

# Wakarusa River Corridor: Design Development

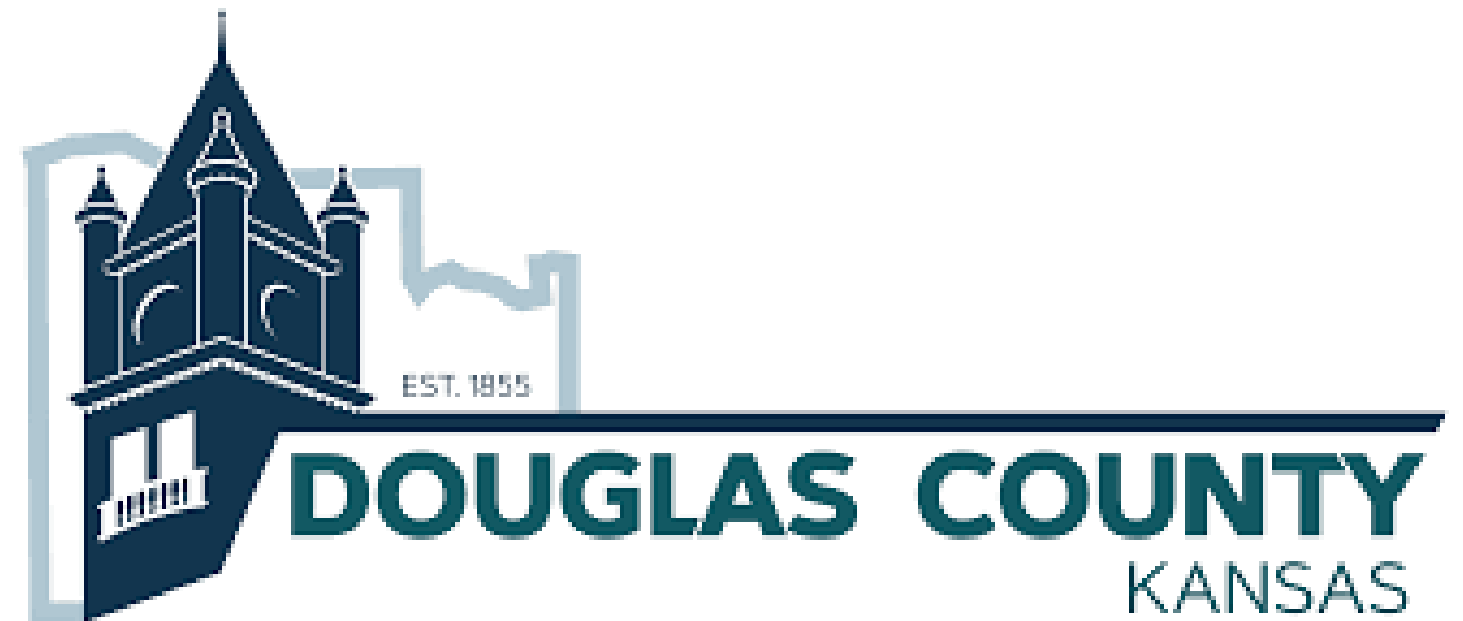
Piper McCann & Zoe Spicer



# Acknowledgements

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Thank you to Biohabitats, Inc. and Douglas County, Kansas for their time and resources to make this project possible.



# Our Vision

Design with ecological intentions for an environmentally collaborative community, allowing spaces and places for humans and nature to thrive together through conservation of critical habitats, restoration of the Wakarusa Riverfront, and ecologically safe recreational developed.



Fig. 1

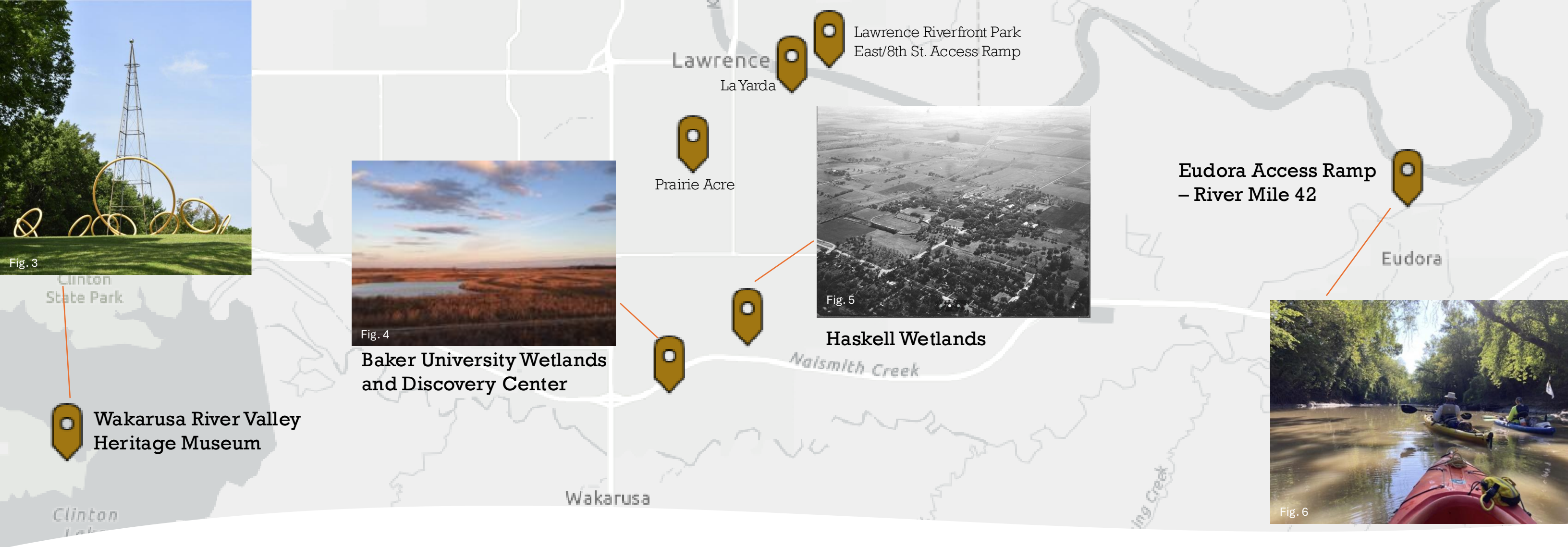


Fig. 2

# Goals

- Conservation
  - Flood Hazard Preparation
  - Protecting Critical Habitats
  - Education of Farmers
- Restoration
  - Patch Work
  - Soil Cleansing
  - Riverfront Restoration
- Development: Blending humans and nature.
  - Bringing Native Planting Culture Back
  - Creating Buffers
  - Riverfront Recreation Opportunities





# Wakarusa Today

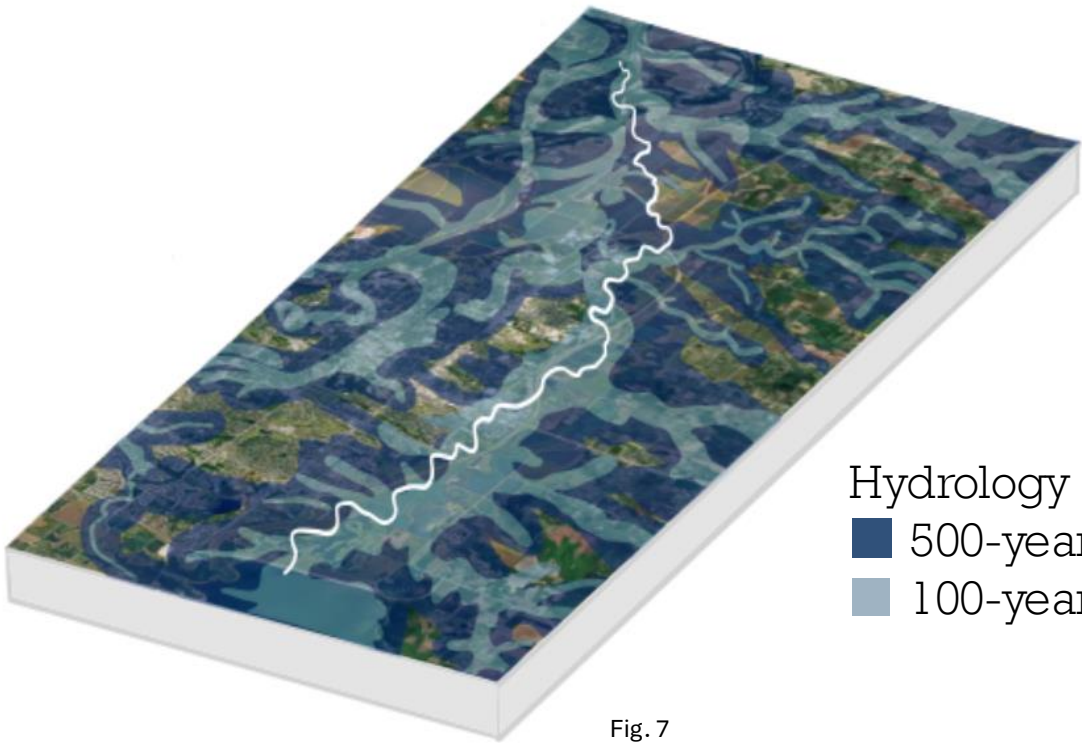
## Recreation and Commemoration

- Fishing & Boating
- The Great Kaw Adventure Race (Eudora, KS)
  - Participants endure cognitive and physical challenges. It includes boating down the Wakarusa River.
- Historical Museums
- Home to historical local societies
  - Some are focused on the Bleeding Kansas Era

