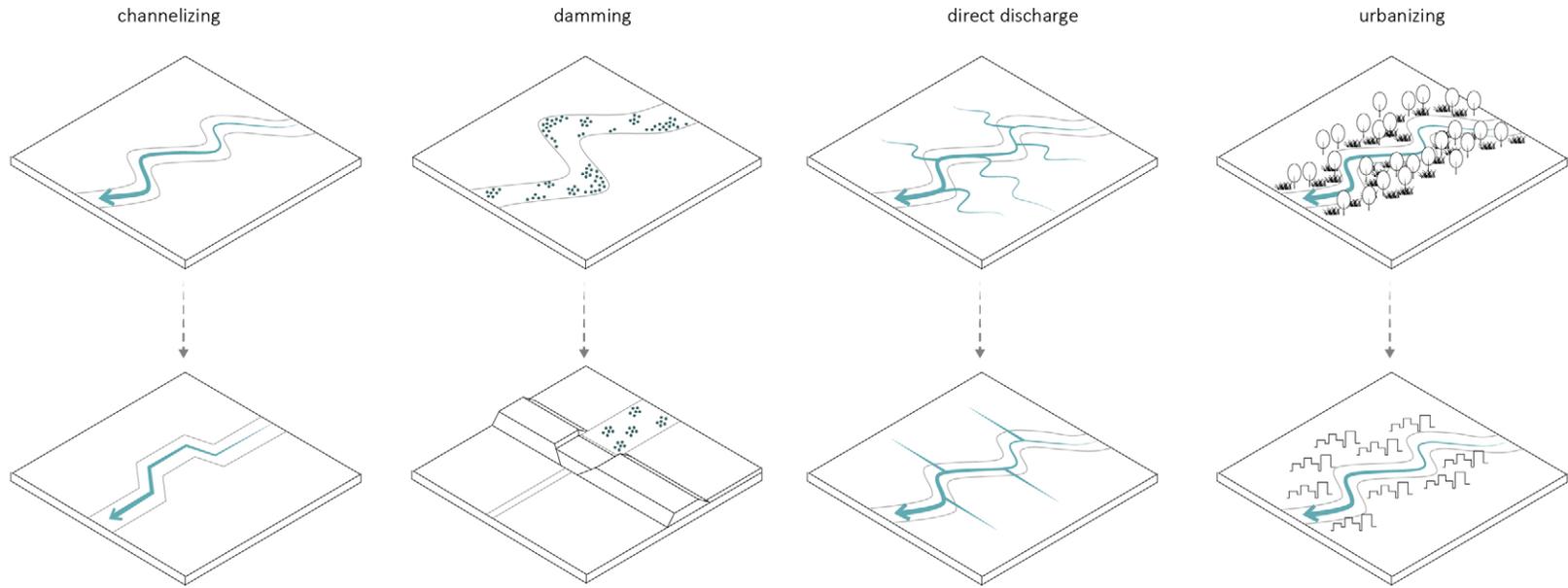




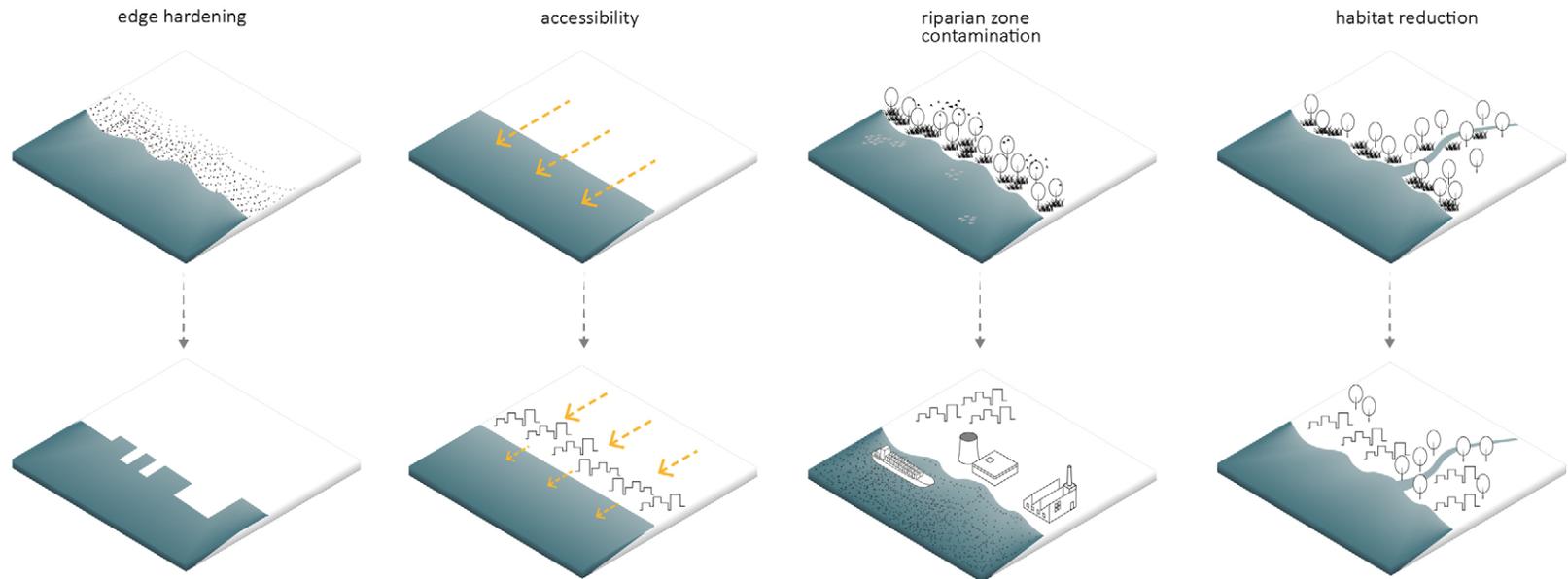
# HYDROLOGICAL ANALYSIS

## River Problem Caused by Urban Development

### River Problem



### Shoreline



# WATERFRONT LAND USE ANALYSIS

Waterfront Type Along Ohio River in Greater Cincinnati Area

Type

P



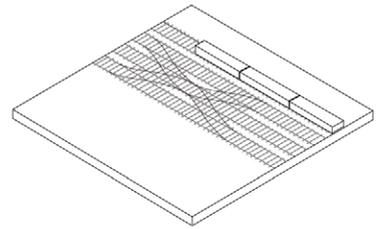
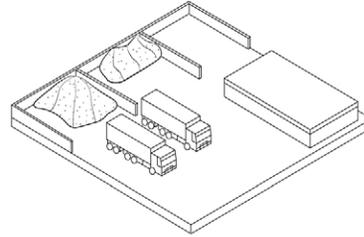
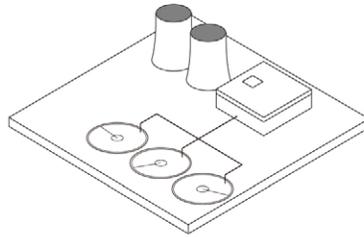
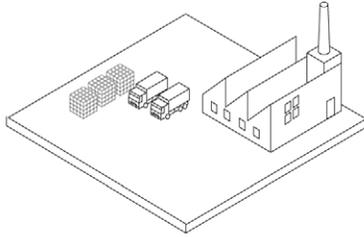
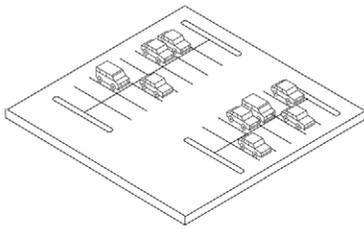
commercial parking

warehouse

chemical plant

Recycling site

rail yard



Area



23.5%



13.7%



10.4%



37.6%



15.8%

Major Contaminants

Petroleum + Heavy Metal + Salt

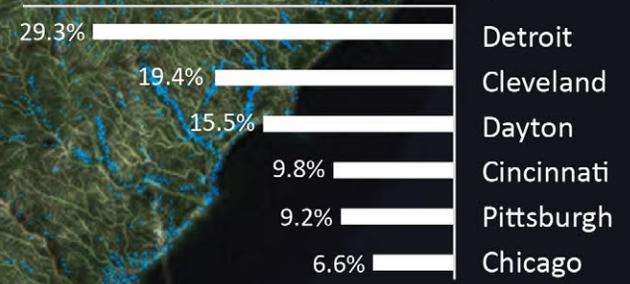
Source: Ohio River Foundation and EPA

## 2016 SPRING FLOOD HAZARD MAP & SHRINKING CITIES IN RUST BELT

With the increasing rate of extreme weather events caused by climate change, many inland cities that are situated along the river are constantly been challenged. Places like Cincinnati, OH, and Newport, KY, increasingly face serious impacts from annual flooding of the Ohio River following strong seasonal precipitation and snow melts.



