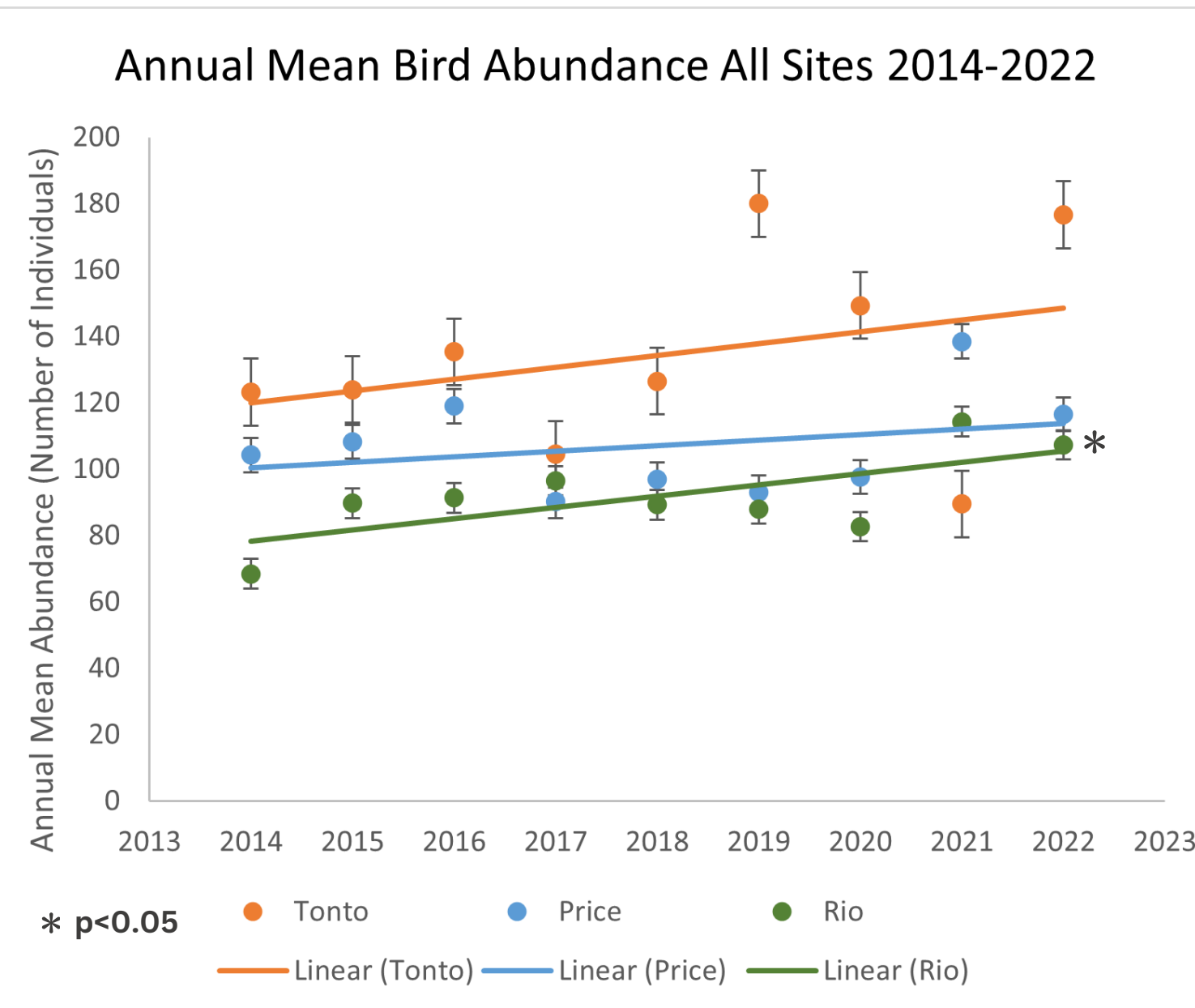