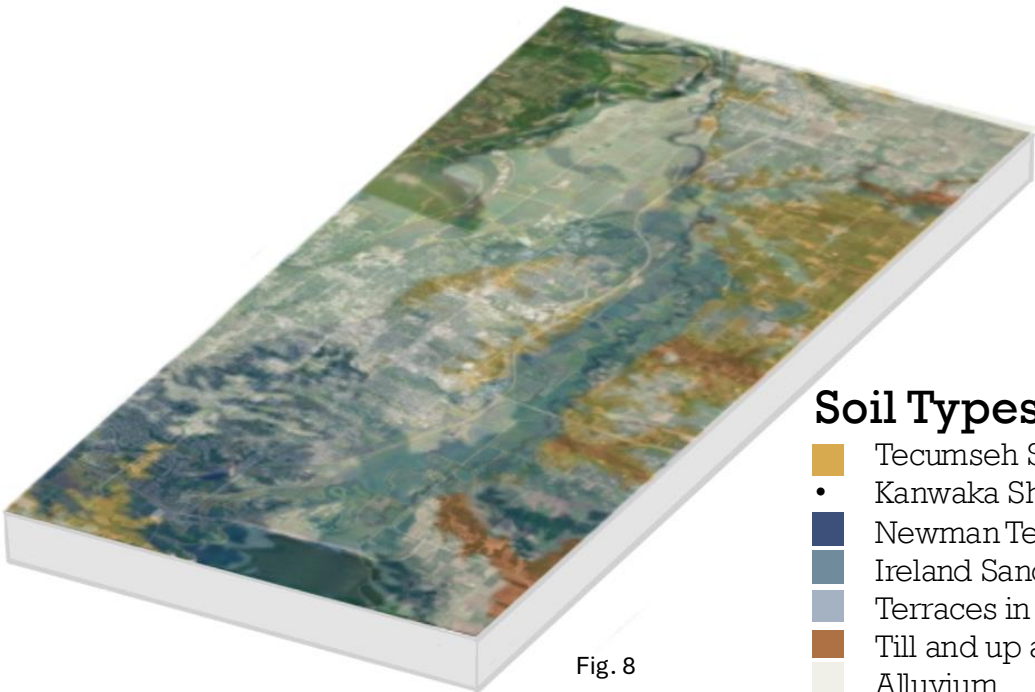


# Ecology

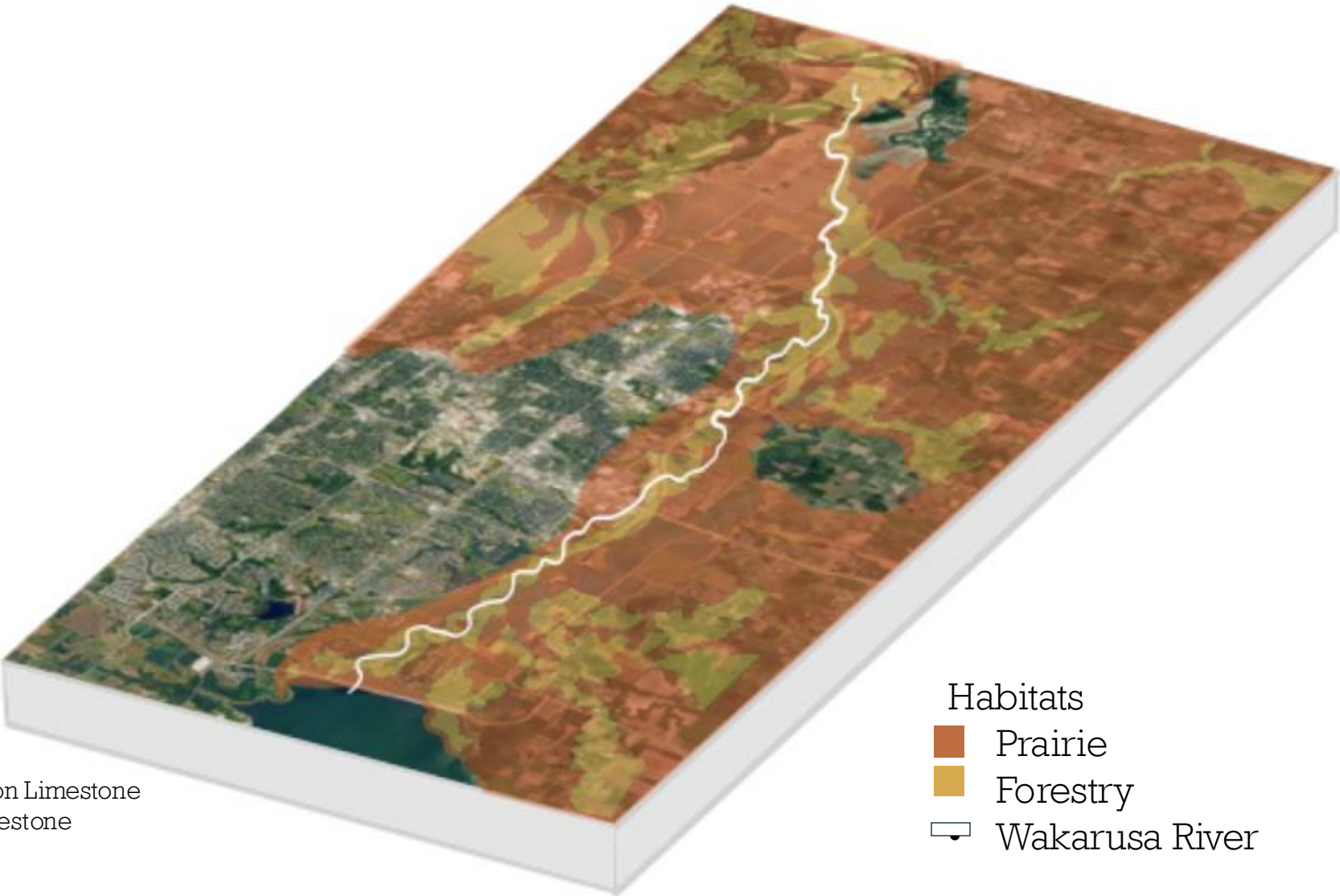
The Wakarusa River flows about 80 miles through eastern Kansas before merging with the Kansas River near Eudora. Its watershed covers 574 square miles and includes smaller streams like Coal Creek and Camp Creek. The river's flow changes with the seasons, influenced by rainfall, land use, and human activities. Clinton Lake helps control flooding, provides drinking water, and supports recreation. Protecting the river through conservation efforts, like storing natural vegetation along its banks, helps keep it healthy for both wildlife and people. In addition, The soil is mostly silt loam and clay loam which are rich and good for farming. Common soil types like Kanwaka Shale and Oread Limestone are found in prairies and floodplains, supporting crops, grasses, and trees.



Hydrology  
■ 500-year Floodplain  
■ 100-year Floodplain



**Soil Types**  
■ Tecumseh Shale and Lecompton Limestone  
• Kanwaka Shale and Oread Limestone  
■ Newman Terrace Deposits  
■ Ireland Sandstone  
■ Terraces in smaller stream valleys  
■ Till and up and glacio-furcal deposits  
■ Alluvium  
■ Kanwaka Shale and Dread Limestone



**Habitats**  
■ Prairie  
■ Forestry  
■ Wakarusa River



# Current Land Use

Most of the land surrounding the corridor is privately owned, and farming/agriculture land.

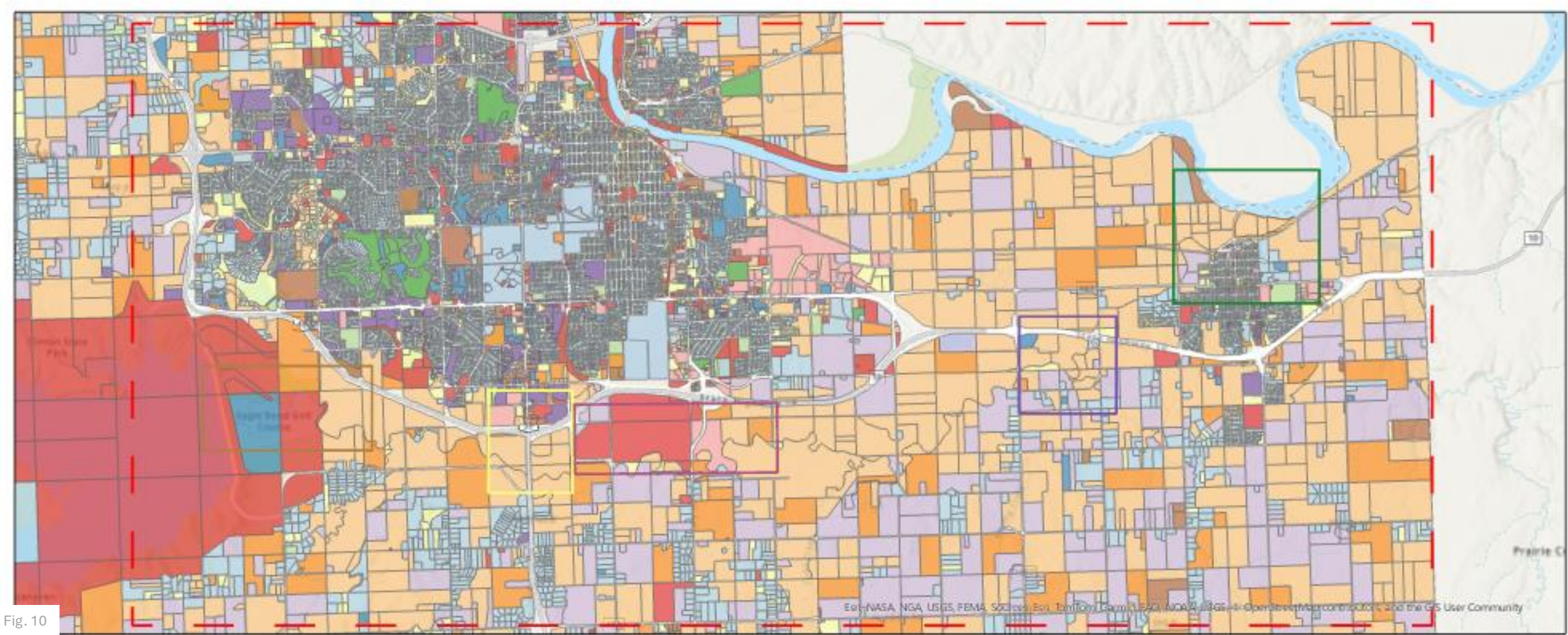
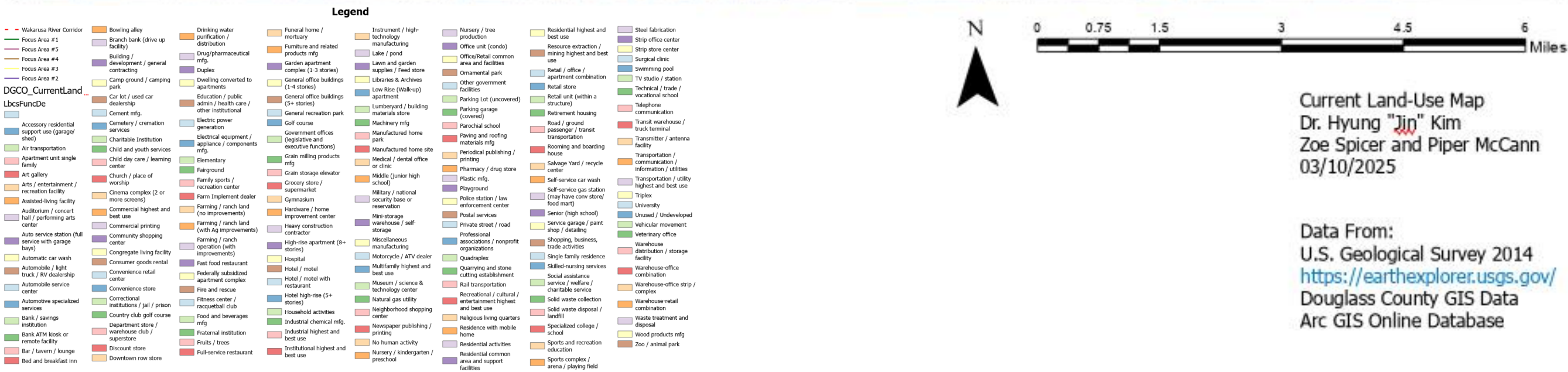


