



CENTRAL ARIZONA CONSERVATION ALLIANCE



Using the CAZCA Greenprint in Land Use Planning, Communications and Stakeholder Engagement

*A Pragmatic Approach for the Future of Open Space
Managment in Maricopa County In pursuit of the Maricopa
County Regional Open Space Strategy*

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*A Pragmatic Approach for the Future of Open Space Management in Maricopa County
In pursuit of the Maricopa County Regional Open Space Strategy*

The Greenprint was developed to support local jurisdictions, land managers, and other natural resource stakeholders in understanding their natural resource assets. This tool is a compilation of site-specific data sets that can be used to inventory, map, and prioritize urban and rural open spaces. Ultimately this information can be incorporated into land use plans and processes that will guide development, conservation, recreation, and other land management efforts.

Proactive planning for open space helps maintain a high quality of life in urban and rural areas to Arizona residents, the state's tourism industry, and our economy at large. The Greenprint supports planning processes by displaying a wide variety of open space and urban planning data simultaneously. Users can tailor their experience to match the focus of their planning processes by selecting from our wide list of data and using the exploratory tools provided. The Greenprint provides several approaches to explore and interact with the data.

This reports outlines the data in the tool and suggests some ways in which it supports planning and prioritization, communications and marketing, and as a tool for stakeholder engagement processes.



Local open space managers strategize during a CAZCA Greenprint workshop. Photo credit: CAZCA

CAZCA Greenprint: Serving Maricopa County's Open Space Legacy

In the past decade, Maricopa County has been one of the fastest growing counties in the United States. One unique aspect of our region that continues to draw people from across the world to visit, live, and work in Maricopa County is the unique and vibrant Sonoran Desert landscape.

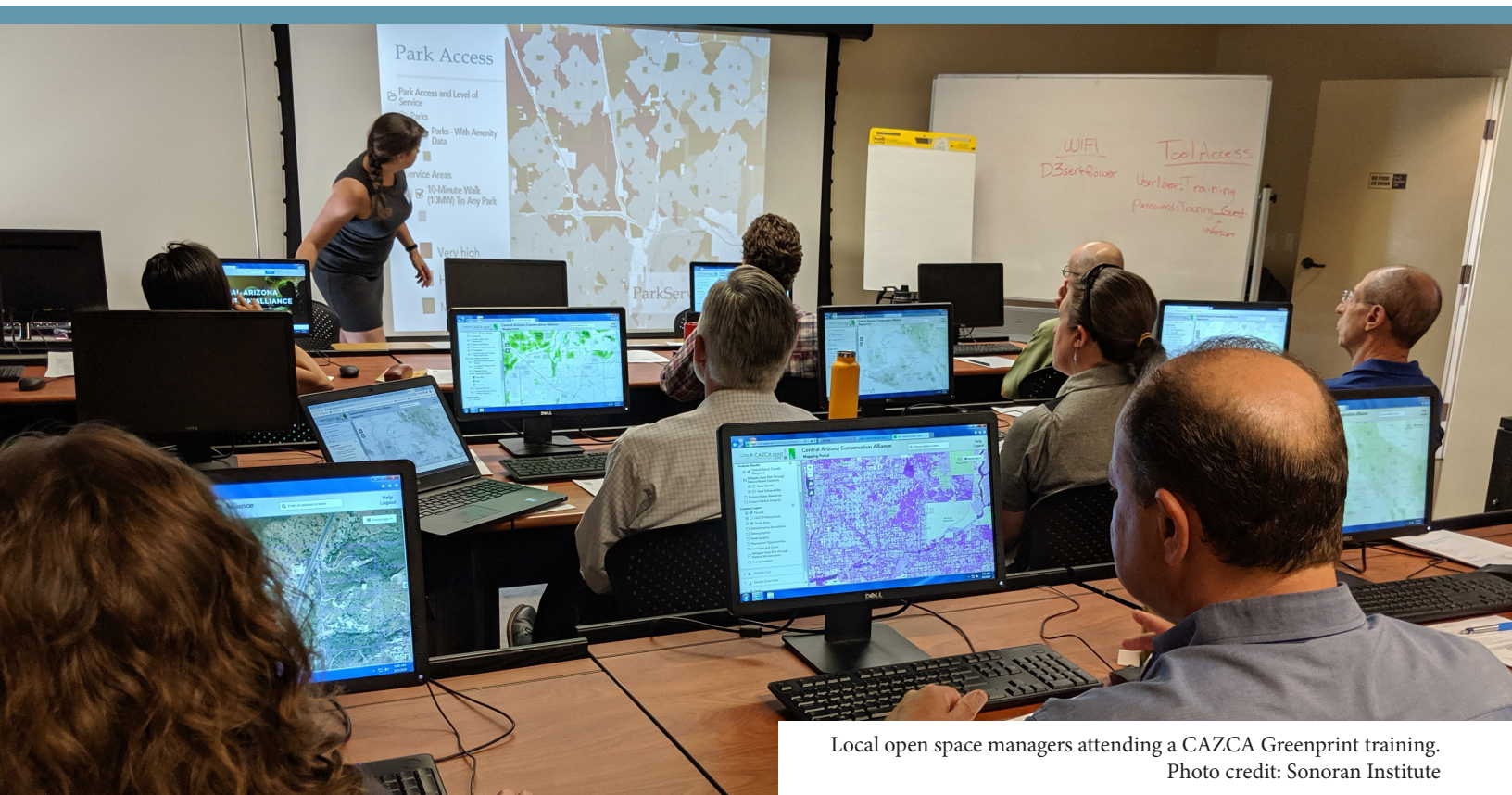
The Sonoran Desert is the most biodiverse desert in North America. This extraordinary and flourishing place is critical to Maricopa County's economy and essential to the fabric of our communities. In response, leaders have cultivated a legacy of open spaces and trails. Central Arizona has much to be proud of by way of open spaces.