2000-2016 Population Change in Major Cities

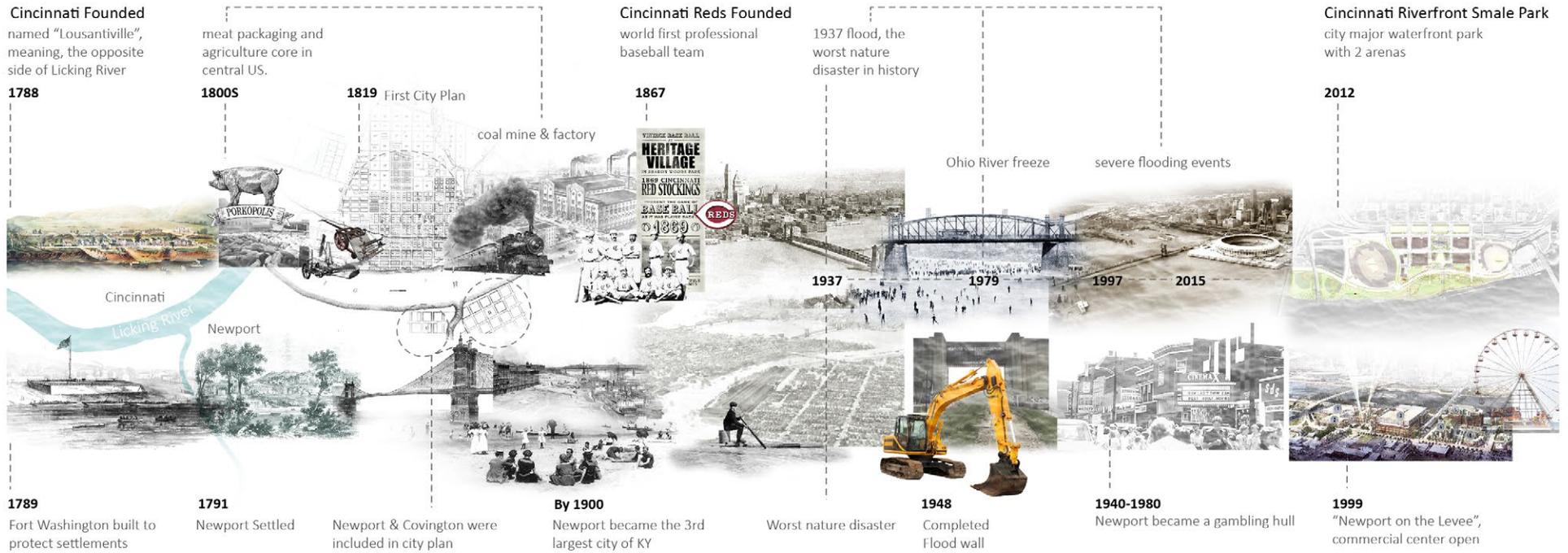


- Severity of Shrinkage
- Shrinking City
- Revitalized City

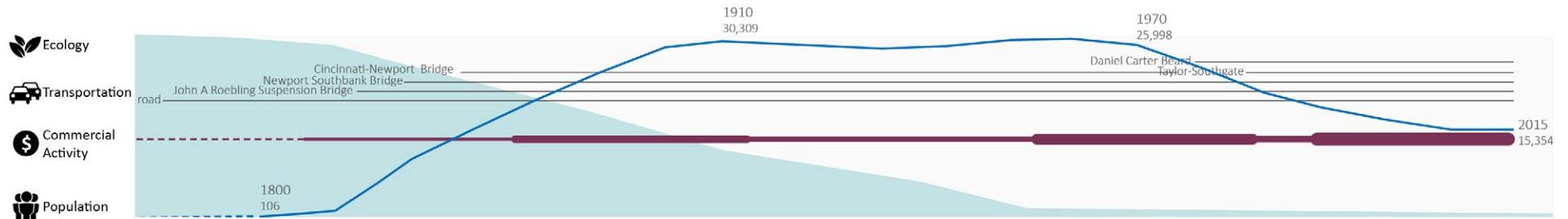
Source: USGS and US Census 2016

# TIME LINE

## Historical Events of Newport, KY, Parallel to Cincinnati



Sources: Ohio River Foundation & City of Cincinnati



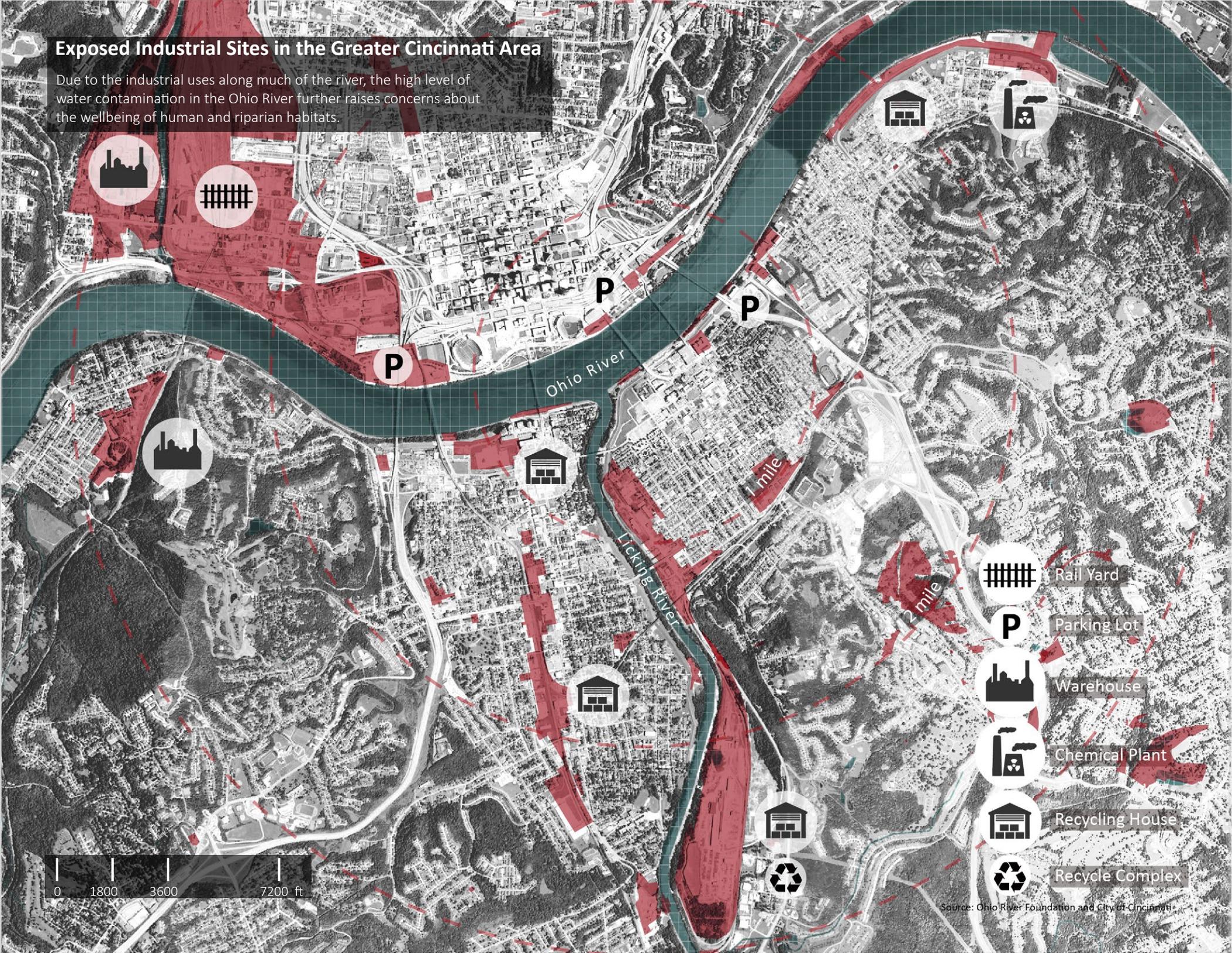
Source: US. Census, Ohio Foundation and Zillow

## CURRENT



## Exposed Industrial Sites in the Greater Cincinnati Area

Due to the industrial uses along much of the river, the high level of water contamination in the Ohio River further raises concerns about the wellbeing of human and riparian habitats.



P

P

P



Ohio River

Licking River

1 mile

2 mile



Rail Yard

P

Parking Lot



Warehouse



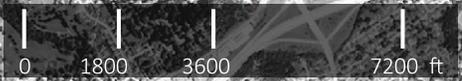
Chemical Plant



Recycling House



Recycle Complex



Source: Ohio River Foundation and City of Cincinnati

FEMA 100 Year Flood Plan

CINCINNATI

OHIO RIVER

LICKING RIVER

NEWPORT, KY

COVINGTON



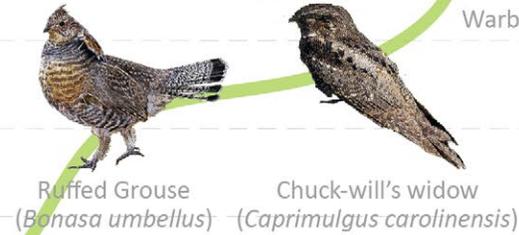
Source: FEMA, City of Cincinnati



**WILDLIFE**  
Ohio River Cincinnati Area Wildlife Appearance



Virginia Rail (*Rallus limicola*)    Spotted Sandpiper (*Actiti macularius*)    Greater Scaup (*Aythya marila*)



