

Regional Riverine Targeted Use of Buyouts **(Regional Riverine TUBs) Program¹**

What: The innovative *Riverine Targeted Use of Buyouts (Riverine TUBs) Program* has a **three-prong approach** to creating river and waterway resilience through providing a long-term implementation/enhancement strategy for buyout properties to be **1)** purchased by respective regional counties (via federal or local funding), **2)** maintained by the county or allowed by state law to be transferred to the state agency or a NGO for fee-simple ownership or a conservation easement structure and **3)** enhanced with native bioswales, large-scale native trees/plants, rain gardens, and other types of Green Stormwater Infrastructure (GSI).

When: The *Regional River & Waterway TUBs Program* has potential to help mitigate the impacts of future large rain events on Greater Houston's key community assets, such as essential infrastructure, and provide critical connectivity along riparian corridors. During flooding/major rain events in the region, emergency responses are increased, and critical infrastructure is paramount. However, flooding creates widespread roadblocks and damage, putting a particular stress on critical infrastructure. For the first prong, these buyouts are on-going in some counties and not being done at all in other regional counties. For prong three, working to implement the *Regional Riverine TUBs Program* will incorporate native bioswales, trees/plants, and potentially other types of Green Stormwater Infrastructure (GSI) into property buyouts that adjoin existing public spaces, such as parks, detention areas, riparian corridors and other green spaces. The Program also coincides with the City of Houston's *Climate Action Plan's* Goal 3 for energy transition: to restore, protect, and enhance Houston's natural ability to capture and store carbon, and the *Resilient Houston Plan*, Goals 6, 11 and 16 related to large-scale native tree plantings, increases in GSI projects and undeveloped regional lands as natural spaces. For prong two, there is still a need to assist some regional counties on ways to maintain/transfer buyout properties in order to provide them with incentives and interest in obtaining qualifying buyout properties with federal, state or local funds.

Why: The impact of recent flood events, such as Hurricane Harvey in 2017, as well as other frequent repetitive flood events that impact rivers and waterways both upstream and downstream in respective regional counties, as well as from tropical storms originating in the Gulf of Mexico, has sparked new proposals for buying out damaged properties to reduce flood risk and return them to natural open space. Open spaces that result from both existing and potential buyout properties can be converted for use as dual wildlife habitat and GSI sites, rather than vacant open spaces with no added ecological benefits. A recent study statistically and spatially demonstrates the feasibility of incorporating additional ecological and proximity criteria into the flood buyout selection process without compromising strong economic benefits (Atoba, 2022). Findings provide a justification for decision makers to include other factors beyond traditional FEMA requirements that more proactively enhance ecological functions, which can provide additional long-term flood protection. This approach may also generate additional management, aesthetic and recreational benefits by protecting concentrated areas close to existing buyout properties and other forms of open spaces such as parks, floodplains and wetlands, especially those adjacent to bayous or waterways.

Following catastrophic impacts of large storm events like Hurricane Harvey, the sizable amount of federal funds coming to the region to buy out chronically damaged properties and restore them to open spaces has provided an opportunity for significant flood mitigation tools. Funding for the buyouts already exists via federal and local funds.

1st & 2nd-prong issues - When counties in Texas expend funds for property buyouts of lots along riverine areas that flood in large rain events, whether with local, state and federal funds (such as federal recovery funds) in rural/suburban communities, it currently: a) causes fragmented land lots (a checkerboard effect) that does not allow for significant flood mitigation solutions (such as contiguous green space – connectivity - along riparian

¹ Updated November 2022

corridors that frequently floods during heavy rain events), b) continues to put leftover homeowners and first responders at risk of harm, and c) puts a serious financial burden on the county responsible for maintaining the buyout lots and providing emergency services.

3rd-prong issues – The pioneering *Riverine Targeted Use of Buyouts (Riverine TUBs)* Program is a region-wide approach to coastal and riparian resilience, erosion and sediment reduction, and hazard mitigation through implementation of green stormwater infrastructure (GSI) techniques (also known as nature-based stabilization techniques) at strategically selected buyout properties adjacent to multiple downstream waterways in Greater Houston/Harris County. Seventeen locations have been targeted in Harris County and funding has been awarded to HW for GSI implementation at these locations.

Buyout properties are also an opportunity to use land for wildlife restoration. Properties acquired using federal funds are required to be demolished and maintained in perpetuity for “uses compatible with open space, recreational, or wetlands management practices” (see § 206.434). Uses also include fish, wildlife, plant resources and habitats. However, research by Zavar and Hagelman (2016) shows that the most common use of buyout properties are vacant lots resulting in maintenance costs for municipalities and counties, as they also must be mowed.

