The Terry Trueblood Wetland Exploration Trail

Students of *Urban & Regional Planning 6256: Environmental Policy & Management*

The Parks & Recreation Commission

Iowa City, Iowa

April 11, 2018

The University of Iowa School of Urban & Regional Planning

Terry Trueblood Recreation Area

- City's largest and most visited park

- Added in 2006

- Open in 2013

- Adaptation Plan for

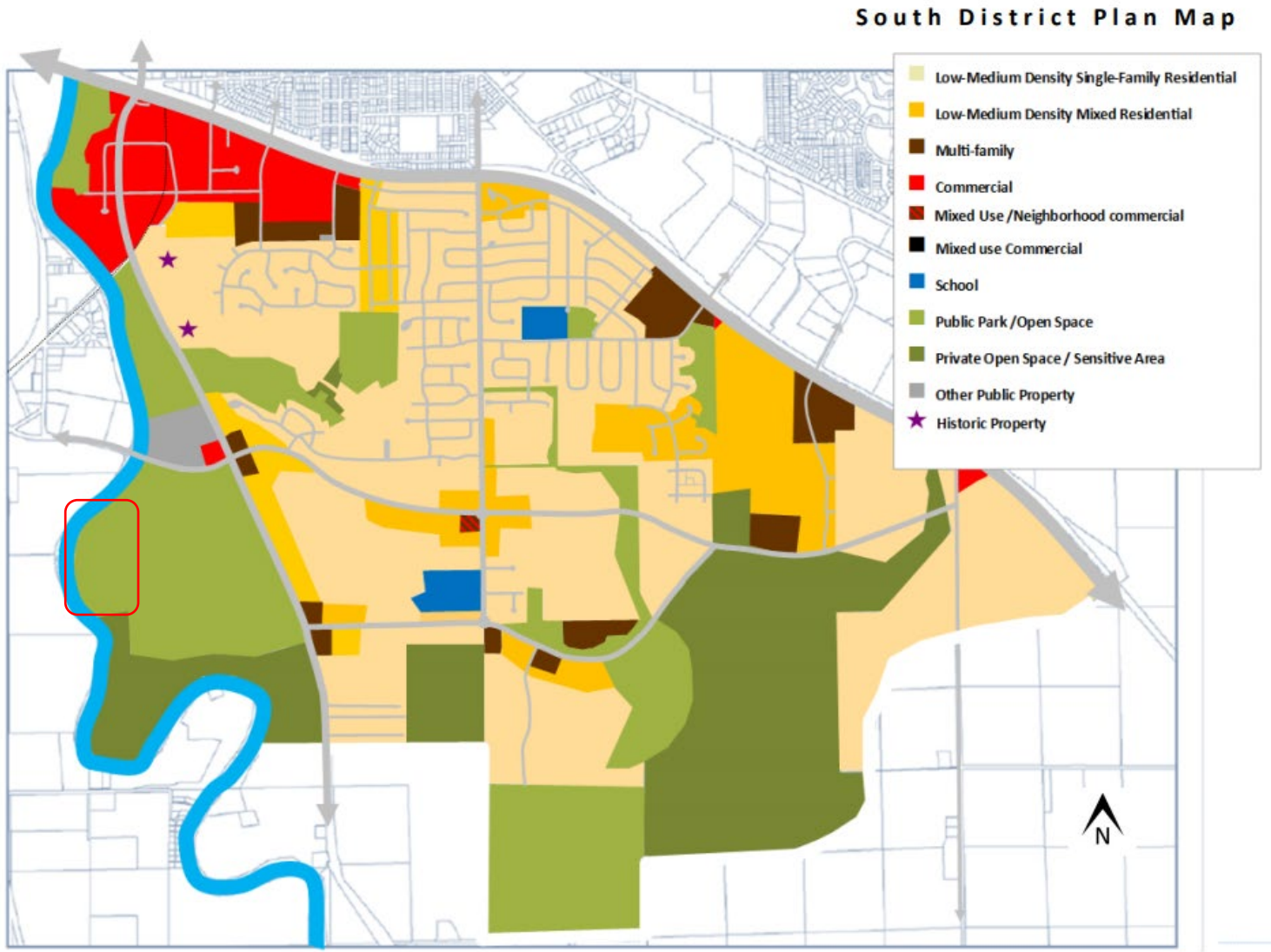
The Terry Trueblood Wetland Exploration Trail (TTWET)

Needs Identification & Emerging Conditions

- Rapid population growth in South District
- Increased flood frequency/intensity, public lands in floodplains
- Increasing parks uses and usage with budget constraints
- Built/natural/digital environments for a new generation of visitors

Population Growth

- Housing variety
  - Single-family
  - Multi-family
  - Manufactured
- Rapid growth expected
- High % of owner-occupied housing for Iowa City



play here
south iowa city

Floodplain Park

- 100 year floodplain 29 feet
- 500 year floodplain 32.5 feet
- "Hydrologic connection"
- Lake stocked with two species, contains all species in Upper Mississippi River Basin

Johnson County GIS Property Viewer
100 year floodplain map
http://gis.johnson-county.com/piv/

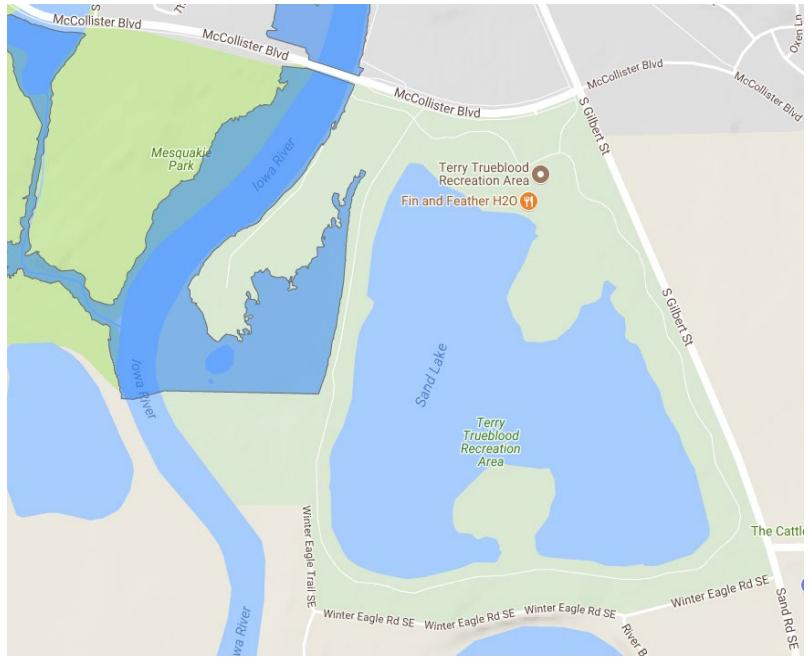
Four of the top 10 historic crests in 170 years of Iowa River observations have occurred in the last decade.

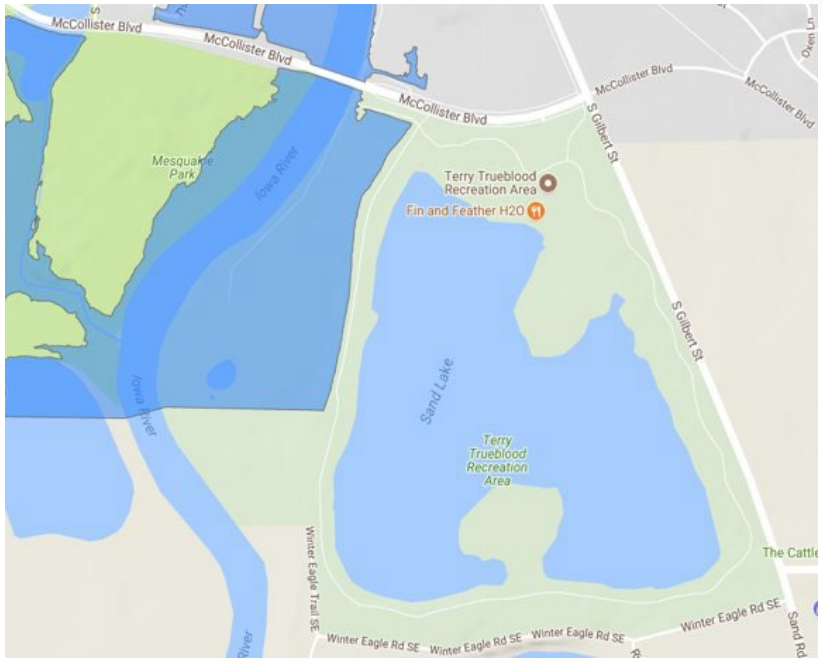
Top Ten Historic Crests – Iowa River at Iowa City, IA
(1) 31.53 ft on 06/15/2008
(2) 28.52 ft on 08/10/1993
(3) 25.15 ft on 07/12/2014
(4) 24.90 ft on 06/05/2013
(5) 24.10 ft on 06/01/1851
(6) 23.35 ft on 06/13/1991
(7) 22.56 ft on 07/01/2014
(8) 22.44 ft on 06/09/1974
(9) 22.04 ft on 05/01/1973
(10) 21.64 ft on 03/29/1979