However, Arizona is forecast to grow toward ten million or more people by 2050. According to the US Census and Maricopa Association of Governments, 70% of that population is expected to live within Maricopa County. There is already evidence that ongoing development is impacting current desert park lands, while newly emerging cities will require effective planning for new desert parks to serve their growing populations and maintain a healthy desert landscape across the city.

As we nearly double in population, it's essential to ask: how do we grow our economy and also preserve and build upon Maricopa County residents' love for their open spaces? What tools are available for planners to effectively select areas for desert parks and preserves that will provide recreation activities and serve as habitats and corridors for the plants and animals that residents and visitors alike believe enhance the quality of the city?

The Trust for Public Land and the Central Arizona Conservation Alliance have developed the CAZCA Greenprint tool to support local jurisdictions, land managers, and other natural resource stakeholders in understanding their natural resource assets.

The [tool is available online](#) to any interested members of the public. CAZCA provides training to local jurisdictions, land managers, and natural resource managers in applying the Greenprint, from updating comprehensive land use plans to communicating the value of conserving critical parcels of land. To learn more about these opportunities, please email cazca@dbg.org.



Local open space managers attending a CAZCA Greenprint training.
Photo credit: Sonoran Institute

DATA OVERVIEW

The Greenprint is a compilation of site-specific data sets that can be used to inventory, map, and prioritize urban and rural open spaces. Ultimately this information can be incorporated into land use plans and processes that will guide development, conservation, recreation, and other land management efforts.

The Greenprint data covers all of Maricopa County as well as the surrounding HUC 10 watersheds. As such, it is useful for urban and rural jurisdictions and various interest groups.

These data are organized into two categories: Analysis results and Context Layers. The analyses are aggregated results of other complex land cover analyses related to Water Resources, Habitat Integrity, and Heat Vulnerability. The extensive list of context layers includes data typically considered in various land-use planning efforts, such as existing and proposed land uses, ownership, and others.

The Greenprint Data Description table is a comprehensive reference on the analyses and metadata for every layer. It is available within the online tool and linked in Appendix C.

APPLICATION IN PLANNING PROCESSES

Proactive planning for open space helps maintain a high quality of life in urban and rural areas to Arizona residents, the state's tourism industry, and our economy at large. CAZCA Greenprint supports planning processes by displaying a wide variety of open space and urban planning data simultaneously. Greenprint users can tailor their experience to match the focus of their planning processes by selecting from our long list of data and using the exploratory tools provided. The Greenprint provides several approaches to explore and interact with the data:

- Individual layers – each layer and analysis criteria can be turned on and off for customized viewing.
- Parcel Queries and Reports – search for specific parcels that meet your criteria of interest and generate a summary report for your records.
- Scenario Tools – allows the viewer to adjust the relative emphasis of Heat Vulnerability, Water Resources, and Habitat Integrity layers according to their priorities.
- Project Impact tools – Explores the potential impact of new parks and open space on urban population and walkability.

