

Integrating Ecosystem Services and Community Preferences to Improve Post-Buyout Land Use Management

Ayesha Islam¹, Elyse Zavar², Alex Greer³, Sherri Brokopp Binder⁴, Jason P Martina⁵

1. Department of Emergency Management and Homeland Security, University at Albany, Albany, NY
2. Department of Emergency Management & Disaster Science, University of North Texas, Denton, TX
3. Department of Emergency Management and Homeland Security, University at Albany, Albany, NY
4. Brokopp Binder Research & Consulting, Allentown, PA
5. Department of Biology, Texas State University, San Marcos, TX



Study Summary

Buyouts seek to remove people from high-risk landscapes and convert the built environment to open space, with the understanding that local governments will manage them in ways that reflect community preferences and maximize ecological services. In practice, however, most land uses on post-buyout open space are developed ad hoc and without community input, resulting in land uses with limited social or ecological benefits. Using a socio-ecological systems (SES) lens, this study is among the first to examine the social and ecological dimensions of buyout property management across six counties in central Texas. The findings from this study will serve as a guide for policymakers to better plan for buyout land uses, integrating community participation, and to formulate policies for future flood adaptation by conserving local ecosystem services.

Research Questions

- How does land obtained through property acquisition programs affect socio-ecological services at local, regional, and global scales?
- How does the management of post-buyout open space contribute ecosystem services to local, regional, and international communities?
- In what ways do residents engage with or attribute values to SES on post-buyout lands?
- What challenges and successes have implementing agencies faced in managing the acquired properties?
- How can land uses on acquired land can promote environmental justice?

Study Area

- Study area includes the counties of Bexar, Bosque, Comal, Guadalupe, Travis, and Victoria in Texas.
- known as “flash flood alley”
- experienced significant flooding in 1998, 2002, and 2015 resulting in extensive buyouts
- FEMA’s HMGP and HUD CBDG-DR grants, plus local governments funded the buyouts.
- 304 buyout properties identified across 30 neighborhoods
- Median area of the properties is 14380.5 Sq meters.