USGS science for a changing world

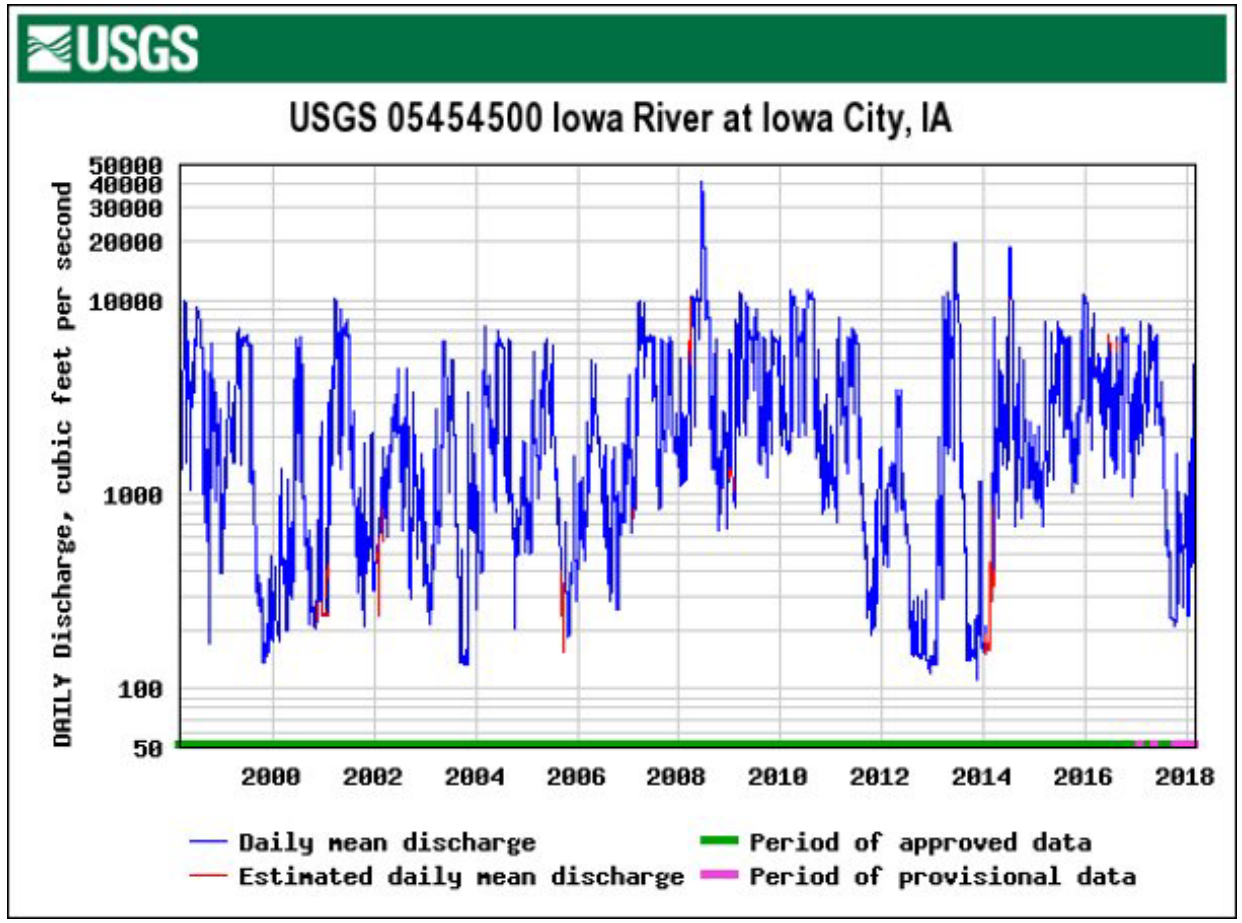
US Geological Survey (USGS) - Discharge Rates and Historical Crests
https://waterdata.usgs.gov/nwis/dv/?site_no=05454500&agency_cd=USGS&referred_module=sw

Inundation at 23 feet, 26 feet





Iowa Flood Information System – Inundation Map http://ifis.iowafloodcenter.org/ifis/



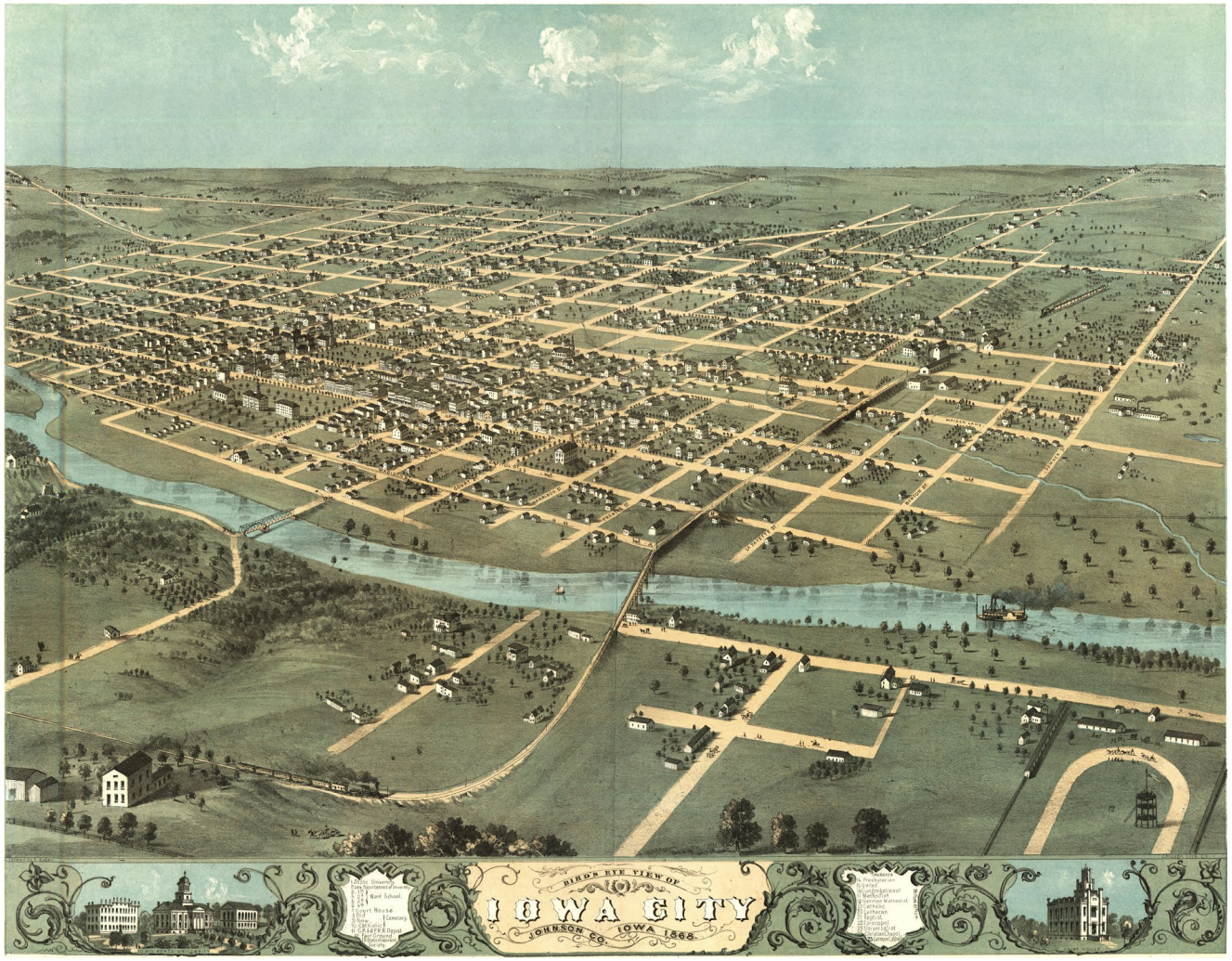
Learning from the last 20 years

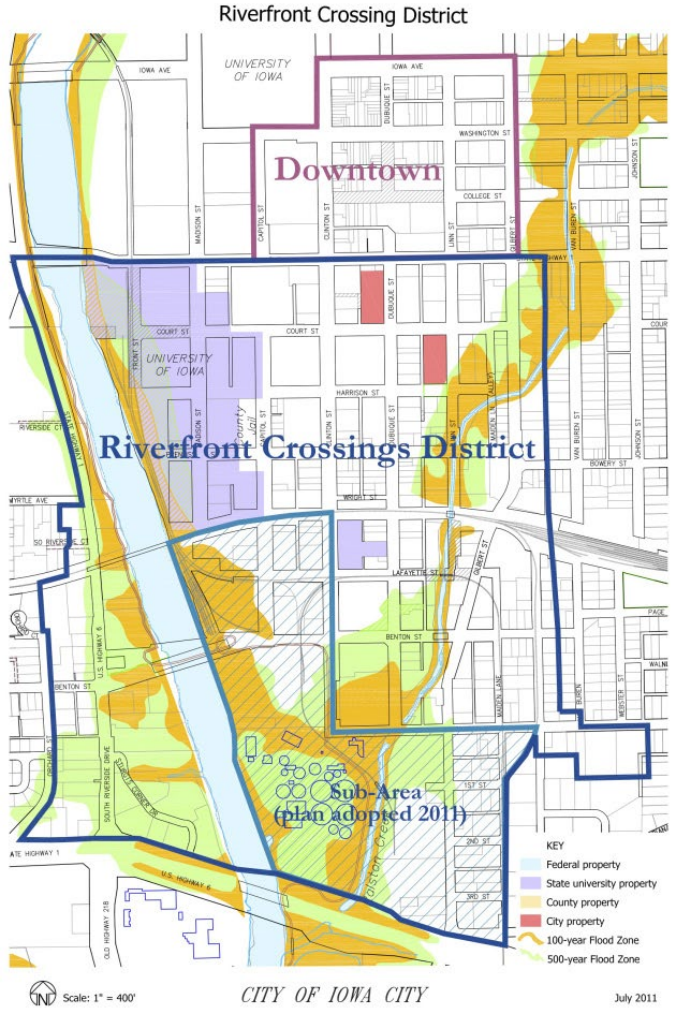
- Flows >11,000 cfs begin to cover the site.

- Bottom Line: expect the site to flood every 1-10 years, with floodwaters present from 2 to 12 weeks.

River Elevation	Discharge Rates (cfs)	Condition of TTW
22.0ft	13,800 cfs	TTW partially covered in water
26.0ft	22,600 cfs	TTW mostly covered in water
29.0ft	31,200 cfs	100-year floodplain
32.5ft	40,900 cfs	500-year floodplain

