

Landscapes

OVERVIEW



Climate change threatens the iconic landscapes of our region. The County is heavily committed to managing open spaces, riparian corridors, and urban landscapes to promote and protect ecosystem health, cultural resources and historic landscapes, and local food production. These large-scale efforts are critical in mitigating and adapting to climate change.

Healthy landscapes provide climate adaptation benefits from rural to urban areas. Intricate multi-storied systems of trees, shrubs, cacti and grasses prevent erosion, support air and water quality, and provide cooling. The County's restoration of riparian corridors and the installation of green infrastructure (engineered systems that mimic natural ecosystem functions) re-connect and restore the functions of rivers to protect against flooding and drought.

The resulting increased habitat for native species also provides outdoor recreation spaces for people, which promotes economic and health benefits.

Unequivocally, healthy landscapes also mitigate climate change. Plants and, by association, their vibrant microbial soil environs capture and store carbon dioxide.

County ranch lands, agricultural properties, and gardens provide conservation co-benefits (economic and cultural value) and climate resilience. These lands in turn support local food systems and help to reduce regional vulnerability to climate-related food security risks.

Cultural landscapes—historic and archaeological sites—underpin our community's identity and are increasingly threatened by the effects of climate change such as flooding, heat and erosion. By conserving heritage assets, the County preserves linkages from the past to the present, passing down knowledge about resilience that can inform modern planning for climate variability.

CHAPTER 3: Landscapes

GOALS AND CORE AREAS

GOALS

Utilize the County's on-going protection and restoration of extensive healthy landscapes as a strategy for climate mitigation and frontline adaptation by protecting native species and natural and cultural resources, installing green infrastructure and restoring riparian areas, and expanding support for local food systems.

CORE AREAS

We aim to fulfill these objectives by focusing on the following core areas:

Natural areas

Includes geographical areas that are undeveloped, i.e. no built structures, and the ecosystems within them in Pima County

Cultural resources

Includes the archaeological sites, historic buildings, and traditional cultural places within Pima County

Urban areas

Includes the boundary defined by AZ Pollutant Discharge Elimination System Stormwater Permit Area. This is where Pima County has the authority to implement changes in land use, open space and GI/LID

Food systems

Includes the network of activities, actors, resources, regulations and institutions required to produce, process, distribute and dispose of food that is supported or provided by Pima County government

BENEFITS OF IMPLEMENTATION



Protects
ecosystems



Protects
cultural
heritage



Fosters a healthy
and beautiful
community



Supports
food security



Reduces
urban heat
island effect

IMPLEMENTATION GUIDE

CORE AREA	TARGET	PERFORMANCE MEASURE	RECOMMENDED IMPLEMENTATION STRATEGIES
Natural areas Lead departments: RFCD, OSC, NRPR	Conserve native wildlife, plants and natural areas	<ol style="list-style-type: none"> Linear miles of surface water wet/dry mapping Cienega Creek Natural Preserve Groundwater depth Acres of natural habitat conserved County acres protected within AGFD linkages (annual, change driven by acquisitions) Miles of major riparian corridor added (County ownership – fee title and ROW) greater than 10,000 CCFs (centum cubic feet) 	<ol style="list-style-type: none"> Track and report surface water for wildlife and plants in key natural areas Monitor the trends of groundwater dependent ecosystems Track and report the level of shallow groundwater Increase total acres of natural areas conserved Increase total acres protected within Arizona Game and Fish Dept. (AGFD) Wildlife Linkages Acquire riparian corridor parcels Increase linear miles of major riparian corridor added each year
	Manage natural areas for resilient ecosystems	<ol style="list-style-type: none"> Number of sites treated for invasive/exotic plants Number of restoration projects (restoration or erosion, fencing, supplemental water for wildlife, treatment and prevention) 	<ol style="list-style-type: none"> Implement and expand strategic interventions to remove invasive species, e.g. Beat Back Buffelgrass Month Continue to inventory restoration projects Track the number and purpose of restoration actions taken
Cultural resources Lead department: OSC	Protect and conserve historic sites, historic buildings, archaeological sites, traditional cultural places, and cultural landscapes	<ol style="list-style-type: none"> Number of acres surveyed on County conservation fee lands Number of cultural resources identified on County conservation fee lands Number of AZ State Parks Site Steward monitoring days Number of cultural resources monitored Number of cultural resources protected by active management projects 	<ol style="list-style-type: none"> Conduct cultural resources surveys Protect cultural resources from damage Collaborate with Tribes Administer oral history and archival studies Conduct public outreach and education Track and report areas inventoried Track and report sites protected
	Promote public outreach and education	<ol style="list-style-type: none"> Number of tours, presentations on County conservation lands 	<ol style="list-style-type: none"> Build education and outreach plan Track and report number of activities