Fig. 10

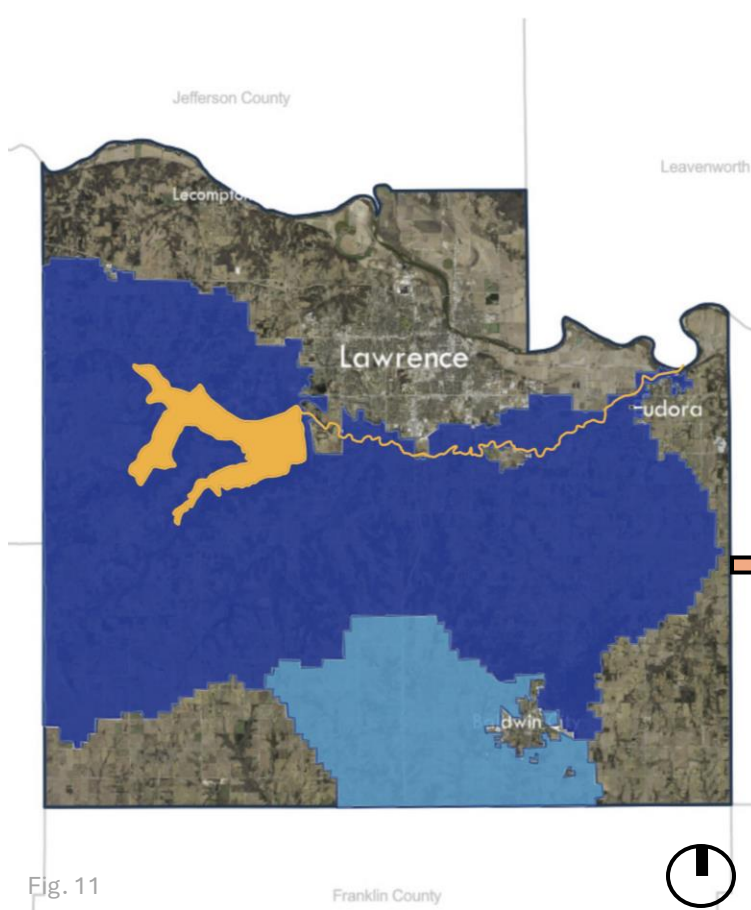




# Tax Districts

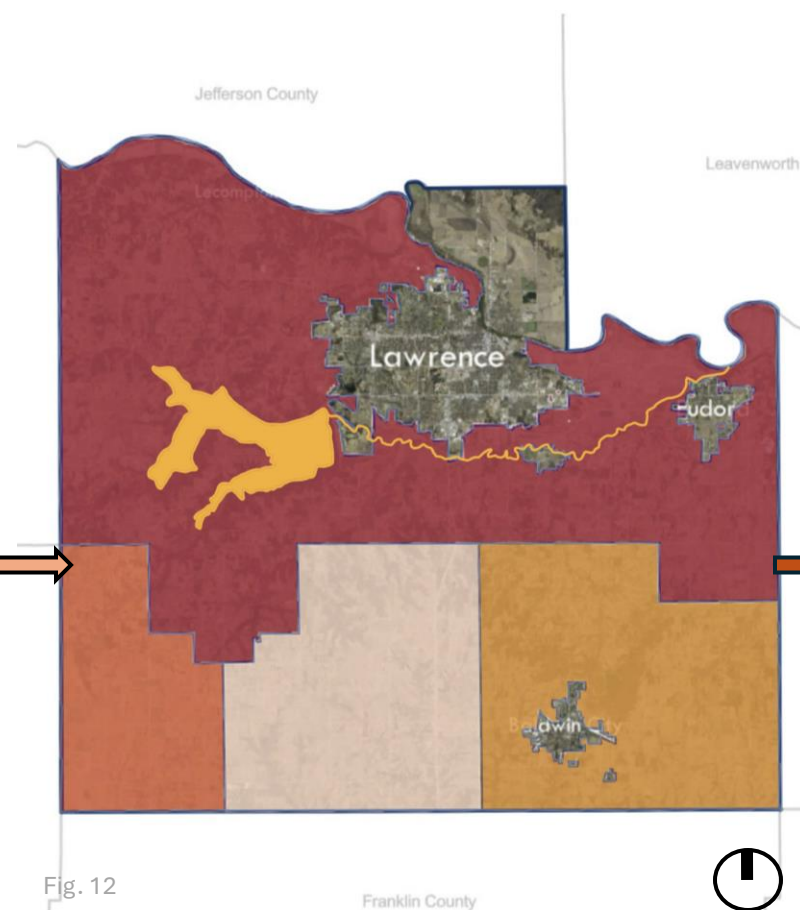
Tax districts of these 3 areas are most likely to respond/fund damages in Douglas County.

Watershed Tax Districts



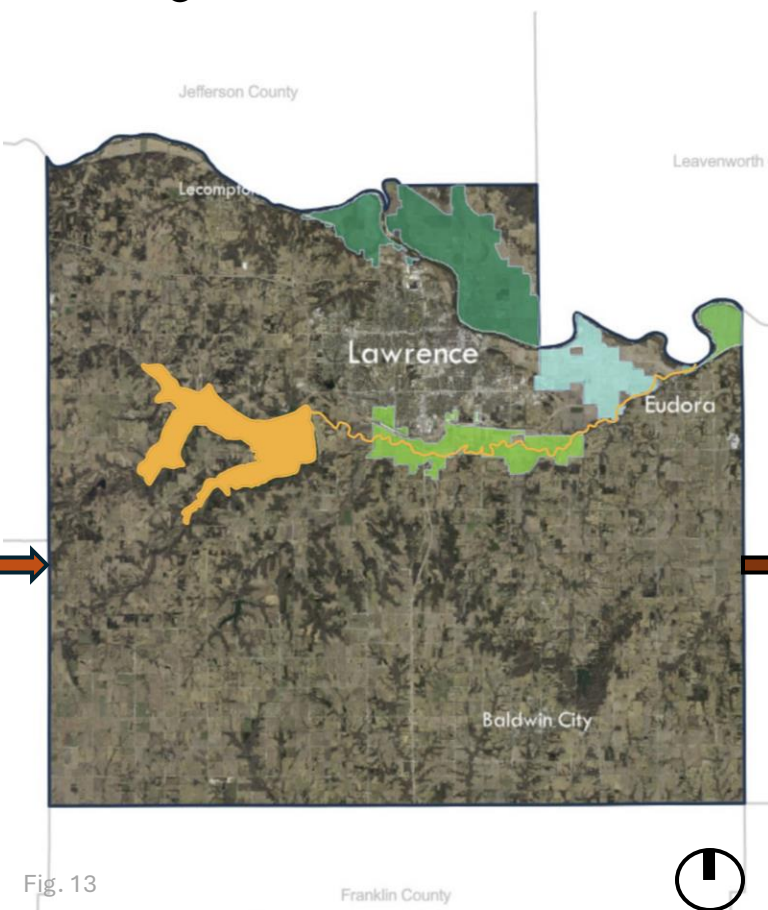
- Wakarusa Watershed #35-SH
- Taury Creek #82-FR

Fire Tax Districts



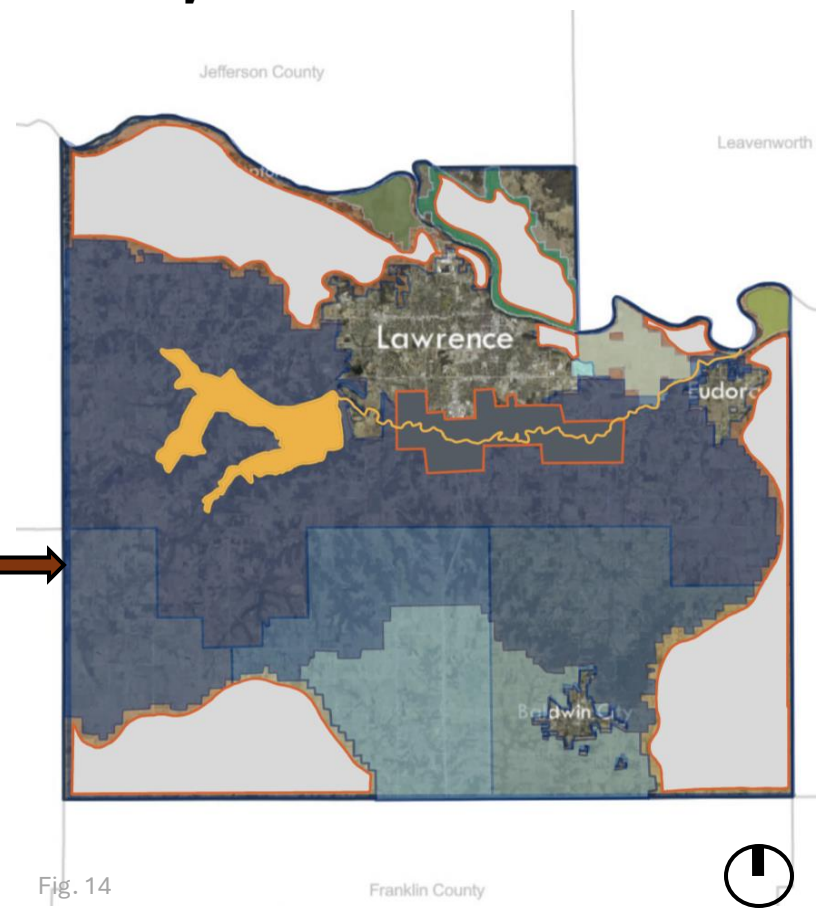
- Douglas Fire District 1
- Douglas Fire District 2
- Douglas Fire District 3
- Douglas Fire District 4

Drainage Tax Districts



- Douglas County Kaw
- Wakarusa Haskell Eudora
- Wakarusa Kaw
- Weaver Bottoms

Overlay



- Includes all 3 Districts
- Includes only 1 District



# Synthesis

## Buildable Areas

- Collaborate with Stakeholders (Current developed land - urban)
- Little Risk (Abandoned urban spaces)
- Little Caution (privately owned land/Agriculture)
- Extreme Caution (Corridor edge with Critical Habitats)
- Highly Discouraged (Wakarusa River)