Where: Planting numerous additional native tree and grass species in strategic buyout locations on both private and public protected/preserved lands, as well as other public/private locations will increase resilience and recovery from shocks and stressors by 1) protecting, restoring and improving the water/air quality, carbon absorption, riparian erosion rates and habitat of multiple watersheds, and 2) reducing Urban Heat Islands. Research by local partners allows large-scale tree plantings to quantify: a) the amount of reduction in air and water pollution, erosion control and Urban Heat Island effects that will occur annually and after 10 years of tree growth, based on type of native tree species planted; and b) the amount of increase in carbon sequestration and water absorption, habitat improvement, and energy savings, based on type of native tree species planted. As Houston grows more dense/urban, new and existing trees, especially those shading pavement and homes, will decrease energy used for air conditioning and mitigate the impact of increasing heat on citizens’ health. These trees promote exercise by providing shade and assist in stormwater management by slowing runoff during rain events.

How: Counties in the Gulf-Houston region are working together with regional and state officials to advocate for solutions to this issue that will allow for (1) the ability of counties in Texas to expend available federal funds to be used for voluntary property buyouts in flood-prone areas under whatever funding qualifications are required, (2) provide a state-based vehicle for additional coordinated funding to buyout remaining properties that are left over after the federal funds have been expended in order to create connectivity along riparian corridors, and/or provide an arrangement for property owners with high flood risk homes to keep their home in flood-prone areas only until that home is subsequently destroyed by a flood or similar event, and (3) arrange for one or more non-county entities to take possession of the properties from the county, once structures on the property have been removed, or provide a legal vehicle for maintenance – such as a viable conservation easement.

The newly-established *Institute for a Disaster Resilient Texas* (IDRT) at Texas A&M University-Galveston plays a key role in the Regional Riverine TUBS Program by providing analysis, research, and technical support on property buyouts and acquisition in relation to Green Stormwater Infrastructure (GSI) techniques. The IDRT buyouts research team focus on systematically identifying the intersection of buyouts, land use, and vulnerability to flooding and developed a methodological framework that can guide the selection of suitable properties as GSI sites.

When lands are purchased and converted/restored to their natural state, development is more likely concentrated away from vulnerable locations like floodplains and wetlands. The focus is on identifying properties that intersect/annex open waters and evaluating the economic benefits of the ecosystem services that they provide in comparison to traditional residential development, re-shaping thinking on how to protect communities in light of projected environmental stressors. Acquiring flood-prone parcels through buyouts converts these lands to

other sustainable land uses such as GSIs. Data will demonstrate the various ways the different sites interact with particular GSI techniques and what degree of impact they have on water quality, air quality and habitat creation.

This holistic approach addresses detrimental impacts from rainwater/storm events, aiming to create new best management practices (BMPs) to combat the impact of these events. The **Regional Riverine TUBs Program** particularly focuses on riparian areas (rivers and waterways) because they flow into the bays, which flow into the Gulf of Mexico. As the sites are located along waterways that feed into Galveston and the Gulf of Mexico, they will significantly impact human community resilience and fish/wildlife in Resilience Hubs (aka TUBs). The program addresses both flood and water quality issues, and enhances habitats for fish and wildlife. Additionally, the entities involved with the TUBs Program have observed the viable potential to capture and remove trash alongside the implementation of GSI activities and are now monitoring and enhancing this process.

This 3-pronged strategy allows for federal dollars to be leveraged while also allowing for contiguous tracts of open space that provide long-term reduction in riverine risks along the three major rivers and the waterways within those watersheds.

The **Regional Riverine TUBs Program** coordinates with the eight-county conservation plan facilitated by Houston Wilderness (HW) and other large initiatives in the region. This plan lays the groundwork for resilience efforts:

The Gulf-Houston RCP's 1st key goal to push for 24% protected/preserved land in the 8-county region by 2040 allows for increased nature-based resilience measures in multiple neighborhoods and riparian corridors. Through HW's research and data collection on protected/preserved land in the eight-county region, it is known that increasing nature-based infrastructure throughout Greater Houston from the current 14.7% to 24% by 2040 will provide the protected/preserved land needed to achieve many of the area's economic, ecological and social goals to reduce shocks associated with flooding, coastal storms and hurricanes, and extreme temperatures (including the Urban Heat Island Effect), and stresses associated with climate change and sea level rise, energy transition, land use and urban sprawl, population growth, environmental degradation and environmental justice issues, carbon sequestration, and subsidence. The current protected/preserved land in the City of Houston and its extraterritorial jurisdiction (i.e. Harris County) exists on both private and public lands for purposes of recreation, riparian corridor use, environmental/mitigation easements and development related detention/reservoir uses.

Regional References:

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