

A close-up, high-speed photograph of water splashing, creating numerous bubbles and droplets. The water is clear and bright, with a soft blue tint. The background is out of focus, showing more water droplets and light reflections.

Designing for Other Considerations in Dam Removal: Stakeholder Concerns, Economics, and Recreation

Tristan Taber

2018 Maine Sustainability and Water Conference

Source: <https://www.publicdomainpictures.net/pictures/40000/velka/water-1363435907ySW.jpg>

Background

Research

Proposals

Outcomes



Background

Elkader, Iowa



Background Elkader, Iowa



Source:Google

Background Elkader, Iowa



Source:Google

Background

Elkader, Iowa



Source: Google

Background Elkader, Iowa



Source: Google

Background

Elkader, Iowa



Source:http://farm4.static.flickr.com/3480/3725141965_e8ac5f9e2b.jpg

Background

Elkader, Iowa



Source:<http://insulatedoverall.com/?p=4589>

Background

2008 flood



Background

2008 flood



Source:https://upload.wikimedia.org/wikipedia/commons/a/a4/Sunken_cars_on_flooded_street_in_Cedar_Rapids_Iowa.jpg

Background

2008 flood



Source: <http://www.kwwl.com/story/32850247/2016/08/Friday/aerial-pictures-show-flooding-in-elkader>

Background

2008 flood



Source: <https://photos.smugmug.com/ImagesoftheMidwest/Iowa/Iowa-Flood-of-2008/i-2GKVB2F/1/980c8b83/M/Iowa%20Flood%20of%202008%20Turkey%20River%20Elkader%20June%2010%202008-5365-M.jpg>

Background

2008 flood



Source:http://kwwl.images.worldnow.com/images/11532553_G.jpg

Background

2008 flood



Source: <https://i.pinimg.com/originals/bf/31/ba/bf31ba930177ad52642810504fe2ec6d.jpg>

Background

2008 flood



Source: https://www.weather.gov/images/arx/flooding_jun0708/elkader1.jpg

Background

2008 flood



Source: <http://www.claytoncountytia.gov/PhotoViewScreen.aspx?PID=17&FullSize=true>

Background

2008 flood



Source:http://kwwl.images.worldnow.com/images/11529520_G.jpg

Background

FEMA funds



Background

Potential dam failure



Background

Potential dam failure



Source: <https://ncsaustralia.com.au/img/8433/2189>

Background

Potential dam failure



Source: https://upload.wikimedia.org/wikipedia/commons/7/78/Diga_gleno1.jpg

Background

Iowa State University



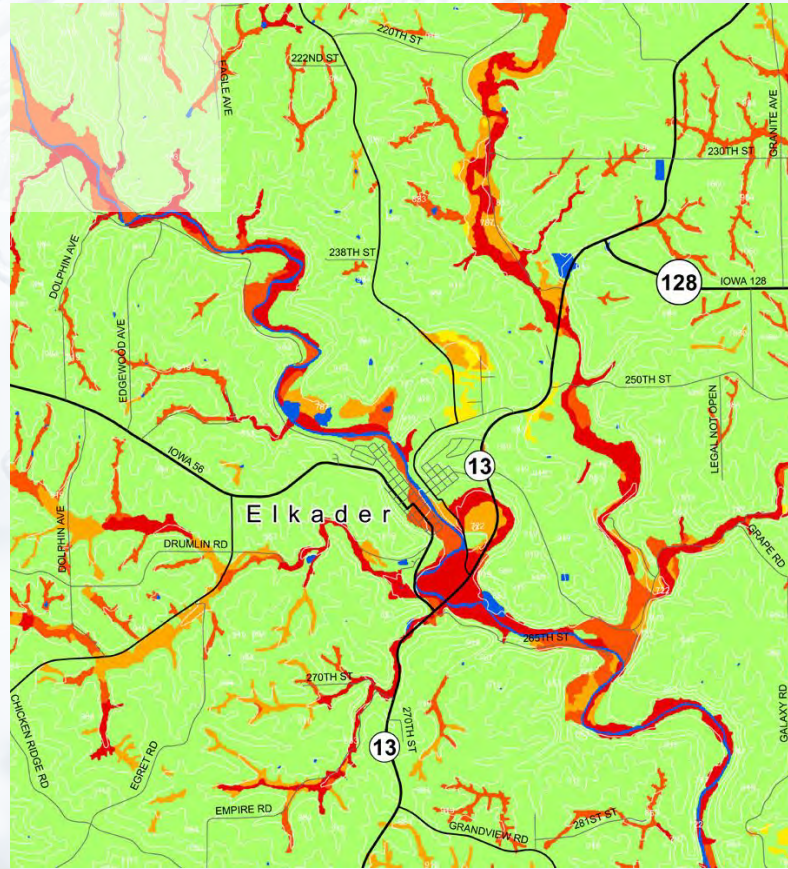
Source: https://cdn20.patchcdn.com/users/22961571/20171108/113624/styles/T800x600/public/processed_images/isuaslamedalionsu_-1510158824-5545.jpg <https://www.fpm.iastate.edu/maps/memorials/photos/32-07%20A%20ASLA%20Centennial%20Medallion.jpg>

Background

Iowa State University



Research Flooding



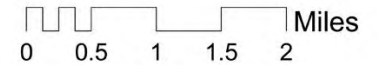
Flood Frequency In the Turkey River Region

