American Rivers
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ILLINOIS FLOODPLAINS WORK

FEASIBILITY STUDY

JULY 2021

Prepared by

SWCA Environmental Consultants


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Acknowledgements

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Gratitude

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About American Rivers

American Rivers believes a future of clean water and healthy rivers everywhere, for everyone is essential. Since 1973, we have protected wild rivers, restored damaged rivers and conserved clean water for people and nature. With headquarters in Washington, D.C. and 300,000 supporters, members and volunteers across the country, we are the most trusted and influential river conservation organization in the United States, delivering solutions for a better future.

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Cover photo

2017 flooding in downtown Alton, Illinois.

Photo credit: Andrew Dobson

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Land Acknowledgement

The state that is now Illinois was and is home to many tribal nations and Indigenous peoples. As colonizers pushed Native Americans and their families off their homelands in the East, many emigrated West, shifting tribal boundaries in and through what is now Illinois. Within a generation following the Revolutionary War, Illinois-land became a destination for European colonizers. The War of 1812, and several skirmishes that lasted until the 1830s, solidified colonists hold on what is now Illinois. In large part due to the outcomes of those wars, Illinois has no federal or state recognized tribal nations. To the best of our knowledge, before Illinois became a state, the land was part of the following Indigenous nations:

- Očhéthi Šakówiŋ (Nation of Seven Council Fires)
- Quawpaw
- Myaamia
- ꓴꓥꓰꓥꓰꓠ (Osage)
- Kaskaskia
- Kiikaapoi (Kickapoo)
- Peoria
- Sauk and Meskwaki
- Bodéwadmiakiwen (Potawatomi)
- Waazija (Ho-Chunk / Winnebago)

We respectfully acknowledge that we are working on the traditional and ancestral lands of many Indigenous people who have called this land home since the beginning, those who continue to call Illinois home, and the Indigenous leaders yet to be born. We apologize for any errors or omissions in our land acknowledgement.

Learn more about Indigenous territories and land acknowledgement at Native-Land.ca.

Executive Summary

Problem Statement

Water over a road during 2019 flood, Hannibal, Missouri. Photo credit: Crystal Dorothy

Flood-related threats to health, safety and property are among the most pressing climate change issues in Illinois. Unfortunately, actions to reduce flood risk are not keeping pace with the need to protect people, infrastructure and economies. To accommodate the predicted increase in precipitation, midwestern rivers need more capacity. The changes in land use for expanding flood zones in Illinois can be opportunities to address long-standing racial justice issues and improve biodiversity within the state. This study puts forward an alternative approach to managing flood-prone land for multiple co-equal goals.

"Multi-benefit floodplain development" offers a framework for people living in river communities to address climate disruption, social and racial injustice and biodiversity loss in a holistic way.

Multi-benefit floodplain development recognizes that flooding is a natural process with many ecosystem services – like floodwater conveyance, improved quality of life, water purification, aquifer recharge and wildlife habitat restoration – and it seeks to capitalize on those benefits through intentional planning and development.

Despite the advantages of "multi-benefit floodplain development," it is not a widely utilized approach in floodplain communities. This study examines how to expand application of this development method in the state of Illinois.

Study Purpose

Other states, include Washington, California, and Vermont, have established programs to advance multi-benefit floodplain development projects. As we began this process, we envisioned an Illinois public-private partnership for multi-benefit floodplain development, similar to the Washington Floodplains by Design Program. We thought this was the best model, given Illinois' budget constraints. Matching state efforts with private investments could provide resource support for locally driven efforts to plan and implement multi-benefit river corridor projects.

This study explores the Washington model, and others like it, and seeks to understand the unique needs for Illinois' floodplain communities to gauge the desirability of a public-private partnership program, establish a framework for such a program, if it is recommended, and put forward other public policy reforms to encourage multi-benefit floodplain planning and development in Illinois.

Stakeholder Process

Stakeholder input was used to inform development of the feasibility study findings and recommendations; however, stakeholders were not asked to endorse the feasibility study. Stakeholder meetings focused on case studies that were selected to represent a compendium of floodplain issues and concerns and identified multi-benefit floodplain development

opportunities. Stakeholder input was based on each participant's area of concern, expertise and/or lived experience.

Findings

During the study process, we determined that replicating Washington's dual purpose (public safety and ecosystem restoration) model was not advisable because it did not adequately incorporate the needs of vulnerable populations who may be displaced to accommodate projects. Instead, we recommend a similar public-private multi-benefit floodplain development program with three co-equal goals: public safety, social justice and ecosystem restoration. The proposed program would be tasked with resolving the three primary barriers that were identified in our research and conversations with stakeholders:

- **Lack of Community Led Problem Solving**: A community's needs are dependent on unique conditions found within it, such as culture, social structure, history and assets, to name a few. Therefore, people living within a community are most equipped to speak to these needs. Illinois' elected officials and state agency staff need to work with community members, municipal staff and non-governmental organizations to establish a better framework to support community led problem-solving that is tailored to that community's individual needs. This includes providing more access to information, better venues for collaboration and access to decision-makers.
- **Too Few Hazard Mitigation Projects**: The number of flood hazard mitigation projects needs to dramatically increase throughout the state. This cannot be limited to only "green" or "gray" infrastructure. It will require a combination of the two strategies to build sustainable projects. To support these projects, the Illinois General Assembly needs to take deliberate steps to grow the hazard mitigation field of practice, especially in a multi-benefit floodplain development context, and encourage recruitment in this field.
- **Economic Instability**: Under the current federal and state programs, the local tax base is responsible for paying a significant portion of hazard mitigation costs, especially upfront costs like staffing to apply for grants and oversee programs. But even well-resourced communities cannot keep up with increasing flood risk, and communities of low income are being left behind entirely. Alternative financing, like administrative grants and low-interest loans, and in-kind support, like technical assistance, need to be dramatically expanded. Municipal staff must also be supported to work on interconnected issues, like affordable housing and community revitalization.

Recommendations

- Establish a multi-benefit floodplain planning and development public-private partnership.
- Establish a multi-benefit floodplain development fund to provide flexible funding for planning and projects.
- Reform agricultural programs to incentivize flood-compatible farming and land conservation practices.
- Ensure the Illinois' state agencies provide equitable support services across all programs, including higher levels of planning support for communities that are socially and/or economically disadvantaged.
- Require flood hazard mitigation training for all insurance agents.

Acronyms and Abbreviations

BRIC	Building Resilient Infrastructure and Communities
Corps	U.S. Army Corps of Engineers
FEMA	Federal Emergency Management Agency
HUC	hydrologic unit code
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
NAACP	National Association for the Advancement of Colored People
NFIP	National Flood Insurance Program
NGO	non-governmental organization
USDA	U.S. Department of Agriculture

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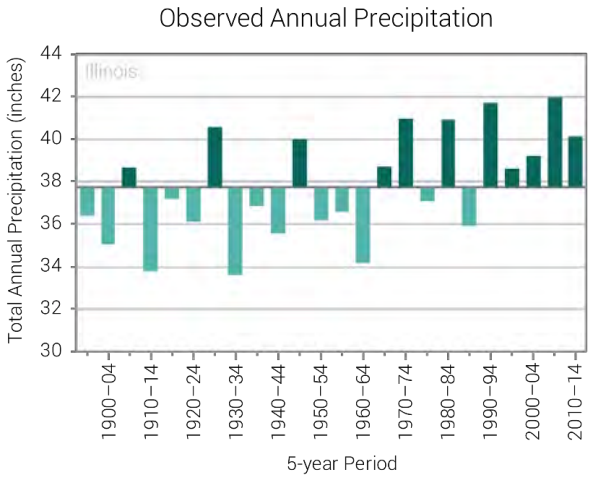
Appendices

1. Introduction



Observed annual precipitation for Illinois, 1900-2010.
Source: Frankson, et al., 2017

Midwestern rivers need more capacity to accommodate the climate change fueled storm events and prolonged periods of flooding that climate science predicts (USGCRP, 2018).

In Illinois, damage from floods and stormwater has increased throughout the state in recent years. Flood insurance claims have steeply increased, with the average annual National Flood Insurance Program payout increasing from $12.5 million in 2000 to $25.5 million in 2014 (Winters, 2015). Comprehensively, between 2007 and 2014, urban flooding has caused more than $2 billion in damage in the state (Winters, 2015). In Illinois, approximately 482,200 properties currently have a 1 percent risk of being damaged by flood events annually (i.e., are located in the 100-year flood zone). Under current climate models, the number of properties in this risk zone will increase to 502,500 in the next 30 years (First Street Foundation, 2021). Flood-related threats to health, safety and property are among the most pressing climate change issues in Illinois. Unfortunately, actions to reduce flood risk are not keeping pace with the need to protect people, infrastructure and economies.

Across Illinois, low income communities and communities of color are experiencing dilapidated stormwater infrastructure that causes serious public health and safety issues. Some outcomes of these problems include wastewater releases in residential areas, loss of useable property, dangerous mold growth and recurring damage to homes. In rural Illinois, agricultural livelihoods are at increased risk as rainfall events become more frequent and severe, causing rivers to flood farmlands, killing crops, preventing planting and damaging infrastructure (Frankson, et al., 2017). Climate change and continued development within floodplains, including flood control measures (which have increased threefold since the 1960s), have resulted in flood damage that continues to escalate (Wright, 2000).

Water over road during 2019 flood, Hannibal, Missouri.
Photo credit: Crystal Dorothy

The flooding issues seen in Illinois are also connected to the global biodiversity crisis. Floodplain habitat is some of the most productive, rich, biodiverse and beneficial type of habitat on Earth. Existing flood management techniques in the state have focused on flood control measures that aim to prevent flooding and move water out of the flood zone rapidly. However, doing so disrupts many of the ecosystem services that flooding, and floodplains enable. These services include filtration of water pollution, creating wildlife habitat, recharging aquifers and offering recreation opportunities and other quality of life improvements. For example, the approximately 87,000 miles of rivers and streams within and bordering Illinois once supported a highly diverse community of flora and fauna. At the beginning of 20th century, most streams in Illinois had winding courses with associated rich marshes and swamps, and the vegetated stream banks reduced the likelihood of bank failures and heavy erosion (IDNR, 2001). Since then, agriculture and development (including gray infrastructure as a flood management technique) have drastically reduced the health of Illinois floodplains. In addition, channels have been straightened and leveed, resulting in fewer marshes and swamps and more turbidity and bank erosion (IDNR, 2001). Consequently, aquatic insects, freshwater mussels and fish once common to Illinois waters have been extirpated from the state (IDNR, 2001).

Multi-benefit floodplain development provides a framework that accounts for and plans around public safety, social issues and environmental challenges in the floodplain space. Adopting this framework in more Illinois communities will produce more comprehensive solutions to floodplain problems. This study provides a path forward.

1.1 Goals and Objectives

Other states, including Washington, California and Vermont, have established programs to advance multi-benefit floodplain development projects. As we began this process, we envisioned an Illinois public-private partnership that would promote, plan and finance projects with dual public safety and ecosystem restoration goals, similar to the Washington Floodplains by Design program.

In this study we:

1. Review the Washington model, and others like it, to understand the range of programs that exist in the United States.
2. Explore the unique needs for Illinois communities to inform our programmatic recommendations.
3. Establish an Illinois-specific framework for a public-private partnership program.
4. Put forward other public policy recommendations to immediately address some of the most pressing barriers that block implementation of multi-benefit floodplain planning and development in Illinois.

Community and regulatory stakeholder conversations were an important part of this study. Stakeholder discussions helped us understand the greatest community needs. While the stakeholder discussions informed our recommendations, stakeholders were not asked to endorse our findings, and stakeholder participation in the study should not be interpreted as an endorsement of the recommendations herein. Indeed, some stakeholders who participated do not agree with our science-driven assumption that flood control, by itself, is an ineffective and dangerous flood management strategy. This conflict drove home the point that more alternative flood risk reduction projects are needed in Illinois that integrate nature-based flood management and social justice solutions.

2. Study Context

In Illinois, environmental and infrastructural factors contribute to the need for a new floodplain management framework. There are many current and impending public safety, social justice, economic and environmental issues in Illinois' floodplain spaces. To address these issues, the feasibility study attempted to: (1) look at a reasonable cross-section of areas in Illinois that are prone to flooding, (2) solicit input from community leaders and members, and (3) consult with local municipality staff that had first-hand experience with flooding and the efforts used to address it. Also included were State of Illinois staff with expertise in pertinent fields (e.g., water resources, natural resources and disaster mitigation, among others). The input from this group largely drove the process and recommendations provided herein.

A list of publicly available sources of floodplain and community data was used to facilitate the effort of identifying priority watersheds in Illinois. A comprehensive list is presented in Section 2.4 and provides data sources from the Illinois Department of Natural Resources (IDNR), Federal Emergency Management Agency (FEMA), U.S. Army Corps of Engineers (the Corps) and U.S. Department of Agriculture (USDA), among other sources.

2017 flood in downtown Alton, Illinois.
Photo credit: Andrew Dobson

2.1 History

Illinois has a long history of flooding and floodplain management. Glacial action that occurred over 10,000 years ago flattened the landscape and contributed to slow drainage, with water pooling on the land instead of swiftly discharging into tributaries. Additionally, several of the nation's large rivers are located in and around the state (the Ohio, Mississippi, Illinois and Wabash rivers). These big rivers have large floodplains that attract people due to their proximity to river-borne trade routes, the flat and easily developable land around them, and abundant natural resources that support community health and wealth.

Flood damage has been tracked since colonization. As soon as settlers arrived in what is now Illinois in the early 1800s, they began plowing the prairie, clearing forests, draining wetlands, and building farmsteads. Prior to 1862, these actions fell under the "homestead principal," a European-derived legal strategy that allows individuals to acquire land through active use. Congress codified this practice in the 1862 Homestead Act and subsequent similar acts that rewarded extractive land development.

Because a large portion of Illinois land was prone to flooding or ponding after rain events, settlers organized local drainage and levee districts to pool the community resources required to break up and drain Illinois' wet prairies and floodplains and protect their development from future flood events. In 1870, the Illinois General Assembly formalized these local units of government and passed the first set of drainage laws in 1871 (Illinois Secretary of State, 2021).

The flood management strategy deployed by the early European settlers is known now as "flood control." Flood control strategies primarily direct water away from people and critical infrastructure. Examples of flood control infrastructure includes levees, dams, tile and other stormwater drainage systems.

While flood control is still the primary approach to reduce flood damage, the strategy, when used by itself, has been proven ineffective because it primarily moves water onto other properties. As a result, it does not truly eliminate flood risk overall, and it creates areas of residual risk (i.e., the false sense of safety in areas that can become inundated when a flood control structure fails) (National Wildlife Federation, 1998).

Floodplain pumping stations push water downstream for others to deal with. Photo credit: Crystal Dorothy

In the 1960s, recognizing that flood control was not effective at reducing flood losses, Congress passed the Flood Insurance Act of 1968 that created the National Flood Insurance Program, which included incentives to move people and critical infrastructure out of flood-prone areas. This was the formal beginning of a new flood management strategy called "risk reduction." Flood risk reduction is the opposite of flood control in that it moves people and critical infrastructure away from flood-prone areas, as opposed to trying to move the water away from people. Flood risk reduction examples include buyouts/relocations, home/infrastructure elevations, and floodplain reconnection and restoration. Flood risk reduction is a much more effective strategy for reducing flood damage and protecting public safety because it significantly reduces or eliminates exposure and susceptibility to the flood hazard (Multihazard Mitigation Council, 2019).

As buyout land became available in the late 1960s and 1970s, conservation proponents, including American Rivers, promoted ecosystem restoration on river-adjacent land parcels that could not be re-developed for residential, business or industrial uses. Floodplains are some of the most biologically diverse and productive ecosystems on the planet; however, freshwater species are endangered at higher rates than terrestrial and marine species due in large part to floodplain development (Richter, et al., 1997; Ricciardi and Rasmussen, 1999). To minimize negative impacts on floodplain ecosystems, flood risk reduction projects can incorporate ecosystem enhancement, often referred to as "natural infrastructure" or "nature-based solutions," into these projects.

Despite the seemingly endless benefits of implementing nature-based solutions, there are several factors that contribute to the limited adoption of natural infrastructure. Part of the issue is a lack of resources. But, even when resources are available, many communities remain resistant to adopting or implementing flood risk reduction approaches due to the following reasons (Browder, et al., 2019):

1. Natural infrastructure projects have greater variability and uncertainty (i.e., it can take time for vegetation features to reach maturity, delaying ecosystem service benefits).

2. Flood problems are often not caused locally, and there are frequent disconnects between upstream causes of flooding and downstream communities struggling to reduce flood damage.
3. Some projects require complex modeling and data collection to design and monitor, which can prevent communities of low income from pursuing nature-based options.
4. Economic benefits associated with healthy ecosystems are challenging to convey to the public and elected officials.
5. Some projects require converting large areas of land from developed to "un-developed," and this can be costly for communities and can disproportionally impact communities of color and low-income, as well as other vulnerable populations like immigrant, unhoused, disabled and elderly communities.

As the environmental community has largely focused on overcoming these barriers to encourage adoption of natural flood risk reduction infrastructure, the deadly levee breaches in New Orleans following Hurricane Katrina in 2005 raised awareness of how racism increases flood risk for communities of color. Since the founding of the United States, public policies have been crafted specifically to benefit white Americans, including policies around land and home ownership. These race-based policies have and continue to push "undesirable" people onto undesirable land, including flood-prone land.

A stark example of this started in the 1930s under New Deal housing programs. Real estate agents outlined community neighborhoods based on investment risks. Neighborhoods outlined in green were the safest to invest in, blue neighborhoods were still desirable, yellow were in decline, and redlines were drawn around the undesirable areas. Factors that triggered redlines were usually the presence of Black families and/or environmental factors, like flooding, pollution or foul odors (Nelson, et al., n.d.). Federally backed housing development loans were prohibited in redline areas, and the federal loans available in the blue and yellow areas carried riders that prohibited the sale of future properties to Black people. As a result, Black families, regardless of income status, were forced to live in the redlined areas, which were much more likely to be flood prone. Making the situation worse, housing development in redlined areas was not eligible for federally backed bank loans, so houses were made of shoddier construction materials to keep the prices low (Rothstein, 2017).

Due to the above factors, floodplain management is inherently entwined with climate change, the global biodiversity crisis and racism in America. Because these three issues are connected in the same physical space, they must be managed jointly; however, few programs exist to provide a framework for integrating these three issues.

This report provides a framework toward integration. As we discuss below, some programs have already been developed to integrate the issues around flood management and biodiversity. While the social and racial justice issues related to floodplains are well documented, they have not been fully integrated into multi-benefit floodplain development programs. This report makes a case not just to manage floodplains for flood risk reeducation and environmental improvements but to also manage them for social and racial justice.[1]

[1] This report focuses on the lived experiences of Black floodplain communities because Black populations are the most segregated (Lichter, Parisi, and Taquino, 2015) and socially oppressed (Wilkerson, 2020). We recognize that other socially

2.2 Ecosystem Services

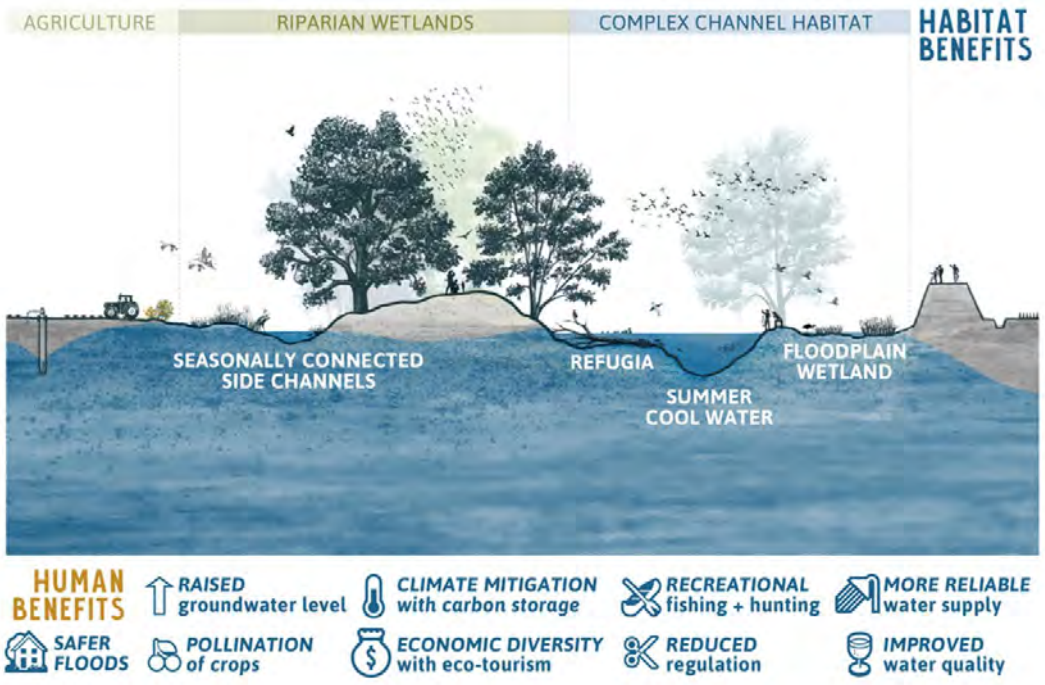
Our multi-benefit floodplain development framework is based on recognizing the full range of services that benefit people when natural systems are healthy and functional (i.e., "ecosystem services").

In the context of floodplain development, a "functional floodplain" is a floodplain that can perform the natural processes that produce goods and services. The four key attributes necessary for a floodplain to be functional are:

1. **Connectivity**: the floodplain is physically accessible by water from its adjacent river or stream to allow an exchange of water, nutrients, sediment and organisms.
2. **Variable Flow**: the connected river is capable of producing flows with magnitudes large enough to inundate the floodplain. These flows must occur with necessary timing, duration, magnitude and frequency to support native, local biota.
3. **Scale**: the floodplain must have the space to accommodate inundation and resulting habitat and landscape forming processes that occur.
4. **Habitat and Structural Diversity**: A diversity of sediment erosion and deposition conditions, gradients of hydrologic connectivity, ecological succession and naturally accumulated debris generate habitat supportive of terrestrial and aquatic organisms.

A floodplain with these attributes can perform an array of natural functions typical of floodplains. These functions produce economic gains related to flood water conveyance, erosion management, water quality improvements, groundwater recharge, biological productivity, fish and wildlife habitat, carbon storage and an improved quality of life through associated benefits related to recreation and culture (FEMA, 2002; Loos and Shader, 2016; Kusler, 2016; Seavy, et al., 2009).

marginalized populations (such as immigrant, indigenous and disabled people) may have additional issues that they face in the floodplain space and ways of knowing that may help us find better solutions to the range of issues discussed herein. We look forward to future partnerships and studies to improve and refine our proposed framework.



Source: American Rivers

2.2.1 Social Justice

Floodplains are often environmental justice areas – areas where historically marginalized people are subject to environmental degradation and related harms, like flooding. An individual's vulnerability to disasters is the result of (1) their physical proximity to the source of harm, (2) the susceptibility to harm during a disaster, and (3) the individual's capacity to cope and recover from the disaster. Communities of color and other historically marginalized communities are systematically more vulnerable to flood-related disasters due to external conditions and circumstances that negatively influence all three of these factors (UNESCO-IHE, 2021).

1. **Exposure**: Communities of color are more likely to live in flood-prone areas. This is, in part, an outcome of New Deal housing programs and policies (described in Section 2.1) that forced Black families to live in undesirable, redlined neighborhoods, regardless of their income status. Today, most urban areas remain segregated along the same lines established under the New Deal of the 1930s, and race-based exclusion in community decision-making and investment processes is ongoing. Because these areas are also a source of inexpensive housing for other under-resourced populations, including people who are unhoused, impoverished, immigrants, disabled and elderly, there is significant overlap of flood-prone and environmental justice areas (Nelson, et al., n.d.; Rothstein, 2017).

2. **Susceptibility**: Just because someone is in physical proximity to a disaster source does not mean they will be significantly harmed. Upgrades in building materials and designs can reduce property damage, and well-planned and executed evacuations can save lives during disasters. Unfortunately, there are numerous factors that elevate susceptibility of harm among historically marginalized groups. As mentioned in Section 2.1, construction

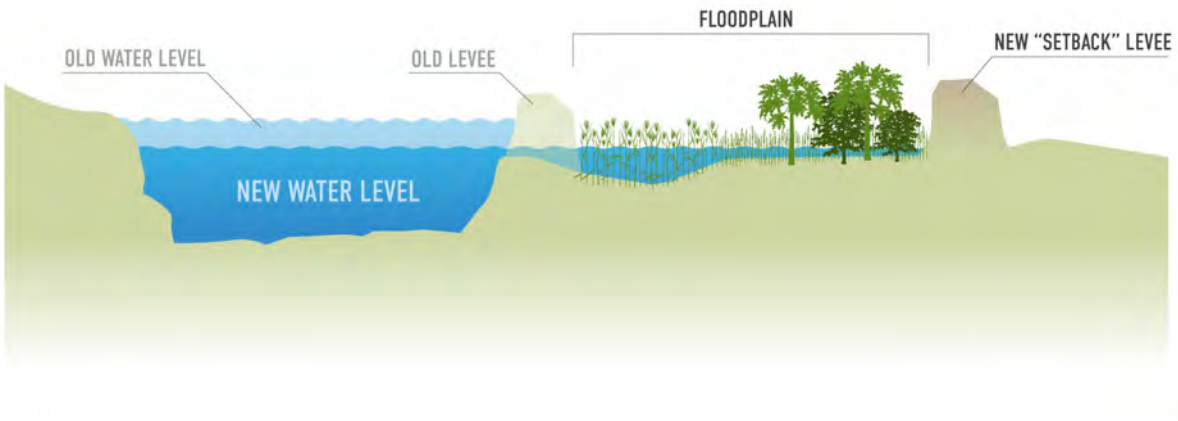
materials used in redline areas, which are more flood prone, are usually inferior to standard building materials due to their cheaper costs (Rothstein, 2017). In addition, impoverished individuals are less likely or unable to upgrade their homes to adhere to higher standards of protection. Also, the needs of historically marginalized populations, by definition, are often neglected during disaster planning. For example, evacuation orders and plans may only be posted in English, making them inaccessible to non-English speaking community members. These factors all contribute to the elevated vulnerability of communities of color and other historically marginalized populations.

3. **Resilience**: Coping with and recovering from disasters is costly and time-consuming. Due primarily to historic and ongoing identity-based discrimination that impacts intergenerational wealth and income, people of color are more likely to be low-income. As a result, white and able-bodied people are better able to weather disasters in a variety of ways. Wealthier people are more likely to have jobs that grant paid time off during a disaster and recovery period. They are more likely to have the time that is required to successfully apply for disaster assistance and have the resources to explore multiple options. They are also more likely to be able to travel away from the disaster and invest in quicker repairs following the disaster. Historically marginalized populations are less likely to have the resources needed to cope with and recover from the disaster, which can result in loss of life and property, job loss, displacement, and other negative outcomes.

While not often recognized as such, floodplains are spaces with significant racial and social justice needs. Incorporating the other ecosystem services through a racial and social justice lens will create more diverse, sustainable and successful communities.

2.2.2 Flood Water Conveyance

Functional floodplains convey flood water and, if managed properly, can be used to divert and/or store flood water away from people and infrastructure. Studies show that when flood water is allowed to access its floodplain, the water slows down, dispersing energy and depositing sediment, which results in the reduction of flood damage and flood-related erosion. (FEMA, 2002; Rohde, et al., 2005; Opperman, et al., 2010).



Setting back levees to reconnect floodplains increases flood conveyance and allows riparian vegetation to colonize the floodplain, which subsequently slows flood waters and further increases safety.

Source: American Rivers

Using natural floodplains to convey flood water is cost effective. For every dollar spent moving people and critical infrastructure out of floodplains, there is an average of $6 in savings accrued from minimizing future expenses associated with flood defense, clean up and recovery where flood water can be successfully conveyed (Multihazard Mitigation Council, 2017).

2.2.3 Water Quality Improvements

Water pollution includes a variety of toxins and compounds that threaten human and animal health. Water treatment facilities remove most common pollutants, but they can be imperfect and vulnerable to external factors like new contaminants, excessive contamination, equipment malfunction and pipe or other transport/delivery failures. In general, cleaner source water and cleaner landscapes result in safer and more reliable drinking water for communities. Natural strategies, like floodplain and wetland restoration, can help remove contamination from water and are often significantly cheaper than water treatment facilities (EPA, 2020).

Natural floodplains are hotspots for water purification, though sometimes to the detriment of the floodplain ecosystem. Floodplain wetlands support microbial communities that process pollution out of the water column, especially nutrient and phosphorus pollution that are problematic in Illinois. As floodplains allow water to slow down, sediment and pollutants bound to sediment drop out of the water column, consolidating during the post-flood dry periods. Depending on the types of pollution and vegetation present in the floodplain, some sediment-laden pollutants can be neutralized via plant uptake or other biological methods. Other pollutants, like some heavy metals, may require mechanical removal from the site to ensure the area is safe for people and wildlife (Gordon, Dorothy and Lenhart, 2020). While the safest and most effective strategy to improve water quality is to reduce the sources of pollution, natural floodplains are a reliable and sound option for downstream removal.

2.2.4 Wildlife Habitat

Floodplains are dynamic environments, and their ever-changing nature creates diverse successional stages. As a result, floodplains are some of the most biodiverse and productive ecosystems on the planet (Ward, Tockner and Schiemer, 1999).

Deer in Illinois River floodplain at Spunky Bottoms, Illinois.
Photo credit: Chris Young

During inundation, floodplains support river ecosystems by providing habitat for fish and wildlife, maintaining water quality and supplying nutrients and shelter that enhance fish reproductive success and growth rates. The flood pulse concept (Junk, Bayley and Sparks, 1989) illustrates the ecological value of floods, describing them as periodic pulses of nutrient- and sediment-rich water that spur productivity and connect riverine and floodplain habitats. Flooding underpins the processes that create and sustain the ecological functions of floodplains. Where those natural processes remain intact and ecological processes are sustained, a floodplain is considered to be ecologically functional.

2.2.5 Groundwater Recharge

In addition to conveying flood water, floodplains are often recharge zones for aquifers (Doble, et al., 2012; Brunet, Astin and Dartiguelongue, 2003; Zhang, et al., 2017). This includes the "sole-source" Mahomet Aquifer in East Central Illinois, where the floodplains of the Illinois River and other lesser rivers recharge the aquifer (Mahomet Aquifer Consortium, 2018). This groundwater recharge function is critically important under climate change as Midwest precipitation patterns shift to longer droughts punctuated by extreme precipitation events (USGCRP, 2018). Allowing flood water to access the floodplain will recharge aquifers, which can help offset the impacts of drought when river levels are low.

2.2.6 Quality of Life

Functional floodplains improve a community's quality of life, and these improvements translate to community wealth. Quality of life values are associated with human health and well-being. Studies show that human-nature interactions provide numerous health benefits that range from general feelings of improved happiness to lower blood pressure to longer lifespans (Hartig and Kahn, 2016; Kardan, et al., 2015; Halonen, et al., 2014; Astell-Bert, Feng and Kolt, 2014; Alcock, et al., 2017; Mitchell, et al., 2015; Gascon, et al., 2016; Dadvand, et al., 2017; Dadvand, et al., 2012; Dadvand, et al., 2015; Maas, et al., 2006; Mitchell and Popham, 2007; Seresinhe, Preis and Moat, 2015; White, et al., 2013).

Bicyclist along the Mississippi River, Moline, Illinois.
Photo credit: Olivia Dorothy

These health benefits translate to a range of economic impacts associated with people *wanting* to live and work in areas with accessible natural spaces. A study that looked at nine urban floodplain restoration projects found that the ecosystem improvements translated to an increase in the local community wealth via the following mechanisms (Parsons, et al., 2020):

- Reduction in costly flood damage repairs and lower flood insurance rates for communities enrolled in FEMA's Community Rating System.
- Increased property values that more than compensated for the lost revenues from undeveloped parcels.
- Increased business investment and employee attraction due to enhanced recreational opportunities.
- Increases in high-value development, economic growth, and jobs in other parts of the community that cascaded from the employee attraction value due to enhanced recreational opportunities.

2.3 Existing Programs and Data

The multi-benefit floodplain development framework is not a new concept. In this section, we explore successful programs in the states of Washington, Vermont, New York and California, as well federal grants and programs which can be used to extrapolate lessons to consider for Illinois. As part of this process, representatives from the various programs and agencies joined our stakeholder meetings to provide information, which was then discussed by stakeholders. Compiled notes from the stakeholder meetings are available in Appendix C.

2.3.1 Washington Floodplains by Design

The Washington Floodplains by Design Program is a public-private partnership grant program between the Washington State Department of Ecology and The Nature Conservancy. The goal of this program is to reduce flood risks, promote floodplain ecosystem health and support agriculture, recreation and clean water. Washington Floodplains by Design is perhaps the most comprehensive multi-benefit floodplain development program in the United States, and over $165 million in state funding for projects has been leveraged by the program since the first funding cycle in 2013.

After implementing projects for 5 years, Washington Floodplains by Design coordinators realized that outreach was needed to work with and educate the public on multi-benefit floodplain development. To change public perception of how floodplains in the state should be managed, Washington Floodplains by Design conducted a variety of engagement activities that targeted a diverse range of stakeholders. Activities included key decision makers, tribal government representatives, local elected officials, state agency representatives, leaders of agricultural groups, conservation organizations and organizations that represent vulnerable communities. By consulting with such a broad network of stakeholders, coordinators were able to gain a greater understanding of needs and helped to develop a dialogue between the multiple entities that should be involved in floodplain management decisions throughout the state.

Following these initial stakeholder outreach activities, the Washington Floodplains by Design program has normalized integrated (or multi-benefit) floodplain restoration and is building more robust management systems at the local and regional level. Communities are now incentivized to develop local collaboratives that bring together diverse interests to create an integrated approach for managing floodplains. These local groups are now the driving force behind identifying and prioritizing projects. This approach ensures projects meet local needs and have broad support across diverse interests. Washington Floodplains by Design is also engaged in efforts to change the policy and regulatory framework to allow for facilitation of funding and enhanced management of floodplains in the state.

Lessons for Illinois:

- **Collaborations are under-resourced**: Open forums to define floodplain management issues serve the interests of the broader community. To find agreement on an integrated set of actions, local integrated groups are a critical piece for implementing successful on-the-ground actions.
- **Regional integration is as important as local integration**: There are significant constraints generated by state and federal laws, policies and funding programs that limit, restrict and hamper integrated floodplain management at the local level.
- **Integrated floodplain management requires a wide variety of skills**: The needed skills are complex, nuanced and need to be performed at a high level. For

example, technical skills, project management skills, the ability to facilitate visioning, the ability to fit an effort within institutional structures, facilitation, storytelling and grant writing are all necessary skills for these efforts, though a full list of skills would be much longer.

- **Sustained integrated floodplain management requires tracking and measurement of progress**: If participants do not see that progress is being made on the goals they find most important, it will be difficult to maintain both trust and momentum.
- **Integrated floodplain management works best at a large scale and with many voices involved**: The larger the scale (ideally a reach or watershed scale), the more possible it is to develop a package of projects to address a wide range of issues.

2.3.2 Vermont Rivers Program – Functioning Floodplains Initiative

The Vermont Rivers Program is a state organized program spearheaded by the Agency of Natural Resources. The program is aimed at protecting and restoring natural river and floodplain processes to enhance water quality, ecological health and flood resilience. The Vermont Rivers Program has three core focus areas — Streamflow Protection, River Management and River Corridor and Floodplain Protection. Under these three focus areas, the State of Vermont has further subdivided the program into focus areas for specific issues such as hydroelectric power, dam removal, stream alteration, permitting, flood training and National Flood Insurance Program information, among others. Of the Vermont Rivers Program's many sub-programs and information repositories, the Vermont Functioning Floodplains Initiative provides the most value to the State of Illinois as an example of beneficial and proactive floodplain management.

The Functioning Floodplains Initiative is managed by Vermont's Department of Environmental Conservation, a department of the Agency of Natural Resources. The Functioning Floodplains Initiative's goal is "to achieve the highest water quality, flood resilience, and ecological integrity by targeting restoration and reconnection where it is most beneficial. (Vermont Department of Conservation, 2021). This goal is being approached through a multi-phased approach to ensure that the program is developing effective recommendations for restoration throughout the state. To assist with the Functioning Floodplains Initiative, the Department of Environmental Conservation has enlisted a diverse group of stakeholders, including state employees and local governments, non-profits, academia and the private sector. The recently completed Phase 1 is focused on formally assessing rivers and streams throughout the state to determine what percentage of river corridors/floodplains are disconnected in a watershed due to existing constraints or stressors. Phase 2 of the program will develop a list of floodplain reconnection projects and the estimated costs for the implementation of those projects.

Lessons for Illinois:

- **Information on river health is incomplete.** A science-based assessment of rivers and watersheds is needed to provide foundational information, set goals and measure success.
- **Diverse stakeholder engagement is important.** Engaging stakeholders ensures buy-in and sharing of resources and knowledge, both of which will contribute to a more effective and impactful investment in the long term.

2.3.3 New York Rising Communities Reconstruction Program

The New York Rising Communities Reconstruction Program was established in 2013 in response to the damage caused by Hurricane Irene in August 2011, Tropical Storm Lee in September 2011, and Hurricane Sandy in October 2012. The New York Governor's Office of Storm Recovery was allocated over $650 million in federal funds and has been administering funding for planning and implementation projects across the 124 New York state communities damaged by the storms. Each community identified as being impacted by one of the three storm events was allocated between $3 and $25 million to implement recovery and resiliency projects in their community. Additionally, each community that participated in the program and received funding was required to participate in a regional planning group made up of local community members so they could collaboratively identify reconstruction and resilience projects that would improve their collective resilience.

The New York Rising Communities Reconstruction Program is notable because their recovery and resilience initiative utilizes recovery funding for community led resilience planning in addition to direct disaster recovery efforts. In general, community planners felt the program was more successful than previous planning efforts due to the community-driven, consensus-based approach.

Flood wall in Hannibal, Missouri.
Photo credit: Crystal Dorothy

For this study, we did not review the entire The New York Rising Communities Reconstruction Program , but just one project in the Village of Sidney, due to the project's integration of social justice issues. Prior to receiving program funds, the Corps evaluated the potential installation of a floodwall to protect the Village of Sidney but found a floodwall does not meet the Corps' cost-benefit threshold. In response, the community started reviewing alternatives, including green infrastructure, to increase their community's resilience. The New York Rising Communities Reconstruction Program community planning effort brought the funding and engagement needed to thoroughly assess and evaluate Sidney's options. This resulted in a science-based, community-driven plan that outlined almost two dozen projects that will remove residents from danger, increase stormwater storage/conveyance, provide affordable housing options to displaced people and ensure that Sidney's jobs, historic Main Street, and economy remain resilient to future storm events.

Lessons for Illinois:

- **Community-driven processes create better outcomes.** Village of Sidney officials listened to the needs of the people impacted and then developed creative solutions that solved multiple problems associated with flood risk and economic stability.
- **Solutions need to be problem oriented.** State and federal programs tend to apply a solutions-driven approach, which limits the types of options available (i.e., floodwall versus no floodwall). If the solutions are not feasible, it weakens relationships with the

community. More flexibility is needed to focus on solving problems instead of presuming solutions.

2.3.4 California Department of Water Resources – Division of Multi-Benefit Initiatives

The California Department of Water Resources recently established the Division of Multi-Benefit Initiatives to develop and implement multi-benefit projects that "integrate flood risk reduction, ecosystem uplift, and water supply reliability throughout the Central Valley" (Delta Stewardship Council, 2020). The California Department of Water Resources has been discussing multi-benefit floodplain development since the establishment of their statewide flood management plan in 2012. However, California had not codified the practice as a preferred method of flood resilience management until the establishment of the Division of Multi-Benefit Initiatives in 2019.

The Division of Multi-Benefit Initiatives is focused on achieving the following social goals: public safety, ecosystem health, stable economies and enriching life experiences. Multi-benefit initiatives and projects are unique in that they tend to result in the aforementioned benefits, but the Division of Multi-Benefit Initiatives noted some struggles with changing public perception regarding multi-benefit projects. Typical misconceptions of multi-benefit projects are that these types of projects require more time, are more costly and create less beneficial impact than gray infrastructure solutions (e.g., levees, dams, and floodwalls). However, as the Division of Multi-Benefit Initiatives has implemented more projects, these misconceptions are dissipating as projects that incorporate multiple goals are consistently cost-competitive, effective and pay dividends. As a result, the Division of Multi-Benefit Initiatives has made a tangible impact on flood control throughout the Central Valley.

To generate more projects, the Division of Multi-Benefit Initiatives is correcting misperceptions and implementing more projects by working across all state and local agencies. In doing so, they can find unique solutions that increase the resilience to flooding while improving ecosystems and the quality of life for Californians.

Lessons for Illinois:

- **Goals should be human-centered.** To generate buy-in, program and project goals should clearly articulate how people will benefit from multi-benefit floodplain development. California's program shows that these projects can achieve broader social goals.
- **Challenge misconceptions.** Understanding public perception is key to developing goals and objectives that address any outstanding questions or misconceptions.

2.3.5 FEMA Building Resilient Infrastructure and Communities (BRIC) Grants

FEMA has been delivering pre-disaster mitigation grants since the signing of the Stafford Act in 1988 (FEMA, 2021a). The Building Resilient Infrastructure and Communities (BRIC) grant program was established in 2018 and consolidates several pre-disaster grant programs. BRIC was created following extensive stakeholder feedback in 2019 (over 5,000 comments received) and is designed to make communities more resilient through multi-benefit flood risk management planning and development. BRIC guiding principles are to support community capacity building, encourage and enable innovation, promote partnerships, enable large infrastructure projects, maintain flexibility and provide consistency. BRIC priorities are to encourage public infrastructure projects, mitigate risk to lifelines, promote nature-based solutions and incentivize adoption of modern building codes. Major programmatic focus is on

funding "lifelines" like communication, power, emergency personnel, etc. In the past, FEMA has focused disaster spending on a structure-by-structure basis, but now wants spending to focus less on individual buildings or pieces of infrastructure and more on sustaining vital community operations during and after the inevitable disaster. Also, BRIC is now funding pre-project planning (i.e., scoping and studies) to encourage community-driven solutions and partnerships, which will be more competitive.

2011 flood in Cairo, Illinois.
Photo credit: Iris Shreve Garrott

Funding for BRIC is based on current federal disaster spending. For each federally declared disaster that occurs, FEMA is required to create an estimate within six months of the declaration for the amount of assistance needed. From that estimate, six percent is set aside for the National Public Infrastructure Pre-Disaster Mitigation Fund, the parent fund that provides funding for BRIC. Each year, FEMA assesses the amount of funding available and makes allocations to the various programs funded through the National Public Infrastructure Pre-Disaster Mitigation Fund (including BRIC). In 2020, $500 million was allocated to BRIC and roughly distributed as follows: state/territory allocation: $33.6 million; tribal allocation: $20 million; mitigation grants: $446.4 million. Eligible entities include states, territories, federally recognized tribal governments and DC, as well as sub-applicants, including local governments, tribal governments, state agencies and tribal agencies. To submit an application for a BRIC grant, communities must have an approved Hazard Mitigation Plan and that is kept up to date. Hazard mitigation planning is also eligible for BRIC grant funding.

<u>Lessons for Illinois</u>:

- **Federal funding is available for multi-benefit floodplain development.** Federal funds are available to support multi-benefit floodplain development and, indeed,

such applications would be more competitive than traditional gray infrastructure by itself. Supporting multi-benefit floodplain development projects can bring more federal dollars to the state.

2.3.6 FEMA National Flood Insurance Program

Any resident (property owner or renter) can sign up for flood insurance if the community is part of the National Flood Insurance Program (NFIP). NFIP is a voluntary federal insurance program that maps flood hazard zones and provides incentives for better floodplain management for communities. To join, a community must adopt the flood hazard maps and studies and enforce flood hazard regulations. In Illinois, 89 out of 102 counties have joined and 891 communities have joined. Only a few rural areas have not been mapped; these areas are primarily in counties that are not already members of the program.

The regulated floodplain is defined by the Flood Insurance Rate Map, which defines the areas subject to flooding during 100-year flood events. Buildings within the regulatory floodplain will have higher insurance premiums versus those outside the mapped floodplain. To receive lower flood insurance premiums, structures must be elevated above or relocated outside of the flood zone, as defined by the rate map. Often, urban flooding areas are not shown as having a flood risk because they are behind a levee or are "protected" by another impoundment. Urban areas in densely populated cities will often not show flood risk, even though flooding may be an issue. Flood insurance is required as part of any federally backed loan if a building or mobile home is sited within the Special Flood Hazard Area, as defined by the Flood Insurance Rate Map. The flood insurance is used as a security of the loan. Once the loan is paid off, flood insurance is no longer required but is available for all homeowners and renters, on a voluntary basis, both inside and outside of the Special Flood Hazard Area.

Flood insurance only covers surface water flooding (i.e., it does not cover sanitary issues, basement seepage pump failures, etc.).

Flood insurance premiums also depend on community actions. If a community maintains compliance with NFIP requirements (i.e., the community is consistently enforcing minimum requirements and conducting consistent maintenance to benefit their community) the community can reduce flood insurance premiums for community members and organize a community floodplain management program.

Despite efforts to mitigate flood hazards in floodplains, 92 percent of flood damage in Illinois now occurs outside of the mapped floodplain. (Winters, 2015). This is due to out-of-date flood hazard maps and more intense rainfall. Rainfall has increased by 5 inches per year in the last 120 years, and the number of heavy rain events (2-inches or more per day) has increased 40 percent since 1901. And it is expected to get worse. Climate models predict a further increase in precipitation of 0-6 percent by mid-century and 2-10 percent by 2100 (Wuebbles, Angel, Petersen, & Lemke, 2021). Flooding outside the mapped floodplain is especially problematic because homeowner policies do not typically cover surface flooding and insurance riders are required for sanitary sewer backups.

Lessons for Illinois:

- **Floodplain projects influence community insurance rates**. Multi-benefit floodplain development can help lower flood insurance rates in participating communities.

- **Flood insurance is needed outside the mapped floodplain**. With 92 percent of flood insurance claims originating from locations outside the mapped floodplain, more people need to enroll in the NFIP.
- **Flooding is getting worse.** Flooding trends are tracking with climate models that predict more frequent and severe events. The number of flood hazard mitigation projects needs to increase dramatically.

2.3.7 U.S. Department of Agriculture (USDA) Easement Programs

USDA Easement programs for floodplain areas include the Agricultural Conservation Easement Program – Wetland Reserve Easement Program and the Emergency Watershed Protection Program - Floodplain Easement Option. These USDA easement options are made possible by a landowner's voluntary enrollment in the program. Financial compensation is provided to the landowners in exchange for land-use modifications or restrictions that benefit floodplain ecosystems. The landowner keeps the title and can sell the land or pass it on to heirs. Easements range from 30 years to perpetual, with around 85 percent being perpetual nationwide. Frequently, the 30-year easement holders come back to get perpetual easements.

Flooded farmland with and without conservation easements, along the Edwards River, Illinois.
Photo credit: Roy Plasschaert and LightHawk

Tribal and private landowners can enroll in the Wetlands Reserve Program. The goal of this program is to restore land to baseline conditions (prior to it being farmed) and protect and enhance wetland areas with the purpose of restoring hydrology and native vegetation. The USDA holds the easement and is responsible for monitoring and maintenance of the easement.

The program requires 24-month ownership, and landowners keep the rights to use and enjoy the property, to exclude others, and to possess or to transfer the property by sale or gift.

The Emergency Watershed Protection Program - Floodplain Easement Option is only funded when and where there is a disaster. The goal of the program is to restore the land, to the maximum extent possible, to its natural condition. Funding is requested through a secretarial order and is not something the USDA National Resources Conservation Service provides every year. The Dogtooth Bend area in Alexander County is currently enrolling landowners in floodplain easements. There was a levee in the area, but the Mississippi River breached the levee in 2016 and was not repaired. Farming has been nearly impossible since the levee breached. Finally, in 2019 the Dogtooth Bend area was included in the disaster designation, allowing floodplain easement funds to finally go to helping the landowners in the area.

Lands eligible for the EWPP - Floodplain Easement Option must have been damaged by flooding at least once in the previous calendar year or twice within the previous ten years. Additionally, the land must be within a floodplain and contribute to the restoration of the flood storage and flow, provide for control of erosion, or improve the practical management of the floodplain easement. Landowner eligibility is determined much like Wetlands Reserve Easement program. Should the landowner voluntarily enroll in the program, the landowner keeps the title but is required to comply to terms of agreement that define acceptable land uses.

Landowners are compensated through an appraisal process each year. Compensation value is determined as the lowest of three values:

1. The fair market value of the land. The fair market value may be determined through either of two methods: an area-wide market analysis or survey or an individual Uniform Standards for Professional Appraisal Practice (USPAP) appraisal.
2. The geographic area rate cap (GARC). The GARC reflects the value the State Conservationist, with the advice of the State Technical Committee, determines to be fair compensation for the value of the easement.
3. A voluntary written offer by the landowner. When the landowner applies for the easements, they may voluntarily offer to accept less compensation than NRCS would offer. This may enhance the probability of the easement becoming enrolled during a competitive enrollment cycle.

For EWPP – Floodplain Easements and perpetual ACEP – Wetland Reserve Easements, the NRCS will cover 100 percent of the restoration costs. Restoration actions are focused on restoring floodplain functions back to baseline and include both structural and non-structural conservation practices (e.g., planting trees to cut down the water flow) (USDA-NRCS, n.d.).

Lessons for Illinois:

- **Flooding is both a rural and urban issue.** Oftentimes, floodplain managers focus on flood impacts in urban areas; however, farmland and farm infrastructure can also suffer damage that impacts the bigger regional economies. Given the dominance of agriculture on the Illinois landscape, a multi-benefit floodplain development program needs to provide resources to farmers.

2.4 AVAILABLE DATA

A database query was conducted to fulfill investigations into publicly available data for the case study areas of this feasibility study. The table below details publicly available data that were sourced during this effort.

Dataset	Provider	Communities	Link
Threatened and Endangered Species Occurrences	IDNR	All	*Available upon request from IDNR
Illinois Natural Areas Inventory	IDNR	All	*Available upon request from IDNR
Illinois Land and Water Reserves	IDNR	All	*Available upon request from IDNR
Lands with Illinois Nature Preserves Commission Protection	IDNR	All	*Available upon request from IDNR
Buyouts as of 2017	Illinois State Water Survey	All	*Available upon request from IDNR
Conservation Reserve Enhancement Program Eligible Watersheds	IDNR	All	*Available upon request from IDNR
Landscapes of Ecological Integrity/Inventory	IDNR	All	*Available upon request from IDNR
Conservation Opportunity Areas	IDNR	All	*Available upon request from IDNR
Conservation Stewardship Program Properties	IDNR	All	*Available upon request from IDNR
Conservation Stewardship database	IDNR	All	*Available upon request from IDNR
Forest Development Act Properties	IDNR	All	*Available upon request from IDNR
FEMA National Flood Hazard Layer - Effective Data	FEMA	Freeport, Rockford, Ford Heights, Alexander	https://hazards.fema.gov/gis/nfhl/rest/services/public/NFHL/MapServer
FEMA National Flood Hazard Layer - Preliminary Data	FEMA	Ford Heights	https://hazards.fema.gov/gis/nfhl/rest/services/PrelimPending/Prelim_NFHL/MapServer
National Hydrography Dataset (NHDPlus High Resolution)	USGS	All	https://viewer.nationalmap.gov/services/
Hydric Soils	USDA	All	https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx
Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland (Soil types)	USDA	All	https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx
Corps Projects	USACE	Alexander, East St. Louis, Rockford	https://geospatial-usace.opendata.arcgis.com/datasets/1019535ea7a848939dc5b5d54aca19a9_1
National Land Cover Database	Multi-Resolution Land Characteristics Consortium	All	https://viewer.nationalmap.gov/services/
Corps National Levee Database	USACE	All	https://levees.sec.usace.army.mil/mapserver/public/ows
Flood Factor	First Street Foundation	All	https://www.illinoisfloodmaps.org/dfd.aspx
Building Footprints	Illinois State Water Survey	All	https://illinoisfloodmaps.org/

Dataset	Provider	Communities	Link
National Agricultural Statistics Service Cropland Data Layer	USDA	All	https://nassgeodata.gmu.edu/CropScape/

3. Stakeholder Engagement

In conjunction with the development of this feasibility study, a community stakeholder engagement process was undertaken to ensure community involvement in identifying the issues that residents and other stakeholders are living with or working to resolve. The engagement process is considered integral to the development of programmatic priorities and objectives for multi-benefit floodplain development. The stakeholder engagement process included four stakeholder meetings that were organized by American Rivers and their partners. Due to health precautions taken for the COVID-19 pandemic, participants attended the stakeholder meetings using Zoom virtual meeting software.

Stakeholders participated in discussions that focused on six case study areas (listed in Section 3.1.1) and assessed the viability of establishing a statewide multi-benefit floodplain development program. The diverse group of stakeholders represented in the meetings included the IDNR, Illinois Farm Bureau, Illinois Environmental Council, Friends of the Chicago River, Illinois Department of Transportation, The Nature Conservancy, various branches of the National Association for the Advancement of Colored People (NAACP), Southern Illinois University, and Blacks in Green, among others. A full list of stakeholder participants and notes from each stakeholder meeting are included in Appendix C.

3.1 Stakeholder Engagement Process

The stakeholder engagement process began with the development of a contact/attendee list targeting non-profit or non-governmental organizations, Illinois state agencies, and a cross-section of floodplain users. American Rivers sought to identify potential participants representing the two most common land uses that are negatively affected by flooding or changes in floodplain management — urban uses and agricultural uses. In addition, waterways and their floodplains in Illinois include miles of open space, recreational areas, and natural areas that provide habitat for common and rare species, recreational opportunities and, in some locations, space for a river or creek to overflow during storm and increased water events. American Rivers also sought to include participants who could speak to these uses.

As previously discussed, flooding issues often disproportionately affect communities of color and low income. American Rivers coordinated with the NAACP to identify communities of color in Illinois that have been most impacted by flooding and that should be included in the stakeholder engagement process. American Rivers also coordinated with the Illinois Farm Bureau in an effort to address extensive and repeated flooding that has occurred on agricultural lands; in some watersheds, repeated flooding has resulted in permanent removal of lands from agricultural productivity. In addition, American Rivers coordinated closely with Illinois state agencies that have oversight of floodplain areas or resources that rely upon them. These included IDNR, Illinois Department of Transportation, and others. Academic institutions, such as Southern Illinois University and the University of Illinois State Water Survey, were also included in the coordination efforts. Non-governmental organizations included The Nature Conservancy, the National Resources Defense Council, Blacks in Green, and Prairie Rivers Network.

3.1.1 Stakeholder Meeting #1 (September 15, 2020, 10:00 a.m. to 5:00 p.m. CT)

The first stakeholder meeting was intended to provide the large and diverse group of over 50 individuals an opportunity to be introduced to one another and to the idea of a multi-benefit floodplain program. Presentations were given by representatives implementing similar programs from the states of Washington and Vermont. Additionally, six geographic case studies were proposed:

1. Alexander County
2. East St. Louis
3. Freeport
4. Rockford
5. Effingham
6. Chicago (Ford Heights)

Breakout sessions were held to receive feedback from stakeholders on the proposed case study locations. The breakout sessions were divided by topic: Environment/Natural Resources, Farming/Agriculture and Social Justice/Equity. Attendees were self-elected for the three topic groups.

Following the first stakeholder meeting, extensive notes were sent to attendees along with a post-meeting survey asking participants to provide feedback on meeting format and topics and for suggestions on additional stakeholders or participants. As a result of the feedback, one case study, Effingham, was removed and replaced with Danville and two of the case studies became more focused on specific areas: Cairo in Alexander County and Centreville in East St. Louis. The revised six geographic case studies discussed at subsequent stakeholder meetings were:

1. Alexander County (Cairo)
2. East St. Louis (Centreville)
3. Freeport
4. Rockford
5. Danville
6. Chicago (Ford Heights)

Stakeholders also requested that the meetings be shortened from 6 hours, and this request was adopted for subsequent meetings.

3.1.2 Stakeholder Meeting #2 (October 27, 2020, 12:00 p.m. to 5:00 p.m. CT)

The goals of the second stakeholder meeting were to further define and clarify for attendees what is meant by multi-benefit floodplain development and to also provide attendees with responses to concerns about the case study locations. Lessons learned from the first meeting were discussed. Two education panel presentations were given, one on the California Department of Water Resources Multi-Benefit Floodplain Project Office and the other on the New York Rising Project in the Village of Sydney.

Stakeholder Meeting #2 focused on three of the six case studies: East St. Louis (Centreville), Alexander County (Cairo) and Rockford. Presentations from community members on the three case study areas affected by flooding (local municipality or county officials, the Illinois Farm Bureau and non-governmental organizations) preceded breakout sessions for each case study area. Breakout group attendees were randomly selected at the end of the presentations for each of the case studies. The objectives for each case study breakout session were to receive input on solutions to the flood-related issues being experienced in each location and to identify resource gaps to implement those solutions. Breakout session attendees were asked to provide their ideas to solve flood-related issues (if given unlimited resources) and to provide information on any existing programs or funding that may be available to the case study areas. Section 4 provides a summary, by case study area, of the feedback and input from the case study breakout sessions.

3.1.3 Stakeholder Meeting #3 (March 9, 2021, 12:00 p.m. to 5:00 p.m. CT)

Stakeholder Meeting #3 was set up similarly to the second stakeholder meeting and focused on the remaining three case study areas: Chicago (Ford Heights), Freeport and Danville. Educational panel presentations for the third stakeholder meeting included presentations on the Building Resilient Infrastructure and Communities Grant Program, the NFIP and the Agricultural Conservation Easement Program.

Presentations from community members on the three case study areas affected by flooding (local municipality or county officials, the Illinois Farm Bureau and non-governmental organizations) preceded breakout sessions for each case study area. Breakout group attendees were randomly selected at the end of the presentations for each of the case studies. The objectives for each case study breakout session were to receive input on solutions to the flood-related issues being experienced in each location and to identify resource gaps to implement those solutions. Breakout session attendees were asked to provide their ideas to solve flood-related issues (if given unlimited resources) and to provide information on any existing programs or funding that may be available to the case study areas. Section 4 provides a summary, by case study area, of the feedback and input from the case study breakout sessions.