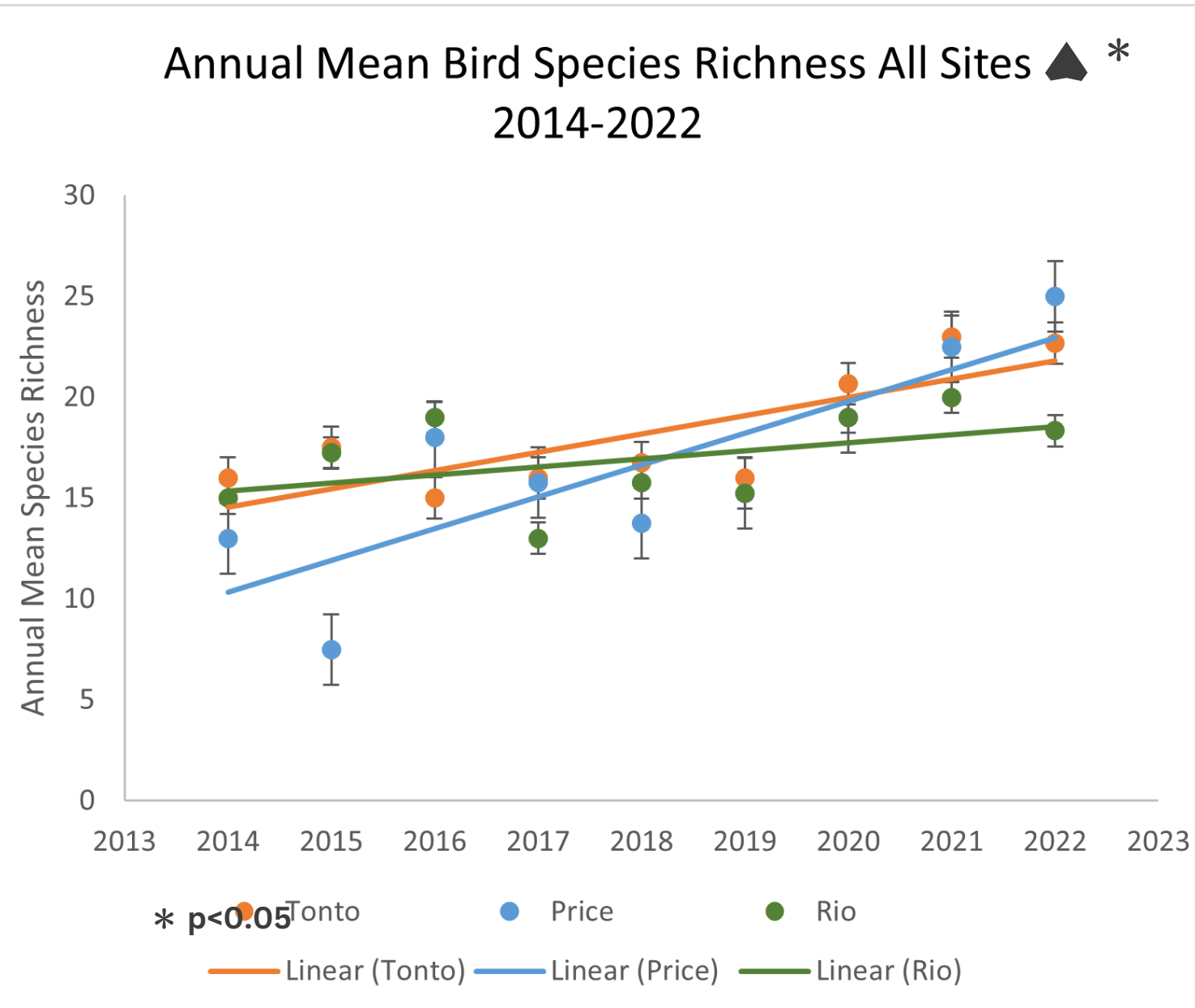