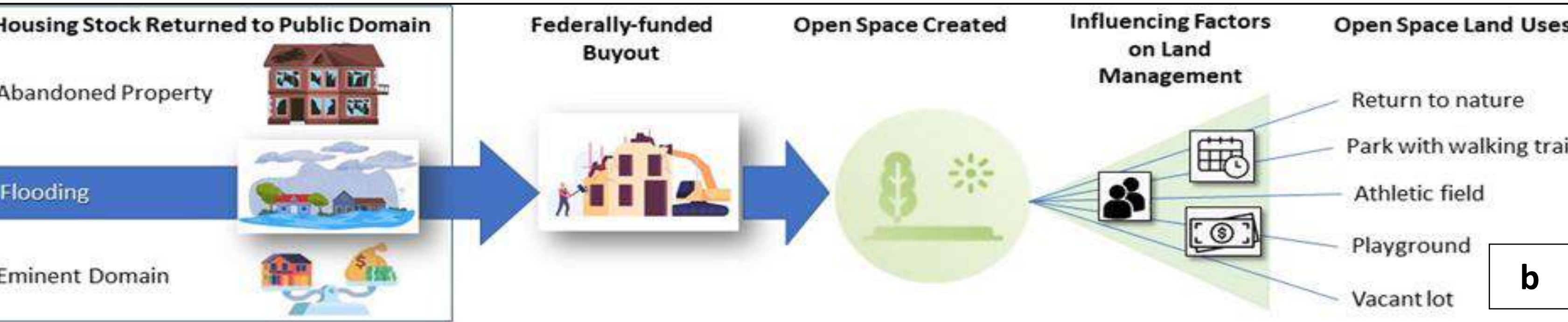
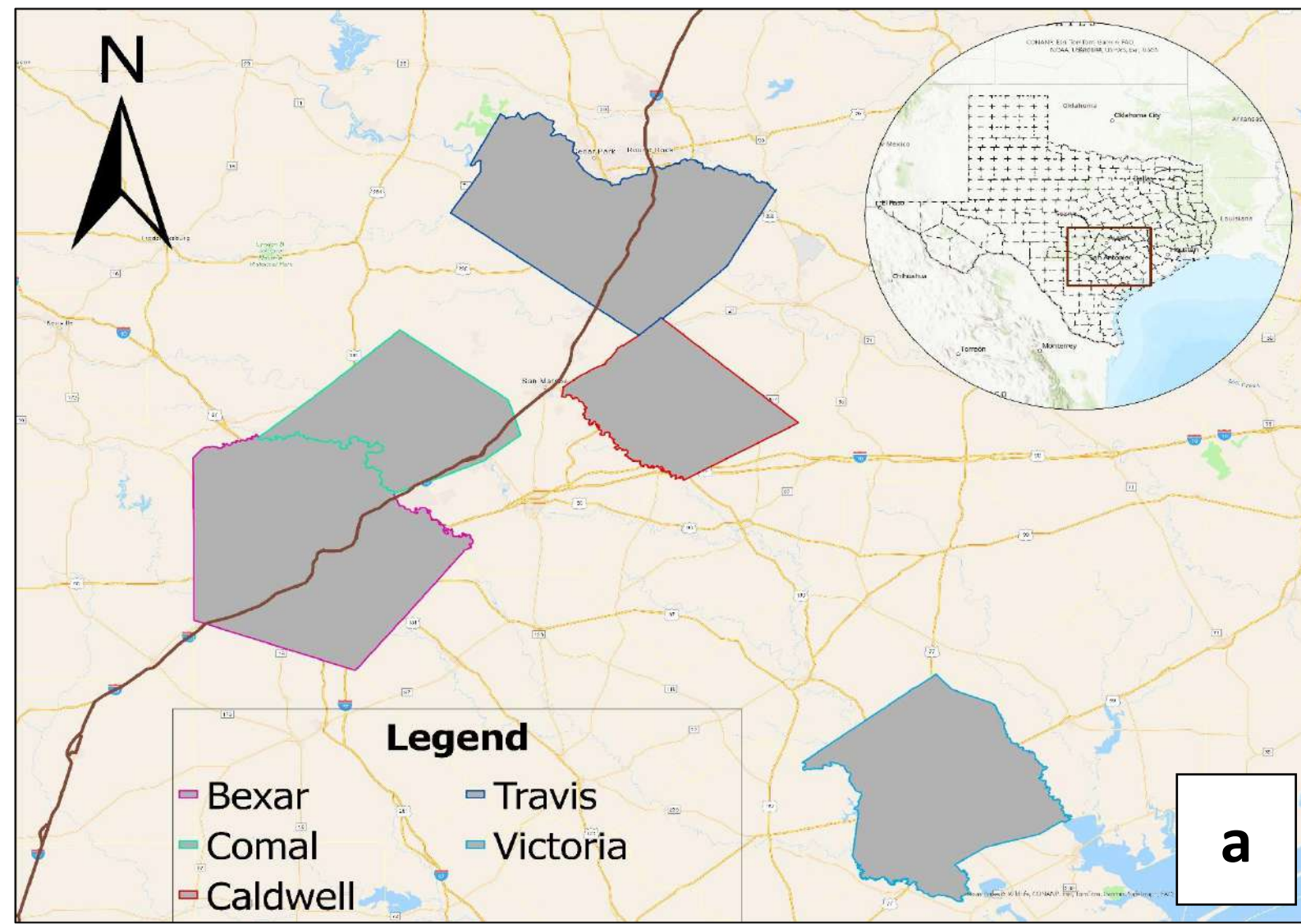


Figure-1: a) Study areas in Texas, b) Process of buyout – Flood exposure to open space