3.1.4 Stakeholder Meeting #4 (April 27, 2021, 12:00 p.m. to 5:00 p.m. CT)

The fourth and final stakeholder meeting focused on the draft conclusions of the case studies as well as the findings and stakeholder recommendations resulting from the previous meetings and discussions. The participants reviewed all six case studies to ensure that their recommendations and feedback on the existing flooding conditions, challenges, barriers and potential solutions were accurately captured. Breakout sessions were held for each case study so that participants could discuss the most important lessons learned, record any information that was missed or misinterpreted, and provide any additional information stakeholders wanted to share about each location. At the end of the breakout sessions, American Rivers gave a presentation on the overall big-picture recommendations, which were based on stakeholder input and extensive literature research conducted by American Rivers. The presentation included an overview of why changes to floodplain development need to be made, the advantages of multi-benefit floodplain development, what kind of support is needed in Illinois to implement multi-benefit floodplain development, and the overarching recommendations that will be made to the Illinois General Assembly (based on the stakeholder meetings). At the end of the presentation, participants were asked to share their reactions and thoughts on the high-level recommendations. Revisions were made, and the final recommendations are discussed further in Section 4.5.

4. Case Studies

4.1 Selection Process for Case Studies

A desktop review was conducted to identify areas that are disproportionately impacted by flooding and floodplain-related issues. Following the desktop review, a preliminary list of six geographic case studies was presented to stakeholders during the first stakeholder engagement meeting. The initial list was revised and refined by meeting participants, and the final list of case study areas was carried forward in subsequent meetings and are discussed below. For the purpose of this discussion, the case study areas are grouped into three regions: Southern Illinois, Central Illinois, and Chicago (see Appendix B).

4.2 Southern Illinois

4.2.1 Alexander County

4.2.1.1 Location and Demographics

Alexander County is located in the southwestern tip of Illinois. It is bordered by the state of Missouri to the southwest, Pulaski County, Illinois, and the state of Kentucky to the east, and Union County, Illinois, to the north. The county has an area of 253 square miles and contains the city of Cairo, a rural, historic community that was a focal point of discussion during Stakeholder Meeting #2 due to the complex floodplain issues facing the city. Alexander County had a population of 8,238 people during the 2010 census. The U.S. Census Bureau estimates that the county has seen a 30.1 percent decrease in population since the 2010 census, placing the current population estimate at 5,761 people (USCB, 2019a).

The city of Cairo is an Illinois Environmental Protection Agency (IEPA) designated environmental justice area within Alexander County (see Appendix B). IEPA defines areas of environmental justice concern as “communit[ies] with low-income and/or minority populations greater than twice the statewide average” (IEPA, 2018). Large portions of Cairo are located within the FEMA floodplain and are inhabited by communities of color or low income.

ALEXANDER COUNTY RACIAL DEMOGRAPHICS (Source: USCB, 2019a)	
Census Group	***Percent of Population***
White	64.9%
Black or African American	31.8%
American Indian or Alaska Native	0.5%
Asian	0.3%
Native Hawaiian or Other Pacific Islander	0.2%
Two or More Races	2.4%
Hispanic or Latino	1.9%
ALEXANDER COUNTY INCOME DATA (Source: USCB, 2019a)	
County Median Household Income:	$38,806
National Average Median Household Income:	$68,703
Percent of Population in Poverty	24.0%

4.2.1.2 Existing Conditions

During Stakeholder Meeting #2, floodplain and flooding issues were discussed in depth. Representatives from Alexander County, Alexander County Soil and Water Conservation District, The Nature Conservancy, Cairo NAACP and the Illinois Farm Bureau were present during the meeting and discussed the flooding issues the county is facing. A synopsis of these issues can be found in the subsections below. Specific recommendations on how to address these issues are included in Section 3.7.

4.2.1.2.1 Hydrology

The western and southern boundary of Alexander County (and Illinois) is formed by the Mississippi River, and the eastern boundary of the county is formed by the Cache and Ohio rivers. The southernmost point of Alexander County is located at the confluence of the Mississippi and Ohio rivers. Alexander County is primarily located in the Upper Mississippi River drainage basin, with a small portion of the southeastern part of the county in the Ohio River drainage basin. Alexander County is intersected by multiple U.S. Geological Survey eight-digit Hydrologic Unit Code (HUC8) watersheds (i.e., sub-basin level hydrologic units, such as medium-sized river basins), including the Upper Mississippi-Cape Girardeau (HUC8 07140105), Cache (HUC8 07140108), and Lower Ohio (HUC8 05140206) watersheds. Mean annual precipitation for Alexander County is approximately 47.6 inches, with precipitation being evenly distributed throughout the year, averaging between 3.0 to 4.8 inches per month.

Alexander County is bordered by the Mississippi and Ohio rivers, resulting in a large portion of the county being in the FEMA floodplain. Dogtooth Bend, a riverine peninsula formed by a meander of the Mississippi River, is located west of Cairo. Located north of Dogtooth Bend is Horseshoe Lake, an oxbow lake that was formerly a large meander of the Mississippi River but has since been abandoned by the mainstem. Additional levees are located east of Dogtooth Bend surrounding the city of Cairo. These levees are managed by the Corps' Mississippi River Commission as part of the Mississippi River and Tributaries System. An additional agricultural levee is located in northern Alexander County across from Cape Girardeau and protects approximately 550,000 acres of farmland.

4.2.1.2.2 Flooding Impacts

Alexander County has been subject to many flooding events throughout its history. In recent years, agricultural lands at Dogtooth Bend have been flooded to the point that they are no longer farmable. To combat the financial impacts to farmers and other residents in the Dogtooth Bend area, The Nature Conservancy has been working with the Natural Resources Conservation Service and local residents to enroll landowners in easement programs that provide financial compensation to those that are unable to farm their land due to flooding. This helps to reconnect the floodplain to these agricultural areas and increases floodplain benefits for those living in the area (USDA-NRCS, 2020).

The Len Small Levee, initially installed in 1945 to enable agriculture at Dogtooth Bend, was breached in 1993, 2011 and 2016 and has remained in disrepair following the most recent failure. The levee's failure has been linked to the alluvial sediment deposited at the location by the historical Ohio River. This sediment is readily eroded by the Mississippi River and further levee repairs will only serve as a temporary solution that fails to address the larger structural issues present (Olson and Speidel, 2020). In addition, water contained behind the Len Small Levee results in backwater flooding into Horseshoe Lake located upstream. The flooding is threatening infrastructure at Horseshoe Lake and the associated sedimentation from flooding is

damaging existing natural resources (i.e., habitat for waterfowl), recreational resources and associated recreational infrastructure.

2011 Flood (top) and 2010 (bottom) in Alexander County, Illinois.
Photo credit: NASA

Cairo is regularly subjected to flooding events that disproportionately impact the city's communities of low-income and color. In April 2011, Alexander County received 16.1 inches of rainfall which, combined with upstream runoff from snowmelt, brought the river to a record 61.72 feet, within 2 feet of the levee's capacity (Shaw, Song and Michels, 2018). To prevent the Ohio River's levee from breaking and flooding the town, the Corps manually breached the levee downstream and flooded the Birds Point New Madrid Floodway, a 130,000-acre parcel of farmland located downstream in the state of Missouri. In addition to concerns about the effectiveness of Cairo's levee system, Cairo suffers from groundwater intrusion and has

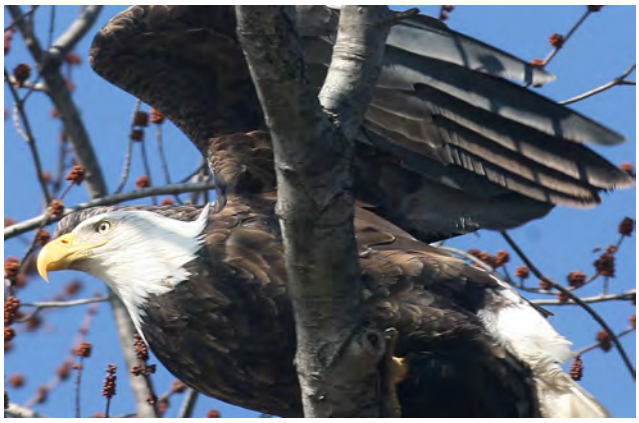
outdated, underperforming storm and sewer infrastructure. The impacts of inadequate storm and sewer infrastructure are felt by residents on an annual basis when intense rainfall events overwhelm the existing infrastructure and flood residential areas and homes.

The U.S. Census Bureau's 2019 population estimate shows Cairo's population is rapidly shrinking, which directly impacts the tax revenue that the City is able to generate to maintain critical infrastructure, including levees. Although these levees are managed by the Corps, the City of Cairo is responsible for maintaining the associated pump stations. In light of these population and tax revenue estimates, Cairo's financial capabilities to maintain the pump stations is a concern.

4.2.1.2.3 Biological and Natural Resources

A total of 36 federally listed threatened and endangered species or critical habitats occur in Alexander County. These species should be considered when discussing potential floodplain management decisions in the county. The 12 federally listed threatened species include one mammal, one bird, one reptile, one mussel, and eight plants. The 21 federally listed endangered species include two mammals, two birds, one fish, 10 mussels, one snail, three insects, one crustacean, and one plant. Additionally, Alexander County contains designated critical habitat for one bird, one mussel, and one insect. A comprehensive list of species can be viewed online through the U.S. Fish and Wildlife Service website at fws.gov/midwest/endangered/lists/illinois-spp.html

A total of 47 IDNR state-listed threatened and endangered species occur in Alexander County. These species should also be considered when discussing potential floodplain management decisions in the county. Of these species, 13 are state-listed threatened, including seven plants, two amphibians, one fish, one bird, one mammal, and one reptile. State-listed endangered species in Alexander County include 17 plants, six fish, five birds, four mammals, one reptile, and one crustacean. A comprehensive list of species can be viewed online through IDNR's website at www2.illinois.gov/dnr/ESPB.



Bald eagle, Illinois River, Illinois.
Photo credit: Chris Young

Additionally, the bald eagle (*Haliaeetus leucocephalus*), which is afforded protection through the Bald and Golden Eagle Protection Act, is present in Alexander County.

Although none of these resource concerns occur directly within the city of Cairo, both the state-listed endangered osprey (*Pandion haliaetus*) and bald eagle have been spotted in proximity to the city and have potential to occur within the city limits.

Alexander County contains numerous sections of land enrolled in the Illinois Natural Areas Inventory. The inventory shows high-quality natural areas, habitats of endangered species and other significant natural features intended to guide and support public, private and non-governmental organization land acquisition and protection. These lands, however, are disconnected from Cairo, the only environmental justice community in Alexander County. Illinois Natural Areas Inventory lands within Alexander County can be viewed in Appendix B.

4.2.2 East St. Louis and Centreville[2]

4.2.2.1 Location and Demographics

Centreville is located in western Illinois within St. Clair County, along the state's border with Missouri (see Appendix B). The border follows the Mississippi River, which separates East St. Louis, Illinois, from the city of St. Louis, Missouri. Centreville covers approximately 4.2 square miles southeast of East St. Louis and is part of the larger St. Louis metropolitan area. Centreville had an estimated population of 5,309 at the 2010 census. The U.S. Census Bureau estimates that the city has seen a 5.8 percent decrease in population from 2010 to 2019, with the estimated population in 2019 being 4,999 people (USCB, 2019b).

Centreville has multiple IEPA-designated environmental justice areas that are populated by communities of low income and color (see Appendix B).

CENTREVILLE RACIAL DEMOGRAPHICS (Source: USCB, 2019b)	
Census Group	***Percent of Population***
Black or African American	93.2%
White	4.6%
Native American or Alaska Native	1.6%
Asian	0.2%
Two or More Races	0.4%
CENTREVILLE INCOME DATA (Source: USCB, 2019b)	
Centreville Median Household Income:	$21,370
National Average Median Household Income:	$68,703
Percent of Population in Poverty	42.1%

4.2.2.2 Existing Conditions

During Stakeholder Meeting #2, flooding and floodplain issues in East St. Louis and Centreville were discussed in depth. Residents from Centreville and representatives from the East St. Louis NAACP and the Illinois Farm Bureau were present and discussed the issues these communities are facing. A synopsis of these issues can be found in the subsections below. Specific recommendations on how to address these issues are included in Section 3.7.

4.2.2.2.1 Hydrology

Centreville is located in the Upper Mississippi River drainage basin within the Cahokia-Joachim watershed (HUC8 07140101). The Mississippi River is located in proximity to Centreville, which is situated within its floodplain. This part of the Mississippi's floodplain is known as the American Bottom. Mean annual precipitation for East St. Louis and Centreville is 39.46 inches. May is typically the wettest month, with an average 4.2 inches of precipitation.

[2] During the course of this study, a referendum was passed that combined the neighboring municipalities of Centreville, Cahokia, and Alorton. While the new community of Cahokia Heights was established by the finalization of this report, we maintained the original names for clarity.

Near Centreville, the Mississippi River is contained by the Metro East Levee system. During precipitation events, runoff in the Cahokia-Joachim watershed flows from east to west toward the Mississippi River due to topographical influence. Precipitation that falls in the bluffs east of Centreville drains into Centreville, resulting in frequent urban flooding events. Stormwater infrastructure is designed to pump the water out of Centreville into East St. Louis and subsequently into the Mississippi, but similar infrastructure issues in East St. Louis prevent Centreville from pumping stormwater out of the area. East St. Louis' stormwater infrastructure is unable to handle the combined stormwater input from Centreville in addition to their own load. As a result, stormwater accumulates in Centreville and overloads their current infrastructure, resulting in constant degradation and increasingly common flood events.

4.2.2.2.2 Flooding Impacts

Many residents attribute the current infrastructure issues in Centreville to extreme flooding that occurred in 1993, commonly referred to as the Great Flood of 1993. The Great Flood of 1993 resulted in at least 32 deaths and approximately $15 to $20 billion in damage (Larson, 1996). During stakeholder engagement sessions, residents of Centreville noted that infrastructure issues in the city became much worse following these floods; residents assume that infrastructure became damaged during the flood and never received necessary repairs. Because of this, the aboveground stormwater pumps and sewage system do not function properly and continue to degrade.

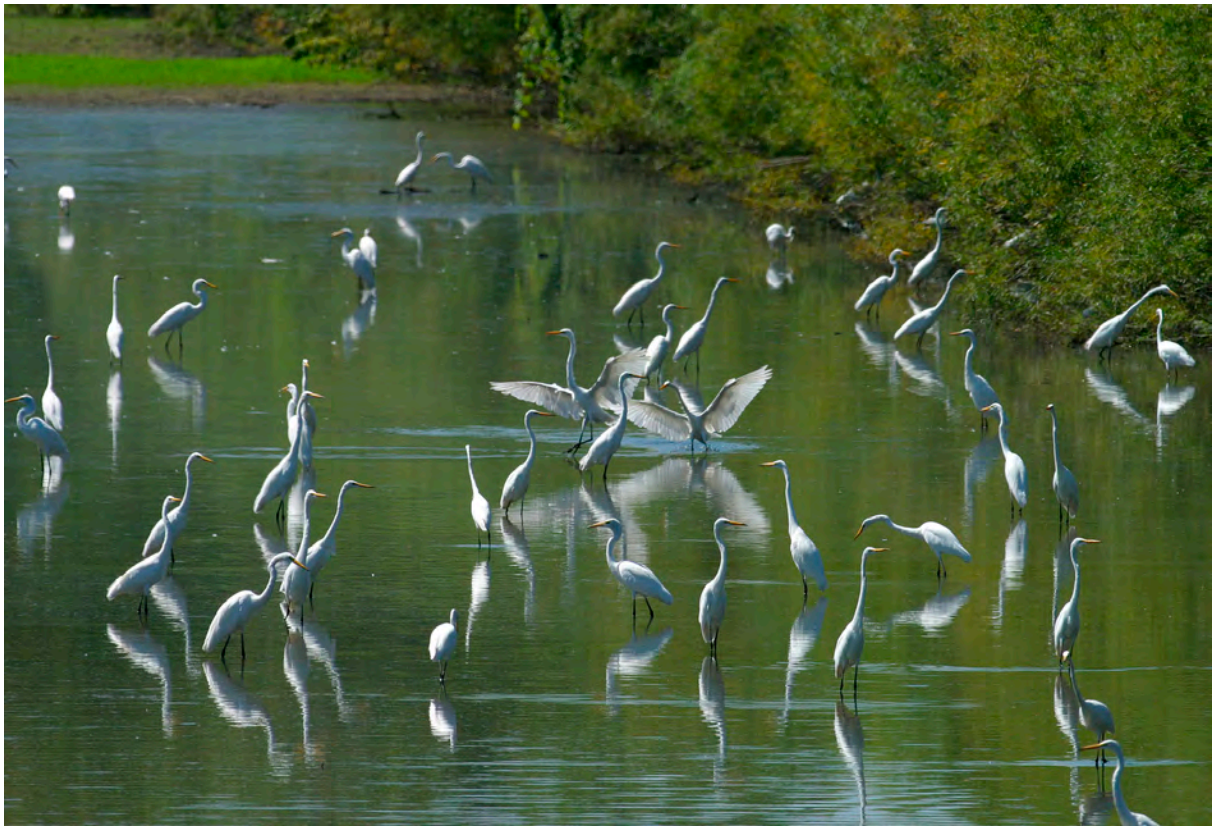
Centreville's pump systems are unable to keep up with the amount of water they need to convey to keep residents' homes safe from flood events. Because of the overloaded stormwater and sewage systems, basements in Centreville flood on an annual basis and residents are replacing major appliances (i.e., water heaters, furnaces, air conditioning systems, etc.) every 2 to 3 years. During annual flood events, raw sewage backs up into residential properties and spills out of toilets and sinks. To avoid interior damage from sewer backups, some residents have installed "clean-out pipes" in their yards that allow sewers to spill out onto their lawns instead of the inside of their homes. Residents are then required to pay for removal of the sewage from their lawns in addition to the sewer fees they are already paying for and outdated, damaged infrastructure.

Due to Centreville's failing stormwater and sewer infrastructure, many residents are concerned for their health. Clean-out pipes re-route sewage onto the lawns, the city's wastewater is seen bubbling out of manholes, and many residents report living with mold in their homes (St. Louis Post-Dispatch, 2020). Residents also expressed concerns about the quality of their drinking water. Illinois American Water has flushed the lines in Centreville and declared the water is safe to drink, but many residents still do not trust the infrastructure and resort to purchasing and obtaining bottled water through organizations, like the Urban League of Metropolitan St. Louis, to avoid the risk.

Frequent flooding and substandard municipal infrastructure have lowered property values in Centreville. Due to the issues described above, many homeowners are unable to sell their homes and relocate to safer areas. Updates to municipal infrastructure are not currently possible due to the magnitude of the problem and negative population trends over the past decade that have resulted in a shrinking tax revenue pool necessary for capital improvements. To compound problems even further, many grant programs that are available for infrastructure upgrades are not accessible to these communities due to cost-sharing requirements.

4.2.2.2.3 Biological and Natural Resources

Centreville has no recorded sightings of federally or state-listed threatened or endangered species. However, Alorton, Illinois, located 0.5 mile west of Centreville, is home to the Alorton Heron Rookery, which contains habitat for the snowy egret (*Egretta thula*), little blue heron (*Egretta caerulea*), black-crowned night-heron (*Nycticorax nycticorax*) and the yellow-crowned night-heron (*Nyctanassa violacea*), all state-listed endangered species. Additionally, Centreville is intersected by the Frank Holten State Recreational Area, a 1,080-acre urban state park that contains habitat for the state-listed threatened blue sage (*Salvia azurea*) and bald eagle (protected under the Bald and Golden Eagle Protection Act). Because of their proximity to Centreville, these species should be considered when discussing potential floodplain management decisions.



Egrets in a floodplain, Illinois.
Photo credit: Chris Young

4.3 Central Illinois

4.3.1 Freeport

4.3.1.1 Location and Demographics

The city of Freeport is located in northern Illinois within Stephenson County, approximately 20 miles south of the Wisconsin border (see Appendix B). The estimated population of Freeport was 25,638 at the 2010 census. The U.S. Census Bureau estimates that the city has seen a 7.3 percent decrease in population from 2010 to 2019, with the estimated population in 2019 being 23,775 people (USCB, 2019c).

Large areas of northeastern Freeport are dominated by low-income residents and have been designated as environmental justice areas by the IEPA (see Appendix B).

Flood damage in Freeport, Illinois.
Photo credit: U.S. National Archives

FREEPORT RACIAL DEMOGRAPHICS (Source: USCB, 2019c)	
Census Group	***Percent of Population***
White	81.8%
Black or African American	13.8%
Native American or Alaskan	0.2%
Asian	1.0%
Pacific Islander	0.04%
Other Races	1.0%
Two or More Races	2.2%
Hispanic or Latino of any Race	2.1%
FREEPORT INCOME DATA (Source: USCB, 2019c)	
Freeport Median Household Income:	$35,399
National Average Median Household Income:	$68,703
Percent of Population in Poverty	13.1%

4.3.1.2 Existing Conditions

During Stakeholder Meeting #3, floodplain and flooding issues for the city of Freeport were discussed in depth. Representatives from NFIP, the NAACP and the Illinois Farm Bureau were present during the meeting and discussed the flooding issues the community is facing. A synopsis of these issues can be found in the subsections below. Specific recommendations on how to address these issues are included in Section 3.7.

4.3.1.2.1 Hydrology

Freeport is bordered by the Pecatonica River along the northern boundary of the city and Yellow Creek along the southern boundary of the city. The Pecatonica River is a major tributary of the

Rock River. Freeport is entirely within the Pecatonica watershed. The Pecatonica River is one of the major rivers that comprises the Rock River Basin, which occupies 6,481 square miles in northwest Illinois. Mean annual precipitation in Freeport is approximately 37.2 inches, occurring throughout the year. June is the wettest month on average, which combines with spring snowmelt from upstream and results in flooding along the Pecatonica River. The river channel that comprises the Pecatonica River has wide bows and frequently doubles back, creating a wide floodplain with an average width of 1 mile or more (Sinclair, 1996).

The Pecatonica River watershed runs south from southern Wisconsin into Illinois, with the majority of the land cover within the watershed used for agricultural practices (82 percent) and only a small portion of the watershed being urban residential (7 percent), mostly within the east side of Freeport. The Pecatonica River watershed is predominantly characterized by rolling hills and well-developed stream valleys (IEPA, 2014).

A 2016 study by the Wisconsin Department of Natural Resources focused on the non-wadable waters of the Pecatonica River upstream of Stephenson County, Illinois. The study determined that the best approach for mitigating excessive flooding and poor water quality downstream is to focus efforts in smaller HUC12 watersheds (i.e., sub-watershed level hydrologic units, such as tributary systems), as practically-sized implementation areas. Implementing landscape-level best management practices may slowly improve the water quality and reduce flood risks in the watershed over long periods of time. Implementation practices such as barnyard and pasture management and streambank stabilization to reduce sediment runoff and nutrients from fields and reduce erosion of streambanks are all viable options.

4.3.1.2.2 Flooding Impacts

The Pecatonica River and Yellow Creek both experience regular flooding, impacting both residential and agricultural communities. There are no levees in place outside of the city of Freeport.

In March 2017, the Pecatonica River reached its highest river crest since 1938, reaching a height of 17 feet. Since flooding events in 2017 and 2018, many community members on the east side of Freeport have been forced to relocate, leaving many empty homes. Since May 2017, the Pecatonica River has flooded Freeport seven times. The necessary flood cleanup has cost the City of Freeport more than $1.5 million (Better Government Association, 2019).

Construction along the Pecatonica River within Freeport has been halted since severe flooding in 1994. The City of Freeport has pursued homeowner buyout programs due to increased flooding occurrence, but lack of outreach and limited public interest has affected the success of the buyout programs and, in general, the buyout programs have had a contentious history in Freeport, even with increasing efforts by individuals, families and City officials to mitigate flooding impacts on an annual basis. With the current suite of flood risk reduction options, buyouts are the only path forward for the residents on the east side of Freeport. Many of the homes within the Pecatonica River floodplain, especially in the northeast portion of Freeport, have low property values. Because these buyouts are based on a home's current market value in the city of Freeport, where home values are typically low, homeowners accepting a buyout cannot afford to purchase a home elsewhere. Additionally, the remaining families and individuals are deeply culturally connected to the east side of Freeport and are hesitant about losing touch with their local cultural heritage. Outside of the city of Freeport, land use is predominantly agricultural, which raises some community stakeholder concerns about overlapping land use.

4.3.1.2.3 Biological and Natural Resources

State-listed endangered species present within Freeport include yellow birch (*Betula alleghaniensis*), downy yellow painted cup (*Castilleja sessiliflora*), spike (*Eurynia dilatata*) and blacknose shiner (*Notropis heterolepis*). Additionally, the state-listed endangered tall sunflower (*Helianthus giganteus*) may occur within the vicinity of Freeport. There are no state-listed threatened species in Freeport.

The Freeport Prairie Nature Preserve is the only nature, land or water preserve located in the city of Freeport. The preserve is located in the south-central part of Freeport and is in proximity to the environmental justice areas of concern in the city.

4.3.2 Rockford

4.3.2.1 Location and Demographics

The city of Rockford, Illinois, is located in central Illinois within Winnebago County, approximately 20 miles south of the Wisconsin border and 25 miles east of Freeport (see Appendix B). Rockford has an area of approximately 65.39 square miles and the largest population in the state of Illinois outside of the Chicago metropolitan area, with an estimated population of 152,871 at the 2010 census. The U.S. Census Bureau estimates that the city has seen a 4.8 percent decrease in population since the 2010 census, placing the current (2019) population estimate at 145,609 people (USCB, 2019d).

Kent Creek in Rockford, Illinois.
Photo credit: Olivia Dorothy

The city of Rockford contains many IEPA-designated environmental justice areas (see Appendix B) that are inhabited by populations of color or low income.

ROCKFORD RACIAL DEMOGRAPHICS (Source: USCB, 2019d)

Census Group	*Percent of Population*
White	65.1%
Black or African American	20.5%
Native American	0.4%
Asian	2.9%
Pacific Islander	0.01%
Other Races	7.5%
Two or More Races	3.6%

ROCKFORD INCOME DATA (Source: USCB, 2019fd)	
Rockford Median Household Income:	$38,000
National Average Median Household Income:	$68,703
Percent of Population in Poverty	14.0%

4.3.2.2 Existing Conditions

During Stakeholder Meeting #2, floodplain and flooding issues for the city of Rockford were discussed in depth. Representatives from the Rockport NAACP, the City of Rockport, and the Illinois Farm Bureau were present during the meeting and discussed the flooding issues the community is facing. A synopsis of these issues can be found in the subsections below. Specific recommendations on how to address these issues are included in Section 3.7.

4.3.2.2.1 Hydrology

Rockford is situated on the banks of the Rock River, which flows south into the Mississippi River. Rockford is located in the Upper Mississippi drainage basin and almost entirely within the Lower Rock watershed (HUC8 07090005) A small portion of the eastern and southern boundaries of the city lies within the Kishwaukee watershed (HUC8 07090006). The Rock River is one of the major rivers that comprises the Rock River Basin, which occupies 6,481 square miles in northwest Illinois. Mean annual precipitation in Rockford is approximately 36.2 inches, occurring throughout the year; June is typically the wettest month, with an average 4.7 inches of precipitation.

Rock River floodplain, Illinois.
Photo credit: Olivia Dorothy

Increased development along the Rock River coupled with increasing storm frequency has created more severe flooding events within the city of Rockford. Currently, there are no levees or adequate stormwater infrastructure in place along the Rock River to mitigate flooding events. During Stakeholder Meeting #2, local stakeholders commented on the lack of land use plans addressing flooding along the Rock River.

4.3.2.2.2 Flooding Impacts

Within Rockford, the major areas of concern for high-risk flooding coincide with areas with communities of color and low income. Areas such as the southern and western sides of Central Avenue frequently sustain the worst impacts of flooding events and have the most difficulty rebounding economically, as many families struggle to afford flood insurance premiums. Most of the western side of Rockford has been designated by the IEPA as environmental justice areas, with communities of color and low income.

Most watersheds in Rockford have a combination of urban and rural land uses. Concerns raised by some community stakeholders directly relate to the overlapping land use. Specifically, residents expressed concern about a large condominium community on the east side of Rockford, where water that is discharged from farmland located upstream of the community frequently floods the building and its grounds where it ponds into a lake. The people who live in the condominiums are often displaced and live with environmental and public health concerns as a result of these upstream releases.

In recent years, flooding events in the Rock River have steadily become more frequent. Two of the top five historic crests of the Rock River, measured a few miles upstream from Rockford, were recorded in 2018 and 2019 (NOAA, 2021a). The significant increase in Rock River flooding has exacerbated impacts to citywide infrastructure, residential subdivisions, and agricultural zones. Local stakeholders have commented on agricultural practices being severely impacted with damaging flooding events now occurring every 1 to 2 years within the last decade, which previously occurred an average of only 2 out of every 10 years. One local farmer whose land abuts Keith Creek put 10 acres into a wetland reserve program, as those acres had become unsustainable to use as productive agricultural land.

In 2006 and 2007, Keith Creek sustained back-to-back years of 100-year flooding events. Keith Creek is a tributary of the Rock River and runs west to east across the northwestern section of Rockford. Since the flooding events in 2006 and 2007, the City of Rockford has invested heavily in acquisition and demolition of residential homes in the path of the Keith Creek floodplain. These activities have resulted in 122 homes being acquired and demolished through grants to return the creekside to a more natural setting and encourage stream meandering. However, the creek is essentially channelized at this location and requires additional investment to restore it to natural greenspace. Funding for citywide restoration projects continues to be the most pressing issue preventing large-scale floodplain and infrastructure improvements.

The Alpine Dam, which is located east of Rockford along Keith Creek and regulates flow into Rockford, is scheduled to undergo infrastructure improvements to satisfy infrastructure standards over the next 2 years after the City of Rockford allocated $2.5 million in funding for the necessary upgrades. In a 2007 report written by the Corps, the Alpine Dam is described as "in poor condition due to its age and does not meet federal design standards" (The Corps, 2009). Improvements are aimed at better regulating flood waters and preventing dam failure.

Rockford currently lacks an extensive network of stormwater basins, whereas other nearby municipalities have regional stormwater management infrastructure. Additionally, Winnebago County does not have the State-granted authority for countywide stormwater management. Rockford does, however, have an established Stormwater Environmental Management Team, whose purpose is "protecting and improving the quality of local bodies of water [...] by implementing flood control systems, water monitoring, and enforcing water-friendly construction practices that follow Environmental Protection Agency standards." The Rockford Stormwater Environmental Management Team has produced regulatory documents such as the 2015 Stormwater Management Plan, the 2015 Stormwater Management Ordinance, and 2018 and 2019 Annual Reports. These documents are made available for public viewing on the website for the City of Rockford.

4.3.2.2.3 Biological and Natural Resources

A total of seven state-listed threatened and endangered species are present within the city of Rockford. These species should be considered when discussing potential floodplain management decisions in Rockford. State-listed threatened species include gravel chub (*Erimystax x-punctatus)*, river redhorse (*Moxostoma carinatum)*, black-billed cuckoo (*Coccyzus erythropthalmus*) and Franklin's ground squirrel (*Poliocitellus franklinii*). State-listed endangered species include rusty patched bumblebee (*Bombus affinis*) (also federally listed endangered), upland sandpiper (*Bartramia longicauda*), and large-flowered beard tongue (*Penstemon grandifloras*). In addition, bald eagles (federally protected under the Bald and Golden Eagle Protection Act) are present in the city of Rockford.

The Searls Park Prairie Nature Preserve is the only Illinois nature preserve within the city limits and is located several blocks away from IEPA environmental justice communities. In the area surrounding Rockford (outside of the city limits), there are several other Illinois nature, land and water preserves. Similar to the Searls Park Prairie Nature Preserve, these are all disconnected from IEPA-designated environmental justice communities. These include the Harlem Hills Nature Preserve to the northeast, the Johns Mound Group Land and Water Reserve, the Silver Creek Prairie Natural Heritage Landmark, the Howard D. Colman Dells Nature Preserve and the Severson Dells Nature Preserve, all to the west, and the Winquist Prairie Natural Heritage Landmark to the southeast.

4.3.3 Danville

4.3.3.1 Location and Demographics

The City of Danville is the county seat of Vermilion County. Danville is located approximately 120 miles south of Chicago and 35 miles east of Champaign-Urbana (see Appendix B). The population of Danville was estimated at 33,027 in 2010. The U.S. Census Bureau estimates that the city has seen a 7.7 percent decrease in population since the 2010 census, placing the current estimated population at 30,479 people (USCB, 2019e).

The IEPA has designated large sections in the center of Danville along Stoney Creek and along Lick Creek in the northwestern edge of Danville as environmental justice areas because they contain mostly communities of color and low income (see Appendix B).

DANVILLE RACIAL DEMOGRAPHICS (Source: USCB, 2019e)	
Census Group	***Percent of Population***
White	70.2%
Black or African American	24.4%
Native American	0.2%
Asian	1.2%
Pacific Islander	0.03%
Other Races	2.1%
Two or More Races	1.9%
Hispanic or Latino of any Race	4.6%
DANVILLE INCOME DATA (Source: USCB, 2019e)	
Danville Median Household Income:	$30,143
National Average Median Household Income:	$68,703
Percent of Population in Poverty	18.1%

4.3.3.2 Existing Conditions

During Stakeholder Meeting #3, flooding and floodplain issues in Danville were discussed in depth. Representatives from NFIP, the City of Danville, the NAACP and the Illinois Farm Bureau were present and discussed the issues Danville is facing. A synopsis of these issues can be found in the subsections below. Specific recommendations on how to address these issues are included in Section 3.7.

4.3.3.2.1 Hydrology

Danville is almost entirely within the Vermilion watershed (HUC8 05120109), with a small section of the eastern edge of the city within the Middle Wabash-Little Vermilion watershed (HUC8 05120108). Average monthly precipitation ranges from 1.99 inches in February to 4.70 inches in June, which is the wettest month of the year for Danville.

Lake Vermilion, a 1,000-acre reservoir and important recreational and tourist attraction, is located along the northern edge of Danville. Danville is within the floodplain of several nearby rivers and creeks, including the Vermilion River, North Fork River, Lick Creek and Stony Creek. These waterways are all tributaries of the larger Wabash River, which conveys flow from headwaters in Ohio through Indiana and joins the Ohio River on the border of Illinois and Kentucky. Stoney Creek runs through a community of color as well as a community of low income in the center of Danville.

4.3.3.2.2 Flooding Impacts

In recent years, increasing flooding occurrence and severity has promoted community investment in mitigating flood risks and damage; however, Danville still lacks adequate funding to combat current flood risks and the likelihood for increased flood risk in the future. Buyout programs, organized by the City of Danville, are currently in place in areas of high flood risk, such as where Stoney Creek flows through the center of Danville's communities of low income. Common issues faced by city residents include flooding in the streets, which restricts vehicular transportation, and flooding of residences, which causes millions of dollars in property damage and threatens the health and safety of residents. During Stakeholder Meeting #3, community stakeholders expressed concerns about the flooding along Stoney Creek that impacts residences in communities of low-income. Stakeholders also shared concerns regarding inadequate and outdated infrastructure along North Fork Creek, which impacts citywide resources.

Sequential storm days resulted in 6 to 8 inches of rainfall within a few days across Danville in 2016. Severe flooding coupled with the overloaded and outdated stormwater drainage system forced the Danville Elementary School into closure for the remainder of the 2016–2017 school year. Infrastructure in Danville is outdated, ranging in age from 50 to 80 years of operation.

North of the city of Danville, the North Fork of the Vermilion River floods annually and causes problems in recreational parks frequented by Danville residents as well as structures downstream. In 1994, the Danville Sanitary District's water treatment plant was inundated with flood water and caused a sewage leak into the watershed and residential areas. Immediately following the incident, a barrier was placed around the water treatment plant in Danville to prevent floodwater from the Vermilion River from contaminating the treatment facility and to prevent sewage leaks. Additionally, dams were removed from the North Fork of the Vermilion River in 2018, which has had some positive impacts on flooding reduction south into Danville.

The City of Danville and the NFIP conducted a previous community outreach exercise to gain input on flooding issues in the city. Results from a survey into citywide drainage problems resulted in a common understanding of problems facing Danville, including street flooding, property flooding, erosion, rolling topography, abundance of creeks and watersheds in the area, overdevelopment in creeks and drainages and out-of-date infrastructure. The takeaway of the survey was that, at this time, community stakeholders are interested in focusing efforts on infrastructure updates to address the issues created through overdevelopment and out-of-date, inadequate infrastructure.

In addition to these data gathering efforts by the City of Danville and the NFIP, community members are engaged in an existing effort to select and implement infrastructure improvements in Danville. Forty potential projects were identified by the NFIP and the City of Danville; however, there is insufficient funding to pursue these projects. An effort to prioritize some of these projects resulted in 10 top-priority projects being selected. The City Council of Danville approved a rate increase on the storm and sanitary sewer bills in 2020, which is set to generate close to $1 million a year to go toward stormwater and sewer projects. However, residents expressed concern over the priority projects that were selected, citing that the distribution of these projects is inequitable and does not benefit communities of color proportionally.

4.3.3.2.3 Biological and Natural Resources

A total of seven state-listed threatened and endangered species are present within Danville. These species should be considered when discussing potential floodplain management decisions in Danville. State-listed threatened species include wavy-rayed lampmussel (*Lampsilis fasciola*), purple wartyback (*Cyclonaias tuberculata*), bigeye chub (*Hybopsis amblops*), monkeyface (*Quadrula metanevra*), eastern sand darter (*Ammocrypta pellucida*) and river redhorse. State-listed endangered species include bluebreast darter (*Etheostoma camurum*).

Danville has no Illinois nature, land, or water preserves or INAI lands within its city limits.

4.4 CHICAGO

4.4.1 Ford Heights

4.4.1.1 Location and Demographics

The village of Ford Heights is located approximately 25 miles south of Chicago in Cook County, Illinois (see Appendix B), and has an area of 1.95 square miles. Ford Heights is 3.5 miles west of the state's border with Indiana and is bisected by Deer Creek, a source of frequent urban flooding events in the village.

Ford Heights had an estimated population of 2,858 at the 2010 census. The U.S. Census Bureau estimates that the village has seen a 4.3% decrease in population since the 2010 census, placing the current population estimate at 2,736 people (USCB, 2019f).

Ford Heights is an IEPA-designated environmental justice area that is inhabited by communities of color and low income (see Appendix B).

FORD HEIGHTS RACIAL DEMOGRAPHICS (Source: USCB, 2019f)	
Census Group	***Percent of Population***
Black or African American	95.6%
White	2.9%
Two or More Races	1.4%
FORD HEIGHTS INCOME DATA (Source: USCB, 2019f)	
County Median Household Income:	$34,167
National Average Median Household Income:	$68,703
Percent of Population in Poverty	41.2%

4.4.1.2 Existing Conditions

During Stakeholder Meeting #3, flooding and floodplain issues in Ford Heights were discussed in depth. Representatives from NFIP, Kankakee NAACP, the Metropolitan Water Reclamation District of Greater Chicago, and Ford Heights Mayor Annie Coulter were present and discussed the issues Ford Heights is facing. A synopsis of these issues can be found in the subsections below. Specific recommendations on how to address these issues are included in Section 3.7.

4.4.1.2.1 Hydrology

Ford Heights is located in the Upper Mississippi River drainage basin and lies within the Chicago watershed (HUC8 07120003). Mean annual precipitation for Ford Heights (Cook County) is 36.45 inches occurring throughout the year. June is typically the wettest month, with an average of 4.3 inches of precipitation.

Peak precipitation in June combines with spring snowmelt from upstream and results in overbank flooding in Deer Creek, which has damaged approximately 40 percent of the homes in the area (The Corps, 2014). To help prevent overbank flooding in Ford Heights, the Corps constructed a 238-acre-foot reservoir in 2014. The reservoir is located in southeast Ford Heights, west of Illinois Route 394 and south of U.S. Route 30. Additional work was done within Deer Creek, including channel clearing, channel modifications and ecosystem restoration.

FEMA flood maps for the residential areas west of Deer Creek and north of Lincoln Highway show that the 100-year flood event is restricted to the banks of Deer Creek. The FEMA 500-year floodplain includes small portions of the residential area. However, local topography slopes westward toward the residential area, which allows water to pond in areas outside of the FEMA-mapped floodplain.

4.4.1.2.2 Flooding Impacts

Despite the Corps' efforts to reduce flooding, Ford Heights is still subjected to annual flooding from Deer Creek. Flood events in February 2018 overwhelmed the village and shut down many roads and schools. Although the areas that are flooding on an annual basis are in the 500-year FEMA floodplain, representatives from Metropolitan Water Reclamation District of Greater Chicago indicated that only 2 or more inches of rain is needed to result in overbank flooding that will drain west into the residential area. These flows overwhelm Ford Heights' existing stormwater infrastructure and make streets impassable, preventing residents from leaving their homes and causing structural damage.

Flooding issues in Ford Heights are multi-faceted. Although there has been some planning done to evaluate the benefits of a levee system, this improvement alone likely would not stop flood events from occurring. The existing stormwater infrastructure in Ford Heights cannot handle the large precipitation events that are occurring annually; therefore, in addition to flood mitigation infrastructure like levees, an overhaul of existing stormwater infrastructure will need to occur to completely mitigate risk.

4.4.1.2.3 Biological and Natural Resources

Ford Heights has no recorded sightings of federally or state-listed threatened or endangered species. Southeast of Ford Heights in Sauk Village, there is INAI-designated Category I prairie habitat at the Sauk Village Railroad Prairie.

4.5 Stakeholder Recommendations

Throughout the stakeholder engagement process, recommended actions to help resolve and/or lead to improvements to floodplain issues were discussed and recorded. In addition, any potential barriers (i.e., regulatory, funding, environmental, etc.), that would limit actions that would lead to multi-benefit floodplain development were outlined, as were any existing programs or funding sources that support this work.

Many potential solutions were identified by the stakeholders for the multitude of issues in the six case studies. It is worth noting that similar issues were identified and similar recommendations were made for many of the case studies. Because of the similarities identified in issues and recommendations, a Stakeholder Recommendations Table (Appendix A) has been developed. The significant overlap and consistency in issues indicates widespread flood risk management problems in Illinois communities.

These themes emerged in all six case studies:

- Lack of community education and community led public engagement.
- A clear need for combinations of green and gray infrastructure.
- Housing and relocation assistance with buyout programs.
- Resiliency planning.
- Flood insurance accessibility.

The Stakeholder Recommendations Table in Appendix A provides additional details on the most common recommendations listed above as well as others that were made throughout the stakeholder process.

5. Strategies for Floodplain Management in Illinois

To assist both urban and rural communities in reducing flood risk and improving health, safety and economic prosperity, several strategies for enhancing floodplains and reducing flood risk are discussed in this section. Technical floodplain management strategies (like infrastructure improvements or modification) and non-technical strategies (like community education and outreach) are both discussed in detail to cover the broad range of issues facing the state of Illinois. These specific strategies were developed based on the community issues identified during the stakeholder engagement process (see Appendix A – Recommendations Table).

5.1 Technical Floodplain Management Strategies

Technical floodplain management strategies for reconnecting and managing hydrology can come in many forms. Prior to employing any of these techniques, it is important that proper investigation and study into the underlying problems are conducted to determine the best site-specific solution. In some cases, utilizing multiple techniques and solutions will result in the most resilient and sustainable option. In addition, because floodplain systems are complex, improvement efforts need to look beyond surface characteristics and concentrate on restoring the underlying processes that create and sustain floodplains and their functions (Rohde, et al., 2006; Matella and Jagt, 2014; Matella and Merenlender, 2014). By first identifying the

attributes that underpin functional floodplains (i.e., biophysical and flow), restoration efforts can be directed toward more impactful and self-sustaining outcomes (Loos and Shader, 2016).

The strategies outlined below do not represent the entirety of potential floodplain resiliency techniques. However, these particular technical solutions directly correlate to the issues and potential solutions that were discussed during the stakeholder engagement process. All techniques outlined below follow best available science and are proven (i.e., previously implemented and field tested) to reduce flood risk and address multiple floodplain issues.

5.1.1 Green Infrastructure

Green infrastructure is a restoration and rehabilitation technique that utilizes natural surfaces to capture, hold and percolate water where it falls. It is an approach to water management that protects, restores or mimics the natural water cycle (American Rivers, 2021). This technique builds resiliency by managing stormwater runoff with green space enhancement in urban areas and drainage management in rural areas. Green infrastructure can be used to manage both stormwater quantity and quality, reduce urban "heat islands" (i.e., metropolitan or urban areas that experience higher temperatures than the surrounding, more rural areas), provide wildlife habitat, create open space and generate resilience to climate change. Use of green infrastructure as a water management practice can result in better quality of life by providing open space for community recreation and engagement, filtering stormwater runoff for improved water quality and reducing air temperature and pollution.

Planter box, Washington, DC.
Photo credit: DC Green Infrastructure

Heavy rains have become more frequent and intense in the United States over the past 50 years, increasing the risk of flooding and sewer system overflows (EPA, 2021a; Kennedy, 2014). As a result, the average size of a 100-year floodplain is likely to increase 45 percent by 2100, potentially increasing annual economic damage from flooding by $750 million (EPA, 2021a). Another growing problem is urban flooding, which is caused by too much rain on impervious surfaces (not by storm surges or overflowing bodies of water). Urban floods primarily affect communities of color and low-income and can result in serious health problems such as asthma and illnesses caused by mold. Installation of green infrastructure reduces flood risk and bolsters climate resiliency and quality of life for communities by capturing rain where it falls and keeping it out of sewers and waterways (Denchak, 2019).

In the context of flood risk reduction, green infrastructure reduces stormwater runoff and protects floodplain ecosystem services. Green infrastructure can be applied to manage both localized and riverine floods. In areas affected by localized flooding, green infrastructure practices absorb rainfall, thereby preventing water from overwhelming stormwater infrastructure, and also prevents ponding and pooling in streets or basements. Rain gardens, rainwater harvesting, bioswales, and permeable pavement are types of green infrastructure practices that enhance local water infiltration. In areas impacted by riverine flooding, green

infrastructure, open space preservation, and floodplain management can complement gray infrastructure approaches, all of which are discussed in this chapter. This approach reduces the quantity of stormwater that flows into streams and rivers, helps protect the floodplains' natural function, and reduces infrastructure and property damage (EPA, 2021a).

5.1.1.1 Rain Gardens

A rain garden is a manmade depression in the landscape that collects rain and surface water from hardened infrastructures (i.e., roofs, streets, parking structures, driveways, sidewalks, etc.), allowing it to percolate into the ground. These depressions can be used in a variety of settings and are scalable. From street medians to yards to urban green spaces such as parks, rain gardens typically feature native vegetation in a shallow basin. For example, planter boxes are a type of rain garden and feature elevated sides with openings that allow water to enter and be absorbed by the vegetation and soil. These green infrastructure features can be used in the space between a sidewalk and street to beautify urban areas with a practical function. In addition to allowing rainfall to evapotranspire (i.e., the sum of evaporation from the land surface plus transpiration from plants) or seep into the ground, rain gardens improve water quality, recharge underground aquifers, provide habitat for wildlife, reduce the quantity of water in stormwater gray infrastructure and beautify urban landscapes (USGS, 2021).

A typical rain garden is 30 percent more absorbent than a conventional lawn. In an analysis of Seattle area rain gardens, researchers estimated that a typical 1,200-square-foot residential rain garden can filter as many as 30,000 gallons of stormwater in a year (Denchak, 2019).

5.1.1.2 Rainwater Harvesting

Rainwater harvesting is a method of capturing rain, stormwater, and runoff from a rooftop or other structure and storing it for later use. Harvested rainwater does not require water treatment and can be used for various municipal activities such as watering lawns and greenspace. In addition, rainwater harvesting provides another avenue for communities to rein in the stormwater runoff that is overwhelming current gray infrastructure throughout Illinois. This green infrastructure practice has the potential to meet 21 to 75 percent of a city's annual water needs, effectively supplying enough non-potable water for up to hundreds of thousands of residents (Garrison, Kloss and Lukes, 2011). Rainwater harvesting can be accomplished in various ways, but typically utilizes cisterns or rain barrels to collect runoff from impervious surfaces (i.e., rooftops, pavement, etc.), making it a relatively inexpensive method of capturing and redistributing stormwater runoff. This green infrastructure practice provides a practical way to meet municipal water needs in the face of climate change, population growth and increased demand from industries such as agriculture and energy, both of which strain water supplies.

5.1.1.3 Bioswales

Bioswales are stormwater runoff conveyance systems that provide an alternative to the use of storm sewers. They tend to be long, relatively deep channels planted with native vegetation and soils that run parallel to impervious surfaces such as roads, parking lots and buildings. They can absorb low flows or carry runoff from heavy rains to storm sewer inlets or directly to surface waters (USDA-NRCS, 2005). Bioswales improve water quality by infiltrating the runoff and filtering the sometimes large quantities of runoff from impervious surfaces. It is estimated that effective bioswales can capture and filter out as much as 90 percent of trace metals, oil, and grease, 70 percent of sediment and about 30 percent of phosphorus from the runoff they collect (Denchak, 2019). In addition, they slow the release of water from heavier rains to sewers or surface waters, thereby limiting floods. This green infrastructure approach emphasizes design and planning techniques that mimic the natural, infiltration-based, groundwater-driven hydrology of the Illinois landscape.

Bioswale.
Photo credit: SUNY College of Environmental Science and Forestry

5.1.1.4 Permeable Pavements

Over half of the rain that falls in urban areas winds up as stormwater runoff (Denchak, 2019). To help reduce runoff from entering urban infrastructure and flooding natural and manmade channels, permeable pavement or porous pavement (including pervious asphalt, pervious concrete, interlocking pavers and plastic grid pavers) can be installed. This pavement system is often used for sidewalks, parking lots, or driveways and allows rainfall to seep through to underlying layers of pollutant-filtering soil before entering groundwater aquifers. Once installation costs are factored in, it can cost as much as 50 percent less up front than conventional pavement systems, and it can be less expensive in the long run to maintain (Clements, St. Juliana and Davis, 2013). In addition, this type of green infrastructure can reduce the need for road salt and cut down on construction costs for residential and commercial development by decreasing the need for conventional drainage features (EPA, 2021b).

Permeable pavement.
Photo credit: Center for Neighborhood Technology

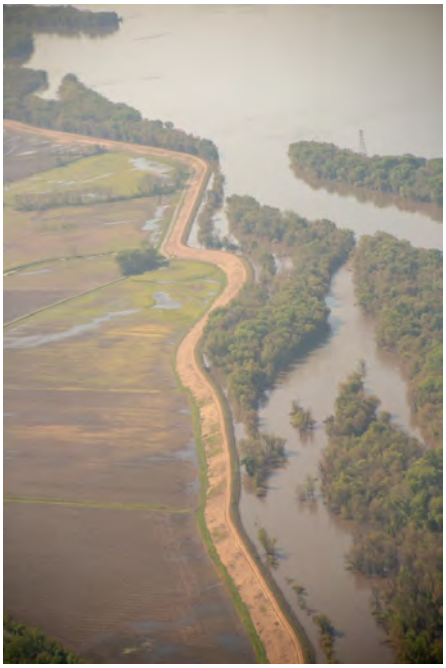
5.1.2 Gray Infrastructure

As discussed in Section 2, gray infrastructure is the most frequently used strategy to reduce flood damage; however, as also discussed, over-reliance on gray infrastructure has many public safety, financial and environmental consequences. Therefore, communities should always consider green infrastructure and other types of natural infrastructure when evaluating flood-related problems. Gray infrastructure relies on “hard structures,” such as levees, which block

water flow, and storm drains, concrete and pipe, that collect and quickly discharge water into rivers or other water bodies. Gray infrastructure does not provide the same range of benefits as green infrastructure, such as flow reduction, water quality improvements, habitat restoration, recreation opportunities and aquifer recharge. In fact, gray infrastructure often has the opposite result, which is why new frameworks and strategies are needed to address flood issues. However, depending on the scale, location and other factors (such as population density), gray infrastructure may be required to complement green infrastructure.

5.1.2.1 Levee Improvements

Seventeen million people live or work behind the approximately 30,000 miles of levees across the United States. Levees protect critical infrastructure systems, $2.3 trillion of property, and 4,500 schools that collectively enroll over 2 million students (ASCE, 2021). Levees are considered gray infrastructure and can be made of concrete, rock, steel, earth, or any combination of those materials. Many of the existing levees were built prior to 1970 and were, therefore, built using engineering standards less rigorous than the current best practices (ASCE, 2021). Many of the existing levees throughout the United States are built and maintained by the Corps. However, according to the National Levee Database, up to 10,000 miles, or one-third, of levees exist outside of the Corps' portfolio, and the locations and conditions of these levees are unknown due to complex and varying local ownership (The Corps, 2021). Due to levees being undersized, neglected and deteriorating, the Corps estimates that $21 billion is needed to improve and maintain the moderate to high-risk levees in its portfolio, which represents approximately 15 percent of the known levees in the United States (ASCE, 2021).



Mississippi River levee in Illinois.
Photo credit: Crystal Dorothy and LightHawk

As more extreme weather events result in increased flooding, such as the $20 billion in damages caused by flooding in the Midwest in 2019, it is important that levees across the state of Illinois are maintained, upgraded and replaced, if necessary, in order to mitigate flood risk. In recent years, several innovations have been developed and utilized to help maintain and modernize levees. LIDAR (i.e., light detection and radar) technology is being employed to help assess existing levee vulnerabilities and maintenance issues and efficiently and cost-effectively target improvements (ASCE, 2021). This technology allows for a more accurate evaluation of the risk of a catastrophic levee failure in order to mitigate the impacts. Another more recent technology is the use of drones to fly over levees to collect pertinent data, saving both time and cost (ASCE, 2021).

Caution should always be used when considering levee improvements due to potential impacts on neighboring properties. Improvements to existing levees should mitigate impacts and integrate green infrastructure wherever possible. Examples include moving levees away from the channel and building spillways to allow water to access the floodplain without damaging the infrastructure, or establishing a tiered levee system, with a lower levee that overtops more frequently, closer to the river, and a higher levee to protect people and critical infrastructure. In addition, some longer levee systems, such as those along the Lower Mississippi River that start

in southern Illinois, use "fuses" to allow water to divert away from areas where there are high concentrations of people, property and infrastructure. Much like fuses designed to protect electronic devices, levee fuses "break" and redirect floodwater into lower-risk areas. While broken levee fuses would require post-flooding repair, the costs to repair the fuses are dramatically lower than the cost of restoring flood-damaged properties and infrastructure in areas of higher population. Restrictions on land development in floodplains, even if they are protected by levees, should be considered to reduce the residual flood risk should the levees fail.

5.1.2.2 Infrastructure Upgrades

Most flood damage in the United States occurs outside of mapped 100-year floodplains. This will only be exacerbated by the projected 45% expansion of the 100-year floodplain by 2100 (EPA, 2021a). In particular, urban flooding occurs largely outside mapped floodplains where runoff overwhelms drainage systems. While this is not a widely studied issue, one study in Illinois found that 90 percent of flood damage claims from 2007 to 2014 were from outside the mapped floodplains (Winters, 2015).

This undersized stormwater outfall broke, causing the collapse of the ground above and around the outfall and displacing the outfall structure about 30 feet away from the rest of pipe, East Moline, Illinois.
Photo credit: Olivia Dorothy

Localized flooding, which occurs when rainfall overburdens urban drainage systems, is among the types of flooding that will likely become more frequent over time; therefore, stormwater infrastructure upgrades are necessary to combat localized flooding. Like other types of infrastructure, the condition of stormwater infrastructure is a function of the quality of construction, appropriateness of size and stability for ever-changing systems, and regular maintenance (National Academies of Sciences, Engineering and Medicine, 2019). Adequate maintenance and timely rehabilitation will keep high-quality and correctly installed infrastructure from deteriorating. However, climate change is driving a need to replace older, smaller infrastructure with larger systems that can convey the ever-increasing amounts of stormwater runoff. As such, stormwater infrastructure should be implemented with a context-sensitive approach. A localized understanding of flood risk and an awareness of land-use practices and regulatory expectations should be taken into consideration during project design and implementation (ASCE, 2021).

To create effective and resilient infrastructure, technological innovations, such as real-time control systems, can be used to model flood events and stormwater surges and predict flooding in various stormwater structures. These systems leverage complex modeling, cloud computing, data storage and predictive analysis. Large datasets can be used to improve the capacity of stormwater conveyance, storage and treatment systems (ASCE, 2021). The affordability of stormwater sensors has also improved, which expands the opportunity for collecting real-time data and having more control over infrastructure functions.

5.1.3 Making Room for the Water

Most large watersheds in the United States have undergone some type of major hydraulic modification for flood control or water supply (e.g., levees, dams, pump stations and diversions) (EPA, 2015). This work is done to facilitate development of floodplains that offer rich resources and proximity to waterways. Floodplains have served as thriving centers of agriculture, trade, industry and residential development for all of human history. Unfortunately, most people do not realize how harmful engineered structures can be, especially since large floods can still overwhelm flood-control structures. When structures fail, they release massive amounts of water all at once, which endangers lives, destroys homes and businesses and costs millions of dollars in repairs. In 2018, the National Weather Service estimated the 30-year flood loss average in the United States to be 82 fatalities and $7.96 billion annually (Sadiq et. Al, 2019).

In addition to creating an artificial sense of security and encouraging risky development, dams and levees often disconnect rivers from their floodplains and convert them for other uses. Floodplains have been disconnected from waterways on a massive scale across the United States. Floodplains covered an estimated 7 percent (over 270,000 square miles) of the North American continent prior to colonization (Loos and Shader, 2016). Today over 50 percent of North American wetlands have been drained, with the largest loss from forested riverine wetlands, and 46 percent of continental U.S. river riparian areas are classified as intensively cultivated (Tockner and Stanford, 2002).

Engineered river channels are the most common source of disconnection between rivers and floodplains, and structures can take multiple forms, including levees, channelization and channel straightening. Levees, a common flood control tool, were described previously. Other types of river engineering can also limit the amount of water that rivers can safely convey. To facilitate river navigation, river channels are often straightened, dredged, and cleared of snags and obstructions. These engineering practices turn rivers into simplified pipes that move water downstream more quickly and with more energy. As a result of these projects, large areas of once functional floodplain become disconnected from rivers. The Mississippi River is one of the best examples of this. Today the Mississippi River has over 2,200 miles of levees and a net river length around 150 miles shorter than it did in 1929 as a result of straightening (Alexander, Wilson and Green, 2012).

In smaller rivers, channel straightening can lead to floodplain disconnection through incision (Loos and Shader, 2016). In channelized reaches, sediment is transported downstream faster than new sediment is deposited, leading a riverbed to erode downwards over time (Shields, Knight and Cooper, 1994). This scenario is often exacerbated in areas where river flow is impeded by dams upstream that alter sediment supply (Dixon, et al., 2015). Dams catch sediment in their reservoirs rather than passing it downstream; therefore, the energy once used to transport sediment is instead eroding riverbanks. Over time, incision can result in a deep channels precluding floodwaters from overtopping riverbanks and disconnect water from the floodplain. Whether through engineering practices or worsened through incision, once a river and floodplain become disconnected, the exchange of nutrients, sediment and organisms is eliminated and habitat corridors are severed (O'Hanley, 2011; Tockner, Schiemer and Ward, 1998).