Combining Art and Ecology to Understand Changing Biotic Communities of the Urban Salt River

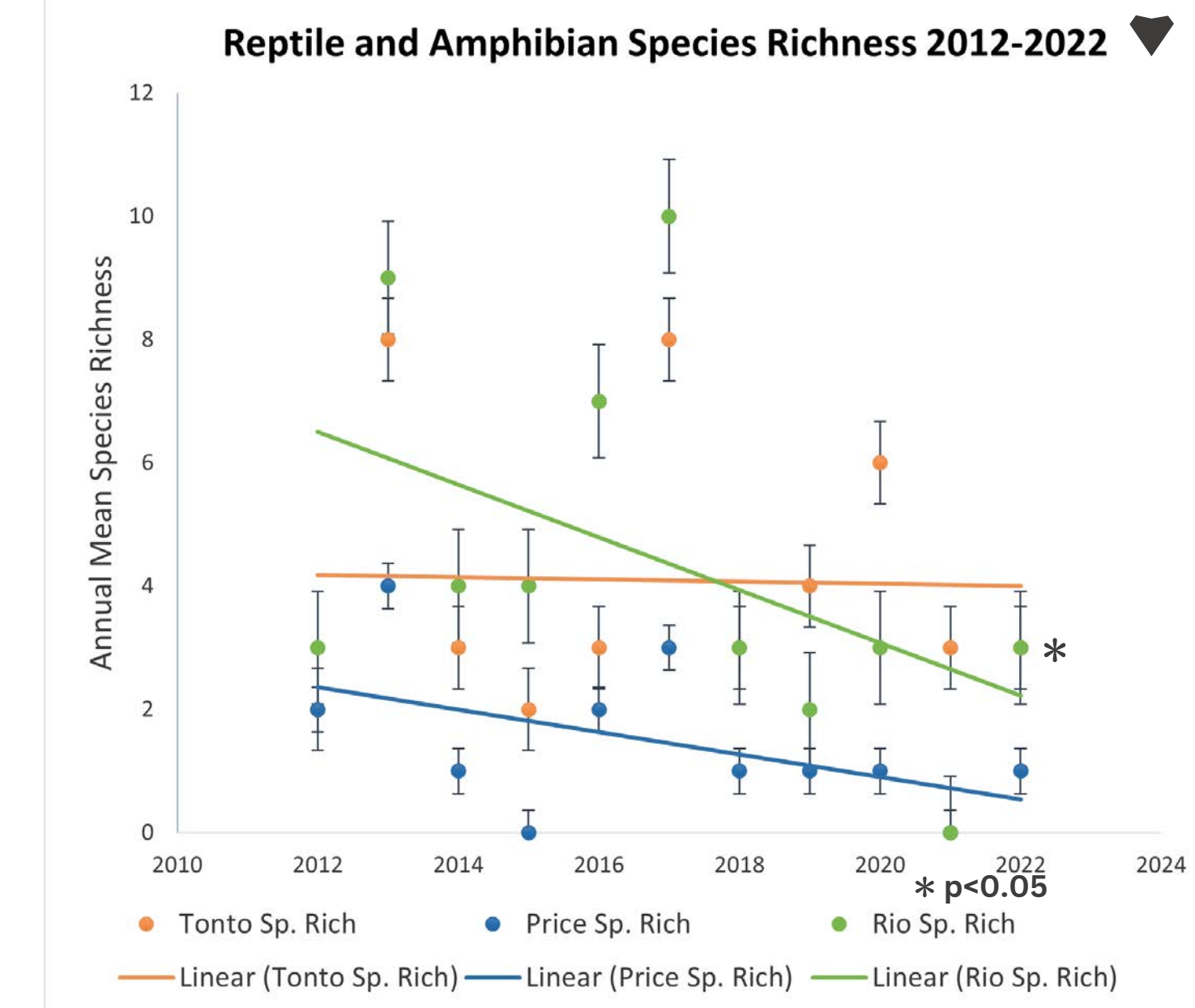
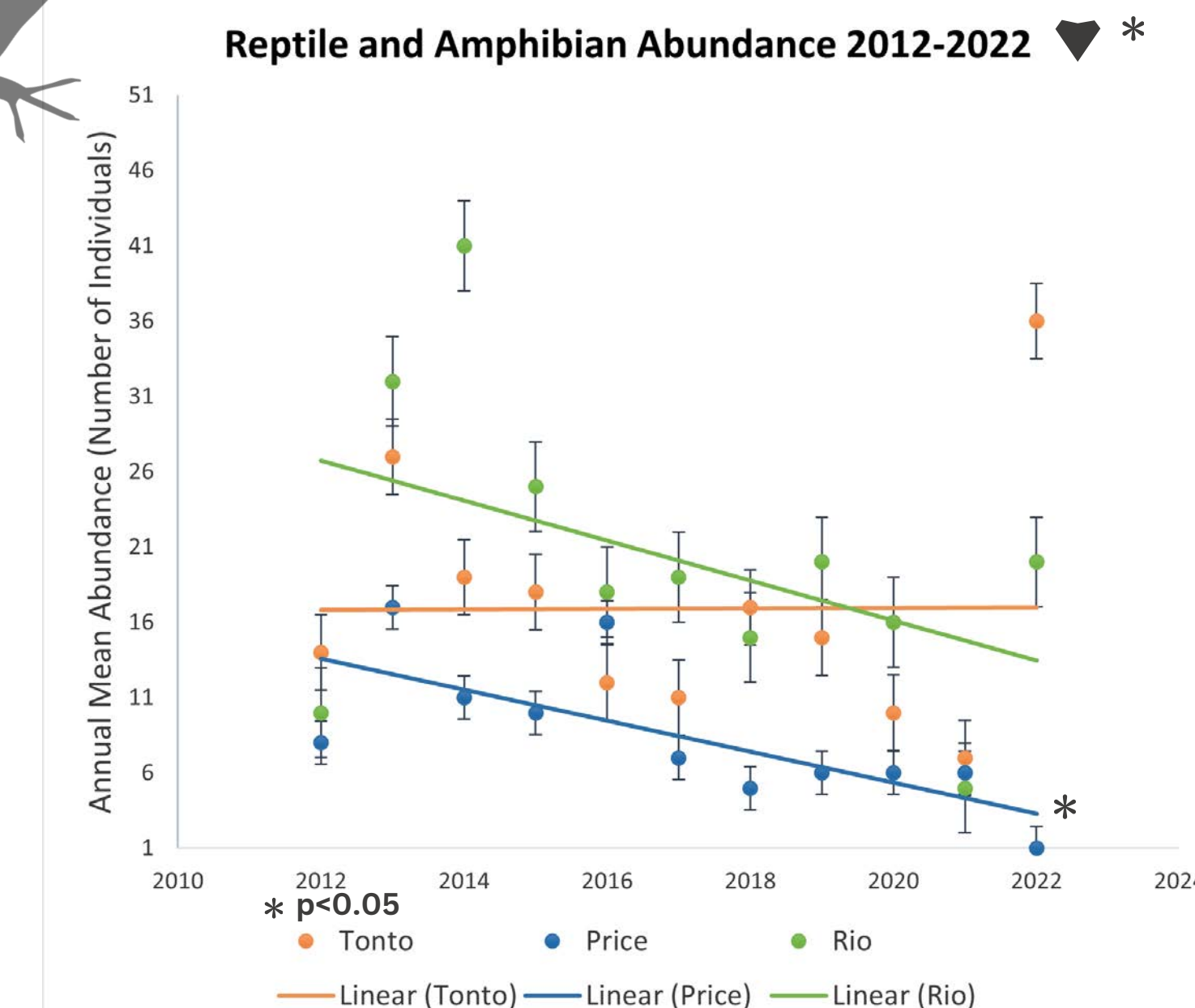
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While most of the urban Salt River has rarely flowed since Granite Reef Diversion Dam's construction, human activity provides water year-round to several parts of the riverbed, sustaining wetland landscapes in the midst of one of the country's largest and fastest-growing urban areas. **CAP LTER's Salt River Biodiversity Project (SRBP)** has monitored birds, reptiles, and plants in these ecosystems since 2012 to understand how urbanization, climate change, and management affect ecological communities in the urban river. **Here we review changes in three SRBP sites with year-round water availability: a remnant wetland on the urban outskirts (Tonto), an accidental and unmanaged wetland formed by urban runoff (Price), and a publicly-managed restoration area in downtown Phoenix (Rio). Each site changed in a unique way in response to its land use history and management style, and some overarching trends were shared across all three.**