Iowa City's Riverfront Remade





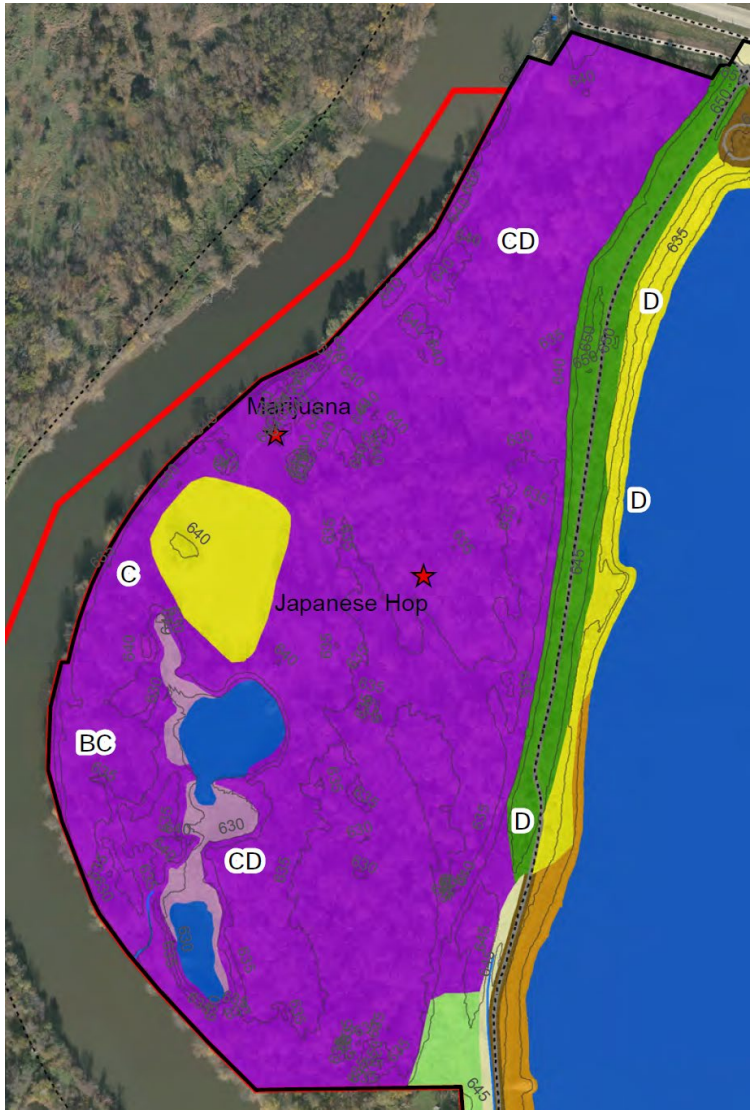
Natural Areas Assessments

Habitat Connections
- Sand Prairie and Wetherby Park
- Makada Wetland Mitigation and Sycamore Greenway to the East
- Ryersons Wood and Mesquakie Park to the West (across the river)

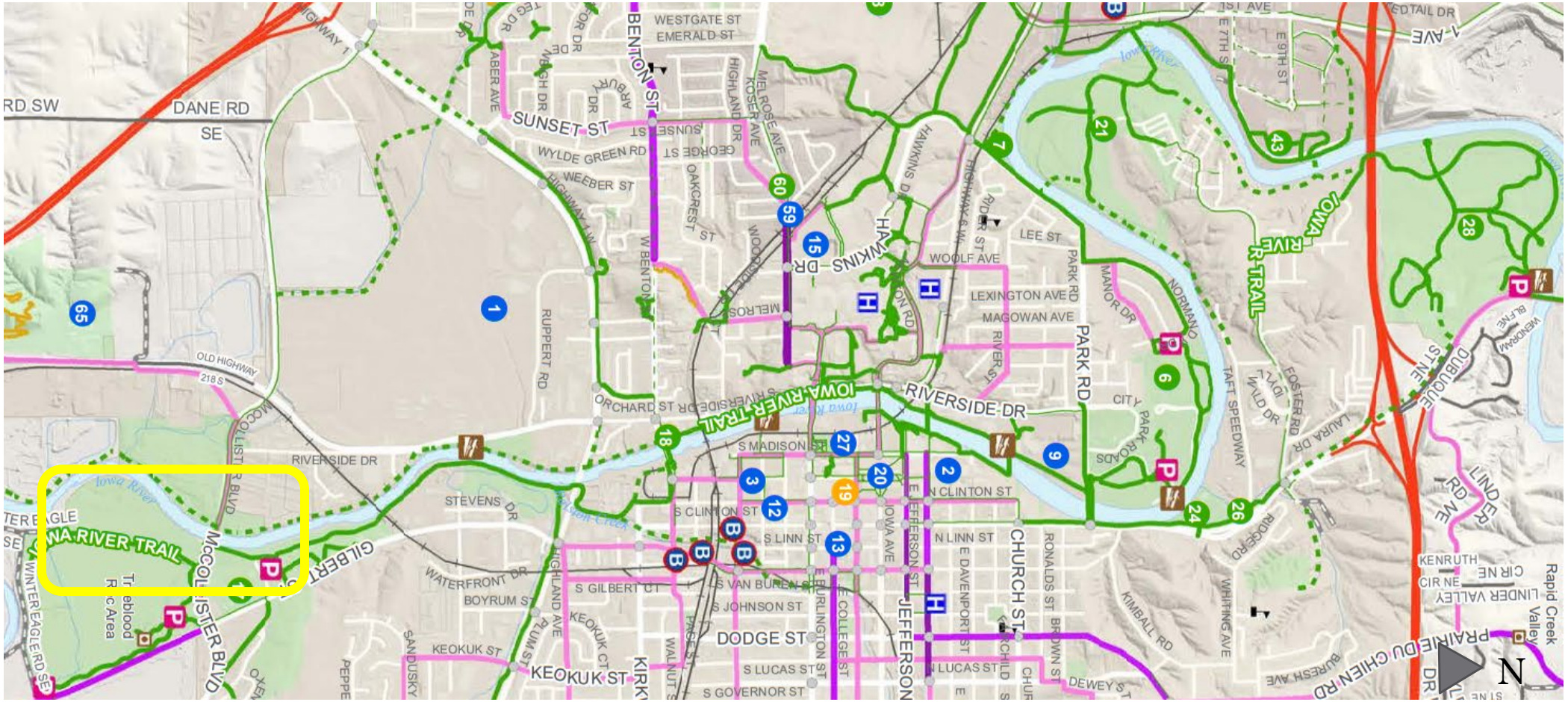
Previous Use
- Cropland
- Sand and gravel quarry

City of Iowa City Natural Areas Inventory and Management Plan

Iowa DNR Forest Stewardship Plan, Healthy Forest Initiative



Iowa River Corridor Trail



City Parks Master Plan

- Scale Classification: Regional
  - Attracts visitors from outside immediate community
  - Service radius: up to 60 miles

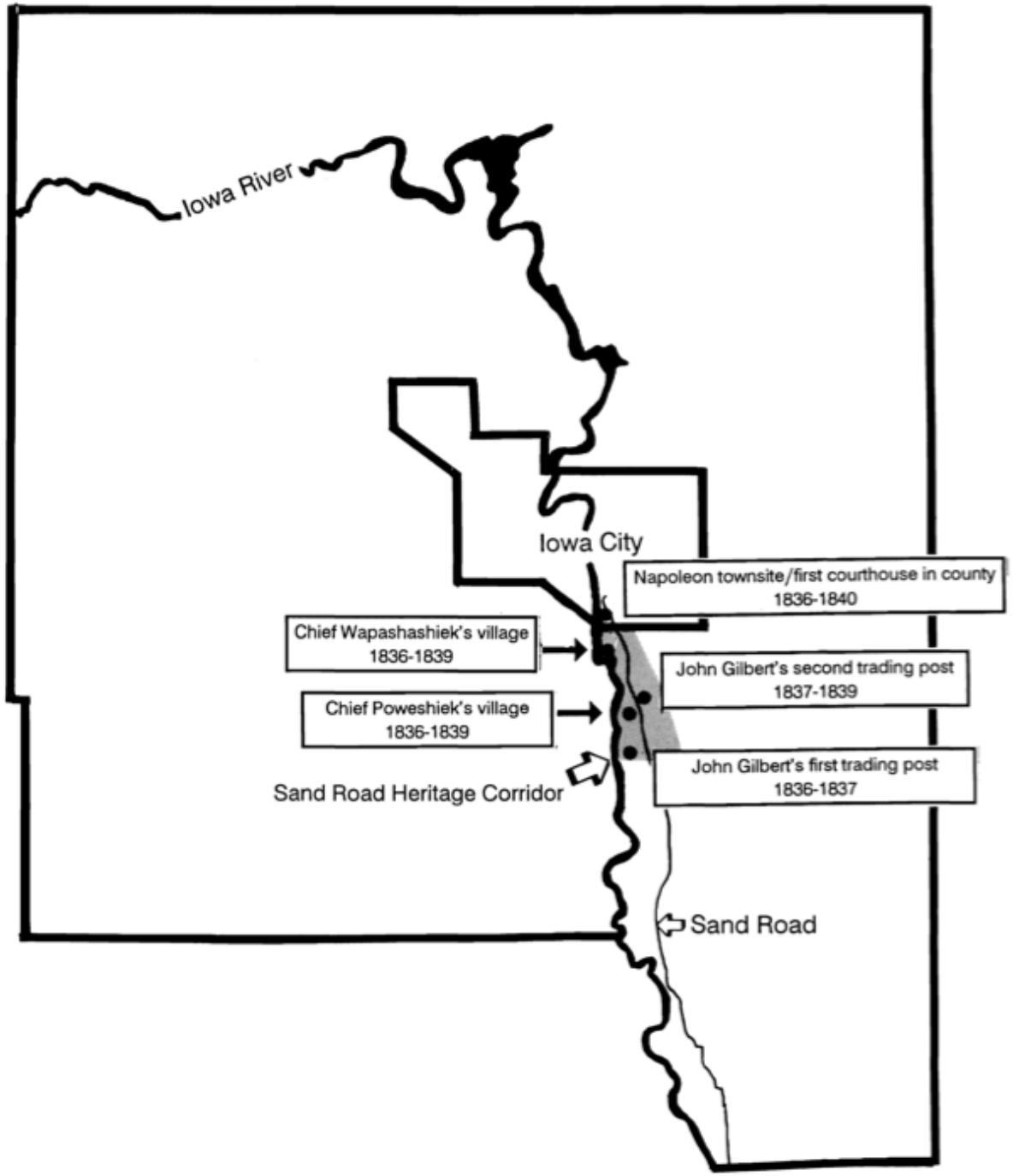
- Character Classification:
  - Primary: Go Wild
  - Secondary: Connect