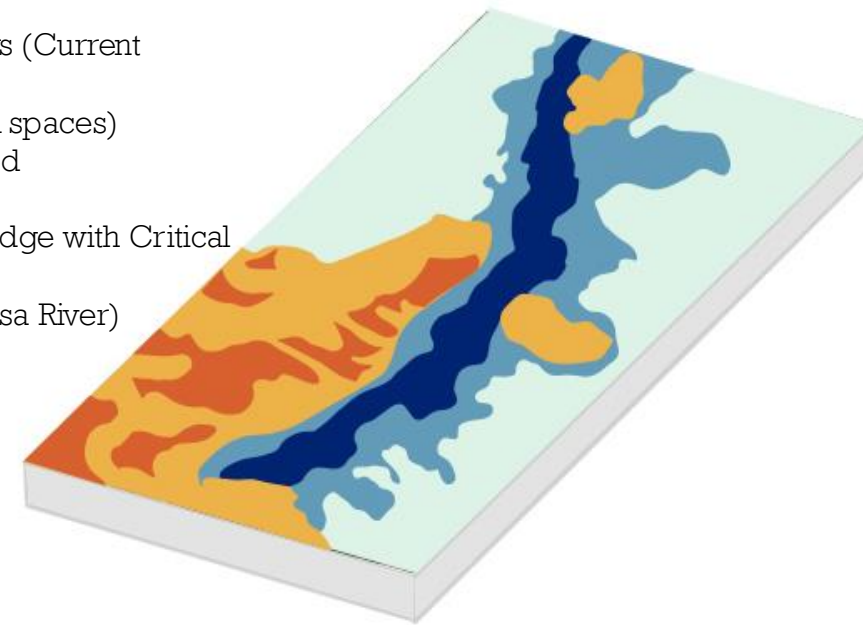


Fig. 15

## Economic Constraints

- Includes all 3 Districts (High risk of paying for natural damages)
- Includes only 1 District (Low risk of paying for natural damages)

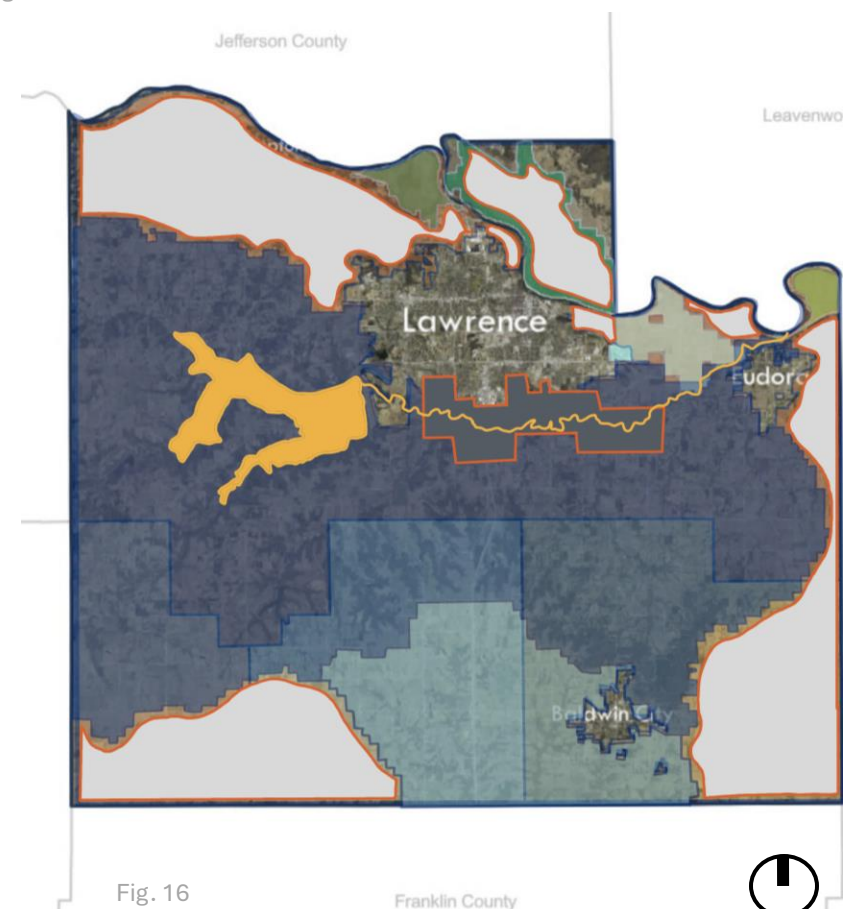


Fig. 16

- Outside of heavily overlapped tax districts so there is less public concern on what the cost of maintenance would be for them. This would most likely gain more support from the public and other businesses because there is less money coming out of their pocket initially.
- Preserving the spaces that need the most attention, like the habitat for mucket mussels (endangered species). This would be a longer process legally, but it can be argued that the redevelopment of these spaces will lower the risk factor for surrounding communities and limit the amount of maintenance that would take place. Therefore, if there is less maintenance, there is less money coming out of the taxpayer's dollar. Likewise, the restoration of a native landscape stops urban expansion (something that requires yearly/monthly maintenance).



# Precedent 1: Huangshi Bay Coastal Park by Sasaki

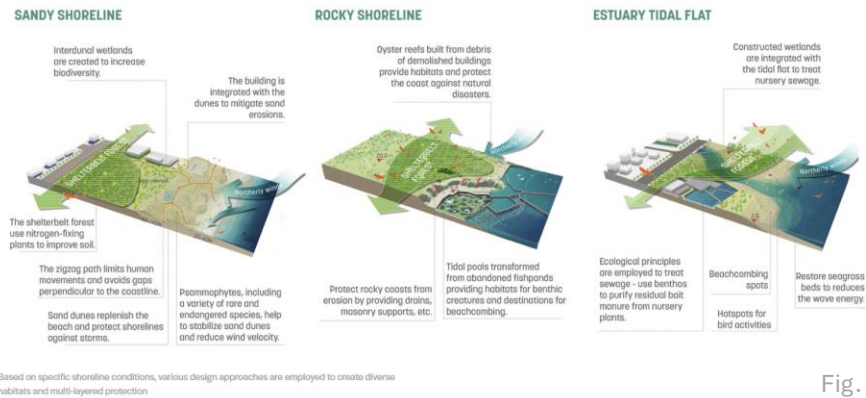


Fig. 18

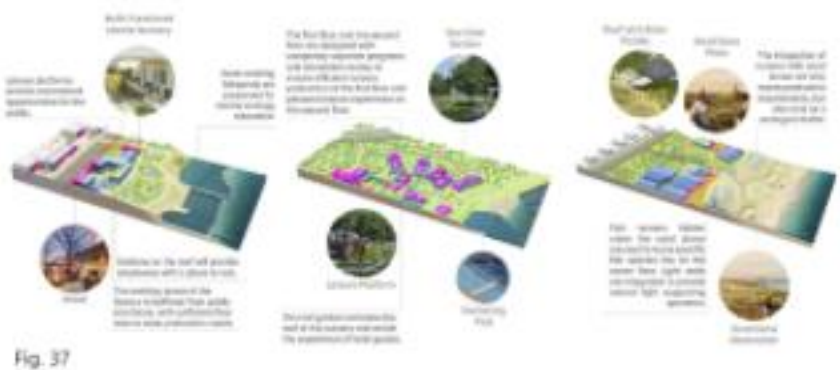


Fig. 19



# Precedent 2: Dune Peninsula at Point Defiance Park by Social Workshop





# River Corridor Vision

## Conserve

- Protecting critical habitats
  - Endangered Species
- Protecting Humans and Nature
  - Flood/Fire/Drainage Preparations.
  - Educating stakeholders on the benefits of conservations practices.

## Restore

- Restoring old farmland back to a more native landscape.
  - Soil Cleansing
  - Community wide education
- Increase corridor's wooded edge to create a wider buffer between development.
  - Riverfront Restoration

## Develop

- Incorporate family-friendly and eco-friendly outdoor spaces to excite the community about the Wakarusa River.
  - Riverfront recreation

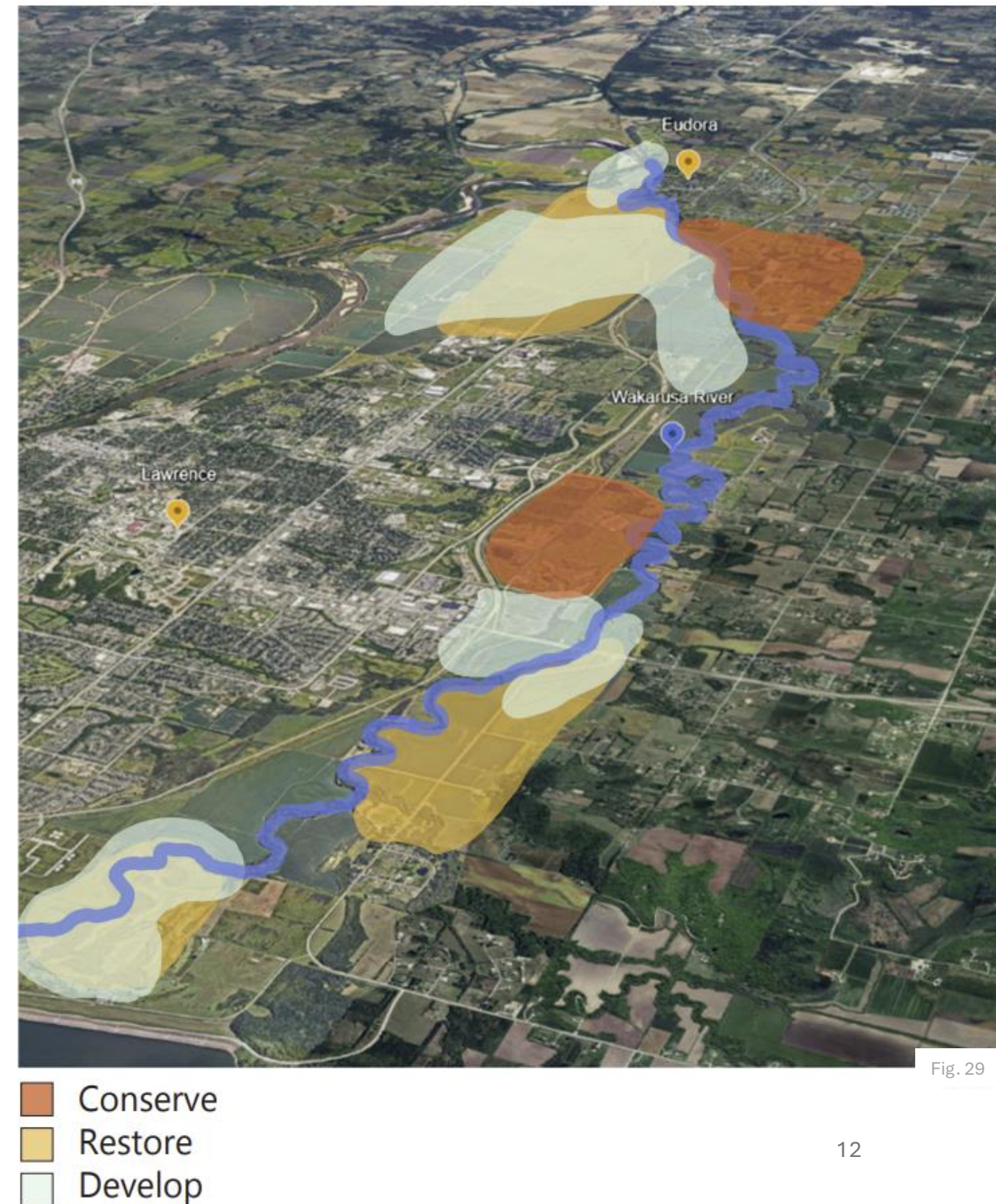


Fig. 29



# Focus Area 1: Clinton Lake Reserve

Conserve - The site's native prairie and wetland space - The human interest (recreational spaces) to allow for an interesting space for all species  
Restore - Create a buffer between recreational space and the river corridor - Expand the current Native landscapes to allow for natural habitat growth  
Develop - Allow developed recreational space to blend with the natural spaces without harming the habitats - Use of trails to blend Human and Natural elements - Highlight the natural landscape of the site (bridge to view the river).