Bird and reptile communities showed opposite trends:
Total bird species richness increased, and bird abundance increased at the restored wetland.
But both richness and abundance of reptiles and amphibians declined, especially at urban sites.



Our plant surveys revealed more abundant vegetation in urban sites than on the urban periphery. The remnant, less urban reach, however, supported the highest plant species richness and diversity (using the Shannon Diversity Index), which had increased since 2012.

To visualize these changing communities in more detail and using a more experiential and artistic approach, **we integrated printmaking, papermaking, and landscape management into data visualization.** We collaborated with the City of Phoenix and Salt River Pima-Maricopa Indian Community to remove unwanted plants from wetlands they are currently rehabilitating, and used the most abundant marsh plants at case study sites (*Arundo donax*, *Schoenoplectus californicus*, and *Typha latifolia*) to make paper. This paper became the background for hand-printed community composition charts for each site's plant community in 2012 and 2022 (below). Each relief-printed pixel represents 1% annual cover of a classification group (i.e. growth habit, wetland indicator status, or biogeographical origin; see key). **These art pieces are displayed at the Nina Mason Pulliam Rio Salado Audubon Center as part of their outreach galleries. This project creates a space where researchers, land managers, the public, and the plants themselves can collaborate, integrating CAP's long term research with the communities that call the Salt River home.**