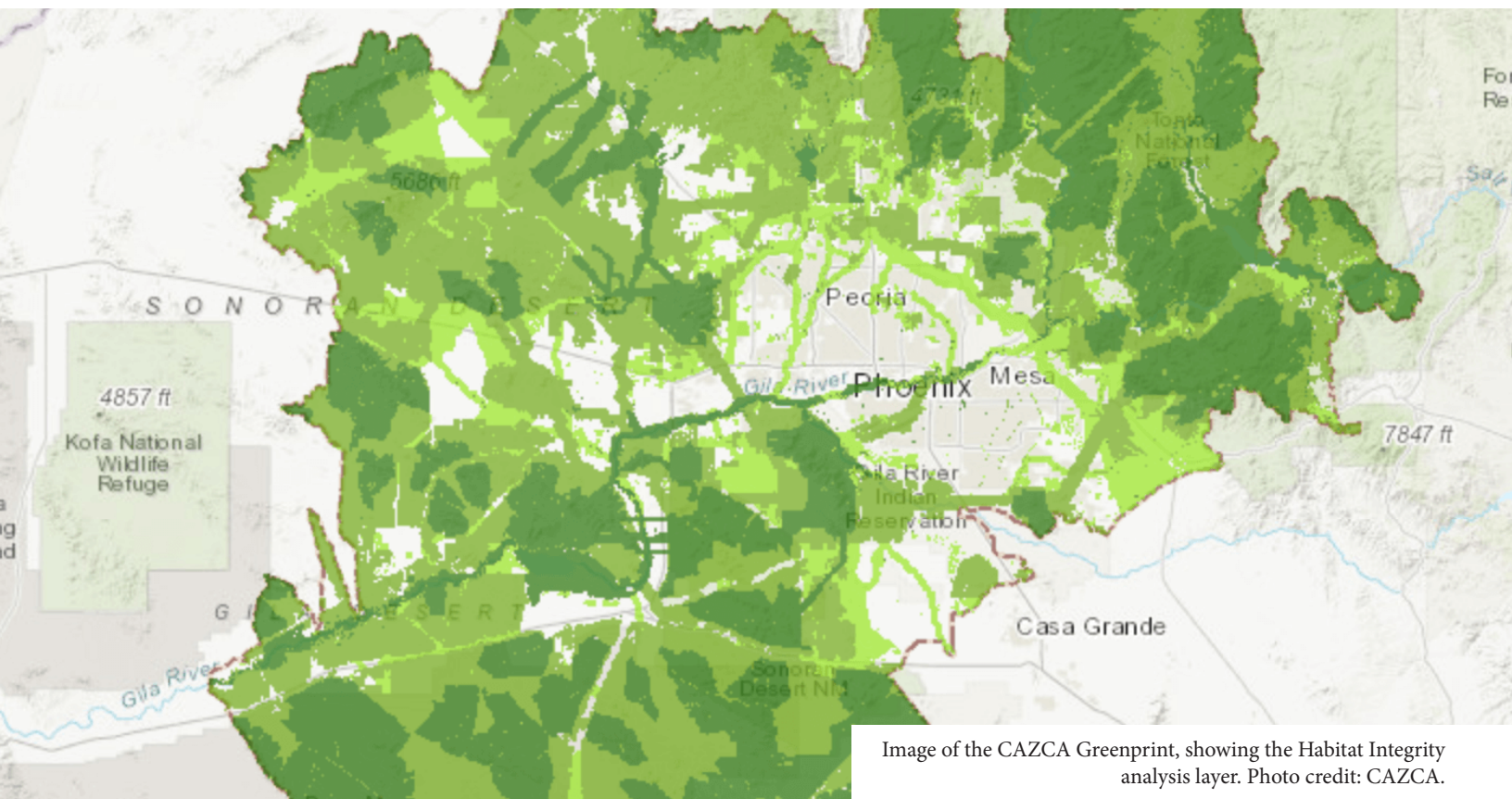


Image of the CAZCA Greenprint, showing the Habitat Integrity analysis layer. Photo credit: CAZCA.