Ruffed Grouse (*Bonasa umbellus*)    Chuck-will's widow (*Caprimulgus carolinensis*)

Black-throated Green Warbler (*Dendroica virens*)    American Kestrel (*Falco sparverius*)



Northern Dusky Salamander (*Desmognathus fuscus*)



Channel Catfish    Blue Catfish    Flathead Catfish    Bass Fish



Paddlefish (*Polyodon spathula*)    Burbot (*Lota lota*)    Walleye (*Sander vitreus*)    Blake Buffalo (*Ictiobus niger*)    sauger (*Sander canadensis*)

**Newport Site Context**

**Cincinnati OH**

Daniel Carter Beard BNDge

Purple People Bridge

Taylor Southgate Bridge

1

Newport on the Levee

2

3

**Newport KY**

Ohio River

Licking River

4th St Bridge

**Convinton KY**

0 125 250 500 100 ft

1.3 mile

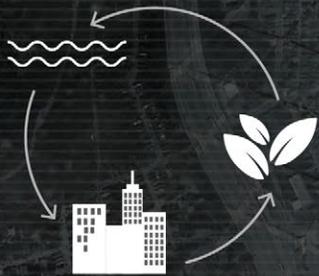


## WATERFRONT CONCEPT

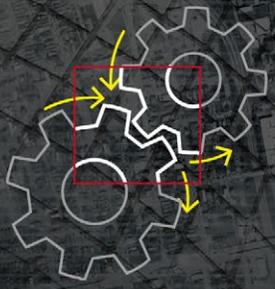
### Waterfront Pattern Language and Reconceptualization

**Uniformity:** The exploration of form for Newport waterfront begins with inputting a basic city grid pattern. Lattices start to stretch when the source of two forces- the Ohio River and Licking River- are introduced.

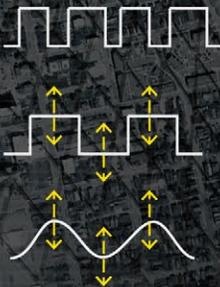
**City-River Relationship:** If a river is seen as one tooth wheel and city as the second, in order for two to work the best together, the periphery has to fit and respond to each other. Therefore, a resilient riparian zone is the key in this relationship.



ESSENCE OF RESILIENCE



CONCEPT



RELATIONSHIP  
DEFORM



INTENSITY

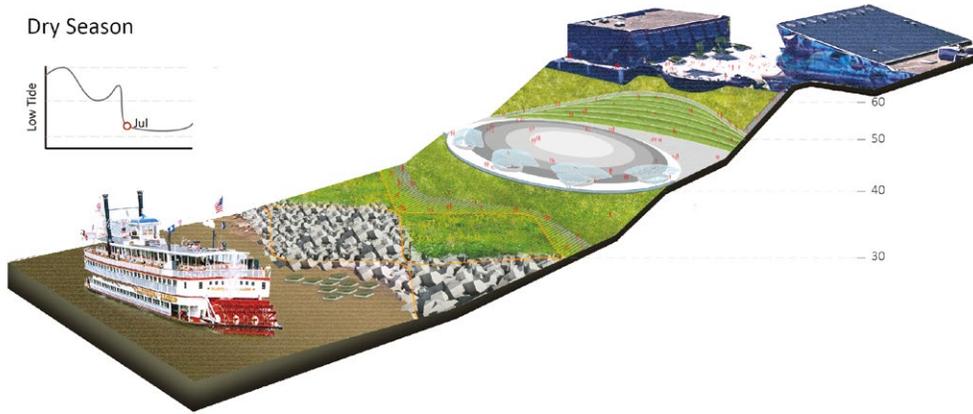
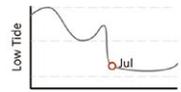


