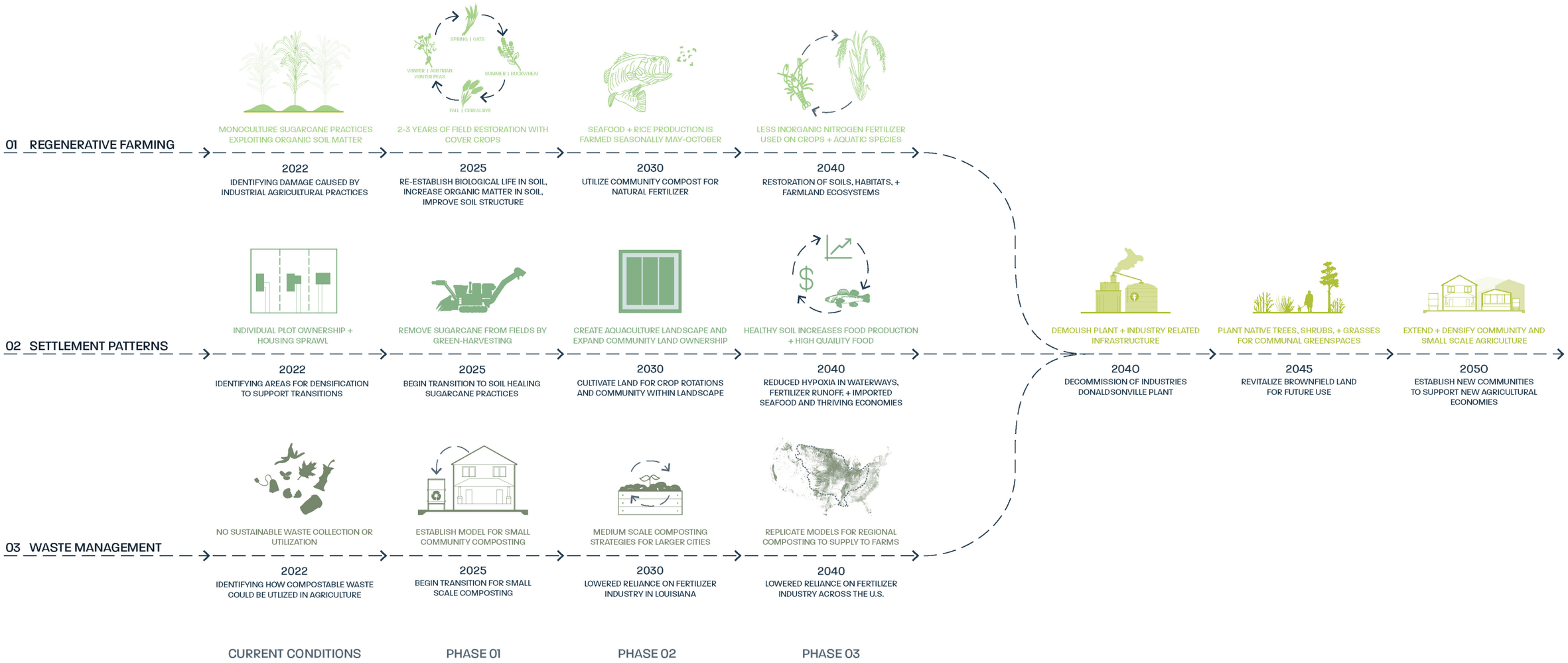

Cultivating Transitions

Regenerative Agricultural Practices in the Mississippi River Watershed

Country /City Donaldsonville, Louisiana

University / School Tulane University School of Architecture

Academic year 2022-2023

Title of the project Cultivating Transitions: Regenerative Agricultural Practices in the Mississippi River Watershed

Authors Brianna Baldwin '23

TECHNICAL DOSSIER

Title of the project Cultivating Transitions: Regenerative Agricultural Practices in the Mississippi River Watershed

Authors Brianna Baldwin '23

Title of the course Gulf Design Research Studio Pilot: Climate Futures

Academic year 2022-2023

Teaching Staff Prof. Margarita Jover and Prof. Liz Camuti

Department / Section / Program of belonging Landscape Architecture Department / School of Architecture

University / School Tulane University School of Architecture

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Written statement, short description of the project in English, no more than 250 words