COMMUNICATIONS

The Greenprint can be used to identify co-benefits of open space that would convey the value of planning projects to broader audiences. By bringing data out of “silos,” Greenprint users can view multiple types of data simultaneously and compare across categories of data that represent various interests. We provide two examples, and Appendix C provides a link to a list of the available data.

For example, if the primary interest of a planning initiative is a reduction of peak flood levels after storms, one might examine the Enhanced Natural Recharge and Floodplain data sets under Water Resources. Many areas of high natural recharge and floodplains coincide with Linkages and Species Richness under Habitat Integrity and are High-Value Sportsman’s Areas listed under Recreation. These co-located “bonus” conservation values can be used by decision-makers to reinforce the value of protecting lands for reduced flood flows broaden the appeal of the project through diverse messaging.

Similarly, a land use planner can use the Project Impact tool to explore how a hypothetical urban greenspace would mitigate heat risks and quickly identify the demographics of residents within a 10-minute walking distance of that open space.

GUIDING STAKEHOLDER PROCESSES

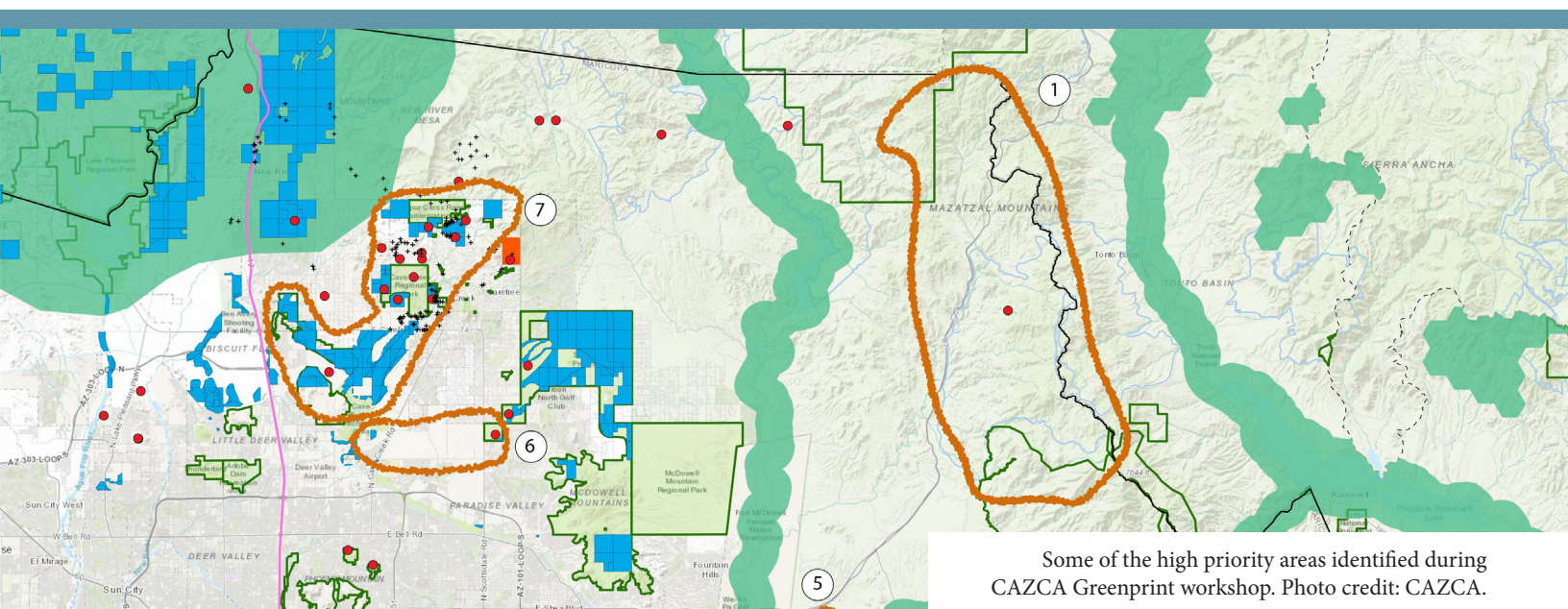
Stakeholder processes are an essential component of open space planning processes by integrating informed opinions from knowledgeable locals and conservation experts with the best available data. The Greenprint can inform stakeholder processes in two significant ways:

1. Structuring the conversation
2. Validating the results

A CASE STUDY: USING CAZCA GREENPRINT IN A STAKEHOLDER PROCESS TO IDENTIFY HIGH VALUE NATURAL RESOURCE ASSETS.