Tonto: Remnant Wetland

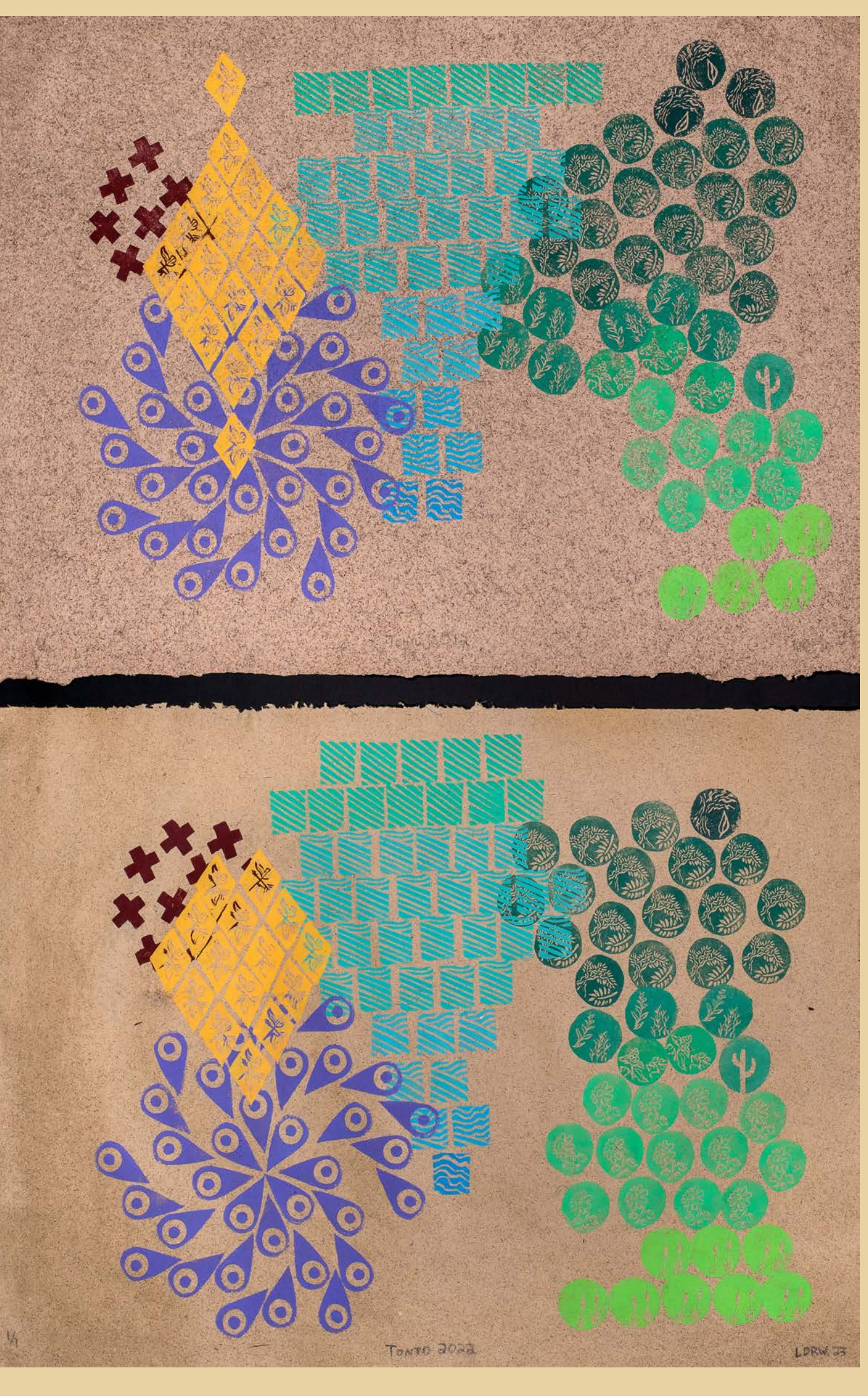
Less cover than in 2012, with fewer marshes and riparian trees.

Diversity increased, especially among grasses and forbs.

Upland vegetation is more common and wetland plants are more scarce.

These trends are consistent with ongoing drought and grazing by wild horses.

Culturally significant species for the Akimel O'odham are less abundant, but biogeographically native species are not, suggesting a gap between USFS and Indigenous land stewardship priorities.