RE-CONCEPTUALIZE  
DEVELOP LANDFORMS

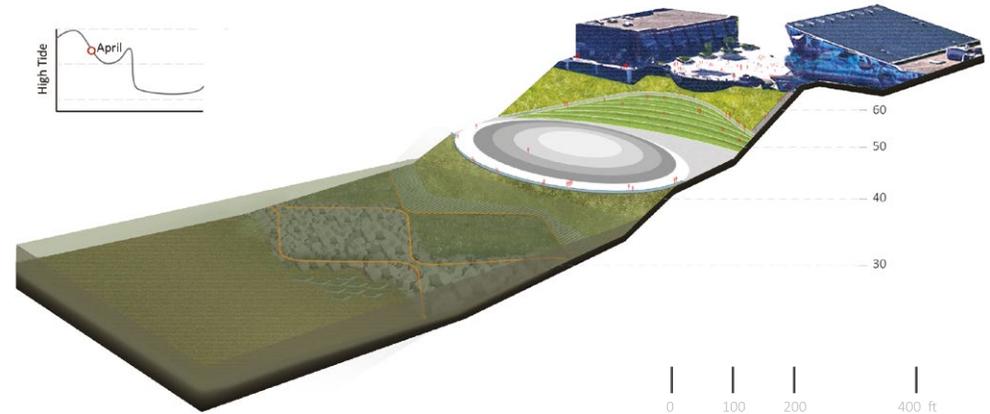
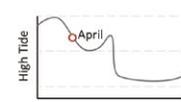
# Study Area 1 - Newport Commercial Center

## Prototype in Dry and Flooded Conditions

Dry Season



Wet Season



The goal is to combine the conceptual landscape pattern with existing topography and site program to enhance the user experience, terrace connections, and aesthetic value of Newport on the Levee commercial center.

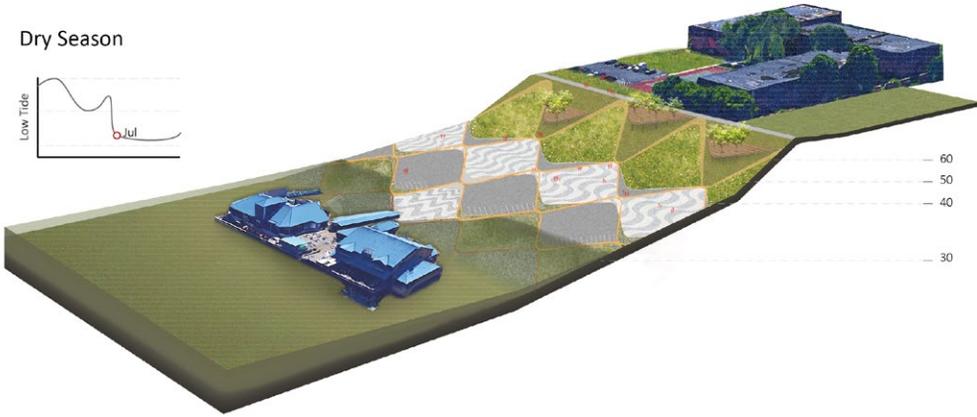
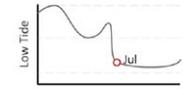
## Newport on the Levee Event Space



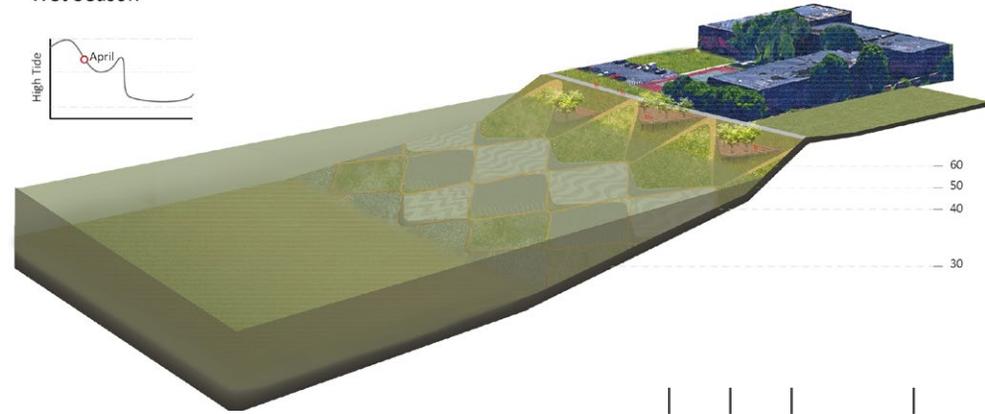
## Study Area 2 - Residential Area Gateway

Prototype in Dry and Flooded Conditions

Dry Season



Wet Season



Aiming to offer a sustainable waterfront and enhance the user experience, the design for Study Area 2 introduces a better storm water management method and diversifies the function of levee through landscape design.