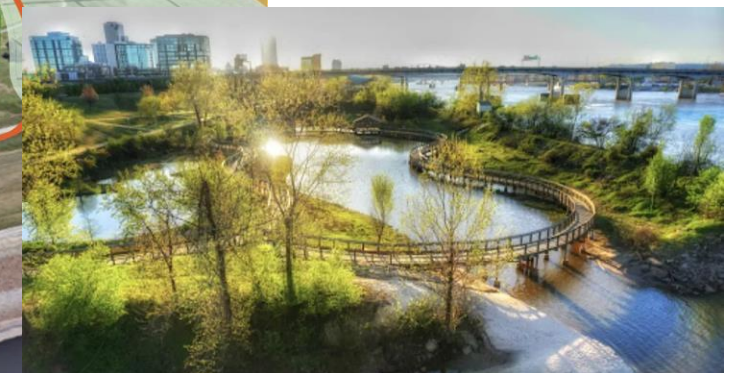


Fig. 32



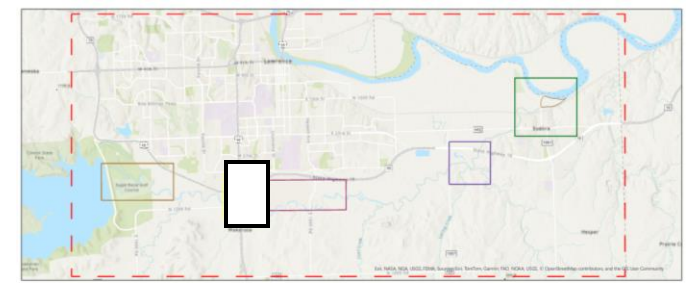


Fig. 34

# Focus Area 2: K-10 and US-59 Intersection

## Problems

- Mostly unused or abandoned farmland
- Fragmentation of ecosystems



Fig. 35



Fig. 37

## Solutions

Development: Human and Nature Use

- Overhead corridor to accommodate natural traffic with human traffic

Restoration

- Restoring the unused farm land with native prairie grasses
- Safe space for more prairie and forestry habitat species to flourish



Fig. 36



# Focus Area 3: Creek Connection



Fig. 38

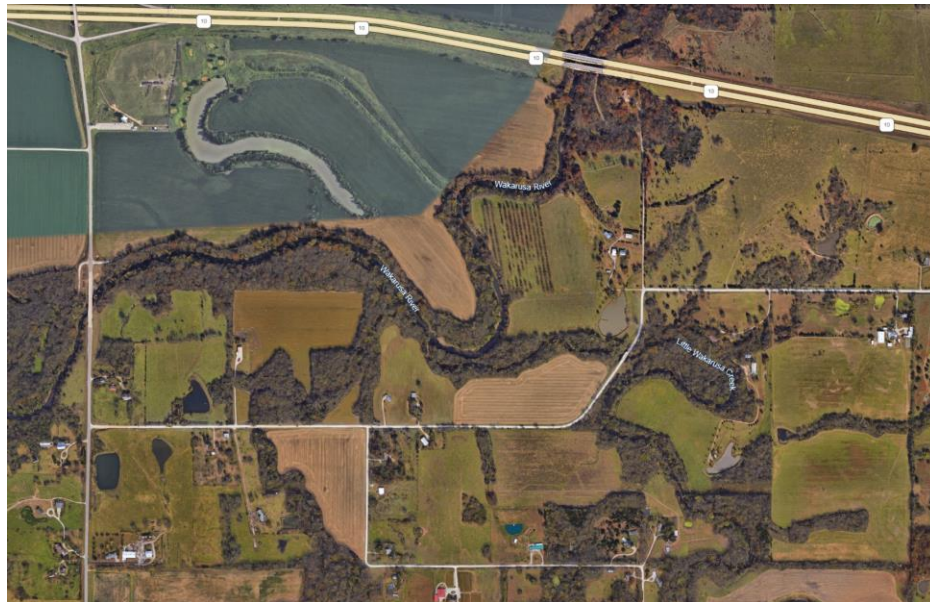


Fig. 40



Fig. 39

- Forestry
- Prairie
- River/Creek
- Wetlands

## Suggestions

### Restore

- Patch work
- Bringing back the Native Prairie reduced flood/fire/drainage hazards.
- Incorporating Wetlands
- Taking existing swales

and converting them to a more habitat focused space.

### Conserve

- Conserve the corridor edge
- Educating public (specifically farmers) how the native landscape can help them.

### Development

- Site contains a driving range, so this allows for a more scenic view instead of the old farmland.

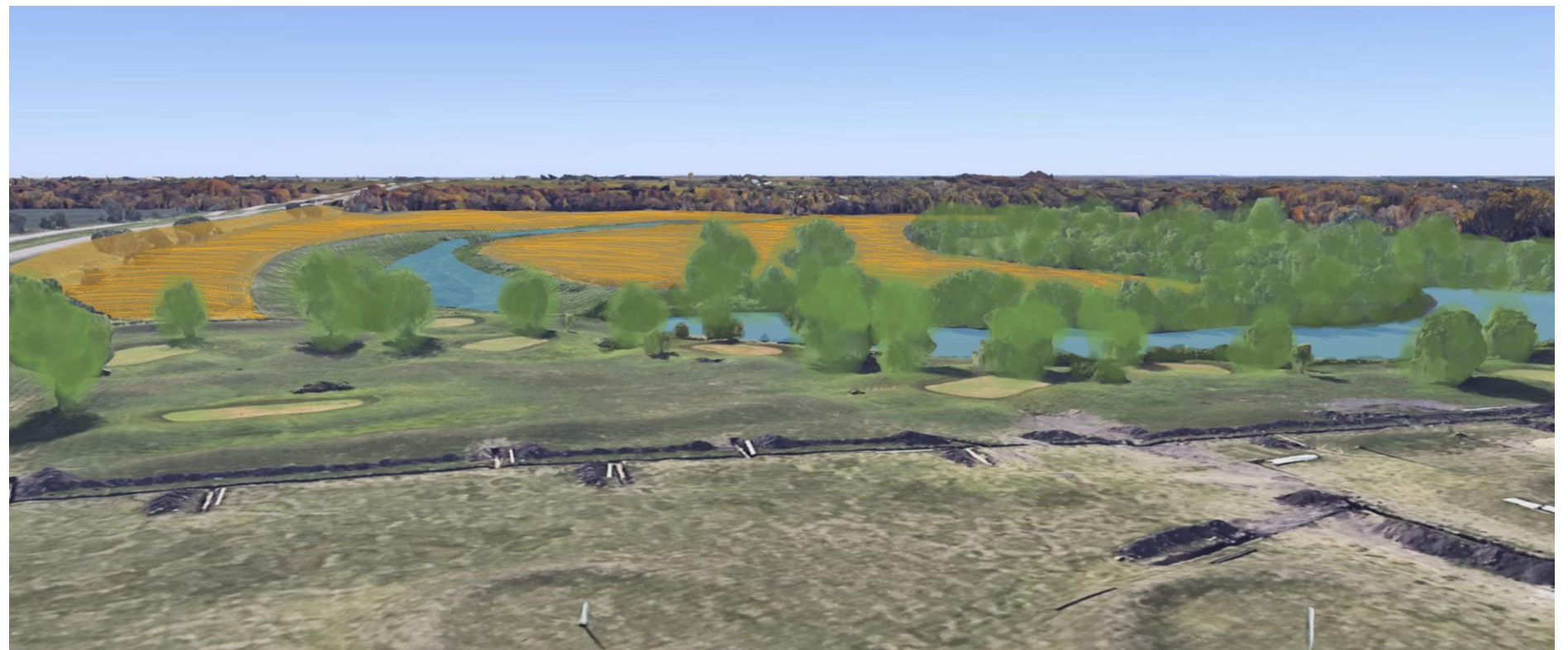


Fig. 41





Fig. 42

# Focus Area 4: Baker Wetlands

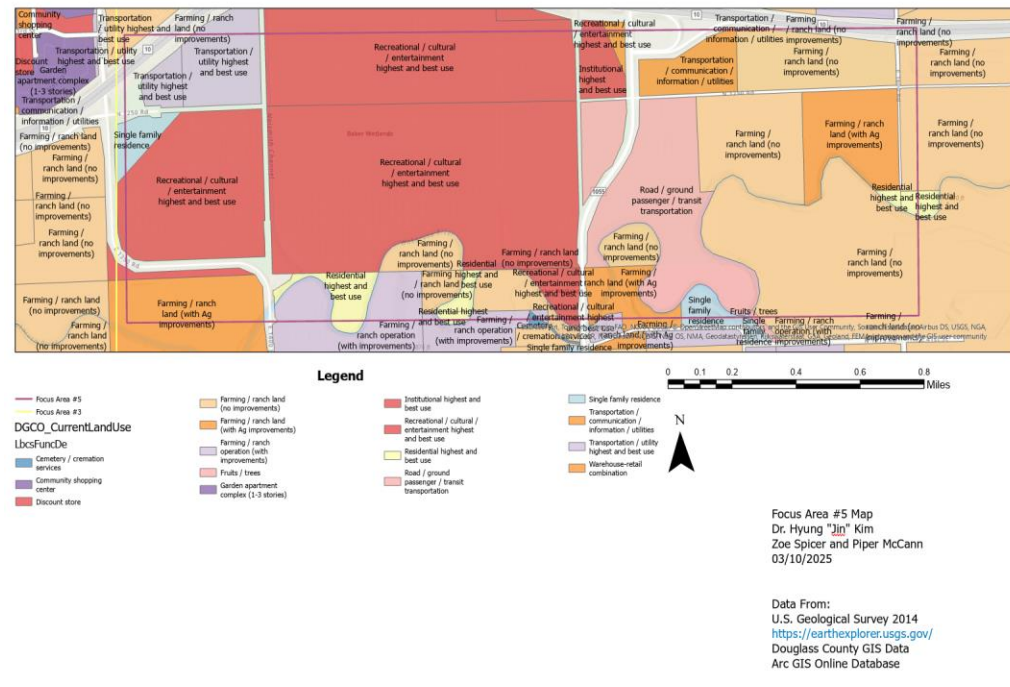


Fig. 43

Restore - Allows the Corridor to connect with the Baker wetlands to allow for better ecological flow.  
Develop - Highlight the beauty of the Baker Wetlands by expanding the park.