In 2017, CAZCA demonstrated how to use both Greenprint and stakeholder input in a type of open space planning to identify opportunities for conservation. CAZCA Greenprint added structure to the initial stages of the planning process, and validated stakeholder ideas at the end, turning anecdotal input into hard data.

CAZCA steering committee members used the Overall Habitat Integrity and Land Protection Status layers to identify what appeared to be high habitat value and low land ownership conflict areas on the map. These areas became the starting point for a conversation among 60 CAZCA members that provided structured input into a stakeholder process.



Some of the high priority areas identified during CAZCA Greenprint workshop. Photo credit: CAZCA.

During a workshop, stakeholders were asked to use their own expert opinions to review the mapped conservation opportunities, indicate whether they agreed with them as high priorities, and propose other locations that they believed would be worthy of conservation. The result was a list of approximately 30 conservation opportunities. Then Greenprint was used to calculate the percentage of very high, high, or moderate habitat integrity and water resources value for each stakeholder-identified opportunity area (Appendix A). These results suggest a high correlation between expert opinion and the objective GIS data analysis, highlighting the utility of iteratively using Greenprint to evaluate stakeholder input and vice versa.

The stakeholder-identified opportunities fell within these three categories of open space assets:

1. **Rivers and Waterways:** Our region's rivers have sustained wildlife and human populations for centuries. Ephemeral, intermittent and perennial waterways provide important wildlife connectivity across the landscape. In addition to their ecological importance, they provide historical and cultural value to Native American communities and others in the region.
2. **Habitat Blocks:** A habitat block is a relatively large and unfragmented area of land capable of sustaining healthy populations of wildlife into the foreseeable future. Although the carrying capacity of individual habitat blocks varies, these blocks are necessary to maintain biodiversity in the region and are the foundation for open space conservation on an ecological level.
3. **Linkages between Existing Protected Areas:** These provide pathways between areas designated and managed as open space. These linkages also serve as corridors necessary for wildlife to move between distinct habitat blocks. These include landscape features that allow wildlife to access resources and for gene flow among populations.

The results from this case study (Appendix A) highlight conservation opportunities within local communities as an aid for land use planning.

INTENT AND BEST PRACTICES

The Greenprint is intended to inform and guide regional open space conservation priorities and planning and to inform the public about natural resource assets and opportunities at the regional scale. It is not intended to support legal or regulatory actions, and it is not a substitute for federal, state, or local agency guidance on matters of natural resource compliance. For example, while Greenprint includes data from Arizona Game and Fish Department's HabiMap Arizona (www.habimap.org), it does not replace or supersede consultation with the Department on compliance related to endangered or threatened species.

Greenprint was built using the best available data supplied by reliable sources. However, the Greenprint is not intended to be all-inclusive and may over- or under-represent the extent of existing natural resources, and on-the-ground comparison of the results is encouraged. Furthermore, much of the data is not refined for use below a scale of one square mile. Please contact CAZCA or consult with appropriate state agencies for site-specific information.

THE CENTRAL ARIZONA CONSERVATION ALLIANCE: A RESOURCE FOR MARICOPA COUNTY

Convened in 2012 by the Desert Botanical Garden, the Central Arizona Conservation Alliance (CAZCA), strives to coordinate, align and unify the efforts of more than 60 partner organizations to conserve, restore, and raise awareness for open space in Central Arizona.

In 2018, CAZCA released a Regional Open Space Strategy for Maricopa County (ROSS) that is both a road map and agenda for conserving open space. The ROSS is the culmination of an 18-month process of engaging hundreds of diverse stakeholders, while conducting research and outreach in the region.

It outlines four goals and related objectives that seek to balance the continued urbanization of the region with sustainable stewardship of its natural and cultural assets. Among its four goals is protecting and connecting open space through the creation of a robust network of habitat blocks, connected so that they sustain native plants and animals and provide opportunities for recreation.

PROTECT AND CONNECT OUR OPEN SPACE INVESTMENT

Maricopa County is fortunate to have numerous county and city parks and preserves, but we shouldn't stop now. There are opportunities to further our significant open space legacy for the benefit of residents today and tomorrow. Join CAZCA and engage in an organization that shares your interest in planning for a sustainable county that supports healthy communities and environments.

