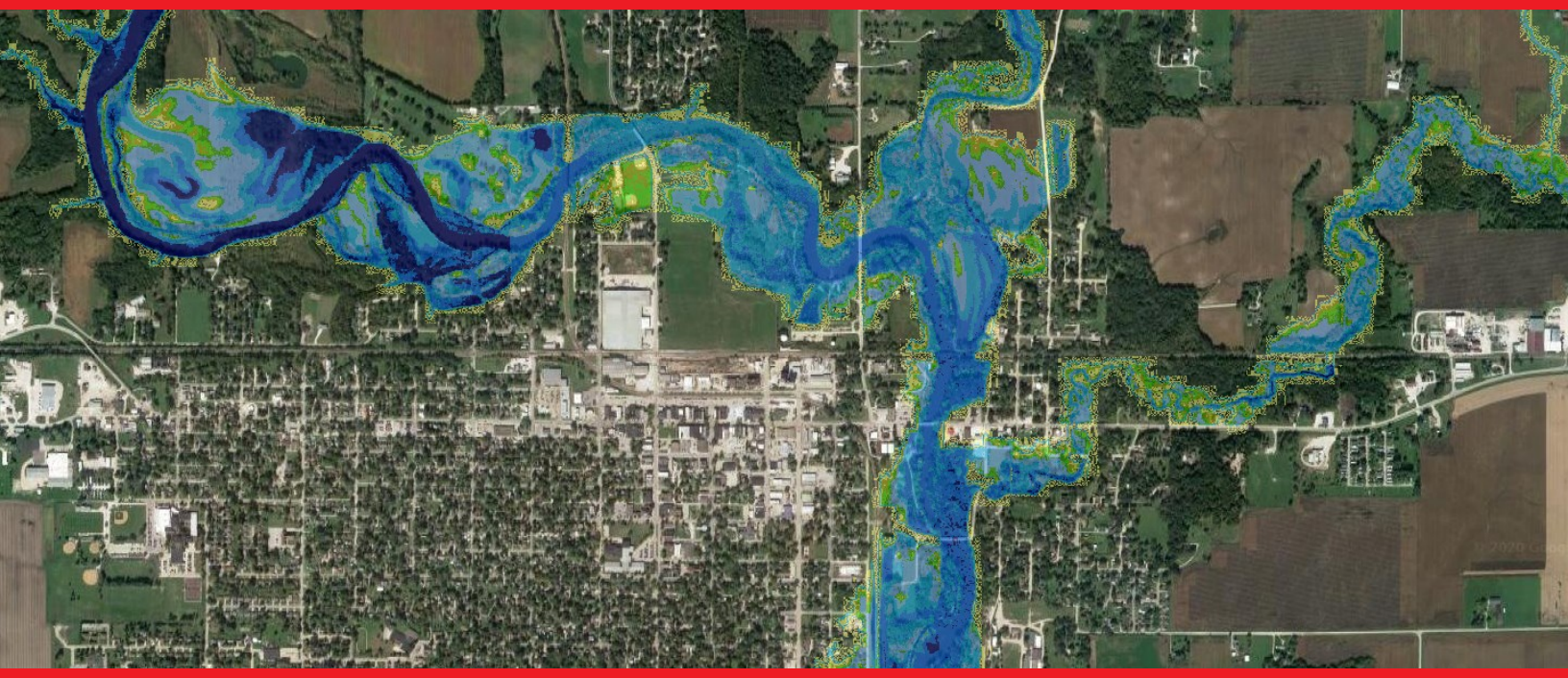
JEO CONSULTING GROUP INC

BOONE RIVER WATERSHED

Boone River Watershed Current Conditions Report:

Flood Resiliency

Boone River Watershed Management Authority



November 2020

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Watershed Management Authority

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Prepared as part of the Boone River Watershed Management Plan

TABLE OF CONTENTS

LIST OF TABLES

No table of figures entries found.

LIST OF FIGURES

No table of figures entries found.