Industrial agriculture relies heavily on monoculture practices that significantly degrade soil health through a lack of biodiversity, land exploitation, and the use of synthetic fertilizers on crops. These inorganic fertilizers pollute water bodies in the Mississippi River Basin and are dumped into the Gulf of Mexico, leading to hypoxic water conditions. The largest synthetic fertilizer industry plant in the U.S. is the fourth-largest polluter in Louisiana. As a result, the region suffers from both the impacts of industry on surrounding communities and runoff pollution that returns to the Gulf region through waterways within the basin. The proposal explores the potential benefits of embracing ecologically beneficial agricultural practices in the region, and integrating and scaling up existing practices to support a more regenerative pattern of inhabitation and waste management. This new localized agricultural framework includes regenerative agriculture strategies supported by densified settlement patterns and waste management policies. These transitions would result in a reduced reliance on synthetic fertilizers, a reduction of nutrient runoff and hypoxia in waterways, and a restoration of soils, habitats, and farmland ecosystems. This approach has the potential to improve the health of the environment and support the long-term cohabitation of people and ecosystems in the region.

For further information

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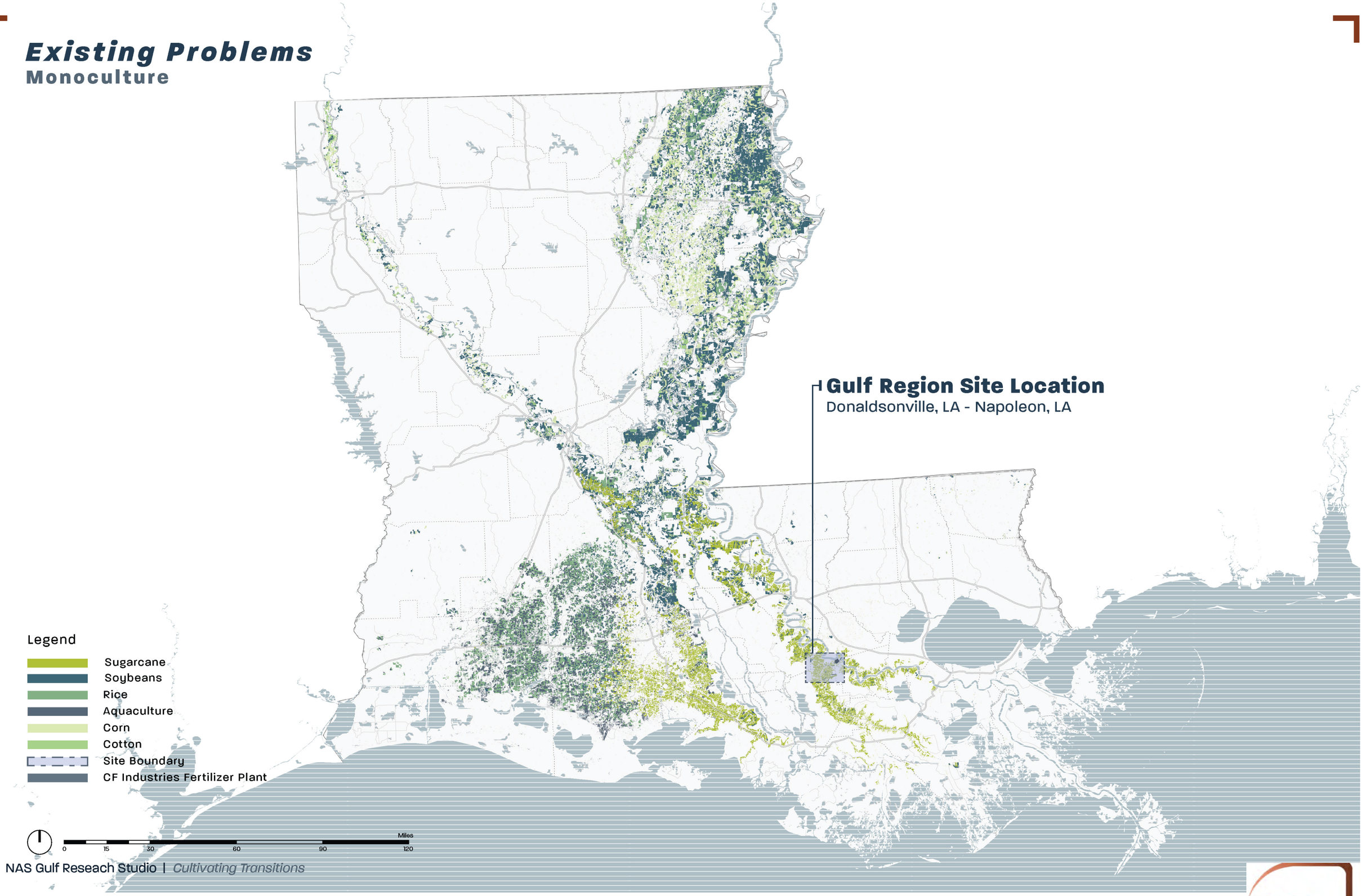
12th International Biennal Landscape Barcelona