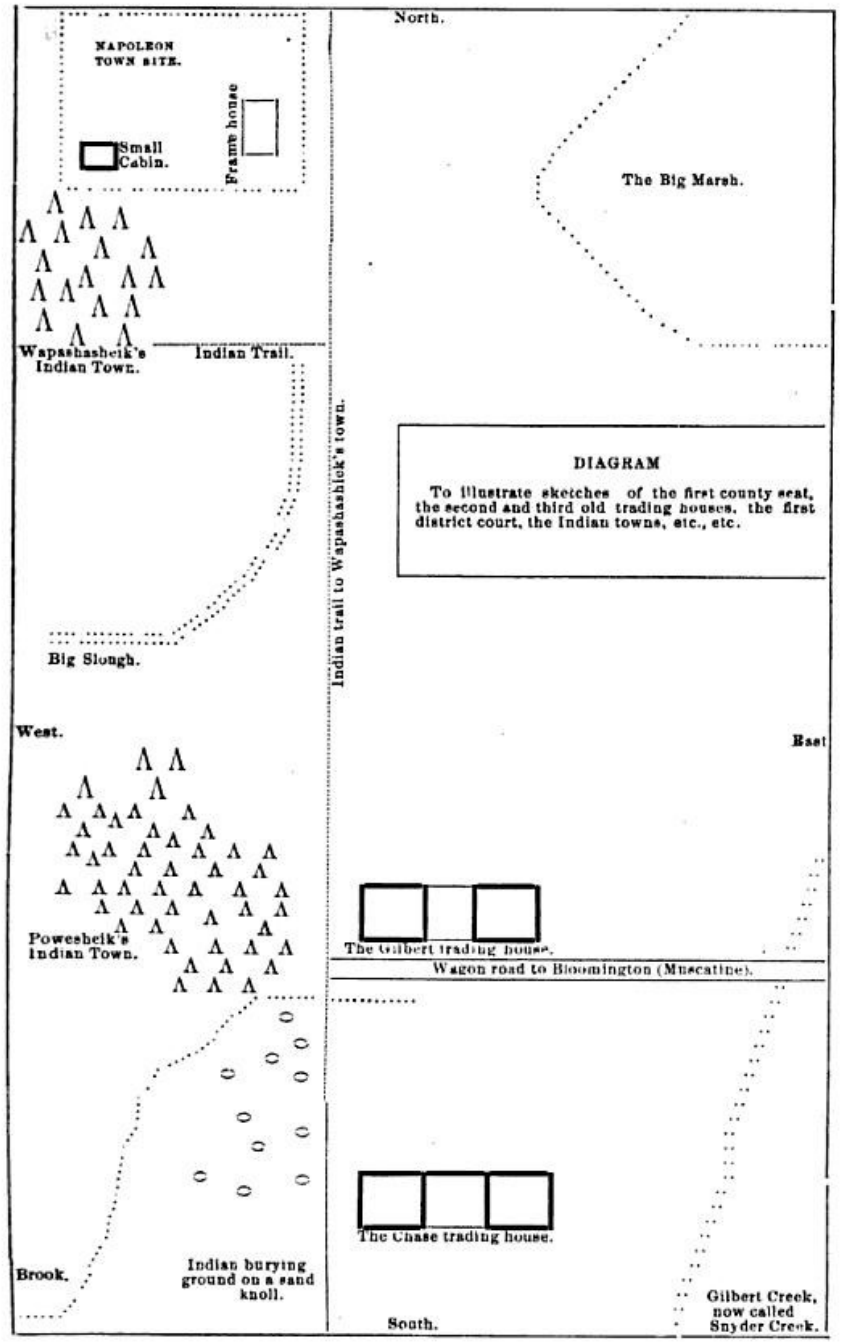
Go Wild 	Nature preservation is the focus of these parks, and natural areas with native plants and animals shape the human experience. Natural play, woodland or creek exploration, or some level of immersion in nature dominates here. These parks tend to support hiking, discovery and create-your-own adventure instead of a structured event. In this way, Go Wild parks, especially the larger ones, overlap with Reflect and Learn parks.	Ryerson's Woods, Terry Trueblood Recreation Area, Hickory Hill
Connect 	These parks support social connections through programming or facilities. An events lawn, a performance space or a central shelter might be an indicator, or trails and sidewalks linking to the park. These would support informal connections and programs like pot lucks, reunions or cultural exchanges.	City Park, College Green

Site Features

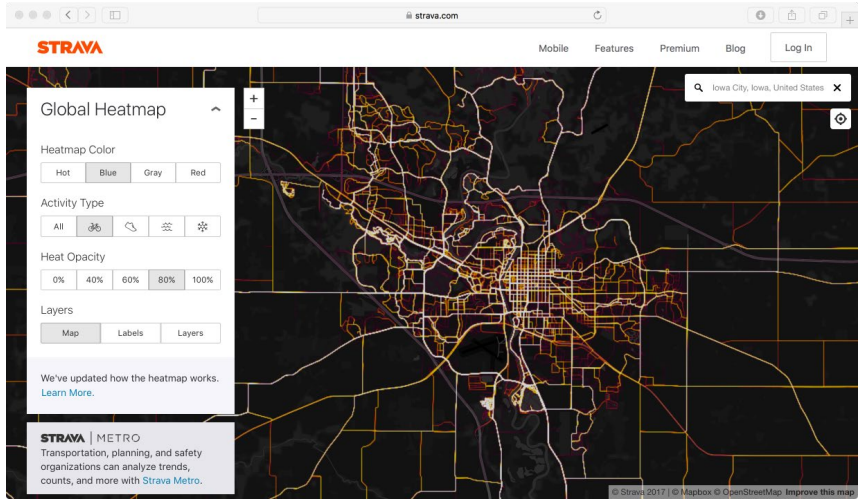
TTWET Attributes

- Cultural history
- Natural history
- Settlement history
- Lake
- Rich soil types
- Fishing
- Biking Path
- Pavilion


Iowa River
Iowa City
Napoleon townsite/first courthouse in county
1836-1840
Chief Wapashashiek's village
1836-1839
John Gilbert's second trading post
1837-1839
Chief Poweshiek's village
1836-1839
John Gilbert's first trading post
1836-1837
Sand Road Heritage Corridor
Sand Road


NAPOLEON TOWN SITE.
Small Cabin.
Frame house
North.
The Big Marsh.
Wapashashaik's Indian Town.
Indian Trail.
Indian trail to Wapashashick's town.
DIAGRAM
To illustrate sketches of the first county seat, the second and third old trading houses, the first district court, the Indian towns, etc., etc.
Big Slough.
West.
East
Poweshaik's Indian Town.
The Gilbert trading house.
Wagon road to Bloomington (Muscatine).
The Chase trading house.
Brook.
Indian burying ground on a sand knoll.
South.
Gilbert Creek, now called Snyder Creek.

Bicycling


strava.com
STRAVA
Mobile
Features
Premium
Blog
Log In
Global Heatmap
Heatmap Color
Hot
Blue
Gray
Red
Activity Type
All
Heat Opacity
0%
40%
60%
80%
100%
Layers
Map
Labels
Layers
We've updated how the heatmap works.
Learn More.
STRAVA | METRO
Transportation, planning, and safety organizations can analyze trends, counts, and more with Strava Metro.
Iowa City, Iowa, United States
© Strava 2017 | © Mapbox © OpenStreetMap Improve this map

TTWET Site Constraints

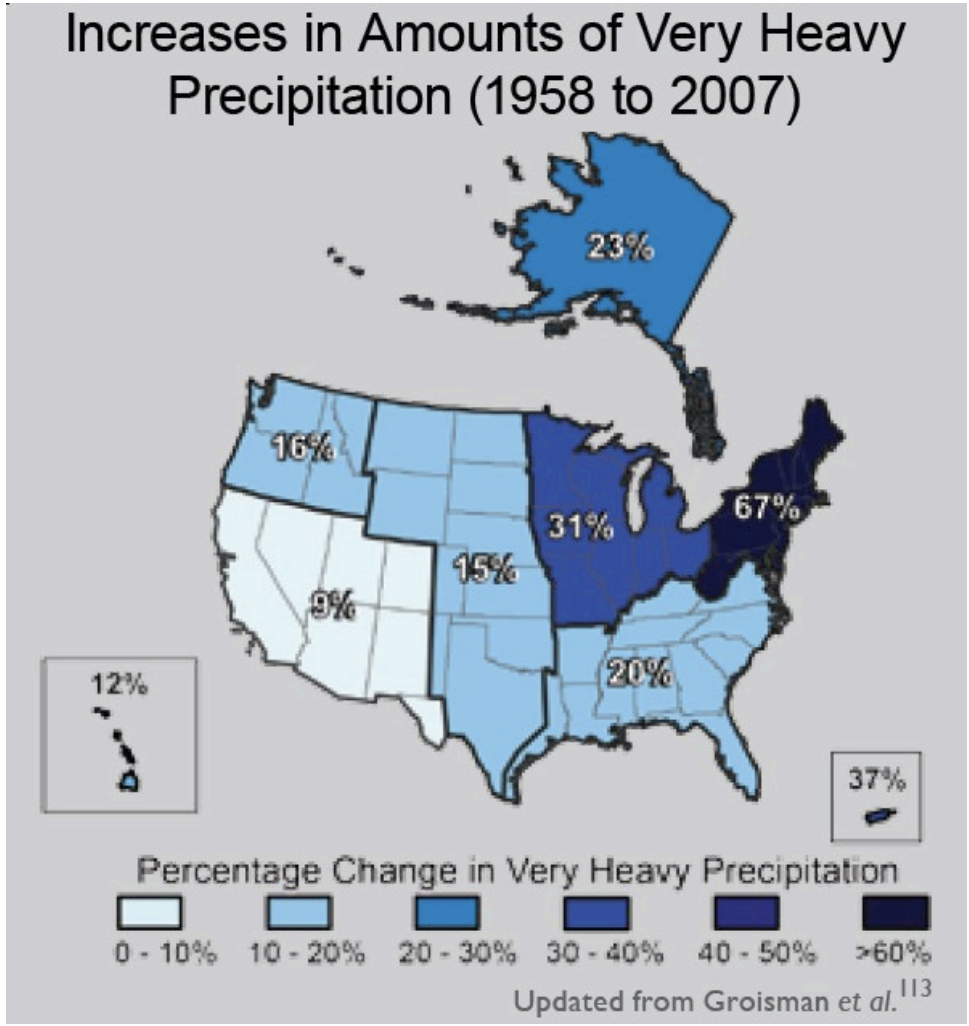
- Low-lying
- Long-duration flooding
- Debris
- Invasive species
- No current infrastructure
- Budget?

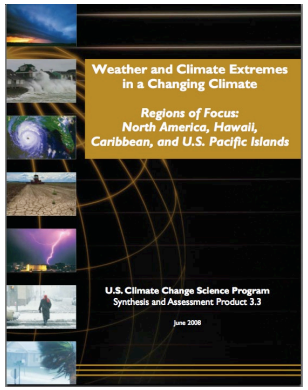
Adaptation Planning

"One of the clearest trends in the United States observational record is an increasing frequency and intensity of heavy precipitation events."

Last 100 yrs: 50% increase in number of days with precipitation > 4 inches in the Upper Midwest.

This trend is statistically significant.





Karl, T. R., J. M. Melillo, and T. C. Peterson, (eds.). Global Climate Change Impacts in the United States. U.S. Climate Change Science Program Synthesis & Assessment Product. Cambridge University Press, 2009, 196pp.