Flood Frequency

- None
- Rare
- Occasional
- Common
- Frequent
- Ponded

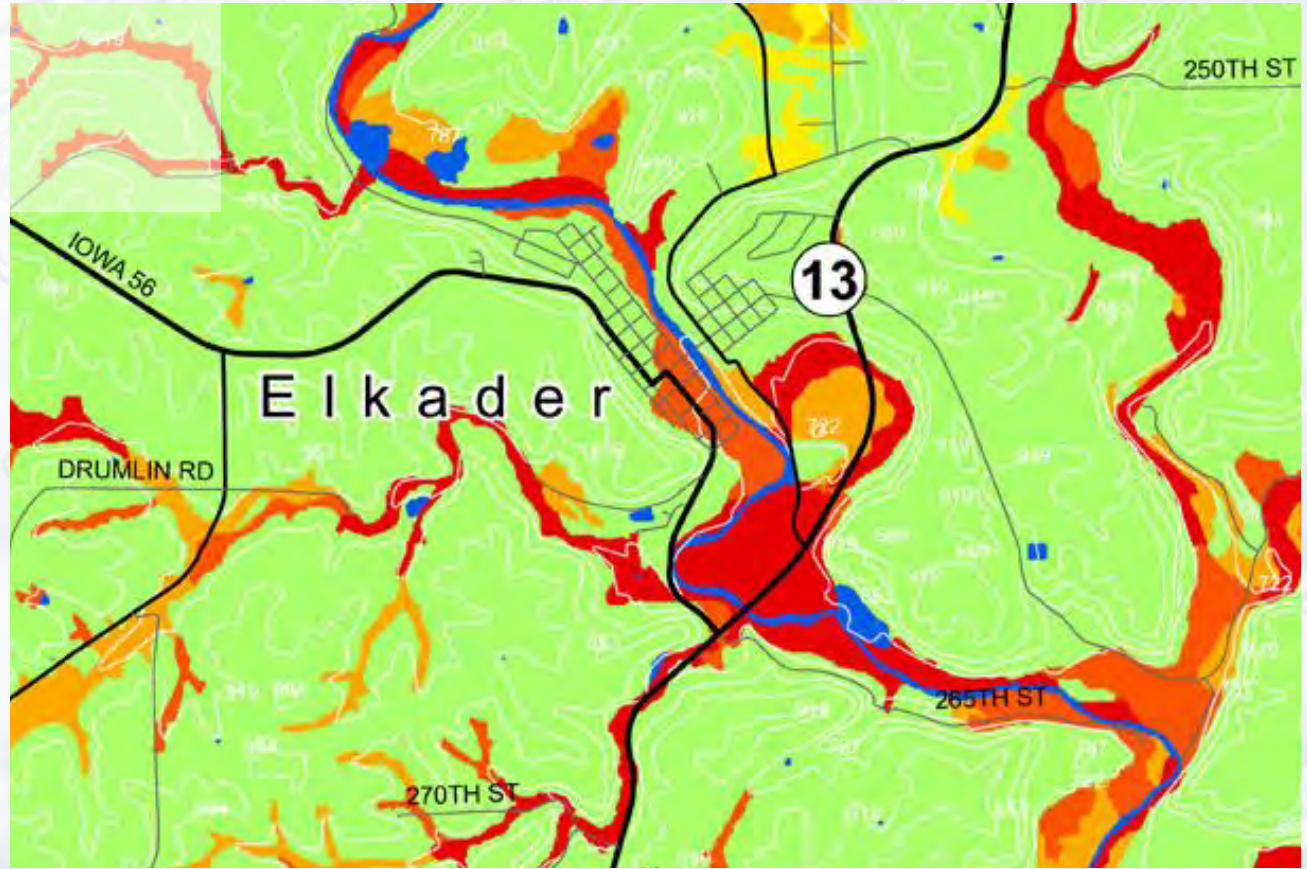
Roads

- US Highway
- State Highway
- Paved County Road
- Other Road



Developed with: ESRI ArcGIS

Research Flooding



Developed with: ESRI ArcGIS

Research Flooding



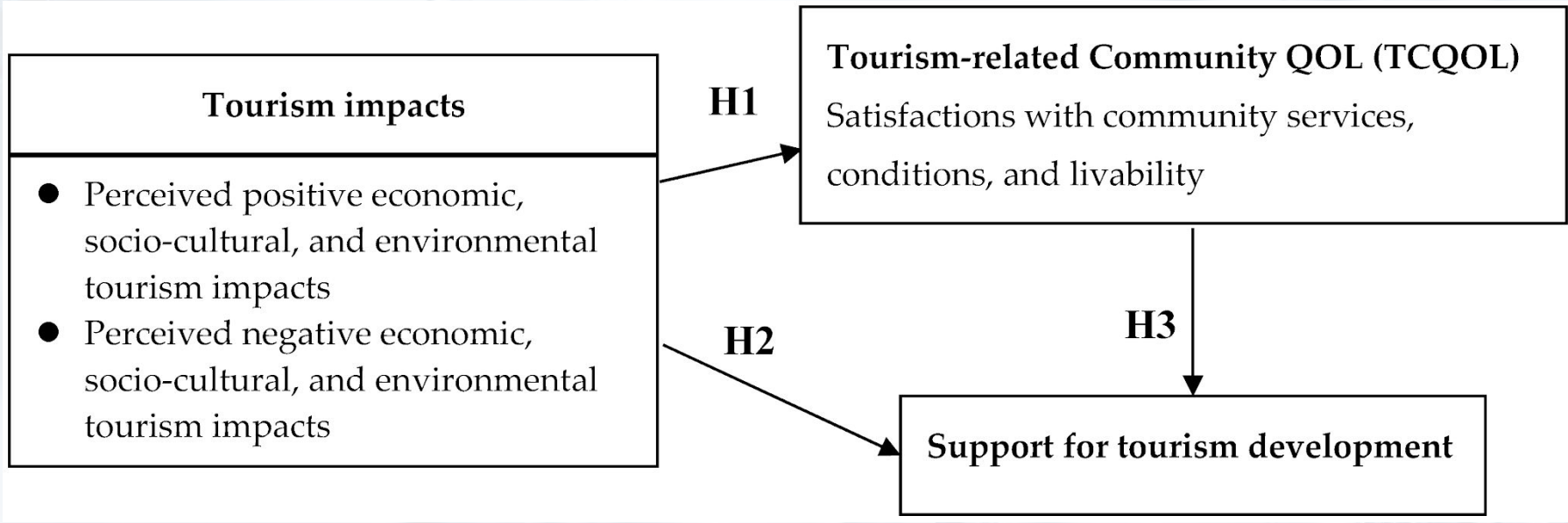
Source: Iowa State Geographic Map Server

Research Flooding



Source: Iowa State Geographic Map Server

Research Economy



Research Economy



Source:<http://turkeyriver.org/wp-content/uploads/2013/08/DSC00207-900x521.jpg>

Research Site aesthetics



Research Site connectivity



Research Site connectivity



Research Pushback



Research Case studies



Source: https://upload.wikimedia.org/wikipedia/en/7/7c/Edwards_dam.jpg

Research Case studies



Source: Maine Rivers

Research

Case studies



Source: Maine Rivers

Research Case studies



Source: https://activerain-store.s3.amazonaws.com/image_store/uploads/2/1/7/8/6/ar127759005668712.jpg

Research Case studies



Source: [https://fthmb.tqn.com/BXVdRrYLiyj43FUG8ptuBXufskY=/960x0/filters:no_upscale\(\)/wingfield-park-reno-nevada-56a7f29b5f9b58b7d0ef8383.jpg](https://fthmb.tqn.com/BXVdRrYLiyj43FUG8ptuBXufskY=/960x0/filters:no_upscale()/wingfield-park-reno-nevada-56a7f29b5f9b58b7d0ef8383.jpg)