IMPLEMENTATION GUIDE

CORE AREA	TARGET	PERFORMANCE MEASURE	RECOMMENDED IMPLEMENTATION STRATEGIES
Urban areas Lead departments: PDEQ, RFCD, NRPR, CDNC	Plant at least 10,000 trees	Number of trees planted	<ol style="list-style-type: none"> 1. Utilize PAG GI Prioritization Tool (high heat/low tree canopy) 2. Implement Green Infrastructure Action Plan 3. Pursue policies to require RTA to install trees as part of 4% landscape budget allocation 4. Implement DOT Landscape Manual Standards (require developers and utilities removing trees in the right-of-way to replace them or pay in lieu fee)
	Install at least 40 green infrastructure sites	Number of GI sites installed	<ol style="list-style-type: none"> 1. Implement Green Infrastructure Action Plan 2. Determine triple bottom line benefits with modeling tools 3. Utilize Capital Improvement Project (CIP) funding where applicable 4. Explore and identify general funds, grants and other resources for projects 5. Identify appropriate County-owned parcels and right-of-ways for projects
	Maintain or increase acreage of restored habitat, vegetation and turf supported by renewable water	Acres served by non-potable water	<ol style="list-style-type: none"> 1. Calculate triple bottom line benefits for restoration efforts with modeling tools 2. Track and report number of acres served by non-potable water
Food systems Lead departments: NRPR, OSC, A&T, CDNC	Maintain or expand number of County properties with Farmer's Markets	Number of sites	<ol style="list-style-type: none"> 1. Catalogue number of new or expanded farmer's markets on County properties each year. 2. Identify areas to expand or extend the number of farmer's markets on County properties 3. Track and report County properties with Farmer's Markets
	Maintain or expand number of County sites with community or heritage gardens	Number of sites	<ol style="list-style-type: none"> 1. Identify appropriate County-owned parcels and right-of-ways for projects 2. Utilize PAG's Food Desert Map to identify areas to expand or extend number gardens on County properties 3. Pilot a project to use reclaimed water for heritage trees 4. Pilot a project using local best practices for community engagement and sustainability

IMPLEMENTATION GUIDE

CORE AREA	TARGET	PERFORMANCE MEASURE	RECOMMENDED IMPLEMENTATION STRATEGIES
Food systems <small>cont.</small>			<ol style="list-style-type: none"> 5. Model Triple Bottom Line Cost Benefit Analysis (TBL-CBA) of Community Gardens with modeling tools 6. Track and report County sites with community or heritage gardens 7. Explore and identify general funds, grants and other resources for projects
	Maintain or expand number of County acres under cattle grazing leases	Number of acres	<ol style="list-style-type: none"> 1. Continue rangeland inventories, monitoring and assessment 2. Continue applying management practices to provide for ecosystem health 3. Track and report County acres under cattle grazing leases
	Maintain or expand number of County acres under commercial, niche and/or commodity agricultural production	Number of acres	<ol style="list-style-type: none"> 1. Update the Range Management Standards and Guidelines for agricultural production. 2. Track and report County acres under commercial, niche and/or commodity agricultural production
	Maintain or expand County-managed food and nutrition programs and associated technical training	Number of activities	<ol style="list-style-type: none"> 1. Catalogue the number food-related education and training programs conducted by staff or at County sites each year 2. Track and report food and nutrition programs and technical training
	Maintain or expand number of County sites with public access for harvesting native plant foods	Number of sites	<ol style="list-style-type: none"> 1. Create a set of guidelines for harvesting native plant foods on County lands 2. Identify potential sites for food harvesting on County lands 3. Track and report County sites with public access for harvesting native plant foods
	Maintain or expand food heritage activities	Number of activities	<ol style="list-style-type: none"> 1. Collaborate with the UA, City of Gastronomy, and other stakeholders to supply resources to include in map for self-guided visitor tours 2. Track and report on supported food heritage activities
	Maintain or expand number of County sites with composting and soil carbon amendment practices	Number of sites	<ol style="list-style-type: none"> 1. Create a set of guidelines for composting and producing soil amendments to increase carbon sequestration on County lands 2. Identify potential sites for composting on County lands 3. Track and report County sites with composting and soil carbon amendment strategies



Materials

OVERVIEW



The materials we purchase for County operations and the way we dispose of them have sizable impacts on the environment and surrounding community. Landfills produce greenhouse gas emissions, groundwater and soil contamination, and loss of land for species habitat or other forms of development. They also lower housing values and increase adverse health effects for people who live around them. Pima County has established targets to increase the recycling of materials, bolster our green purchasing efforts, and reduce the volume of waste generated.