Adaptation Planning Goals

- Assume sudden and incremental environmental changes

- Reduce the vulnerability of social and ecological systems to change
  - Short & long-term time-scales
  - Reduce impacts of flooding for humans and non-humans

- Should be:
  - Protective of unique ecological resources
  - Feasible, low cost, economically efficient
  - Flexible, reflexive, iterative
  - Equitable and protective of health and safety

The TTWET Adaptation Plan

Goals and Objectives

Goals :

1. Promote resilience, adaptation, and ecological regeneration within TTWET and its surroundings.

2. Facilitate increased human interaction with and understanding of the natural area.

3. Create an adaptation plan and planning process template with generalized adaptation strategies and best management practices for other sites along the Iowa River and areas with similar characteristics.

Goal #1: Promote resilience, adaptation, and ecological regeneration

Objectives:

1. Work toward long-term ecological integrity
    1. Plant species that are well-suited for prolonged exposure to flooding and future climate change and provide habitat.
    2. Remove species that are not well-suited (now or in the near future) or that, as invasive species, pose a risk to the wider ecology of the site
2. Attract and retain local and migratory wildlife
3. Use flood-resilient materials and locations for the construction of amenities and signage
4. Clean up garbage and other detritus throughout the site
5. Establish a system for ecological monitoring

Goal #2: Facilitate increased human interaction with and understanding of the natural area

Objectives:

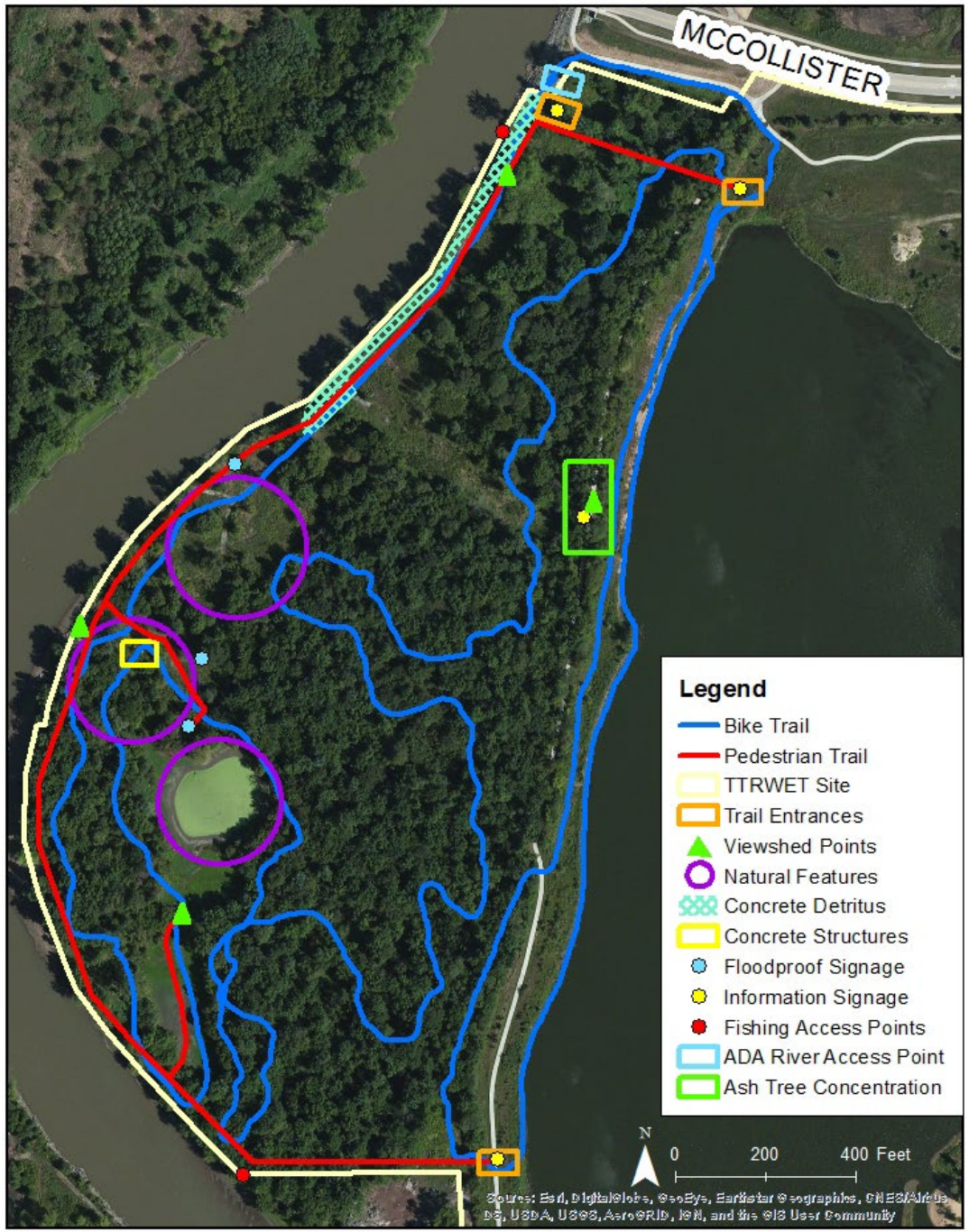
1. Create varied and compatible opportunities for all current and planned site use appealing to all ages and families year-round
2. Educate visitors and the public about natural, historical, and cultural uses of the site and region by utilizing natural, built (including signage), and digital environments
3. Preserve natural viewsheds
4. Involve local residents and park users in decision-making regarding park use and monitoring
    a) Institute comprehensive use and citizen science monitoring
    b) Form a group of volunteers that regularly holds events/meetings at/about TTWET

Goal #3: Create an adaptation plan and planning process template with generalized strategies and best management practices for other sites along the Iowa River and areas with similar characteristics

Objectives:

1. Recommend transferable plan development methods
2. Recommend transferable principles for managing heavily modified ecosystems in frequently flooding areas
3. Recommend transferable steps for informing the public about ecological, historical, and cultural processes in adaptation-oriented management plans

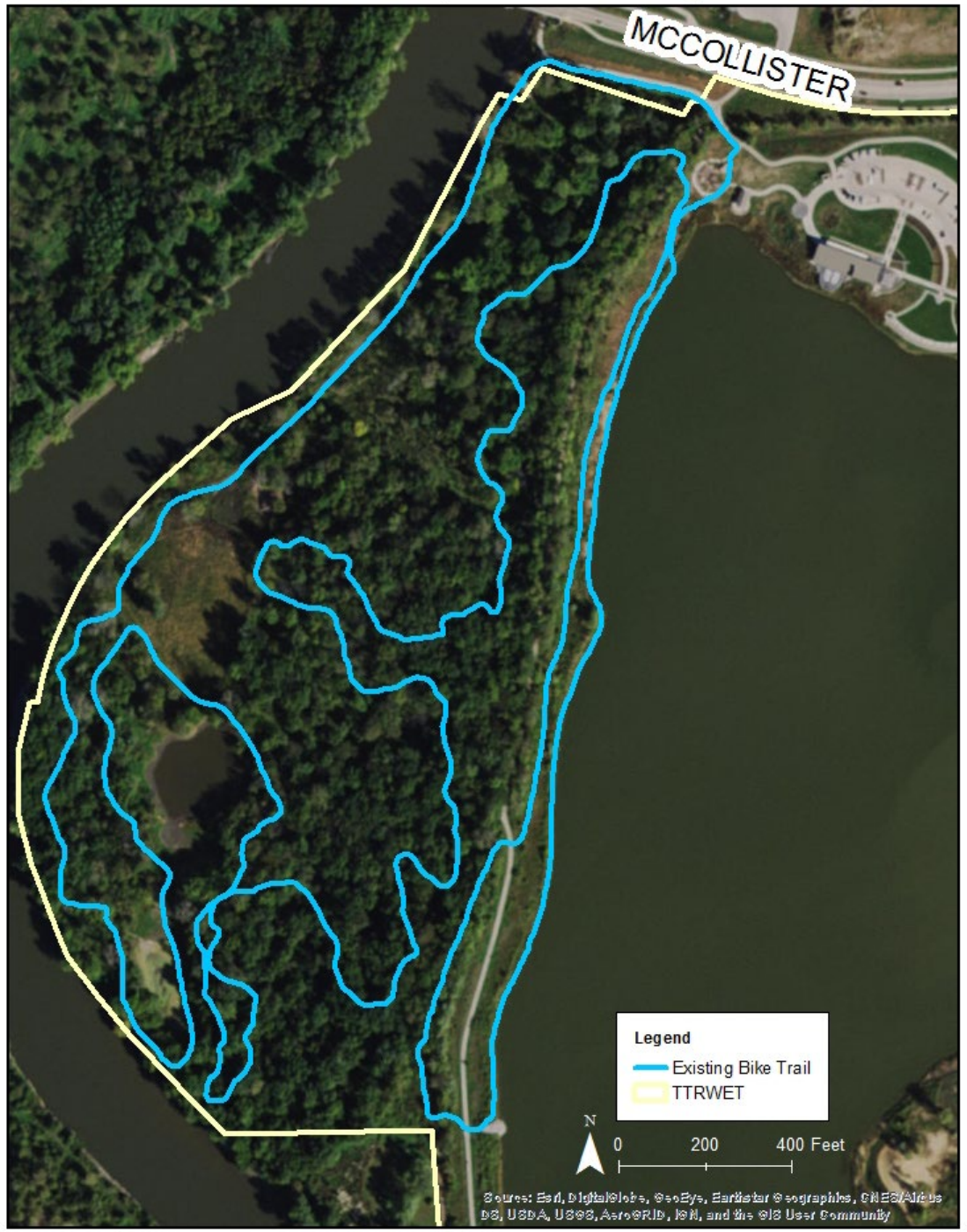
Terry Trueblood Wetland Exploration Trails Site Plan