As discussed in Chapter 2, flood control is still the primary approach to reduce flood damage, even though it is ineffective because these structures just move water onto other properties, elevating the flood risk elsewhere (National Wildlife Federation, 1998). Making room for flood water to spread out and slow down has been the preferred policy since Congress passed the Flood Insurance Act of 1968 that created the NFIP. Programs and projects that move people and critical infrastructure out of flood-prone areas is called “flood risk reduction”. Flood risk reduction examples include buyouts/relocations, home/infrastructure elevations, levee setbacks, and other types of floodplain reconnection. This approach makes room for rivers to flood and is a much more effective strategy for reducing flood damage and protecting public safety because it significantly reduces or eliminates exposure and susceptibility to the flood hazard (Multihazard Mitigation Council, 2019).

Incised channel below an outdated and poorly maintained stormwater outfall. Such neglect of stormwater infrastructure can cause significant erosion, which contributes to downstream sediment pollution, East Moline, Illinois.
Photo credit: Olivia Dorothy

Home elevations on the Mississippi River, Illinois.
Photo credit: Jenny Hoffner

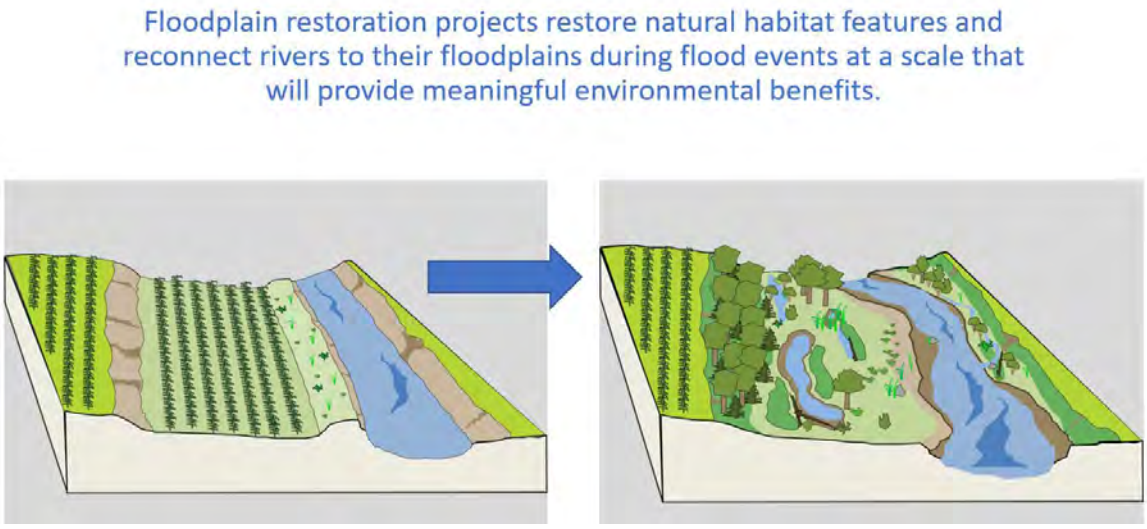
5.1.3.1 Flood Bypass Channels

Diversion channels are constructed to divert waters from the main channel for purposes such as flood control, municipal water supply and irrigation. A type of diversion channel used for flood control is a flood bypass channel or floodway. A flood bypass channel is a separate channel into which flood waters are directed to lessen the impact of flooding on the main river system. Diversion channels on large river systems, such as the Mississippi River, can consist of adjacent low-lying areas or old river courses. Control structures may be located at the head of the diversion channel to divert flows during periods of high water and return flows during low water. Some diversion channels bypass the flood flows into an adjacent waterway, while others return the flows back into the same stream a distance downstream from the point of the diversion. Diversion channels are often used in urban areas where it is not possible to widen the existing channel due to development. Diversion channels may be used to provide a means of diverting floodwater across the neck of a meander or series of meanders (Acheson, 1968). Major considerations for diversion channels include: 1) determining if the channel should convey partial or all flows, 2) design of appropriate controls, 3) the size of the channel needed to convey the design discharge, and 4) design to reduce maintenance (Nunnally, 1985). To be effective in reducing the flood stage, the distance between the point of diversion and point of return to the main channel must be of sufficient length to prevent backwater effects. Additionally, it is essential to consider potential morphologic effects on both the main channel and receiving channel.

5.1.3.2 Floodplain Restoration

Floodplain restoration reestablishes a floodplain to an ecologically functioning status and supports the various ecosystem services. Floodplain systems are complex; therefore, to ensure more successful and self-sustaining projects, restoration efforts need to look beyond surface features and focus on restoring underlying processes that create and sustain floodplains and their functions (Rohde, et al., 2005; Matella and Merenlender, 2014; Matella and Jaget, 2014).

Ecologically functional floodplains depend on three essential elements: 1) hydrologic connectivity between a river and floodplain, 2) variable flow regime that produces high and low flows, and 3) a sufficient spatial scale for floods to occur and benefits to accrue to an ecologically meaningful level (Opperman, et al., 2010).



Source: American Rivers

Floodplain restoration requires a localized, process-based restoration approach that focuses on correcting the underlying causes of ecosystem degradation. Because no two rivers are alike, restoration objectives will be unique among rivers and often among reaches of the same river (Beechie, et al., 2010; Beechie, et al., 2008; Roni, Hanson and Beechie, 2008; DiGennaro, et al., 2012; Opperman 2012; Rohde, et al., 2005). Therefore, instead of attempting to restore every floodplain to an idealized state, floodplain restoration projects should first focus on restoring underlying processes that are impaired in the individual floodplain system. The four steps listed below ensure that a restoration project is designed to correct the causes of floodplain disconnection and degradation and not just the symptoms (Loos and Shader, 2016).

1. Identify why the floodplain is currently not functional (i.e., which functional attributes are missing from the river-floodplain system?).
2. Define restoration objectives.
3. Acknowledge the limits inherent to the project location.
4. Identify the minimum actions needed to return floodplain functions to a level that meets restoration objectives.

5.1.4 Watershed Planning

A watershed is an area of land that channels rainfall and snowmelt to waterbodies, starting first with creeks, streams and rivers, and eventually to outflow points such as reservoirs, bays and oceans. Watersheds connect terrestrial, freshwater, and coastal ecosystems and provide ecosystem services, such as carbon sequestration, water supply, filtration and purification. The size of a watershed depends on the geography and can range from small (e.g., an inland lake or a single county) to large (e.g., the Mississippi River Watershed, which drains 1.15 million square miles) (NOAA, 2021b).

The health of a watershed substantially affects both the environment and its ecosystem services, as well as human quality of life. Healthy watersheds support nutrient reduction, erosion and sediment control, water storage and filtration, flood control, wildlife corridors, carbon storage, biodiversity and recreation opportunities. These goods and services are essential to social, environmental and economic well-being. The wide array of critical ecosystem services provided by healthy watersheds is frequently undervalued when making land use decisions. Therefore, it is important for community leaders to go through the practice of watershed planning, which provides assessment and management information for a geographically defined watershed. A watershed plan is a document that outlines a community's strategy for achieving water resource goals. The outcomes of such a plan can include:

- The community's goals and objectives to protect and enhance local water resources.
- A plan to update local ordinances in order to protect water resources.
- Plans or information to assist in the development of conservation plans.
- Identifying and prioritizing specific projects that will assist with flooding and resiliency.
- Identifying public education opportunities.

The benefits of watershed planning range from environmental (by protecting natural landscapes and wildlife habitat, enhancing water supply, controlling flooding), to community (by directly involving community members in developing a vision for a watershed and providing opportunities for public education), to financial (providing an organization through which to receive grant money for implementing multi-benefit floodplain development projects).

5.1.4.1 Pre-Disaster Resilience and Planning

The ability of a community to successfully manage flood events begins with its efforts in pre-disaster preparedness, mitigation, and recovery capacity building (FEMA, 2017). These pre-disaster planning efforts result in more resilient communities with an improved ability to respond to, endure, and recover from flooding. This type of planning fosters community engagement and considers the needs and resources of all its members, promoting social equity. During the process, the community should provide leadership in developing recovery priorities and activities that are well planned, realistic, and clearly communicated (FEMA, 2017). A community comprises a variety of partners, affordable housing advocates, faith-based organizations, economic development professionals, business leaders, and functional and access needs populations, all of which have a role to play in pre-disaster resilience planning.

In addition to restoring the infrastructure, services, economy and tax base, housing, and physical environment of a community, successful post disaster recovery encompasses re-establishing civic and social leadership, providing a continuum of care to meet the needs of affected community members, reestablishing the social fabric, and positioning the community

to meet the needs of the future (FEMA, 2017). Encouraging a community to make progress toward recovery efforts may be difficult, particularly after a catastrophic disaster. Preparation efforts are a critical step in ensuring that leadership, government, and nongovernmental organizations are organized and communicating effectively, so that recovery actions post-disaster occur quickly and efficiently.

5.2 Non-technical Floodplain Management Strategies

As demonstrated by the list above, we already have the technical knowledge to solve most flood-related issues. Most barriers to multi-benefit floodplain development are non-technical and are significant hurdles. To implement any of the technical floodplain management strategies outlined above, some non-technical activities will need to take place to facilitate their execution. Below are the non-technical strategies that need significant financial and structural investment to accelerate and maximize the number of floodplain management projects that can be completed.

Ducks on the Illinois River, Illinois.
Photo credit: Chris Young

5.2.1 Community Education

Education is a critical component to ensure community members understand existing options, make informed decisions, independently improve their situations, and ensure long-term project success. Stakeholders who participated in the engagement process for this study uniformly felt as though existing flood risk reduction efforts lacked substantial community education and participation components. In addition, many residents expressed feelings of helplessness due to a perceived lack of individual power over their situation.

Educating people who live in flood-prone areas about the issues that are of most concern and urgency for them will increase individual involvement in subsequent planning efforts and inspire community leaders to collaborate with municipal and agency staff to identify and solve problems. Education allows local leaders to move these issues forward rather than depend on outside agents to remedy issues for them. Local knowledge is a powerful tool, but a lack of education prevents communities from fully utilizing that valuable knowledge. This has very real impacts on the availability of funding and resources that communities need to solve flood-related problems. Ensuring that funding is available for community education will break down these barriers.

5.2.2 Community Planning

Many communities lack or have outdated regional plans for water management. A recurring concern identified during stakeholder engagement activities for this study was that communities could not access federal funding (i.e., FEMA hazard mitigation assistance grants) due to expiration of their Hazard Mitigation Plans. To ensure that these communities can access the federal programs and associated funding, they will need assistance updating the expired plans.

Funding for this is available through the BRIC grant program, but it requires a local municipality to sponsor the effort.

Further, regional planning, such as the development of regional watershed plans, would be beneficial to flood-sensitive communities, as it enables communication between rural and urban areas. Enabling platforms for such communication would ensure that individual floodplain and water uses will not disproportionately impact specific populations of people, as seen in the Centreville case study described previously.

5.2.3 Legislative Action

Floodplain and flooding issues within the state are widespread. A larger role must be taken by the State of Illinois to address the negative impacts that were highlighted in the stakeholder engagement process for this study. Issues like the urban flooding in Centreville requires the attention of multiple state and federal agencies to provide adequate relief for the area's residents and environment. Private partnerships are needed to help communities get out of the "flood-repair-flood-repair" cycle and develop long-term, resilient solutions with multiple state, federal and private resources.

For the State of Illinois to remedy these problems, funding will need to be allocated for the express purpose of improving flood management systems, the quality of life, and environment. To accomplish these goals, we recommend establishing a public-private partnership and grant program for multi-benefit floodplain development. In addition, IDNR's Office of Community Outreach should be re-established and appropriately funded to accelerate and maximize the number of projects that can be completed. See Chapter 7.3 below for more details.

6. Anticipated Challenges

Multi-benefit floodplain development provides a consensus-based, community led and scientific method to reduce flood risk for the residents of Illinois, but there are multiple hurdles that pose challenges to getting more projects on the ground.

These barriers fall into three major categories:

Community Led Problem Solving	More Projects	Equitable Economic Growth
- Public education around flood issues and solutions - Support for community visioning - Access to decision-makers and other people in power - Recognizing that floodplain management is intertwined with housing, transportation, access to food and other social services.	- Direct funding to do projects - Outreach to community leaders to update building codes and local ordinances - Homeowners insurance agent education - Incentives for private sector job growth in flood hazard mitigation and nature-based solutions	- Economic revitalization grants, forgivable loans, or low-interest loans for planning and development - Policies and ordinances to ensure communities of color benefit from economic growth - Reparation-type financing and/or mortgage structures to reimburse lost wealth due to housing discrimination in floodplain areas

6.1 Regulatory Framework

The existing state and federal regulatory framework pose multiple challenges for the implementation of multi-benefit floodplain development projects in Illinois. All three of the identified barriers have regulatory hurdles that dissuade the use of multi-benefit floodplain development, as described below.

6.1.1 Community Led Problem Solving

The federal and state permitting and project planning processes often interfere with or hinder community engagement because agencies are incentivized to put forward solutions before evaluating the problem. Agencies tend to respond to complaints about perceived problems and/or demands with limited, “one-size-fits-all” solutions. In addition, agencies often respond to problems by putting forward the solutions that fit solely within their authority. This hinders multi-benefit floodplain development because it: 1) often fails to identify the underlying cause(s) of a problem, 2) is a siloed approach that does not lead to the full range of practicable solutions both within and outside the agency’s jurisdiction, and 3) often starts the community engagement process so late in the decision-making process that community input is no more than perfunctory.

More than any underlying law or regulation, these challenges also reflect a lack of resources, failures of policy guidance, and inadequate staff training. Due to budget cuts and other factors, agency staff tend to do only what is minimally required when it comes to problem-solving and community engagement. Successful multi-benefit floodplain development projects require community led visioning and decision making. Most federal and state programs can be adapted to support this strategy if it is prioritized by the Illinois General Assembly and executive branch.

6.1.2 More Hazard Mitigation Projects

Accelerating and maximizing the number of projects that can respond to climate disruption is primarily a function of available funding. However, even when funding is available, most communities opt for gray infrastructure like levees, floodwalls, pumps, stormwater pipes and dams. Factors that contribute to this trend are discussed in Chapters 2 and 5. In general, city planners need access to more information and technical resources to fully understand the value of multi-benefit floodplain development projects and where they can be implemented. Therefore, while more funding is definitely needed, funding by itself will likely only result in more gray infrastructure projects. In addition to funding, more guidance and direct engagement with municipal leaders and staff will be needed to accelerate and maximize the number of multi-benefit floodplain development projects that can be implemented.

Targeting this information for local leaders and staff will improve outcomes, as their position allows them to demand inter-agency coordination, which will lead to more problem-oriented solutions. This is again due to the intersectional nature of multi-benefit floodplain development that requires coordination across multiple agencies. In the case studies, successful projects will require (at a minimum) consultation with and (at a maximum) direct funding from programs not just administered by the IDNR, but also FEMA, the USDA, the U.S. Environmental Protection Agency, the Department of Housing and Urban Development, the Illinois Department on Aging, the Illinois Department of Commerce and Economic Opportunity and others. The siloed nature of agencies within the Illinois Executive Branch hinders the application of more projects. Chapter 6.3 provides a complete list of programs that fund floodplain projects, and there is very little overlap and coordination between the programs. Therefore, it is important to establish a public-private partnership, as non-governmental organizations are better equipped and incentivized to build collaboration and inter-agency cooperation.

6.1.3 Sustainable Economic Growth

Lack of economic stability in our case study communities was a significant barrier to developing any type of flood risk reduction project, let alone multi-benefit floodplain development projects. Most federal and state grant programs require cost-share and/or repayment with interest. While some will lower or waive cost-share for historically underserved communities, the process of applying for these funding sources requires staff to complete the application and oversee the project – even well-resourced communities sometimes struggle to meet these requirements, and communities of low income are being left behind entirely. Support is needed to help with administrative barriers. This can be achieved with additional set-asides or loan forgiveness programs to help underserved communities build stronger local economies and absorb the change required to adjust their landscapes to the new climate.

To address these issues, agencies should 1) emphasize engaging communities around problem-solving, not prescribed solutions, 2) improve collaboration via public-private partnerships to leverage more funding for projects, and 3) provide more administrative-level support to help communities transition to more resilient economies.

6.2 Incentivizing Floodplain Management

During the stakeholder engagement process, the majority of the participants indicated support for multi-benefit floodplain restoration in their communities. However, there was some concern over the lack of existing incentives for residents to independently develop projects and devote

resources to floodplain management. Specifically, many were concerned about the impact that floodplain reconnection could have on the livelihoods and culture of those that live and work in the floodplain. In rural, generally agricultural areas, residents voiced concerns about their connection to their land – many have been working and managing these areas for multiple generations. For these landowners, floodplain reconnection can be seen in a negative light since it has the potential to decrease the total farmable land and impact their culture and occupation. Similarly, in urban areas, floodplain communities tended to be communities of color and/or low income and environmental justice areas. Urban community members present in the stakeholder engagement process were aware that they are living in unsafe areas and would like to reduce their risk. However, many have spent their entire life in those neighborhoods and do not want to abandon their culture-rich areas through a buyout process that may not provide them with the ability to purchase a different home in a safer location within the same community.

Illinois will need to address the potential for dispersal and negative cultural impacts that floodplain reconnection can have on residents in both rural and urban areas. Developing proper incentives and programs to mitigate these impacts will increase support and improve program success, especially if they are developed in a collaborative setting with direct input from the impacted communities.

6.3 FUNDING

Grant and loan programs that can be utilized for floodplain reconnection/restoration or watershed planning in the State of Illinois are almost exclusively federal programs. Existing federal programs have a non-federal cost-sharing mechanism that is required for all applicants, placing some of the financial burden on grantees to procure supplemental funding from private, state or local sources. To facilitate the participation of communities of low income in these programs, it is recommended that the State of Illinois establish and provide funding for a state-managed grant program that can fill the current “match gap.”

At the state level, IEPA considers floodplain reconnection an eligible project type under their Green Infrastructure Grant Opportunities program. However, this program does not allow for community planning or stakeholder engagement activities. Additionally, there are many other eligible green infrastructure project types that will compete with floodplain reconnection for grant funding. Outside of this green infrastructure project category, the State of Illinois does not have a state-managed program for floodplain reconnection/restoration or watershed planning. Instead, applicants are required to pull non-federal matching funds from their tax revenue (if applicants are local governmental entities and have supplemental revenue), or secure funding from a private entity, such as foundations or private donors.

In addition to the green infrastructure grant discussed above, other state funding sources, including wildlife and sport fish habitat grants, conservation/wetland reserve enhancement programs and the Office of Water Resources Acquisition funds, offer the best opportunities to finance floodplain restoration, but the programs are extremely siloed. The Office of Water Resources is the primary program responsible for floodplain management activities throughout the state and is responsible for issuing permits for construction within and along streams and rivers, implementing non-structural flood mitigation, including property acquisition and building removal, floodplain mapping, and assisting communities in implementation of flood risk reduction projects that include open space. However, floodplain “open spaces” rarely have habitat restoration components and most habitat grants go toward game species. There is limited coordination with the Office of Water Resources and other grant providers within the Department of Natural Resources.

Included below is a selection of existing programs that are frequently utilized to fund floodplain-related projects. Focus areas are noted for each program and a checkbox was included to indicate which programs require cost-sharing for the applicants. An additional field titled "Environmental Justice Considered" was included to indicate whether the program takes environmental justice issues into account. Programs will recognize environmental justice issues in multiple ways, either through an increased score during evaluation of applications, a dedicated environmental justice category, or reduced cost-sharing requirements for environmental justice applicants. If the program includes an environmental justice component at some level, this box was checked.

STATE FUNDING SOURCES FOR FLOODPLAIN PROJECTS	**Flood Risk**	**Water Quality**	**Habitat**	**Land Protection**	**Agriculture**	**Environmental Justice Considered**	**Cost Sharing Required**
Department of Natural Resources							
Office of Water Resources Acquisition	X					X	5% or $1000, whichever is less
Natural Resource Damage Assessment Restoration		X	X	X			N/A
Wildlife and Sport Fish Habitat Grant Programs			X	X			25%
Conservation/Wetland Reserve Enhancement Program			X		X		N/A
Environmental Protection Agency							
Wastewater/Stormwater and Drinking Water Loans	X	X				X	1.1% loan interest rate
Water Quality Grants: Green Infrastructure Grant Opportunities	X	X	X			X.	25%
Emergency Management Association							
Flood Mitigation Assistance	X						25%

There are numerous federal programs that fund components of floodplain projects. Below is a list that includes many of the programs used by states and their local communities. Each program has restrictions on the activities (land acquisition, planning, habitat restoration, etc.) that may be funded and/or the project goal (flood risk reduction, habitat, water quality, etc.). No federal program requires projects to meet co-equal goals of flood risk reduction, social justice, and improvements to the environment. Most programs require matching funds to be provided by non-federal sponsors.

FEDERAL FUNDING SOURCES FOR FLOODPLAIN PROJECTS	Flood Risk	Water Quality	Habitat	Land Protection	Agriculture	Environmental Justice Considered	Cost Sharing Required
Federal Emergency Management Administration							
Hazard Mitigation Grants	X					X	10-25% cash, in-kind services, or materials
Pre-Disaster Mitigation Program	X						10-25%
Building Resilient Infrastructure and Communities (BRIC)	X	X	X	X	X	X	10-25% cash, in-kind services, or materials
Department of Housing and Urban Development							
Community Development Block Grants	X					X	Funds may be used to meet the non-federal match requirements of other federal programs
U.S. Department of Agriculture							
Wetland Reserve Easements			X	X			0-50%
Environmental Quality Incentives Program		X	X		X	X	25%
Conservation Stewardship Program			X		X	X	N/A
Emergency Watershed Protection-Floodplain Easements	X		X		X		N/A
Regional Conservation Partnership Program		X	X	X	X	X	≥50%
Conservation Innovation Grants		X	X		X	X	50%
U.S. Army Corps of Engineers							
Flood Risk Reduction Projects	X						35%
Habitat Restoration Projects			X				25-50% phase dependent
Upper Mississippi River Restoration Program		X	X				35%
Silver Jackets Program	X						N/A
Planning Assistance to States	X	X	X				50%
PL 84-99 Emergency Levee Repair	X						20%
Section 206, Aquatic Ecosystem Restoration			X				35-50% phase dependent
Section 1135, Project Modifications for Improvement of the Environment			X				25-50% phase dependent
U.S. Department of Interior							
National Fish Passage Program			X			X	50%
National Fish Habitat Partnership			X				50%
North American Wetlands Conservation Fund			X				1:1
Cooperative Endangered Species Conservation Fund			X				25%

FEDERAL FUNDING SOURCES FOR FLOODPLAIN PROJECTS	Flood Risk	Water Quality	Habitat	Land Protection	Agriculture	Environmental Justice Considered	Cost Sharing Required
State and Local Assistance Programs				X			Program dependent
U.S. Environmental Protection Agency							
Environmental Justice Grants		X	X			X	N/A
Wetlands Program Development Grants		X	X				25%
Clean Water Act Section 319 Nonpoint Source Grants		X	X			X	25% or completion of a waiver or reduction of the funding match for communities of low income
Water Infrastructure Financing and Innovation Act funding		X	X	X		X	Long-term, low-cost supplemental loan program
National Fish and Wildlife Foundation							
Multiple Grant Programs		X	X	X		Program dependent	Varies; 1:1 match most common

7. Findings and Recommendations

7.1 Findings

During the feasibility study process, we determined that replicating the State of Washington's dual purpose (public safety and ecosystem restoration) model is not advisable because it did not adequately incorporate racial justice needs in floodplain communities. Instead, we recommend a similar public-private partnership program with three co-equal goals: public safety, social justice and ecosystem restoration. The proposed partnership would be tasked with resolving the three primary barriers that were identified in our research and conversations with stakeholders:

1. **Community Led Problem Solving**: A community's needs are dependent on unique conditions found within it, such as culture, social structure, history and assets, to name a few. Therefore, people living within a community are most equipped to speak to these needs. Illinois' elected officials and state agency staff need to work with community members, municipal staff and non-governmental organizations to establish a better framework to support community led problem solving that is tailored to that community's individual needs. This includes providing more access to information, better venues for collaboration and access to decision-makers.
2. **More Hazard Mitigation Projects**: The number of flood hazard mitigation projects needs to dramatically increase throughout the state. This cannot be limited to only green or gray infrastructure. It will require a combination of the two strategies to build sustainable projects. To support these projects, the Illinois General Assembly needs to take deliberate steps to grow the hazard mitigation field of practice, especially in a multi-benefit floodplain development context, and encourage recruitment in this career field.

3. **Sustainable Funding**: Under the current federal and state programs, the local tax base is responsible for paying a significant portion of hazard mitigation costs, especially upfront costs like staffing to apply for grants and oversee programs. But even well-resourced communities cannot keep up with increasing flood risk, and communities of low income are being left behind entirely. Alternative financing, like administrative grants and low-interest loans, and in-kind support, like technical assistance, need to be dramatically expanded. Municipal staff must also be supported to work on interconnected issues, like affordable housing and community revitalization

7.2 RECOMMENDATIONS

Addressing these barriers will take time. As part of our study, we identified five immediate steps that could be taken by the Illinois General Assembly.

1. Establish a Multi-Benefit Floodplain Planning and Development Public-Private Partnership.
2. Establish a Multi-Benefit Floodplain Development Fund to Provide Flexible Funding for Planning and Projects.
3. Reform agricultural programs to incentivize flood-compatible farming and land conservation practices.
4. Ensure the State provides equitable support services across all programs, including higher levels of planning support for communities that are socially and/or economically disadvantaged.
5. Require flood hazard mitigation training for all insurance agents.

7.2.1 Establish a Multi-Benefit Floodplain Planning and Development Public-Private Partnership

Many communities, especially communities of low-income and communities of color, do not have access to or are not otherwise benefiting from the full suite of flood risk reduction tools and are not adequately represented in community planning and problem-solving for flood risk management. State and federal agency staff often limit community assistance to only those programs administered by their respective agencies and limit communications within the community to only municipal staff and/or elected officials. This creates barriers for individuals, communities and/or neighborhoods that may have under-resourced, uninformed and/or otherwise unstable local governments. To overcome this barrier, there is a need for state agency staff to form stronger bonds with non-profit, private and other non-governmental organizations to better serve communities.

The Illinois General Assembly should establish a public-private partnership to support multi-benefit floodplain planning and development that is focused on helping residents, unofficial community leaders, municipal staff and elected officials find safe, just and environmentally sustainable solutions to flood issues. The goal of the partnership will be to accelerate the implementation of climate hazard mitigation projects through multi-benefit floodplain development. This will be accomplished via projects, programs and other tools that meet needs in the following four areas:

1. Community education on flood-related issues and solutions, including flood insurance rate map use and interpretation, flood insurance programs and rates, flood hazard mitigation and floodplain ecosystem services.
2. Community visioning processes with a focus on addressing environmental justice issues like racial equity, affordable housing, storm and wastewater infrastructure, transportation, access to healthy food and improved environmental quality.
3. Community guidance for accessing appropriate resources and funding opportunities to address flood-related issues, like Silver Jackets Flood Studies, FEMA BRIC grants and other resources.
4. Community support for administrative tasks, like grant writing and project tracking, to build community capacity for multi-benefit floodplain planning and development that maximizes climate change resilience, social justice and ecosystem health.

Structure

Through legislative action, the Illinois General Assembly should establish a Public-Private Partnership Multi-Benefit Floodplain Development Team ("Team") that is led by the Illinois Department of Natural Resources, Office of Water Resources, Division of Community Outreach. The Team should be comprised of the following agencies and organizations:

Illinois Agencies, including

- Illinois Department of Natural Resources Office of Resource Conservation
- Illinois Environmental Protection Agency
- Illinois Emergency Management Agency
- Illinois State Water Survey
- Illinois Department of Aging
- Illinois Department of Transportation
- Illinois Department of Agriculture
- Illinois Department of Health and Human Services
- Illinois Rivers Coordinating Council

Federal agencies, including

- U.S. Army Corps of Engineers (SilverJackets Coordinators)
- Federal Emergency Management Agency
- U.S. Environmental Protection Agency
- U.S. Department of Agriculture
- U.S. Department of Transportation
- U.S. Department of Housing and Urban Development

The Team should work with non-government stakeholders, including:

- Environmental Organizations
- Conservation Organizations
- Land Trusts
- Social Justice Organizations
- Affinity Organizations that Represent Minority Populations
- Farm Organizations
- Sustainable Development Organizations
- Floodplain Managers
- County and Municipal Organizations
- Flood Hazard Mitigation Businesses
- Regional Departments of Commerce
- Ecosystem Restoration Businesses

Annual Report

Starting in year 2, and each year thereafter, the Team shall submit an Annual Report to the General Assembly that transparently accounts for the public and private spending (cash and in-kind), and the socio-economic information of community partners and/or project beneficiaries.

Every five years, the Team will submit a Report to the General Assembly which shall include additional information that estimates economic benefits (including ecosystem services) of completed projects, more detailed information about project beneficiaries, and performance reviews completed by partnering communities and Team responses to the review comments.

Work Plan

With the Annual Report, the Team will also submit a Work Plan for the coming fiscal year with funding recommendations, available cash and in-kind matches from the private/non-profit sector.

For work planning purposes, the Team will prioritize communities based on a matrix that will include: 1) known flood-related issues (flood insurance claims, disaster declarations, etc.), and 2) social vulnerability (socio-economic information, density of grocery stores, etc.).

Budget

The Illinois General Assembly should allocate $1,000,000 for the first year to establish the interagency public-private team ($500,000 to support the IDNR Office of Water Resources, Division of Community Outreach, and $500,000 distributed among the other agencies). Each year thereafter, the Team will submit an annual report and work plan, which will include funding recommendations, to the Illinois General Assembly.

How will this help Illinois Communities?

Most communities struggle to navigate complex flood risk management problems alone, especially since the root of the problems might be outside the municipal boundaries. In our case studies, the community of Centreville was emblematic of this issue. As the poorest community in Illinois and as a Black community, it is both economically and socially disadvantaged. This compounds the town's ongoing struggle with frequent flooding that is caused by multiple factors inside and outside of their community. Due to their socio-economic status, they have struggled to secure long-term and sustainable solutions for their community, especially in terms of working with outside units of government to resolve "upstream" causes to their flood issues. At the state-level, agency siloes are contributing to disjointed assistance. Multi-benefit floodplain development could expedite attention to community issues across state and federal agencies and engage stakeholders inside and outside the community.

7.2.2 Establish a Multi-Benefit Floodplain Development Fund to Provide Flexible Funding for Planning and Projects

Floodplains are important landscapes that provide multiple ecosystem services (improved water quality, aquifer recharge, wildlife habitat, etc.) and they need to be managed to sensibly balance community resilience and environmental health. Unfortunately, most programs that support floodplain planning and development are siloed. Funding sources for gray infrastructure, green infrastructure and other community needs (housing, economic development) are often disparate-– housed in different agencies and offices with limited staff or program cross-over. Green infrastructure programs often prohibit spending on gray infrastructure, limited information is available on how green infrastructure can be incorporated with gray infrastructure projects, and economic development programs rarely consider natural resource or public safety needs. To get the most benefit out of their floodplains, communities need to plan and develop for all these issues and opportunities simultaneously. To do this most effectively, communities need access to flexible funding to maximize public safety, climate resilience and natural resource benefits in their frequently flooded and floodplain areas.

Structure

To meet the urgency of climate change adaptation, the Illinois General Assembly should establish a multi-benefit floodplain development low-interest loan and/or grant program to be administered by the IDNR. Grants should be made available to municipalities and non-governmental organizations to advance multi-benefit floodplain planning and development that meets co-equal goals of reducing flood risk, social justice and environmental health. Funding priorities should be set by the Team.

Budget

Starting two years after the establishment of the Team, and annually thereafter, the Team will submit to the Illinois General Assembly a list of projects to be funded via grants and/or low interest loans.

How can this help Illinois communities?

All of the case study areas need a source of flexible funding to solve problems in their floodplains. In Cairo, the community's identity is inextricably tied to the Mississippi and Ohio rivers. To be successful, the city needs assistance revitalizing itself from top to bottom to comprehensively address flooding issues, housing stock, public services and economic

development. Funding or assistance for this type of comprehensive economic and natural resource community planning is not available in every region. For example, in Northeastern Illinois, the Chicago Metropolitan Agency for Planning provides this type of planning assistance through its Local Technical Assistance Program. Unfortunately, the sister agency in southern Illinois, the Greater Egypt Regional Planning and Development Commission, does not cover Alexander County. A low-interest loan and grant program for communities of low-income and non-governmental organizations that work in those communities can help meet needs where gaps in programs and funding exist.

7.2.3 Reform Agricultural Programs to Incentivize Flood-Compatible Farming and Land Conservation Practices

There are over one million acres of farmland in Illinois prone to flooding, and hundreds of thousands of these acres are "protected" by levees. Levees lower crop insurance rates by pushing flooding problems onto other areas – sometimes other farmland and sometimes urban areas. Additionally, vast expansions in tile drainage systems accelerate the movement of water off the land and into rivers and streams, thus contributing to flashier high-water events in some watersheds. As climate change alters precipitation patterns in the region to more frequent and extreme precipitation events, adaptation efforts need to focus on slowing water wherever it falls on the landscape. Slowing water on the landscape creates more predictability in the river systems and gives floodplain managers time to take necessary steps to protect people and infrastructure. As 75 percent of Illinois' landmass is in agricultural production, the Illinois General Assembly needs to facilitate and create programs, projects and incentives to farmers to slow the movement of water off the landscape. These might include reforming conservation easement programs to enroll more flood-prone acres, incentivizing cropping systems that hold more water in the soil, amending the antiquated Illinois drainage code to align with modern flood risk management goals and standards, and changing the crop insurance program to not penalize farmers who convey water across their lands during flood events.

Structure

The Illinois General Assembly should mandate a report from the Illinois Department of Agriculture, with consultation from the Team, to examine farming practices and programs to identify incentives to encourage more widespread adoption of flood-compatible farming and farmland management practices.

Budget

Report, one year, $200,000

How will this help Illinois communities?

In Illinois, most agricultural policies and practices are integrated with the "flood control" approach to managing water. Most farmers invest in projects that move water off their land as quickly as possible, and farm policies encourage this approach. For example, farmers have difficulty securing USDA Agricultural Conservation Easements on flood-prone acres. Frequently flooded land is ranked lower by the state-administered USDA Agricultural Conservation Easement investments due to the risk of floods damaging the restoration projects. The Emergency Watershed Protection Easements do offer permanent easements on frequently flooded lands, but funding for enrollment is tied to federal disaster declarations, which are triggered by flood damage on urban infrastructure (often far removed from the rural agricultural land). In Alexander County, an agricultural levee was breached in 1993, 2011 and 2016, and

following the 2016 breach, it was not repaired. Even though landowners could not farm the acres, the land could not be enrolled in any easement programs until, by chance, the 2019 flood triggered a federal disaster declaration that allowed USDA Floodplain Easements to be paired with Wetland Easements within the effected levee district. Farm practices and policies need to be more closely examined to identify necessary reforms and incentives to encourage farmers to slow runoff and convey floodwater during extreme events.

7.2.4 Ensure the Illinois' State Agencies Provide Equitable Support Services Across All Programs, Including Higher Levels of Planning Support for Communities that are Socially and/or Economically Disadvantaged

Some communities have more resources than others. Pre-disaster resilience planning and project funding sources always require some type of community investment, like municipal staff to apply for grants, direct match, upfront costs for development concepts, access to various experts, a tax-base for loan repayments, etc. The Illinois General Assembly should direct all state agencies to provide tiered assistance to ensure communities get equitable access to resources like planning assistance, grants, technical help, etc. Assistance levels should be based on census block data, and communities with populations that meet multiple census thresholds should be prioritized for higher levels of planning assistance, greater access to funding and more equitable match requirements. State agencies should be held accountable through transparency and reporting requirements in their assistance and grant-making programs.

Structure

The Illinois General Assembly should require state agencies to develop plans to track, publish and allocate resources equitably throughout the state. These agencies should track investments along racial, economic and other social factors (like ability, age, etc.). It is paramount that resource allocation is equitable for each group. This involves recognizing different challenges, needs and histories. Generally, the communities that were addressed in this study will require more state investments across all programs to ensure equity.

Budget

To be determined.

How will this help Illinois communities?

All of the case study areas have large communities of color and low income. Cairo and Centreville also have a declining tax base that cannot support full-time municipal staff, let alone support the staff with the various floodplain management certifications. These factors limit their ability to apply for existing grant programs for watershed planning and green infrastructure, including FEMA's BRIC grants and EPA's Revolving Loan programs and Section 319 Non-point Source Pollution grants. Ensuring that communities that need more assistance are receiving it from the State will help Illinois communities be more competitive for federal assistance and other private-sector investments.

7.2.5 Require Flood Hazard Mitigation Training for All Insurance Agents

One of the goals of establishing the Multi-Benefit Floodplain Development Program is educating Illinois' citizens about floodplains and flood risk management. However, when it comes to decisions about hazard mitigation on private properties, most renters and home and business owners turn to their insurance agents for guidance. Insurance agents are the primary trusted

sources of flood-related information in the general population. Unfortunately, many insurance agents are not adequately trained to provide accurate information about flood insurance, flood risk or hazard mitigation options. FEMA provides free virtual and in-person classes on these topics for insurance agents. The Illinois General Assembly should mandate flood insurance and hazard mitigation training for all homeowner insurance agents.

Structure

The Illinois General Assembly should allow the Illinois Department of Insurance to mandate continuing education specific to flood insurance for insurance agents.

Budget

Not applicable.

How will this help Illinois communities?

In Centreville, community members can clearly see the impacts of poor flood management and floodplain development as their homes and yards are frequently flooded with stormwater and wastewater. Many residents relocated to Centreville after flood buyouts in another area of the Metro East and are now facing the same problems in their new homes. Determined not to "make the same mistake twice," community members are trying to get access to more effective and sustainable alternatives. Unfortunately, when residents approached their insurance agents, they were almost always given incorrect information about flood insurance availability, eligibility requirements, mitigation options and/or rates. None of the stakeholder participants could recall a single example of their insurance agents suggesting structural modifications to lower flood insurance rates, even though many options exist (e.g., home/utility elevations, foundation openings, dry or wet proofing, construction materials, etc.). Insurance agents must be required to provide accurate information about flood insurance and mitigation options to homeowners and renters.

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APPENDIX A

Stakeholder Recommendations Table

Stakeholder Recommendations Table

Actions/Recommendations	Geographic Relevance	Issues Targeted by Actions	Existing Programs and Funding Sources	Potential Barriers Limiting Action	Further Information
	All Case Studies	Flood Risk & Management	National Flood Insurance Program Community Rating System encourages communities to expand flood insurance enrollment.	There is significant misinformation about eligibility outside of mapped flood zones. Need to increase awareness of flood and back-up insurance options for homeowners, renters and insurance agents.	The community should work to increase enrollment in the National Flood Insurance Program (including the Preferred Rate Policies for residents who are not in the mapped flood hazard zones). This would help homeowners and renters recover from flood events. Reduction of premiums may be achieved through raising the elevations of properties.
			National Flood Insurance Program.	Not enough homeowners are enrolled. If more were enrolled, based on community outreach and education of the program, then homeowners and renters would benefit.	-
				Premiums are too expensive for some low-income residents.	-
				More benefit if the municipality is enrolled in the Community Rating System. Enrollment requires additional resources that are not available in under-resourced communities that do not have staff.	
				Insurance agents are not providing homeowners and renters with accurate information about eligibility, rates and hazard mitigation options.	
				Only available in participating communities and requires adoption of the Flood Insurance Rate Map. Only a few Illinois counties do not participate in the program, but information about how the program works and where eligibility requirements are met are not accessible.	
			Flood Insurance Rate Map Updates (Illinois State Water Survey).	Flood Insurance Rate Maps are outdated and not accurate in many areas. Lack of funds to accelerate mapping efforts.	
			In other states, property owners need to disclose to renters if they are located in a hazardous area.	Legislation is needed to require property owners to advise tenants of flood history.	-
Community Led Continued Engagement	All Case Studies	Flood Risk & Management	None identified; private partnerships could help fill this gap.		Black residents may not be adequately engaged in the decision-making process regarding floodplain risk management, planning and solution development.
Community Education	Alexander County (Cairo), Danville, Freeport, Centreville, Ford Heights	Flood Risk & Management	None; however, this work could be done through the establishment of a non-profit, or through the use of an existing non-profit (not currently identified).	Lack of funding for educational programs and support.	The community needs technical assistance to guide assistance requests, including identifying and applying to the right grants and enrolling in programs to finance planning and projects. Education can also occur through continued stakeholder engagement and outreach, which should leverage existing volunteer organizations and universities/academia.
				A historical lack of follow-through by organizations attempting to help with community education. This may be due to a re-prioritization of needs.	-
				Identifying and accessing interested community members for training.	-
Pre-Disaster Resilience and Planning	Alexander County (Cairo), Centreville, Danville	Surface Water Flooding & Groundwater Intrusion	FEMA's Building Resilient Infrastructure and Communities Grant will finance pre-disaster planning, design and construction.	Lack of resources, expertise and capacity to successfully apply for funding.	-
				Project sites need to be included in the relevant hazard mitigation plan and the applicant sponsor must be a municipality or county. Centreville and Cairo need assistance in determining problem sources. All communities need the municipal staff support to apply for the grants.	-
			Environmental Protection Agency Revolving Loan Programs to assist with necessary upgrades to stormwater and sewer infrastructure.	Some communities are not able to pay back loans due to a shrinking tax base. Need to coordinate infrastructure upgrades with a community revitalization plan.	-
			FEMA/IL DNR home buyouts and/or flood-proofing to reduce community reliance on risky levee infrastructure.	Home buyouts often disperse communities and undercut the informal support networks that people of low-income often rely on. Need to provide support for community "relocation."	-
				Loss of property tax revenue for the city. Need assistance calculating return on investments, developing a plan to expand taxable city property and/or increase property values while maintaining diverse community structures (i.e., avoid pushing out people of color as property values rise).	-
				buyouts only benefit homeowners and not renters. Need a financial assistance program for renters that will function in tandem with homeowner and landlord payments.	-
				Because buyout programs are typically targeted at disadvantaged communities, property values are low and buyout amounts are tied to property value. This creates a situation where, if people accept buyouts, they cannot afford to purchase a home elsewhere.	Homeowners who accept buyouts cold be subsidized to allow the purchase of a home elsewhere in a safe environment.
			EPA Section 319 Non-point Source Pollution Grants can help the community finance green infrastructure projects, including along Vermillion Creek where there are public safety concerns with flooding and coal ash storage ponds.	Lack of resources, expertise and capacity to successfully apply for funding. Need technical assistance for grant applications.	-
				Some pollution sources come from farmland, and there is no standard venue for rural and urban residents to collaborate on watershed flood issues. Need to facilitate conversations between cities and rural areas in watersheds.	-
Nature-Based Solutions/Green Infrastructure	Rockford, Danville, Ford Heights	Surface Water Flooding	FEMA's Building Resilient Infrastructure and Communities Grant will finance pre-disaster planning, design and construction for long-term solutions that stop the "flood-rebuild-flood-rebuild" cycle.	Problem areas need to be included in the county hazard mitigation plan and few hazard mitigation plans are developed via community-led dialogue. In addition, municipalities and counties are the only allowed applicants.	Urban flooding issues could be addressed through investments in green infrastructure to slow down the water and increase permeable surfaces to reduce flooding. Keith Creek in Rockford is an area to look at for green infrastructure (trees/train gardens, stream meandering, etc.). In Ford Heights, look at Deer Creek for green infrastructure and restoration. Urban green infrastructure, such as permeable pavement and detention basins could slow down water flow and reduce inundation. Green corridors are a big opportunity and provide multi-benefits (habitat creation, recreation opportunities, etc.) and appeals to a younger generation.
			Metropolitan Water Reclamation District.	Lack of funding for projects.	-
			Communities can impose stormwater utility taxes to fund green infrastructure projects.	Requires political will and action.	-
			Forest preserve districts or other local land management authorities.	Lack of coordination in some areas.	Land conservation areas have a history of catering to white and more affluent populations and are not always aware of how their activities do and/or could benefit historically marginalized populations in or adjacent to their jurisdiction.
			State granted authority for stormwater management is not available in Winnebago County.	State needs to grant authority for all counties to manage stormwater according to the Urban Flooding Report.	-
			Habitat restoration grants.	These grants are siloed and only tenuously connected with floodplain management activities.	Encouraging collaboration between agency staff who manage different grants can help coordinate funding that may need to come from different sources.
			Office of Water Resources.	Historically has been a champion for these efforts. However, spending cuts have caused a reduction in resources and they are unable to assist.	Prior to loss of funding, the Office of Community Outreach helped fill a lot of the community engagement gaps that are described in this report. Need to get the office re-established with an expanded mission to focus on equity issues and increase engagement with the Office of Water Resources.
			IL DNR Grants Division - for open space land acquisition.	Requires community education and leadership to know about these programs and how to apply.	-
Infrastructure Upgrades	Alexander County (Cairo), Centreville, Danville	Surface Water Flooding & Groundwater Intrusion	IL EPA State Revolving Loans provide low-interest loans for drinking, storm and waste-water infrastructure upgrades.	Centreville and Cairo have a shrinking tax base that restricts their ability to take on loans. Need more loan forgiveness for desired outcomes and/or grant opportunities.	Specifically for stormwater and wastewater management in the urban environments. In Danville, stakeholders identified the areas around Stoney Creek as a section of the community that is a prime target for infrastructure and drainage improvements.
Community Relocation (i.e., affordable housing and historic preservation)	Ford Heights, Freeport, Danville	Flood Risk & Management	Various buyout programs via FEMA and HUD.	Lack of other affordable housing and loss of taxable property is a barrier in many communities	Lack of affordable, safe homes and loss of taxable land parcels are significant deterrents for community members and municipal governments. Supporting community-led visions is vital to successful projects with a displacement component. More options that relocate people as a group to safer housing and deliberate land planning to encourage flood-compatible economic develop need to be supported to ensure successful projects. Also, where options are viable, more attention should be paid to retrofits and remodeling efforts to preserve community structures.
			Historic Preservation.	Histories of non-white, disabled and low-income communities are not well preserved.	This emphasizes the need for more community-led visioning and planning around flood risk management to ensure important historic places and event histories are appropriately recorded and accounted for in the project.
			CMAP's Local Technical Assistance (LTA) program to develop "Homes for a Changing Region" Plan.	Too many homes would have to come up to compliance with current codes.	-
			Illinois Department on Aging.	With relocation to existing affordable housing, there may be challenges associated with public transportation and amenities such as grocery stores and pharmacies.	-

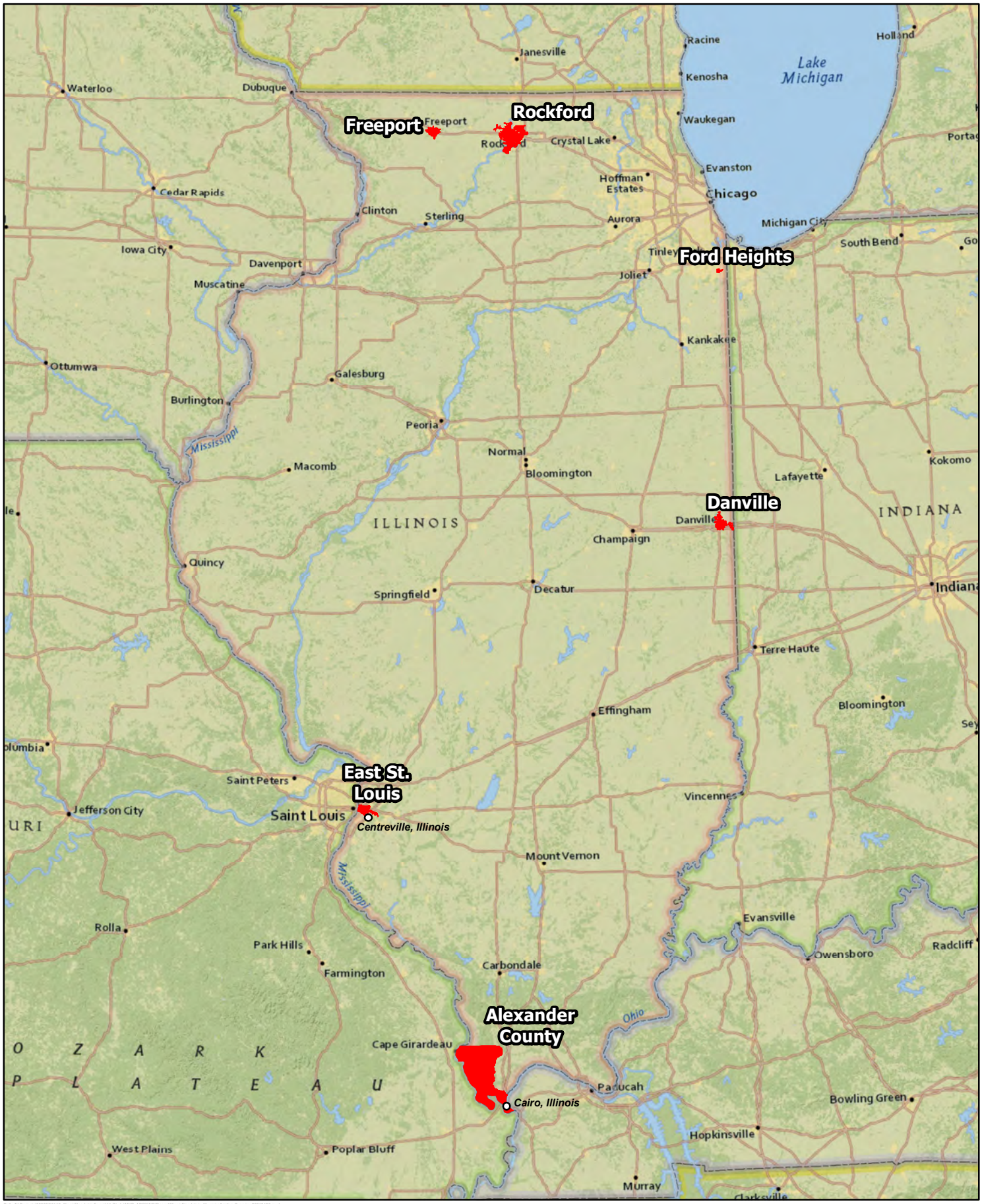
Stakeholder Recommendations Table

Actions/Recommendations	Geographic Relevance	Issues Targeted by Actions	Existing Programs and Funding Sources	Potential Barriers Limiting Action	Further Information
Racial Equity	Centreville, Rockford	Flood Risk & Management	Anti-discrimination laws for state and federal agencies.	No or limited transparency in state and federal spending to determine where discrimination might be happening.	There is a need for equitable distribution of resources around flood risk reduction. State and federal programs need to be more transparent regarding demographic information around their community assistance programs. Black residents may not be adequately engaged in the decision-making process regarding community planning and development.
			Health Departments.	The local health departments seem to be siloed or otherwise disconnected from the flood risk management decision-making process.	There are a lot of health issues associated with dampness (like mold) that result from living in floodplains, even where water levels are controlled with levees and pumps.
Political Power	Centreville	Flood Risk & Management	Consolidation of water management districts through the legislative process would allow more equitable distribution of funds in the region.	Requires complex legislative action.	Stakeholders felt that Centreville needs better access to decision-makers and political power to bring resources into their community for investments.
				Resistance to shared power and decision making from public officials.	-
Agency Coordination	Centreville, Freeport	Flood Risk & Management	Many state and federal agencies have programs to facilitate agency collaboration within communities.	Bandwidth and funding at the state and federal agencies. Many agencies are understaffed and do not have the capacity to do effective and continual public outreach.	Centreville deserves the attention of multiple state and federal agencies. FEMA, the Corps, IL DNR, IL EPA, and the county Soil and Water Conservation Districts should review Centreville's flood and pollution problems collaboratively and develop an integrated plan to assist the community.
Addressing Environmental Contamination Issues to Limit Hazards to Public Safety	Alexander County (Cairo), Centreville	Public Health and Safety Issues from Surface Water Flooding & Groundwater Intrusion	Grants through EPA Brownfields Program	Lack of resources, expertise and capacity to successfully apply for funding.	-
Sustainable Development	Ford Heights	Flood Risk & Management	None identified.	Many areas (like brownfields) need to be cleaned up for community use. Need to develop public transportation infrastructure and other community amenities, like a grocery store.	-
Floodplain Reconnection by Removal of Levees	Alexander County	Surface Water Flooding	PL 84-99 Federal Levee Repair Program can finance levee setbacks and removals.	This process is based on benefit-cost ratios and often forced on the landowners and land managers. Need to do more pre-disaster studies and community-led discussions to help people develop a desired alternative state or local action if a levee or floodwall cannot be rebuilt.	-
			USDA Conservation Easement Program can help landowners recuperate losses due to repetitive flooding.	Conservation easement funding is limited, so many landowners are turned away each year. Additional funding is needed at the state and federal levels to enroll more acres.	-
				Conservation easements only help landowners and not tenant farmers who do not receive any financial subsidies under easement programs. Financial assistance is needed for tenant farmers when land is taken out of production.	-
				Farmland losses impact local economies. Strategies to protect productive farmland need to be developed in the context of multi-benefit floodplain development.	-
				Levee and Drainage Districts in Illinois are regulated under the Illinois Drainage Code, which prohibits districts from advancing projects that might cause localized flooding or ponding within the districts. The Illinois Drainage Code should be reviewed and amended to provide more flexibility to advance green infrastructure projects that might help reduce flooding.	-
Revitalization	Alexander County (Cairo)		None identified.	Lack of funding for revitalization planning and execution. Cairo's population is in a steady decline due to lack of community amenities, and is a service desert (groceries, gas station, medical, etc.). Cairo needs assistance revitalizing itself from top to bottom to comprehensively address flooding issues, housing stock, services and economic development.	Cairo and the surrounding region would benefit from a revitalization plan that focused on economically sustainable infrastructure, green jobs, local farm and food production, and ecological health could raise quality of life.
Watershed Planning	Rockford, Centreville	Surface Water Flooding	EPA Section 319 Non-point Source Pollution Grants can help the community finance green infrastructure projects.	Some pollution sources come from farmland and there is no standard venue for rural and urban residents to collaborate on watershed flood issues. Need to facilitate conversations between cities and rural areas in watersheds.	Many flood issues are the result of actions upstream and, in some cases, it will be more effective and cheaper to address the source of the water instead of the downstream flooding.
			USDA Conservation Easement Programs and the Environmental Quality Incentives Program can incentivize farmers to change land use or farm practices to reduce runoff.	Conservation easement funding is limited, and landowners are turned away each year. Additional funding is needed at the state and federal levels to enroll more acres.	-
				Conservation easements only help landowners and not tenant farmers who do not receive any financial subsidies under easement programs. Financial assistance is needed for tenant farmers when land is taken out of production.	-
				Farmland loss impacts local economies. Strategies to protect productive farmland need to be developed in the context of multi-benefit floodplain development.	-
				Programs are not regularly connected with urban flooding issues. Need guidance and coordination assistance to facilitate planning.	-
				Financing of flood/watershed projects is challenging due to the involvement of many different federal and state agencies and their own permit regulations.	-
Levee Improvements	Alexander County	Surface Water Flooding	Federal levees are eligible for repair funds through the PL 84-99 Levee Repair Program	Levee repair costs must meet benefit cost ratio thresholds.	-
			Cairo is part of the Mississippi River and Tributaries System; operation and maintenance of their levees is fully federally funded through the USACE Mississippi River Commission.	Lack of political will/influence.	-
Flood Bypass Channel	Alexander County	Surface Water Flooding	None.	Potential issues with existing levees; consider raising or creating new levees instead of investigating a flood channel. Expenditure could be more than raising existing levees.	-

Note: This table represents the outcomes of the stakeholder discussions that focused on the six case study areas. We used these outcomes to understand the unique needs facing Illinois communities. This table should not be used to represent the full range of options available for any community. While many solutions were discussed, additional studies and community led dialogues should be

APPENDIX B

Maps and Graphics



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

ILLINOIS OVERVIEW

Study Area

1:3,000,000

Created By: EWS
Project Number: 59419.00
Date: 4/20/2021
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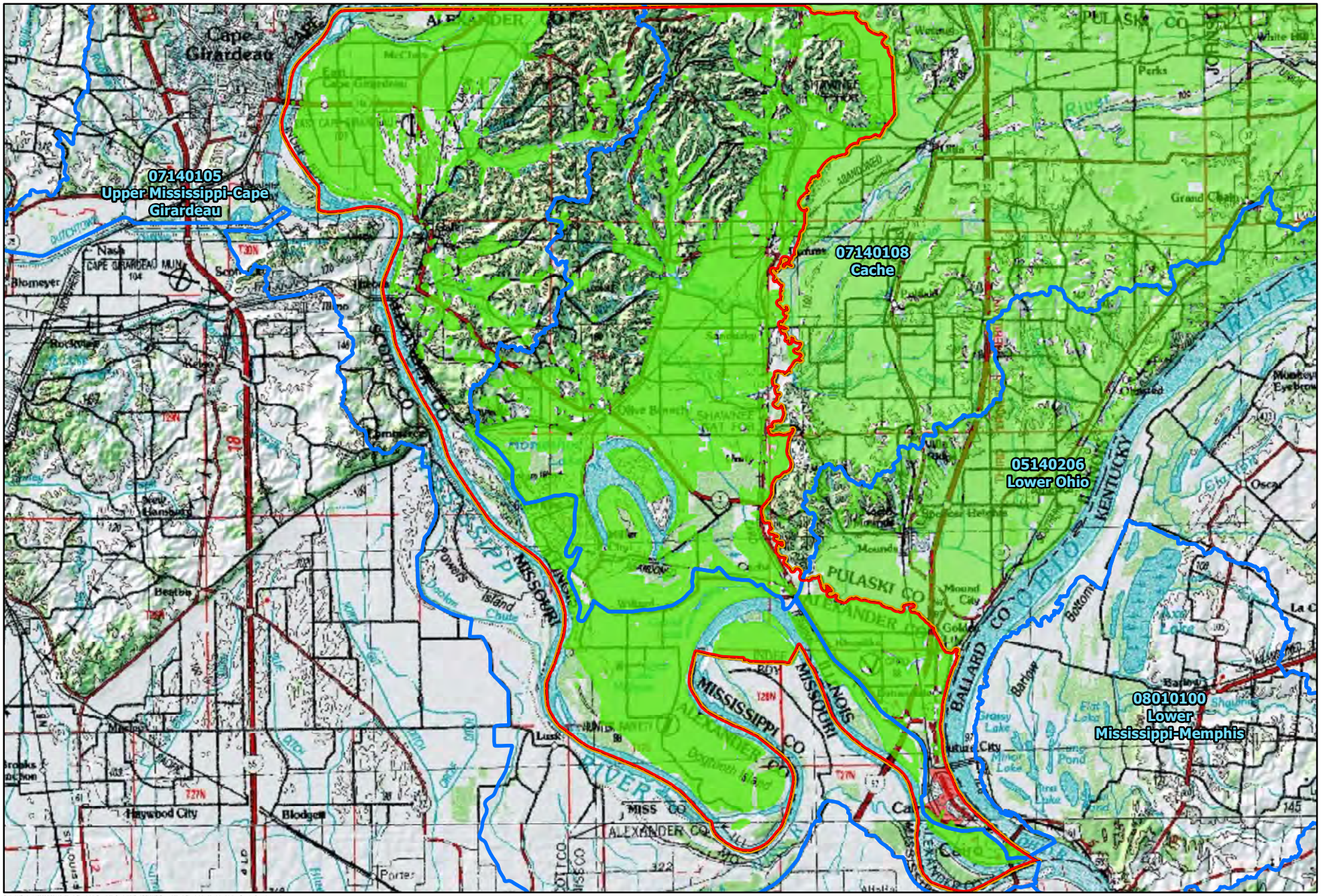
0 30 60 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