Forestry



Pond Pockets



Prairie



Wetlands



Trails



Fig. 44



Fig. 45



# Focus Area 5: Eudora Boat Access Ramp



Fig. 46



Fig. 47

## Develop & Conserve

- Show the community that the river is a part of their history
- Spread awareness of current river conditions to motivate the community to care about the river's future



Fig. 48



Fig. 49



Fig. 50



# Constraints and Opportunities



## Constraints

- Extreme downhill slope, due to the riverbank, causes dangerous conditions for both humans and animal habitats.
- Frequent noise pollution from train on South side of the site.
- **No existing sidewalks/pedestrian access on the southeast corner.**
- Busy highway noise pollution.
- **Existing industrial/developed site (Water treatment plant).**
- Existing heat island & micro-climate from the concrete and other hard scape ground materials.
- **Extreme flood hazard zone.**
- No signage to let community know there is space for them

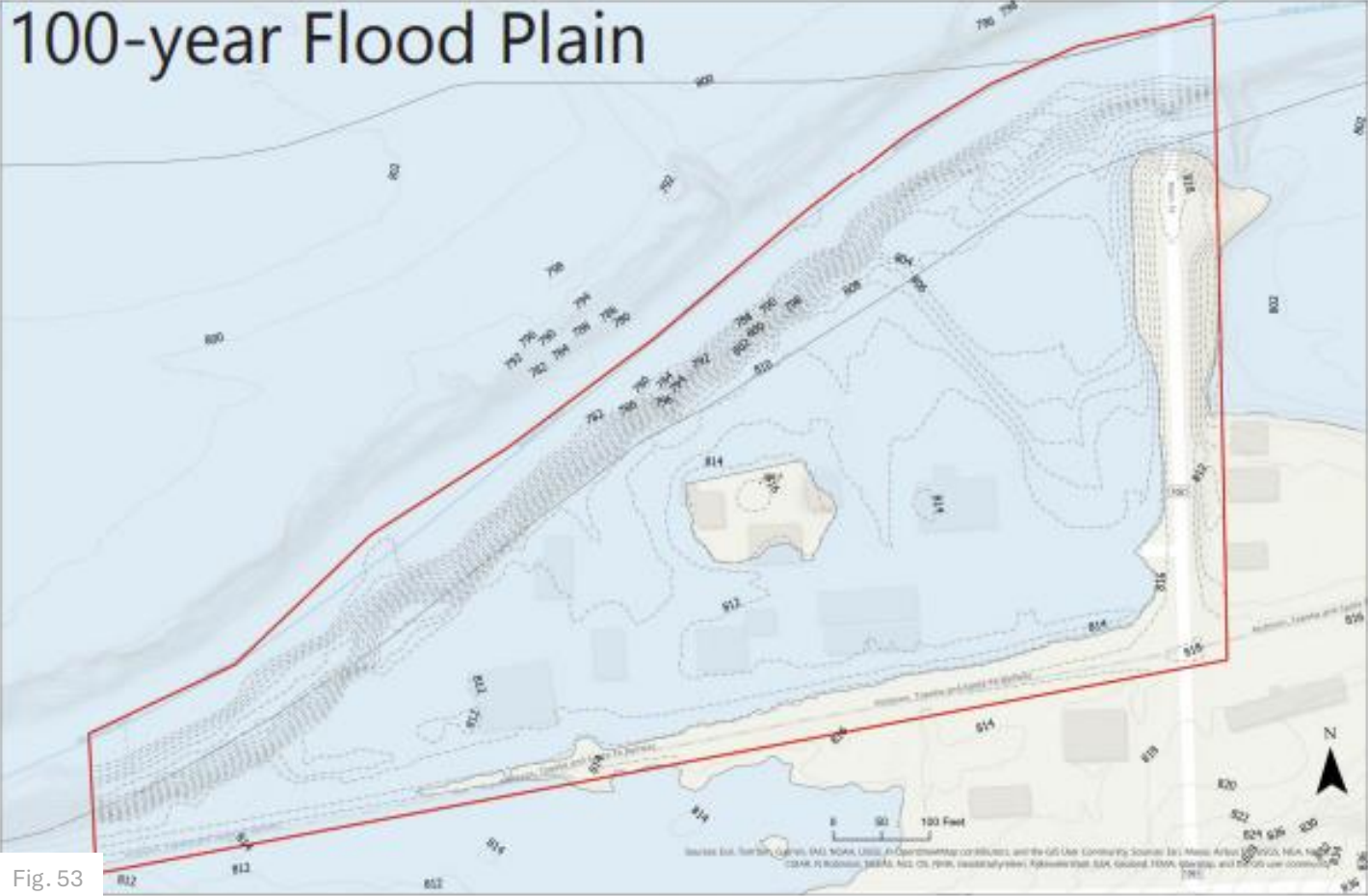


## Opportunities

- **Create a safe and exciting space for riverfront recreation and relationship integration with humans and animals.**
- Possible connections to proposed and existing bike paths.
- Proximity to highway allows for more exposure.
- **Potential for an increase in ecological diversity.**
- Connection to historical sites (Pilla Park and the Pilla House).
- **Revitalizing the ground plane into a richer, ecologically sustainable area.**
- Ability to recycle materials and buildings into new design.



# Current Conditions





# Eudora's Backyard

## Design Concept

The design concept centers on connecting the community of Eudora through a symbolic representation of their own backyard. This is an inviting, familiar space that encourages interaction and shared experiences. By revitalizing a lesser-used area and transforming it into a vibrant community hub, the project fosters a meaningful connection between residents and the Wakarusa River. This renewed access to the water not only enhances the town's sense of place but also highlights the river's significance in Eudora's past and future. Educational elements woven throughout the space allow community members to learn about the river's history and origins, developing a deeper appreciation for its role in the region. As people begin to care more deeply about the Wakarusa, the potential for regional-scale environmental and social enhancement becomes a reality.

## Goals & Objectives

### Phase 1:

- Connecting the Community
  - River Recreation
  - Socially Interactive Spaces
    - Family-Friendly Space
- Conservation
  - Education of River Ecology
  - Prioritizing Eudora's Identity
    - Keeping a "tight-knit" Community

### Phase 2:

- Revitalization
  - Repairing Damaged Ecology
    - Soil, Plant, and other wildlife improvements



# Eudora's Backyard



Fig. 5

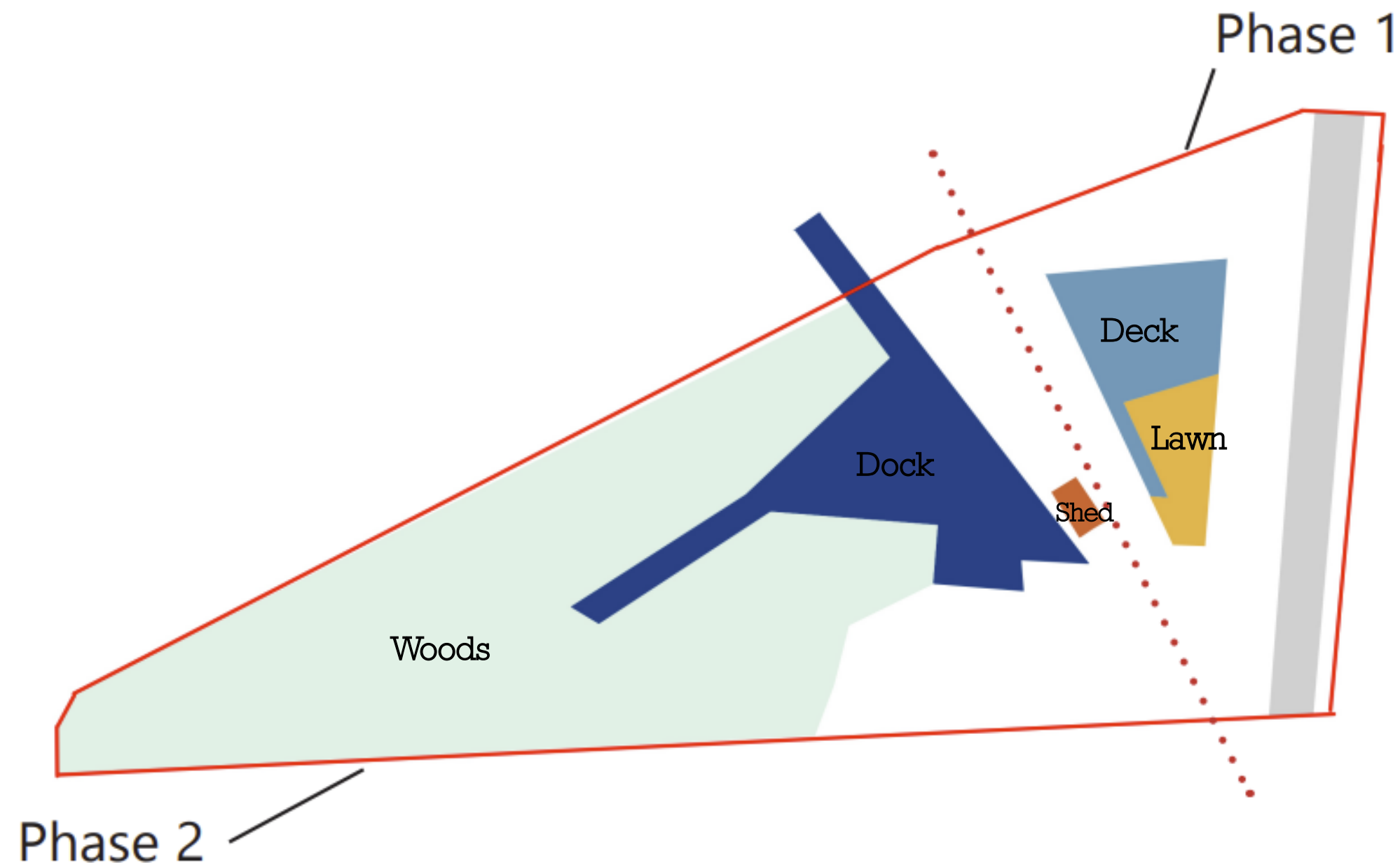
Fig. 57

0' 100'