INTRODUCTION AND BACKGROUND

REPORT OVERVIEW

The Boone River Watershed Management Authority (WMA) has identified eight primary resource concerns for the Boone River Watershed including; Shorelines and Riparian Areas, Plant and Animal Communities, Sediment, Nutrients, Stormwater, Public Access, Flood Resiliency, and Hazard Mitigation. This report focuses on Flood Resiliency and is one of eight reports developed for each of these concerns. Information contained in this report will facilitate the identification of resource and implementation priorities that will be used in the development of the Boone River Watershed Management Plan. Additionally, data gaps that are limiting such prioritization have been identified for future consideration.

INTRODUCTION TO RESOURCE

Flood Resiliency is a relatively new idea and approach to responding to the impacts of flooding. What exactly flood resiliency looks like does not have a set definition and though it tends to consist of the same concepts it varies by community. Flood resiliency in Iowa began through the vision of the Iowa Watershed Approach (IWA). Additional information on the IWA can be found at: https://iowawatershedapproach.org/

The IWA provides a general definition of flood resilient communities; however, for the purpose of this report a more specific definition was developed. The following definition was created to give specific guidance to this report and further efforts in this planning process, though stakeholder input will be used to refine the definition as it applies to this specific watershed. This definition was created using the IWA's definition and studies of other resilience plans (Tourbier, 2012 and Zeverbergen, 2016).

> **Flood Resiliency** is the ability of individuals, communities, farmers, businesses, community organizations, and government entities to work together to manage their resources and develop partnerships which allow for the prevention, mitigation, response and rapid recovery from flood events. This idea includes the management of natural areas, community infrastructure and farmlands to reduce the impacts and extent of flooding; the creation of local partnerships to improve the preparation for and response to flooding; and financial planning and partnerships to allow the watershed to withstand and recover from flooding.

It is important to note that the basis of most flood resiliency definitions consists of four parts: spatial, structural, social, and risk (Tourbier, 2012). According to Tourbier spatial resilience refers to land management, ordinances, and green storm water management to reduce the intensity of flooding; structural resilience refers to structures such as levies, floodproofing, and temporary structures which reduce damages during a flood event; social resilience refers to the partnerships which allow a community to plan, respond, and recover; and risk resilience refers to the financial

ability of an area to prepare, respond, and recover from a flood event. Each of these four parts are important to include in planning and implementation, however, each community must determine the priority of each part for their situation.

Another important idea in flood resilience is to embrace the eventuality that flooding, whether minor or major, will occur. As stated by Zevenbergen “the concept of resilience (as opposed to resistance) represents a new way of thinking about flood disaster mitigation embracing the philosophy that, as a society, we should learn to live with floods and to manage flood risk and seek to avoid it.”

Flood resilience is an important concept and management style that allows communities to plan how they will prepare, respond and recover from a flood event. As an idea, flood resilience is difficult to measure by one number or metric as it is the culmination of many smaller metrics, thus communities should focus on improving each area as they can based on community determined priorities to manage their risk and use all past and future flood events to gage their level of resilience.

EXISTING DATA

The Boone River WMA spans across multiple counties, communities, and HUC 12 subwatersheds. Data that allows for the assessment of the resilience of the Boone River Watershed shall be considered as data that refers to the land use, ordinances, condition of streams and wetlands, condition of flood protection structures, tile drainage, past floods, community groups or participation, community or emergency services personnel training, funding sources, community partnerships, or plans which contain recommendations related to best management practices or structures for flood risk reduction. The following is a summary of the primary existing data for the flood resilience of the Boone River Watershed:

- *All 6 counties have Hazard Mitigation Plans*
- *All 11 communities participated in the Hazard Mitigation Planning*
- *4 HUC 12 Watershed Plans (Eagle Creek, Eagle Grove, Lyons Creek, and Prairie Creek)*
- *IDNR-Des Moines River TMDL Water Quality Improvement Plan*
- *Portions of WMA participate in the Mississippi River Basin Initiative (MRBI)*
- *Boone River Watershed Rapid Watershed Assessment (NRCS)*
- *Boone River Watershed Ecological Assessment (TNC)*
- *Boone River Conservation Action Plan (TNC)*
- *Des Moines River Upstream Mitigation Study (Draft) (City of Des Moines and IFC)*
- *Lyons Creek Watershed Project: Lessons Learned from Partner and Participant Reflections (IDNR)*