Research Case studies



Source:https://static.wixstatic.com/media/372985_09600444db974e5f894f7519299204ef~mv2_d_2816_2112_s_2.jpg_256

Research Case studies



Source:<http://riverbreak.com/wp-content/uploads/pueblo-white-water-park-colorado-arkansas-river-surfing-spot-620x310.jpg>

Research Case studies



Source: https://activerain-store.s3.amazonaws.com/image_store/uploads/2/1/7/8/6/ar127759005668712.jpg

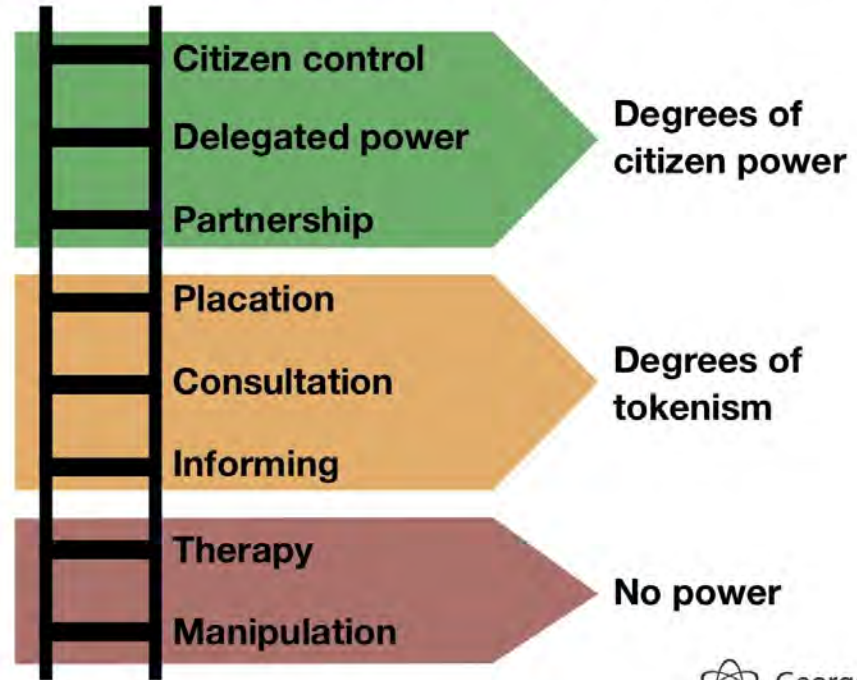
Research Case studies



Source: <http://www.ahtsarchitects.com/uploads/5/2/7/7/52778825/charles-city-river.jpg>

Research Community outreach

Arnstein (1969) Ladder of citizen participation



Research

Community outreach

- Mental map



Research

Community outreach

- Mental map



Research

Community outreach

- Mental map
- Town survey

DER

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RIVER DEVELOPMENT : ELKADER

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Brandon Losey / 815.276.2391 / blos@iastate.edu

[ISU : LA401 : Landscape Studio]

www.LA401.weebly.com/river.html



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Research

Community outreach

- Mental map
- Town survey
- Stakeholder meetings

“People cross the dam and fish off the dam, so maybe something for the opposite side? And, people swim near the small dam a lot... but there is no good path down.” ~Allison

“I'm worried about erosion. I like the shade the trees bring as it gets warm and muggy along the river during summer.” ~Geoff

“The [cascading] water is what I like about the dam.” ~Ruth

Research

Community outreach

- Mental map
- Town survey
- Stakeholder meetings

"River walks are always wonderful"

~Mary

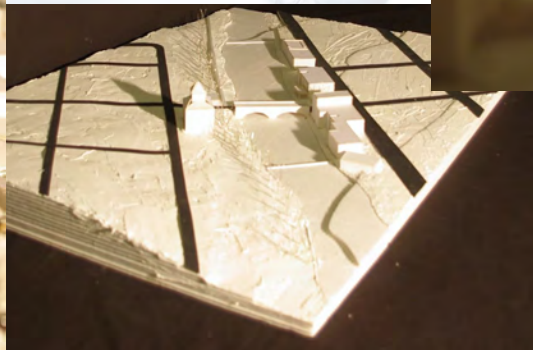
Unidentified man: "If anything was put in I would like it to be **Green**. But not too flashy like with the colors, that recycled **blue** color is bad."

Taber: "So using **earth tones**?"

Unidentified man: "Yes that would work."