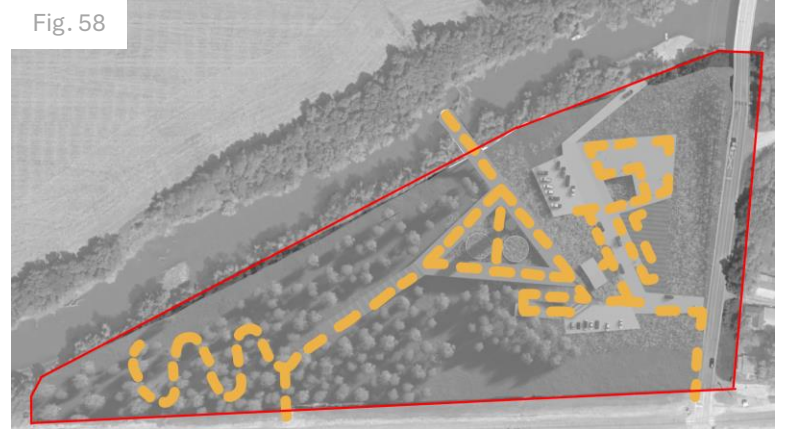




# Spatial Organization and Circulation



- **The Deck (primary):** provides a safe, family-friendly environment for grilling in the kitchen while enjoying a picnic. The proximity to the boat ramp and river allows for a chance to connect to the river without participating in any river activities. To create a backyard feel, you must first step onto the deck.
- **The Lawn (primary):** Connecting it to the deck allows for a smooth transition into yard games and sports. The Lawn connects friends and family with activities.
- **The Dock (secondary):** Since not everyone in Eudora owns a dock, The Dock creates an opportunity for everyone to enjoy this community-friendly area. The majority of activities at The Dock include fishing, walking, and biking.
- **The Woods (tertiary):** The Woods are to accommodate and expand on the native animal habitats. Throughout the woods, cow trails are marked to promote curiosity in nature while maintaining a safe path.
- **The Shed:** Water activity and yard game rental store. All items are free, and the use of the trading honor system allows for everyone to feel welcome in the Backyard.



Pedestrian Circulation



Bike Circulation



Vehicle Circulation



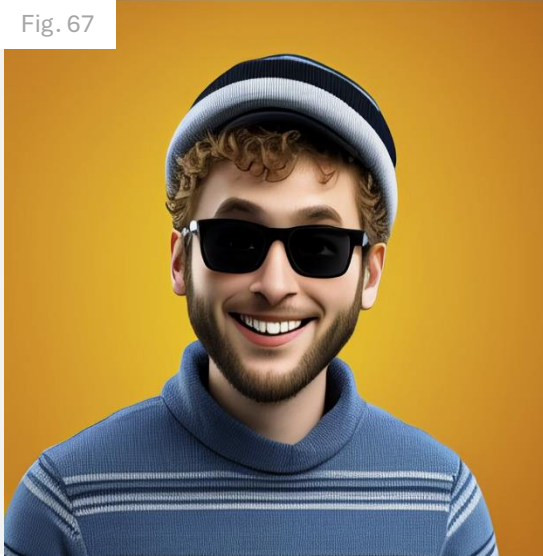
# Age Demographic



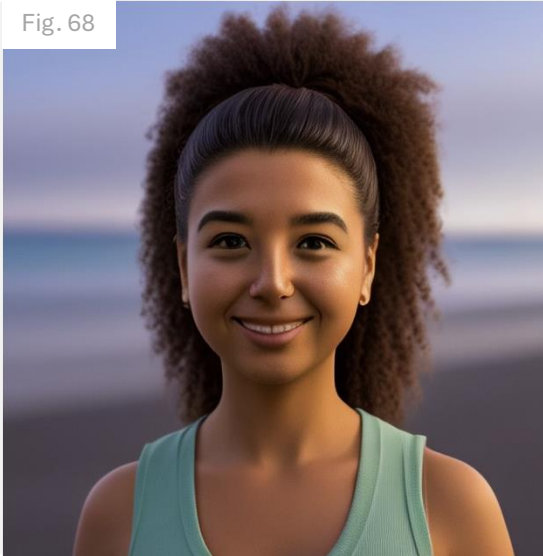
Nicole, 8 y/o  
She lights up Sundays chasing butterflies along the flower-lined boardwalk, enjoying picnic lunches with her family after church, and diving into every outdoor game with joy.



Peter, 16 y/o  
He's all about practicing soccer with his friends on the lawn, exploring the wooded trail, and capturing the perfect Instagram shot with the mural in the background.



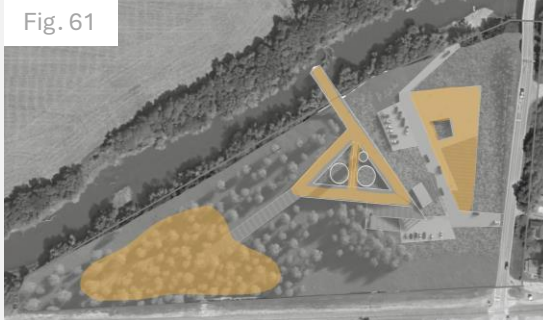
Pedro, 26 y/o  
He bikes to the site with his friends for a game of corn hole on the lawn, and when it's guys' night out, he fires up the grill in the outdoor kitchen for a perfect evening.



Michelle, 45 y/o  
She loves peaceful walks along the boardwalk, where the smooth ramps make it easy to push her baby's stroller. Afterward, she enjoys cozy family time by the fire pit or a fun picnic day with kayaking and yard games.



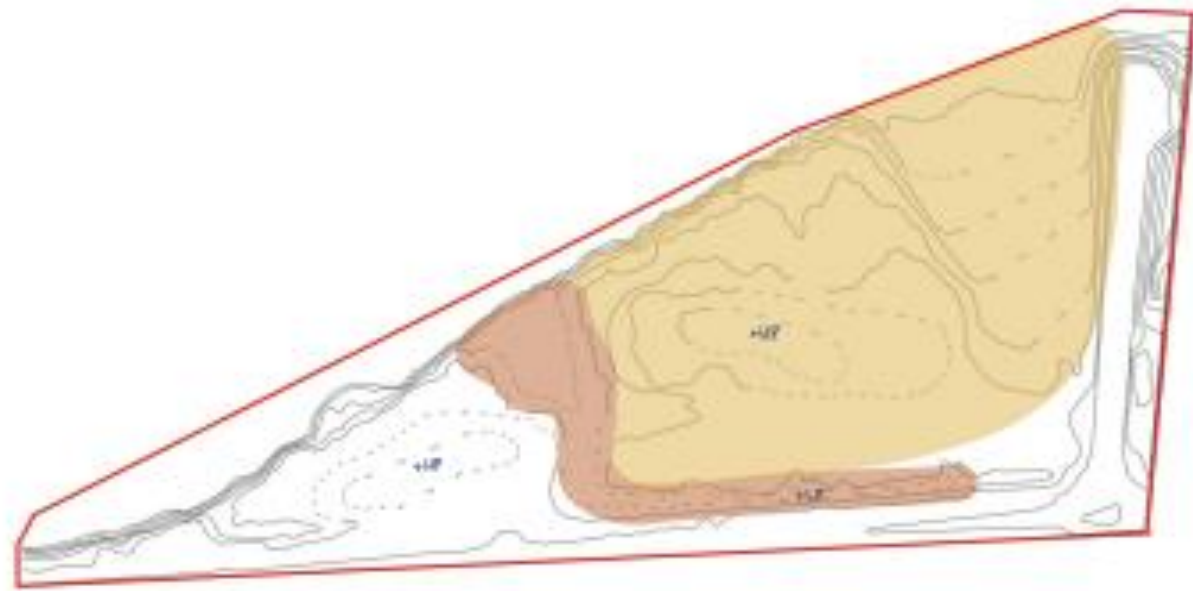
Carl, 70 y/o  
He spends his free time fishing off the bridge, then uses the fish station to prepare a delicious family dinner. The easy-access ramps along the boardwalk make his daily morning walks a breeze.



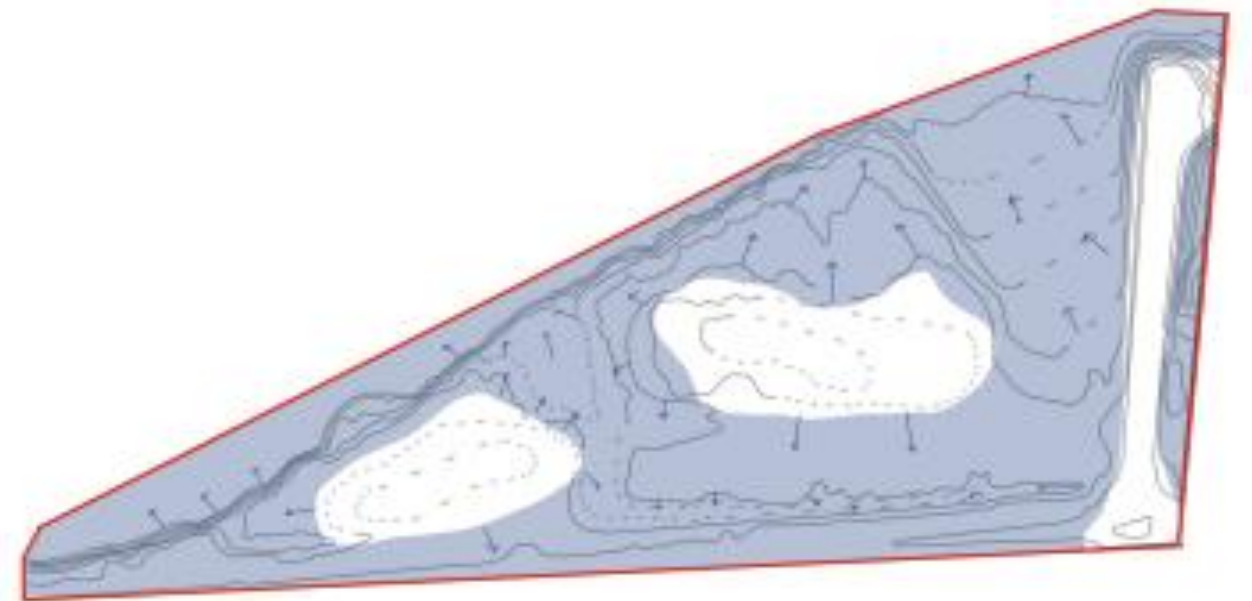


# Stormwater Mitigation

The existing site was at risk of flooding at two spots on the site. To combat the flooding hazard, the topography was altered to create two mounds that would be located outside the floodplain. The two mounds then create a swale between them. The topography accommodates the swale by directing it into a rain garden near the Southeast corner of the site. Near the Northeast corner of the site, the area was mainly built of concrete, creating a smooth and impenetrable surface for the water. Creating rain gardens underneath The Deck and using permeable surfaces, such as gravel, creates an opportunity to control the floodplain.