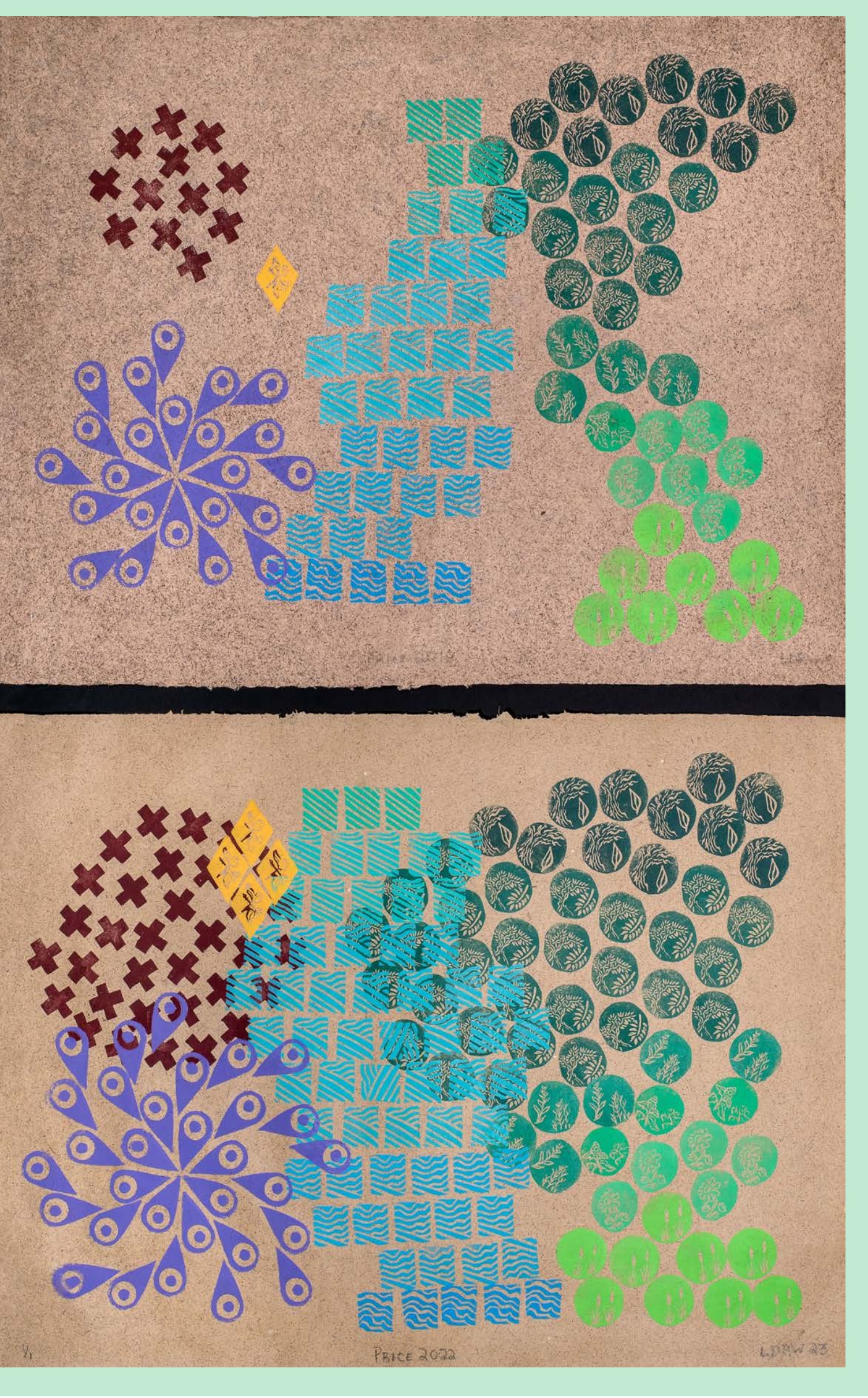


Price: Accidental Wetland

Plants are more abundant than in 2012, and similarly species rich and even. However, in 2012 this site was among the highest in species richness and in 2022 it had the lowest.

Facultative plants, tolerant to changing water availability, have been especially successful.