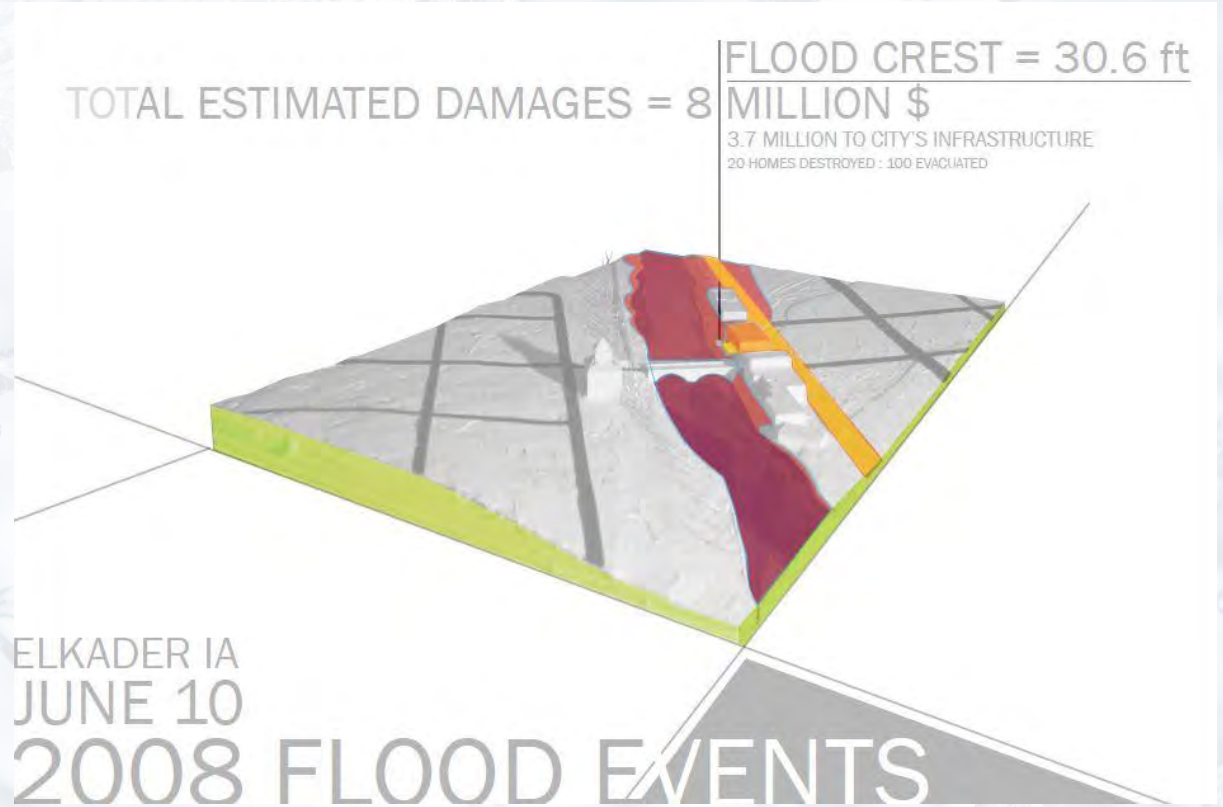
Proposals

Model



Proposals Downtown

- Flood



Proposals Downtown

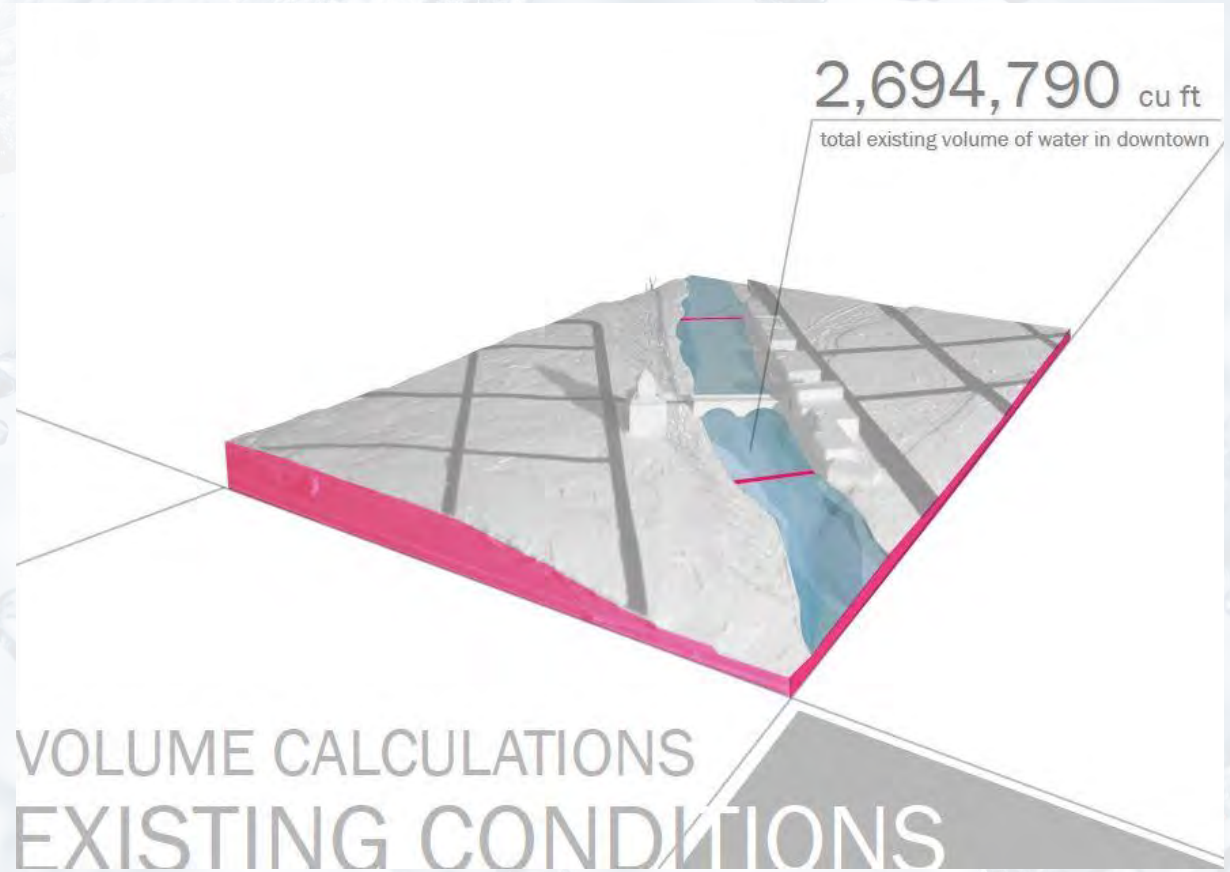
- Flood
- Dam remains



Proposals

Downtown

- Flood
- Dam remains



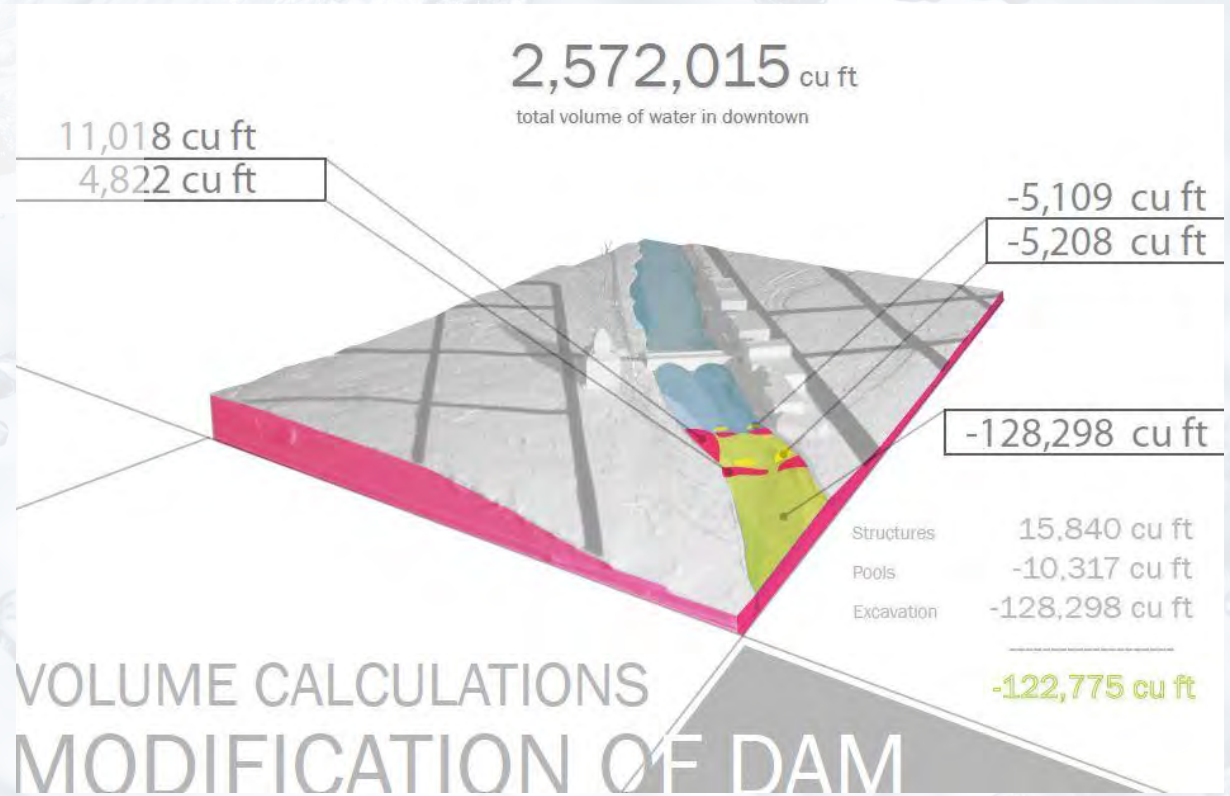
Proposals Downtown

- Flood
- Dam remains
- Dam modified



Proposals Downtown

- Flood
- Dam remains
- Dam modified



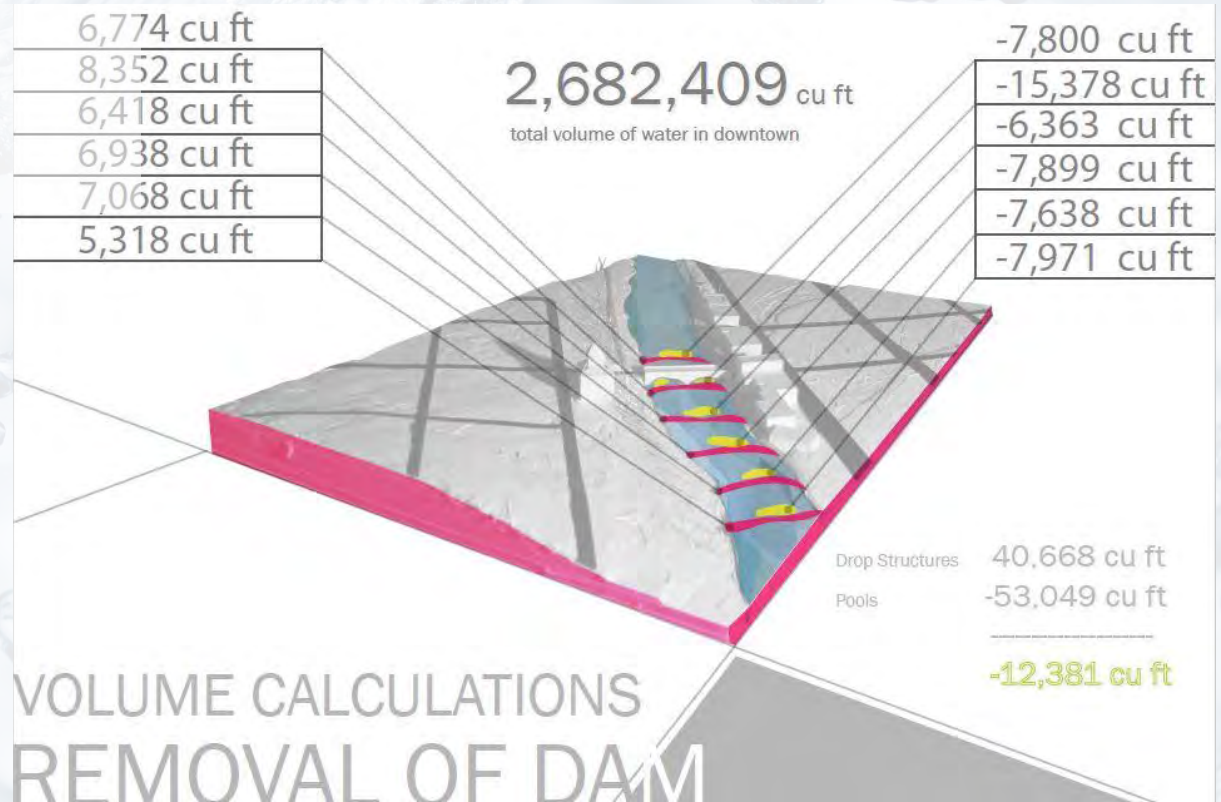
Proposals Downtown

- Flood
- Dam remains
- Dam modified
- Dam removed

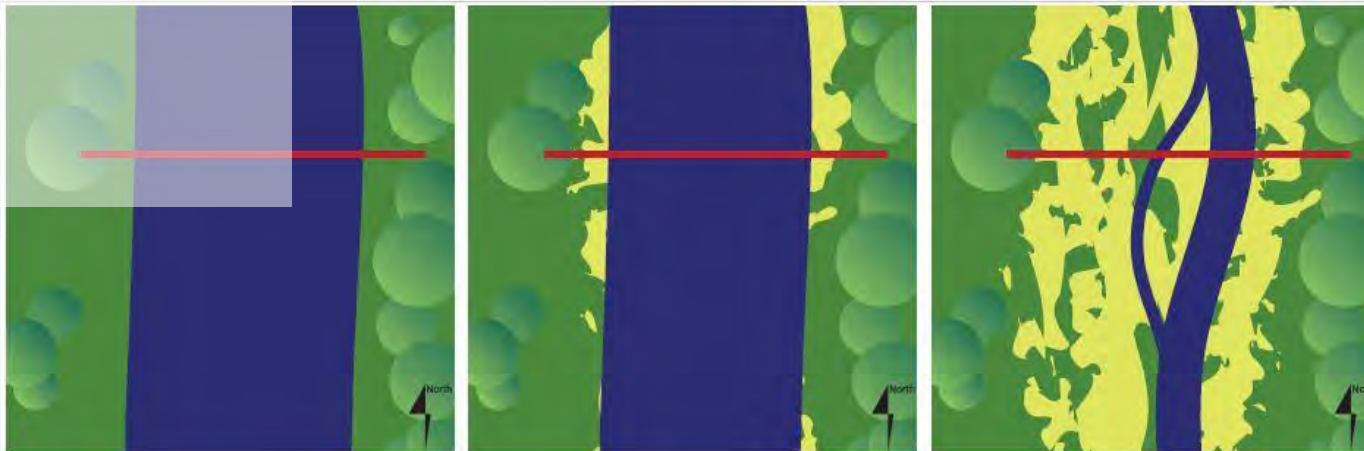


Proposals Downtown