Please join us through one of the many services that CAZCA offers:

- [CAZCA offers](#) training and technical assistance programs on how to use Greenprint to support open space planning efforts.
- Grow your skillsets through CAZCA's [Community of Practice resources](#) including Workshops and the CAZCA Speaker Series.
- Financially support CAZCA organizations who are working on priority actions that advance the [Regional Open Space Strategy](#).
- Advocate in your community for the integration of the Greenprint into open space and land use planning activities. Learn more about why [habitat connectivity](#) is essential to the Sonoran Desert ecosystem and how local and regional planning projects can incorporate it.

- Volunteer with CAZCA and its partners on citizen science and restoration projects. Contact CAZCA to learn how to identify invasive species as you're exploring our mountain parks and add your notes to the [Collector App](#) in real time.

For more information on how to be involved visit www.cazca.org or contact cazca@dbg.org.

MORE LINKS

www.web.tplgis.org/cazca_plan

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APPENDIX A: CONSERVATION OPPORTUNITY AREAS

This list was created using Greenprint and stakeholder input. It is not meant to be all-inclusive of conservation opportunities in the region. The percentages are included to summarize the Greenprint data for that approximate area: 27% of the 1st area is “underprotected” (for conservation) per Greenprint, and another 27% is not protected at all. The percentages were calculated in acres using the same projection as the Greenprint tool: NAD83 UTM Zone 12 N. Appendix B includes an explanation of terms.

ID	Area Name	Description	Ownership	Greenprint Data Summary:		
				Protection Levels	Habitat Integrity Values	Water Resources Values
1	The Middle Gila River	The Gila River is an important resource which provides ecological and economic values and benefits to the west valley.	USFS, FCDMC, AGFD, State Trust Land, municipal, private	27% Underprotected; 27% Not Protected	71% Very High	17%; Moderate; 13%; High; 18% Very High
2	The Agua Fria River	This has been identified as an important ecological corridor connection between Lake Pleasant and the Gila River.	State Trust Land, BLM, municipal, private	71% Not protected	60% Moderate	15%; Moderate; 6%; High; 4% Very High
3	McMicken Dam Conservation Area	The area behind the dam and channels includes over 3,500 acres of possible conservation open space area, 15 miles of regional trails and a wildlife corridor that connects the Aqua Fria River and the White Tank Mountains.	FCDMC, State Trust Land, municipal, private	46% Not protected	58% High	7%; Moderate; 1% Very High
4	Bradshaw/Hieroglyphic Complex	The Bradshaw Mountains has high-quality habitat, has been identified as a priority ecoregional area for its water resources, and as a critical component of the natural recharge within the Agua Fria Watershed.	State Trust Land, BLM, USFS, private	45% Underprotected	77% High	7%; Moderate; 3% Very High
5	Bradshaw Mountains to Vulture Mountains	This is an undeveloped area with an important ecological linkage from the Bradshaw Mountains to the Vulture Mountains.	State Trust Land, BLM, private	64% Underprotected	77% High	7%; Moderate; 3% Very High
6	Upper Hassayampa River	This area provides valuable environmental services (natural recharge and flood protection) and supports a valuable riparian ecological area that is disappearing from the Arizona landscape.	State Trust Land, BLM, private	46% Underprotected; 42% Not Protected	58%; High; 28% Very High	16%; Moderate; 2%; High; 1% Very High