Site Plan

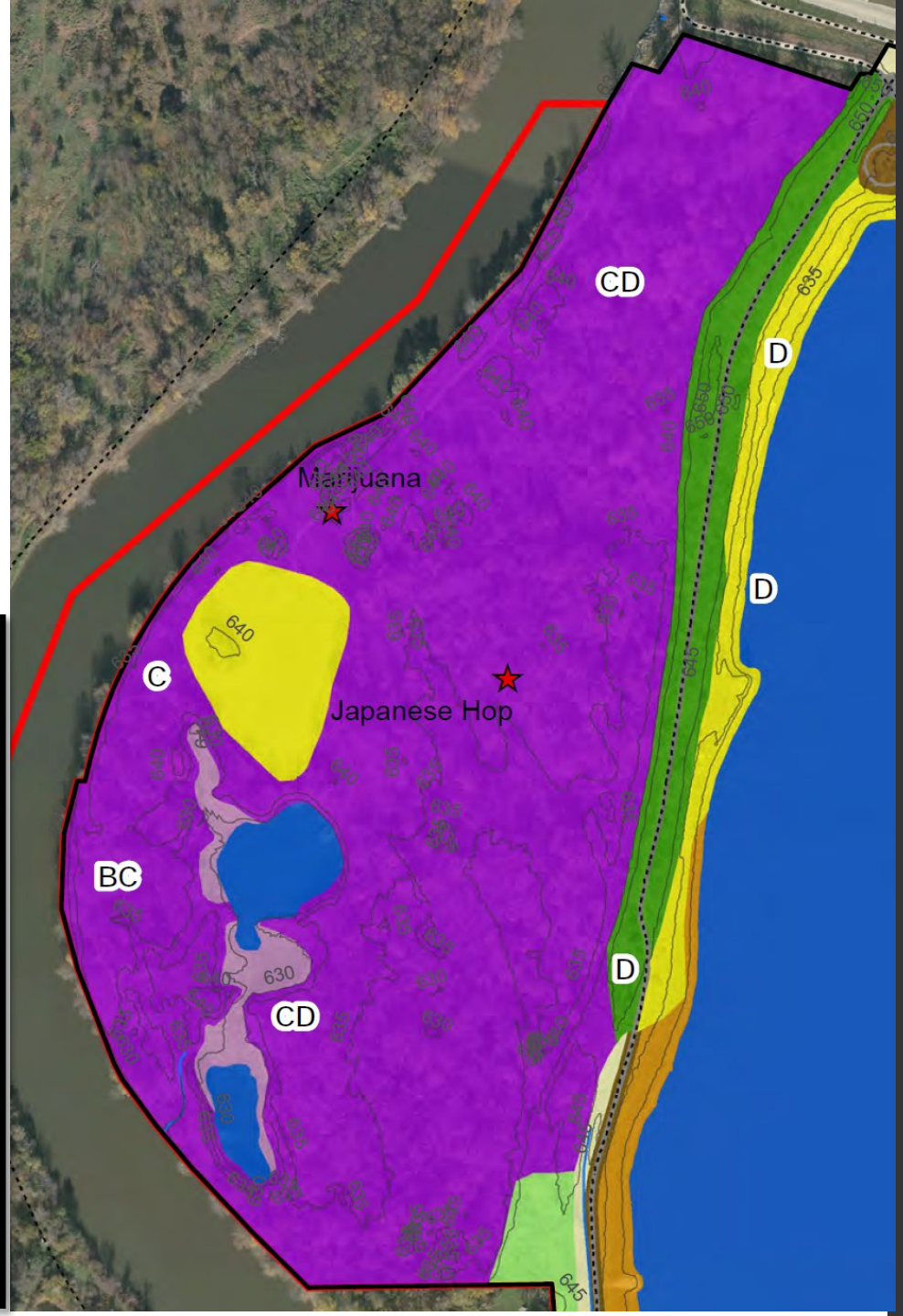
Biking Trails

- Site used for recreational off-road biking
- GPS data collected from Strava corresponds with ICORR official race maps



Existing Land Cover

- Current site is composed of several land covers rather than complete, functioning ecosystems
  - Dry-Mesic Forest
  - Forested Lowland
  - Herbaceous Lowland
  - Prairie
  - Constructed Wetland
  - Open Water
- Invasives threaten ecological integrity



Iowa City Natural Areas Inventory and Management Plan

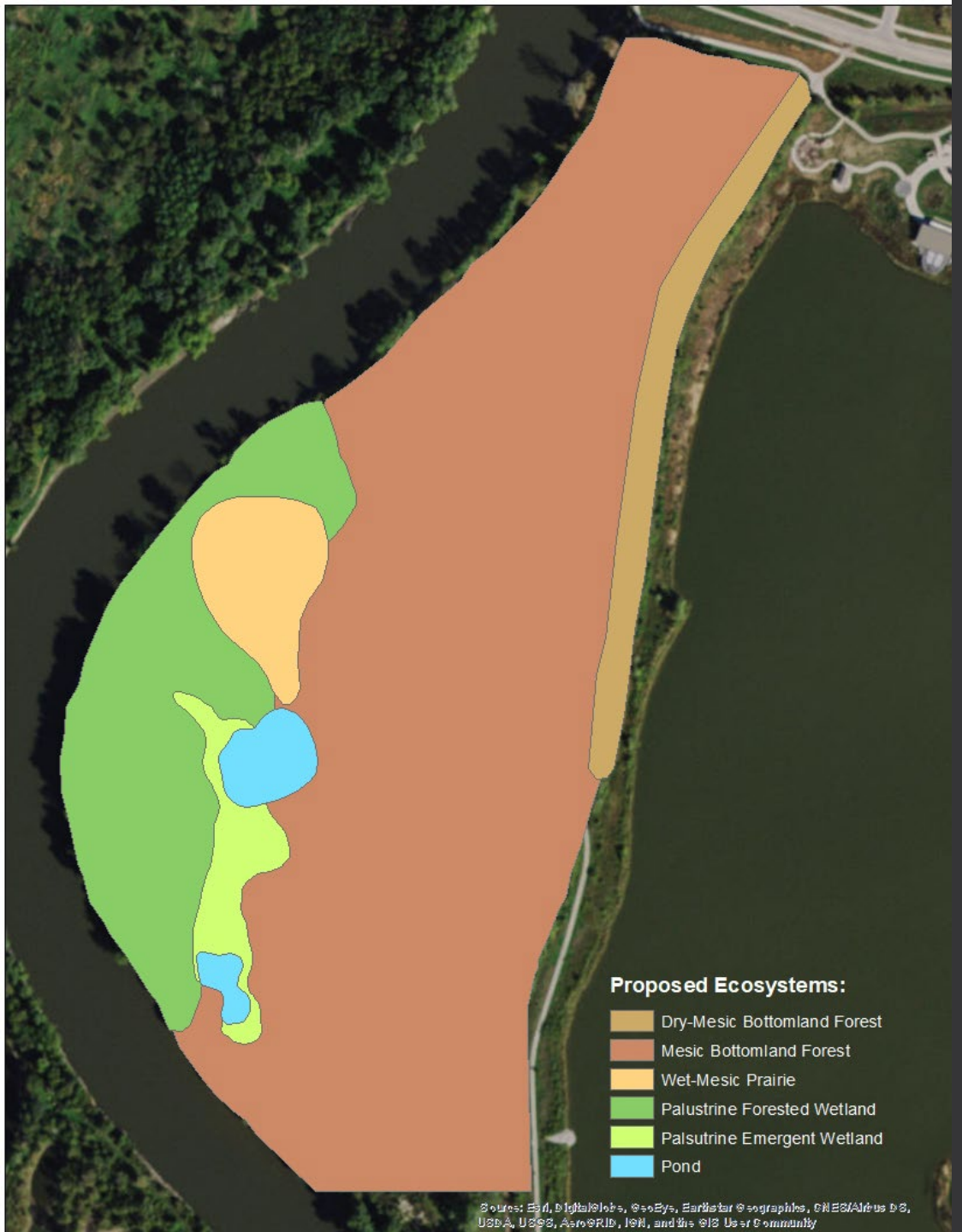
Terry Trueblood Recreation Area

City Limits
Iowa City Park or Natural Area
Invasive Vegetation

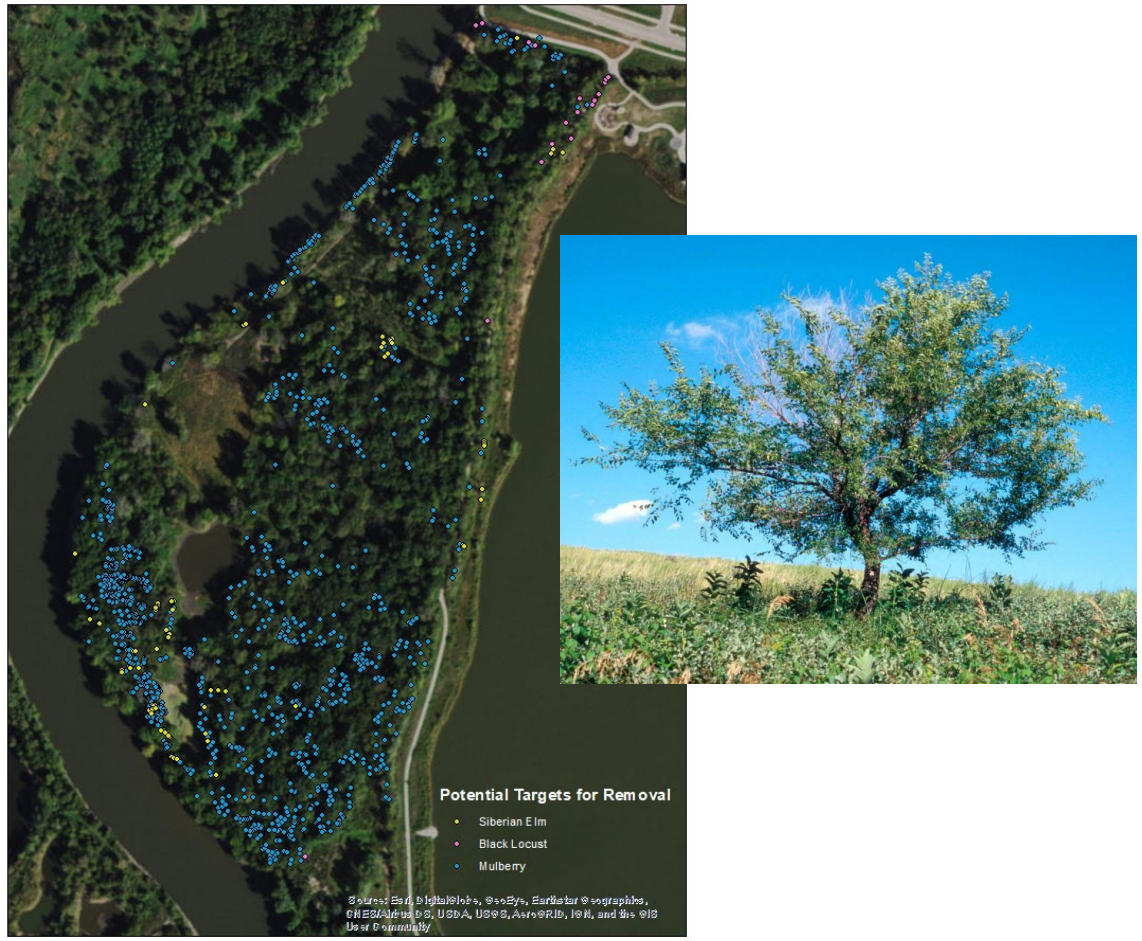
Existing Land Cover
Dry-Mesic Forest/Woodland
Altered Forest/Woodland
Shrub/Scrub
Prairie
Non-native Grassland
Forested Lowland
Herbaceous Lowland
Open Water
Recreation Area
Building or Structure
Other Impervious Cover
Contour (5ft interval)
Trail
Drainageway