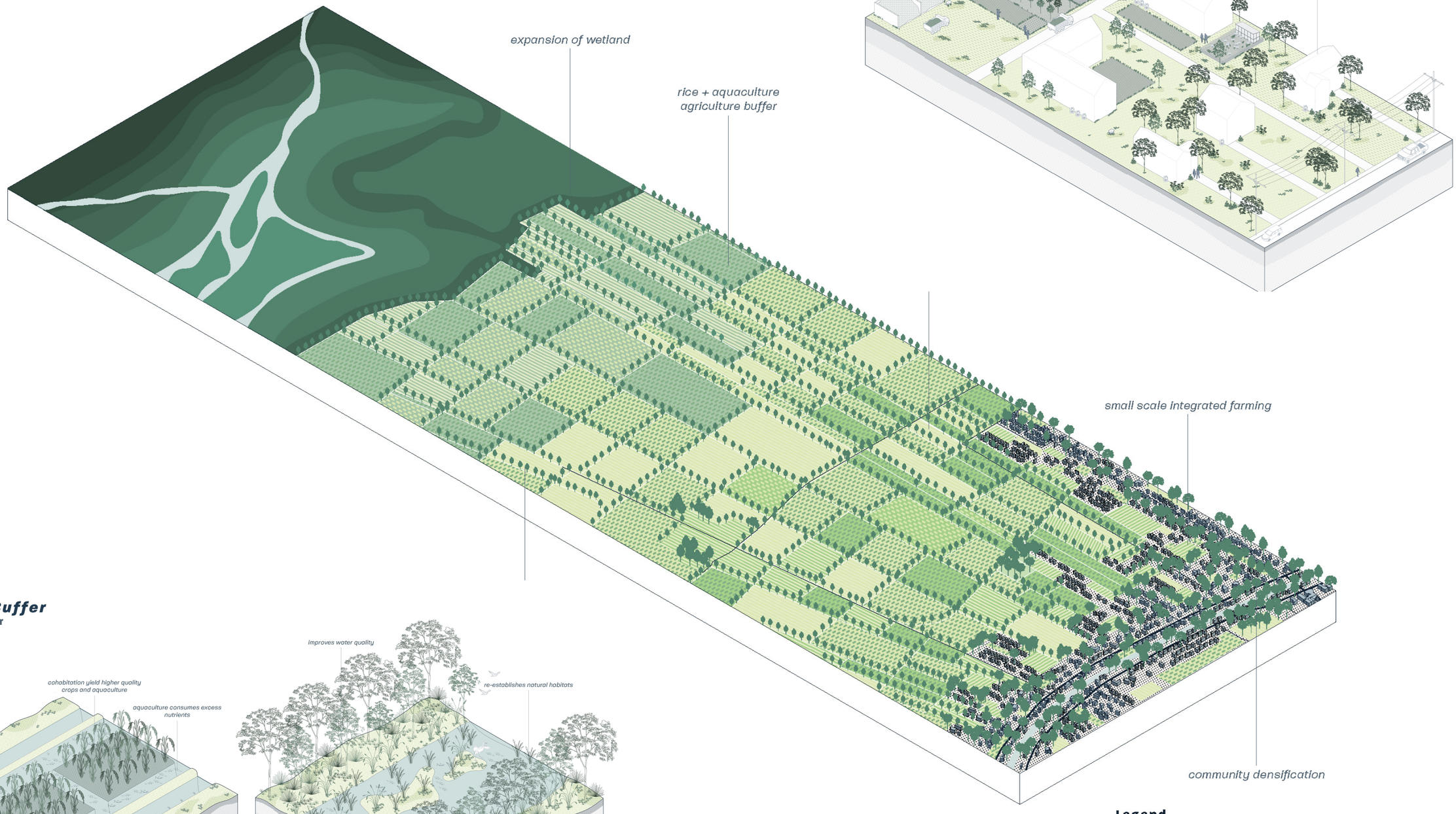
Barcelona **November 2023**

SCHOOL PRIZE

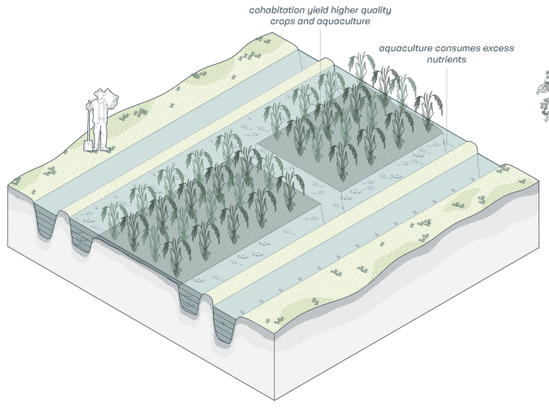
Existing Problems
Monoculture



Phase 03
2040



Productive Buffer
Timescale | Linear



Rice + Aquaculture
May - Oct

Agroforestry
year-round

Legend

Water	Covercrop
Wetland	Sugarcane
Agroforestry	Oats
Rice + Aquaculture	Community

00 0.23 .450 .9 1.35

93°59'44"W 31°29'17"N

88°36'14"W 31°24'59"N

Rich Habitats

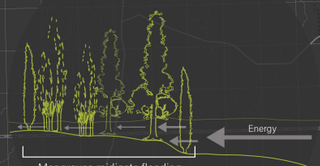
Freshwater marshes are some of the most productive ecosystems with various plant zones such as wet prairies, wet meadows, shallow/deep emergent zones, submergent, floating, + rooted floating. This supports a high variety of animal biodiversity such as invertebrates, fish, amphibians, reptiles, mammals, + birds.

Mississippi Watershed

Nutrient run-off from farms and cities collects within the Mississippi River Basin and funnel out of the Mississippi River to the Gulf of Mexico. The collection of nutrient run-offs such as nitrogen or phosphorous vastly increases the algal blooms in the ocean. When all of the algal blooms die off in a short time span, the decomposition create a blanket over the sea floor absorbing the available oxygen. This oxygen depleted dead zone becomes inhabitable for crabs, shrimp, and other bottom dwelling species.

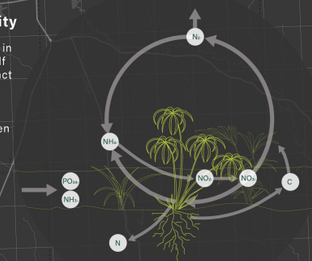
Flood Protection

Wetlands vegetation and soil serves as a barrier, slowing down flood waters while also soaking in the water. This water retention lowers flood heights and reduces erosion across coastal Louisiana. This natural protection from flooding is less expensive and highly effective for flood control within developed areas.