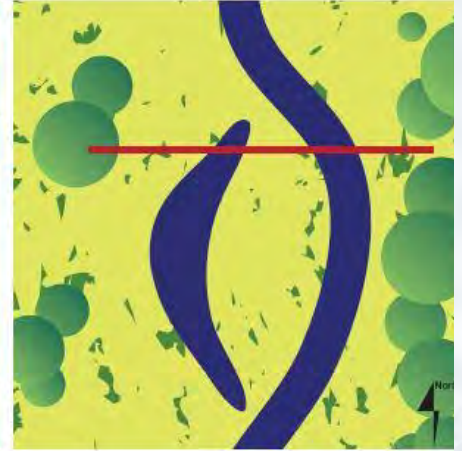
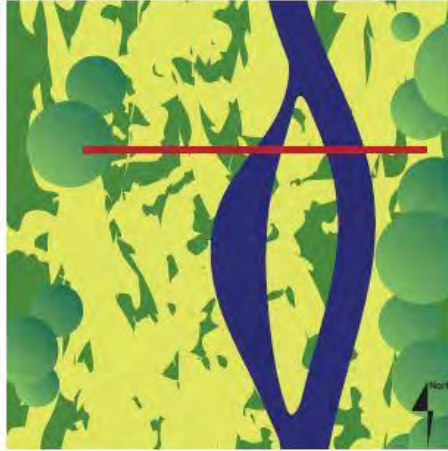
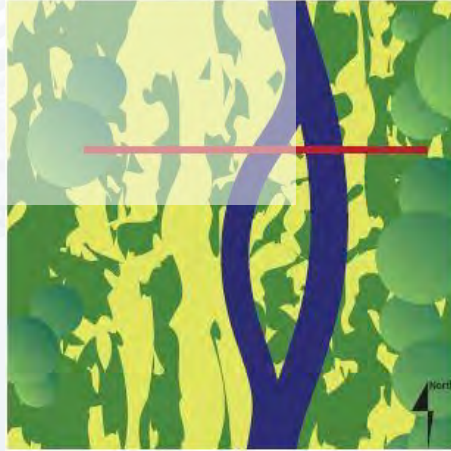
- Flood
- Dam remains
- Dam modified
- Dam removed



Proposals Upstream



Proposals Upstream



Proposals Perspectives



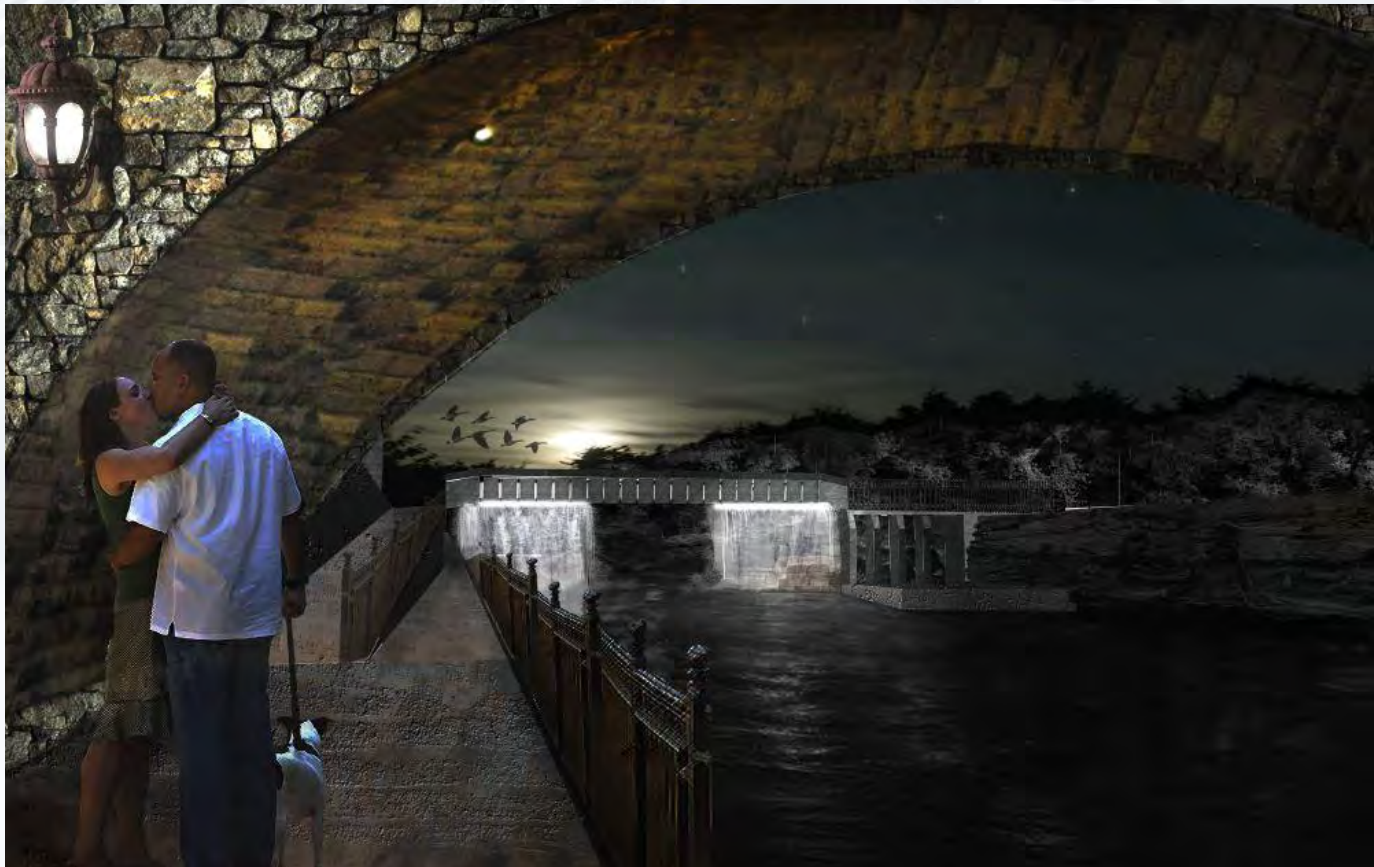
Proposals Perspectives



Proposals Perspectives



Proposals Perspectives



Outcomes Survey

In mailing, fold this flap to the inside first. Tape closed (no staples), mail panel only.

return



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Dam Restoration Option

The primary focus of this proposal is the repair of the large dam with the inclusion of minor hydroelectric power generation as a possibility and a ladder system to allow fish to traverse the river way. Also included within this proposal are the removal of the small dam in the southern end of Elkader which will be replaced by a white water play hole and riverside access, an extended and more dynamic park where the fire station stood prior to demolition, structural and visual improvements to the water access point (Boat take out / park) north of the Elkader downtown, and creation of a riverside boardwalk.