ALEXANDER COUNTY

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land
- County Boundary

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:230,870

Created By: JCK
Project Number: 59419.00
Date: 9/14/2020
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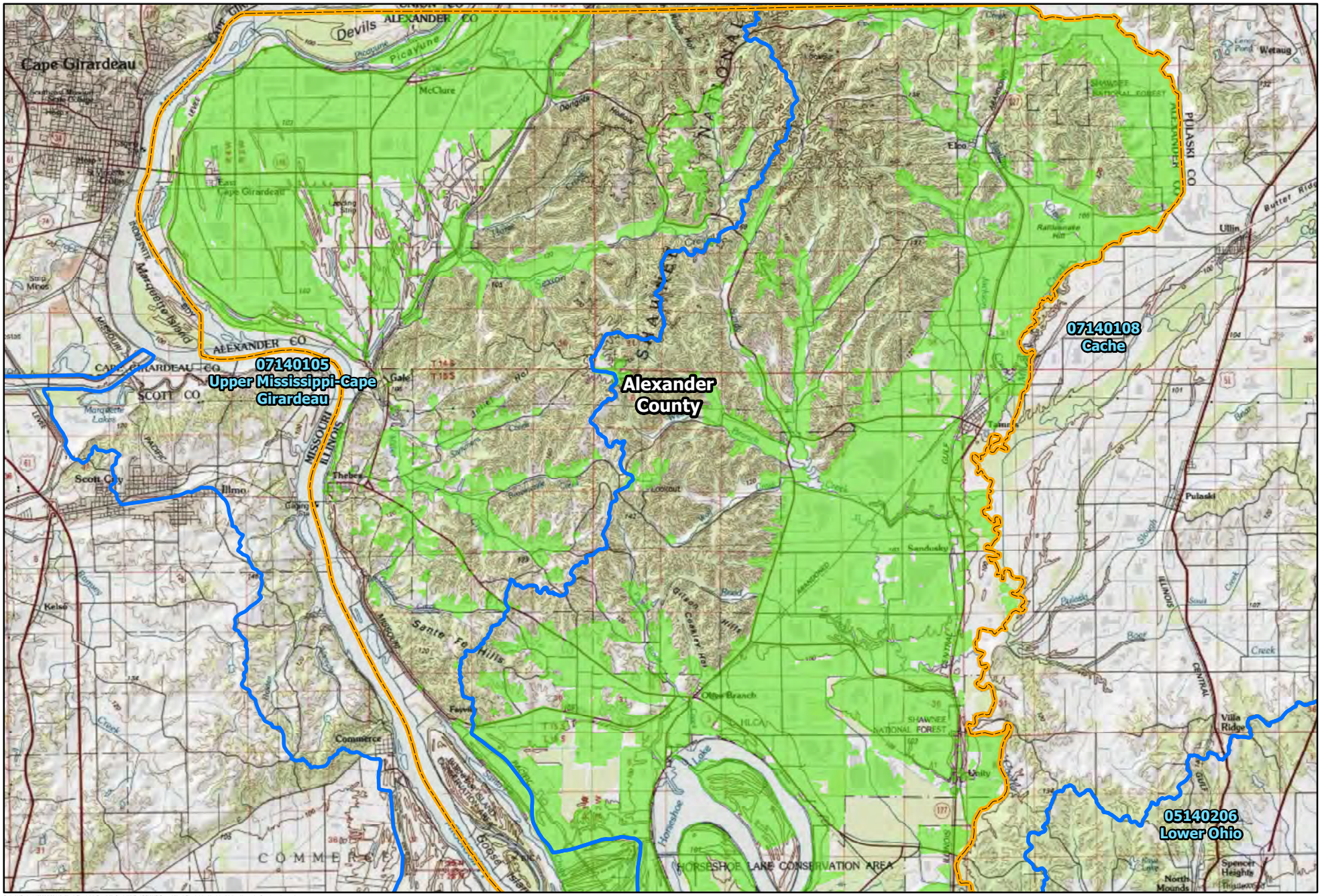

SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

Northern Alexander County

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:135,940

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Date: 9/10/2020
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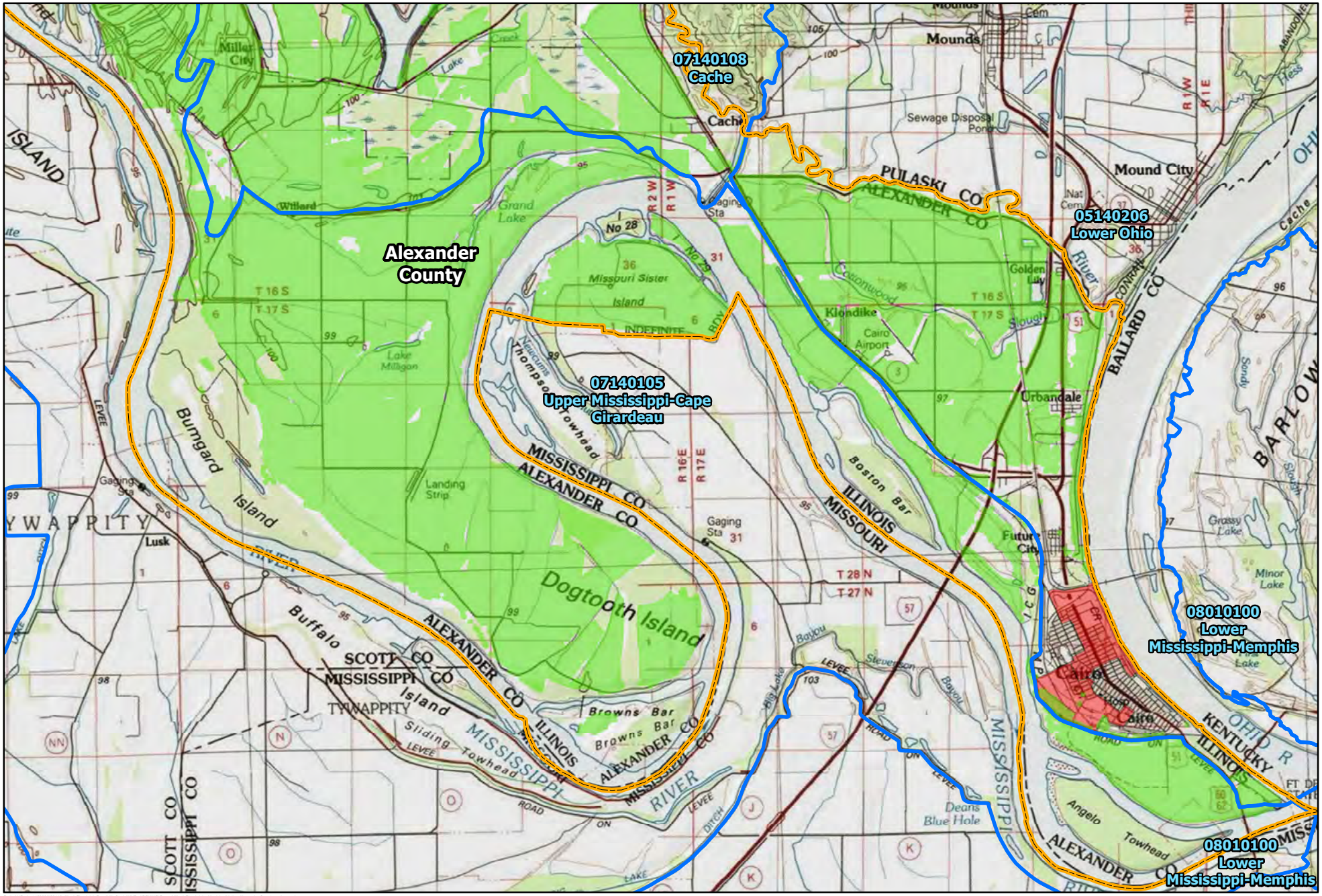

SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

Southern Alexander County

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:96,070

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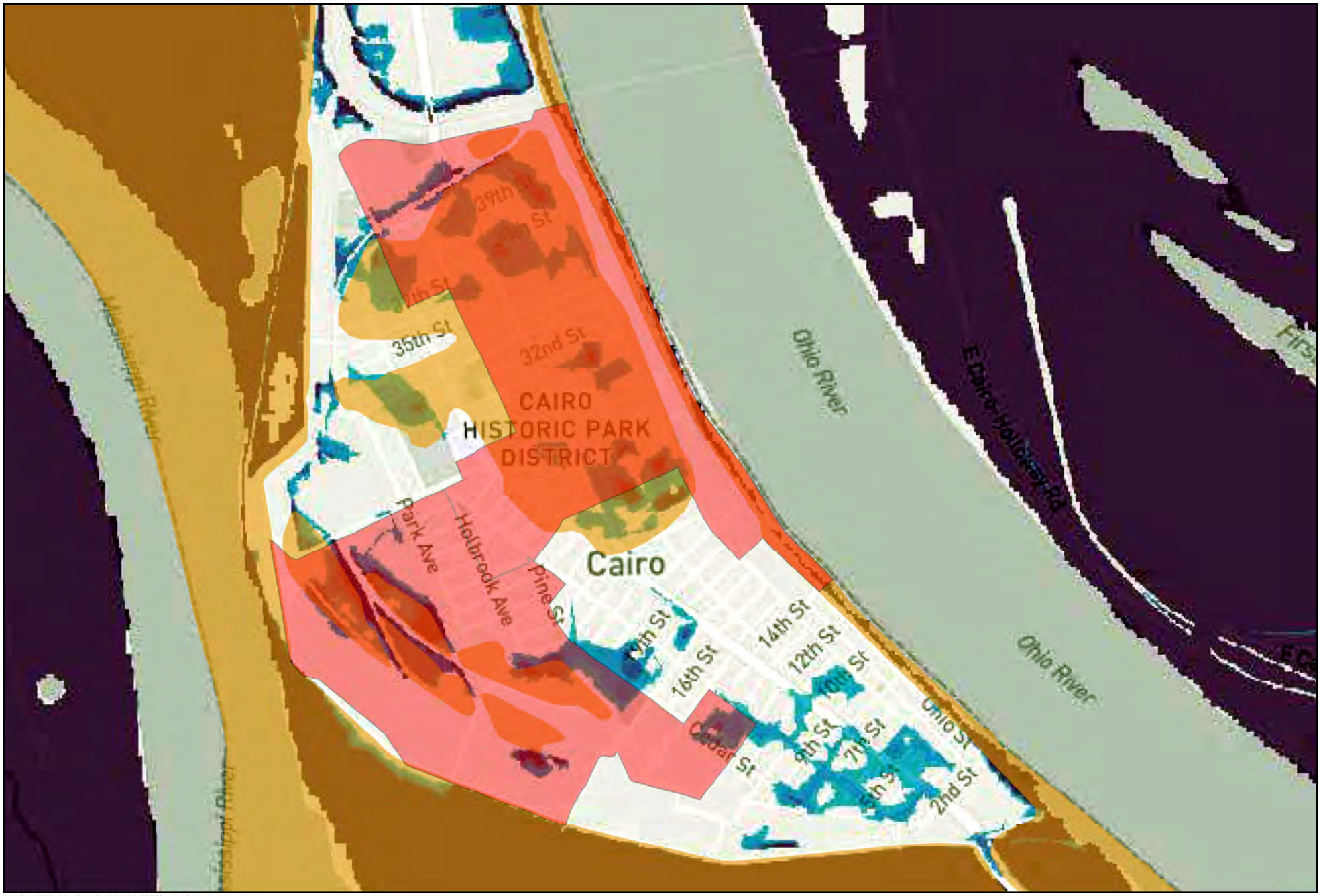
0 1 2 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

Alexander County (Southern Piece) Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

FEMA Floodplain

Illinois EPA Env. Justice Area (US Census Block Group)

Low Income >= 64.8

Minority Population >= 74.8

Minority Population and Low Income

1:20,000

Created By: EWS
Project Number: 59419.00
Date: 9/4/2020
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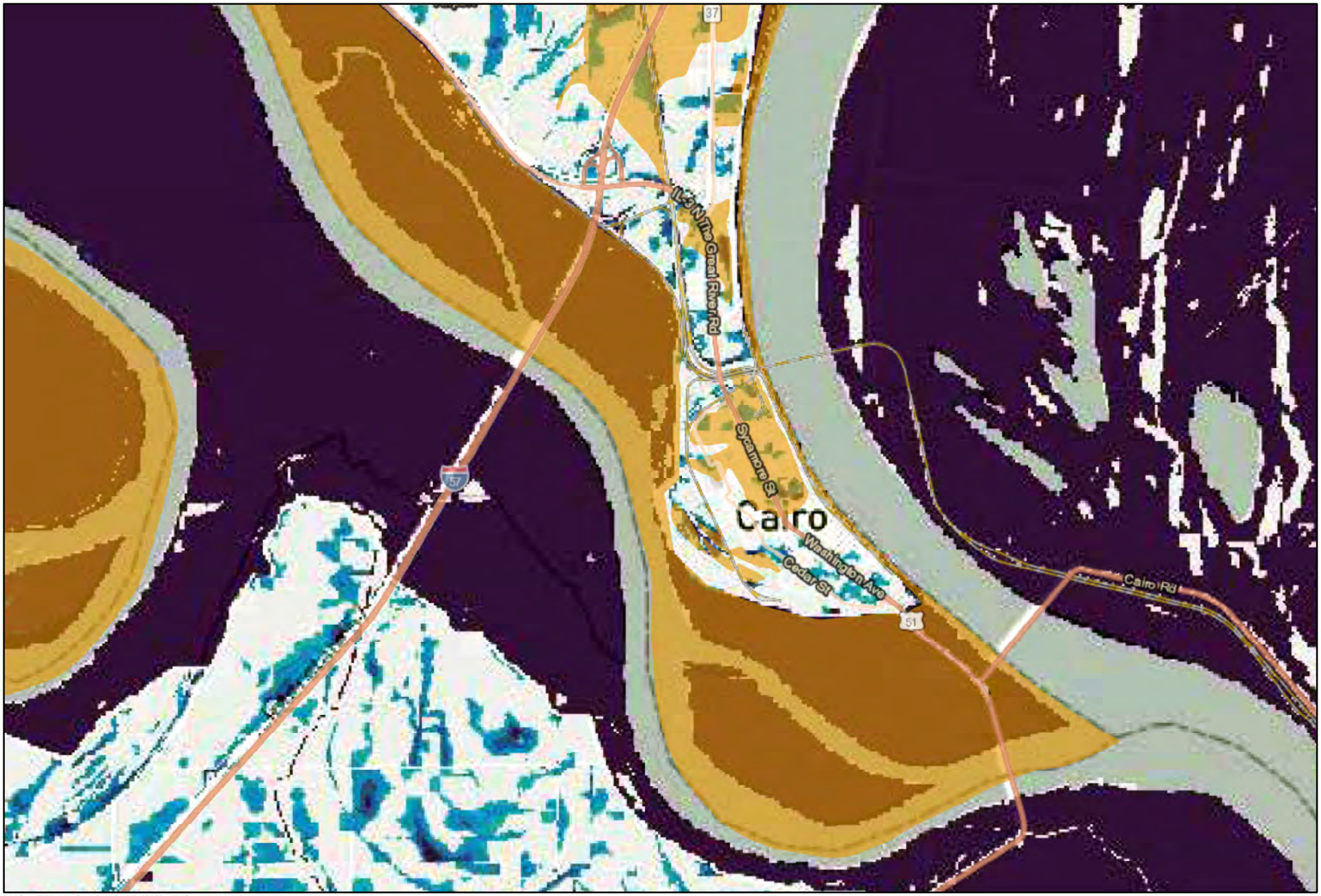
0 0.25 0.5 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

Alexander County (Southern Piece) Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

FEMA Floodplain

1:60,000

Created By: EWS
Project Number: 59419.00
Date: 9/4/2020
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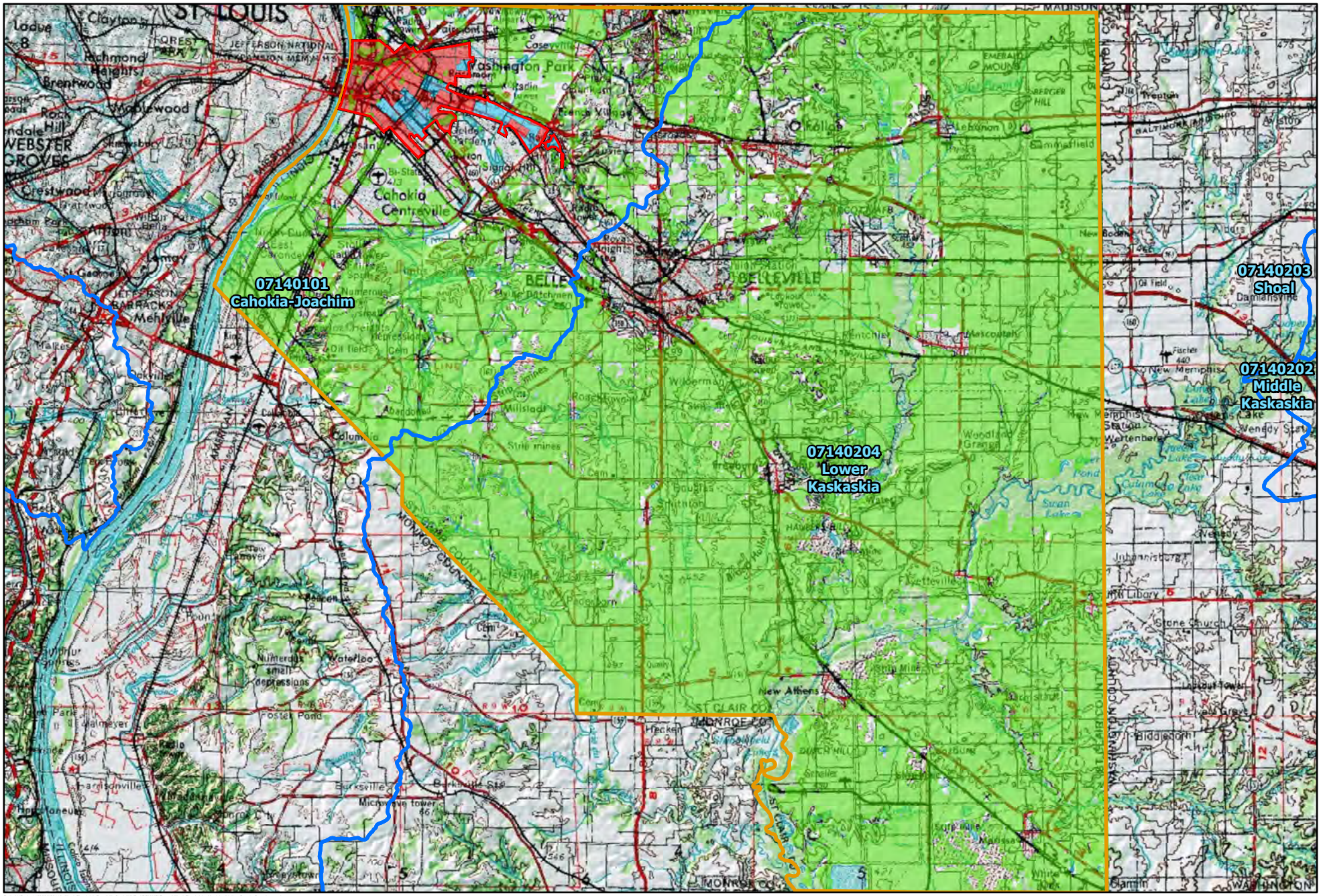
0 0.5 1 Miles

0 0.75 1.5 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

ST. CLAIR COUNTY

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land
- County Boundary

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:278,600

Created By: JCK
Project Number: 59419.00
Date: 9/14/2020
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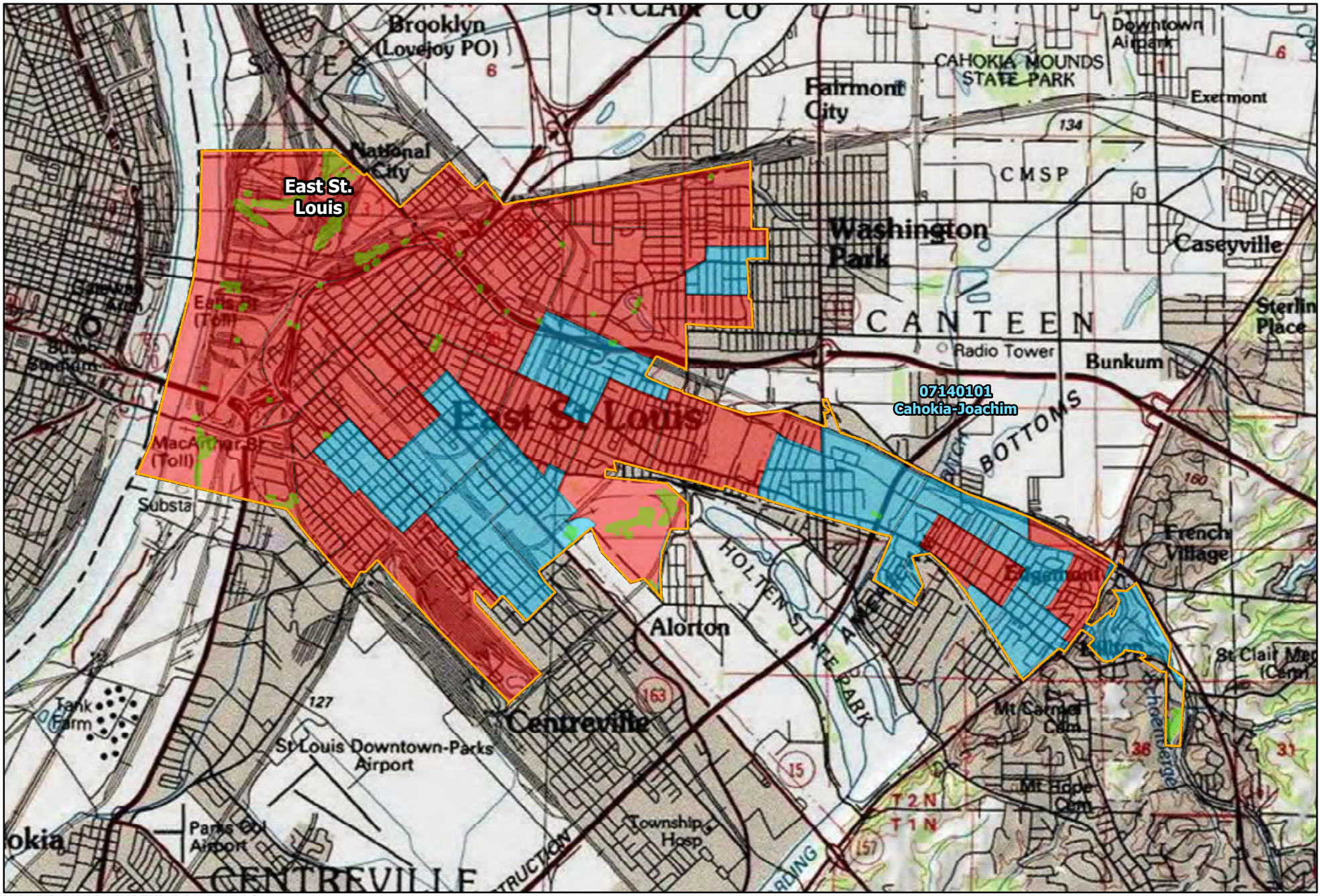

SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

East St. Louis, St. Clair County

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:60,420

Created By: JCK
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Date: 9/9/2020
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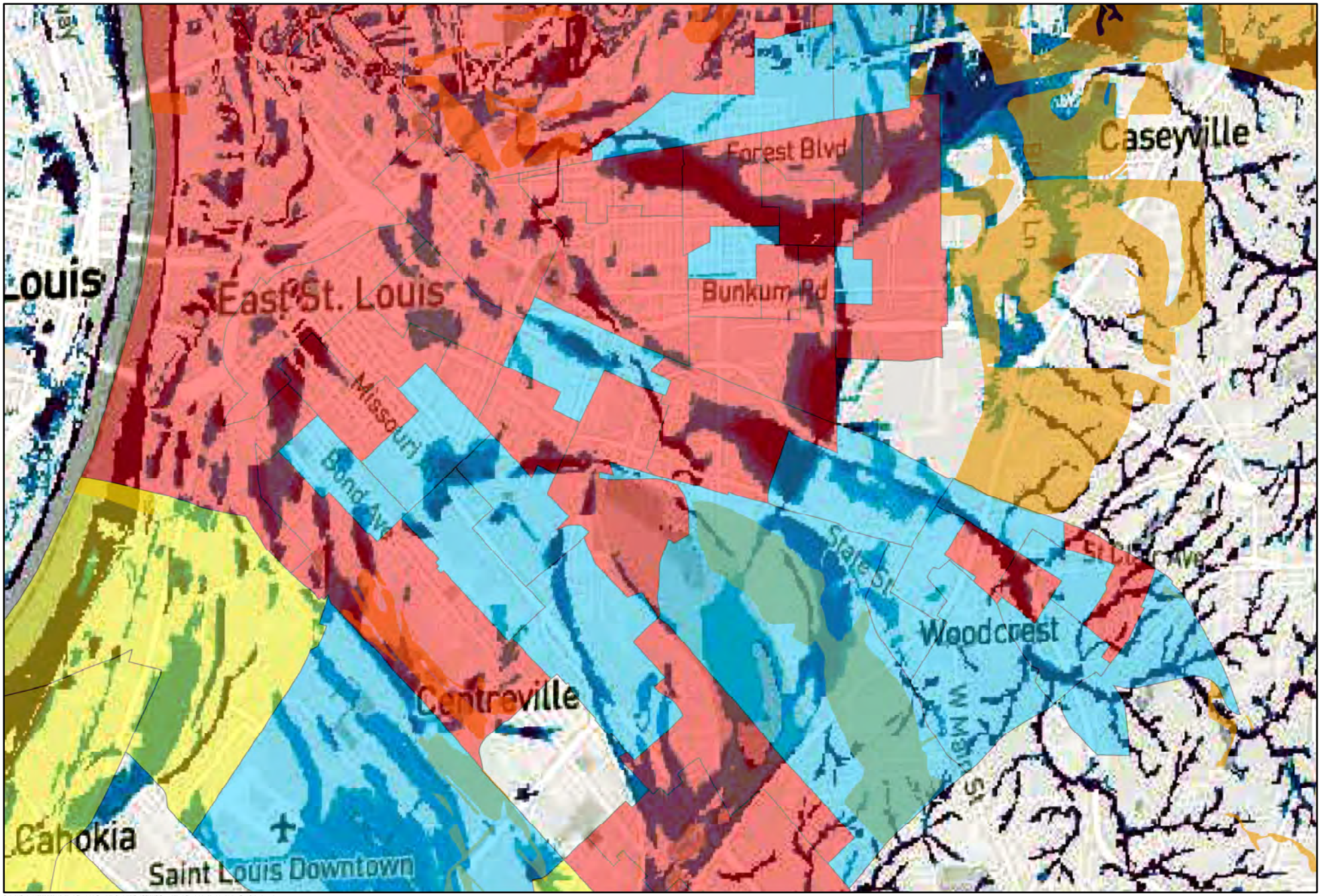

SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

East St. Louis Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

FEMA Floodplain

Illinois EPA Env. Justice Area (US Census Block Group)

Low Income >= 64.8

Minority Population >= 74.8

Minority Population and Low Income

1:55,000

Created By: EWS
Project Number: 59419.00
Date: 9/4/2020
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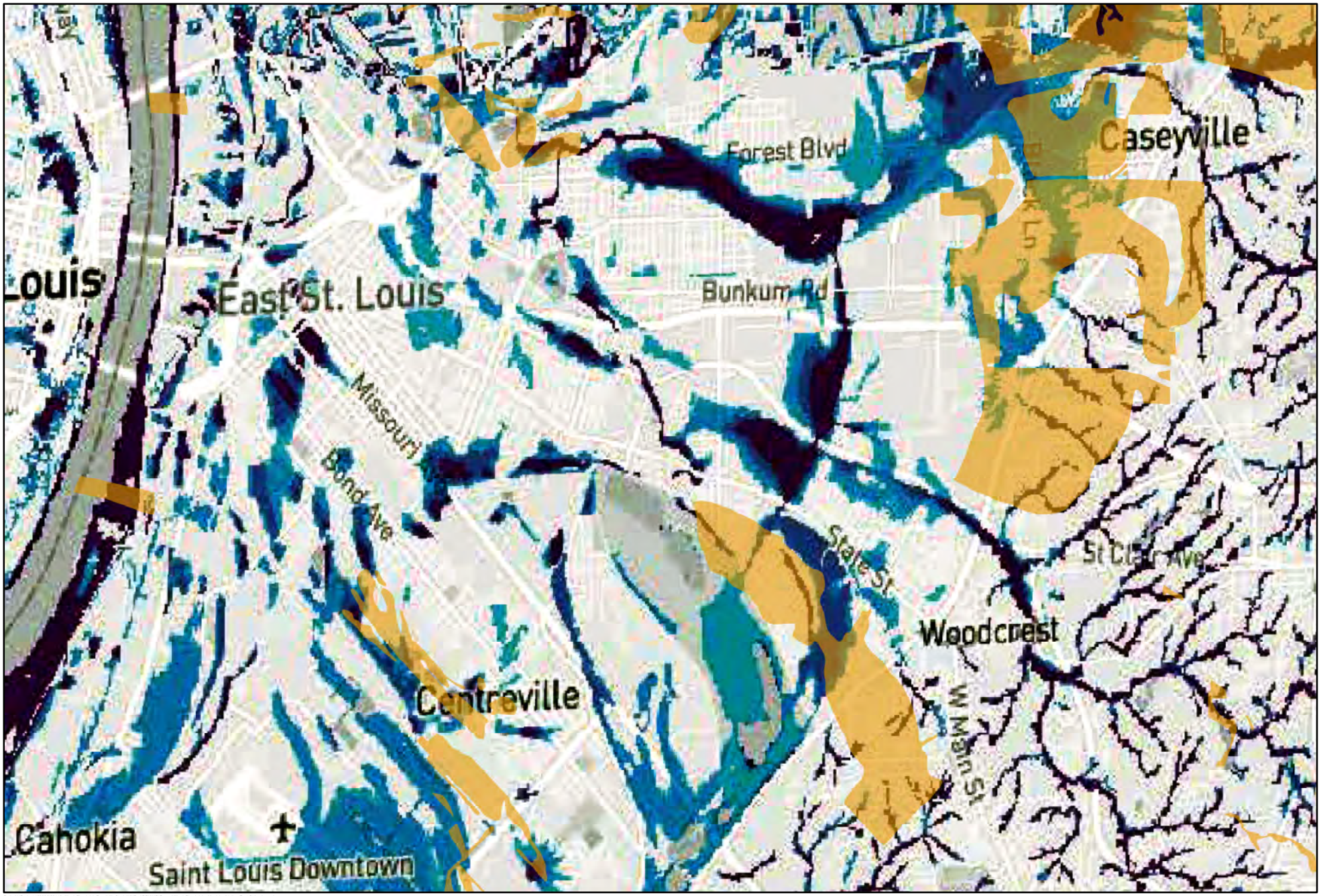
0 0.65 1.3 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

East St. Louis Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

FEMA Floodplain

1:55,000

Created By: EWS
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Date: 9/4/2020
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

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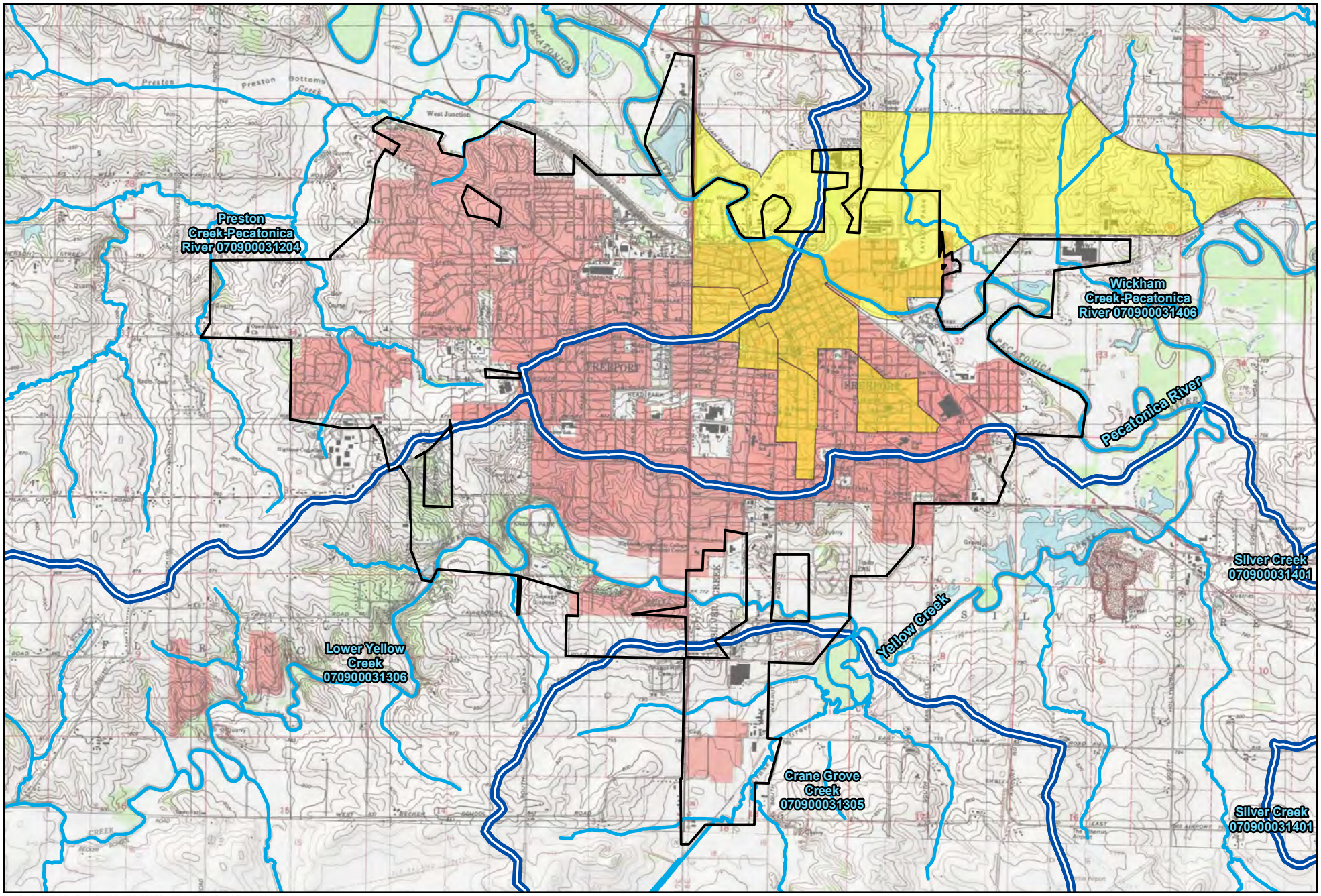


SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS
FIGURE 1: WATERSHED BOUNDARY
Freeport, Stephenson County

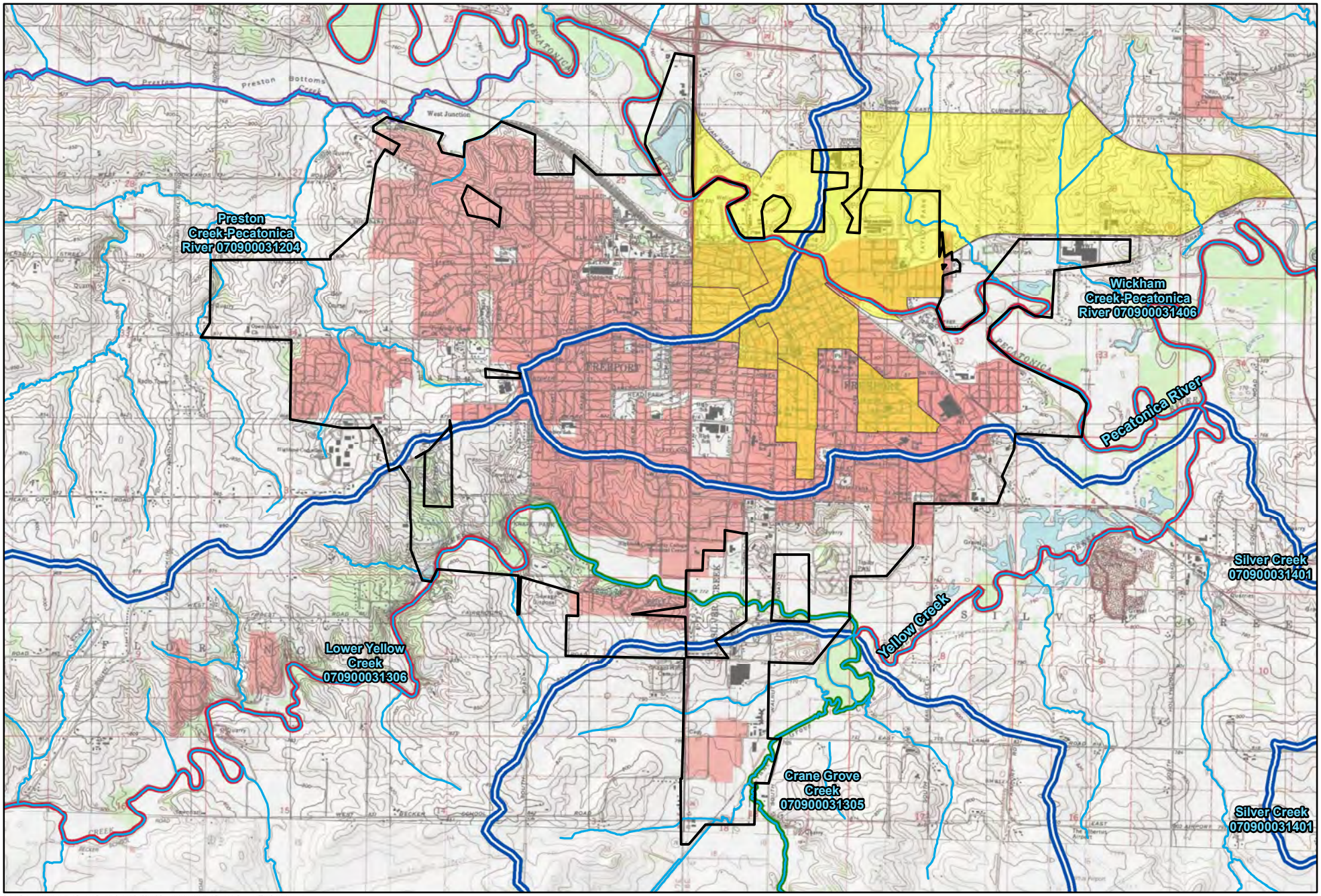
Illinois EPA Env. Justice Area (US Census Block Group)
- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

Buyout Point
Stream
Village/Town Boundary
Watershed Boundary

1:51,000

Created By: EWS
Project Number: 59419.00
Date: 1/15/2021
NAD 1983 UTM Zone 16N

0 0.4 0.8 Miles
0 0.6 1.2 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN
FEASIBILITY STUDY
FOR AMERICAN RIVERS
FIGURE 2: EPA IMPAIRED WATERBODIES
Freeport, Stephenson County

Illinois EPA Env. Justice Area (US Census Block Group)
- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income
- Village/Town Boundary

- Buyout Point
- Minor Stream
- Watershed Boundary

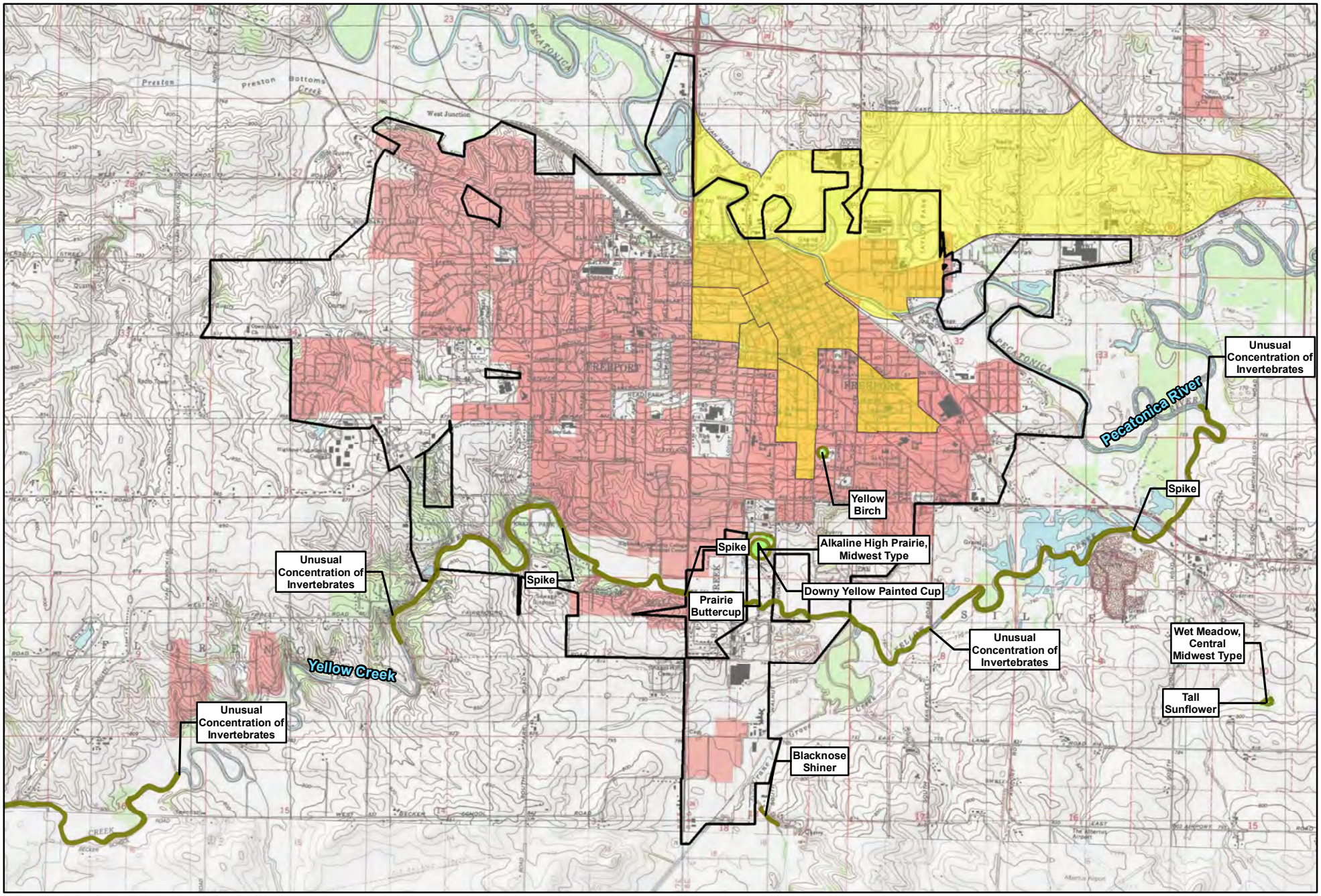
EPA Impaired Waterbodies
- Unassessed
- Polluted
- Good

- Unassessed
- Good
- Polluted

1:51,000

Created By: EWS
Project Number: 59419.00
Date: 1/15/2021
NAD 1983 UTM Zone 16N

0 0.4 0.8 Miles
0 0.6 1.2 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

FIGURE 3: IDNR THREATENED AND ENDANGERED SPECIES

Freeport, Stephenson County

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

- Watershed Boundary
- Village/Town Boundary
- Buyout Point
- IDNR State & Federal Threatened & Endangered Habitat (Sp. Called Out)

1:51,000

Created By: EWS
Project Number: 59419.00
Date: 1/15/2021
NAD 1983 UTM Zone 16N

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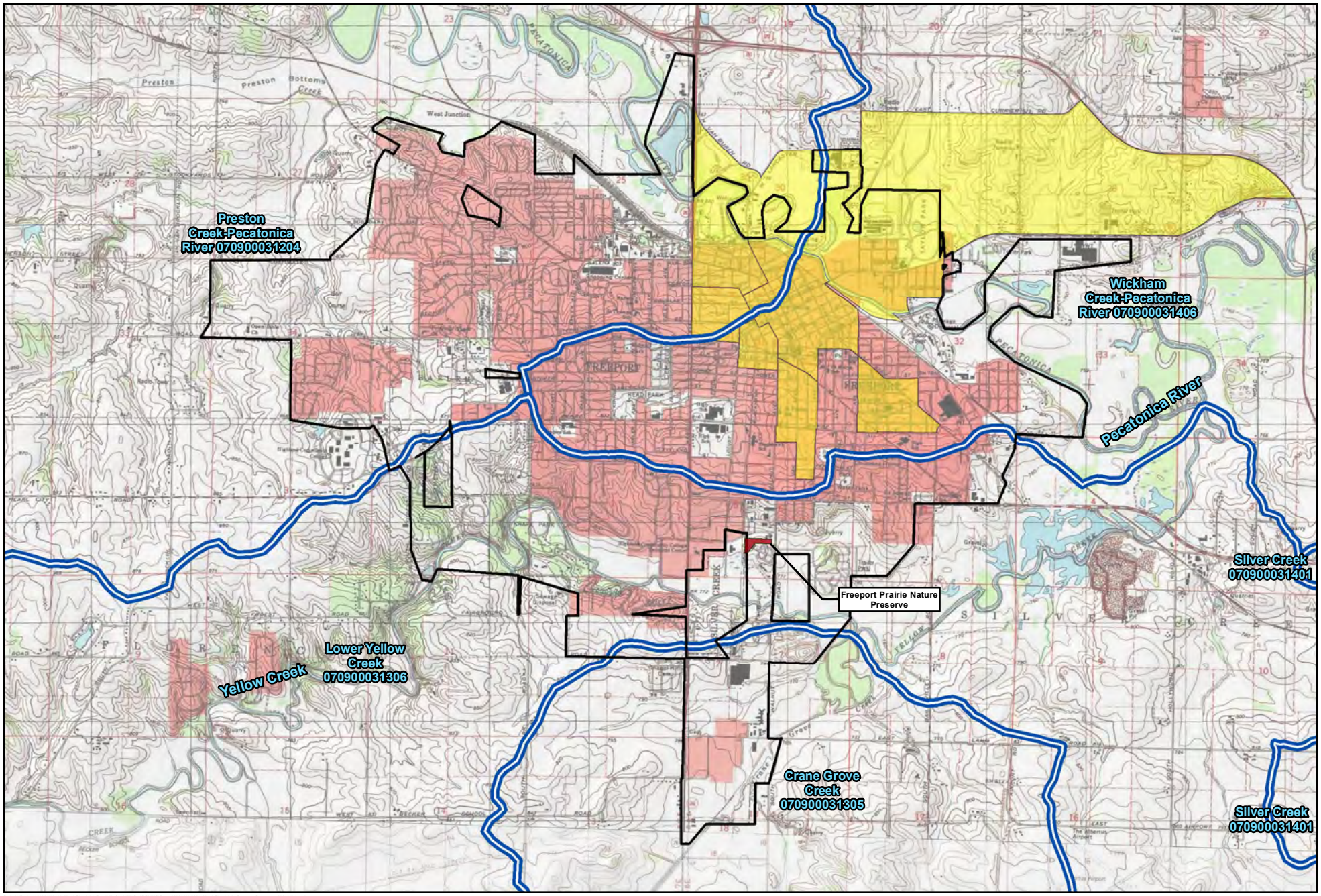
0 0.6 1.2 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

FIGURE 4: ILLINOIS NATURE, LAND AND WATER PRESERVES

Freeport, Stephenson County

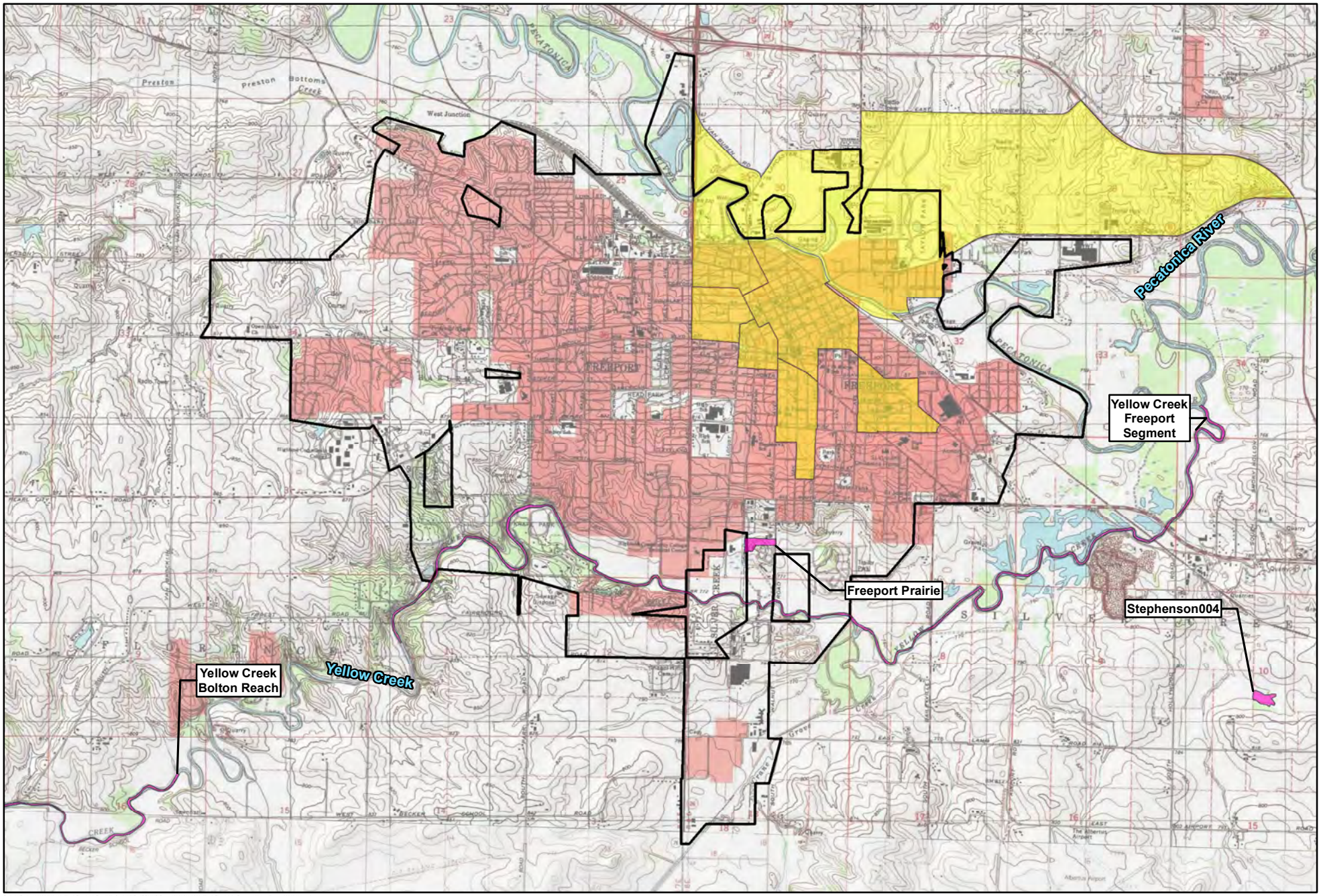
Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income
- Buyout Point
- Village/Town Boundary
- Watershed Boundary
- Illinois Nature, Land & Water Preserves

1:51,000

Created By: EWS
Project Number: 59419.00
Date: 1/15/2021
NAD 1983 UTM Zone 16N

0 0.4 0.8 Miles
0 0.6 1.2 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

FIGURE 5: ILLINOIS NATURAL AREAS INVENTORY

Freeport, Stephenson County

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

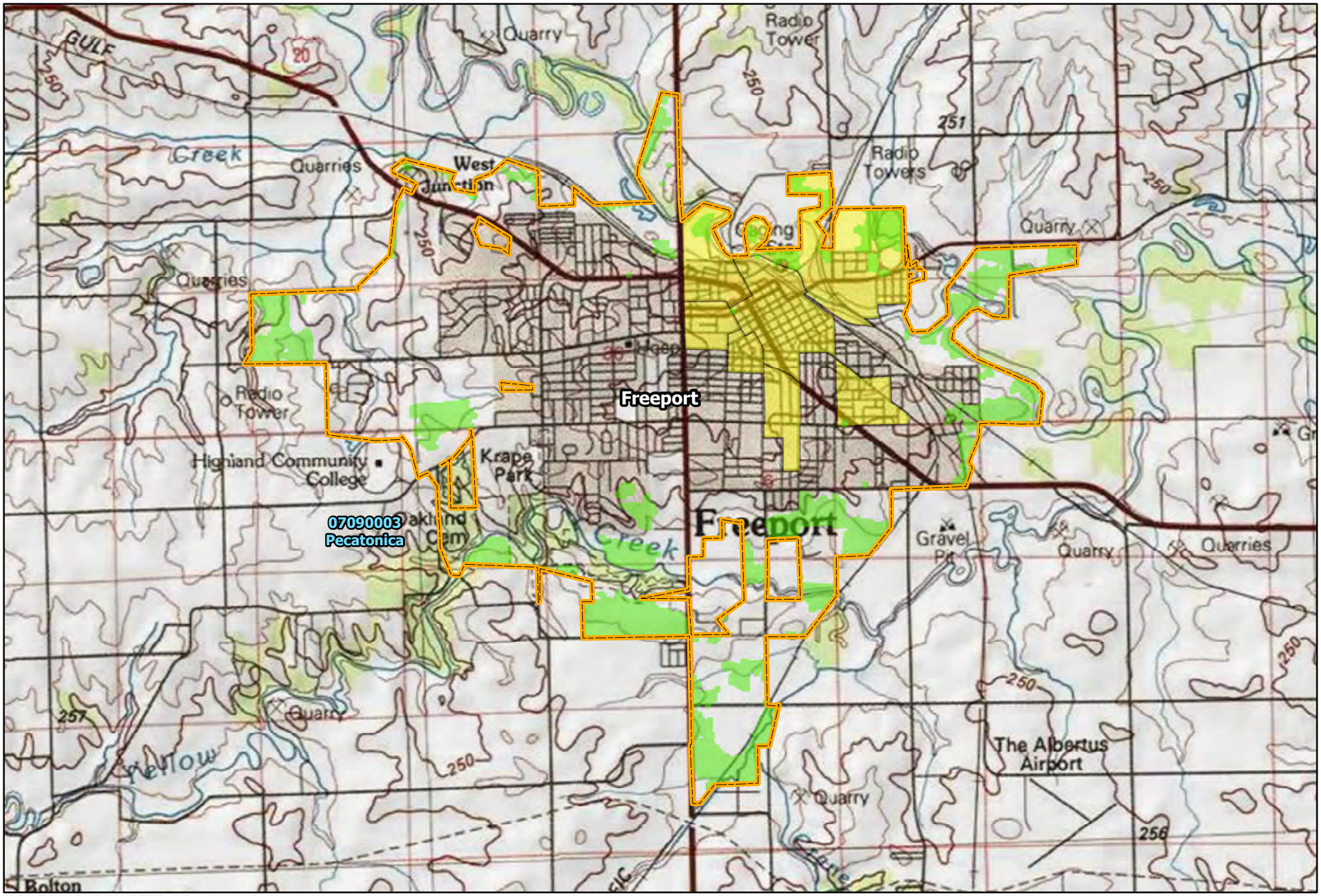
- Watershed Boundary
- Village/Town Boundary
- Buyout Point
- Illinois Natural Areas Inventory

The Illinois Natural Areas Inventory (INAI) shows high quality natural areas, habitats of endangered species, and other significant natural features intended to guide and support public, private and NGO land acquisition and protection.