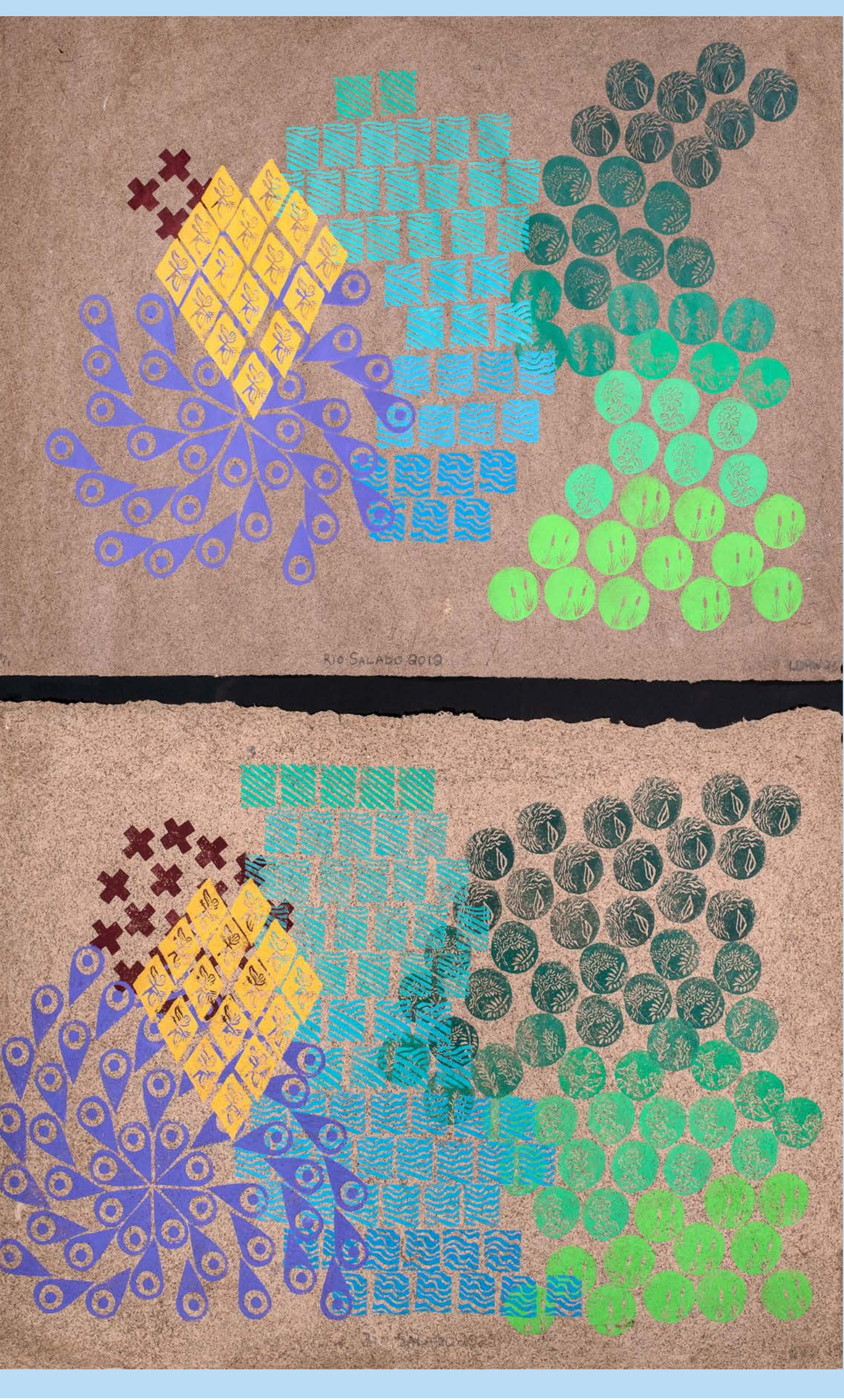
Regionally rare species (i.e. *Ludwigia erecta*, *Ammania coccinea*) and culturally important species (i.e. *Strombocarpa odorata*, *Salix gooddingii*, *Pluchea sericea*) have increased in abundance.



Rio: Restored Wetland

Rio Salado was much lusher in 2022 than in 2012, with growth across all classification groups, showing restoration efforts have helped sustain a heterogeneous habitat structure, vital for urban birds.

While Rio has a higher species richness than in 2012, it has become less even across plant taxa, with the lowest Shannon Diversity Index of the three sites. This unevenness stems from the prolific growth of several species cultivated by restoration managers (*Salix gooddingii*) and introduced from the surrounding city (*Arundo donax*, *Typha latifolia*, *Vitex agnus-castus*).



Heron and spiny lizard silhouettes courtesy of Rebecca Groom and Andy Wilson through Phylopic.
 All other images from Ramsey-Wiegmann, L. D. (2023). Accidental and Restored Wetlands of the Lower Salt River: A Portrait of Biodiversity and Community Composition Over a Decade of Urbanization (Dissertation, Arizona State University).