Proposed Ecosystems

- Goal is to stabilize and enforce these areas to create healthy and resilient ecosystems:
  - Dry-Mesic Bottomland Forest
  - Mesic Bottomland Forest
  - Wet-Mesic Tallgrass Prairie
  - Palustrine Forested Wetland
  - Palustrine Emergent Wetland
- Removal of invasives opens site for reintroduction of native species
- Proposed pawpaw and cypress groves



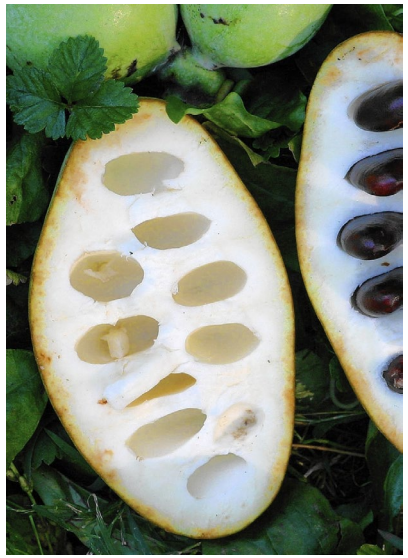
Potential Targets for Removal



- Canopy Invasives:
  - Mulberry*
  - Siberian Elm
  - Black Locust
- Understory Invasives:
  - Honeysuckle
  - Japanese Hops
  - Reed Canary Grass
  - Narrowleaf Cattail
  - Smooth Brome
  - Japanese Brome
  - Canada Thistle
  - Day-flower
  - Creeping Charlie
  - Motherwort
  - Tall Fescue
  - Wild Sunflower
  - Barnyard Millet

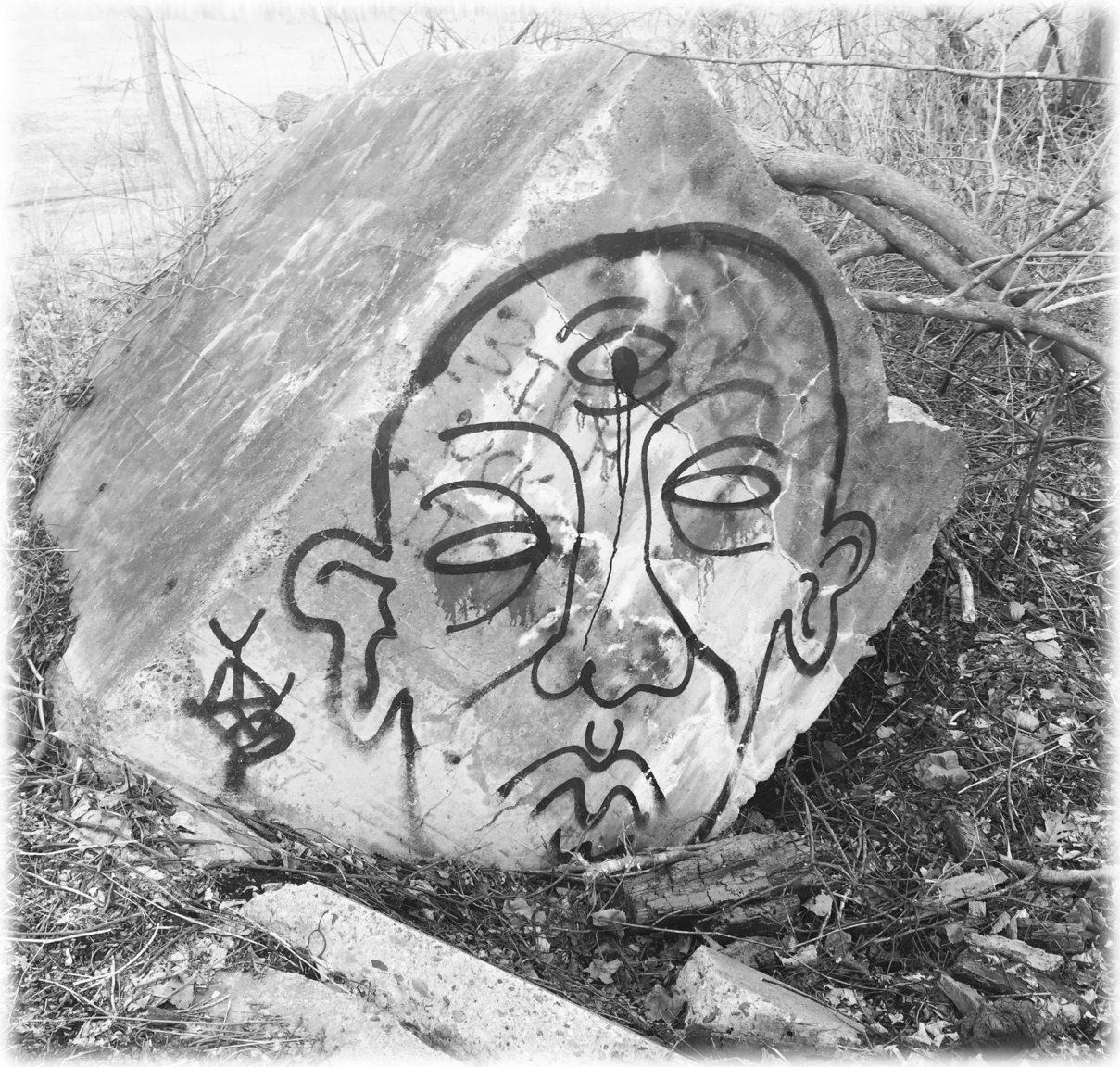
Native Species Reintroduction

Ecosystem	Potential Species for Site
Forest	pawpaw, jewelweed, sandbar willow, violets, sedges
Prairie	purple meadow rue, bottle gentian, bristly sedge, Eastern/Western Prairie fringed orchid
Wetland	blue flag iris, Virginia wild rye, slender mountain mint, smooth clustered sedge

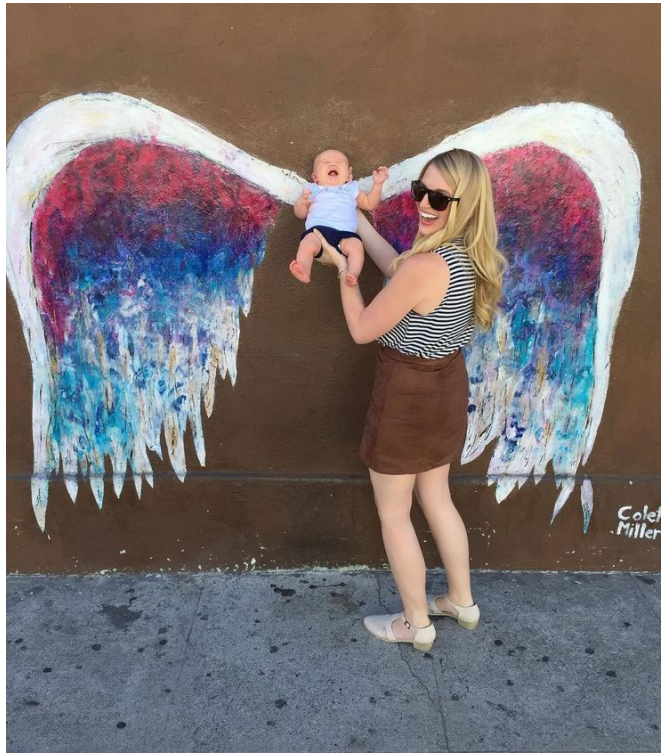


Edible Landscaping

- Educational opportunity
- Species support
- Exploring viable species for the site
  - Mint
  - Pawpaw
  - Mulberry
  - Black Berried Aronia
  - Broadleaf Arrowhead



Murals repurpose built environment



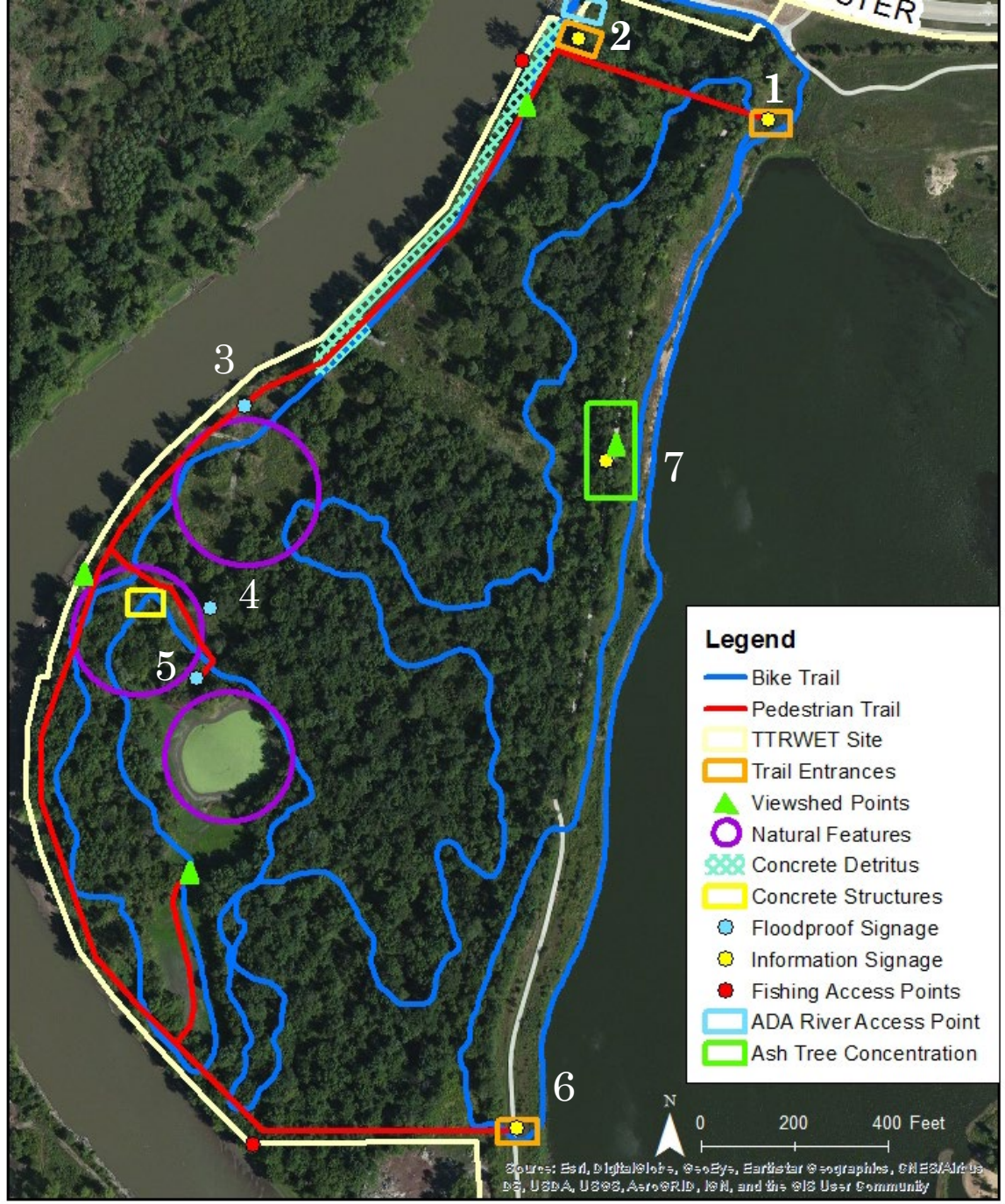
Signage

Educational interpretive signage

- 7 signs
  - 3 at trail access points
  - 1 on TTRA main trail to invite visitors to explore TTWET
  - 3 floodproof signs within the park