ID	Area Name	Description	Ownership	Greenprint Data Summary:		
				Protection Levels	Habitat Integrity Values	Water Resources Values
7	Hassayampa River Valley and Plain	This area is important to maintaining wildlife connectivity and linkages between the Hassayampa River and the Gila River.	State Trust Land, BLM, municipal, private	63% Not protected	46%; High; 52% Very High	46%; Moderate; 1%; High; 1% Very High
8	White Tank Mountains	There is an opportunity to protect the valuable ecosystem around the White Tanks Mountains Regional Park.	State Trust Land, BLM, private	55% Protected	63% Very High	5%; Moderate; 1% Very High
9	White Tank Mountains Wildlife Corridor 1	Maintaining open spaces and corridors between the White Tank Mountains and the Hassayampa River is critical for sustaining a healthy wildlife population.	State Trust Land, BLM, private	79% Not Protected	61%; High; 28% Very High	11%; Moderate; 1% Very High
10	White Tanks Wildlife Corridor 2	Maintaining open spaces and corridors between the Hassayampa River and the Belmont Mountains is critical for sustaining a healthy wildlife population.	State Trust Land, BLM, private	84% Not Protected	60%; High; 40% Very High	11% Moderate
11	Belmont Mountains	There is an opportunity to protect the Belmont Mountains which would ensure that the ecological and recreational value is more durable in the future.	State Trust Land, BLM, private	85% Underprotected	75% High	6%; Moderate; 1% Very High
12	Big Horn to Vulture Mountains	The area between the Big Horn Mountains and the Vulture Mountains is vital to maintain wildlife connectivity and avoid fragmentation.	State Trust Land, BLM, private	68% Underprotected	83% High	5%; Moderate; 2% Very High
13	Big Horn to Harquahala Mountains	Maintaining connectivity between the Big Horn Mountains and the Harquahala Mountains is important to preserve wildlife linkages and avoid fragmentation.	State Trust Land, BLM, private	71% Underprotected	89% High	5%; Moderate; 2% Very High
14	Interstate 10 Wildlife Corridor	Maintaining connectivity between the Big Horn Mountains and Saddle Mountain is important to preserve wildlife linkages and avoid fragmentation.	State Trust Land, BLM, private	47% Underprotected	74% High	6% Moderate
15	Palo Verde Hills	The Palo Verde Hills provide valuable habitat and corridors for wildlife as it moves south to the Gila Bend Mountains and the Gila River.	State Trust Land, BLM, private	94% Underprotected	89% High	9%; Moderate; 3% Very High
16	Palo Verde Hills to Gila Bend Mountains	This area is an important north/south habitat linkage to the Gila River and should be protected	State Trust Land, BLM, private	79% Underprotected	73% High	14%; Moderate; 2% Very High
17	Gila Bend Mountains to Eagletail Mountains	The area is home to many unique archaeological sites from prehistoric cultures and is believed to contain important cultural and ceremonial sites. This area contains intact Sonoran Desert habitat for native species including the Big Horn sheep.	BLM	91% Underprotected	52%; High; 43% Very High	9%; Moderate; 2% Very High

ID	Area Name	Description	Ownership	Greenprint Data Summary:		
				Protection Levels	Habitat Integrity Values	Water Resources Values
18	Sentinel Plain and Painted Rock Mountains	This undeveloped BLM land located southwest of the Gila River and west of Gila Bend contains high-value habitat and is the wildlife linkage between the Gila Bend mountains and the Barry Goldwater Military Range (BMGR).	State Trust Land, BLM, AGFD	72% Underprotected	60%; High; 30% Very High	8%; Moderate; 1%; High; 2% Very High
19	Gila Bend Mountains to Sonoran Desert National Monument	There is an opportunity to protect the valuable ecosystem around the White Tanks Mountains Regional Park.	State Trust Land, BLM, private	56% Underprotected; 27% Not Protected	70% Very High	26%; Moderate; 3% Very High
20	Wildlife Crossing over SR 238 (DeAnza Trail)	There is a need to restore wildlife connectivity between the mountains and create a safe wildlife passage to allow for the migration of desert bighorn sheep, mule deer, bobcats, desert tortoise and other mammals that make their home in the monument.	BLM	56% Protected; 44% Underprotected	71%; High; 25% Very High	39%; Moderate; 2% Very High
21	Wildlife Crossing over I-8	There is a need to restore wildlife connectivity between important conservation areas within the Sonoran Desert National Monument to allow for the migration of desert bighorn sheep, mule deer, bobcats, desert tortoise and other mammals that make their home in the monument and the BMGR.	BLM	83% Underprotected	94% Very High	10%; Moderate; 2% Very High
22	Little Rainbow Valley to Sierra Estrellas	The Little Rainbow Valley contains valuable habitat blocks and wildlife linkages for the variety of species that live in the SDNM and the Estrella Mountains.	BLM	61% Protected	50%; High; 47% Very High	30%; Moderate; 2% Very High
23	New River/I-17 Wildlife Corridor	There a wildlife corridor between the east and west side of I-17 by using the natural New River Wash that crosses under I-17. This corridor would support the movement of wildlife from the New River Mountains/Cave Creek Regional Park to Lake Pleasant Regional Park and the Hieroglyphic Mountains.	State Trust Land and private	28% Not protected; 60% Private	63% High	8%; Moderate; 2% Very High
24	Sonoran Preserve to Cave Creek Regional Park to Spur Cross Ranch Conservation Area	This is an opportunity to connect three large desert preserves and parks in the northern part of the Phoenix metro area to a larger sustainable open space complex to the east of the area Scottsdale McDowell Sonoran Preserve, McDowell Mountain Regional Park and the Tonto National Forest.	State Trust Land and private	33% Not protected; 33% Private	53% High	11%; Moderate; 1% Very High
25	The Preserve Connector	This corridor can be an ecological linkage between the McDowell Sonoran Preserve and the Phoenix Sonoran Preserve and would be a valuable connection for wildlife and recreational users.	State Trust Land	33% Not protected; 54% Private	68% High	10% Moderate