1:51,000

Created By: EWS
Project Number: 59419.00
Date: 1/15/2021
NAD 1983 UTM Zone 16N

0 0.4 0.8 Miles
0 0.6 1.2 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS - Figure 6

Freeport, Stephenson County

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:56,690

Created By: JCK
Project Number: 59419.00
Date: 1/14/2021
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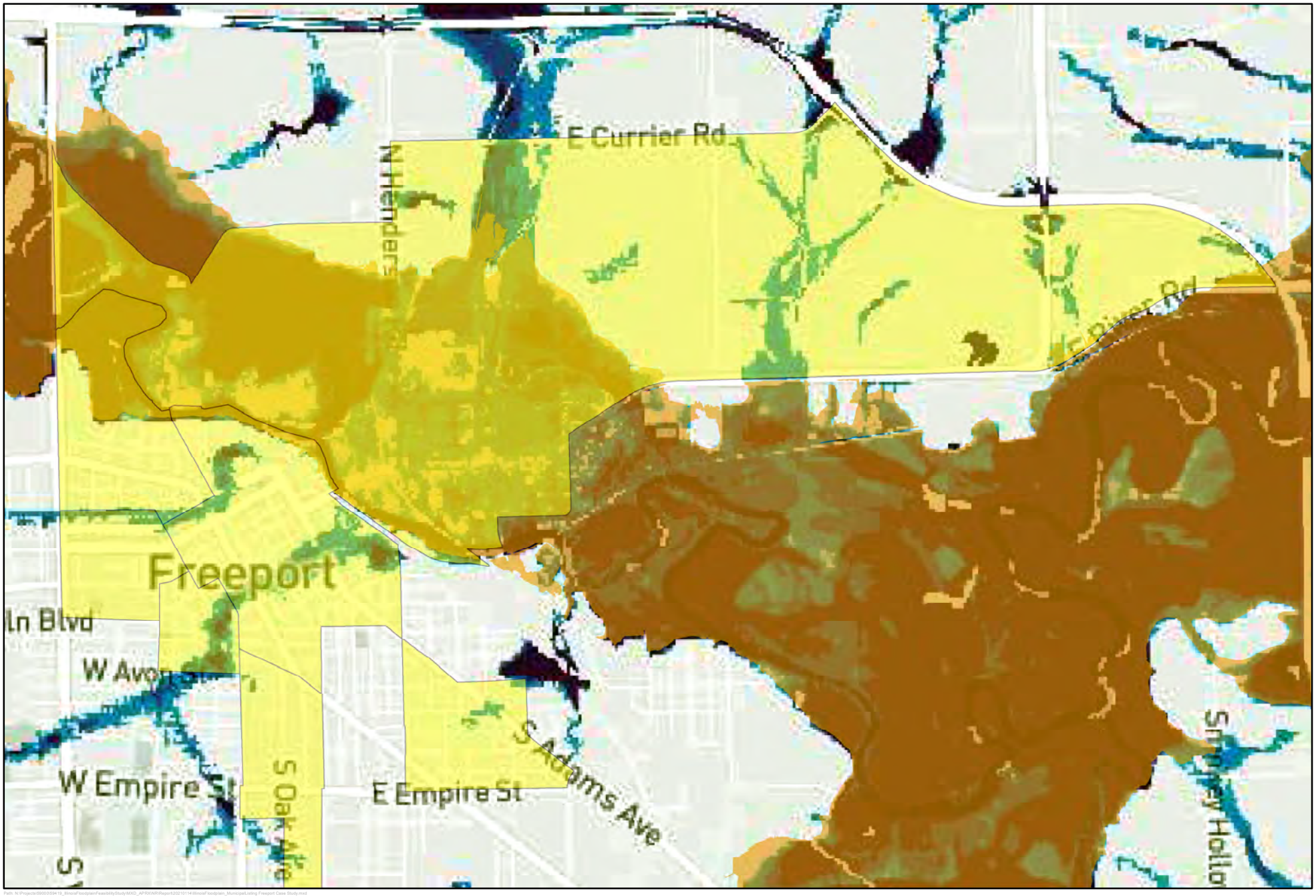
0 0.7 1.4 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY - Figure 7

Freeport Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

FEMA Floodplain

Illinois EPA Env. Justice Area (US Census Block Group)

Low Income >= 64.8

Minority Population >= 74.8

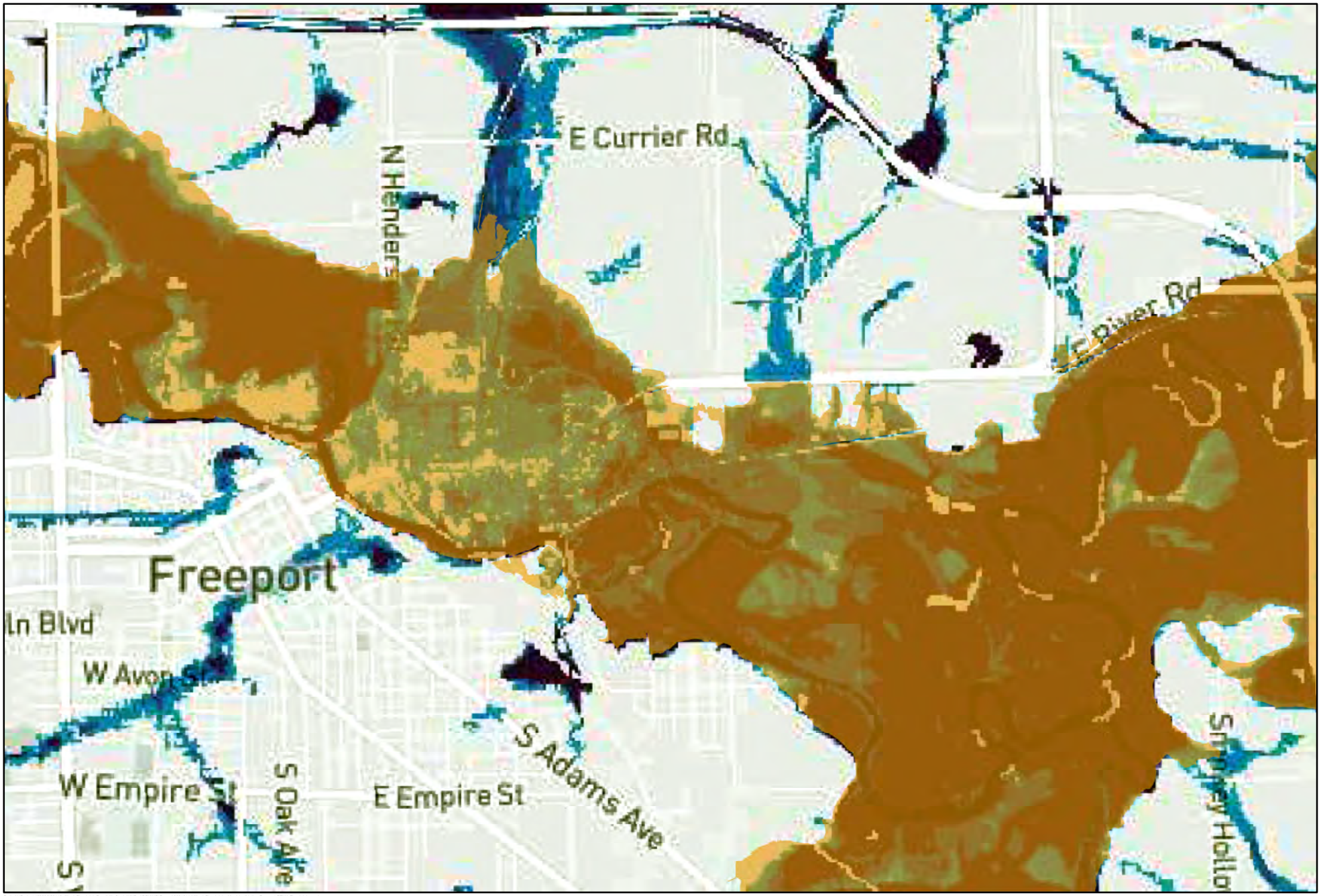
Minority Population and Low Income

1:25,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 0.2 0.4 Miles

0 0.3 0.6 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY - Figure 8

Freeport Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

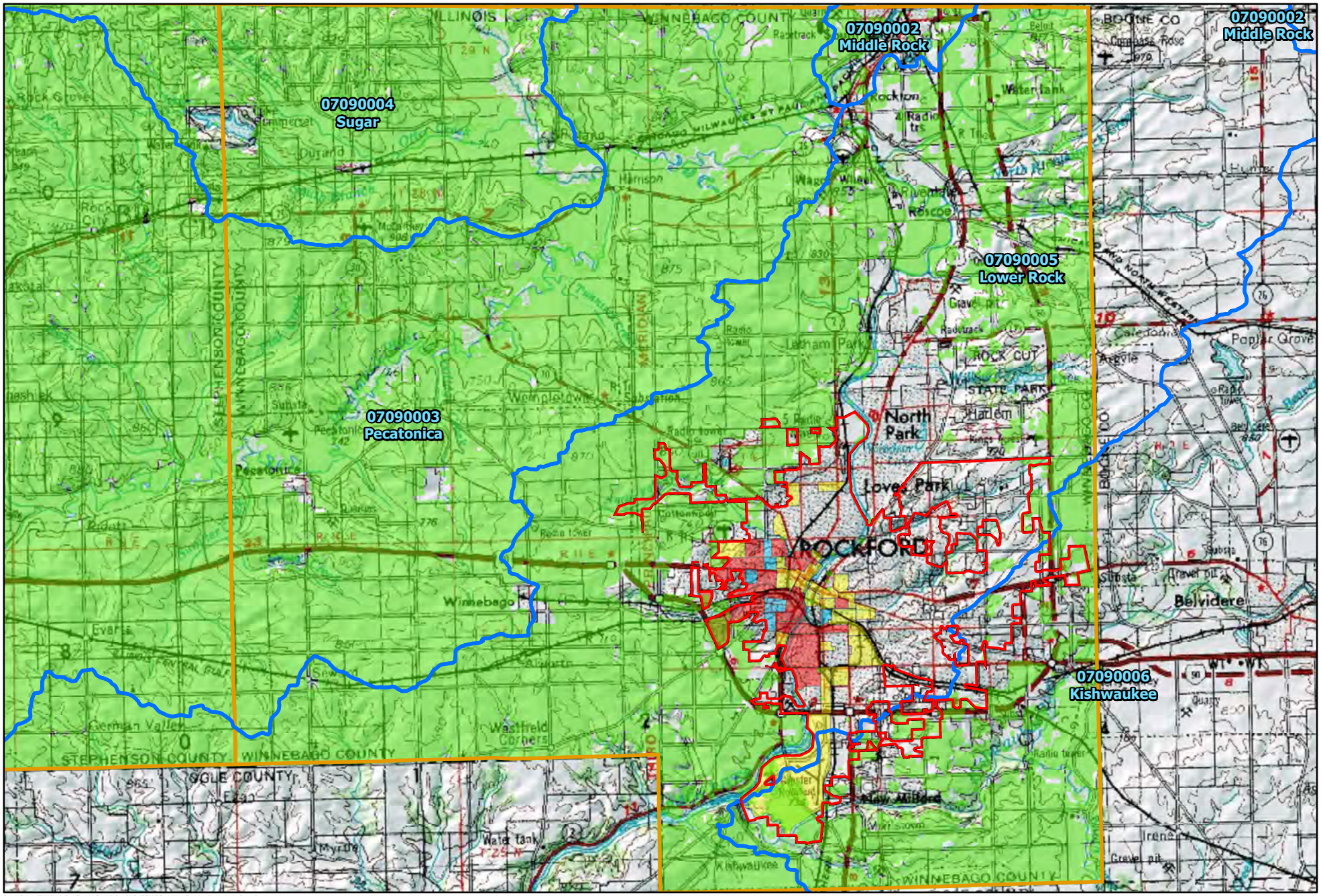
FEMA Floodplain

1:25,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 0.2 0.4 Miles

0 0.3 0.6 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

WINNEBAGO COUNTY

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land
- County Boundary

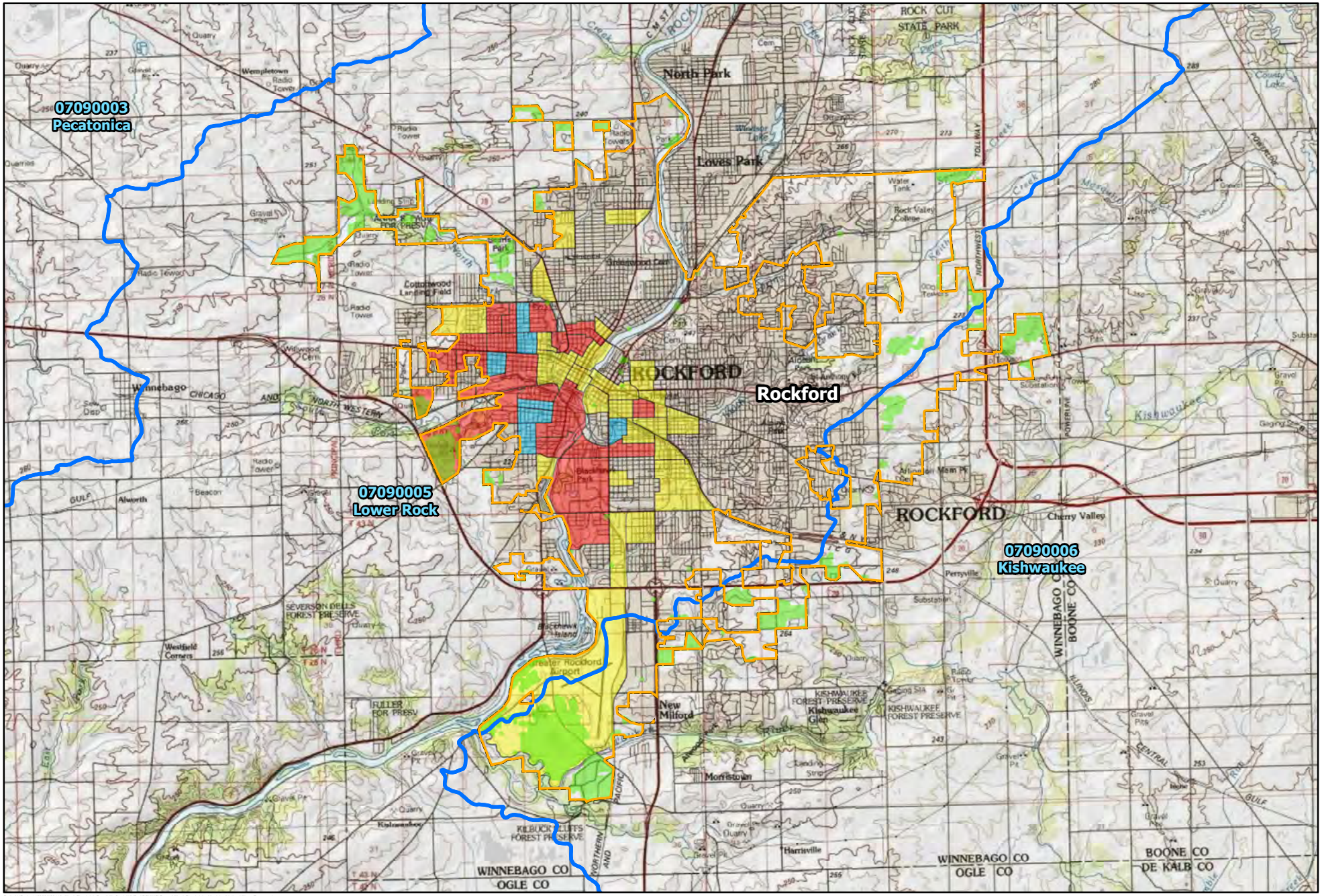
Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:220,860

Created By: JCK
Project Number: 59419.00
Date: 9/14/2020
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 1.5 3 Miles
0 2.5 5 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

Rockford, Winnebago County

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land

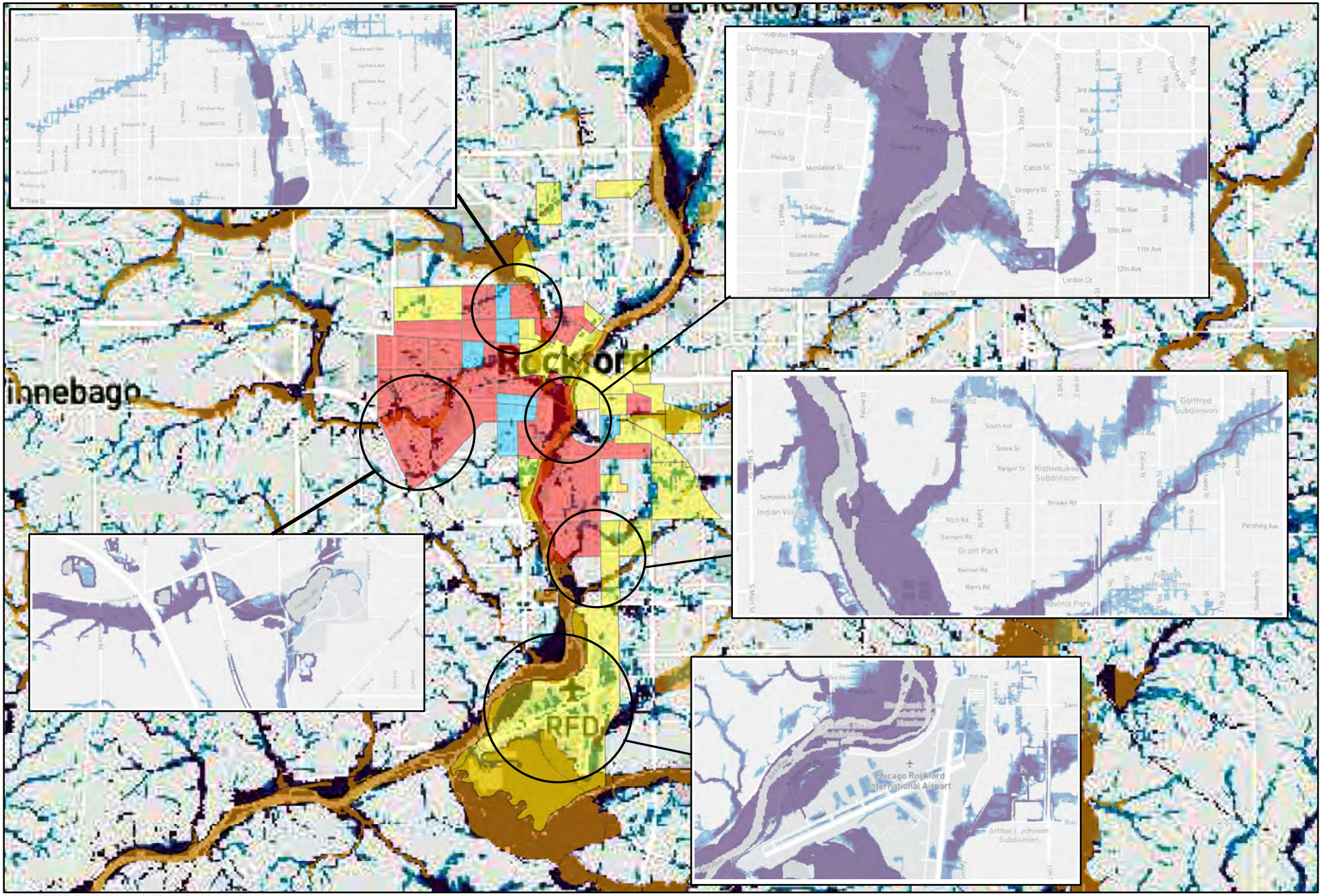
Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:135,210

Created By: JCK
Project Number: 59419.00
Date: 9/9/2020
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 1 2 Miles
0 1.5 3 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

Rockford Case Study

Increasing flood risk areas

Depth of flooding (feet)

FEMA Floodplain

Illinois EPA Env. Justice Area (US Census Block Group)

Low Income >= 64.8

Minority Population >= 74.8

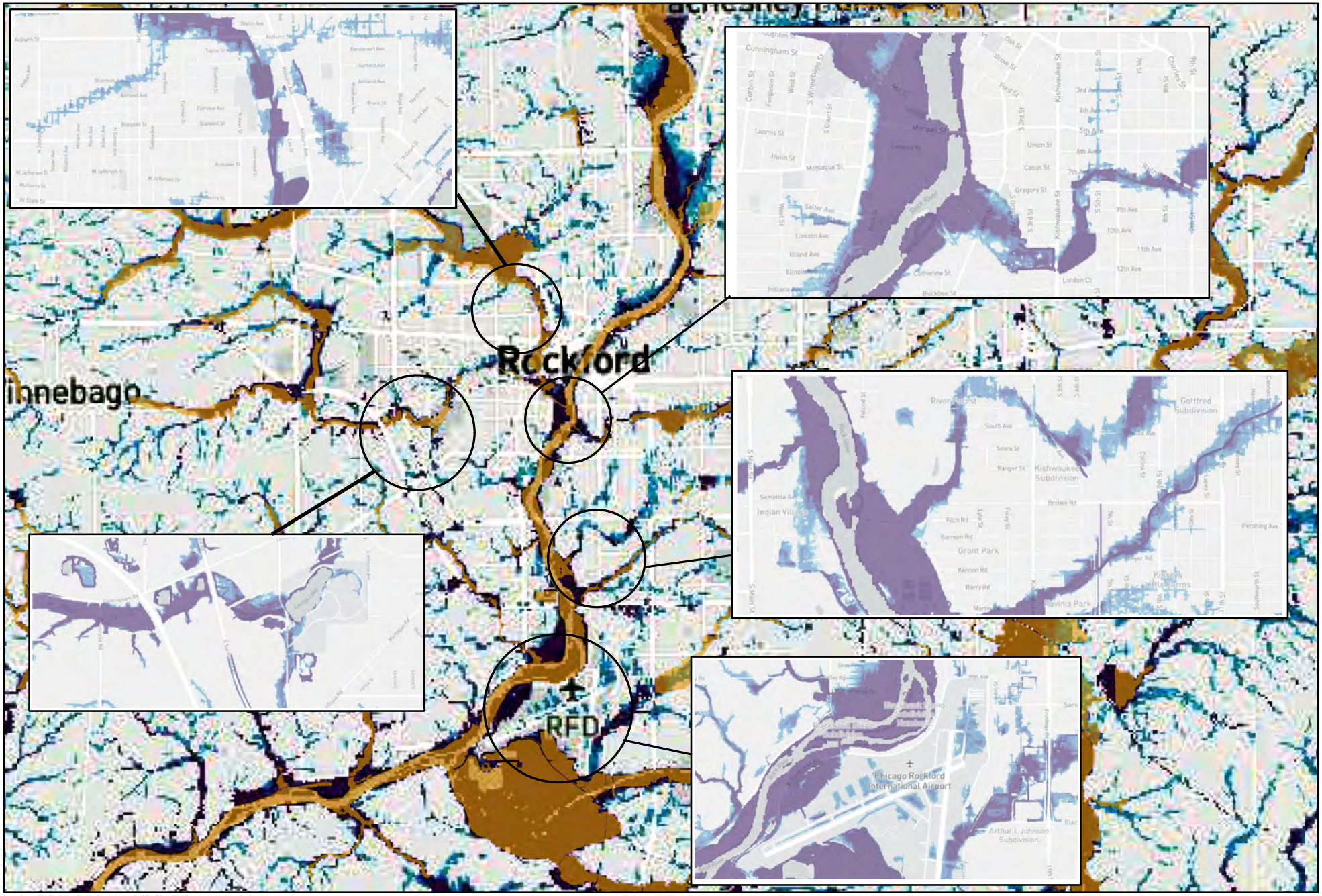
Minority Population and Low Income

1:120,000

Created By: EWS
Project Number: 59419.00
Date: 9/4/2020
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 1 2 Miles

0 1.5 3 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

Rockford Case Study

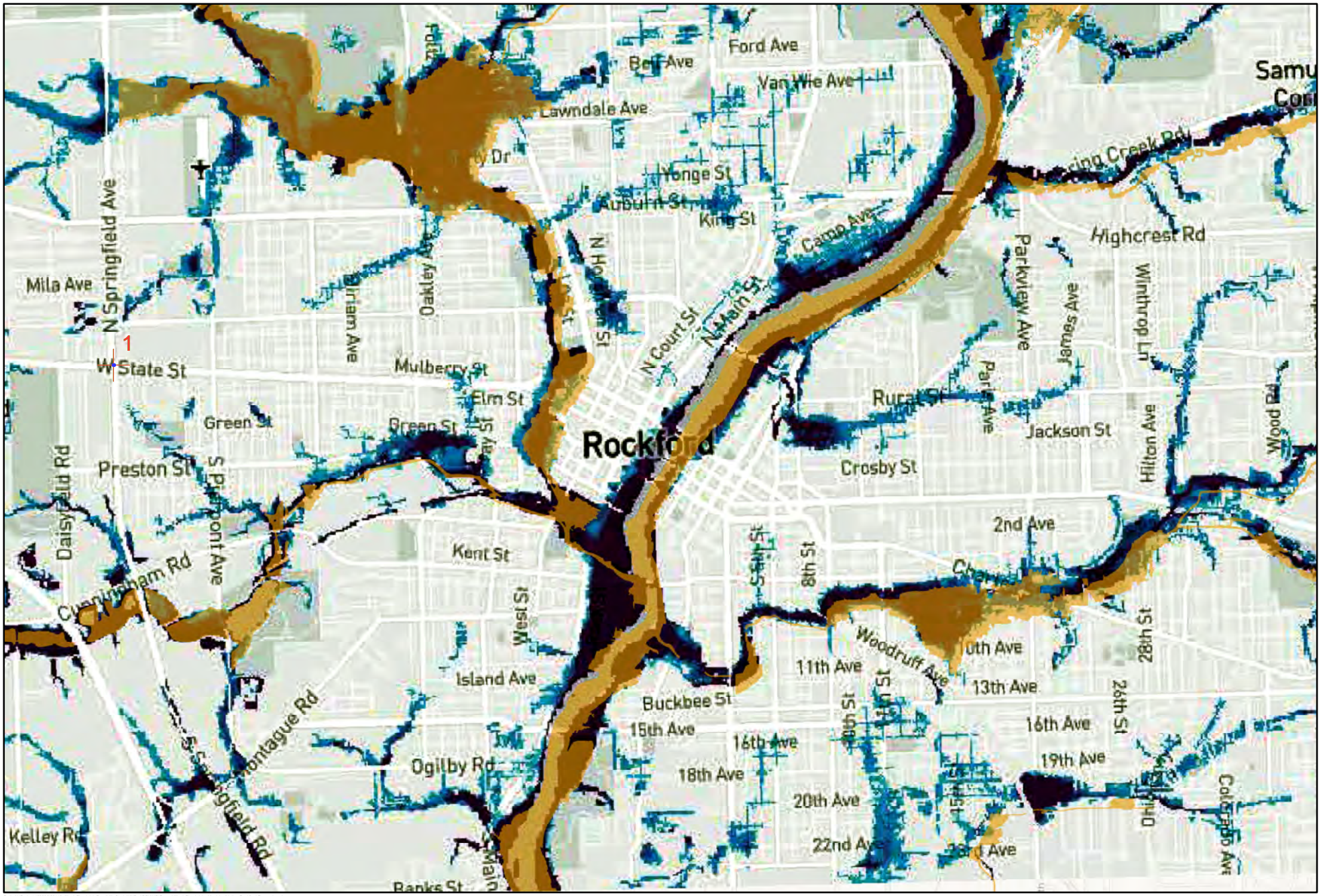
Increasing flood risk areas

Depth of flooding (feet)

FEMA Floodplain

1:120,000

Created By: EWS
Project Number: 59419.00
Date: 9/4/2020
NAD 1983 StatePlane Illinois West FIPS 1202 Feet



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

Rockford Case Study

Increasing flood risk areas

Depth of flooding (feet)

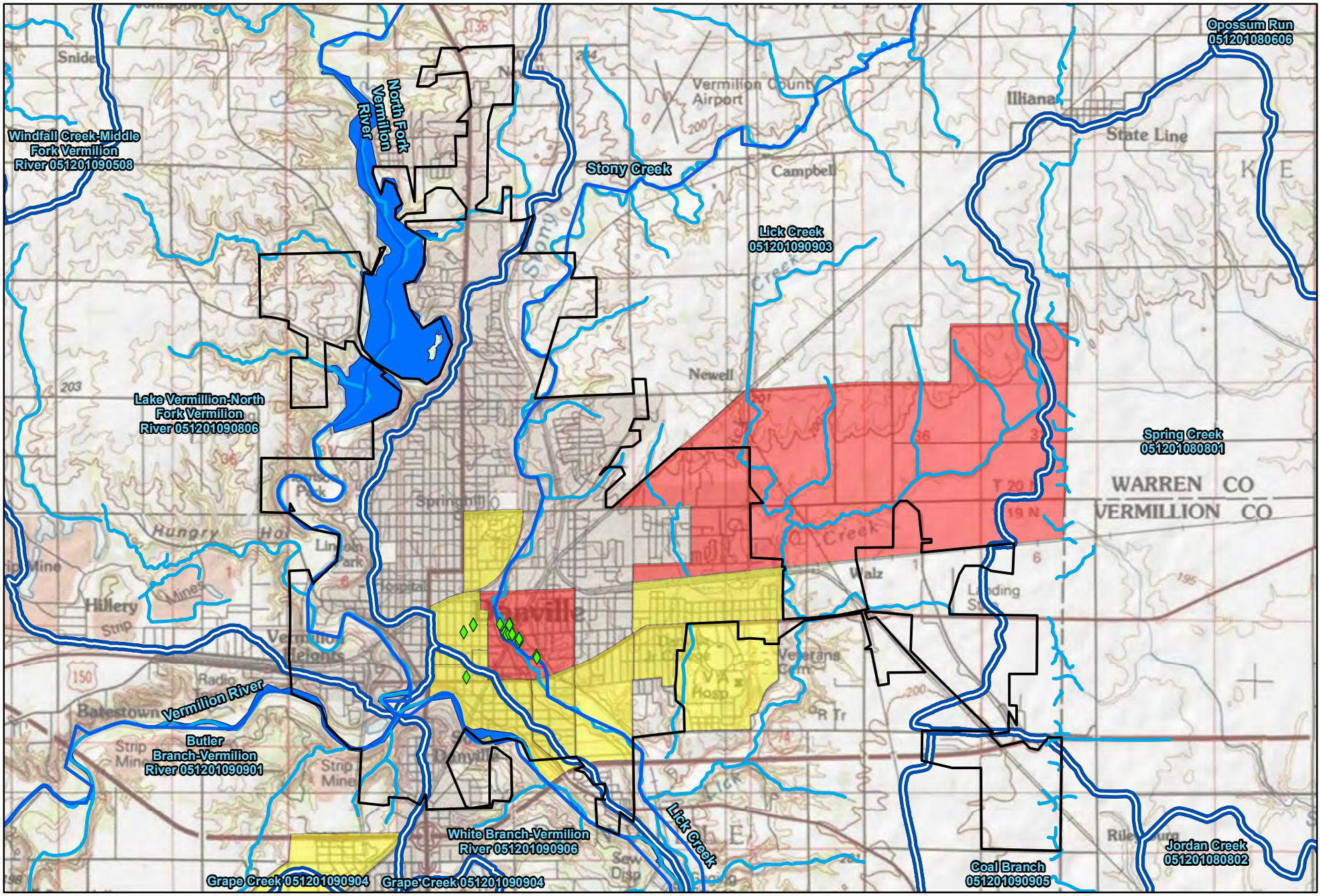
FEMA Floodplain

1:40,000

Created By: EWS
Project Number: 59419.00
Date: 9/4/2020
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 0.3 0.6 Miles

0 0.5 1 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS
FIGURE 1: WATERSHED BOUNDARY
Danville, Vermilion County

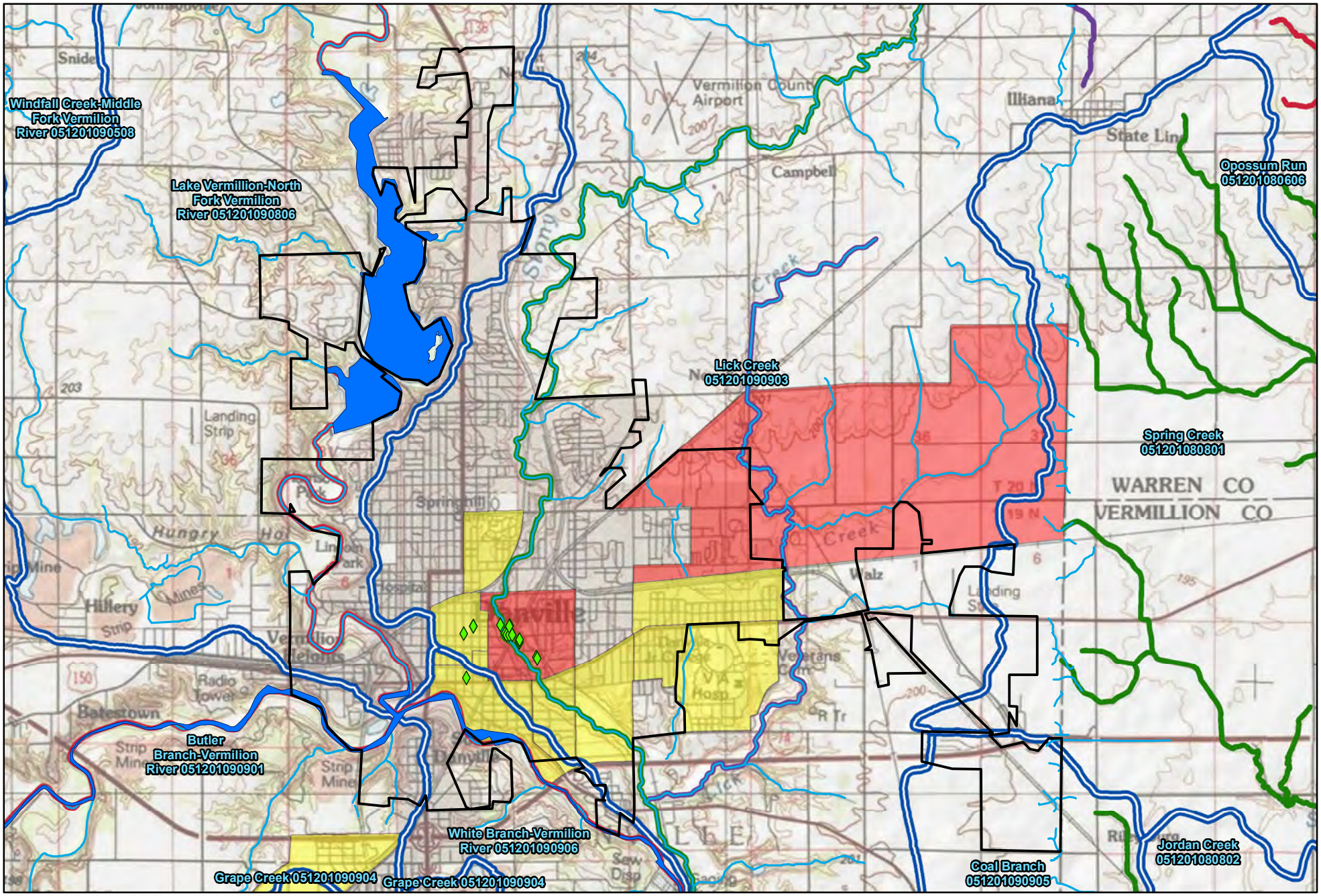
Illinois EPA Env. Justice Area (US Census Block Group)
- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

- Buyout Point
- Major Stream
- Minor Stream
- Village/Town Boundary
- Lake
- Watershed Boundary

1:71,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.6 1.2 Miles
0 0.85 1.7 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS
FIGURE 2: EPA IMPAIRED WATERBODIES
Danville, Vermilion County

Illinois EPA Env. Justice Area (US Census Block Group)
- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income
- Village/Town Boundary

- Buyout Point
- Minor Stream
- Lake
- Watershed Boundary

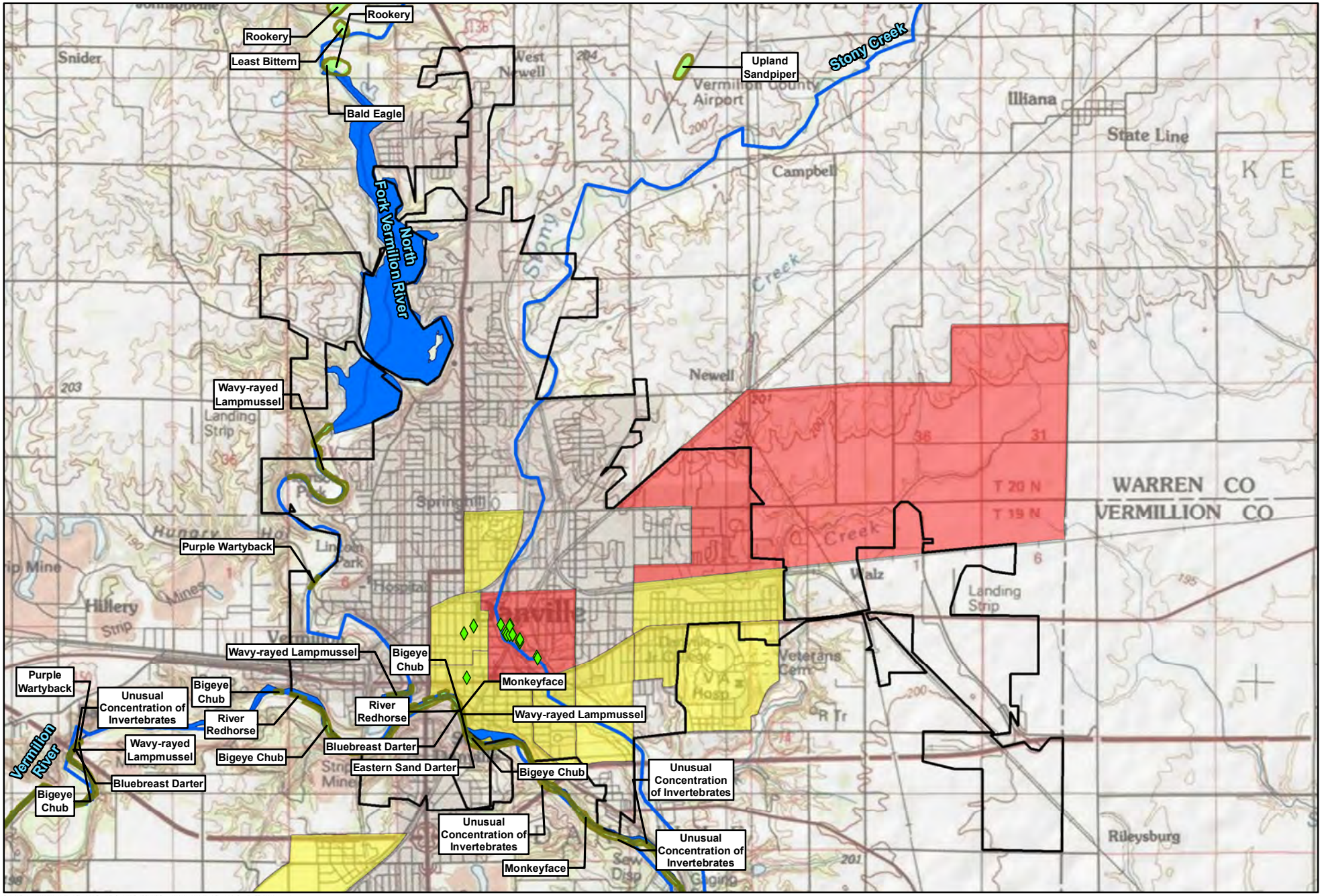
EPA Impaired Waterbodies
- Unassessed
- Polluted
- Good

- Unassessed
- Good
- Polluted

1:71,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.6 1.2 Miles
0 0.85 1.7 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

FIGURE 3: IDNR THREATENED AND ENDANGERED SPECIES

Danville, Vermilion County

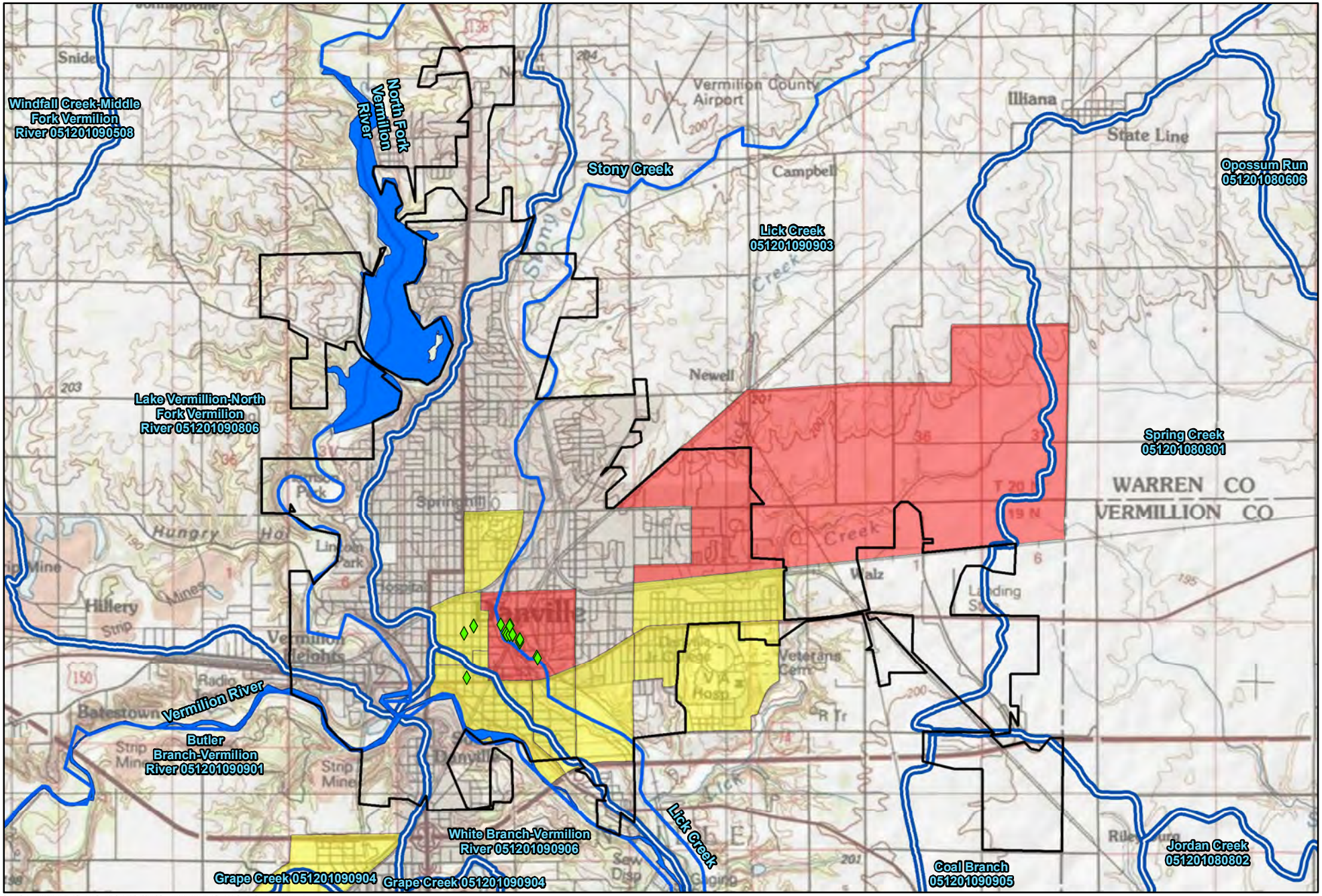
Illinois EPA Env. Justice Area (US Census Block Group)
- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

- Watershed Boundary
- Village/Town Boundary
- Buyout Point
- IDNR State & Federal Threatened & Endangered Habitat (Sp. Called Out)
- Major Stream
- Lake

1:71,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.6 1.2 Miles
0 0.85 1.7 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

FIGURE 4: ILLINOIS NATURE, LAND AND WATER PRESERVES

Danville, Vermilion County

Illinois EPA Env. Justice Area (US Census Block Group)

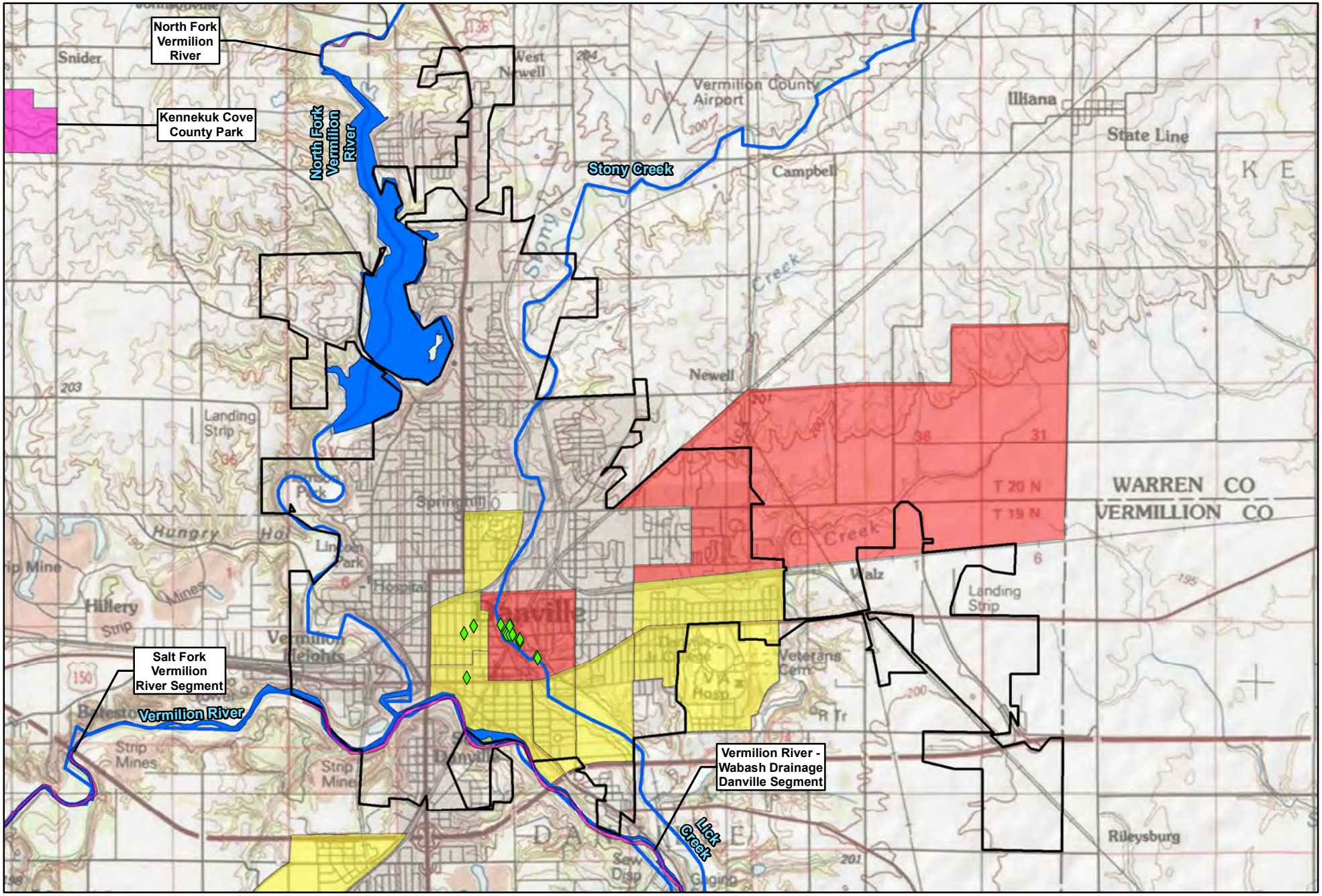
- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

- Buyout Point
- Major Stream
- Village/Town Boundary
- Lake
- Watershed Boundary
- Illinois Nature, Land & Water Preserves

1:71,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.6 1.2 Miles
0 0.85 1.7 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

FIGURE 5: ILLINOIS NATURAL AREAS INVENTORY

Danville, Vermilion County

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

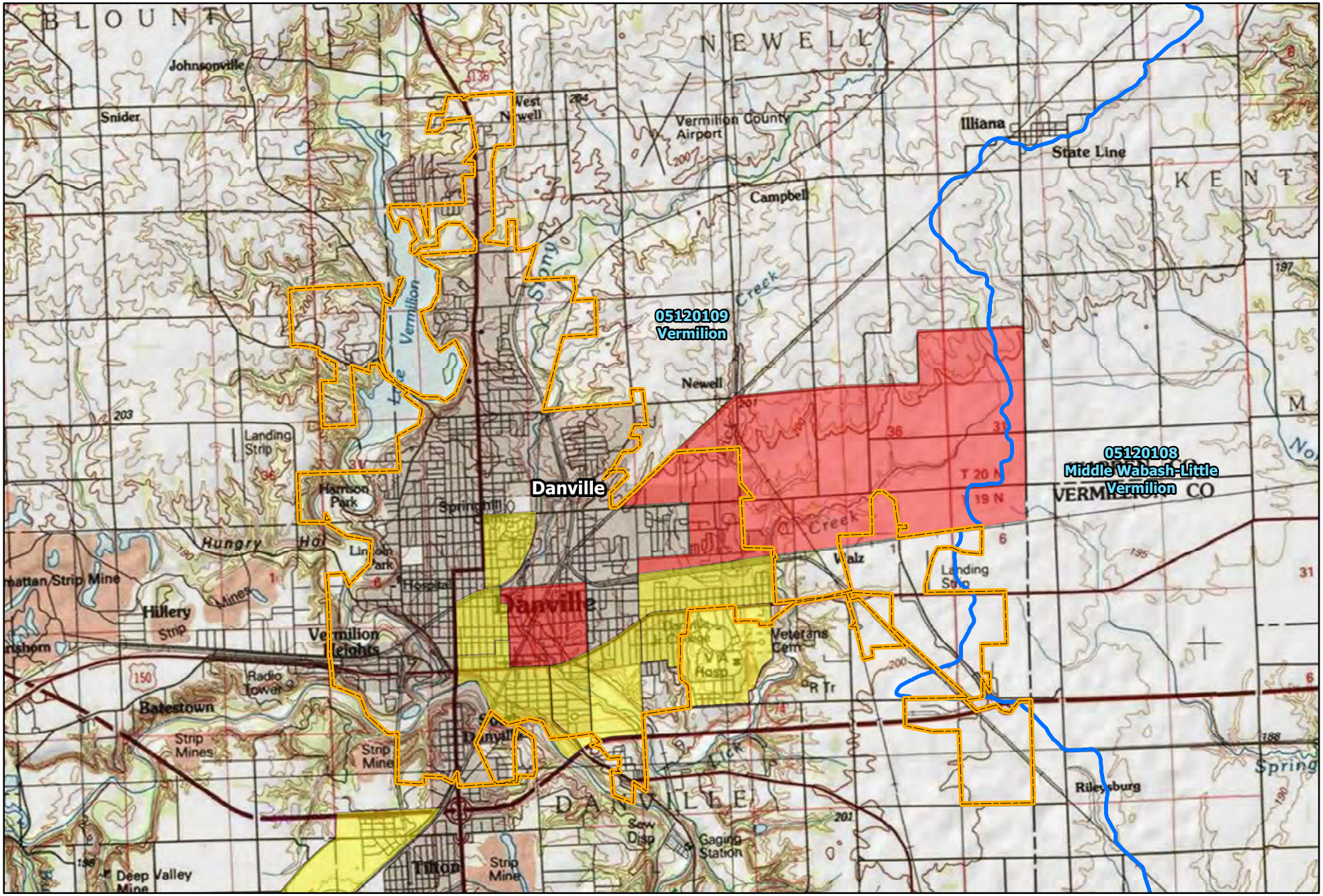
- Watershed Boundary
- Village/Town Boundary
- Buyout Point
- Illinois Natural Areas Inventory
- Major Stream
- Lake

The Illinois Natural Areas Inventory (INAI) shows high quality natural areas, habitats of endangered species, and other significant natural features intended to guide and support public, private and NGO land acquisition and protection.