Design Elements for Water Mitigation



100-Year Flood Plain





# Vegetation & Materials

- **Gravel:** A permeable surface to combat flood risk.
- **Wood Planks:** Organic material that is found throughout Eudora to continue the small-town feel.
- **Oak and Elm Trees:** Native Eudora trees that create a shaded micro-climate when strolling through the site.
- **Native/Drought Tolerant Vegetation:** Creates ecological diversity throughout the site while also mitigating flood risk.
- **Lawn:** To continue the "backyard" theme/feel and allowing a place for people to play and enjoy the land. Also, creates a contrast with the native prairie along the highway and plated in the Rain Gardens.

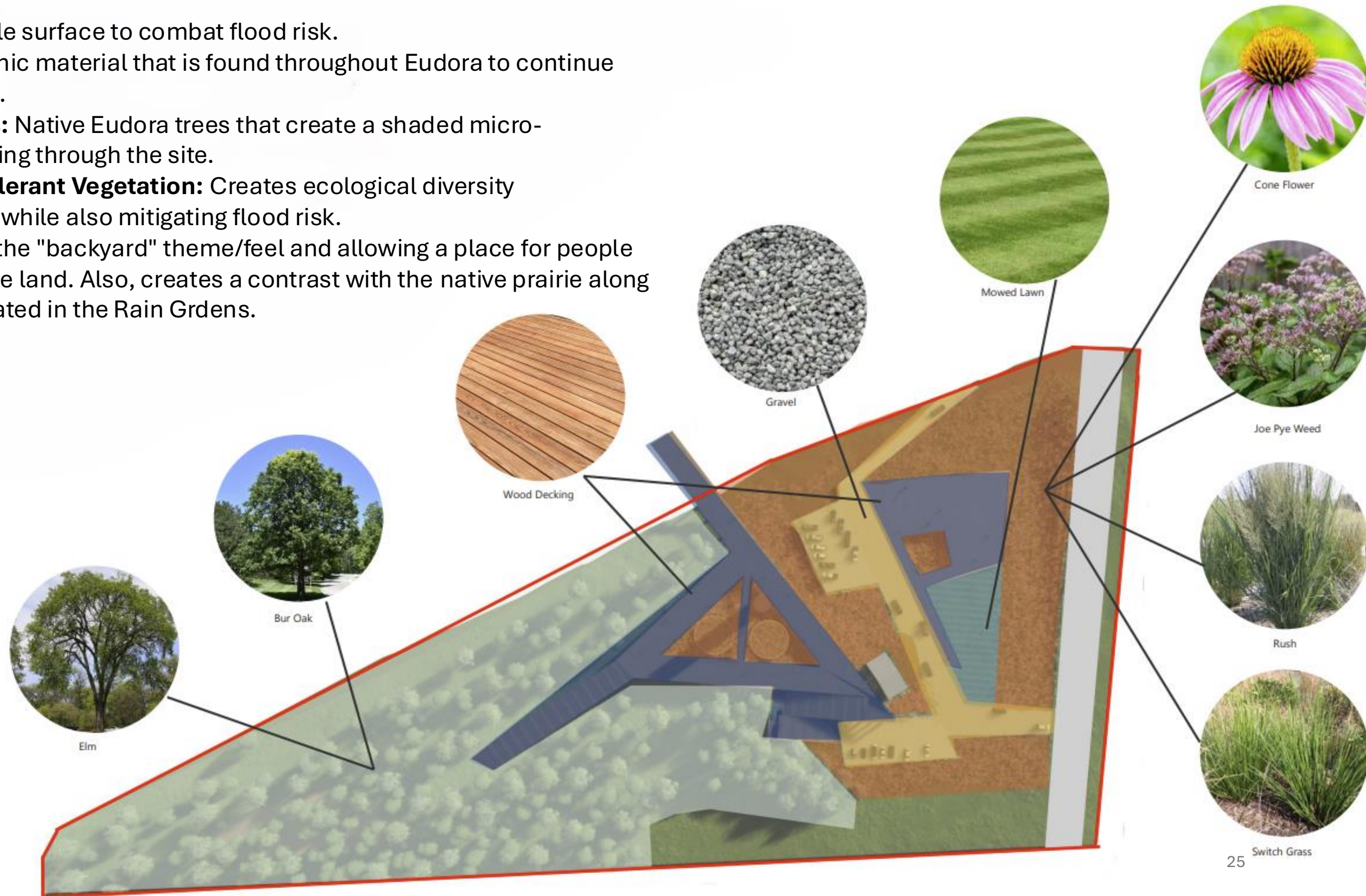






Fig. 70



# Works Cites

Fig. 1: Spicer, Zoe. Photo of Piper McCann & Ariel Gish. Photograph. 2025. February 13, 2025

Fig. 2: McCann, Piper. Photo of Zoe Spicer. Photograph. 2025. February 13, 2025

Fig. 3-6: Council, Heritage Conservation. "Douglas County Natural Landmarks." ArcGIS StoryMaps, January 25, 2024.  
<https://storymaps.arcgis.com/stories/c5d270ea3b2345939464fab503484e88>.

Fig. 7: FEMA. Flood Hazard Map. Map. 2019. February 17, 2025. ArchGIS. =

Fig. 8: ArcGIS. Watershed Map. Map. 2019. February 17, 2025

Fig. 9: O'Conner, Howard. Geologic Map of Douglas County, Kansas. Map. February 17, 2025. <https://www.kgs.ku.edu/General/Geology/County/def/douglasLarge.html>

Fig. 10: ArcGIS. "Current Land Use Map." Accessed March 11, 2025.

Fig 11-14: Douglas County, KS. "Tax Districts." ArcGIS StoryMaps, November 5, 2024. <https://storymaps.arcgis.com/stories/4a85e7f1ef4b40ea8994eea3fd83b736>.

Fig. 15: Spicer, Zoe. "Ecological Overlay Map." 2025. Accessed March 09, 2025.

Fig. 16: Douglas County, KS. "Tax Districts." ArcGIS StoryMaps, November 5, 2024. <https://storymaps.arcgis.com/stories/4a85e7f1ef4b40ea8994eea3fd83b736>.

Fig. 17-22: SASAKI. "Huangshi Bay Coastal Park Master Plan." Sasaki, 2021. Accessed March 10, 2025. <https://www.sasaki.com/projects/huangshi-bay-coastal-park-master-plan/>.

Fig. 23-28: Landscape Architecture Foundation. "Dune Peninsula at Point Defiance Park." Landscape Performance Series, December 11, 2024.  
<https://www.landscapperformance.org/case-study-briefs/dune-peninsula>.

Fig. 29: Google Earth, "Wakarusa River." Screenshot. Accessed March 11, 2025.

Fig 30: ArcGIS. "Focus Area Map." Accessed March 11, 2025.

Fig 31: Google Earth, "Wakarusa River." Screenshot. Accessed March 11, 2025

Fig 32: Google Earth, "Wakarusa River." Screenshot. Accessed March 11, 2025

Fig 33: Council, Heritage Conservation. "Douglas County Natural Landmarks." ArcGIS StoryMaps, January 25, 2024. Accessed March 11, 2025.  
<https://storymaps.arcgis.com/stories/c5d270ea3b2345939464fab503484e88>.

Fig 34: ArcGIS. "Focus Area Map." Accessed March 11, 2025.



# Works Cited

- Fig 35&36: Google Earth, "Wakarusa River." Screenshot. Accessed March 11, 2025.
- Fig 37: Yellowstone to Yukon Conservation Initiative, Allie Banting. "How Do Wildlife Know to Use Animal Bridges and Crossings?" Yellowstone to Yukon Conservation Initiative, May 15, 2024. Accessed March 11, 2025. <https://y2ynet/blog/how-do-wildlife-know-to-use-animal-bridges/>.
- Fig 38: ArcGIS. "Focus Area Map." Accessed March 11, 2025.
- Fig 39-41: Google Earth, "Wakarusa River." Screenshot. Accessed March 11, 2025.
- Fig 42: ArcGIS. "Focus Area Map." Accessed March 11, 2025.
- Fig 43: ArcGIS. "Baker Wet Lands Current Land Use Map." Accessed March 11, 2025.
- Fig 44: Fisheries, NOAA. "Recommendations for Reducing Wetland Loss in Coastal Watersheds of the United States." NOAA, June 13, 2022. Accessed March 11, 2025. <https://www.fisheries.noaa.gov/feature-story/recommendations-reducing-wetland-loss-coastal-watersheds-united-states>.
- Fig 45: Google Earth, "Wakarusa River." Screenshot. Accessed March 11, 2025.
- Fig 46: ArcGIS. "Focus Area Map." Accessed March 11, 2025.
- Fig 47: Google Earth, "Eudora." Screenshot. Accessed March 11, 2025.
- Fig 48: nnovation Norway. "Fun on Norway's Rivers." River activities in Norway | Riverboarding, rafting, packrafting, SUP, 2025. Accessed March 11, 2025. <https://www.visitnorway.com/things-to-do/outdoor-activities/river-activities/>.
- Fig 49: Karin, Tammy. "Linear Park: Manhattan, Kansas." littleleapling.com, August 26, 2021. Accessed March 11, 2025. <https://littleleapling.com/2021/08/26/linear-park/>.
- Fig 50: Friends of the Kaw. "Kansas River Access Map." Kansas Riverkeeper Friends of the Kaw, 2025. Accessed March 11, 2025. <https://kansasriver.org/river-access-map/river-mile-42-eudora-access-ramp/>.
- Fig. 51 & 52: Google Earth, "Eudora." Screenshot. Accessed March 11, 2025.
- Fig 53: ArcGIS. "Watershed." Accessed March 11, 2025
- Fig 54: ArcGIS. Eudora Site Slope Map. Map. 2019. February 17, 2025
- Fig. 55: McCann, Piper. Photo of Eudora Access Ramp Parking. Photograph. 2025. February 13, 2025
- Fig. 56: Karin, Tammy. "Linear Park: Manhattan, Kansas." littleleapling.com, August 26, 2021. Accessed March 11, 2025. <https://littleleapling.com/2021/08/26/linear-park/>.
- Fig. 57-64: Google Earth, "Wakarusa River." Screenshot. Accessed March 11, 2025.
- Fig. 65-69: Apple, "Image Playground." AI-Generated Images. Accessed April 28, 2025
- Fig. 70: Google Earth, "Wakarusa River." Screenshot. Accessed March 11, 2025.