STATE OF THE RESOURCE

CURRENT CONDITIONS

Currently, the Boone River Watershed is not very resilient against flooding. This assessment of current condition is based on the presence of a fair number of studies and planning efforts but a lack of watershed wide planning especially with a focus on flood resilience. There is an abundance of information on the basic conditions within the watershed and partnerships have begun to form between communities, counties and government entities such as IDNR, IWA, IDALS, NRCS, ISU, ISA and others. Information on the current state of infrastructure, flood risks, policies, and community partnerships appear to not exist or be unavailable at this time.

HISTORICAL CHANGES

Iowa has a long history of flooding disasters and related issues and has put forth significant efforts to solving those. The Iowa Flood Center was created in 2009 and has demonstrated the state's commitment to solving flooding challenges across the state. Most recently the Iowa Watershed Project (IWP), which was completed in 2010, and the currently ongoing Iowa Watershed Approach (IWA) have been the largest state-scale efforts to address flooding. Flood resilience in Iowa, as a concept and practice, began to be a focus of planning efforts after the 2011-2013 flood events, with renewed importance after the 2019 flood events. Prior to the idea of flood resilience many communities focused on flood prevention, which can lead to disastrous effects when those flood prevention methods fail (Zevenbergen, 2016)

PROJECTS AND PROGRAMS

Flood resilience planning, and especially implementation, is largely a local responsibility of the stakeholders and partners within the watershed. Some guidance can be found through the Iowa Watershed Approach Flood Resilience Program which sets that the goals of their program is to "measure, visualize, and communicate flood resilience resources, enhance flood resilience content in formal watershed plans and improve social resources of flood resilience". A key resource for flood resilience is partnerships within the community and with surrounding communities, counties, and agencies.

IOWA DEPARTMENT OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT (HSEMD)

The Iowa Department of Homeland Security and Emergency Management is responsible for coordinating and overseeing emergency response activities at the state level for natural and man-made disaster events. The department acts as a regulatory agency and liaison between the Iowa Governor, FEMA, local first responders, and regional representatives. HSEMD reviews all local hazard mitigation plans (HMPs) at the state level before plans are submitted to FEMA for final approval. HSEMD provides grant funding for implementation of flood resiliency projects through

the pre-disaster mitigation (PDM) and flood mitigation assistance (FMA) grant programs. Other funding sources are also available which could be utilized to funding other activities important to achieve flood resiliency.

IOWA DEPARTMENT OF NATURAL RESOURCES (IDNR)

The IDNR manages fish and wildlife, forestry, environmental protection, and water resources programs across the state of Iowa. The IDNR has also established numerous programs which integrate hazard mitigation principles and can be utilized by jurisdictions to reduce overall risk from hazards, such as dam failure, hazardous material incidents, and flooding.

IOWA DEPARTMENT OF TRANSPORTATION (DOT)

The Iowa DOT is responsible for maintaining state highways and major roadways across the State of Iowa. The agency closes and redirects traffic during hazardous conditions and can serve as a partner agency on significant road improvement projects on highways in communities or in unincorporated county lands.

LOCAL EMERGENCY MANAGEMENT AGENCIES

Local emergency management decisions and actions are led by the County Emergency Manager position within the county Emergency Management Agencies as authorized in the Iowa Code Chapter 29C. Roles and responsibilities of county Emergency Managers include: developing plans and capabilities to improve emergency response; build interagency collaboration; direct and facilitate response to natural or man-made hazard events; and assist communities in disaster response and recovery efforts. Local emergency management agencies also oversee emergency communications such as Alert Iowa, Code Red, or other enhanced 911 systems in their respective county.