1:71,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.6 1.2 Miles
0 0.85 1.7 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS - Figure 6

Danville, Vermilion County

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land

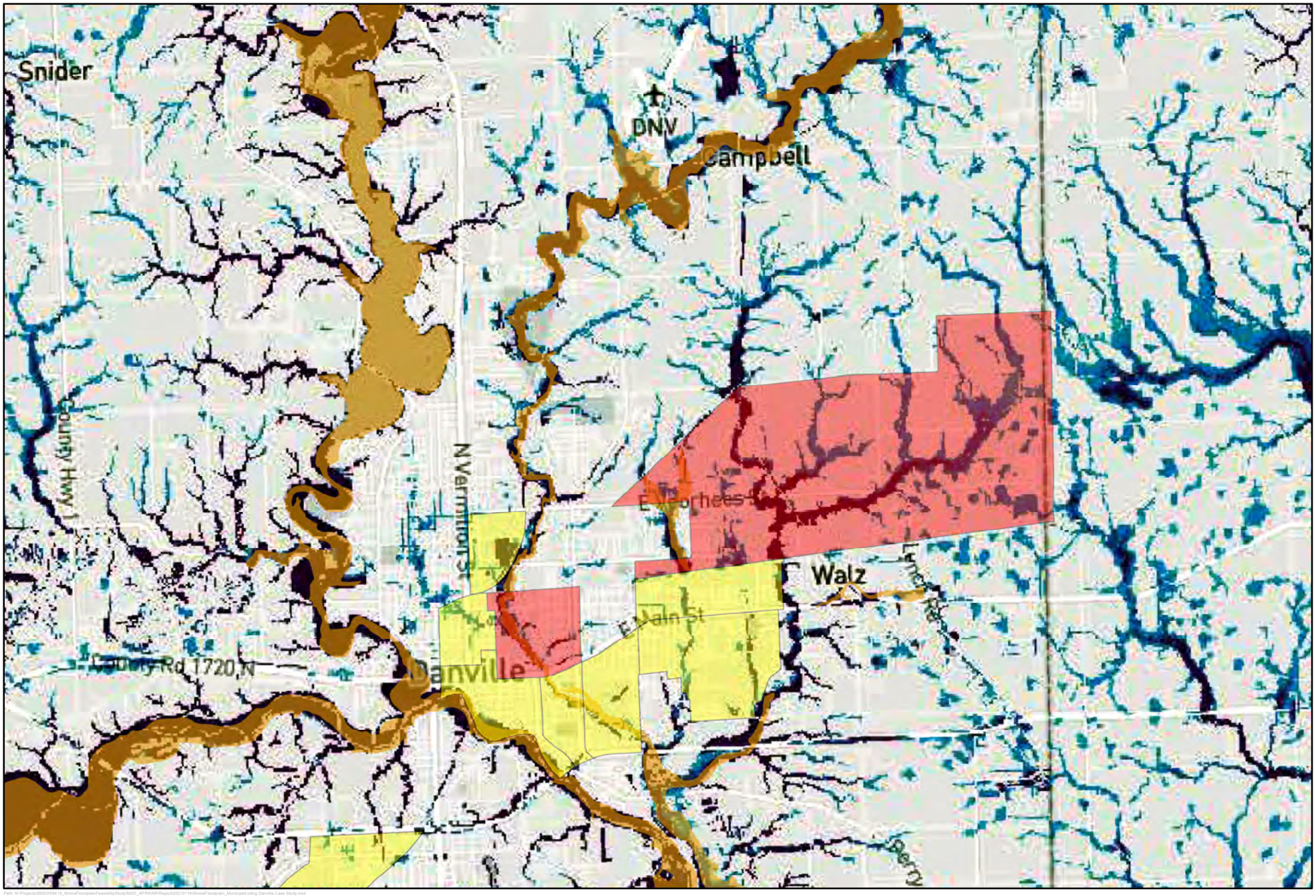
Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:78,600

Created By: JCK
Project Number: 59419.00
Date: 1/15/2021
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 0.65 1.3 Miles
0 1 2 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY - Figure 7

Danville Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

FEMA Floodplain

Illinois EPA Env. Justice Area (US Census Block Group)

Low Income >= 64.8

Minority Population >= 74.8

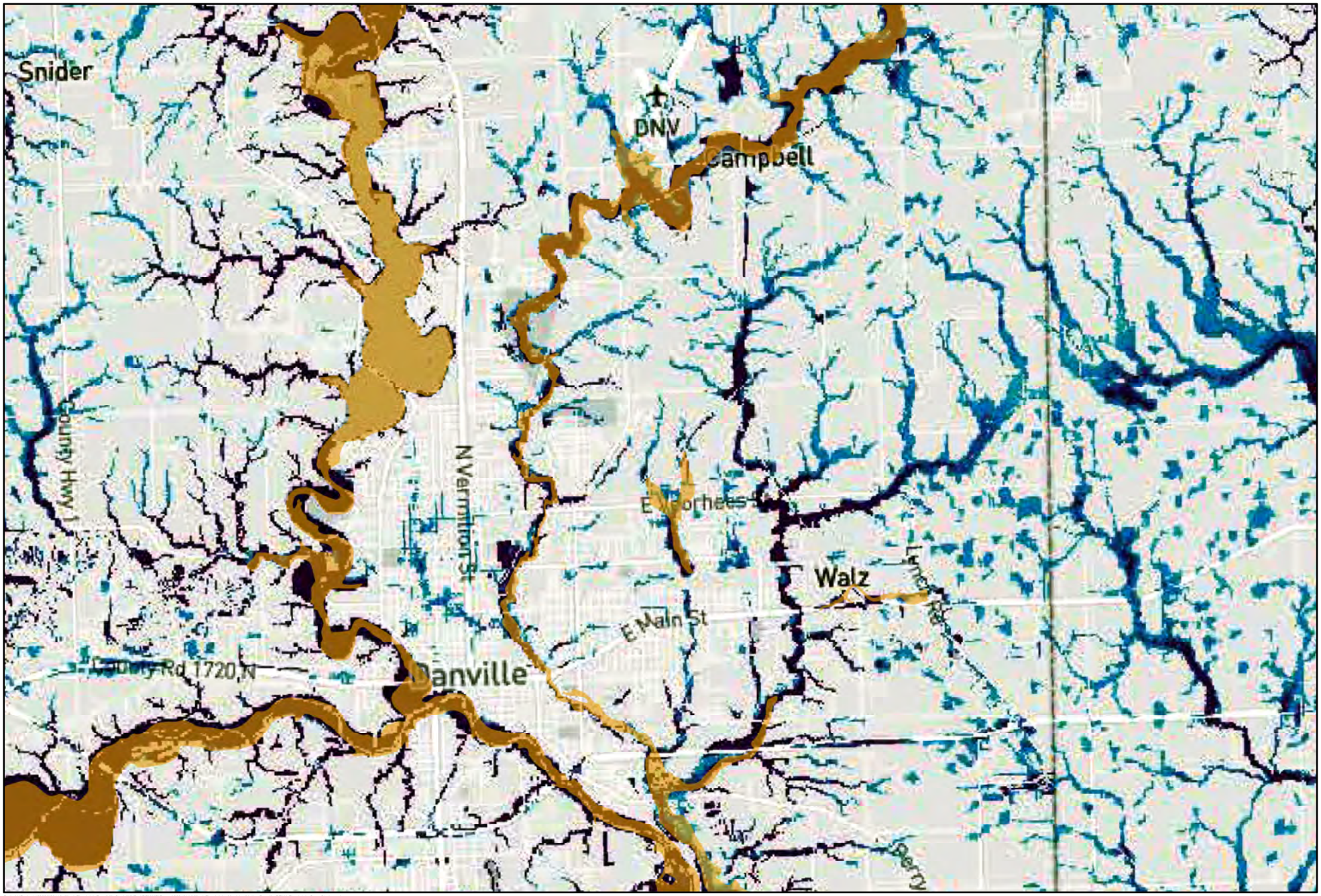
Minority Population and Low Income

1:72,604

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 0.6 1.2 Miles

0 0.9 1.8 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY - Figure 8

Danville Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

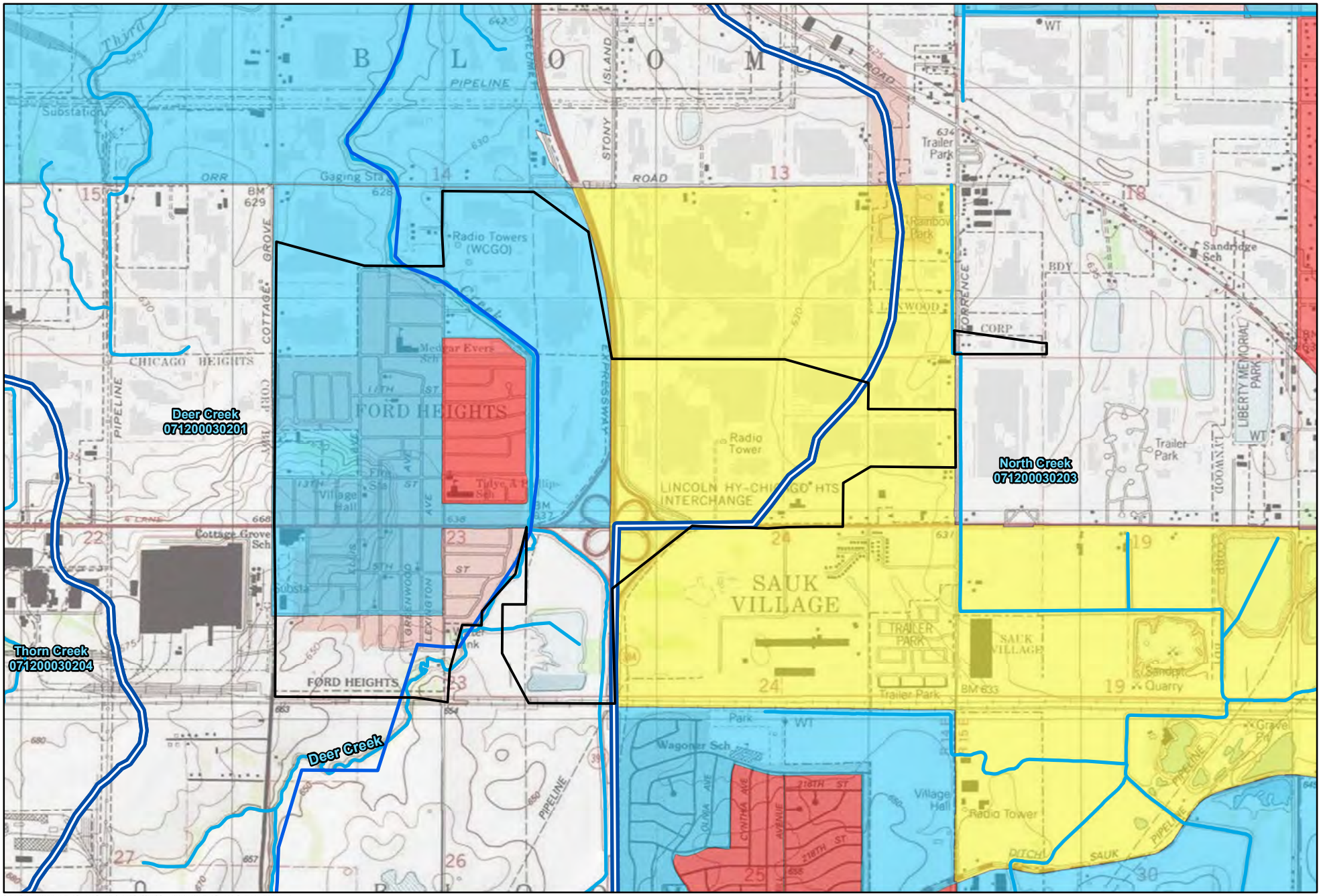
FEMA Floodplain

1:72,604

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 0.6 1.2 Miles

0 0.9 1.8 Kilometers

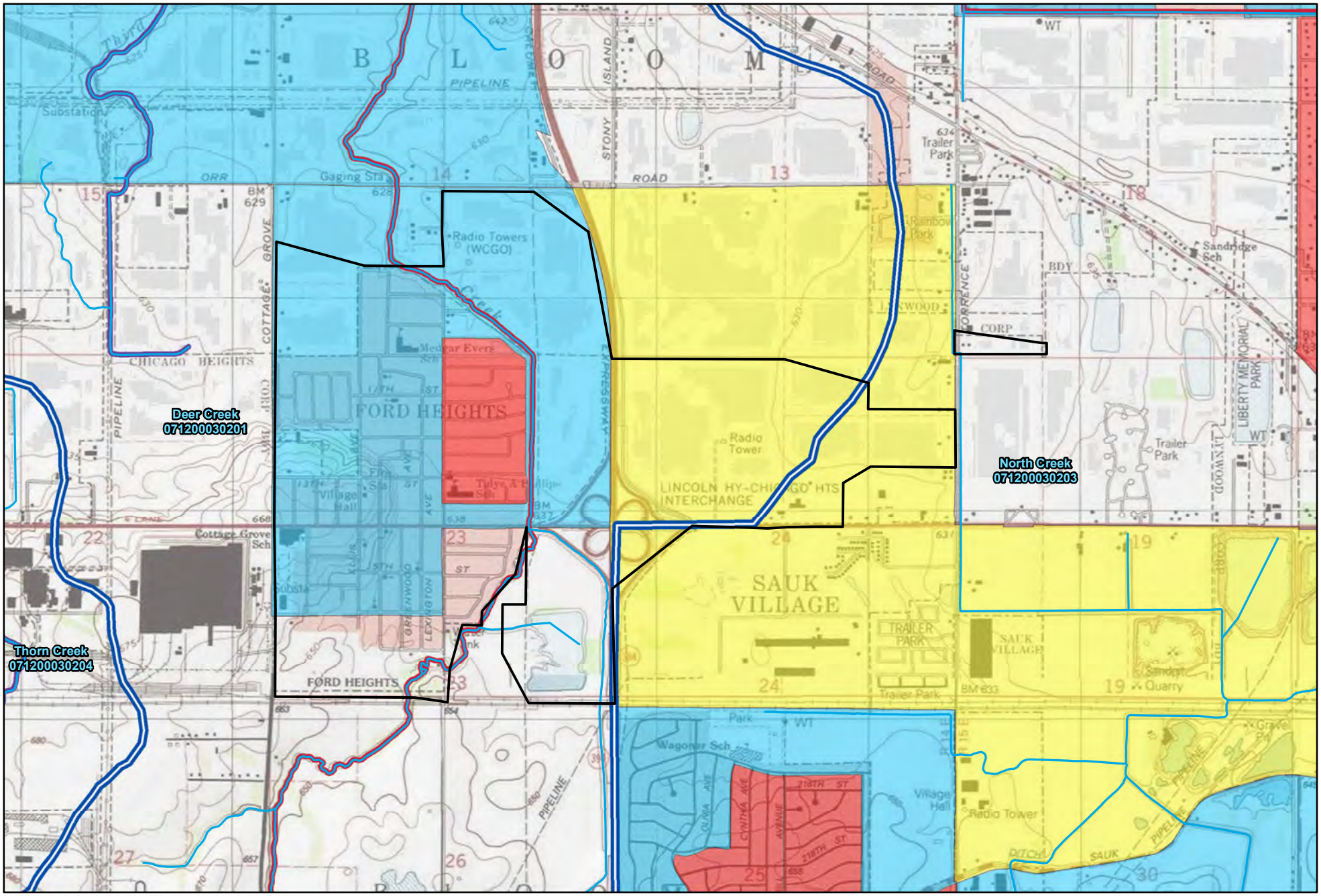


SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

FIGURE 1: WATERSHED BOUNDARY

Ford Heights, Cook County



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN
FEASIBILITY STUDY
FOR AMERICAN RIVERS
FIGURE 2: EPA IMPAIRED WATERBODIES
Ford Heights, Cook County

Illinois EPA Env. Justice Area (US Census Block Group)
- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income
- Village/Town Boundary

- Buyout Point
- Minor Stream
- Watershed Boundary

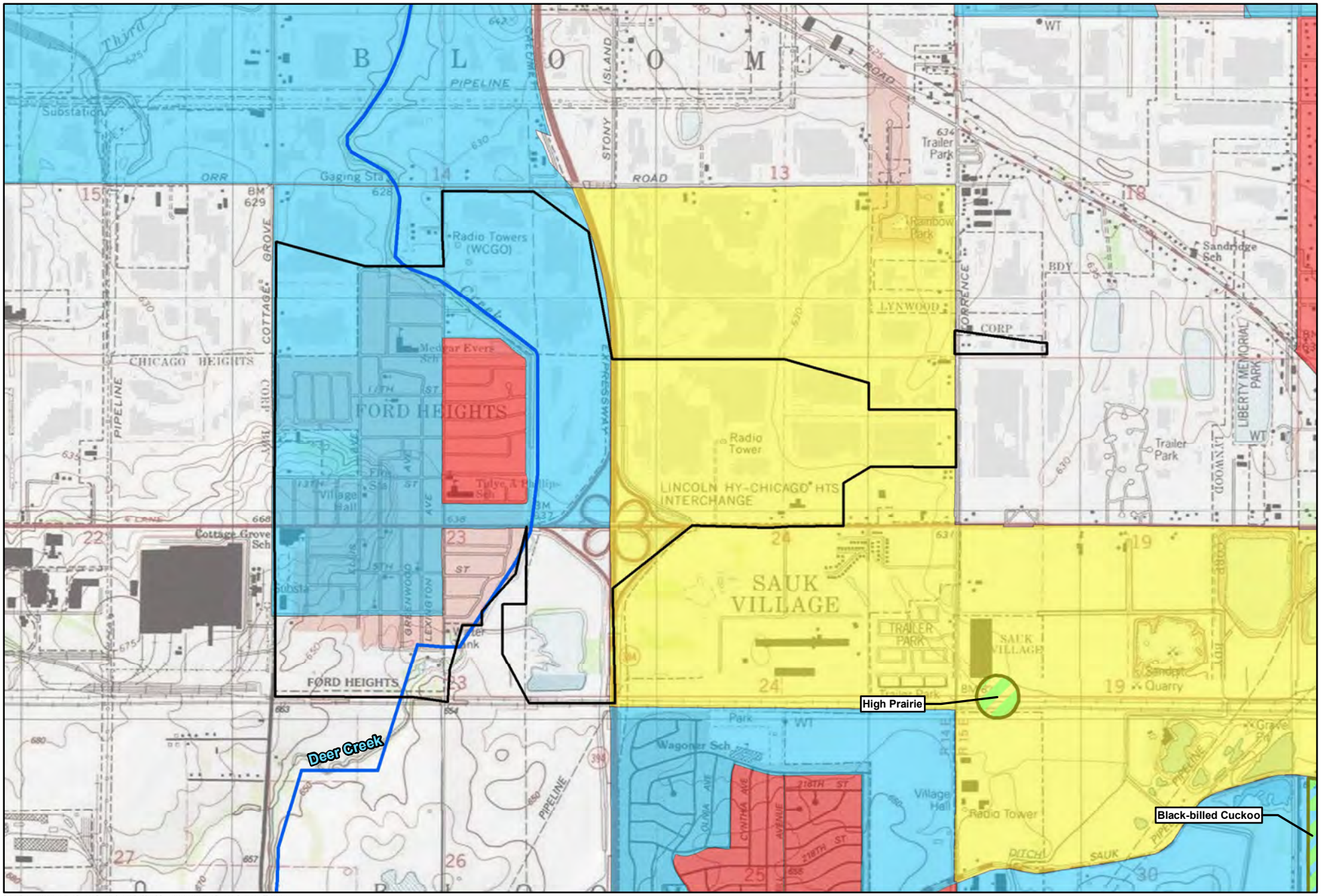
EPA Impaired Waterbodies
- Unassessed
- Polluted
- Good

- Unassessed
- Good
- Polluted

1:24,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.2 0.4 Miles
0 0.3 0.6 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

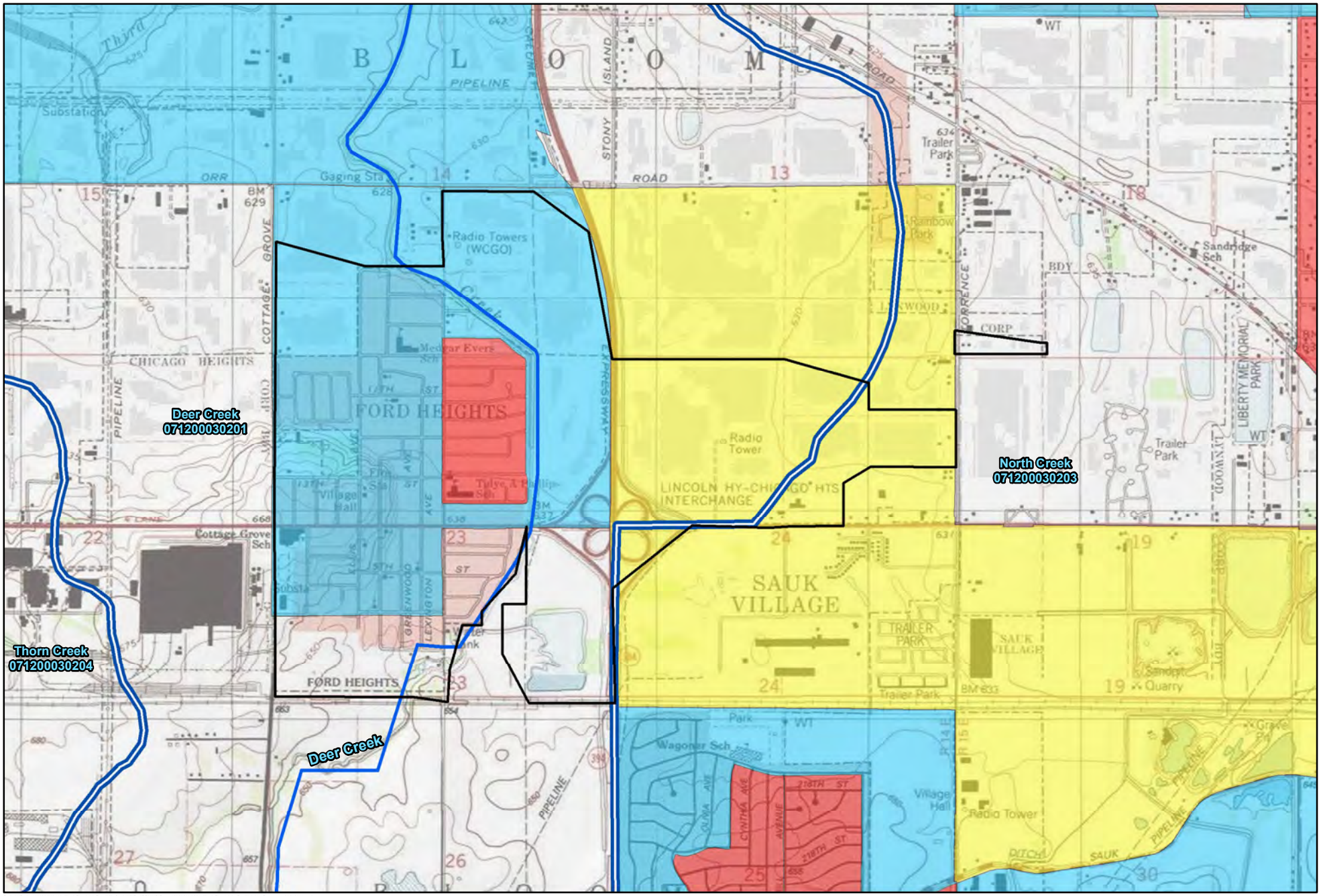
FIGURE 3: IDNR THREATENED AND ENDANGERED SPECIES

Ford Heights, Cook County

1:24,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.2 0.4 Miles
0 0.3 0.6 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

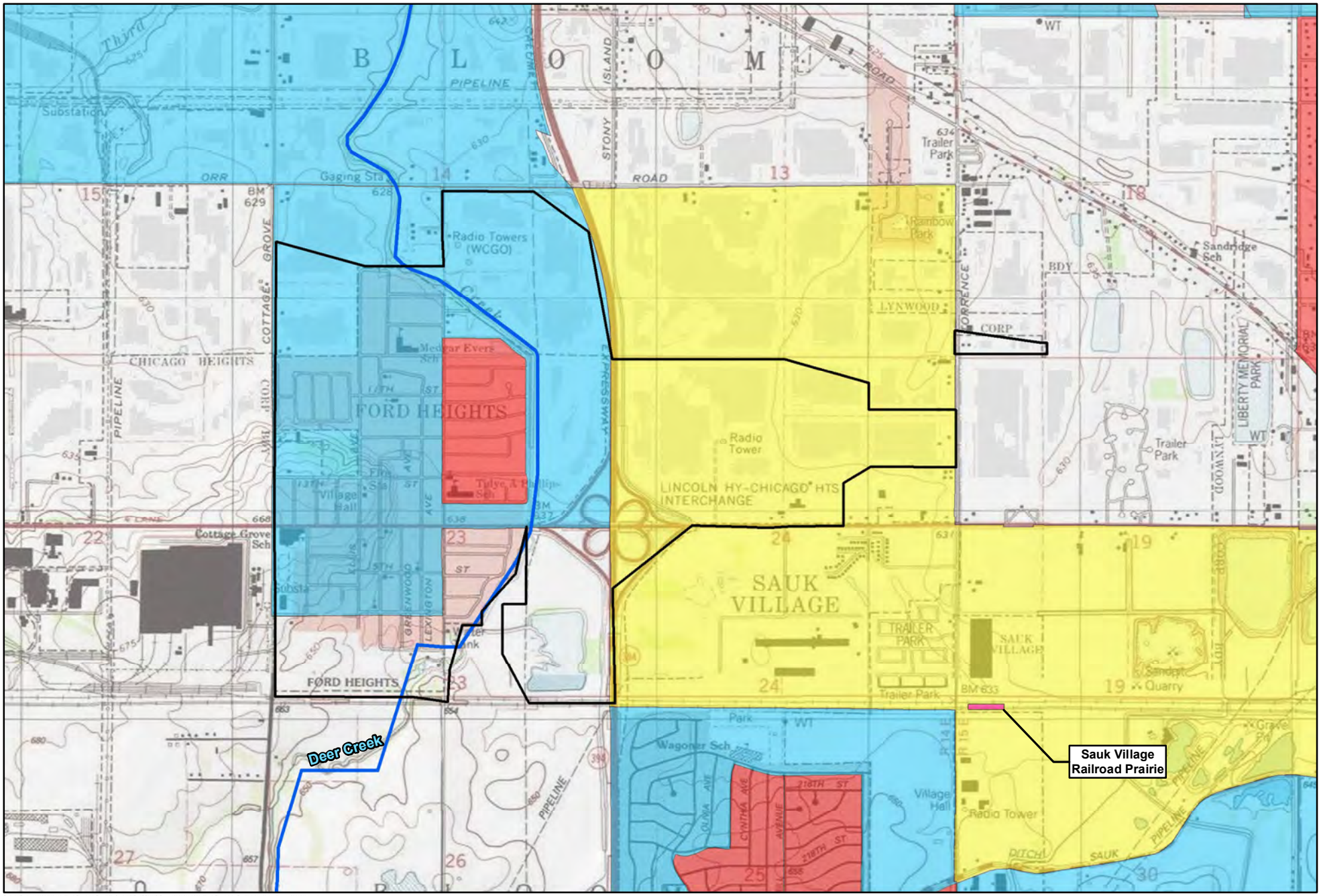
FIGURE 4: ILLINOIS NATURE, LAND AND WATER PRESERVES

Ford Heights, Cook County

1:24,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.2 0.4 Miles
0 0.3 0.6 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN
FEASIBILITY STUDY
FOR AMERICAN RIVERS

FIGURE 5: ILLINOIS NATURAL AREAS INVENTORY

Ford Heights, Cook County

Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

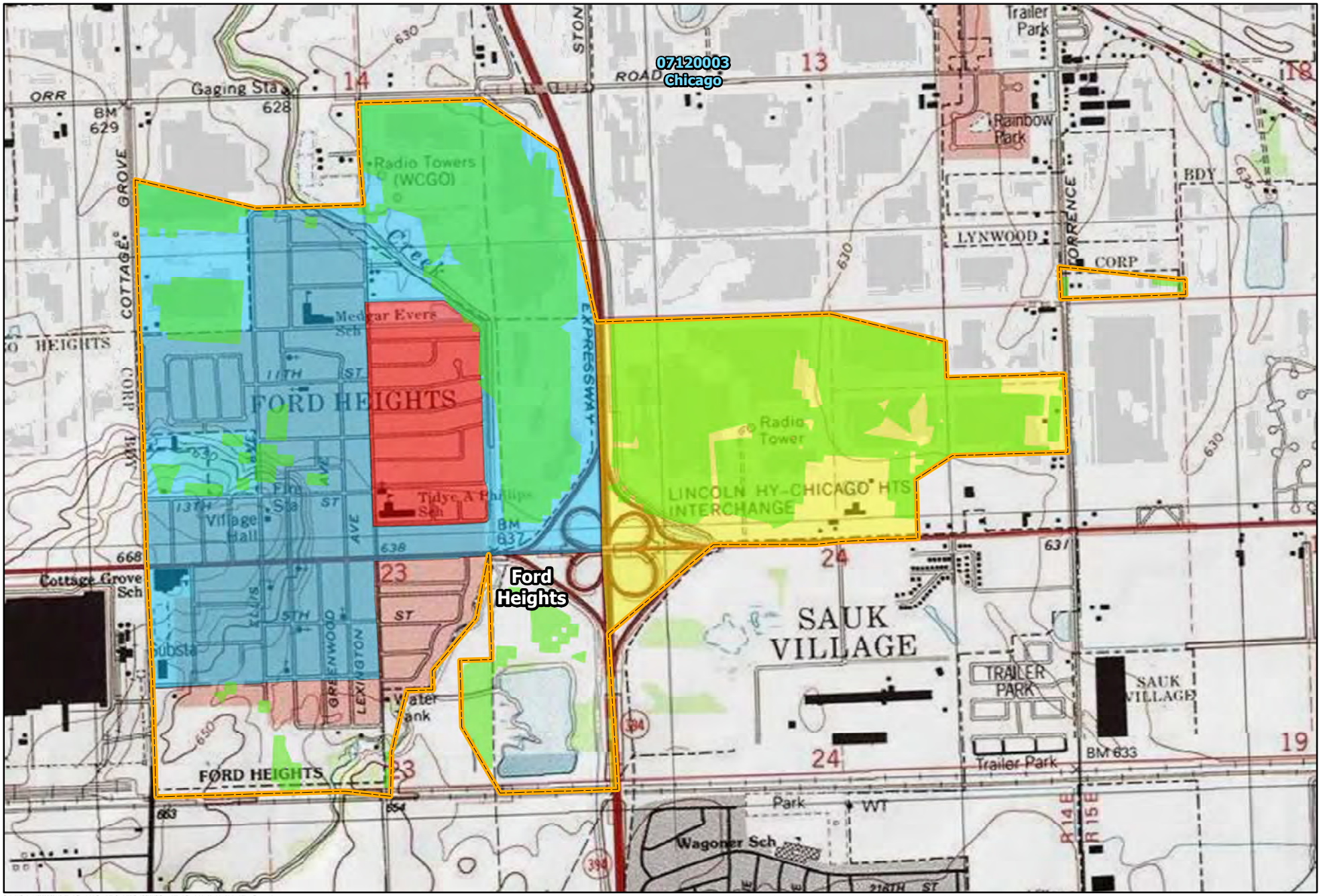
- Watershed Boundary
- Village/Town Boundary
- Buyout Point
- Illinois Natural Areas Inventory
- Major Stream

The Illinois Natural Areas Inventory (INAI) shows high quality natural areas, habitats of endangered species, and other significant natural features intended to guide and support public, private and NGO land acquisition and protection.

1:24,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 UTM Zone 16N

0 0.2 0.4 Miles
0 0.3 0.6 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY FOR AMERICAN RIVERS

Ford Heights, Cook County

- Village/Town Boundary
- USGS HUC8 Watershed
- Farming and Agriculture Land

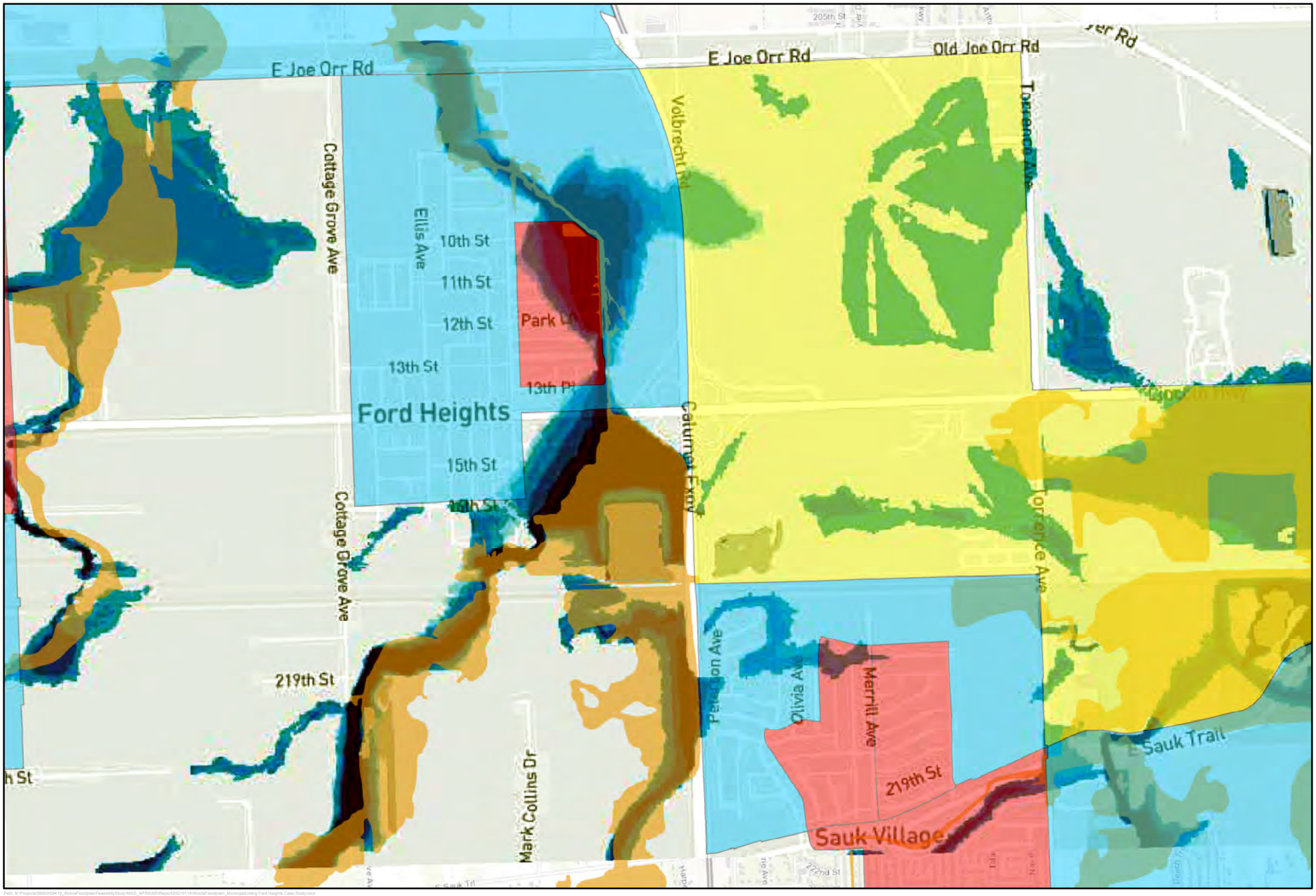
Illinois EPA Env. Justice Area (US Census Block Group)

- Low Income >= 64.8
- Minority Population >= 74.8
- Minority Population and Low Income

1:17,700

Created By: JCK
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 0.15 0.3 Miles
0 0.2 0.4 Kilometers



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

Ford Heights Case Study

Increasing flood risk areas

Depth of flooding (feet)

FEMA Floodplain

Illinois EPA Env. Justice Area (US Census Block Group)

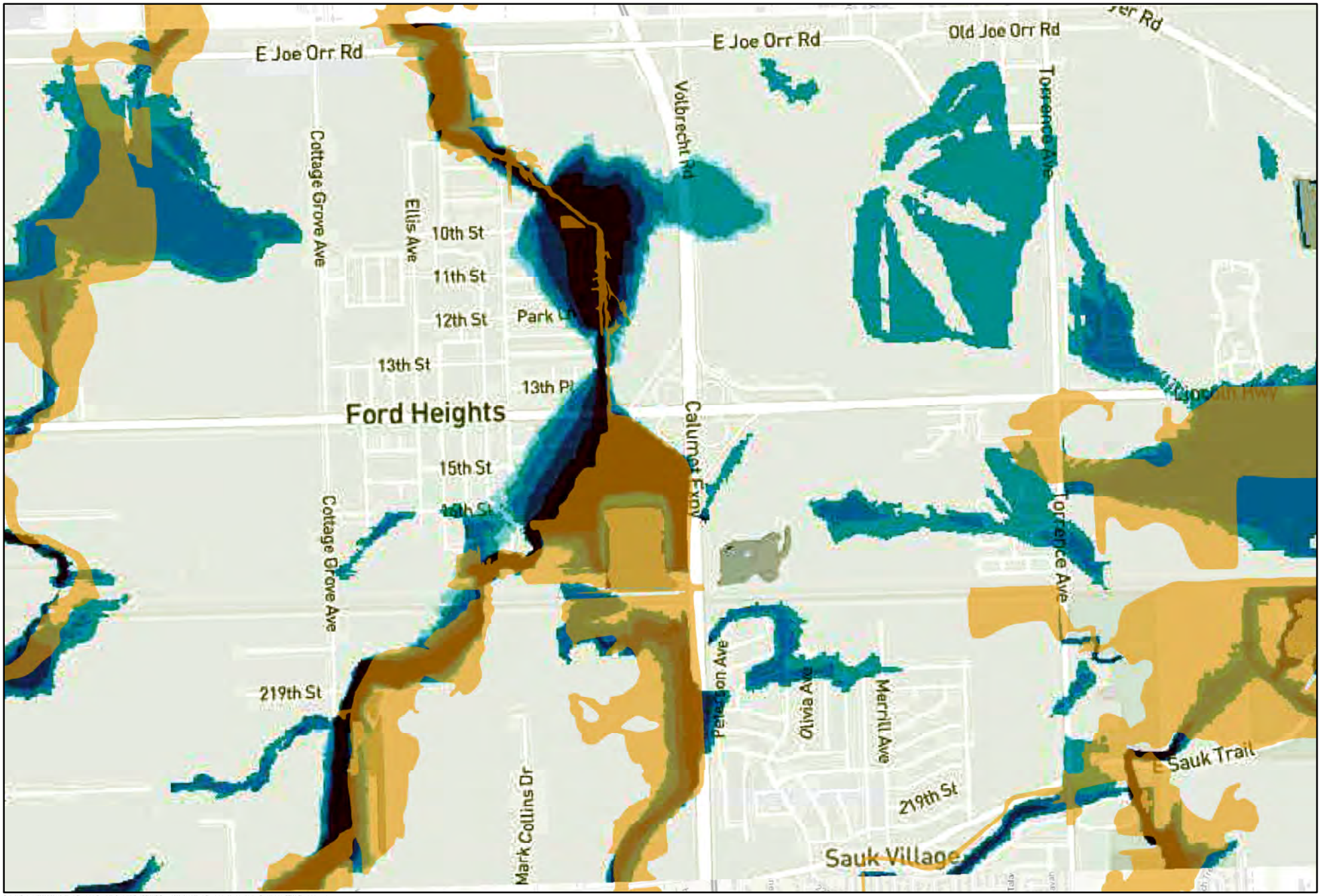
Low Income >= 64.8

Minority Population >= 74.8

Minority Population and Low Income

1:24,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 StatePlane Illinois West FIPS 1202 Feet



SWCA ENVIRONMENTAL CONSULTANTS

ILLINOIS FLOODPLAIN BY DESIGN FEASIBILITY STUDY

Ford Heights Case Study

Increasing flood risk areas

0 1 2 3

Depth of flooding (feet)

FEMA Floodplain

1:23,000

Created By: EWS
Project Number: 59419.00
Date: 1/14/2021
NAD 1983 StatePlane Illinois West FIPS 1202 Feet

0 0.15 0.3 Miles

0 0.25 0.5 Kilometers

APPENDIX C

Notes from Stakeholder Meetings

STAKEHOLDER MEETING PARTICIPANTS

American Rivers

Antero Group

Association of Illinois Soil and Water Conservation Districts

Black Chicago Water Council

Blacks in Green

California Department of Water Resources

Chicago Metropolitan Agency for Planning

Friends of the Chicago River

Illinois Association for Floodplain and Stormwater Management

Illinois Conservation Foundation

Illinois Department of Natural Resources, Office of Water Resources

Illinois Department of Transportation

Illinois Environmental Council

Illinois Environmental Protection Agency

Illinois Farm Bureau

Illinois Silver Jackets

Illinois State Water Survey

Land Conservation Foundation

Metropolitan Planning Council

Metropolitan Water Reclamation District of Greater Chicago

National Association for the Advancement of Colored People:

- Cairo Branch
- Danville Branch
- East St. Louis Branch
- Freeport Branch
- Illinois State Conference
- Kankakee Branch
- Rockford Branch

National Great Rivers Research and Education Center

Natural Resources Defense Council

The Nature Conservancy

Prairie Rivers Network

PLACE Alliance

Residents of Centreville

Southern Illinois University

SWCA Environmental Consultants

United Congregations of Metro East

Village of Ford Heights

The Wetlands Initiative

Illinois Floodplains Work

Stakeholder Engagement Meeting #1

September 15, 2020

Download Participant List Contact Information

1 Morning Session, Educational Panel Notes

Morning Session Recording

1.1 Why are we here? – Olivia Dorothy, American Rivers

Download Slides

Purpose of stakeholder meetings: We need your help doing a feasibility study on creating a new program in Illinois that supports multi-benefit floodplain development projects.

Multi-Benefit Floodplain Development 101

- Floodplains are areas of land that do or could become inundated with water.
- Floodplains can be big and small.
- Flood Control, which seeks to move water away from people, is how we've dealt with flooding historically, but it is not working.
- Flood Risk Reduction, which seeks to move people away from the water, is the new national focus for dealing with flood problems.
- However, with flood risk reduction, communities are often left with "undevelopable" land.
- Multi-benefit floodplain development projects seek to develop these areas in ways that improve community resilience while also improving river and floodplain ecosystems.
- Healthy floodplain ecosystems have many benefits including
    - Flood water conveyance
    - Fish and wildlife habitat
    - Aquifer recharge
    - Economic growth
    - Quality of life improvements
- Several states and communities are promoting multi-benefit floodplain development projects, but few are in Illinois.
- These stakeholder meetings will explore examples from other states, look at some communities with known flood issues in Illinois, and make recommendations for an Illinois program that meets the needs of our citizens.

1.2 Washington Floodplains by Design – Bob Carey, The Nature Conservancy

Download Slides

- Floodplains: cradle of civilization. Super valuable and haven't managed them well.

- Pilot projects – put together a suite of 9 multi-benefit floodplain development projects at $33 million, legislature gave them 44 million.
- Reason they were so successful: it was a large collection of interest. Large stakeholder group.
- It has grown to many projects over the years – $165 million in new funding for this new project work.
- Integrated floodplain management – get out of silos – work in a collaborative, holistic way.
- Reduce the cost to people, remove barriers, support agriculture, recreation, and clean water. Not a floodplain restoration program – and not a flood risk reduction program – it's really a holistic and integrated program involving both.
- Partnership and grant program! Both!
- Public/private partnership. State level (top down), Local level (bottom up)
- Rethinking grant making – what gets awarded:
    - Highly flexible, locally-driven for the types of project work an priorities
    - Reach/watershed scale
    - Multi- benefit (clear, written support from these different jurisdictions).
- Projects range from traditional floodplain restoration, to new levees/dikes (grey infrastructure), biodigester (dairy waste), levee setbacks
- Puyallup Watershed Floodplain Reconnection Plan – holistic management at a river system scale.
- Social Justice:
    - Tribal fisheries, 20% match requirement waived for low income communities. Not just buyouts, but relocations (note: this does not necessarily address affordable housing).
- The secret sauce:
    - Focus on collaborative, locally-driven action: multi-benefit, flexible, system scale
    - Public-private partnership that leverages – resources and capacity of the state, abilities to collaborate and innovate with the private sector
- A comprehensive, learning approach:
    - Top down incentives and policy change, bottom up empowerment, capacity building, and innovation, constant learning and adapting.

1.3 Vermont Rivers Program – Rebecca Pfiffer, Program Manager

Download Slides

- Stable rivers doesn't mean static – balancing act between water and sediment & debris
- Give it room to let processes occur https://floodtraining.vermont.gov
- Statewide river corridor map Tinyurl.com/floodreadyatlas
- They have a training about managing rivers and development
- Land & Easement program – Vermont Land Trust and Vermont River Conservancy buy development rights on certain properties. Many times it's farms.
- They are adjusting management practices for the river to move. Farmers can still farm.
- Ag easements – flood chute that moved into their property – river coordinator easements and FEMA buy-outs with some of the landowners.
- Restoration opportunities – reconnecting – lowering the rail bed (recreation trail) to have floodplain reconnection.

- Northfield, VT – FEMA home buy-outs, and floodplain reconnection with a park – bought out homes and created a recreation park.
- Emergency funds – FEMA disaster declaration – 75% payment and state helps the local groups pay for the rest.
- Incentivize restoration work/floodplain management work – and the state will pay for more, or they get a bigger cost share from the state after the flood happens. And preferential ratings in a variety of state grants (community development grants, transportation grants, etc.).

1.4 Farming in the Floodplain – Bill Bodine, IL Farm Bureau

Download Slides

- Involved in flooding issues since the inception of their org (100 yrs ago) – not a new issue for them.
- Farming in the floodplain and issues and challenges that the farmers see
- Crops/farming practices are not that different that are grown outside the floodplain, and one of the biggest differences is the levee districts and flood control.
- First constructed between 1880 and 1920 – function of state law and funded by local landowners within the district.
- Ag is a HUGE economic engine in the counties bordering rivers ($8.2 billion with 89,000 jobs)
- Thousands of acres of productive farmland is protected by levees. Critical infrastructure is protected and maintained by these levees (roads, rail, and navigation systems – $90 Billion in freight is moving on the navigation system – much of that is farm goods).
- Water quantity – having too much of it - is a major issue for farmers.
    - Many of the farmers may serve on their levee districts as commissioners.
    - Work closely with USACE, emergency agencies, local governments to provide the protection they need
- Water Quality – big investment for farmers
    - Last 5 years 1.5 million in grants in county farm bureaus to research BMPs for water quality – education/awareness, and research, implementation efforts with farmers.
    - Completed as an org – a series of field days around the state (9 virtually) to learn about these practices. Continue to find ways to interact with the farmers to improve water quality within the state.
- IL corn growers, soybean association, great deal of effort occurring.
- Challenges:
    - Lack of systematic plan for flood control on river systems to address needed flood storage and flood protection.
    - Complicated and burdensome regulations- USACE, FEMA, IL DNR – advocating for state level regulations and permitting process for improving levees and they haven't been changed. This puts levee improvements at risk.

1.5 Environmental Justice Issues – Teresa Haley, State President NAACP

Download Slides

- Floodplains are very important
- Minority communities are not receiving those funds to address their issues in the floodplains
- Minority communities often don't own land or property, but are still getting impacted from floodplains in their communities.
- Historically, low income communities and communities of color live in flood prone areas.
- East St. Louis, Alton, Chicago land area, Rock Island, or in Danville, a lot of the community members are at a disadvantage with floodplains
- No insurance, they are renters, not owners – when floods occur – they lose everything.
- These areas also tend to be highly polluted. Raised gardens are necessary because water/soil is contaminated. East St. Louis raised concerns with family members losing lives, cancer, health concerns with plants such as Monsanto.
- Housing and transportation – landlords receive the benefits and not the residences. They go to the NAACP for help. How do they start again?
- Underlying problems
    - Redlining, or systematic denial of various services by federal government
    - Minorities don't receive the funding from the feds in the same way as other groups.
    - Communities divided along racial and socioeconomic lines throughout Illinois.
- We want to participate and have a voice. Appreciate the diversity of this program's stakeholder groups.
- NAACP wants to make sure that people are safe, and that people are taken care of!

1.6 Morning Full Group Q&A

Will we hear from any insurance providers to discuss knowledge gaps on what's covered/not covered?

- Olivia - not today. It is an important question - we have not set agendas for future meetings, but will look at addressing in the future. Specific questions about how that works - we can answer, but may have as a future meeting topic.

Question for the Farm Bureau with regards to the Washington presentation - they had different approaches with Farm Land in the Floodplain. It was more or less all or nothing - the farmer agrees to or sells an easement so that they are still farming in the floodplain but that it's a middle ground. Under certain circumstances, not to take certain actions, or forego one season for other benefits on floodplain. Is this something that you're more open to, or engaged with?

- Farm Bureau: Open to that conversation. Deep southern IL has continued problems. Easements can be purchased for taking on floodwater. Some farmers are participating in some of these programs. It has to be a systemic approach - you can't do that in a single levee district - you will need cooperation between many farmers in that levee district in order to make it work. Willing to discuss, but we will encounter challenges unless it's a systemic approach.

It was nice to learn/hear about NAACPs Equitable Flooding Management Certification, is there more information available online?

- Since the NAACP has started this program, it's been delayed twice. It is something that was supposed to take place in August and September. Links will be sent to Olivia to distribute to the stakeholders. It is a 2 day certification program, and addresses systemic racism in the floodplain. It is a nationwide effort.
- NAACP is looking for grant writers - monies being available for victims of flood - but can't access them. They would be open to help with this work (grant work). They don't have the necessary tools in their toolbox to help their communities with applying for these grants.

In Washington's Floodplain by Design Program they are having issues with communities of color having the opportunities to engage. They recognize that communities of color or minorities are having issues getting their voices heard (time and bandwidth). Make sure that the people that need to be engaged, are engaged.

- NAACP - thank you for those comments. We are here to help support our state president and want to hear more about this nationwide environmental consulting firm.

2 Afternoon Session Summary Notes

After lunch, stakeholders were split into groups for more in depth discussions. Full Notes and Recordings are below.

2.1 Main Take-Aways from Topic Areas Discussion

Topic areas: Environment/Natural Resources, Social Justice/Equity, Farming/Agriculture

1. What appeals to you about the multi benefit approaches?
    - Holistic approach, acknowledges the diversity of the river and floodplain users.
    - Giving streams room to move without damaging people/property, responsive to climate change.
    - Focuses on listening to and learning from each other to meet multiple needs for the same resource.
    - Opportunities to improve flood protection and spend less money fighting floods.
2. What concerns you about multi-benefit approach?
    - How will this impact our neighbors? Illinois rivers are a state boundary.
    - Need to avoid one-off projects, focus on systemic changes.
    - Needs to be community driven. Communities should prioritize the needs: Public safety, health, recreation, water quality, drinking water, subsistence fishing & hunting. Don't assume levees are the only answer – residual risk should be addressed.
    - Floodplain issues are already very complicated. Problems with regulations. Limited financial resources. Lack of trust among stakeholders
3. What are the most important Floodplain benefits to your community?
    - Highly productive farmland – economic driver for local communities. Societal benefit at large for growing food.
    - Beautiful areas for outdoor recreation and wildlife habitat.
    - Public safety through flood conveyance.
    - Improving water quality for public consumption

4. What are the challenges to achieving Multiple Floodplain benefits?
    - Lack of community engagement and resources to educate communities equitably.
    - None of the existing programs help the most vulnerable communities living in floodplains, i.e. frequent flooding, mold, water contamination, displacement, etc.
    - Projects must be driven by willing participants. Regulatory challenges are needed. Need to make sure no one is negatively impacted if one part of the system is changed.
    - It's hard to quantify all the benefits of floodplain functions. Lots of technical, data and science challenges. Especially since rivers are dynamic and changes are continuous.
5. What Questions do you have about Implementation?
    - Who's in charge? How will we pay for it? How does it fit with existing programs? How will projects be prioritized?
    - If you don't own property, how can you be assisted?
    - How do we incorporate other environmental health issues like mold and clean drinking water?
    - How can local leaders (especially in EJ communities) be better engaged and access local decision-makers (i.e. levee districts)?

2.2 Main Take-Aways from Case Study Discussion

Southern Illinois (Alexander County & East St. Louis)

1. Good case study sites, but vastly different issues in these areas. There is more traditional flooding and the Mississippi River wanting to move versus groundwater intrusion and stormwater issues (no where for the water to go).
2. Infrastructure with lack of funding is something that can be improved. Access to funding and assistance from the federal government needs to be improved for all communities in S. Illinois.
3. Major contamination/environmental issues exist in these areas (particularly in the urban areas). Major flood events seriously risk public safety. This may cause challenges for project implementation.

Central Illinois (Effingham, Rockford & Freeport)

1. Get presentations from community leaders into next stakeholder meeting
2. Danville, Freeport & Rockford are good case study sites (Peoria & East Peoria might be a good community to swap out, they have water quality issues, levees, low income, combined sewer overflow issues). Quincy might also be considered - levee district.
3. Scope should include upstream - problems aren't alway in the community.
4. Data should include hazard mitigation plans. USACE has list of plans for mitigation

Chicago (Ford Heights)

1. Ford Heights is a small municipality surrounded by other municipalities, many of which have flooding issues
2. We did not have a representative from Ford Heights so it was difficult to understand issues/potential multi-use needs and issues.
3. Funding, limited tax base, decreasing population.

2.3 Afternoon Full Group Q&A Session

Chicago Metropolitan Agency for Planning wants to know what the next steps are for the group. What resources can be shared? Is AR sticking with these case studies? What about extra representation?

- AR might need to revisit some of these case study areas. Suggested changes will be shared with the group.

Next steps discussed:

- Clean up notes from breakaway sessions.
- All links will be shared.
- Powerpoints will be made available to everyone.

The Nature Conservancy (TNC) thinks we should look at results from the USACE floodplain constituents meetings held last fall up and down the river. A TNC representative attended the Cape Girardeau meeting and there was certainly broad participation from many constituents.

- USACE is publishing the results this fall - so it will be available soon.

Chicago Metropolitan Agency for Planning had questions about the case studies: AR is looking at communities that have not done planning for these projects before, correct?

- Yes, these are potential opportunity areas where we can grow actual projects.
- Just because projects are already occurring, it doesn't mean that there cannot be more projects there.
- Opportunity areas to apply a multi-benefit approach.

NAACP states that this experience has been worthwhile and that they are very happy to be involved. It's not often that they are at the table. Decisions are frequently being made without them.

Chicago Metropolitan Agency for Planning asks if the list of participants will be shared.

- Yes, we will make it available with contact information. Part of this process is building relationships and we want to facilitate that.

AR wants to know if there is there a case study that you have in mind. If you know someone that we should involve, that maybe lives in these communities, please let us know, so we can include them in these discussions.

- NAACP will do our part to bring more people into the conversation.

3 Afternoon Sessions - Detailed Notes

3.1 Break Out Group - Environmental & Natural Resources Group

3.1.1 "What appeals to you about the multi-benefit approaches you heard about this morning?"

Responses:

- Inclusive
- Much more likely to last the long haul instead of swing with the pendulum of interest
- Acts more like “nature” - complex but room for all - when in balance
- Multi benefit will also help assure proper funding levels
- Allows for flexibility - especially in a changing world: what may resonate in the past might not fly in the world of climate change
- Allows us all to learn from each other
- Possibility of getting past any sector’s veto power in the floodplain, results in more needs met
- Collaboration
- Big picture, larger scale spatial and systemic
- Holistic!
- Innovative - response to changing climate, haven’t done projects on this scale
- This strategy has a better chance at long term sustainability.
- Policy proposal, sets up partnerships to allow people to go after money collaboratively.
- Multiple groups collaborating increases support for projects!
- Potential to access more funding opportunities
- Multibenefit approach encourages us to look at the problems/solutions as a system, rather than a piecemeal approach
- Established precedents in multiple-use natural resource management
- Everyone gets involved, better buy-in and support, better maintenance in the long term.
- Awareness is good also for emergency management.

3.1.2 “What concerns you about a multi-benefit approach?”

Responses:

- Complex and will take time; not always smooth conversation but well worth the investment in my opinion.
- It’s hard to make federal and state programs play nicely together. Each agency has different requirements and it can be overwhelming.
- Barriers at regulator level, funding, etc. so many barriers!
- A lot of outreach and education is needed to get the public to understand and support. Need technical resources.
- Timing with all the grant programs can undermine projects - multiple grants require a lot of coordination for timing.
- No coordination in the state of Illinois for mitigation. It’s kind of a free for all. No one is thinking about how we can optimize all the federal and state grant programs. Need more coordination.
- Tension between reality and desire - it’s not free! Relationship building takes investment.
- Outcomes for an individual player can be very resource dependent. Whoever has the most money gets to make the decisions.
- Quantification of benefits - it’s easy to calculate costs but it’s hard to calculate the benefits. The science isn’t perfect. This can drive issues of trust among stakeholders.
- Too many potential benefits can water down the true purpose and top needs. We have to stay disciplined about what we can specifically promise, otherwise we risk making skeptics’ eyes roll.
- Money is in short supply and it can get very competitive.

- State fiscal crisis - limited state resources available
- Collaboration takes a lot of time - important to invest in relationships before moving too quickly into policy
- Archaic state water laws
- Need bipartisan political support to create a lasting program
- Lack of trust among stakeholders
- Knowledge needed to quantify multi-benefits of floodplains
- Reaching consensus can be difficult and time-consuming

3.1.3 "What are the most important benefits of floodplains to you and your community?"

Responses:

- Safety - keep the water in the floodplains and out of people's basements
- Recreation
- Flood storage
- Mosquito farms! (not a benefit, the thing is that folks want to know that we're _not_ creating bonus mosquitos for their neighborhood)
- TWI is involved in a project in Gary IN on a multi-benefit project. Once a community trusts that safety will be achieved, there isn't a firm hierarchy of needs. Recreation, habitat, scenic, etc.
- Groundwater recharge, ecosystem diversity, need to understand how sensitive changes in development and climate enlarge the floodplain. Mapping floodplain is really hard to do and can change with somewhat minor encroachments.
- Provision of wildlife habitat
- Provision of regulating services - nutrient sequestration
- Reduction of flood risk for the community and its neighbors
- Water quality and quantity
- Carbon mitigation and storage
- Biodiversity
- Letting rivers be rivers
- Preservation of open space and access to rivers for recreational purposes
- Resilience of infrastructure

3.1.4 "What are the flood and floodplain related challenges to generating/enhancing/protecting the benefits identified in Question 3?"

Responses:

- Landowners ownership issues
- Floodplain work can be very expensive, finding the $$$ do everything.
- Mapping of the floodplain is very difficult. Small changes in the floodplain can have significant impacts on flood stage.
- There are very significant changes that have happened over the landscape - lots of impervious pavement changing the way water moves.
- Public trust! Climate is changing - can't promise the water will go here and not there.
- Flood insurance rate maps and regulations are not responsive to dynamic river systems and floodplain changes. Community pushback if the floodplain expands.
- Overcoming the status the status quo set by current flood policy - putting it back the way it was

- All work within floodplains are super slow whether it is getting money to impacted residents, aligning mis-aligned government programs, land ownership micro-rights v. community rights, and so on
- Floodplain funding and resources can be distributed unequally
- Risk and unpredictability
- Different jurisdictional responsibilities: levee managers, state/fed partners (USACE, IDNR, etc.); public vs private ownership in floodplains;
- Public understanding of the science and physics of flooding and floodplains
- Development pressure- developers don't have long-term investments
- Not only are many benefits not easily quantified, there aren't currently markets for many, so even though they are important, they don't seem to have as much clout as they should.
- Short-term memory after a flood event!
- Zoning and inappropriate land use
- Not recognizing that what "happens on my land" actually affects others down the line…
- Archaic state laws
- Need a Rivers/Freshwater compact to protect the quantity of water and natural regimes so the water isn't diverted

3.1.5 "What questions do you have about implementing multi-benefit projects in Illinois?"

Responses:

- Primary source of funding
- Who is going to organize and keep this effort going?
- Will it be one organizing entity or a collaborative effort?
- What is the political strategy? Who will lead the charge at the political level?
- How would we get information out? Who is the driving force to make sure resources get into communities (especially BLack and Brown) to move forward?
- Will there be a designation of areas? Which area goes first? Location, project? How do we rank these?
- Who's in charge of implementation?
- How will we define activities and projects that can be funded?
- Local ordinances - how rectify differences/barriers to implementation?
- If there is a public-private partnership- where will the non-state funding come from?
- Are all partners in agreement on the issues and possible solutions/goals moving forward? Are there still differences we need to hash out? Are differences okay? Is there a process for resolving them if not?
- How can we best define damages? FEMA databases for damages is held internally and needs to be more shared with project managers. Not just recent flooding, but a history of flooding is important. (See openFEMA.gov)
- How can we ensure that all communities in Illinois have equitable opportunities to tap into a program like this?

3.1.6 "Other Questions, Comments or Concerns?"

Responses:

- Areas that are being flooded - it becomes an environmental and health issue - MOLD! How do we address those issues?

- How can we get engineers et al to recognize the value of nature-based green
- infrastructure
- Seems flood insurance premiums should not be a driver as much as it is…How can we lower flood insurance premiums? Some folks cannot afford to pay for flood insurance, can they be subsidized?
- How can we support the real estate movement that is stating how many times a home has been flooded! Good stuff! Consumer driven.

3.2 Break Out Groups - Farming and Agriculture

3.2.1 "What appeals to you about the multi-benefit approaches you heard about this morning?"

Responses:

- Confusion expressed from the Farm Bureau on why we are having this breakout group and what the purpose of the group is.
- The National Great Rivers Research & Education Center (NGRREC) discussed the metro east area and how they are working with watershed groups to work with those communities.
    - The NGRREC representative picked this session because they would like to see more of heartland conservancy series of open houses where AR meets different communities, finds out where the flooding is and maps it out.
    - NGRREC is looking for good participation from both the urban and the farming communities.
    - NGRREC would like to see more connection between the farming groups and the watershed groups.
    - NGRREC is also interested in soil health – the representative is a soil scientist as a background. There is a greater connection in the way the agricultural lands are managed and the flooding. Anticipates seeing a benefit to soil health which should be great for farmers.
- IL Farm Bureau would like to see opportunities to get better flood protection. Flood fighting requires a lot of money and the Farm Bureau wants to raise levees so that flood fighting is less of an issue and costs less money.
    - Farm Bureau representative also wanted to point out that there are regulatory issues with the state of IL for levee improvements to occur. These regulatory issues have made levee improvements largely unsuccessful.
    - The IL Farm Bureau is still unclear on what the benefits of floodplain restoration could be. Need to flesh out the program more to get a better idea of what that looks like.
- The NGRREC representative has driven through farmlands that haven't recovered from flooding over a year ago and is curious if farmers could use that land differently? Maybe this program could create more programs for farmers that could help benefit them as well allowing them to gain income from this program.
- The NRCS has various different programs and they are active in the community (i.e., their wetland easement program). They are involved in the Len Small Levee project through an easement on the property.

    - Farm Bureau says that the program is getting rolling currently at Len Small Levee. 4-5 year issue at Len Small levee. The restoration didn't work and they have encountered lots of issues with USACE. With these factors combined, they have run out of options and are always running into flooding.
- The representative from the Association of Illinois Soil and Water Conservation Districts (AISWCD) has a really good resource at Dog Tooth Bend through the Alexander Soil and Water Conservation District. They are one of the groups spearheading the efforts there. Plans on introducing us to that person.

3.2.2 "What concerns you about a multi-benefit approach?"

Responses:

- A representative from the IL Farm Bureau is concerned about a comprehensive plan. As we talk about the flooding and economical impacts, a majority happens in the Mississippi river - we have neighbors on the other side. (Missouri, Iowa.) If we affect these river systems, we should talk with those users.
- Another rep. from the IL Farm Bureau recommends a systematic plan. Says that we should address these issues as a holistic approach and avoid implementing one-off situations that will change what is going to work.
- IL Farm Bureau reiterates that we should avoid negative impacts from not looking holistically.
- Willing participation is key – don't try and force this on people. We should only work with willing participants in other states and we have to think about what the impacts are on those working within the levee district.
- AISWCD mentions that both the Farm Bureau and IL Soil and Water Conservation Districts are voluntary land management solutions.
- People will only volunteer if there are financial solutions available. Otherwise they could be worse off than they are now.
- It could be a tough sell because transition is tough to take on. Farmers will see this as a big risk and a possible financial hit.
- USACE – mainstem and 100 year floodplain – don't think outside of that. NRCS has lots of different conservation programs – issues with collaboration and communication. How does that work and the more collaboration and money be used up through that.

3.2.3 "What are the most important benefits of floodplains to you and your community?"

Responses:

- Good soil for farming.
- Highly productive farmland – agriculture is in river communities and is the economic driver for that community.
- Societal benefit of growing food. Need to ensure that this is recognized and understood.
- Beautiful areas – outdoor recreation/activities very important to all groups.

3.2.4 "What are the flood and floodplain related challenges to generating/enhancing/protecting the benefits identified in Question 3?"

Responses:

- Regulatory changes are needed to make improvements on the river.

- Making sure we are looking at this systematically and that all parties are benefiting from this and that nobody is negatively impacted.

3.2.5 "What questions do you have about implementing multi-benefit projects in Illinois?"

Responses:

- How are we going to pay for this? IL has some fiscal challenges.
- What agency will drive this/house this?
- How does it fit within the nutrient state strategy?

3.2.6 "Other Questions, Comments or Concerns?"

Responses:

None

3.3 Break Out Groups - Social Justice and Equity

3.3.1 "What appeals to you about the multi-benefit approaches you heard about this morning?"

Responses:

- No surprises heard. Look at what we do to improve holistic approaches
- Better management of streams/floodplains as well as people who live in them - address different and diverse needs/coexist; giving streams room to move without damaging people and property
- Current/past floodplain management that is siloed has exacerbated current issues
- Climate change impacts have a disproportionate effect on EJ communities
- Agencies and floodplain groups get focused on single actions; focus needs to be on multiple processes and people
- Information presented this morning on floodplains and programs was a lot of info to take in at one time
- Floodplain users seem to lookout for their own interests (e.g. levee districts); sharing floodplains should be the goal

3.3.2 "What concerns you about a multi-benefit approach?"

Responses:

- Ensure floodplains are adequate to support freshwater and recreational fishing
- People of color - make sure they are protected, levee should protect those communities (e.g. Centerville flooding; people who live there need to be protected); need to determine if there a way to incorporate protection of these communities into levee design/upgrades
- Multi-benefit floodplain should mean holistic approach with broad group participation and consideration
- A consistent basis for multi-benefit floodplain approach is needed with tangible solutions and timelines that prevent imminent damage
- ALL VOICES ARE HEARD - toolbox needs to be adequate to provide relief to people suffering from increased flooding
- People are experiencing climate justice inequities, needs to be diverse group representing the demographics that are being impacted (e.g. black and brown people)

- Fair and equal representation/consideration of stakeholders, BUT urban areas should be prioritized in order to protect people

3.3.3 "What are the most important benefits of floodplains to you and your community?"

Responses:

- Connection to natural resources for recreation (e.g. fishing, open space)
- Good water quality
- Adequate space for high water flows/food conveyance - so levees do not have to be opened and inundated neighborhoods

3.3.4 "What are the flood and floodplain related challenges to generating/enhancing/protecting the benefits identified in Question 3?"