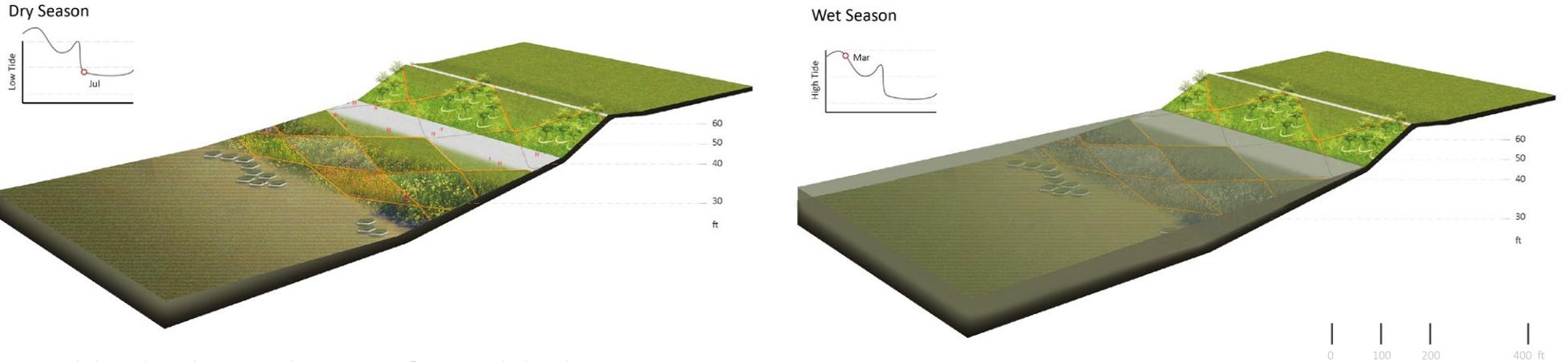


## Levee and Incorporated Landscape



## Study Area 3 - Natural Refugee & Educational Spot

### Prototype in Dry and Flooded Conditions



Located along the Licking River close to its confluence with the Ohio River, is designed to showcase regional ecology as an educational spot. Some parcels are designed to be a children's playground and learning spot, by reintroducing some neglected regional species and wildlife that are currently live in remaining manmade habitat.