Study Design

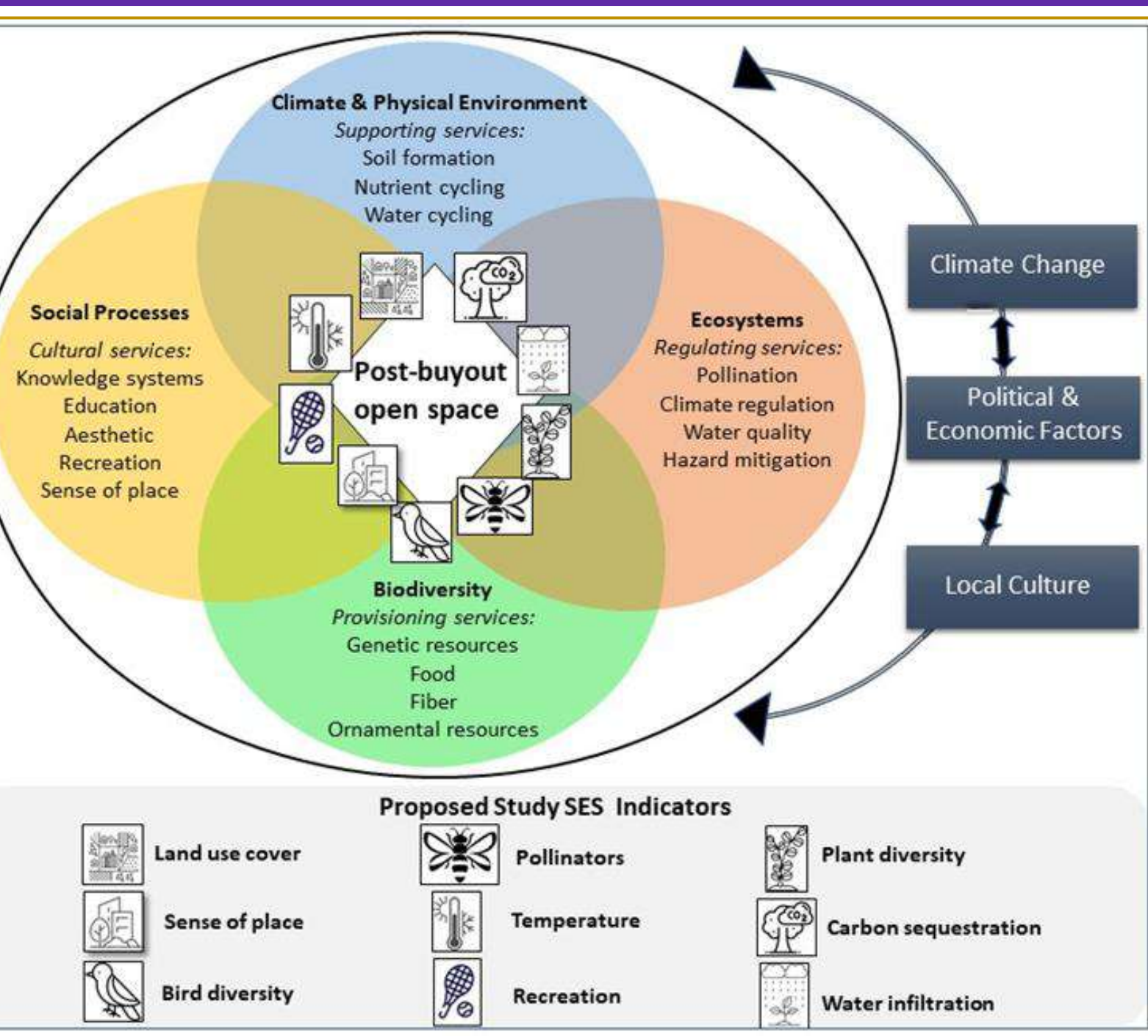


Figure-2: Socio-Ecological Model [source: C.M. Raymond Et al.,2017; C.M. Ryan et al.,2012]

- Given that acquisition lies at the nexus of complex environmental and social systems, this study utilizes the Social-Ecological Systems (SES) model to evaluate the buyout properties.
- Overall, six ecological services are quantified across the buyout properties. These are:
 - Biodiversity (plant diversity and avian diversity);
 - soil carbon storage,
 - pollinators,
 - ambient temperatures,
 - water regulation and purification,
 - And the presence of recreation activity in the buyout sites.
- Using stratified random sampling in ArcGIS Pro to select sample transects.

Specific tasks, task leads, and methods to address research questions

Measurement of ecosystem services across buyout subtypes

Methods: Spatial data analysis, soil sample extraction, ambient temperature record, and bird chirping recording

Task 1

Task 2

Methods: Spatial data analysis, site visit, photo documentation, and observation

Engagement with government stakeholders for understanding buyout implementation and management process

Methods: interview, field observation, policy document review

Task 3

Task 4

Identify residents’ perspectives on buyout land use practices and efficacy

Methods: door to door survey, interview

Output-1: Land use change and current management



Snapshots of the study sites

- High-utility land uses (ecosystem restoration and structural mitigation) observed the least.
- Moderate (recreation, garden, memorial/ education, informal use) and low-utility (parking lot, and vacant lots) land uses were more frequent.
- Adults were most users at the observation sites, followed by children, seniors, and teens.
- More males observed than females
- People of Color underrepresented at the open spaces when compared to surrounding neighborhood and city demographics