Responses:

- EJ communities are not being heard equitably in floodplain decision making
- EJ communities need to have an equal seat at the table
- Representatives of people who live in the communities that are experiencing the damage and devastation need to be part of the solution and decision making - direct experience matters
- Agencies and leadership in floodplain management need to prioritize perspective and participation of communities that are being impacted
- Health and safety - flood is contaminated plus lack of access or impetus to provide access to clean and safe drinking water
- Location of EJ housing people of color) in flood prone areas can result in demolition due to consistent pervasive issues
- EJ communities need to have better access to the decision makers; ensuring that EJ communities are included in the floodplain decision making process

3.3.5 "What questions do you have about implementing multi-benefit projects in Illinois?"

Responses:

- How do EJ communities that do not own the property and do not have flood insurance find assistance
- How can EJ communities be better engaged and have access to the decision makers

3.3.6 "Other Questions, Comments or Concerns?"

Responses:

None

3.4 Geographic (Case Study) Break Out Rooms - Central Illinois

Download Video Recording

3.4.1 Effingham

Effingham map files:

Is this a good case study location?

- Flood hazard data in Vermilion County is not considered valid - it's really old.
- Danville uses surface water from a reservoir on the North Fork, this may have water quality issue
- Effingham selected because of data and Wabash watershed
- Decision to switch to Danville.

What geographic area should we focus on in this community?

- N/A

What are the goals/challenges in this community?

- N/A

How can flood damages be reduced in this community?

- N/A

How does the community use their river?

- N/A

How does the community want to use the river or how could they use their river?

- N/A

What types of natural resource/environmental issues exist in this area?

- N/A

What types of economic issues exist in this area?

- N/A

What types of projects are already being or have been implemented to address flooding issues in the communities?

- N/A

What are the available resources for multi-benefit projects at this location, if any?

- N/A

3.4.2 Freeport

Freeport map files:

Is this a good case study location?

- Yes there is updated flood hazard data and a lot of outreach has occurred with the community. At one time a neighborhood greatly impacted by the Pecatonica River had a plan for relief. I understand buyouts may be in progress.
- Image is from the USACE National Levee Database

What geographic area should we focus on in this community?

- Need someone from the community
- There is also a community upstream that is flooding.
- Northeast corner of Freeport might be a good place to start.

What are the goals/challenges in this community?

- N/A

How can flood damages be reduced in this community?

- N/A

How does the community use their river?

- N/A

How does the community want to use the river or how could they use their river?

- N/A

What types of natural resource/environmental issues exist in this area?

- N/A

What types of economic issues exist in this area?

- N/A

What types of projects are already being or have been implemented to address flooding issues in the communities?

- N/A

What are the available resources for multi-benefit projects at this location, if any?

- N/A

Other questions

- DO they have levees?

3.4.3 Rockford

Rockford map files:

Is this a good case study location?

- Has updated flood hazard data, recent update showed hundreds of additional homes in the 1% floodplain. We did a structure specific risk assessment. Lots of low to middle income housing, renters impacted.

What geographic area should we focus on in this community?

- N/A

What are the goals/challenges in this community?

- N/A

How can flood damages be reduced in this community?

- N/A

How does the community use their river?

- N/A

How does the community want to use the river or how could they use their river?

- N/A

What types of natural resource/environmental issues exist in this area?

- N/A

What types of economic issues exist in this area?

- N/A

What types of projects are already being or have been implemented to address flooding issues in the communities?

- N/A

What are the available resources for multi-benefit projects at this location, if any?

- N/A

3.4.4 Top 4 Take-Aways from Central discussion

1. Get presentations from community leaders into next stakeholder meeting
2. Danville, Freeport & Rockford are good case study sites (Peoria & East Peoria might be a good community to swap out, they have water quality issues, levees, low income, combined sewer overflow issues). Quincy might also be considered - levee district.
3. Scope should include upstream - problems aren't always in the community.
4. Data should include hazard mitigation plans. USACE has list of plans for mitigation

3.5 Geographic (Case Study) Break Out Rooms - Chicago

Download Video

3.5.1 Ford Heights

Ford Heights Map Files:

Is this a good case study location?

- There are plenty of places in the Chicago area that flood
- Ford Heights seems to be representative of diversity, low income, EJ; south suburban area has similar flooding due to topography, industrial and grey structure changes and vast low lying with bad drainage

- Chicago Metropolitan Agency for Planning to point group to CMAP resources

What geographic area should we focus on in this community?

- Group raised concern that this question was difficult to relate to this case study given Ford Heights small area
- Group wondered if this case study should stop at the municipal boundary or should this case study look more broadly?
- Group had limited knowledge of Ford Heights and asked what the current WQ of Deer Creek or other tributaries in the area is. Also curious how WQ plays into decision making?

What are the goals/challenges in this community?

- Ford Heights is a small community that has little control over water flows surrounding and contributing to issues there
- Funding issues due to small tax base
- Allocation of Ford Heights limited funds
- Trust in government
- Declining population (50% decline over 30 years)

How can flood damages be reduced in this community?

- Is there an opportunity to do floodplain management on the east side of Ford Heights (1-394 is in the way)

How does the community use their river?

- Group determined they needed to investigate further due to lack of knowledge about the Ford Heights area
- Group asked if Deer Creek is channelized - not certain?
- Group asked if there is room to provide space for the creek to move
- Also asked if Deer Creek is currently connected to the floodplain or if it needs to be connected to the floodplain?

How does the community want to use the river or how could they use their river?

- Group gave same answer to number 5 and believes they need to better understand what Ford Heights uses are; need familiarity with the area

What types of natural resource/environmental issues exist in this area?

- Open space to the north and the west, outside Ford Heights may provide multi-use floodplain opportunities
- Plum Creek is located to the South and could consider ways to access from Ford Heights
- Group wants to understand the cause of population decline in Ford Heights and wondered how impacts potential for multi-use projects?

What types of economic issues exist in this area?

- Funding, small tax base
- How funds are allocated currently
- Declining population (50% decline over 30 years)

- If multi-use projects are implemented would/could that result in pushing out longtime residents?

What types of projects are already being or have been implemented to address flooding issues in the communities?

- Green Streets Project 31,000 sf of bioswales in Sunnyvale neighborhood
- USACE constructed a basin in SE Ford Height in 2014 to address flooding:
- https://www.lrc.usace.army.mil/Missions/Civil-Works-Projects/Deer-Creek/

What are the available resources for multi-benefit projects at this location, if any?

- There is open/vacant (possibly ag land) land that could potentially provide space for multi use projects

3.5.2 Top 3 Take-Aways from Chicago discussion

1. Ford Heights is a small municipality surrounded by other municipalities, many of which have flooding issues
2. We did not have a representative from Ford Heights so it was difficult to understand issues/potential multi-use needs and issues.
3. Funding, limited tax base, decreasing population.

3.6 Geographic (Case Study) Break Out - Southern Illinois

Download Video

3.6.1 Alexander County

Alexander County map files:

Is this a good case study location?

- NAACP IL Chapter stated that this is a great case study due to the flooding issues.
- Cairo - what steps are being taken with infrastructure issues - stormwater maintenance.
    - Are there federal dollars being put towards the levee improvements?

What geographic area should we focus on in this community?

- Alexander County needs to update their pre-disaster mitigation plan so they are eligible for federal funds
- East Cape Girardeau - major flooding issues - drainage system issues.
    - Major flooding issues with velocities.
- Dog Tooth Bend
    - Many stakeholders are involved and have issues with Mississippi River flooding; climate change is increasing the volume and velocity of the water to the point that the river is trying to cut a new channel.
    - Local landowners have reached the conclusion that even if the levee was repaired, it would break at another point next year. They recognize that the river has changed and that business as usual (levee rebuild without allowing room for the river and nature-based solutions) won't solve the issues.

    - Federal funds are currently being spent in the area, per landowner request, to purchase easements that allow for land use change and the land to regenerate to help absorb the river's energy.
- Cairo
    - Unique issues with the stormwater and levees.

What are the goals/challenges in this community?

- Challenges and regulatory groups involved are different in N. Alexander County vs. Cairo. The federal government is more involved in the Cairo levees due to it being part of the Mississippi Rivers & Tributaries program. Cairo's issues are with drainage and maintenance with the existing levees.

How can flood damages be reduced in this community?

- Infrastructure with a lack of funding is something that can be improved. This is a common theme across all areas. Water level is high and the ground is already saturated. There is no place for that water to go except for the surface. It has to be pumped.
    - Lack of funding is a major issue. Tax assessments can't keep up with this equipment.
- Some places are located right next to the major rivers and there is no good place to go with the rivers system. A lot of coordination has to occur in the uplands where the water needs to be caught and slowed down before it hits the floodplain.
- All need help accessing the federal system for funding and assistance.

How does the community use their river?

- Economic opportunities, particularly early on. In a challenging position being next to the river.
    - With increased flooding issues has now put these communities in a bad position moving into the future.
- Recreation opportunities, economic opportunities (fishing, etc.).
- Transportation corridor and navigation. Barges economically sustainable and efficient for moving goods.

How does the community want to use the river or how could they use their river?

- N/A

What types of natural resource/environmental issues exist in this area?

- Len Small Levee issue - failing multiple times of year.
    - Starting talking with the landowners and they know that the river's velocity and volume has changed.
    - Changes need to occur behind the levee.
    - Landowners are working on a buyout program.
    - Ag is moving into natural vegetation, which is helping people downstream. Work has already started. Enrollment project is already moving forward.
- Cairo/East St. Louis.
    - East St. Louis has lots of past industrial issues resulting in challenges to construction projects with soil contaminants.

        - The East St. Louis Metro levees cannot fail. There are chemical plants that would result in a large environmental disaster.
        - The steel plant is still operational.
        - Explosions would occur if the levee system was to fail.
        - Levee setback will likely not be an option here and we will need to deal with the water behind it in other ways.
        - Recently, a park was developed as a recreational overlook to watch the river. It is experiencing flooding problems and it is getting worse.
            - Mayor has the redline of streets not to drive down because it's flooded. Working with another group (NAACP) clearing up an aluminum plant that is now a dump. It is in the second phase of this project. The next step is unknown.
    - West of East St. Louis is flooded and not too far from them.
        - Cairo has similar issues but at a smaller scale.

What types of economic issues exist in this area?

- In Cairo it was announced during a flood event that the governor is going to be working on a port authority proposal to stimulate the economy. Permitting hasn't been started. But, it is something that is being proposed and talked about. Could bring a lot of investment into the area.
- Insufficient economic base to support a healthy economy, many residents work outside of the City of Cairo because of a lack of opportunities
- The agricultural economy is not supporting as many people as it has historically because of mechanisation and industrialization of agriculture, so, they don't have the tax base to support the flood mitigation infrastructure

What types of projects are already being or have been implemented to address flooding issues in the communities?

- At Dogtooth Bend the NCRS is currently purchasing easements to allow for reconnection of the floodplain.
- There are voluntary buyouts in the Olive Branch and East Cape Girardeau jurisdictions to move some at risk landowners out of harm's way. There was an attempt to perform a Valmeyer-type relocation of the town.

What are the available resources for multi-benefit projects at this location, if any?

- N/A

3.6.2 East St Louis

East St Louis map files:

Is this a good case study location?

- Yes, this is a good place to focus on.

What geographic area should we focus on in this community?

- N/A

What are the goals/challenges in this community?

- Similar issues to those in Cairo and East St. Louis.
- Internal drainage issues - stormwater maintenance needed.
    - Bluff runoff - the pipes were draining down to East St. Louis. The system was not upgraded to deal with the population growth.
- It is taking a very long time to figure out how to map the levees in East St. Louis. New mapping is occurring in this area now.
- Are they truly involving the EJ community? IDNR will share with NAACP these names offline so they can get involved.

How can flood damages be reduced in this community?

- See Alexander County notes. Similar issues to Cairo.

How does the community use their river?

- N/A

How does the community want to use the river or how could they use their river?

- N/A

What types of natural resource/environmental issues exist in this area?

- N/A

What types of economic issues exist in this area?

- N/A

What types of projects are already being or have been implemented to address flooding issues in the communities?

- The metro east sanitary district and associated levee districts / jurisdictions have passed new taxes to meet maintenance needs - however, the levee system is still under funded.

What are the available resources for multi-benefit projects at this location, if any?

- N/A

3.6.3 Top 3 Take-Aways from Southern discussion

1. Good case study sites, but vastly different issues in these areas. There is more traditional flooding and the Mississippi River wanting to move versus groundwater intrusion and stormwater issues (no where for the water to go).
2. Infrastructure with lack of funding is something that can be improved. Access to funding and assistance from the federal government needs to be improved for all communities in S. Illinois.

3. Major contamination/environmental issues exist in these areas (particularly in the urban areas). Major flood events seriously risk public safety. This may cause challenges for project implementation.

Illinois Floodplains Work

Stakeholder Engagement Meeting #2

October 27, 2020

Download participant list and contact information here.

Download notes from Stakeholder Engagement Meeting #1 here.

Please note that due to technical difficulties during the meeting, not all the break-out session videos were recorded properly. We apologize.

1 Educational Panel & Discussions

1.1 Recap of Stakeholder Process – Whitney Fiore, SWCA

Hyperlinks: PDF of Slide Deck & Video

The product of this process is a feasibility study to examine the application of multi-benefit floodplain development in Illinois. It will be used to assess potential and make recommendations to manage and develop floodplains in Illinois for multi-use benefits (e.g. urban communities, habitat, public access, stormwater and flood zone management, among others). Stakeholder input will be used to inform development of the feasibility study. Stakeholders will not be asked to endorse the feasibility study.

In the Post-Meeting #1 Participant Survey you told us that you would like to see

- A shorter, more focused experience;
- Clearer expression of overarching goals and purpose;
- More detailed or pre-circulated information on case studies could allow more constructive discussion;
- More clarity on focus of study (e.g. is it targeting urban or minority communities, floodplains, in the broader sense, etc.); and
- Information on funding mechanism for the study.

To address this feedback, we have

- Changed to half day format;
- Reiterated that goal is to determine the feasibility of implementing a multi-use benefit floodplain program in Illinois;
- Reiterated stakeholder input needed to help refine and focus feasibility study and case study locations;
- Clarified that stakeholder workshops intended to build upon each and become more focused as we proceed;

- ❖ Eliminated one proposed case study;
- ❖ Focused on only three case studies during this meeting (the other case studies will be reviewed in January);
- ❖ Added additional local participants added from case study areas; and
- ❖ Clarified that the study will be presented to the Illinois Legislature for program consideration and funding.

The stakeholder meetings focus on case studies. These locations were selected to represent compendium of floodplain issues and concerns. The case studies will be used to discusses floodplain develop in terms of issues and multi-use benefit opportunities. Participants should provide input based on your area of concern, expertise or lived experience. The feasibility study will not be used to solve the issues in the case study areas, just highlight the feasibility of the program as a tool to help address these issues.

1.2 Recap of Multi-Benefit Floodplain Development – Olivia Dorothy American Rivers

Hyperlinks: PDF of Slide Deck & Video

What is "multi-benefit floodplain development?" Let's break down the definition. Floodplains are any low-lying area subject to flooding. Floodplains, like rivers, can be big and small. Urban floodplains can be hard to identify because wetlands, creeks, and streams have been converted to storm sewers. Regardless, the same geomorphologic and hydrologic are at work in big, small and urban rivers and floodplains. Land development that is not compatible with flooding has numerous negative impacts on public safety, river health, economic stability, and quality of life. Multi-benefit projects aim to address disparate needs and community priorities in the same physical space. Taking these definitions together, multi-benefit floodplain development seeks to plan and develop floodplains in ways that both maximize community resilience and ecosystem functionality. In other words, multi-benefit floodplain development identifies and advances projects that check as many boxes as possible: public safety, economic stability/growth, ecosystem health, water quality improvement, recreation opportunities, aquifer recharge, drinking water security, etc. Different areas and communities might have different priorities and opportunities that check different combinations of these boxes.

Why is multi-benefit floodplain development important? Climate change is driving more frequent severe precipitation events that cause flooding. Despite hundreds of billions of dollars being spent on traditional "flood control" infrastructure flood disasters continue to escalate. "Flood control" – the strategy of trying to move water away from people and infrastructure – has been proven largely ineffective and risky. "Flood risk reduction" – the strategy of trying to move people and infrastructure away from frequently flooded areas – is the most effective approach for protecting people. However, with the "flood risk reduction" approach, communities are often left with parcels of land that have limited functionality for people and ecosystems. "Multi-benefit floodplain development" strives to look at flooding as a resource for communities and asks the question, "how can we benefit from the floods?"

The purpose of the feasibility study is to identify incentives to increase the application of multi-benefit floodplain planning and development in Illinois. Other states have started to take this approach. At the last stakeholder meeting, we learned about Washington and Vermont.

See notes from Stakeholder Meeting #1.

1.3 California DWR Multi-Benefit Floodplain Project Office - Steve Rothert, Director

Hyperlinks: Video (no slides)

Steve is the new chief of the California Department of Water Resources Division of Multi-Benefit Initiatives. This office emerged after a long history of battling floods. Going back to gold rush – when European decedents came to California – they mined gold in the Sierra Nevada, but also settled California Central Valley. The Central Valley has great soils, but the area is also very flood prone. So, levee districts formed and built levees to control flooding. Things were great for decades, but it became apparent that the levees only approach wasn't working, the levees kept failing and overtopping. So, they built bypasses to allow water to access parts of the floodplain. The approached worked well for last century. But with climate change, the system is no longer adequate to protect communities and agriculture. So American Rivers and other partners started pushing for more integrated approach to flood management. California recognized that we couldn't keep building our way out of flooding problems. So groups started trying to get the Central Valley Flood Board – the regulatory entity – and the Dept of Water Resources – the implementor of projects – to adopt principles of multi-benefit planning approaches. The approach recognizes we need to do more and different things to reduce flood risk while doing other things to restore habitat for salmon and other at-risk species. In 2012, California developed first statewide flood management plan that adopted multi-benefit approach in concept but not much detail. As a state California recognizes that the investments in flood management need to address 4 societal goals:

1. Public safety
2. Ecosystem health
3. Stable economies
4. Enriching life experiences

Last goal is interpreted expansively to include equity and environmental justice. Those four goals set a prioritized framework for multi-benefit initiatives. In project planning and development, we try to advance all four of those societal goals, though not every project achieves all four.

The Multi-Benefit Office works to identify strategies to achieve the four societal goals. Some projects include working to set large levees back by as much as half a mile to provide more room for flood water conveyance while restoring floodplain habitat. New bypasses are being created by breaching levees to allow for managed flooding. There are a lot of concerns about land use, property rights, property values, and agricultural practices on the wet side of the levee. We are finding that is possible to continue to farm wet side of levees with compatible crops like rice. Still learning as we go and still not a universally accepted approach. Most stakeholders are realizing that the multi-benefit approach might not solve all the problems, but it's an important component. His office works with all the state and local agencies to find multi-benefit solutions for flood related issues. Setbacks and bypasses might not work everywhere – levee raises and strengthening can be compatible.

1.4 New York Rising Project - Andy Boehne

Hyperlinks: PDF of Slide Deck & Video

Village of Sidney used collaborative local and regional partnerships, consensus around climate change, working with nature to enhance public safety. The village had a highly flood prone area; had rebuilt after large events in early 2000's but didn't address root causes. Ultimately the community determined some areas of the Village in the extreme risk floodplain could not be kept safe. Brought stakeholders on board by not presenting plan as "RETREAT" – instead MAKING PEACE with nature and giving back what she clearly intends to take. Plan prioritized sustainable green infrastructure to minimize flooding. The plan understands the post storm real estate market and that rebuilding in place does not make economic sense. So, creating a vital new neighborhood where relocated residents, businesses, and community organizations can enjoy a remarkable quality of life and REBUILD THEIR LIVES. Development used sustainable mixed-Use LEED Neighborhood Development with scaled development/density, open space, smart grid, municipal services. Plan also incorporated affordable and market rate housing to meet needs of all including executive level housing, senior housing missing from current market mix. To be successful, they collaborated with private sector developers and used Adaptive Preservation techniques.

1.5 Breakout Session #1: Draft Programmatic Recommendations

Hyperlinks: Chelsea's group, Olivia's group, and Whitney's group (not recorded).

With the new information from California and New York, stakeholders reviewed the draft recommendations and suggested changes:

1.5.1 Collaboration:

"Many discussed the need to collaborate across stakeholders to solve flooding problems, indicating a lack of venue for discussions to take place, especially if there are power dynamics at play."

- What is the "venue" now? What are alternative venue options?
- The base for collaboration is clear data and information (quantitative impacts, ROI, and qualitative impacts).
- Direct communication with community leaders is important and needs to expand to more frequently flooded communities and continue. It is important to share, listen and fine-tune to develop ideas that have not been considered.
- We need to make sure we acknowledge the scale of the communication we are trying to accomplish. We need to make sure we are adequately engaging at all levels of stakeholders (from the State level to the local). Local engagement is very important as they have direct knowledge of the impacts. More collaboration is needed between agencies and across communities.
- The decision-making process needs rules and boundaries, including an approach to the collaboration.
- Need to ensure that all communities have an equitable place at table so we can develop an equitable solution. Who has decision making authority?

- There is lots of collaboration occurring in different circles creating barriers to getting things done.
- There are many competing funding requests compounded by Illinois fiscal situation.
- Data/information needs to be presented in accessible formant and that it uses language everyone can understand. Use layperson's terms, explain the scientific and engineering information There is a lack of expertise at local level. Involving more partners generates a more comfortable atmosphere. Partners need appropriate tools to participate and be heard.

1.5.2 Climate resiliency

"Many emphasized the need to move away from static flood control tools and the need for more flexibility and options, indicating a need for more tools and resources on how to build projects"

- The statement above indicates that our only tool is to move away from static flood control, when there are other tools and at times, static flood control is a useful one.
  - We should also be looking at maintaining and improving existing hard infrastructure where necessary, and not fully discounting it
- There is an inherent downside to static infrastructure…rivers are not static, they continue to change and are less predictable.
  - The word static and static structures imply that you cannot adjust, and there is a long-term downside
- This statement needs to indicate that we are looking at all the tools, more than just moving the levees back.
- We need to work with the river, provide space and live with its dynamic nature.
- Sewer backup issues in urban environments – correcting errors of the past might be impractical and costly. What are the available natural options?
- Need to understand the individual watersheds, one solution does not fit all. We need to develop unique solutions to unique conditions.
- Need to figure out how to adjust to climate change in the built environment. Much of the infrastructure is aging.
- Need to look in the upstream areas of the watershed for solutions, not just the areas where flooding occurs.
- There is no silver bullet – it's not possible for a single entity or industry, agency etc. to take this on. This will require everyone's participation
- Must accelerate move away; identifying multi-benefit projects (e.g. beyond water resources or disaster constituencies); multi-stakeholders, etc
- What is meant by "static flood control tools"? - I.e. levees are set to a certain elevation but flood frequency elevations change over time.
- There needs to be a set "design standard" for projects - can't get away from static design standards for all projects - i.e. roads.

- However, to address climate crisis, it's likely that projects that affect/solve only a single primary service (e.g tollways, major highways) which are often some of our most expensive projects need to rapidly expand the types of benefits that are provided to the communities where the projects are located. Multi-benefit projects might account for benefit s accrued to local counties, municipalities, forest preserves and other public lands

- Is this the place to discuss green, nature-based infrastructure?
- Changing regulations to be based on flood frequency? How can we get communities out of the cycle of chasing those elevations with the infrastructure?
- I'm really interested in prioritization criteria that work across agencies, across capital projects. For example https://www.metroplanning.org/news/8931/Investing-Wisely-in-Transportation

1.5.3 Cost & Jobs

"Any floodplain development will have short and long-term costs and employment implications, indicating a need for deliberate planning to ensure net economic gains"

- Need to put in context of "costs & benefits."
- "Net economic gains": This really should be more comprehensive than economic. The benefits to local communities, local waterways, and local economies should be prioritized. There are plenty examples of infrastructure projects that can demonstrate a net economic benefit, which do not result in sustained, inclusive economic growth for a community where a project is located.
- This statement should be expanded to include ecosystem service benefits (in particular), but other benefits as well. Expanded ecosystem services usually result in a benefit to the cost analysis.
- We need to make sure we look at more than just the tax base, and look at the long-term effects.
- Make sure that the economic benefits of these projects are going directly to the local communities. In the past, outside groups/organizations have received economic benefits, and the money didn't make it to the local communities.
- Make sure to look at the full economic cycle of projects. For example, don't just look at the immediate cost analysis of the restoration itself, or relocation itself, but also the long-term economic benefits of these actions (i.e. increased tourism, recreation, etc.)
- Look at the regional and state economic benefits as well as the local benefits.
  - It may be useful to look at the potential future costs of continuing to fix floodplain issues, or mitigation due to floodplain issues at the state/regional level. What would have been spent if the program wasn't created.
  - Perhaps these funds (that would have been spent after flood events or other disasters) could be put into another fund that could help pay for additional community support

- In urban areas, we need to take into account equity issues, particularly around displacement of homeowners and renters. We shouldn't consider just moving people out of the floodplain without also taking into consideration generational wealth accumulation and equity.
- There are multiple funding sources and applications. Will need to coordinate when identifying available funding
- There will be green jobs in the communities where the issues occur and solutions are being implemented, resulting in training and development for those in the community

1.5.4 Regulatory challenges

"Permitting for projects is difficult and there is a lack of resources for non-landowners, indicated need to review state and federal regulations."

- This statement shouldn't be specific to non-landowners, the language should be changed to include landowners as well.
- This statement seems contradictory. While permitting projects is difficult due to the existing level of thresholds, expanding the number of parties involved in a program like this, could have unintended consequences… making the process even more difficult because of the number of stakeholders involved.
- "Resources" in this statement needs to be defined.
- Tools and guidance needs to be provided to communities so they can efficiently and effectively navigate the regulatory process.
- Multiple permits and agencies involved, multiple funding opportunities that don't necessarily coordinate well
- Requires consultant or expertise in permitting often, grant requests should account for engineering and environmental expertise needs
- Building Resilient Infrastructure and Communities (BRIC) Program addresses the need for funding technical expertise
- Some regulations are restrictive and perpetuate issues in EJ communities (e.g., public/private inequitable rules and policies)
- Lots of flood mitigation funding comes with a cost share requirement which many urban and low-income communities cannot contribute towards.
- Note - what is "regulatory, permitting" for building versus NFIP for renters, etc.
- There could be an accelerated permit process, if a project was to reach the multi-benefit criteria. Another idea is to align funding for pre-development, or public participation.

1.5.5 Public health

"Not all floodplain issues are in the "regulated floodplain" and solving them is difficult (i.e. mold from high water tables), indicating a need to adopt a more comprehensive view of 'floodplains'"

- Hazardous materials need to be taken into account. We may need to consider groundwater as well.

- This statement needs boundaries, i.e. what are considered threats to public health? Could this statement extend to waterborne diseases and pests, such as mosquitos and Zika?
  - We should have clarity about what we mean by public health
- There is a difference that needs to be taken into account with this statement, riverine flooding versus urban flooding and what that means to public health.
- We should consider health issues with the homeless and those that are being displaced from homes during a flood event that makes buildings uninhabitable. The homelessness issue complicates things.
- Another consideration to consider when discussing public health issues is the nutrient loading and pollution that comes with floodwaters and how we can work on nutrient reduction projects to update these pollutants.
- Public health is a major problem in floodplain areas. Basement flooding is a public health issue. People try to clean up themselves, not understanding the public health issues, i.e. mold. More assistance is needed for communities that are outside the flood plain dealing with flood issues
  - Especially during pandemic - mold is a huge issue. Need to assist.
  - Using more nature-based flood risk reduction solutions can improve public health.
  - Public health is not only respiratory, but the mental health impacts that economic hardship, relocation, etc cause.

1.5.6 Communities need to set priorities

"While information and resources are helpful, floodplain development needs to be community driven, indicating the need to get resources into the hands of communities for better decision-making."

- How do we empower people to get the information into their hands?
- We should consider drilling down into planning at the community level and use a bottom up approach to this program.
- Perhaps look at establishing community benefit agreements, requiring a community to sign off on the plans and what the anticipated benefits will be for that community
- One of the most important pieces. Getting information to people to help reimaging solutions.
- Community stakeholders should have a voice in setting priorities. It should be clear what participation looks like for each community, each planning process; as well as what the limits of that input may be. An example of this might be, in communities where there is costly repetitive flooding, a community with a strong priority for staying in place, should be evaluated against the triple-bottom line impacts and benefits of the local and upstream/downstream communities.

1.5.7 Other items

- If flooding is not associated to "waterways" how can we address flooding from a multi-benefit approach that start from other concerns? Flooding is certainly a negative, but it may

not be the most pressing issue for all communities where this group would want input. Are there ways to work through other planning or priority setting initiatives or collaborations, that allow floodplain development prioritization to occur. At this point in time, there seems to be a lot of participation fatigue, AND increased access for many communities to participate digitally.

2 CASE STUDIES

Below are the draft case study findings. With each case study, links to the raw notes, discussion recordings, maps and other resources. Prior to Meeting #3 (January 20, 2021), stakeholders will be asked to review the draft case study findings and submit corrections, suggested edits and other comments.

2.1 ALEXANDER COUNTY - INTRODUCTION

Hyperlink: Introductory video here.

Jeff Denny, Alexander County Engineer

Alexander County is bordered by the Mississippi and Ohio Rivers. Both rivers are trying to cut new channels during flood events. Last year over 300,000 cfs cut through Dogtooth Bend, which disconnected part of the county. Cairo is protected by the Mississippi River & Tributaries Project, but the County has to maintain the pumps stations with a shrinking tax base. Also, in the northern part of Alexander County, across from Cape Girardeau, there is a large agricultural levee that protects about 550,000 acres of farmland. The long duration of last year's flood caused major flooding behind the levee because there are not pump stations.

David Maginel, Alexander County Soil & Water Conservation District

The Len Small Levee caused Horseshoe Lake in Alexander County to be subject to periodic backwater flooding from the Mississippi and Cache Rivers. Water moving through Horseshoe Lake is causing damage to transportation infrastructure, including a main road. Horseshoe Lake and sedimentation caused by flooding is degrading the natural resources. Need to revive the recreational opportunities in the area. Gates in the spillway could be opened during flood events to help drain water and sweep sediment out. Just northeast of Horseshoe Lake is a good area for waterfowl development and bottomland hardwood restoration. There is also an opportunity to link this whole area to the Shawnee National Forest. Creating a corridor to the bluffs and uplands would help critters escape floodwaters.

Viv Bennett, The Nature Conservancy

TNC is working with landowners and USDA to secure conservation easements in the Dogtooth Bend area of Alexander County. Flooding in this area now regularly occurs every year or every other year. Cultivation is becoming impossible. 99% of the landowners have applied for easements. USDA is working towards making offers on the land to take it out of production permanently.

Tyrone Coleman (Theresa Haley presented), Cairo NAACP

Black people in the County are suffering from social inequities for several reasons. Because many Black people in the County do not own their land, they cannot get flood insurance. Having

forums such as this allows stakeholders to take back information to these communities. Cairo is suffering, HUD removed their only housing program. Concerned over census results since population in Cairo is decreasing.

Bill Bodine, IL Farm Bureau

While most farmers have applied for easements in the frequently flooded areas of Alexander County, most want their levees rebuilt to protect their investments.

2.2 Alexander County Case Study Discussion

During the discussions, facilitators asked stakeholders two questions: Given unlimited resources, how could the flood-related issues in this community be fixed? Once participants had exhausted all ideas, facilitators follow up with another question: Are there currently any programs/funds/policies to install/apply the identified solutions?

Hyperlinks:

- No recordings available for the Alexander County discussion groups.
- Full notes from Whitney's Group, Chelsea's Group, and Olivia's Group.
- Flood Factor© Maps and Data.
- Map package for Alexander County (maps include land use, buy out locations, threatened and endangered species sightings, threatened and endangered species critical habitat areas, census block demographic data, flood hazard zones, areas of increasing flood risk, impaired water bodies, natural areas, and priority conservation areas).

Draft Findings:

- **Levee Improvements.** Stakeholders felt that levees and/or floodwalls should be considered around Cairo and across the breach near Dogtooth Bend.
  - State and federal programs to build/improve levees:
    - Federal levees are eligible for repair funds through the PL 84-99 Levee Repair Program.
      - Barrier: Levee repair costs must meet benefit cost ratio thresholds. Withdrawal of federal financing due to low benefit-cost ratios for post-flood levee repairs is intended to incentivize levee setbacks and floodplain reconnection, but these projects must be initiated by local sponsors. Local sponsors lack the information and resources they need to understand, build support for, and advance setback projects within their communities.
    - Cairo is part of the Mississippi River and Tributaries System, operation and maintenance of their levees is fully federally funded through the US Army Corps of Engineers Mississippi River Commission.
      - Barrier: None.
- **Flood bypass channel.** Stakeholders felt that in lieu of building a new levee or retiring all the farmland in Dogtooth Bend, a flood channel or bypass can be created at the site. New infrastructure could be built to access the land during flood events.

- State and federal programs to construct flood bypass channel:
  - None.

- **Floodplain reconnection.** Stakeholder felt that since many agricultural levees cannot meet benefit-cost ratio thresholds, levees should be removed or set back far enough to convey flood water.
  - State and federal programs to remove and/or setback levees:
    - PL 84-99 Federal Levee Repair Program can finance levee setbacks and removals.
      - Barrier: Non-federal sponsor must initiate requests for non-structural flood risk reduction alternatives before US Army Corps of Engineers can provide planning assistance. Local sponsors are not aware of non-structural options or understand that they must initiate the process.
    - US Department of Agriculture Conservation Easement Program can help landowners recuperate losses due to repetitive flooding.
      - Barrier: Conservation easement funding is limited, landowners are turned away annually. Additional funding is needed at the state and federal levels to enroll more acres.
      - Barrier: Conservation easements only help landowners and not tenet farmers who do not receive any financial subsidies under easement programs. Financial assistance is needed for tenet farmers when land is taken out of production.
      - Barrier: Farmland loss impacts local economies. Strategies to protect productive farmland need to be developed in the context of multi-benefit floodplain development.
      - Barrier: Levee and Drainage Districts in Illinois are regulated under the Illinois Drainage Code, which prohibits districts from advancing projects that might cause localized flooding or ponding within the districts. Illinois Drainage Code should be reviewed and amended to provide more flexibility to advance green infrastructure projects that might help reduce flooding.

- **Pre-disaster resilience planning and projects.** Stakeholders felt that Cairo would benefit from pre-disaster planning and investment to address the numerous flood-related issues that stem from groundwater intrusion and Cairo's very high residual risk of catastrophic flooding if the levees fail. Stakeholders also felt that Cairo would be benefit from green infrastructure projects to more sustainably resolve local flood-related challenges.
  - State and federal programs for pre-disaster planning and construction:
    - FEMA's Building Resilient Infrastructure and Communities Grant will finance pre-disaster planning, design and construction.
      - Barrier: Lack of resources, expertise and capacity to successfully apply for funding. Population is steadily decline due to lack of community amenities, Cairo is a service desert (groceries, gas station, medical, etc.). Cairo needs assistance

revitalizing itself from top to bottom to comprehensively address flooding issues, housing stock, services, economic development.

- Environmental Protection Agency Revolving Loan Programs to assist with necessary upgrades to storm and sewer infrastructure.
  - Barrier: Loans cannot be paid back unless Cairo's economy is revitalized. Need to coordinate infrastructure upgrades with community revitalization plan.
- FEMA/DNR home buy-outs and/or flood proofing to reduce community reliance on risky levee infrastructure.
  - Barrier: Home buy-outs often disperses communities and undercuts the informal support networks people of low-income often rely on. Need to provide support for community "relocation".
  - Barrier: Loss of property tax revenue for the city. Need assistance calculating returns on investments, developing plan to expand taxable city property, and/or increase property values.
  - Barrier: Buyouts only benefits home-owners and not renters. Need financial assistance program for renters to function in tandem with home-owner and landlord payments.
- EPA Section 319 Non-point Source Pollution Grants can help the community finance green infrastructure projects, including along Vermillion Creek where there are public safety concerns with flooding and coal ash storage ponds.
  - Barrier: Lack of resources, expertise and capacity to successfully apply for funding. Need technical assistance for grant applications.
  - Barrier: Some pollution sources come from farmland and there is no standard venue for rural and urban residents to collaborate on watershed flood issues. Need to facilitate conversation between cities and rural areas in watersheds.

❖ **Revitalization.** Stakeholders felt that Cairo's economy needed a deliberate revitalization plan. Cairo and the surrounding region is impoverished, revitalization that focused on economically sustainable infrastructure, green jobs, local farm and food production, and ecological health could raise quality of life. Area has unique natural resources created by historic flooding. Economic opportunities: waterfowl hunting, tourism (Shawnee National Forest, Horseshoe Lake, Dogtooth Bend), silviculture, etc.

➢ State and federal programs for community revitalization

- None?

2.3 EAST ST. LOUIS / CENTREVILLE - INTRODUCTION

Hyperlink: See all the presentations here.

Cornelius Bennett and Earl Fuse, Residents from Centreville

All longtime residents and homeowners in Centerville. Repeated and persistent flooding in basements is common. Sewage backs up into their basements and yards, have to install cleanout pipes and pay for clean outs of raw sewage in their yards after storms. Multiple replacements of hot water heaters, HVAC systems and other home utility equipment is common as well as flooring on 1st floor. Property values are less than the purchase price. American Waters piping system is ~100 years old and in disrepair. Some people have moved hot water heaters/HVAC systems to attic to avoid repeated replacement.

Bill Bodine, IL Farm Bureau

Farmers agree that infrastructure is causing or exacerbating flooding. Drainage issues in southwest need to be addressed

Stanley Franklin, East St Louis NAACP

E St Louis is still suffering from 1993 floods. FEMA requirements to protect SW area have still not been met; means homeowners have to carry flood insurance. USACE has been requested to repair/upgrade, but they have not done so. Bluffs/Bellevue community above stormwater flows through E St Louis which has expanded in population but not upgraded stormwater systems, overwhelms antiquated pumping system Centerville area. Many people's basements flood. Centerville is one of poorest cities in US, 95% African American, older residents. Home values are very depressed, many owned by residents. Sewage issues pervade, backup into basements, toilets and sinks; many people have clean outs in their yards so they can remove raw sewage. Community has repeatedly raised these issues, but no solutions have been forthcoming. Drinking water is also unsafe.

2.4 East St. Louis / Centreville Discussions

During the discussions, facilitators asked stakeholders two questions: Given unlimited resources, how could the flood-related issues in this community be fixed? Once participants had exhausted all ideas, facilitators follow up with another question: Are there currently any programs/funds/policies to install/apply the identified solutions?

Hyperlinks:

- Recordings Whitney's Group, Chelsea's Group, and Olivia's Group.
- Full notes from Whitney's Group, Chelsea's Group, and Olivia's Group.
- Flood Factor© Maps and Data.
- Map package for East St. Louis / Centreville (maps include land use, buy out locations, threatened and endangered species sightings, threatened and endangered species critical habitat areas, census block demographic data, flood hazard zones, areas of increasing flood risk, impaired water bodies, natural areas, and priority conservation areas).

Draft Findings:

- **Community education.** Stakeholders felt that the community needs technical assistance to guide assistance requests. Communities often "see" the manifestation of a problem, but maybe not the cause. They also help identifying and applying for the right grants and enrolling in programs to finance planning and projects. This could be done through the establishment of a non-profit or coordination with a non-profit organization.

- State and federal programs to help communities identify and access:
  - Any?
    - Barrier:

- **Infrastructure upgrades.** Stakeholder felt that storm and wastewater infrastructure need to be upgraded in the community.
  - State and federal programs for infrastructure upgrades:
    - EPA State Revolving Loans provide low-interest loans for drinking, storm and waste-water infrastructure upgrades.
      - Barrier: Loans cannot be paid back unless Centreville's tax base grows. Need more grant opportunities.

- **Pre-disaster resilience planning and projects.** Stakeholders felt that Centreville would benefit from pre-disaster planning and investment to address the numerous flood-related issues. Stakeholders also felt that Centreville would be benefit from green infrastructure projects to more sustainably resolve local flood-related challenges.
  - State and federal programs for pre-disaster planning and construction:
    - FEMA's Building Resilient Infrastructure and Communities Grant will finance pre-disaster planning, design and construction for long-term solutions that stop the "flood-rebuild-flood-rebuild" cycle.
      - Barrier: Lack of resources, expertise and capacity to successfully apply for funding. Centreville needs assistance applying for grant funding.
      - Barrier: Projects need to be outlined in the county hazard mitigation plan. Centreville needs assistance determining which projects are eligible and advocating the county to include projects in future plan.
    - FEMA/DNR home buy-outs and/or flood proofing to reduce community reliance on risky levee infrastructure.
      - Barrier: Home buy-outs often disperses communities and undercuts the informal support networks people of low-income often rely on. Need to provide support for community "relocation".
      - Barrier: Loss of property tax revenue for the city. Need assistance calculating returns on investments, developing plan to expand taxable city property, and/or increase property values.
      - Barrier: Buyouts only benefits homeowners and not renters. Need financial assistance program for renters to function in tandem with homeowner and landlord payments.
    - EPA Section 319 Non-point Source Pollution Grants can help the community finance solutions to address public health issues stemming from the impacts of raw sewage, coal ash ponds, and superfund sites in the area.

        - Barrier: Lack of resources, expertise and capacity to successfully apply for funding. Need technical assistance for grant applications.
        - Barrier: Some pollution sources come from farmland and there is no standard venue for rural and urban residents to collaborate on watershed flood issues. Need to facilitate conversation between cities and rural areas in watersheds.
    - FEMA Flood Vulnerability Assessment can help prioritize investment in flood risk reduction projects.
        - Barrier: Any?

- **Racial equity.** Stakeholders heard from Centreville panelists that there is, at least, a perception of unequitable distribution of resources around flood risk reduction strategies. State and federal programs need to be more transparent regarding demographic information around their community assistance programs.
    - State and federal programs to address racial equity in government spending.
        - Any?
            - Barrier: Any?
- **Political power.** Stakeholders felt that Centreville needs better access to decision-makers and political power to bring resources into their community for investments.
    - State and federal programs to empower community and provide access to decision-makers.
        - Consolidation of water management districts through the legislative process would allow more equitable distribution of funds in the region.
            - Barrier: Requires legislative action.
- **Agency coordination.** Stakeholders felt that Centreville deserves the attention of multiple state and federal agencies. FEMA, USACE, IL DNR, IL EPA, and the county Soil and Water Conservation Districts should review Centreville's flood and pollution problems collaboratively and develop an integrated plan to assist the community.
    - State and federal programs to facilitate agency collaboration within communities.
        - Any?
            - Barrier: Any?

2.5 ROCKFORD CASE STUDY INTRODUCTION

Hyperlink: See all the presentations here.

Brad Holcomb, Engineering Operations Manager:

Buyout program after 2007/08 back to back floods on Keith Creek. Purchased 122 homes. Area converted to open space, but river is essentially channelized at this location. The buyback open space area would benefit from restoring it to a meandering river. Alpine dams needs to be

upgraded and homes could be updated. Some of these fixes would reduce flood insurance premiums.

Bill Bodine, IL Farm Bureau

Farms along Rock River flood every other year in last 10 years. One farmer put 10 acres into the wetland program. Significant increase in Rock River flows has exacerbated flooding of agricultural areas.

Rhonda Robinson, Rockford NAACP

Rockford population ~155,000, very diverse city. Many residents live below the poverty lie in this area, resulting in high crime rates. SW side of Rockford is especially prone to flooding. Public access to riverfront/open space is inadequate. Land use plans need to be updated to address flooding along Rock River.

2.6 ROCKFORD CASE STUDY DISCUSSIONS

During the discussions, facilitators asked stakeholders two questions: Given unlimited resources, how could the flood-related issues in this community be fixed? Once participants had exhausted all ideas, facilitators follow up with another question: Are there currently any programs/funds/policies to install/apply the identified solutions?

Hyperlinks:

- Recordings Whitney's Group, Chelsea's Group, and Olivia's Group.
- Full notes from Whitney's Group, Chelsea's Group, and Olivia's Group.
- Flood Factor© Maps and Data.
- Map package for Rockford (maps include land use, buy out locations, threatened and endangered species sightings, threatened and endangered species critical habitat areas, census block demographic data, flood hazard zones, areas of increasing flood risk, impaired water bodies, natural areas, and priority conservation areas).

Draft Findings:

- **Green infrastructure.** Stakeholders felt many of the urban flooding issues in Rockford could be address through investments in green infrastructure to slow down the water and increase permeable surfaces to reduce flooding. Keith Creek is an area to look at for green infrastructure (trees/train gardens, stream meandering, etc.).
  - State and federal programs to plan, design and construct green infrastructure projects:
    - FEMA's Building Resilient Infrastructure and Communities Grant will finance pre-disaster planning, design and construction for long-term solutions that stop the "flood-rebuild-flood-rebuild" cycle.
      - Barrier: Project needs to be listed in the county hazard mitigation plan. Need assistance ensuring green infrastructure projects are included in the county mitigation plan.
    - Communities can impose stormwater utility taxes to fund green infrastructure projects:

        - Barrier: Any?
    - Silver Jackets flood risk reduction study to identify priority areas for buyouts, relocations, and protections.
        - Barrier: Any?
    - State granted authority for stormwater management is not available in Winnebago County.
        - Barrier: State needs to grant authority for all counties to manage stormwater according to the Urban Flooding Report.

- **Watershed Planning.** Stakeholders felt the community needs develop watershed plans to guide land development and investments, including the green and grey infrastructure projects necessary to reduce flooding. Most watersheds in Rockford have a combination of urban and rural land uses. For example, there is a large condo community of the east side, where water pours down into the building and grounds and develops into a lake. The people who live in the condo are often displaced and living with environmental and public health concerns. This water comes from farmland up-river. This process needs to be community driven.
    - State and federal programs to develop watershed plans:
        - EPA Section 319 Non-point Source Pollution Grants can help the community finance green infrastructure projects.
            - Barrier: Some pollution sources come from farmland and there is no standard venue for rural and urban residents to collaborate on watershed flood issues. Need to facilitate conversation between cities and rural areas in watersheds.
        - US Department of Agriculture Conservation Easement Programs and Environmental Quality Incentives Program can incentivize farmers to change land use or farm practices to reduce runoff.
            - Barrier: Conservation easement funding is limited, landowners are turned away annually. Additional funding is needed at the state and federal levels to enroll more acres.
            - Barrier: Conservation easements only help landowners and not tenet farmers who do not receive any financial subsidies under easement programs. Financial assistance is needed for tenet farmers when land is taken out of production.
            - Barrier: Farmland loss impacts local economies. Strategies to protect productive farmland need to be developed in the context of multi-benefit floodplain development.
            - Barrier: Programs are not regularly connected with urban flooding issues. Need guidance and coordination assistance to facilitate planning.

- **Flood insurance.** Stakeholders felt the community should work to increase enrollment in the National Flood Insurance Program (including the Preferred Rate Policies for residents

that are not in the mapped flood hazard zones). This would help homeowners and renters recover from flood events.

- State and federal programs to increase flood insurance enrollment
  - Nation Flood Insurance Program Community Rating System encourages communities to expand flood insurance enrollment
    - Barrier: There is significant misinformation about eligibility outside of mapped flood zones. Need to increase awareness of flood and back up insurance options for homeowners, renters and insurance agents.

- **Public health.** Stakeholders felt that there are significant health issues associated with water damage that are not being addressed because the buildings are not in a mapped flood hazard area.
  - State and federal programs to repair and prevent water damage outside of mapped flood hazard areas:
    - Any?
      - Barriers: Any?
    - In other states, property owners need to disclose to renters if they are located in a hazardous area.
      - Barrier: Legislation is needed to advise tenets of flood history.

- **Racial equity.** Stakeholders felt that Black residents may not be adequately engaged in the decision-making process regarding community planning and development.
  - State and federal programs to assist community engagement in watershed planning:
    - Any?
      - Barrier: Any?

Illinois Floodplains Work

Stakeholder Meeting #3

March 9, 2021

Download participant list and contact information here.

Download notes from Stakeholder Engagement Meeting #1 here.

Download notes from Stakeholder Engagement Meeting #2 here.

1 Education Panel

1.1 Recap

Hyperlinks: Slide Deck & Video

Chelsea, Whitney, and Olivia welcomed everyone and provided an overview of why we are here, what the feasibility study is, and the case study process. Multi-benefit floodplain planning & development tries to maximize the many benefits of floodplains - economy, aquifer recharge, water quality, EJ, etc. Today our case studies are Ford Heights, Danville, Freeport. Executive summary comments due back on Friday March 12th. Executive summaries from meetings 2 & 3 will not be discussed until meeting 4.

1.2 FEMA's Building Resilient Infrastructure and Communities Grant Program - Mr. Eric Letvin, Deputy Assistant Administrator for Mitigation, FEMA

Hyperlinks: Video & Slide Deck

Contact Information: eric.letvin@fema.dhs.gov

Mr. Letvin is in DC where he oversees the BRIC program for the Biden Administration. BRIC stands for Building Resilient Infrastructure and Communities. It is a pre-disaster and post-disaster grant program that works with the national floodplain insurance program. Mr. Letvin is also responsible for implementing the STORM Act when it is finalized. The STORM Act authorizes revolving loans for flood risk management infrastructure.

FEMA has been delivering pre-disaster mitigation grants since. New BRIC grant program was established in 2018 and FEMA is currently reviewing the first grant applications. BRIC was created following extensive stakeholder feedback in 2019 - over 5,000 comments received – and is designed to make communities more resilient. BRIC guiding principles are to support community capacity building, encourage and enable innovation, promote partnerships, enable large infrastructure projects, maintain flexibility, and provide consistency. BRIC Priorities are to encourage public infrastructure projects, mitigate risk to lifelines, promote nature-based solutions, and incentivize adoption of modern building codes.

Major programmatic focus now on funding "lifelines" – i.e. not just thinking about a single structure standing, but how do we keep the whole community operational, need to support the

communication, power, etc. Also focusing more on promoting nature-based solutions and green infrastructure, including promoting building code updates. Notice of Funding Opportunity was posted August 20 and the grant application period Sept 2020 - Jan 2021. By law, grants must be approved via the state emergency office before getting to FEMA. States set their own deadlines. This caused a little bit of stress because the window for communities to apply was short.

Now, FEMA is reviewing applications through June 21. It is a competitive program - not just within states, but nationwide. Scoring criteria are listed in the Notice for funding. Panels of state and federal floodplain managers are going through the project submissions now. Project selection Summer 2021.

FEMA is really trying to focus on pre-disaster funding to prevent damages. Funding for BRIC is based on current disaster spending. FEMA takes all the disasters that happen in a certain year and creates an estimate for about 6 months after an event - how much money will FEMA spend on that disaster for all the different programs? 6% of the estimate will go into a piggy bank that will feed into BRIC. In 2020 there was $500 million available. Broken out into: State/territory allocation: $33.6 million, tribal allocation: $20 million, mitigation grants: $446.4 million. Who is eligible? States, territories, federally recognized tribal governments, and DC; and sub applicants, including local gov, tribal governments, states agencies, and tribal agencies.

We also changed the Ecosystem Service Benefits Policy. By law we must have a cost/benefit analysis on any projects that come through. Previously, had to get to .75 benefit-cost ratio (BCR) before you could use the ecosystem benefits (i.e. water quality benefits of a wetland). Now removed the .75 BCR threshold, however, they can be used to bolster the applications.

Other Capability & Capacity Building activities include updating building codes, encouraging partnerships, funding project scoping, studies and associated costs with studies, feasibility and conceptual design, and pre-studies/cost-estimates.

To submit for a BRIC grant, communities must have an approved Hazard Mitigation Plan and keep them up to date. Hazard Mitigation Planning is eligible for BRIC grant funding. Grant applications with strong partnerships will be ranked higher. Partnerships can include other federal agencies, state/local/tribal/territorial governments, and private sector/non-governmental organization.

FEMA has a lot of supporting materials for communities available online. There are new executive orders (EOs) for climate and equity, so the program may change to accommodate the goals of those EOs. Intention not to make massive changes from year 1. If you think you have a project, start working on it now based on Year 1 guidance. Year 2 funding Notice of Funding Opportunity will be coming out this Summer. There will be communication and outreach in the future with project examples that were successful in year 1.

1.2.1 Q&A

Hyperlink: Q&A Audio

Question: Does a local government need to be a National Flood Insurance Program (NFIP) community to be eligible for BRIC? Must they also have been a participant in their County Hazard Mitigation Plan?

Response: Communities must participate in the NFIP and have a current hazard mitigation plan to be eligible for BRIC funding. If the community does not have an approved plan, they are eligible to get a BRIC grant to do the required hazard mitigation planning.

Question: Who can apply for the grant within a city for BRIC - can an individual apply?

Response: The city would be the sub applicant. The city would apply to the state, which functions as the main applicant. A typical application would be a group of homeowners that want to be bought out or flood-proof their homes via renovations. The city would solicit this information from their community members. Individuals are unable to apply directly to BRIC.

Additional Response: There is a matching funds requirement on BRIC funding. FEMA provides typically 75%, but community must come up with some money to match. That is often a stumbling point for some communities. There are times when the state can help with that, but it is a competitive program to request matching funds from the state. Grants can be used for match, if tax revenues are not sufficient.

Question: Are any of the communities allowed to make changes to application after submission?

Response: No, it is a competitive process. The software locks applications after the deadline. Sometimes FEMA will reach out to a community if a file cannot be opened, etc. But once a deadline passes, it is not fair to others if continual changes are allowed on some applications.

1.3 National Flood Insurance Program - Marilyn L. Sucoe, Illinois National Flood Insurance Program Coordinator (Acting)

Hyperlinks: Video

Contact Information: Marilyn.Sucoe@illinois.gov

Basic terms:

- FEMA - Federal Emergency Management Agency
- NFIP - National Flood Insurance Program
- FIRM - Flood Insurance Rate Map (Note: Not all communities have a FIRM, or are working with very old maps that cannot be viewed digitally)
- Pre-FIRM - Refers to a structure built before a community's first FIRM
- SFHA - Special Flood Hazard Area, aka: Floodplain, Regulatory Floodplain, Zone A and Zone AE.

Anyone can get flood insurance if your community is part of the National Flood Insurance Program (NFIP). In Illinois, 89 out of 102 counties have joined and 891 communities have joined. Only a few rural areas have not been mapped - primarily in counties that are not members of the program. NFIP is a voluntary federal insurance program for homeowners and renters. NFIP provides incentives for better floodplain management for communities and maps flood hazard zones. To join, a community must adopt the flood hazard maps and studies, flood hazard regulations, and enforce flood hazard regulations. Flood insurance only covers surface water flooding. It does not cover sanitary issues, basement seepage, pump failures, etc.

Anyone in a community participating in the NFIP can purchase flood insurance through the federal program. Buildings within the regulatory floodplain will have higher insurance premiums versus those outside the mapped floodplain. Often, urban flooding areas are not shown as having a flood risk because they behind a levee or are "protected" by another impoundment. Urban areas in densely populated areas will not show, even though flood risk is present.

The regulated floodplain is broken into parts. The floodway is the deeper/faster moving portion of the floodplain – areas most likely to flood on a regular basis. Development is regulated here to a higher degree. In Illinois, this area is defined conservatively, so a much broader portion of the floodplain is in the floodway. The goal is to keep people out of the floodway completely. The regulated floodplain is defined by the Flood Insurance Rate Map, which defines the areas subject to flooding during 100-year flood events. To receive lower flood insurance premium rates, structures must be elevated above or relocated outside of the flood zone, as defined by the rate map. Mapping quality has increased significantly for Illinois, making it easier to understand the flood zone boundaries. Mapping is coming for Madison and St. Claire counties.

Flood insurance is required as part of any federal-backed loan if a building or mobile home is sited within the Special Flood Hazard Area, as defined by the Flood Insurance Rate Map. The flood insurance is used as a security of the loan. Once the loan is paid off, flood insurance is no longer required.

Flood insurance premium rates depend on where the structure is in relation to the flood elevation. If the structure is above the flood elevation, the premium is lower. If the structure is below the flood elevation, flood insurance rates can increase significantly.

Flood insurance premium rates also depend on community actions. If a community is doing a good job by enforcing minimum requirements and going above and beyond (i.e., performs consistent maintenance to benefit their community), the community can reduce flood insurance premiums for community members and help organize a community floodplain management program. Ex: Danville has 29 policies; resulting in savings a little over $1,000. Ex: East St Louis has over 340 policies; resulting in savings over $5,000. There are 71 active communities in the community rating system in Illinois.

Despite efforts to mitigate flood hazards in floodplains, 92% of flood damages now occurring outside of the mapped floodplain this is due to out-of-date maps and more intense rainfall. Rainfall has increased by 5 inches in the last 100 years, and this is expected to get worse. The National Climate Data Center is predicting an increase of 31% of heavy precipitation per year. Flooding outside the mapped floodplain is especially problematic because homeowner policies do not typically cover surface flooding and insurance riders are required for sanitary sewer backups. Some private policies are available but read the fine print.

1.3.1 Q&A

Hyperlink: Q&A Audio

Question: Is Chicago's south side intense rain increasing due to climate change being reconsidered for NFIP?

Response: The flood maps that FEMA produces are designed to help set an insurance rate, not forecast future risk. So, they look in the past at historical data in setting the flood elevations. As part of FEMA's new Riskmap program, we are looking at releasing data that is produced as part

of the modeling process that could be used to help with future conditions such as sea level rise, urban flooding, etc. There is more to come.

Question: How can municipalities join?

Response: Communities join by resolution and apply to FEMA for NFIP. Then the community must adopt the NFIP program regulations associated with the State of Illinois. Communities that get kicked out of NFIP for permitting structures that are in non-compliance and must bring all properties into compliance before they can rejoin. Regardless, if an area is mapped by FEMA, a local government can map their own flooded areas and enforce their regulations in those areas. e.g., Downers Grove has a Locally Poor Drainage Area map to which they apply their floodplain regulations. Local realtors and homeowners are aware of this mapping. Finally, flood insurance is available to residents that suffer from urban flooding even though it is not mandated by their lender.

Additional Response: A tool that may be informative for some Chicago region communities is CMAP's Flood Susceptibility Index. Link: (https://www.cmap.illinois.gov/programs/water/stormwater/flood-index).

Important Note: While riverine flood risk continues to be best identified through updated floodplain modeling efforts, locations of urban flood risk remain largely unknown outside of individual modeling efforts done by municipalities. These indexes are not intended to replace those more technical efforts; instead, they are designed to identify larger scale priorities across the region for mitigation activities, and help inform flood susceptibility in communities lacking more technical analysis.

Question: Danville was not on the list of NFIP participants?