CHAPTER 4: Materials

GOALS AND CORE AREAS

GOALS

Adopt mindful purchasing practices that are preferential toward environmentally-friendly (or “green”) office products and equipment.

Adopt mindful disposal practices in which the landfill is the destination of last resort.

CORE AREAS

We aim to fulfill these objectives by focusing on the following core areas:

Solid waste

Includes the landfill waste and industrial waste produced by County staff and operations

Green purchasing (Office)

Includes all office products and equipment purchased on the vendor’s website

BENEFITS OF IMPLEMENTATION



**Reduces GHG
emissions**




**Decreases
landfill waste**



**Preserves natural
resources**

IMPLEMENTATION GUIDE

CORE AREA	TARGET	PERFORMANCE MEASURE	RECOMMENDED IMPLEMENTATION STRATEGIES
Solid waste a) Landfill waste b) Industrial waste Lead department: FMD; Fleet	<p>Reduce volume/weight of landfill waste by 20%</p>  <p>20% REDUCTION</p> <p>Recycle industrial waste by 100%*</p>  <p>100% RECYCLING</p> <p>*In accordance with the EPA Resource Conservation and Recovery Act (RCRA) laws and regulations</p>	<p>Volume/weight of landfill waste produced (tons)</p> <p>Quantity of each type of industrial waste recycled (tires; car batteries; waste oil; waste metal; coolant)</p>	<ol style="list-style-type: none"> 1. Improve waste reduction education <ol style="list-style-type: none"> a. Paperless systems b. Company take-back programs c. Internal reuse of equipment and materials d. Efficient printing practices (e.g. double-sided printing) 2. Reuse and repurpose existing buildings 3. Recycle building construction materials
Green purchasing Lead Department: Procurement	<p>Increase percentage of Preferred Products purchased by the County: 20%</p>  <p>20% INCREASE</p>	<p>Percent of office purchases that are listed on Pima County's Preferred Product List</p>	<ol style="list-style-type: none"> 1. Expand education and outreach program for green purchasing practices and policies <ol style="list-style-type: none"> a. Online trainings b. Updated office vendor webpage c. Engagement of Green Purchasing Representatives 2. Standardize product selection and purchasing practices 3. Include green specifications in vendor contracts



Workforce

OVERVIEW



Climate change is increasing worker vulnerability to rising air temperatures and decreased air quality and acute climate-related events, such as extreme heat and storms. Studies show that for every one degree temperature of Celsius increase, there is a decline in hours worked of one to three percent.^{vii} Providing pertinent training and education will improve the climate preparedness of Pima County's workforce and create a safer work and home environment for employees.

CHAPTER 5: Workforce

GOALS AND CORE AREAS

GOALS

Foster a safe work environment by preparing Pima County employees for climate change risks they may encounter at their work sites.

Provide the resources necessary to adequately prepare Pima County employees for climate change risks that may affect their home environment.

CORE AREAS

We aim to fulfill these objectives by focusing on the following core areas:

Workplace preparedness

Includes climate change readiness designed for acute and long-term risks in the workplace or work sites

Personal preparedness

Includes climate change readiness designed for personal use and/or the home environment

BENEFITS OF IMPLEMENTATION



Improves
employee safety

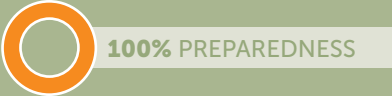
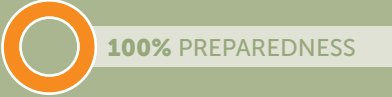


Fosters employee
resilience



Builds employee
morale

IMPLEMENTATION GUIDE

CORE AREA	TARGET	PERFORMANCE MEASURE	RECOMMENDED IMPLEMENTATION STRATEGIES
Workplace preparedness Lead Department: Risk	100% of employees complete emergency trainings (annual) 	Percentage of employees who complete the quiz on the trainings and/or submit a confirmation of a completed training	<ol style="list-style-type: none"> 1. Implement quarterly seasonal safety trainings and education campaigns, for example: <ol style="list-style-type: none"> a. Fall – fires, dust and air quality b. Winter – cold, winter flooding c. Spring – bees and venomous creatures d. Summer – heat related illnesses, air quality issues, summer monsoons/flooding 2. Promote through a variety of outreach sources - Wellness Program, E-Scoop 3. Host annual safety classroom trainings for field departments i.e. NRPR, RWRD, DOT, PCSD, etc.
Personal preparedness Lead Department: OEM	100% employees download emergency checklist and information handouts (annual) 	Percentage of employees who complete the quiz on the information downloaded and/or submit confirmation of completed training	<ol style="list-style-type: none"> 1. Implement an annual emergency preparedness campaign with an ADP prompt to: <ol style="list-style-type: none"> a. Download an Emergency Preparedness Checklist b. Download Neighborhood Climate Resilience Resource 2. Complete a quiz on at-home preparedness 3. Partner with Risk and Human Resource's Wellness Team to promote information via events