Benefits: Some fish species are able to traverse the river corridor; generation of a small amount of electricity; improved riverside infrastructure and access; possible economic generation with the white water play hole.

Drawbacks: Although the fish ladders would allow for greater mobility of some fish species upriver, there would not be a way for canoeists and other watercraft users to traverse the river. Also, the river will continue to buildup sediment in back of the dam, the nutrients from upstream will be blocked and similar detrimental effects in the river would continue to exist.



Plan view of the downstream Elkader river corridor

Right: Flood volume calculations for Dam Restoration Option

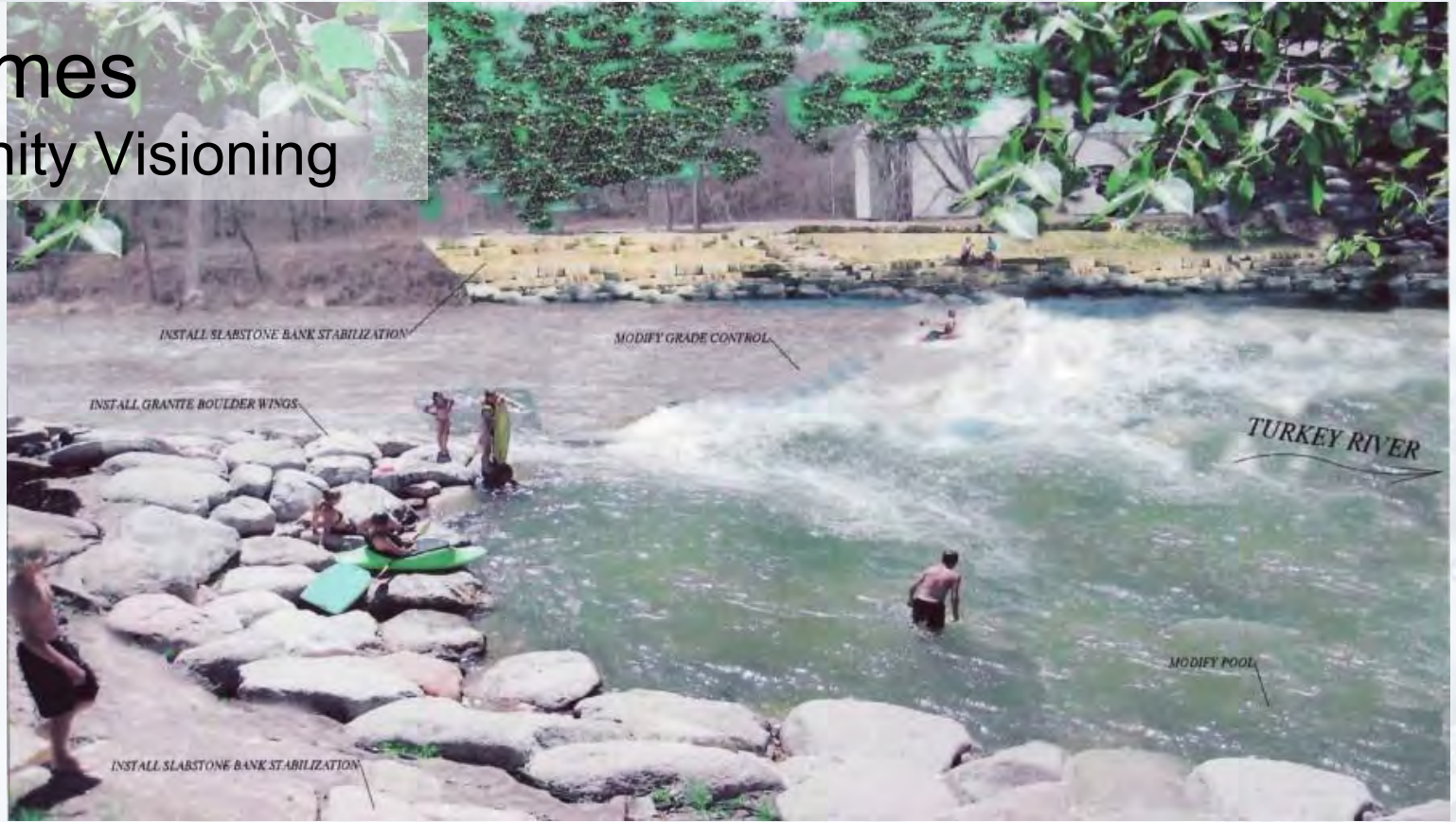
Dam Removal and Inclusion of Rapids Option

The primary focus of this proposal is the removal of the large dam replaced by a series of rapids churning up water and creating a visual and audio feature. Also included within this proposal are the removal of the small dam in the southern end of Elkader which will be replaced by a white water play hole and riverside access, an extended and more dynamic park where the fire station stood prior to demolition, structural and visual improvements to the water access point (Boat take out / park) north of the Elkader downtown, and creation of a riverside



Outcomes

Community Visioning



Source: <http://turkeyriver.org/wp-content/uploads/2012/10/elkaderWhitewater-900x510.jpg>

Outcomes

Built Spaces

The Gazette

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ARTICLE

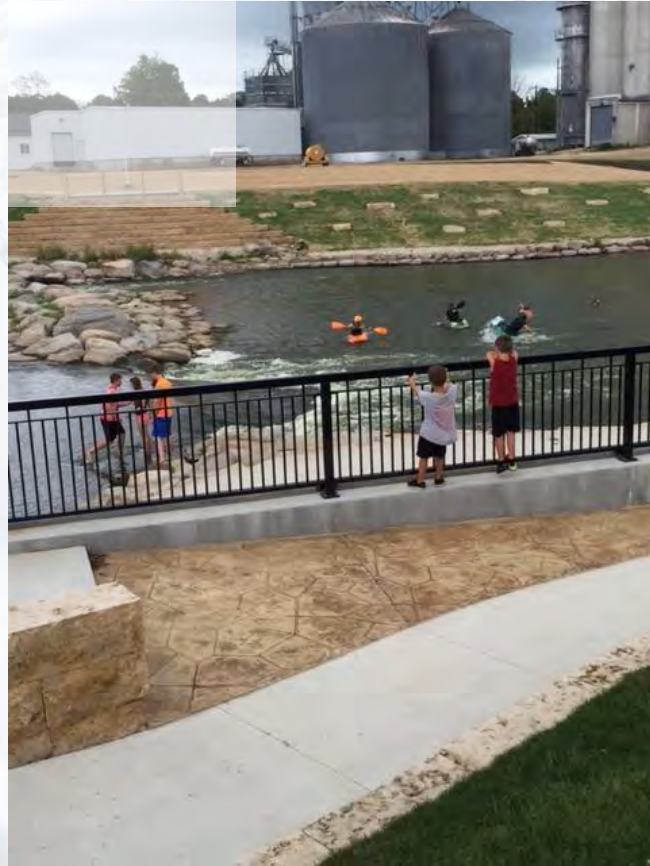
Whitewater feature enhances downtown Elkader

Same river that caused millions of dollars in damage now the focus of efforts to make city a mecca for water sports enthusiasts



Source:<http://www.thegazette.com/2013/12/01/whitewater-feature-enhances-downtown-elkader>

Outcomes Built Spaces



Source: Emily Yaddof, Director, Elkader Development Corporation

Outcomes

Built Spaces

The economic impact of the whitewater park all by itself is hard for us to track. We can tell you that it is used quite frequently and is a draw for out-of-town visitors.