Incorporate viewsheds/overlooks into signage

- Overlook into TTWET from TTRA main trail (Ash tree area)
- Floodplain signage overlooking natural features / ecosystems



Potential Signage Placement

Educational content

1. Cultural history
2. Flooding and climate change adaptation
3. Flora (prairie grasses/trees/edibles)
4. Birds (linked with digital environment)
5. Mammals (linked with digital environment)
6. Ecosystems
    - Wet-mesic prairie
    - Palustrine wetland
    - Bottomland hardwood forest
7. Main trail sign – invitation to explore

Floodplain Signage

Floodproof

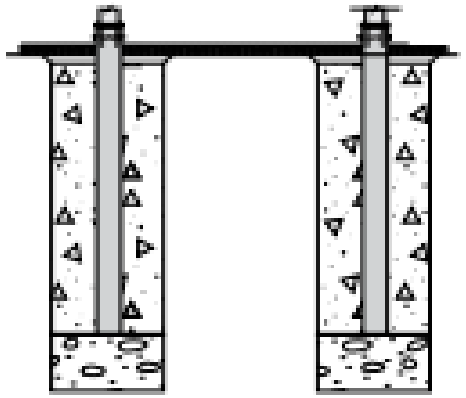
- Gabion-mounted panels
- Panels oriented downstream to protect from flood detritus

Removable

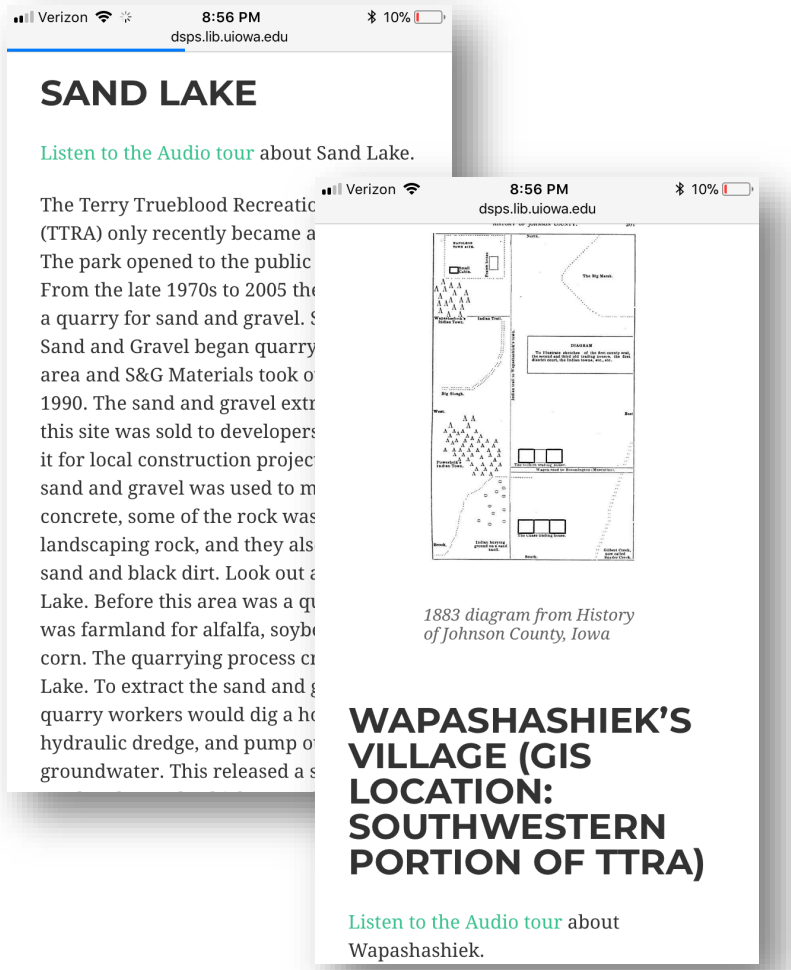
- Socket mounts
- Post mounts (wooden)

Direct Embedment Socket Mount (SM)

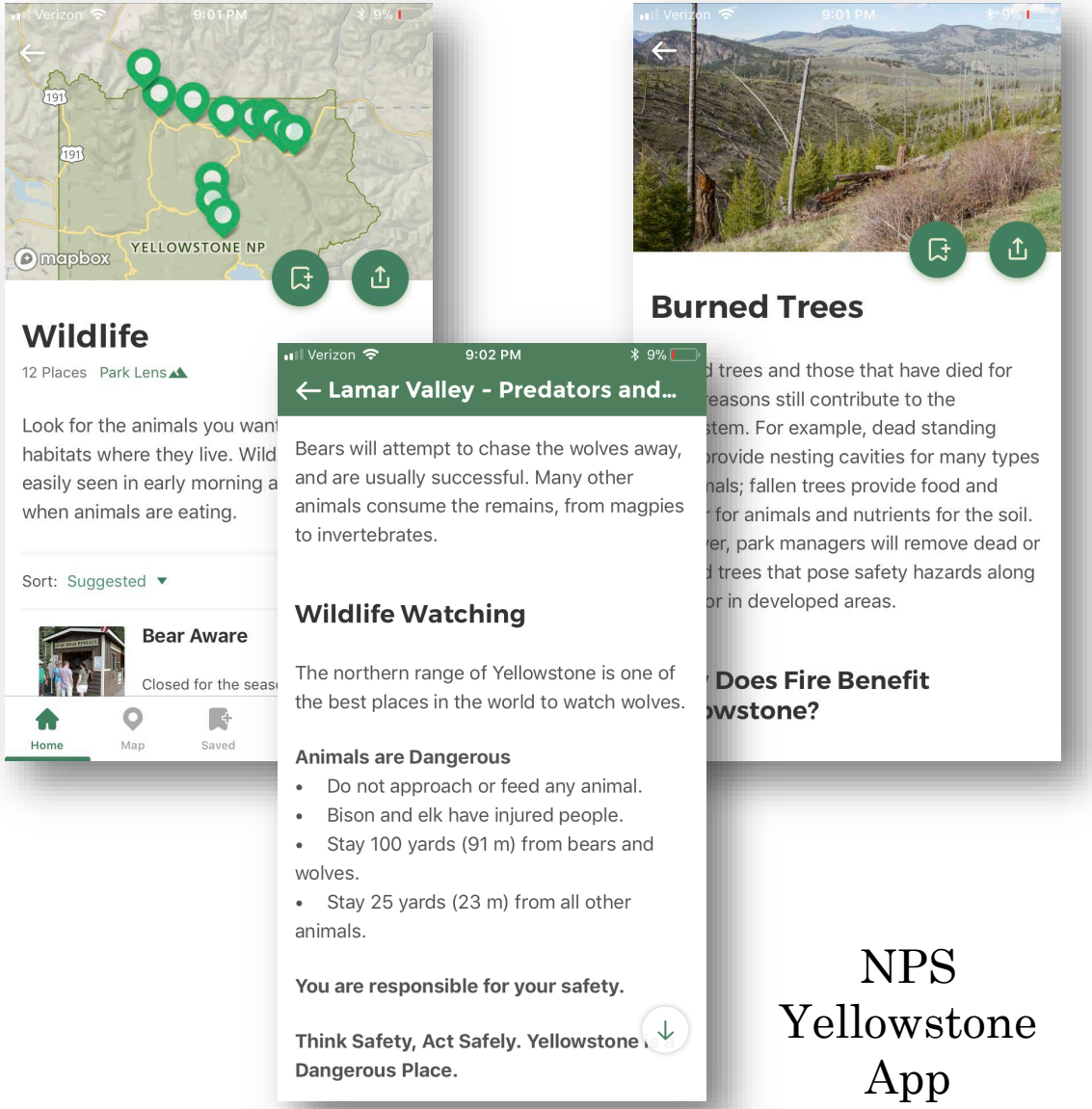
Socket mounting allows the VIS base to be removed. Oversized sleeves are secured in the ground and the base can slide in and out. This is an excellent choice for park areas with huge snowfall or flood conditions.



Digital Environments



Existing TTRA Environmental History Website (mobile)



NPS Yellowstone App

Monitoring

Table 1 Summary of pros and cons of governance structures for CBM groups

	Consultative/functional	Collaborative	Transformative
Details	Gov. led, community run; gov. recognizes problem and uses CBM group to monitor	Involves as many stakeholders, individuals, etc. as possible; often based on a non-politically demarked area (i.e. watershed)	Community led, run and funded; community recognizes problem- trying to get gov. attention
Pros	May lead to long-term data sets; often successful in short term	Often more decision making power than other structures	Can be successful with community and stakeholder support
Cons	Dependant on gov. funding; less diverse stakeholders	None published	May not be diverse (i.e. only activists), problems with credibility and capacity Monitoring issues that are not governed by legislation

- Combine institutionally-supported mobile apps and engage local citizen-science/parks management.
- Citizens can identify species on-site with the Merlin Bird ID app and by taking photos of foliage or animals to identify at home.
- Using the eBird, iNaturalist, and Budburst websites, citizens upload observations and data they collected.
- Data can be downloaded from the websites by citizens and city officials to monitor plant and bird life.

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Johnson County GIS Property Viewer "100 year floodplain map"
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- History: John Jepsen

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- Assistant Professor Scott Spak

The University of Iowa School of Urban & Regional Planning