ID	Area Name	Description	Ownership	Greenprint Data Summary:		
				Protection Levels	Habitat Integrity Values	Water Resources Values
26	Tonto NF Wilderness Connectivity	The area has high conservation value as it contains important ecological linkages and habitat blocks. The Nature Conservancy has identified it as a priority ecoregion.	National Forest	88% Underprotected	34%; High; 64% Very High	6%; Moderate; 4% Very High
27	Salt River to Gila River	The Salt River has been identified as an important resource which provides both hydrological, ecological, and recreational values and benefits to the valley.	State Trust Land, BLM, private	55% Protected	63% Very High	5%; Moderate; 1% Very High
28	East Valley Connectivity	This is an opportunity to connect four ecologically and high-value recreation open space areas (Usery Mountain Recreational Area, Usery Mountains, Goldfield Mtns, Salt River and the Superstition Mountains).	State Trust Land, BLM, private	79% Not Protected	61%; High; 28% Very High	11%; Moderate; 1% Very High
29	Superstition Mountains	This area could supplement the Superstition Wilderness area and would greatly ameliorate urban encroachment moving up from the valley floor.	State Trust Land, BLM, private	84% Not Protected	60%; High; 40% Very High	11%; Moderate; 1% Very High
30	Queen Creek Wash	This corridor is an opportunity to connect two ecologically and high-value open space areas (the Superstition Mountains and the San Tan Mountain Regional Park) via a major wash system (Queen Creek Wash).	State Trust Land, BLM, private	85% Underprotected	75% High	6% Moderate

APPENDIX B: EXPLANATION OF TERMS USED IN GREENPRINT DATA SUMMARY

- Protection Levels:** Derived from land ownership and associated oversight and permanence
 - Protected: High levels of public oversight and management
 - Otherwise Protected: Native American lands or military lands
 - Underprotected: Public land that has multiple permitted uses that conflict with each other and offer limited regulation against degradation
 - Not Protected: State lands with very little oversight or regulation to limit degradation but also hold opportunities for appropriate natural resource conservation as needed
 - Private: Private Land
- Habitat Integrity:** This layer approximates the overall value (“moderate,” “high,” or “very high”) for Habitat Integrity conservation management goals. It is calculated in a geospatial analysis called a “weighted overlay” and illustrates the extent to which features co-exist in any particular point or location. The data description within the Greenprint tool provides more detail.

The Habitat Integrity analysis overlays the following features:

- Rural and urban habitat blocks
 - Ecological linkages and corridors
 - Riparian areas
 - Landscape integrity
 - Species richness
- **Water Resources:** This layer approximates the overall value (“moderate,” “high,” or “very high”) for Water Resources conservation management goals. It is calculated in a geospatial analysis called a “weighted overlay” and illustrates the extent to which features co-exist in any particular point or location. The data description within the Greenprint tool provides more detail.

The water resources analysis overlays the following features:

- Headwaters
- Perennial rivers and streams
- Intermittent and ephemeral rivers, streams and washes
- Wetlands
- Lakes, ponds, reservoirs
- Springs/seeps
- Enhancement of natural recharge
- Floodplains

APPENDIX C: A LIST OF DATA LAYERS INCLUDED IN GREENPRINT

This link will take you out of this report and into the Greenprint Data Description table, a Google Drive document that lists the datasets available in Greenprint, the analysis methodologies, and which layers are available to query at the parcel level. In some professions, this is called a metadata table.

MORE LINKS

www.cazca.org
www.web.tplgis.org/cazca_plan

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