IOWA FLOOD CENTER

With the support of the Iowa Legislature, the University of Iowa founded the Iowa Flood Center (IFC) in response to record-setting flooding in 2008. The IFC is the nationals only academic center focused on floods, flood research, and education. The IFC is an outward-facing organization focused on direct service to the people of Iowa. The IFC actively engages in flood-related projects that help Iowans understand their flood risk and better prepare for flooding, which includes:

- A cost-efficient sensor network to better monitor stream flow
- A library of flood-inundation maps for more than 30 Iowa communities
- Floodplain maps for all of Iowa’s 99 counties
- Leading the Iowa Watershed Approach
- Conducting Hydrologic Assessments

FUTURE TRENDS

Flood resilience will continue to be an important part of watershed planning, especially as climate change continues to make flooding more severe and as urbanization continues.

RECOMMENDATIONS

The following goals have been developed for initial discussion with the WMA regarding flood resiliency. It is anticipated that these goals may be modified for inclusion in the final Boone River Watershed Management Plan.

EXISTING FLOOD RESILIENCE GOALS

Each of the data sources listed above have various goals for the Boone River Watershed. The major themes of these goals are to improve the health of the soil, improve water quality, and reduce the risk of flooding in a cost-effective manner. The goals of this planning process as stated in the Boone River Comprehensive Restoration Plan grant application are to improve the resiliency of watershed farms and communities. These goals show the same intent through a different lens.

RECOMMENDED GOALS FOR WATERSHED PLANNING

To integrate flood resilience into the Boone River Watershed Plan, the following goals have been identified for consideration:

- Work with communities and stakeholder groups for holistic watershed management planning
- Leverage the planning process to further refine and evaluate flood risk reduction strategies and projects
- Encourage the participation of multi-agency participation in watershed planning update
- Create a strong network of stakeholders to facilitate the creation of partnerships to build social and financial resilience to flood events.
- Identify strengths and weaknesses in the current floodplain management, ordinances, infrastructure, and flood protection structures.
- Identify and prioritize measures to build flood resilience within the Boone River Watershed
- Integrate the Boone River Watershed Plan with each local hazard mitigation plan

IMPLEMENTATION

Flood resilience is a function of an entire watershed working to reduce the impacts of flooding and increase the speed with which a watershed can recover from the event. This requires much planning and coordination between residents, communities, counties, and their partners. Building a common understanding of goals, determining deficiencies and opportunities withing the watershed, and building partnerships are important steps to creating a resilient watershed.

ACTION STEPS

- Use a stakeholder group to identify the priorities of flood resilience within the Boone River Watershed.
- Identify and collect data related to flood resilience, including but not limited to: land use, zoning, ordinances, agricultural and urban BMPs, tile drain locations and effects, condition of current infrastructure, past flood damages and responses, and community partnerships.
- Determine the deficiencies and opportunities for improvement in collected data.
- Complete a flood risk assessment for each community to identify flood risks and potential solutions that address flood risk and each community's ability to recover economically and socially
- Identify vulnerable populations within the watershed and identify solutions to improve their resiliency to flooding
- Create and prioritize projects, ordinances, and community partnerships based on data collected and input from stakeholder group.
- Develop a list of projects directly related to flood risk reduction and amend it into each local hazard mitigation plan
- Develop a hydrologic model to predict changes in flooding occurrence and extents over the next 30-years.

EDUCATION STRATEGIES

Education and outreach efforts are key to ensuring flood resilience principles are integrated into other planning mechanisms and ongoing resource management decisions. Extensive public engagement is a crucial component of effective and implementable flood resilience plans. Ways to educate and engage the public in the creation of a flood resilience strategy for the Boone River WMA include:

- Provide updates on project websites and community websites/social media
- Invite elected officials, residents, and stakeholders to meeting forums to define flood resilience for this watershed, discuss goals, and action items
- Ensure county emergency managers, county engineers, watershed coordinators, IHSEMD, IDNR, IFC, and others directly impacted by flood events meet regularly or are involved in other planning processes or meetings
- Share press releases with local news media for ongoing plan updates
- Sharing progress reports, photos, and results of implementation with community members
- Showcasing successful flood resilience efforts in surrounding areas or in areas with similar conditions to the planning area.
- Ensure residents and responders who have been impacted or involved in past flooding events are included in the planning process and their previous experiences are recorded.

- Organize an education series on urban and agricultural BMPs that residents can implement on their own, with information on financial assistance available.

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