### Waterfront as Habitat and Educational Spot

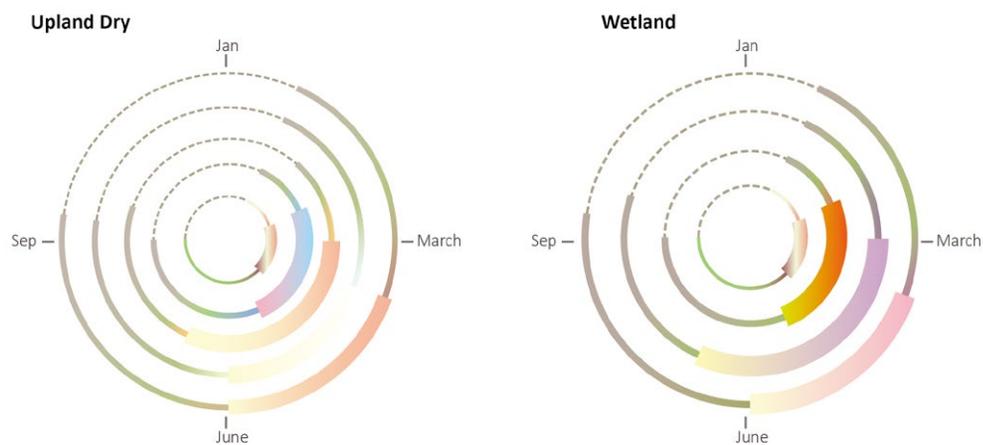


# Phytoremediation Implementations - Planting List & Floating Wetland

## Planting List

Upland Dry	Scientific Name	Form	Height	Bloom Time	Color
Golden Alexanders	Zizia aurea	Forb	3'	Spring (April-Jun)	Yellow
Butterfly Weed	Asclepias tuberosa	Forb	1-3'	Summer (Jun-Aug)	Orange
Black-Eyed Susan	Rudbeckia hirta	Forb	1-3'	Summer (Jun-Sep)	Yellow
June Grass	Koeleria pyramidata	Grass	2'	Spring (May-Jun)	Yellow
Sand Dropseed	Sporobolus cryptandrus	Grass	2-4'	Summer (Jun-Oct)	Yellow
Maple-Leaved Viburnum	Viburnum acerifolium	Shrub	3-6'	Summer(Jun)	White
Wild Lupine	Lupinus perennis	Forb	1-2'	Spring (May-Jun)	Blue
Hoary Vervain	Verbena stricta	Forb	2-3'	Summer (Jun-Sep)	Purple
Purple Coneflower	Echinacea purpurea	Forb	1-3'	Summer (Jun-Sep)	Purple
Purple Love Grass	Eragrostis spectabilis	Grass	2'	Fall (Aug-Oct)	Red,Purple
Pennsylvania Sedge	Carex pensylvanica	Sedge	1-3'	Summer	N/A
Sand Dropseed	Sporobolus cryptandrus	Grass	2-4'	Summer (Jun-Oct)	Yellow
Sullivant's Milkweed	Asclepias sullivantii	Forb	2-3'	Summer (Jun-Sep)	Pink
Wild Bergamot	Monarda fistulosa	Forb	2-4'	Fall (Jul-Sep)	Pink
Showy Goldenrod	Solidago speciosa	Forb	2-3'	Fall (Aug-Oct)	Yellow
Bottlebrush Grass	Elymus hystrix	Grass	2-3'	Summer (Jun-Aug)	Green
Little Bluestem	Schizachyrium scoparium	Grass	2-3'	Summer (Aug-Sep)	White,Brown
Fox Sedge	Carax vulpinoidea	Sedge	2-3'	Summer	N/A
Pagoda Dogwood	Cornus alternifolia	Small Tree	15-25'	Spring(April-Jun)	White
Serviceberry	amelanchier canadensis	Small Tree	15-25'	Spring(April-Jun)	White
Wetland	Scientific Name	Form	Height	Bloom Time	Color
Ohio Spiderwort	Tradescantia ohiensis	Forb	2-4'	Spring (May-Jul)	Blue, Violet
Great Blue Lobelia	Lobelia siphilitica	Forb	1-3'	Summer (Jun-Sep)	Blue
New England Aster	Aster novae-angliae	Forb	3-6'	Fall(Aug-Oct)	Purple
Queen of the Prairie	Filipendula rubra	Forb	4-6'	Fall(Jun-July)	Pink
Marsh Fern	Thelypteris palustris	Fern	1-3'	Summer	Brown
Common Three-square	Schoenoplectus pungens	Sedge	3-6'	Spring	Brown
New York Ironweed	Vernonia noveboracensis	Forb	3-6'	Fall(Aug-Sep)	Red
Blue Vervain	Verbena hastata	Forb	3-6'	Fall(July-Sep)	Yellow
Green-Headed Coneflower	Rudbeckia laciniata	Forb	3-6'	Fall(Jun-Sep)	Yellow
Golden Alexanders	Zizia aurea	Forb	3'	Spring(Apr-Jun)	Yellow
Ostrich Fern	Matteuccia struthiopteris	Fern	3-6'	Summer	N/A
Marsh Fern	Thelypteris palustris	Fern	1-3'	Summer	Brown
Virginia Mountain Mit	Pycnanthemum virginanum	Forb	2-3'	Summer (Jun-Sep)	White
False Aster	Boltonia asteroides	Forb	3-5'	Fall(Aug-Oct)	White
Flat Topped Goldenrod	Euthamia graminifolia	Forb	1-4'	Summer (Jun-Sep)	Yellow
Golden Alexanders	Zizia aurea	Forb	3'	Spring(Apr-Jun)	Yellow
Wool-Grass	Scirpus cyperinus	Grass	4-6'	Summer(Jun-Aug)	Yellow
Bluejoint Grass	Calamagrostis canadensis	Grass	2-4'	Summer (Jun-Aug)	Green
Bee Balm	Monarda didyma	Forb	1-3'	Summer(Jun-Aug)	Red
Wild Columbine	Aquilegia canadensis	Forb	2-3'	Spring(Apr-Jun)	Orange
Cardinal Flower	Lobelia cardinalis	Forb	2-5'	Summer(Jul-Sep)	Red
Spotted Joe-Pye Weed	Eupatorium maculatum	Forb	3-6'	Summer (Aug-Sep)	Red
Virginia Weild Rye	Elumus Virginucus	Grass	1-3'	Spring(May-Jun)	Yellow
Bluejoint Grass	Calamagrostis canadensis	Grass	2-4'	Summer (Jun-Aug)	Green
Silky Dogwood	Spiraea alba	Shurb	3-6'	Summer(Jun-Jul)	White
Meadow-Sweet	Spiraea alba	Shurb	3-6'	Summer(Jun-Sep)	White

## Growing and Flowering Duration



## Floating Wetland Details