Figure-4: Pictures of recent land use practices in the buyout areas: a) signage in the buyout land, b) buyout land turned to a soccer field at the Wheatly Heights, San Antonio, Texas, c) snakes’ habitat in the old refrigerator at the buyout property in Crescent Bend Nature Park, Bexar County

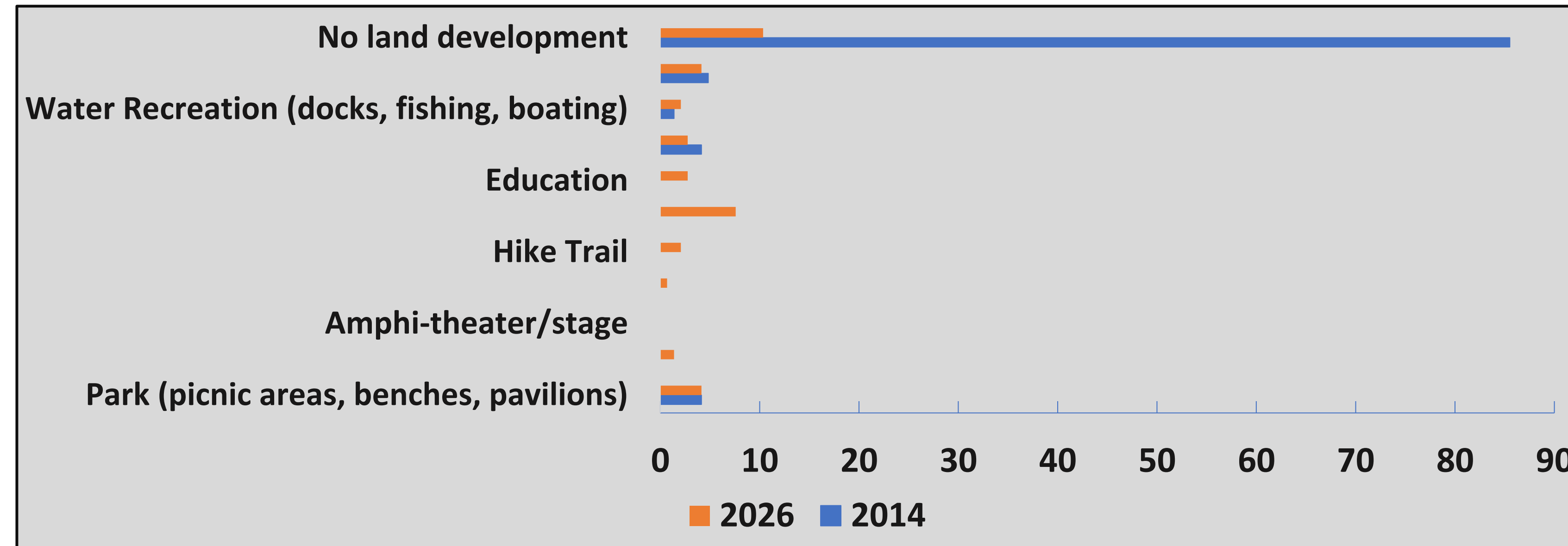


Figure-5: Percentage of land use changes across the buyout study sites for 2014 and 2026

Snapshots of comparative land-use changes

- No land development is largest category in both years.
- A clear shift away from no development in 2026 compared with 2014 is visible.
- More variety of land uses observed in 2026 than 2024.

Output-2: Neighborhood perspective on buyout land use



Figure 6: Pictures of the neighborhood near the buyout properties. a) vacant lot in the Wild Onion Dr Road, Austin, b) memorial at a buyout site near Hayman Lane, Austin c) road damage from the 2025 flood at Martinez Creek, San Antonio

Snapshots of resident survey:

- 48.39% residents agree that buyout open space protects them from future flooding; 19.35% were neutral.
- 54.84% residents believe the open space positively affects their property value; 67.74% say it attracts positive activities to the area.
- 64.52% agree that the open space is well maintained, though about a quarter disagree across the maintenance and neighborhood-benefit items.
- 61.92% residents agreed they would support the local government in conducting more buyouts in the future.

Application & Next Steps

- Analyze data for the ecological services in the buyout properties.
- Conduct interviews with the government to understand the management process.
- Develop a Community Participation Guide focusing on the management of the Open Space.
- Disseminate the findings through community workshops in the presence of local and state-level officials, study participants, and non-profit organizations.

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