**~ Emily Yaddof, Director
Elkader Development Corporation**

Outcomes

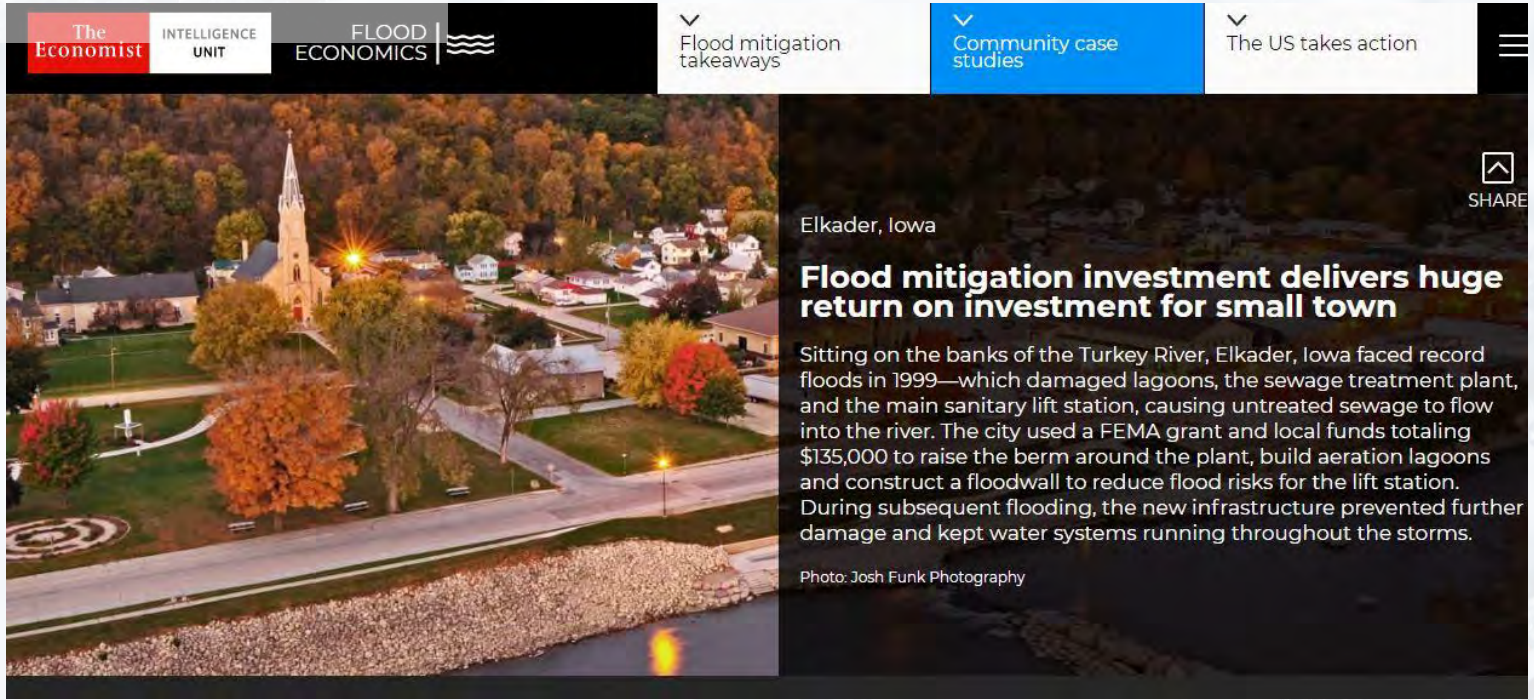
Built Spaces



Source: Emily Yaddof, Director, Elkader Development Corporation

Outcomes

Publicity



The screenshot shows a webpage layout with a dark header. On the left, there are logos for 'The Economist', 'INTELLIGENCE UNIT', and 'FLOOD ECONOMICS' with a wavy line icon. To the right of the header are three navigation items: 'Flood mitigation takeaways', 'Community case studies' (highlighted in blue), and 'The US takes action'. Below the header is a large aerial photograph of Elkader, Iowa, featuring a prominent church steeple and a river in the foreground. To the right of the photo is the article text, which includes a 'SHARE' icon in the top right corner.

The Economist | INTELLIGENCE UNIT | FLOOD ECONOMICS

▼ Flood mitigation takeaways

▼ Community case studies

▼ The US takes action

SHARE

Elkader, Iowa

Flood mitigation investment delivers huge return on investment for small town

Sitting on the banks of the Turkey River, Elkader, Iowa faced record floods in 1999—which damaged lagoons, the sewage treatment plant, and the main sanitary lift station, causing untreated sewage to flow into the river. The city used a FEMA grant and local funds totaling \$135,000 to raise the berm around the plant, build aeration lagoons and construct a floodwall to reduce flood risks for the lift station. During subsequent flooding, the new infrastructure prevented further damage and kept water systems running throughout the storms.

Photo: Josh Funk Photography

Source:<http://floodeconomics.com/communities/elkader-ia/>

Outcomes Cascade



Source: <https://bloximages.chicago2.vip.townnews.com/wfcourier.com/content/tncms/assets/v3/editorial/2/11/2111b1f4-f2dc-54a3-814c-21cc527177d8/572e68e761a1b.image.jpg>

Acknowledgments



FEMA



**IOWA STATE
UNIVERSITY**



Source: https://upload.wikimedia.org/wikipedia/commons/thumb/1/15/iowa_State_University_wordmark.svg/1280px-iowa_State_University_wordmark.svg.png, <http://www.elkader-iowa.com/images1/ChamberLogo.jpg>, <http://www.claytoncountyiowasheriff.com/ImageRepository/Document?documentID=54>, https://upload.wikimedia.org/wikipedia/commons/thumb/6/67/FEMA_logo.svg/1200px-FEMA_logo.svg.png

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