FROM CONVERSATIONS WITH BLACK HILLS ENERGY, EXISTING GAS LINE IS APPROXIMATELY 30-40 FT BELOW GRADE AT RIVER CROSSING. CONTACT: BRIAN BAILEY, BLACK HILLS ENERGY, OFFICE PHONE: 515-832-3972;

REF.	NORTHING	EASTING	ELEV.
CP1	3846301.08	5070174.78	997.51
CP2	3846342.02	5070125.83	996.81
CP3	3846521.34	5070091.98	992.93
CP4	3846354.32	5069891.71	996.87
CP5	3846144.77	5070178.00	985.73
CP6	3846179.48	5070524.79	1003.34
CP7	3846401.45	5070444.82	1005.32

- LEGEND:**
- - - - - EXISTING MINOR CONTOUR
  - 1000 — EXISTING MAJOR CONTOUR
  - - - - - EXISTING EDGE OF WATER
  - — — — EXISTING EDGE OF PAVEMENT
  - — — — EXISTING EDGE OF CONCRETE
  - - - - - APPROX. PROPERTY LINE
  - — — — EXISTING OVERHEAD POWER LINE
  - - - - - EXISTING UNDERGROUND GAS LINE
  - - - - - EXISTING STORM SEWER
  - — — — EXISTING SHEET PILE WALL
  - — — — EXISTING TREE LINE
  - △ CP1 EXISTING CONTROL POINT

1 PLAN: EXISTING CONDITIONS ▲  
 0 30 60  
 SCALE IN FEET

**90% DRAFT**  
**NOT FOR CONSTRUCTION**

A	MTP2	TEM	TEM	08/30/13	50% DESIGN DRAWINGS	I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.  SIGNATURE PRINTED NAME THOMAS E. MCDONALD DATE XX/XX/2013, REG. NO. 21594 MY REGISTRATION EXPIRES DECEMBER 31, 20XX	CLIENT BID CONSTRUCTION	8/30/13 8/13/13	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>A</td><td>B</td><td>C</td><td>0</td><td>1</td><td>2</td><td>3</td> </tr> </table>	A	B	C	0	1	2	3	<b>BARR</b> Project Office: BARR ENGINEERING CO. 4700 WEST 77TH STREET MINNEAPOLIS, MN. 55435-4803 Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277	Scale AS SHOWN Date 08/26/13 Drawn MTP2 Checked TEM Designed BARR Approved TEM	<b>FLOYD COUNTY CONSERVATION</b> <b>ROCKFORD, IOWA</b>	<b>ROCKFORD DAM REMOVAL</b> <b>ROCKFORD, IOWA</b>  <b>EXISTING CONDITIONS</b> <b>PLAN</b>	BARR PROJECT No. <b>15341004.00</b> CLIENT PROJECT No.	DWG. No. <b>C-01</b> REV. No. <b>B</b>
A	B	C	0	1	2					3												
B	MTP2	TEM	TEM	09/13/13	90% DESIGN DRAWINGS	RELEASED TO/FOR	DATE RELEASED	NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION									

## Appendix C:

Public meeting questions and comments.

Public meeting May 7, 2011

<b>Questions/concerns/comments</b>	<b>Responses (project working group entities)</b>
General cost estimate to remove dam	\$40,000-\$80,000 to remove dam, bank stabilization, hauling costs, stability assessment of east abutment. Additional costs for unforeseen actions that need to be taken care of. General estimate of \$100,000 to repair the dam plus engineering costs. Approximately \$1 million or more to rebuild the dam based on similar dam projects.
Sedimentation	Depth and sediment-probe study was completed for the Rockford Dam impoundment. There is little sediment build up behind the dam. There would be a gradual release of sediment downstream when dam is breached and removed.
Physical condition including water levels of area after dam is removed	Width of river channel through former dam impoundment area would be narrower, but would widen over time from natural processes. Exposed sediment from dam removal would naturally revegetate. Riffle would form upstream of the former dam. Not much change above the 1-mile former impounded area.
Other dam projects in area	Vernon Springs Dam modification, Turkey River White water park, Charles City on the Cedar River Rebuilding of Lake Delhi Dam (\$20-25 million), Maquoketa River
Other considerations	Fish ladders present at some dams- Not feasible here. Flow is too fast coming through Rockford area of the Shell Rock River.
Fill holes in dam with rocks instead of breaching the dam or use concrete from bridge replacement to reinforce dam	Dam must be brought into compliance as directed in a 2010 IA DNR Dam safety inspection letter. Dam structure is compromised. Water has undercut the dam exposing chicken wire. Sizeable voids are present in the structure. Filling holes in the dam with rocks and leftover concrete would not fix the problem. Concrete from bridge replacement is unusable. Dam repairs would be over \$100,000 plus repair costs thereafter to stay in compliance with dam safety standards.