Response: Danville is part of NFIP, but not a Community Rating System member – which means residents are not eligible for special discounts. It takes a lot of effort to join the Community Rating System and communities that have staff or funding issues and are trying to keep their head above water will have a more difficult time participating. Savings at class 7 at typical entry level is about $1,650 - not much in the way of savings. In comparison - Northeast IL has 800 flood insurance policies and saw close to $100,000 savings. Another thing to note, the Vermillion County Hazard Mitigation Plan is expired and it needs to be updated for Danville to be eligible for BRIC funding.

Question: Is there a timeline for map updates for St Clair and Madison County?

Response: They have been working on the maps for 25 plus years and much of the delay is due to levees, disrepair, and their potential for decertification. The levees are being recertified, Metro East, Alton's and others. Their floodplains are complicated (levees, pumps, lack of elevation, etc.). Look for preliminary maps being released soon, and community members can make comments.

Question: The NAACP continues to ask these questions and the response is always that they are working on it. We want to make sure they are.

Response: The thinking is the next year or two this will be completed.

Question: It was noted that a $21,000 yearly premium was shown under the new rating system. How does that translate for poorer communities?

Response: It is true this can be crippling for some homeowners if their premiums go up that high. They would have to move everything (HVAC, water heater, etc.) out of the basement to reduce premiums. Many people have walked away from their homes because of this. In October of this year, FEMA is rolling out new flood insurance premiums and coastal communities will be paying more for premiums, than non-coastal. If you do things to reduce risk (i.e., lifting the AC up on stand, moving appliances to upper floors), you can find ways to reduce premium, even if you do not get rid of your basement. FEMA is looking forward to updating the program and for Congress to tackle larger policy issues.

Question: Do local governments need to be part of NFIP and have a county hazard mitigation plan to be eligible for BRIC?

Response: Yes, to both. You must have an up-to-date hazard mitigation plan, local or community level, or be part of a county plan. BRIC provides funding to update these plans, if it is out of date or if it has never been done.

Question: Is Chicago southside overland funding due to climate change? Is it being reconsidered for NFIP flooding?

Response: Essentially, the flood maps look at historic data over the last 100 years. People frequently use flood maps to predict risks, but we caution people that this is just a point in time. We are looking at releasing data to communities - but it is a static point of time that looks backwards and not forwards. We know it floods outside the mapped floodplain. We are trying to help communities with tools to help manage floodplains properties. We are exploring advisory, not legal layers.

Additional Response: While FEMA produces the maps, they are a partner to communities and to the state - communities can work to update their maps if risks have changed. Applying for a letter of map revision is a costly process. Most municipalities do not want to show the risk in their communities, even residents do not want that shown because it affects their home values. It is difficult to get these maps updated. Illinois and FEMA are working with communities that still do not have maps. It is difficult to expect FEMA to be the sole entity to update these maps.

Question: Would buyout and turning properties into forest reserve address very much of the flooding in that area?

Response: It depends on the hydrology of the area, but this type of project is generally encouraged.

1.4 Paula Hingson – US Department of Agriculture, State Director for the Agriculture Conservation Easement Program.

Hyperlinks: Video & Slide Deck

Contact Information: paula.hingson@usda.gov

The easement programs that work in the floodplain area include the Agricultural Conservation Easement Program (ACEP). Emergency Watershed Protection Program (EWPP) - Floodplain Easement Option (FPE), and Wetland Reserve Easement (WRE) Program. Other programs not

discussed today include the ACEP-Agricultural Land Easement Program, Healthy Forests Reserve Program (HFRP), and Regional Conservation Partnership Program (RCCP).

Most ACEP easements require voluntarily enrollment into the program. There are land restrictions, but the landowner gets to keep the title, and can sell the land or pass it on to heirs. Landowners enter easement program when it gets recorded in the courthouse and easement is transferable to other landowners. Easements can be perpetual or 30 years. Around 85% are perpetual. Frequently, the 30-year easement holders come back to get perpetual easements.

Tribal and private landowners can enroll WRE. Goal is to restore, protect and enhance wetland areas - mostly in the floodplain. Easement holder is the USDA and is responsible for monitoring and maintenance of the easement. Purpose is to get back to hydrology and native vegetation. 24-month ownership is required and landowners keep rights to use and enjoy, to exclude others, to possess or to transfer by sale or gift. NRCS can subdivide and develop the land. The goal is to restore the land back to conditions prior to it being farmed - as close to baseline as possible.

Emergency Watershed Protection Program (EWPP) - Floodplain Easement Option (FPE) is only funded when and where there is a disaster. Funding gets requested through a secretarial order and is not something the NRCS has every year. Dogtooth Bend area is an example of EWPP-FPE. There was a levee - but the Mississippi River broke the levee and damaged all the adjacent lands. Broke in 2016, flooded in 2017. Subsequent flooding in 2019. Farmland unable to be used since. Designated an IL disaster and secretarial disaster declared in 2019 and was able to get some money under this program.

Lands eligible for the EWPP-FPE Easements must have been damaged by flooding at least once in the previous calendar year or twice within the previous ten years. Land is within a floodplain and contributes to the restoration of the flood storage and flow, providing for control of erosion, or improving the practical management of the floodplain easement. What determines landowner eligibility is much like WRE program: Provide title as landowner and comply to terms of agreement. Additional requirement is proof landowner is suffering from the flood damage and not just looking at restoration potential to get back to baseline. Application package contains: Application for assistance, evidence of sufficient legal access, site specific evidence of flood damage, and documentation of other disaster recovery assistance received or utilized such as other funding from groups like FEMA or the state. NRCS is the last resort - but often the best option for some of these rural landowners.

How are landowners compensated? Appraisals happens every year. Compensated 90% of property value through WRP, but with this type of floodplain easement, purchase closer to 100% of what the land is worth. NRCS covers 100% of the restoration costs. Restoration restores floodplain functions back to baseline and includes both structural and non-structural conservation practices (ex: Planting trees to cut down the water flow). NRCS establishes Compatible Use Agreements for landowners who still want to manage the property. Make sure that whatever the landowner is doing is further benefiting the area. Management must make the land better. Easement compensation is $3,000 per acre downstate and $6,000 per acre in parts of Northern Illinois. This does not cover the full cost of the property, but a sizable amount for control of the property.

2 CASE STUDIES

2.1 CASE STUDY DISCUSSION SET UP – OLIVIA DOROTHY, AMERICAN RIVERS

Olivia reiterated the purpose of case-studies is to identify resource gaps to justify a new program and/or incentives.

2.2 FORD HEIGHTS

2.2.1 Overview

Hyperlinks: Video

2.2.1.1 Map Review – Whitney Fiore

Hyperlinks: Maps

2.2.1.2 Village of Robbins - Mayor Tyrone Ward

A big portion of Robbins (1.5 mi^2) is in the flood zone. We are working on the east side of town. Our goal is to get the entire area out of the floodplain. Richard Fisher from MWRD is doing some work on the east side of town. He wants to make sure that we are looking for operations to alleviate the entire flood zone area of Robins. Listening in to see what we have to offer and what we are suggesting for solutions. Looking out for the best interests of Robbins always.

In Ford Heights there is one roadway that floods in the spring and closes the elementary school (Cottage Grove Upper Grade Center) causing major issues with the educational system in the area. People cannot leave their homes because the area must be closed. Regarding maps shown earlier, in underserved minority and disadvantaged area; flooding is a major problem. Highest shown risk is not actually mapped by FEMA. All local media is there when it rains near cottage grove school - major issues with the flooding west of I-394.

2.2.1.3 Metropolitan Water Reclamation District - Richard Fischer and Jack Chan

Provided a walk through/overview of their work in the Ford Heights areas. We have been working with the Village for a while to develop a project that is community led and is compatible with the community priorities. We originally looked at a project that was developing a very minor levee, that would be along the western border of the residential area that is highlighted as having the most risk. We developed engineering plans for the minor levee, because to the west of the residential area is farmland. Idea that farmland could accommodate most of the flooding compared to the residential areas. Community identified that area as having potential for future development - some opportunity for connection to the interstate. They want to make sure that anything development-related would include consideration of these parcels.

Area has challenges - FEMA flood maps do not indicate flood risk in the area. Detailed watershed plan done in 2011, inundation maps indicated what is shown on flood risk maps. They also indicated that the risk is much greater than what FEMA shows. Presents unique challenges, because you want to address the flooding, but also the solution is going to require that the area be remapped.

Could the next project to look at (after direction from the community) channel improvements? Even levees will not eliminate the flood hazard. When you remap, the area behind the levee will still be a flood risk area. Could we make a project that would increase the

flood area, or just remove the risk? Maybe channel improvements in the area to accommodate more water? Even with modeling and channel improvements, Jack Chan pointed out that although the flooding comes from Deer Creek, the internal stormwater infrastructure is inadequate. Even if flood waters could stay in the creek, infrastructure is overwhelmed by storm events. To really address flooding some significant changes to the internal infrastructure will need to happen. Building a reservoir plus the channel improvements.

Towards the east side of the development, coming down a hill into a bowl area with a creek in the bottom of it. With any kind of measures, there will still be a flood hazard. This is a significant investment for the Village plus commitment to maintenance. In the end, the projects need to be turned over to the communities to own and operate the projects. With both projects, costs for maintenance would not be feasible, and would not result in a level of protection that would guarantee that home would not flood.

We are now evaluating a buyout program. We do have a program for voluntary acquisition of homes in the floodplain for opportunities to move away from the risk. This is a significant challenge due to the lack of affordable housing. Acquisition funding available, but where can these people go with that money? We are looking at bringing other partners into the project to help in areas that our mission (legislative authority) is unable to help with. Potential partners for building affordable housing include Cook County as a partner, Economic Development and Land Bank Authority, and potentially the Housing Authority of Cook County.

Can we develop an acquisition project that phases move outs and develops other housing in a different location? Another partner that has expressed interest is the Cook County Forest Reserve - purchase houses and turn the area into a natural area owned by the forest reserve. Looking at developing this framework now. We understand that this is not going to happen overnight. It is going to take a lot of resources, partnerships, and time to get this program off the ground. Will look to the community of Ford Heights to help lead to the answer.

Jack will share maps with the group as we move forward on these discussions. Shared buyout location map for riparian restoration work. It is between Woodland Ave and Kennedy Ln, and Lincoln Hwy and Hammond Ln. Homes are being looked at for the buyout program. A lot of the parcels are already vacant. Some due to fires, some due to Village demolition. You can see that some of the residents are already moving out of the area.

Shared inundation map - FEMA flood hazard area (100-year area). Confined to the creek itself, the orange area shows the 500-year floodplain. Reality is that flooding is occurring more frequently and coming into the 500-year floodplain. MWRD came up with their own 100-year inundation area. Shows lots of street flooding and home flooding. Showed Village Development map plans for development opportunities in the area. Development shows areas east of I-394 for development.

If we can get a buyout program implemented, then there will be opportunities for turning this area into a green space/riparian corridor. Concept plan shown. Thinking of a phased approach for the buyouts and restoration. Phase 1: 40 homes, Phase 2: 83 homes. This work must be community championed to be successful.

2.2.1.4 Mayor of Ford Heights - Mayor Annie Coulter

Community is not understanding what MWRD is trying to do. Many outstanding questions like: Where is the water flowing from? What other communities is the water coming from? Are there

floodgates in other communities? Are there dams in this area? Why can't we just move the water to the farmland? How is the communication piece going in terms of the intent of the buyout program? What are the pros/cons of the buyout program?

There are issues with landlords (i.e., renters and homeowners). Landlords are absent. In addition - there are seniors in the area that may need additional communication. Need help with tax bases as taxes have been charged to the community incorrectly. Rebuilding is an issue. Also look at types of homes - especially for the seniors.

Theresa Haley, NAACP added that disadvantaged communities continue to be disadvantaged for many reasons (not educated, absent slumlords, cannot afford to move or have good options for affordable housing). Maybe NAACP can help with calling out the slumlords. Yes, there are some problems with floods, but there is work that the NAACP can be doing behind the scenes.

2.2.2 Ford Heights Discussion Groups

Note: The purpose of these discussions was to identify and document the various barriers to implementing multi-benefit floodplain development in these communities. Facilitators hosted structured discussions with the prompt "If we have totally unlimited resources, how would we fix the flood issues in this community?" Following an open discussion that identified various solutions, facilitators then tried to drill down on the primary solutions to understand the opportunities and barriers associated with those solutions. This discussion structure was not strictly enforced, and, in some instances, time ran out before the discussion was done.

2.2.2.1 Olivia's Ford Heights Discussion Group

Hyperlinks: Video & Jamboard

Prompt: If we have totally unlimited resources, how would we fix the flood issues in this community?

Open Discussion: Want to see them build a whole new community outside of the flood area, where they can take pride in their communities and not be in fear of the government taking their homes, which is very stressful. Slum landlords and crooked attorneys are scary for people. On the East Side of Ford Heights is 394 – what additional pieces of economic development can come in and help stabilize the community and increase the tax-base. Would like to see a sustainable approach that avoids further environmental issues for the community. Need access to healthy foods. Need to be a sustainable, healthy community. Not an industrial toxic zone. With unlimited resources, perhaps we could re-route the water source. Looking at re-routing the water away from the community. The only sustainable way is to remove the homes form the floodplain to allow for a more natural riparian habitat – it will have a lower long-term maintenance cost. It will be hard to ensure we maintain everyone's investment in the community. Need to engage the community in the discussions and choices.

Solution: Relocations instead of buy-out.

Barriers: Education, resources, outreach, communication. Transportation – dealing with a small community that does not have access to grocery stores, etc. People need public transportation to shift with the community. Financial barrier between market value of the properties versus what cost to replace homes. Paying higher property taxes if the relocation area is higher value. Age is a barrier – seniors are reluctant to move away from a home that they live their whole life. It is the homestead, gathering place, memories, etc.

Opportunities: If done the right way, relocation focus can help improve access to facilities.

Solution: Sustainable Development

Barriers: Making sure brown spaces turn to green space, make sure land is not toxic. There is an extra cost to doing things right – with sustainable designs, etc. Need to connect people to healthy food by bringing a grocery store into the new development or fix public transportation to connect people to grocery stores.

Opportunities: Building energy efficient homes. Access to green space for gardens, farmers markets, etc. There are a lot of resources to do energy efficiency and independence. Opportunities for education and home improvements.

2.2.2.2 Whitney's Ford Heights Discussion Group

Hyperlinks: Video (only recorded last 5 minutes of 20 minute discussion) & Jamboard

Prompt: If we have totally unlimited resources, how would we fix the flood issues in this community?

Open discussion: Do not just look at buy outs, but also home elevations and flood proofing. Is there room in the community to do new development outside the floodplain? FEMA mitigation funding does not work well in communities of low-income and tends to facilitate gentrification that pushes Black and other minorities out of the community. Need to combine and coordinate federal, state, and private grants to due multiple things across siloed agencies. Moving people out of the floodplain decimates the school district because property tax declines and this needs to be addressed. When FEMA comes in – people do not get the full value of the home. It is not the buyers' fault because it is not revealed to them that the home was in the flood area. Flood information needs to be communicated to potential buyers at time of purchase. There is a need for supplemental funding for buy out program to provide home replacement costs.

2.2.2.3 Chelsea's Ford Heights Discussion Group

Hyperlinks: Video & Jamboard

Prompt: If we have totally unlimited resources, how would we fix the flood issues in this community?

Open discussion: Not recorded.

Solution: Build apartments for relocation

Opportunities: Some of agricultural acres could be tax delinquent. They are looking at the Cook County Land Bank, which can be used to repurpose blighted homes. Need to utilize land that can be redeveloped, repurpose properties, grants available, like HUD.

Barriers: Urban sprawl, need to directly fund projects in center of town to rebuild.

Solution: Affordable housing for relocation

Opportunities: Elevate the homes ($10-20,000 per home). Continued community engagement to resolve the issues through community visions. Work with agency for aging in the area to help understand housing needs of the senior citizens.

Barriers: Regarding home elevations, a lot of the houses in the floodplain have basements – elevation might not be a solution. Would need to bring the houses into compliance, which will increase cost. Absentee landlords can take advantage of people in cheap housing.

Solution: Deer Creek Restoration

Opportunities: IDNR Grants division can help ecosystem restoration and converting the land into a park. Open Space Land Acquisition Grant would apply. Wetland banking through Section 404 regulations – a lot of dollars

Barriers: None discussed.

2.3 DANVILLE

2.3.1 Overview

Hyperlinks: Video

2.3.1.1 Map Review – Whitney Fiore

Hyperlinks: Maps

2.3.1.2 Sam Cole, City Engineer, NFIP Coordinator

Where do we see flood issues manifesting? Lots of rain events in 2016, Danville was hit hard with 6 - 8 inches of rain within 24 hours. There is public outcry. Some issues in community include street flooding and home flooding. City collected data on how to move forward on projects to address flooding, including drainage reports, city infrastructure info, interviews, and community outreach.

Results from Drainage Problem Survey: Common problems include street flooding, yard flooding, erosion, rolling topography, basement flooding, building flooding and maintenance. Lots of creeks and watersheds in the area. There are filled in creeks/drainages causing issues. This is an old community founded in 1880. Infrastructure is old (1920s - 1970s) and newish infrastructure is from the 70s.

Solutions include: Stormwater and sewer infrastructure, curb and gutter, drainage basins, etc. Project areas: Not necessarily the floodplain itself - mostly a lack of drainage systems, 40 projects identified, less than 1 acre to 204 acres per project, variety of solutions, and costs around $24.8 Million (2016 dollars).

Floodplain management is not a large part of the plan, it is more about the infrastructure. Some neighborhoods were built without drainage systems at all. There are areas where ravines are resulting in major erosion events that flow downstream, and this exposes sewer lines.

Project prioritization based public safety and other factors, like city council and staff funding needs. There is not enough money in the general fund and not a lot of nationwide stormwater infrastructure funds.

For the top projects, how do we invest in the infrastructure? Wanted to look at a business case for funding it - not just a wish list. How do we sustainability fund and sustain this? What level of investment will be needed? There is a 2021 rate increase for utility- will generate around $1 million in funds for stormwater improvement projects. Could be used for a variety of things,

including match to federal grants. Low market values of properties. Could open some greenspace. Trying to develop a maintenance program.

2.3.1.3 Farm Bureau - Bill Bodine

Outside urban Danville are rural lands. Opportunity to speak with Vermillion County Farm Bureau. Flooding outside in the more rural areas has been happening for a long time. Issues with water quality and nutrient management, especially North of Lake Vermillion (flows North to South).

2.3.1.4 NAACP, Ed Butler

Has been living in Danville for a long time, floods on Harrison Street. When there is a 2-day rain Stoney Creek floods - runs north to south, right through town. Attempted to get maps for the floodplain from the City and was unsuccessful. There is a long history of flooding and areas that need specific attention. Including Stoney Creek area, all along the creek homes are flooded. Especially in the heart of Danville. Low-income families are located here. Ed lives 4 blocks from the creek, and this is still a concern when it rains. Heavy rains flood the entire town. Great Creek area, and Great Creek road - mobile homes are in this area of the floodplain. North Fork Vermilion River - always floods, particularly parks where little league and festivals occur, also goes by the water treatment plant. Flooding was so bad it flooded the treatment plant and sent sewage into town. Fixed by creating a barrier around the treatment plant.

Two years ago, 2 dams were taken out for safety reasons. Helped a bit, but still a problem. Seems like up north there is no control for water flow, which impacts Danville. Very personal issue - Harrison Street is regularly flooded resulting in safety issues for children/teens playing in the area. Aware buyouts occurring, but still issues.

2.3.2 Danville Discussion Groups

Note: The purpose of these discussions was to identify and document the various barriers to implementing multi-benefit floodplain development in these communities. Facilitators hosted structured discussions with the prompt "If we have totally unlimited resources, how would we fix the flood issues in this community?" Following an open discussion that identified various solutions, facilitators then tried to drill down on the primary solutions to understand the opportunities and barriers associated with those solutions. This discussion structure was not strictly enforced, and, in some instances, time ran out before the discussion was done.

2.3.2.1 Olivia's Danville Discussion Group

Hyperlinks: Video & Jamboard

Prompt: Given unlimited resources, what would we do in Danville to resolve flood related issues?

Open Discussion: Need to do something with our barriers around the Stoney Creek area. It is unsafe, and it is a small area, and it is where the most impoverished people live. Need to do something about storm sewers. Like Cairo, nothing will happen until the citizens start to make elected officials more accountable at the local, state, and federal levels. These problems are not new, but there is a lack of leadership and people at the city are not doing their jobs. Grants and assistance is available, but the community needs to bring things to the attention of leaders inside and outside the community. The whole community needs to be involved. Danville does not have a floodplain ordinance. Infrastructure is an issue, need funding to address maintenance and upgrades. Need to do education like "turn around don't drown." Danville has a lot of land where

they can expand and so buy outs might be more feasible. Based on information provided by the city, more investments are going to the wealthier, whiter neighborhoods. Need to work with environmental lawyers to being attention to the justice issues of who is getting the investments. Does not seem like Tier 1 projects in Danville are happening the Black and Low-Income census blocks, investments are going to white, wealthy neighborhoods – this is a problem. Need to do a vulnerability assessment and look at health impacts.

Solution: Fix drainage

Barriers: Need to update flood hazard mitigation plan to get access to grants.

Opportunities: Programs like BRIC and EPA Section 319 grants help finance infrastructure projects. Municipality is trying to do this, though they are not prioritizing the most vulnerable neighborhoods.

Solution: Community education

Barriers: Community groups are not organized around flood issues.

Opportunities: Some community organizational structure does exist, so need to leverage and build off what we have in terms of community organizing. Need community leaders with flood risk management expertise.

Solution: Equitable investments

Barriers: Need to do more outreach to representatives, mayors, governors to fix problems.

Opportunities: Grants.

Solution: More buy outs

Barriers: What do we do with the land after the land is empty? Generational homes. Keeping community together.

Opportunities: None discussed.

2.3.2.2 Whitney's Danville Discussion Group

Hyperlinks: Video & Jamboard

Prompt: Given unlimited resources, what would we do in Danville to resolve flood related issues?

Open Discussion: Need a long-term vision of how they want to address flooding. Do not need all the details in hand, but a framework for a long-term vision. What resources are available to do this? The problem is not that they are land-bound. They can restore the river corridor as an amenity that makes room for the river and move development away. No levees, but there is a reservoir – but it is not a flood control dam. Could levees help? Maybe a small berm, but it would be very expensive to maintain. While investments can build projects, there will always be maintenance challenges to ensure infrastructure is upkept. "Strong Towns" is a movement to address the financial issues in towns to maintain infrastructure. Partnership is key to make sure cities are getting equitable funding. Need to get more expertise in the communities to help apply for grants and administer them to do successful projects. Multiple property owners can present challenges to coordinated solutions. They started a stormwater utility but it fell apart in 2017, they should revisit this to implement green infrastructure and community engagement. It can be

successful if it is done right. How was this implemented and how did it fall apart? Neighbor Champaign-Urbana has a stormwater utility and it works really well. Maybe Danville should revisit this idea. Requires municipal buy in, but it provides a sustainable long-term community structure to address localized flooding. Rock Island also has a stormwater utility, has similar topography, a lot of success installing rain gardens to prevent erosion in the gullies. Affordable housing is an issue with buy-outs. In buy-outs, is there an opportunity for retention of some of the residents who may not be able to afford, but be subsidized to stay in place. Start thinking about wealth building within floodplain communities to avoid racial and social inequalities. Danville was able to do a fee increase to do matching with some of the federal grants.

2.3.2.3 Chelsea's Danville Discussion Group

Hyperlinks: Video & Jamboard

Prompt: Given unlimited resources, what would we do in Danville to resolve flood related issues?

Discussion: Update storm water infrastructure, including detention basins where land is available. Urban green infrastructure throughout the watershed – planting trees, permeable pavements – need to take pressure off the existing infrastructure. Infrastructure is a major issue – multiple creeks, watersheds, stormwater runoff. Need the upgrade infrastructure. There are a lot of green corridors, younger generation really appreciates the natural riparian habitat, and need to address encroachment issues and do more restoration to improve natural amenities. Community education needs to be a part of everything. Citizen science could be a good tool to get people engaged with keeping storm water infrastructure clean.

Solution: Update stormwater infrastructure and do more green infrastructure

Opportunities: Flood prone property buy outs, post-buy out restoration funding needs to come from other resources. Land and Water Conservation Fund can help fund restoration and land acquisition.

Barriers: Match can be really challenging for a lot of communities – getting private funding for a restoration component can help meet match without taxing communities. Having staff resources to find grants, etc. IL Department of Natural Resources can do a lot of work to champion matching grants, etc – but staffing cut-backs limit ability. "Local assistance section" of IDNR Office of Water Resources, was cut due to budget constraints, not staffed or funded for 30 years or so. Lack of community awareness of stormwater issues.

Solution: Community education and citizen science

Opportunities: Teaching good habits to improve long-term stewardship and maintenance.

Barriers: Need to maintain long-term communications and relationships.

Solution: Buy outs

Opportunities: None discussed

Barriers: None discussed

2.4 FREEPORT

2.4.1 Overview

Hyperlinks: Video

2.4.1.1 Map Review – Whitney Fiore

Hyperlinks: Maps

2.4.1.2 NFIP Coordinator – Kristin Hinds

City of Freeport is located at the Pecatonica watershed, the area of focus is the east side neighborhood. This area is low income, and they get a disproportionate amount of flooding. Neighborhood is majority Black, and there is a lot of section 8 rental housing. Long history of flooding, recording back to 1916, most recent was in 2019. Construction of buildings stopped in the area since 1993 flooding. Intended to do buyouts, but not enough outreach. In 2012 attempted buyouts also did not work. In 2019, river was at 17.26' and a lot of flooding.

Since 2019, there have been several town hall meetings to build trust and frozen the sale of tax trustee homes. But people continue living in flood prone zones. Community buildings such as Taylor Park Elementary and multiple churches, Freeport Housing Authority also has housing development in this area. Need to relocate residents to different section 8 housing. Challenges include generational house and history in neighborhood, devoted residents, older residents, and availability of affordable housing.

Current actions include grants from IDNR ($1M), DCEO acquisition ($300k) and demolition of 24 abandoned, vacant, and condemned properties. Also submitted $4M for pre-disaster mitigation grants for 139 homes. Submitted $4M for HMGP & BRIC Grant Applications for remaining floodway properties.

Long Range Plans include park expansion, bike trail expansion, pollinator meadows, housing options through Northern Illinois Land Bank, and affordable housing.

2.4.1.3 NAACP, Patricia Norman

Freeport, years ago, had a horse racing track in Taylor Park. All the festivities were held there. A big community focal point. Gradually over the years it has moved to the other side of town. Majority of African Americans grew up on the east side of town. Many have moved out of the east side that could afford it. Those who have stayed are maintaining the family home.

Main points of contention: the way people feel about their homes and having some opportunities to stay connected to the neighborhood. The elementary school is no longer operable. But was a very important building to the community. Every year the flooding seems to be getting worse and worse.

In 2017 or 2018 people had to evacuate and move out of the community. Previously the norm was to stay in the home, until these years. People in the community were trying to decide what to do. City applied for BRIC grants. They do not want to see the community disappear. There is the idea that the community could work with the City to make it a wetland and recreation area that also honors the community's history (interpretive signage, benches, etc.).

Flood in 2019/2020 - people realized that a lot of the community did not come back after 2017/2018 flooding. Majority of community understands that the buyouts are the best thing that can happen on the east side. Find on every block 5-6 empty homes. FEMA and IEMA have

worked with the community and have done a good job communicating with the Freeport community. Gave people an opportunity to express pleasure/displeasure.

Need to hear concerns from the population still on the east side. Services will still take place but losing that feeling of "home". This is particularly hard for the elderly communities. Generational homes are difficult to leave/abandon. Everyone understands that they can stay or take advantage of the buyouts. The City is working with Homestart and other organizations on affordable housing and other options - particularly for those who are living on a fixed income.

Question: Were there any proposed buyouts such as in Ford Heights?

Response: We believe they are similar. There is a voluntary list and are waiting to hear if the funding came through a grant. There is a buyout that is going to be offered to the residents.

There is a lack of developable lands that can be repurposed and finding the funds are difficult.

Additional Response: It is important to have a community member from the NAACP. NAACP wants to see follow through and action.

2.4.2 Bill Bodine, Farm Bureau

Freeport is a city within an agricultural watershed. Farming community outside freeport - much like Vermillion county is aware of the flooding issues in the city. Outside of the city there is no flood protection (such as levees). Flooding happened in these areas in 2019, along Pecatonica River, as well as along Yellow Creek. We are participating in a water stakeholder group that includes multiple counties - looking at water quality issues mainly, but now looking at quantity issues.

2.4.3 Freeport Discussion Groups

Note: The purpose of these discussions was to identify and document the various barriers to implementing multi-benefit floodplain development in these communities. Facilitators hosted structured discussions with the prompt "If we have totally unlimited resources, how would we fix the flood issues in this community?" Following an open discussion that identified various solutions, facilitators then tried to drill down on the primary solutions to understand the opportunities and barriers associated with those solutions. This discussion structure was not strictly enforced, and, in some instances, time ran out before the discussion was done.

2.4.3.1 Olivia's Freeport Discussion Group

Hyperlinks: Video & Jamboard

Prompt: Given unlimited resources, what would we do in Danville to resolve flood related issues?

Open Discussion: Freeport is a good example of a municipality that is listening to and working with the minority communities in the city. The floodplain is continuing to encroach and that will continue to happen. Questions about whether buildings were salvageable in terms of preserving the historic properties. If there are historic buildings, they should be saved where it is possible, if buildings are not too badly damaged. The NAACP has being working to articulate their problems with flooding for a long time in the Freeport community. Suggesting relocating the buildings, which might be a viable option for smaller historic buildings. Until you can hold elected officials accountable, the problems will not be fixed. It will require lobbying elected officials at all levels, local city councils, Springfield, and DC.

Solution: Community engagement and communication with elected officials

Barrier: Financial resources.

Opportunity: Municipal leagues are a good venue to coordinate education with elected officials. Active community and champions who are engaging with local officials.

Solution: Historical preservation

Barrier: Overcoming historic racism that is erasing African American history under the guise of flood risk reduction. What does historical preservation look like in the context of public safety?

Opportunity: There are state and federal funds available for historic preservation. Local benefactors have helped a lot with historic preservation.

Solution: Maintain community structure and cohesion

Barrier: The federal buy-out program is bad for maintaining community cohesion, which is particularly damaging to communities of low-income and color.

Opportunity: There is a lot of dialogue around this, and we can influence the outcome.

2.4.3.2 Whitney's Freeport Discussion Group

Hyperlinks: Video & Jamboard

Prompt: Given unlimited resources, what would we do in Freeport to resolve flood related issues?

Open discussion: Can homes be elevated or moved whole-sale instead of buyouts? That has happened in some communities. The Honeywell plant seems to be constricting the river and might be causing water to back up and exacerbate flooding. The plant has been there for decades. The big plant south of town is closed. The plant that is on the east side of Pecatonica River was flooded. Is there an opportunity to widen the floodplain at that location? The other plants are closed, can jobs be relocated? It is contributing to flooding and should look at to modify. There is another industrial site in the floodplain that has been closed, the soil is toxic, but there might be another opportunity to open the floodplain there. The community has come around and wants to discuss more options to reduce flood mitigation. More people are signing up for buyouts, close to 100 people have signed up for buy outs so far. People are exhausted. Flood stage maps are available from the USGS here https://water.weather.gov/ahps2/hydrograph.php?wfo=dvn&gage=feei2. One of just a few spots in Illinois where we have flood stage mapping. Green infrastructure should be incorporated into the plan. There has been good dialogue between the municipality, citizens and FEMA happening in Freeport. Good case study of doing things right and working with citizens. Community discussions are even so nuanced focusing on recreational trails in buy-out areas with interpretive materials to remember the African American History. Need to develop an After Action Report for Freeport to share. Communications in particular have been great in this community. Yellow Creek has also been problematic and will be a focus of future efforts. Unfortunately, after FEMA buyouts there often is not funding for restoration and you end up with an eye sore. Need to do that long-term planning.

2.4.3.3 Chelsea's Freeport Discussion Group

Hyperlinks: Video & Jamboard

Prompt: Given unlimited resources, what would we do in Freeport to resolve flood related issues?

Open discussion: Need to purchase new homes for residents who have been or might be displaced by flooding. Keeping the sense of community, how do we keep the sense of home and sense of community in place? Need to start a conversation with the community at the table. Start conversation about why they cannot stay in these flooded areas and then listen to what the community wants to do to fix it. Form partnerships with the communities. There are generational differences in values, older residents moved to areas for specific reasons, but many areas are not attractive to the younger generations for a lot of reasons. Need to get a feasibility committee or group to see where we can get funding to address flooding issues and address economic development. Learning that a lot of structural solutions have not worked, sunk a lot of money into flood control historically. These issues are as much a housing issue as anything else. Should not just focus on fixing flooding – because that is not really the problem. The problem is safe, affordable housing. Agencies are silo-ed, MWRD is not authorized to deal with housing issues, but tasked with figuring out how to fix flooding issues without being about to access all the opportunities.

Solution: Community-driven feasibility committee

Opportunities: Private foundation grants. Leveraging existing community relationships to understand localized concerns.

Barriers: Funding and staff capacities at municipalities.

Solution: Affordable housing

Opportunities: Public-private partnerships with NGOs to bridge gaps.

Barriers: Outreach – it is difficult for government agencies to effectively do outreach due to limited to staff and expenses.

2.5 Final Thoughts & Sentiments

Hyperlinks: Audio & Group Photo

Illinois Floodplains Work

Stakeholder Meeting #4

April 27, 2021

Download participant list and contact information here.

Download notes from Stakeholder Engagement Meeting #1 here.

Download notes from Stakeholder Engagement Meeting #2 here.

Download notes from Stakeholder Engagement Meeting #3 here.

1 Welcome & Recap

Hyperlinks: Slide Deck & Video

Chelsea, Whitney, and Olivia welcomed everyone. Whitney reminded everyone about roles, process, expectations. Olivia reviewed the purpose of the feasibility study, to determine appropriate state-level reforms to encourage more multi-benefit floodplain development projects. Reminded everyone of the different types of floodplain management strategies: "Flood control" tries to move the water away from people and critical infrastructure, "flood risk reduction" tries to move people and critical infrastructure away from the water, "multi-benefit floodplain development" combines "flood risk reduction" with strategic, flood compatible development that maximizes environmental, economic, and social benefits of healthy floodplains.

Need to shift how we manage and respond to flooding because climate change is causing more frequent flooding in more areas. Traditional "flood control" approaches are not safe and do not reduce flood damages. "Flood risk reduction," while safer than flood control, ignores many social, environmental, and economic needs in communities. But there are not many examples of good multi-benefit floodplain planning and development and there are many barriers to doing projects in this framework. This feasibility study tries to identify those barriers and leverage public-private partnerships to do more projects using this model.

Unlike previous meetings, we will review the draft conclusions, findings and recommendations. We will be reviewing the 6 case studies we developed, and we want to hear from the stakeholders to ensure we captured the feedback from all previous meetings.

Before getting things started, Olivia asked everyone to schedule one-on-one meetings with her to get feedback from everyone individually. Sort of an "exit interview" to understand how we did with this process.

2 Case Study Review

2.1 Ford Heights

Hyperlinks: Slide Deck, Chelsea's Video, Olivia's Video & Whitney's Video

Entire residential area at risk of riverine flooding and ponding due to runoff. Flood Insurance Rate Maps are significantly wrong when compared to actual flood risk. Need to relocate residents, but not sure where. City wants to develop business near interstate exchange. Most homeowners are elderly and need additional assistance and considerations. Community identified that there are still many outstanding questions regarding potential upstream options. Community also very worried about protecting economic and social interests of the residents and concerned that floodplain buyouts will hurt people and the community.

2.1.1 What are the most important lessons from this case study?

- Because the area is a "bowl" shape, there are limited options for addressing flooding or moving water. If we cannot build our way out of it, where do you go?
- Long-term residents (often elderly) present challenges to moving the community.
- There is a lack of education and communication within the community and leadership on these issues and potential solutions.
- Need to ensure that there is not just an opportunity for a public-private grant program, but community education to ensure long-term care. People need the tools to get engaged – community needs the tools to make the projects.

2.1.2 Did we miss or mis-interpret anything?

- Upgrades to stormwater storage and conveyance system are needed, but this may have limited benefit due to the topography (bowl-shaped).
- Flood insurance and lack of education are also important issues.
- Lack of communication in the entire village – as of Tuesday the past administration was voted out which will impact the relationship building. This is cyclical.
- Political issues surrounding moving/buyouts – affordable housing needed someplace safe to accommodate buyouts.
    - Solutions need to be scaled to the community (looking at smaller successes over a longer period rather than a complete overhaul that disrupts an existing community). Example – phased buyouts to address community makeup (older/longer term residents vs. younger population)
    - People are afraid of buyouts. It's like "starting again" and most people are older. The focus should be on making people comfortable.
    - Some of the elderly residents do not understand the contract with the buyouts. Some lost money because they were not able to adequately negotiate.
        - Need help fighting for fair prices to ensure residents get the cost of replacement.
    - Low-income residents need assistance getting services/advisors that will help them get the best price for their properties.
    - Need to address other inequities as community is relocated. The area is a food desert, need to do some intentional planning to improve community well-being.
- Green infrastructure should include looking upstream at where the water comes from. The Forest Preserve of Cook County has had an interest in the properties upstream.

2.1.3 Other General Reactions?

- There needs to be a desire by local, state, and federal elected officials to address the issues and the process should be driven by community members. This requires long-term, personal investment.

- MWRD – did they look at the property to the east for reservoir options for future development? Is there rethinking for stormwater retention?
- Consider elevating homes particularly for those in the flood insurance program. They can get funding to elevate their home and reduce flood insurance rates.
- Significant role that the highway east of the Village plays – could Illinois Department of Transportation be a partner in rectifying the flooding issues in this region?
- Lower premiums do not happen with more enrollment – need to enroll in the Community Rating System. That may take some technical assistance. Note: On the recommendation table add that they will require technical assistance and need for additional funding, which may be possible via private grant.
- Need to draw attention to the issues using media, outreach, etc., particularly by the community that is affected by the flooding.
- Education on the issues and available/needed tools within the community. Similar issues were reviewed in the Thorne Creek watershed plan.

2.2 DANVILLE

Hyperlinks: Slide Deck, Chelsea's Video, Olivia's Video, Whitney's Video

Farmers in Vermilion County are working to implement nutrient management strategies in the Lake Vermilion watershed. No rural flood control infrastructure. In Danville, most of the flood infrastructure is inadequate, degraded, or absent. The city is struggling to sustainably fund infrastructure needs. Danville does have a prioritized list of stormwater and flood risk infrastructure projects. None of the prioritized projects are located downtown, where most of the communities of low income and color are concentrated. Significant flooding issues downtown around Stoney Creek where some buyouts have occurred. There is also a mobile home park southwest of town that is situated at a spot where the Flood Insurance Rate Map shows no risk of flooding but there has been significant flooding at the site. Danville's wastewater treatment plant is also in the floodplain and sometimes discharges raw sewage during high water events.

2.2.1 What are the most important lessons from this case study?

- People from disadvantaged communities are not getting a fair share of resources or being adequately engaged in the decision-making process.
- There needs to be community led communication to the state in order to get FEMA floodplain studies updated as well as the hazard mitigation plan updated. This will help prioritize Danville for the state and FEMA
- Issues in Danville are in the inner-city with Stony Creek flooding into people's property.

2.2.2 Did we miss or misinterpret anything?

- Mobile home areas also having issues. Flooding could wipe out many of these areas and flood out the homes which are low-income population areas.
- Drainage issues in Stony Creek watershed and south.
- Learned in education panel with FEMA that Danville is part of NFIP but not a community rating system member. Vermilion County hazard mitigation plan has expired. Representative Tammy Duckworth in Springfield reached out to Ed Butler (NAACP) to see how they can help within Danville to see what they can do for infrastructure and floodplain areas.

- Following a buyout, it is difficult to find an entity to take on land ownership and liability – typical entities include municipalities or forest reserves.
- Need to emphasize Vermilion County farmers are "working to implement nutrient management strategies in the Lake Vermillion watershed." Farmers are dealing with flooding issues consistently – no levees or other flood protection infrastructure is present.
- Need to address wastewater being discharged during flood events. This is also important for protecting endangered species, which are present in the Vermillion River. This should be a priority.

2.2.3 Other General Reactions?

- Danville did not have funding to conduct the studies necessary to update the FEMA floodplain maps. So, it is not surprising that there are areas not identified on the current maps that are experiencing frequent flooding. Cairo's flood maps are being updated, but other case study areas (East St Louis Area and Ford Heights) need to be updated.
- Who does the Flood Insurance Rate Maps? IDNR Office of Water Resources and the State Water Survey give FEMA a list of what to prioritize for updated studies. FEMA will help support this multi-benefit work.
- Hazard mitigation plan is outdated and needs to be updated to access BRIC funding. Who does this? Usually organized by local municipality. BRIC funding can be secured to do the Hazard Mitigation Plan to access future project funding through BRIC. Plan and funding for subsequent projects must be approved by Illinois Emergency Management Agency (IEMA). FEMA State Hazard Mitigation Officer is Sam M. AL-Basha.
- Short letter from Danville to Illinois DNR Office of Water Resources outlining the need will help move process forward.
- An example we should review is Elmhurst, where a buyout program allowed underground storage at those areas. IDNR OWR manages this – the land goes to the municipality and must remain open with deed restrictions. The land is allowed to flood, so maintenance is limited.
- FEMA is strict about what can happen on buyout lands post-buyout. OWR typically has matching FEMA funds. Improvements to the land could possibly be made if it's not considered development – this would be explicit in the deed restrictions.
- Information was clear – a lot of people are going through similar flood-related issues. Especially as it relates to Black and Brown communities.

2.3 FREEPORT

Hyperlinks: Slide Deck, Chelsea's Video, Olivia's Video, & Whitney's Video

There is a Black community on the Northeast part of town that is entirely within the Pecatonica floodplain. The community has been flooded many times and some buyouts have happened in the past. Outreach for the buyout program has been conducted poorly by the city, which has led to low acceptance rates. New city management has opened up dialogue with the community and the city has been receptive to community needs, like historic preservation and helping offset relocation costs for residents. Grant applications are pending and it is too early to call this a success story, but progress is going in the right direction.

2.3.1 What are the most important lessons from this case study?

- Impacted communities need a seat at the table and to be a part of the decision-making process. Not just a seat at the table, impacted communities need to led the dialogues.
- Transparency is important for trust-building. Everyone did not always agree, but transparency helped build trust in the process.

2.3.2 Did we miss or misinterpret anything?

- Need to educate people about what happens after the buyout. Need to build public knowledge so they have negotiating skills because now many do not understanding the loan and tax implications of accepting a buyout and moving someplace else.
- Potentially add to the feasibility study that this could be a case study for success of community engagement.
- The river dynamics (land between Pecatonica and smaller stream) may preclude and engineered solution.
- Freeport is only talking about flood mitigation for buyouts, not the additional green infrastructure and quality of life pieces. The City is still not doing a great job assuring residents regarding the future of their homes and communities. The overall progress in the community is mis-represented and is not as great as we made out.
- Flood insurance was largely unaffordable for the community in the flood area.
- The City will not allow people to sell homes in the floodplain.
- The City is doing a good job with conversations, but there has not been the necessary action.

2.3.3 Other General Reactions?

- Report needs to call out and specify importance of stream restoration outside of green infrastructure – maybe use the term "nature-based solutions" instead to act as an umbrella that captures more actions.
- A just transition needs to be applied to buyouts and relocations. Same for other infrastructure and mitigation upgrades. How can we make sure the process is "just"? Need to do the cost of relocation – not just value of home.

2.4 Alexander County

Hyperlinks: Slide Deck, Chelsea's Video, Olivia's Video, & Whitney's Video

Alexander County is bordered by the Mississippi and Ohio Rivers. In the northern part of Alexander County, across from Cape Girardeau, there is a large agricultural levee that protects about 550,000 acres of farmland. In a southern part of the county, both the Mississippi and Ohio Rivers are trying to cut new channels during flood events. In 2019, over 300,000 cfs cut through Dogtooth Bend, which disconnected part of the county. USDA securing conservation easements in the Dogtooth Bend area of Alexander County. Flooding in this area now regularly occurs every year or every other year. Cultivation is becoming impossible. Initially farmers tried to repair the levee, but now 99% of the landowners have applied for easements. USDA is working towards making offers on the land to take it out of production permanently. Farmers are not happy about what is happening. Lots of confusion, broken promises and delays due to poor collaboration between Corps – who maintains the levees – and USDA – who manages easements and farm programs. Due to the breach, a lot of water is now moving into Horseshoe Lake, causing damage to road infrastructure and natural resources. Need to add spillway to

facilitate drainage as water levels lower. Proximity to Shawnee National Forest could allow for restoration of floodplain to blufflands corridor, which would help some critters get out of the floodplain during severe events. This would enhance recreational opportunities too.

Cairo, the largest metropolitan area in Alexander County, is protected by the Mississippi River & Tributaries Project, but the County must maintain the pumps stations with a shrinking tax base. long duration of 2019 Flood caused major flooding behind the levee because there are not pump stations. As a Black community, Cairo has suffered from significant divestment and failure of government at multiple levels. Concerned over census results since population in Cairo is decreasing. Food desert, no grocery stores inadequate public transportation, etc. The town is entirely in the historic Mississippi and Ohio River floodplains, protected solely by levees. Misinformation around flood insurance availability for renters especially. Need more access to political power structures and decision-makers. Not enough affordable housing.

2.4.1 What are the most important lessons from this case study?

- None listed.

2.4.2 Did we miss or misinterpret anything?

- PL 84-99 funds are only available after a disaster. Need to look at other levee related funded under pre-disaster funding. Planning for system wide improvements that could also come into play in this location.
- Ensure that levee removal recommendation is associated with the agricultural areas and not Cairo's levees. Levee removal was/is not supported by agriculture community, who consider the levee vital to maintaining the navigation channel. USACE modified breach to prevent migration of navigation channel, but levee overtops during flood events.
- Agriculture community wants to change cost benefit analysis to include transportation benefits in the PL 84-99 Benefit-Cost Ratio. Note this request for recommendations table.
- There is a proposed major port in the Cairo area that would provide job creation and economic development. This should be supported by local and state decision makers. Build on Governor's proposed budget to support this.
- Habitat investments should be included beyond conservation easements. Should look at different plantings to create various different habitats. Note this request for recommendations table.
- Flood insurance is not a panacea for the community because the levees are so important. Should the levees breach, there would be a surge of 20-feet of water. This is an emergency situation.
- Why has USACE neglected Cairo's levees if they are part of the Mississippi Rivers and Tributaries system? The agricultural levees on other parts of the Lower Mississippi River are better maintained. These should be fully self-sustaining and maintained by the Memphis District. Should look at MR&T backlog of maintenance and list of projects to see why this is taking so long. Is there a communication breakdown? What is causing the delay?

2.4.3 Other General Reactions?

- Cairo survives by levees and five pump stations. It has no funds to maintain them and depends on ongoing or revolving grant funding to maintain infrastructure that is built to address flooding.

- Infrastructure is very old and has not been maintained. The decreasing tax base exacerbates the situation – the state needs to assist.
- Highlight the importance of having a plan in place if the levees break (evacuation).

2.5 CENTREVILLE

Hyperlinks: Slide Deck, Chelsea's Video, Olivia's Video, & Whitney's Video

East St Louis area is working to repair the levees, slow progress and many additional issues. Significant storm and wastewater infrastructure upgrades are needed. Urban development in the wealthier, whiter communities on top of the bluffs is accelerating water runoff into the low-lying areas of the Southwest Metro East, including Centreville. Residents from Centreville described how combined sewer overflows coupled with accelerating runoff has resulted in their community frequently being flooded with human waste. Wastewater can be so deep at times it damages residential utilities, like water heaters, furnaces, air conditioners, etc. Contaminates drinking water supply. Constant mold issues, people cannot use their yards due to odor issues.

2.5.1 What are the most important lessons from this case study?

- Need to help communities get funds to resolve problems. Municipal or other governments are not reliable. Need to be able to self-advocate.

2.5.2 Did we miss or misinterpret anything?

- Issues with local municipalities American Water. Neglect. Local governmental body is not providing the assistance needed.
- County, Centreville and East St. Louis – working with this these three entities brings complexity. The reason why Centreville is hit so hard is because systems surrounding them are updated, but their systems. Pumps are not being activated when they need to because East St. Louis does not want to take on the flooding.
- Locals are getting the runaround but are gaining support. Representatives need to be involved (Belt and Greenwood) at the state level.
- Issues with stormwater and utilities are not included in the hazard mitigation plan – need help to solve these issues.
- Need to look at separating these utilities to help with the flooding issues and sewer backup.
- Centreville and Allerton have separate collection systems that combine and are delivered to another entity that treats the wastewater. Existing funding sources are unable to address this split municipality system.
- FEMA and IEMA grants were previously identified and an application was made in 2021.
- IEPA awarded a 319-grant for Heartlands Conservancy to develop a watershed plan for 95,000 acres (Portion of St. Clair county and Judy's branch). Citizen driven watershed planning and a small amount of BMPs. How will these funds be used to benefit the community?
- Need to engage with the Department of Public Health. It is shocking how often residents have to replace appliances – need to discuss this in the report.
- State agencies are having ongoing communication to implement actions. There are problems with local leadership. Looking at addressing drainage maintenance.

2.5.3 Other General Reactions?

- When the building on the bluffs happened, they didn't build enough retention ponds/basins. Perhaps a recommendation is to build these nature based solutions to assist with flooding issues.
- These residents do not have a choice – they feel trapped, abused, not valued, communicate concerns, but no one listens. Nothing changes. There needs to be additional help for families. Living conditions exacerbate public health concerns.
- Allerton, Centreville, and Cahokia to be Cahokia Heights. This has left gaps in leadership and cohesion.
- Where does the responsibility sit with the wastewater system? Is it county or municipal?
- This is a huge public health concern – where are those departments/agencies?

2.6 ROCKFORD

Hyperlinks: Slide Deck, Chelsea's Video, Olivia's Video, & Whitney's Video

In Winnebago County, farmers deal with flooding every year, there are no levees or pumps. In Rockford, Keith Creek is an area with a lot of flood issues. Buyouts have moved everyone out, city is still looking for funds to re-meander and restore the channel. City is also prioritizing repairs for Alpine Dam in Northeast part of town. Looking to reduce flood insurance premiums via the Community Rating System. Rockford is a very segregated city, a line through the center of town is stark. The Southwest part of town has a concentrated population of people of color and low-income. The Northeast part of town is very white and wealthy. NAACP representatives pointed out that there is a lot of flooding in the Downtown and Southwest part of town along the Rock River and Kent Creek, and resolving flood issues here are not high priorities for the city. The Black community also needs investments in walking and biking paths in the Southwest part of town. The area is very rich in natural resources and the local neighborhoods want to see more investments to improve quality of life.

2.6.1 What are the most important lessons from this case study?

- There is a disconnect between where the city is prioritizing its funds and where the needs are on the ground. The racial equity gap seems obvious.
- Very rich natural resources and the community sees those resources as an asset.

2.6.2 Did we miss or misinterpret anything?

- A farmer along rock river that has issues and is worried that impervious surfaces that may be increasing flooding in the area.
- There were risk assessments conducted along Kent Creek – there was some outreach but the floodplain manager left and the momentum was lost and the program died.
- Kent Creek has a lot of renters – this challenges community participation and community leadership.
- There is a significant problem with mold and water damage related issues.
- Error in flood map – lots of flooding downtown as well.

2.6.3 Other General Reactions?

- Conversations with the city are happening, but we are seeing few projects implemented.
- Consider expanding city parks to enhance natural resources where there are flood issues (possible buyout and redevelopment).

3 DRAFT RECOMMENDATIONS

Hyperlinks: Slide Deck & Video

3.1 PRESENTATION

Olivia provided an overview of the draft program and policy recommendations. Explained that the case studies are informing these program and policy recommendations, but recommendations are not limited to only those items that have been discussed. Some recommendations are being put forward based on literature review and other factors.

Olivia provided an overview of what we learned in this process. Climate change is driving more frequent flood events at increasing costs. This why we are driving this study towards multi benefit floodplain development to improve community resilience and maximize healthy floodplain functions. Goals to use the floodplain space to improve economy, aquifer recharge, flood risk reduction, recreation, fish and wildlife, water quality, and social and racial justice.

Started this process by looking at the Washington State Model which was a public/private model. On the public side, Washington Department of Ecology administers a grant program for multi-benefit floodplain development that reduces flood risk and restores river habitat. On the private side, NGOs help state prioritize projects and help communities feed projects into the grant program. Question: Will something like the Washington Public-Private Partnership Program work in Illinois?

Stakeholder meetings were held. We hosted educational panelists, looked at case studies, and had discussion groups. Major questions that were asked during our meetings included: How can we solve the flood issues in these communities? What tools do we have and don't have?

We collected feedback on how communities are successfully and unsuccessfully planning and developing floodplain projects with multi-benefit goals. A table with all this information will be included in the final report.

Major finding: Stakeholders like the idea of multi-benefit floodplain development because it provides a good framework, however, there are barriers.

In Illinois, barriers to multi-benefit floodplain development fall into three major categories:

1. Need support for more **community led problem solving**. This includes public education around flood issues and solutions; community visioning processes; access to decision-makers and other people in power; and recognition that floodplain management is intricately intertwined with housing, transportation, access to food and other social needs.
2. Need incentives to **do more projects**. This includes direct funding for projects; outreach to community leaders to update building codes and local ordinances; homeowners insurance agent education; and incentives for private sector job growth to do flood hazard mitigation.
3. Need support **equitable economic growth** (i.e. remove floodplain management silos). This includes supporting municipal needs to address shortfalls in local tax revenue through low-interest loans and grants; economic development; and community revitalization.

Based on these needs and the barriers identified during the case-study discussions, Olivia put the following recommendations forward for discussion.

1. Establish Public Private Collaborative structure
    - NGOs/Agencies continue with this dialog created through this stakeholder process to continue to understand the needs in more communities across IL and develop further reforms (Community Led Problem Solving).
    - NGOs/Agencies can develop workshops to advance public understanding of issues and solutions (Community Led Problem Solving).
    - NGOs/Agencies to work with communities to identify and help develop competitive multi-benefit projects for federal/state financing (Do More Projects & Equitable Economic Growth).
    - NGOs/Agencies develop more technical information floodplain mangers (Do More Projects).
2. Reform Agriculture Programs
    - Create permanent floodplain easement program in next Farm Bill (Do More Projects).
    - Reform crop insurance to reward farmers who "hold water" during wet years (Do More Projects).
    - Encourage farmer/urban dialogue to advance watershed-scale solutions (Community Led Problem Solving).
    - Develop additional recommendations for flood-compatible farming (Do More Projects).
3. Higher Levels of Assistance for Communities in Need.
    - Acknowledgement from State that access to resources has not always been equitable (Community Led Problem Solving).
    - Need to establish a program to assist extremely poor communities who lack staff to manage community-wide flood hazard mitigation programs (Do More Projects).
    - State needs to be more transparent to release socio-economic information about communities who benefit from grants and other forms of assistance (Community Led Problem Solving).
4. Increase Public Awareness of Flood Issues and Solutions
    - Continue dialogue we have started as part of this program, reaching out to more communities and affinity groups (Latinx, Immigrant, Indigenous, etc.) (Community Led Problem Solving)
    - Mandate flood insurance training for all homeowners insurance agents (Do More Projects)
    - Create incentives for flood hazard mitigation job growth (Do More Projects)

3.2 DISCUSSION

Discussion Prompt: What is your reaction?

- Flood insurance is being reformed, and will hopefully be more transparent, particularly around flood risk.
    - You are required to join the community rating system to reduce insurance rates. However, there are some things individual homeowners can do to lower their rates if they are in a mapped floodplain (raise the home, etc.)

    - Urban flood awareness report - as part of the insurance agent's continuing education - training was recommended as being mandatory for insurance agents.
    - How do we educate the community that this is available?
- Areas that we have covered are poor communities. People cannot even afford the cost of flood insurance. So, something that must be done about this. There needs to be a subsidy to help community members.
    - Rates are already subsidized to be that low, otherwise they would be higher. The community rating system is there - however it is a substantial task to get communities into this system.
- Office of Water Resources in IDNR had a stronger local assistance program. They used to be assistant to these communities. They helped with recommendations we made. However, this program has been cut with the budget cuts and downsizing. Maybe reestablish funding for these positions in government to assist?
    - Increasing state assets to help.
    - Also getting a different mix of staff. Many of the staff at the state are technical, and not educated in community engagement/liaisons. These would be new positions in the government.
- There needs to be a desire from the local, state, and federal officials, and from the community to make this better. Everyone must be a part of the solution. Bringing the press into this for exposure and the politicians may be helpful. Utilization of the press could shed a light and educate politicians, community members, etc.
- $20 million dollar BRIC grant for Centreville has not been awarded yet. That was a miscommunication to the community – only the Illinois Section 319 Watershed Grant was awarded.
- One of the recommendations was that the state should provide more transparency and release socioeconomic information on the grants that are being released. However, many of these grants are coming from the federal government. This may be the responsibility of the federal government to do.
    - As far as transparency the statewide mitigation officer - there is not policy in IL on how IEMA prioritize the projects for BRIC grants. FEMA is the organization that screens and prioritizes the projects at IEMA.
        - FEMA has a checklist that gives the application points as they evaluate each one.
        - Recommendation in state flooding report - a collection of state agency representatives/agencies that would get together and the applications would come through (Interagency Mitigation Advisory Group – IMAG) this committee first, using screening criteria. Left with real and actionable mitigation solutions that would go with a point system. Perhaps due to a lack of staff, the committee fell apart. That recommendation has been offered before to reestablish an integrated state management of the mitigation applications.
            - We have learned through this process that, prior to a lot of current events, the social and environmental aspects were not weighted in applications in the past.
    - Agencies in the Governor's office need to follow the mandated process to make sure that the reviews and spending through grants is more consistent. For IEPA, they need to put together notice of funding, (review process, who is eligible, what

is available, what the grant is for, etc.). The IEPA is trying to fix these historical issues with the reviews and getting money to where it needs to go.
        - Example of how program is evolving - there are additional points in the ranking system that gives more points to environmental justice communities.
            - However, they do not have proper communication with those communities to make sure they are submitting projects for these programs. The communication, education, and resources for these communities is not there yet. IEPA is continuing to work through this.
        - An issue with all these grants, is that there are matching funds required, which limits communities applying because they cannot afford match at any level.
            - IEPA is trying to figure out how to bridge this gap, and the list of communities who need assistance is growing, especially when compared to the state budget. The money just is not there.
    - Very important that NAACP is at the table.
- EO from the Biden Administration states that EJ now applies to all federal actions. Which expands the environmental justice lenses to all actions of the federal government (will apply to BRIC and other grant programs).