INNOVATION AND ECONOMIC PROSPERITY UNIVERSITIES
AWARDS PROGRAM

CASE STUDY 2022

IEP CATEGORY – PLACE

North Carolina State University: Lumberton – Coastal Dynamics Design Lab
ABOUT THE LUMBERTON AND COASTAL DYNAMICS DESIGN LAB PARTNERSHIP

In North Carolina, Hurricane Matthew (2016) caused $4.8 billion in damage and displaced thousands of families due to flood waters. Hurricane Florence (2018), making landfall less than 23 months later, caused an additional $17 billion in monetary damages. Tragically, Hurricane Florence hit the City of Lumberton, North Carolina (pop. 21,040) before implementation of Hurricane Matthew community recovery planning efforts were completed, with flood waters from both storms devastating the same areas.

Established in 1787, the city owes its location and existence to the abundant resources provided by the Lumber River. The river has made deep and lasting physical and cultural impressions that continue to influence both city and region. Recognizing that river and city are inseparable, this partnership is guided by land-water relationships, including the powerful forces associated with flooding, recovery, and equity.

The interdisciplinary partnerships and work in Lumberton reflect best practices in rural resilience, as organized around: community design and planning; post-disaster recovery procedures and financing; public policy and administration; and environmental planning and design. Begun in 2017 following Hurricane Matthew and continuing to the present day, the goal of this partnership is to assist the city increase social and physical resilience within flood-prone areas. Community engagement has guided the development of a community plan that respects and reflects local character and history to guide local land-use and flood risk reduction decisions.

Priority break down of the Lumberton Loop project set be a flood infrastructure asset to the city as well as a recreational attraction. 65% allocated to educational focus, 22% social focus, 13% recreational focus.
The team works closely with elected officials, city staff, and citizens to transform the city’s vacant parcels into places for water storage, habitat and ecologically sensitive trails, parks, and programs. Projects are tied to existing community assets, plans, and existing recreation programs. The project team has led community engagement activities to support equitable design and implementation of projects. Our community-engaged, technical assistance process has helped Lumberton build capacity to navigate the difficult tasks of rebuilding its community and recovering its relationship with the Lumber River.

These actions promote adaptive design strategies that support long-term community function, health, resilience, culture and vitality.

PRIORITIZING EQUITABLE FUTURES

The most vulnerable people live in the most vulnerable places. Flood risk is not distributed equally across communities and correlates with a wide array of social vulnerability indicators. Communities with large numbers of low income households, people of color, seniors, young children, and other factors often find themselves in areas most affected by environmental stressors. In Lumberton, many of the city’s most vulnerable populations exist within the floodplain areas south of the Lumber River. These neighborhoods are artificially “protected” by a levee and lack redundant flood control measures to counteract the environmental hazards correlated with major flooding events. The team conducts vulnerability assessments as baselines for land suitability analysis. Identifying and understanding these socio-economically vulnerable populations provides a more accurate picture of the distribution of risk, and associated “gaps” in resource allocations, which in turn guide the prioritization of neighborhood-level, sub-area planning recommendations. The resulting community plans create more equitable access to park space and recreational opportunities while simultaneously reducing exposure to flood risk at the scales of individual house and homeowner, neighborhood block, and citywide.

REPURPOSING VACANT LAND FOR PUBLIC BENEFIT

Flooding has left a scatterplot of vacant and/or underutilized properties throughout the city, further exacerbating existing vulnerabilities of these areas. In most cases, the City of Lumberton becomes the owner of such properties and ultimately bears the responsibilities of upkeep and management. In rural communities like Lumberton, post-disaster decreases in tax base coupled with spatial discontinuity between vacant properties can quickly make the task of land
management an overwhelming burden. Additionally, in this condition, vacant and/or flood-prone properties are not typically used in ways that serve an ongoing public benefit. Instead, vacant and/or flood-prone properties remain unprogrammed, become problematic to maintain, and are often viewed as a nuisance.

When managed properly, vacant land can catalyze (re)connections to natural systems, nurture strong social bonds, and provide essential ecosystem services. To realize these benefits, the collaboration continually evaluates vacant lands in the context of the entire community’s landscape. This informs larger planning and design strategies and aligns proposed designs/programs with existing community planning documents/initiatives. These analyses also enable a system-wide understanding of critical issues, such as vulnerability to flooding (including causes), ecological significance, and asset connectivity (existing and potential). Once these criteria are mapped, issues and opportunities related to management of vacancies within the system are revealed and accordingly prioritized. Illustrative methods are also used to illustrate “buy-out” alternatives, computationally modeled stream restoration scenarios, and resultant land use recommendations. Simplified, highly communicative graphic methods play an instrumental role in informing the decisions of individual property owners, neighborhood groups, and city staff and elected officials. The results have been transformative — ongoing collaborations with residents and city staff to co-design and implement projects have increased the speed of disaster recovery and resiliency planning activities and continue to guide the city in optimistic and opportunistic directions.

**CLOSING THE LOOP - RECOVERY, RECREATION, RESILIENCE**

The highest and best use of land within a floodplain is to serve its natural function – attenuate flooding through the capture, absorption and slow release of rising waters. These same areas can serve as public amenities through the provision of active recreation and ecosystem services, especially when connected to land held by the city, state, and conservation groups. While buyout parcels, conservation easements, and city/county parks in Lumberton are often located in environmentally sensitive floodplain areas, these land holdings are disconnected and incapable of providing an integrated, citywide nature-based amenity. Leveraging all of the robust analyses, the Lumberton Community Floodprint developed a citywide plan, coined the “Lumberton Loop”, that aggregates these lands into a collective whole to provide a landmark recreational and flood
infrastructure asset for the city. The plan organizes 108 fragmented parcels into a citywide trail network that connects 806+ acres of vacant lands, over 99% of which are located in the 100-year floodplain. To date, the total direct-to-community funding generated by the Lumberton-CDDL partnership to implement the Lumberton Loop is $2,762,769.00.
ABOUT APLU

The Association of Public and Land-grant Universities (APLU) is North America’s oldest higher education association. APLU is a research, policy, and advocacy organization dedicated to strengthening and advancing the work of public universities in the U.S., Canada, and Mexico. The association's membership consists of public research universities, land-grant institutions, state university systems, and affiliated organizations.

APLU's mission is to: expand access and improve student success to deliver the innovative workforce of tomorrow; advance and promote research and discovery to improve society, foster economic growth, and address global challenges; and build healthy, prosperous, equitable, and vibrant communities locally and globally.

Based in Washington, DC, the association's work is furthered by an active and effective advocacy arm that works with Congress and the administration as well as the media to advance federal policies that strengthen public universities and benefit the students they serve.

ABOUT THE IEP UNIVERSITIES PROGRAM

APLU and its Commission on Economic and Community Engagement (CECE) established the Innovation and Economic Prosperity (IEP) Universities Program to help higher education institutions codify, elevate, and advance their campus enterprise supporting economic and community development.

The IEP designation program recognizes institutions that have demonstrated a meaningful, ongoing and substantial commitment to economic and community development, growth, and economic opportunity.

The IEP awards program recognize exemplary and innovative projects in university-based economic and community engagement:

- **Talent** and workforce development
- **Innovation**, entrepreneurship, and tech-based economic development
- **Place** development through public service, outreach, and community engagement

Learn more at: [www.APLU.org/IEP](http://www.APLU.org/IEP)