Improving Water + Air Quality

The agriculture industry is a key factor in nutrient run-off in waterways + the Gulf of Mexico. Freshwater marshland can act as a filter for those pollutants through sedimentation, volatilization, and absorption. Through these processes, the plants can uptake inorganic nitrogen and phosphorus and convert it to organic compounds.



Lake Charles
Lafayette
Baton Rouge
Prairieville
Gonzales
Hammond
Covington
Slidell
Gulf Port
Bay St. Louis
Lake Pontractrain
New Orleans
Thibodaux
Morgan City
Bayou Vista
Houma
Port Sulphur
Golden Meadow
Buras
Grand Isle
Gulf of Mexico

Legend

- Isohaline
- 2006 Levees
- 2017 Master Plan Sediment Restoration Regions
- 2017 Master Plan Sediment Deposition Points
- 1932 - 2015 Land Gain
- 1932 - 2015 Land Loss
- Wetlands

Louisiana's Dynamic Coast

For over 5,000 years the Mississippi River has actively changed its course freely, forming the Deltaic Plain by building land though depositing sediment along the coastline. This mineral rich sediment creates low, poorly drained areas for grasses, sedges, and rushes to thrive. Freshwater marshes are the most diverse, productive ecosystems made of plants, animals, and microbial communities. Due to the salinity range of 0 - 5 ppt, they are suitable for a greater number of species. In addition to the rich habitats, freshwater marshes act as a barrier for flood protection, improves water + air quality.

40% *US wetlands in Louisiana*

80% *US wetlands loss in Louisiana*

0 10 20 40 mi

93°57'56"W 28°26'56"N