GLOSSARY

Adaptation (climate change): Climate change adaptation helps individuals, communities, organizations and natural systems to deal with those consequences of climate change that cannot be avoided. It involves taking practical actions to manage risks from climate impacts, protect communities and strengthen the resilience of the economy.

Air Quality Index (AQI): An index for reporting daily air quality. It determines how clean or polluted air is and what associated health effects might be of concern. The AQI focuses on health effects that may be experienced within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each pollutant, EPA has established national air quality standards to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country.

Air Quality Standards: The level of pollutants prescribed by regulations that are not to be exceeded during a given time in a defined area. National Ambient Air Quality Standards are the federal standards for the minimum ambient air quality needed to protect public health and welfare.

Alternative Transportation: Refers to transportation modes other than driving a single-occupant vehicle, such as carpooling, mass transit, biking and walking. Choosing alternative modes of transportation provides many benefits such as cost and time saving, improved air quality, reduced congestion and less dependency on fossil fuels.

Alternative Fuel Vehicles: Vehicles that operate on fuels other than gasoline or diesel. Alternative fuel vehicles include those that operate using compressed natural gas (CNG), liquid natural gas (LNG), propane, electricity, hybrid of gasoline and electricity, and hydrogen.

Baseline: A starting point or benchmark used to assess progress towards reaching a target.

Beneficial Use of Biogas: Methane recovery and purification for use as a fuel source in power production or in vehicles as an alternative to natural gas.

Best Management Practice (BMP): Methods that have been determined to be the most effective, practical means of addressing a particular environmental or sustainability challenge.

Biodiversity: The variety of life, including the number of plant and animal species, life forms, genetic types, habitats, and biomes (which are characteristic groupings of plant and animal species found in a particular climate).

Carbon Footprint: The amount of carbon dioxide and other carbon compounds emitted due to the consumption of fossil fuels by a particular person, group, etc. in a given period.

Carbon Dioxide Equivalent (CO₂e): A metric used to compare the emissions from various greenhouse gases based upon their global warming potential. Carbon dioxide equivalents are commonly expressed as "metric tons of carbon dioxide equivalents" (Mt CO₂e).

Carbon Sequestration: Storage of carbon through natural or technological processes that can include using biomass, biochar or deep geological storage.

Central Arizona Project (CAP): A 336-mile-long system of aqueducts, tunnels, pumping plants and pipelines that divert water from the Colorado River from Lake Havasu near Parker into central and southern Arizona. The CAP is the largest

and most expensive aqueduct system ever constructed in the United States and is designed to bring about 1.5 million acre-feet of Colorado River water per year to Maricopa, Pinal and Pima counties.

Clean Air Act (CAA): Federal law designed to control air pollution on a national level. It requires the EPA to develop and enforce regulations to protect the public from airborne contaminants known to be hazardous to human health.

Clean Water Act (CWA): Primary federal law governing water pollution. Its objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands.

Climate Change: Changes in average weather conditions that persist over multiple decades or longer. Climate change encompasses both increases and decreases in temperature, as well as shifts in precipitation, changing risk of certain types of severe weather events, and changes to other features of the climate system. Increased levels of atmospheric carbon dioxide produced through the burning of fossil fuels is the primary driver of climate change since the beginning of the Industrial Revolution (mid-1800s).

Climate Variability: Natural changes in climate that fall within the observed range of extremes for a particular region, as measured by temperature, precipitation, and frequency of events. Drivers of climate variability include the El Niño Southern Oscillation and other atmospheric phenomena.

Core Area: A category in which resources, labor, and implementation efforts are focused.

Drought: A period of abnormally dry weather marked by little or no rain that lasts long enough to cause water shortages for people and natural systems.

Earth Systems: Refers to Earth's interacting physical, chemical, and biological processes and consists of the land, oceans, atmosphere and poles. It includes the planet's natural cycles — the carbon, water, nitrogen, phosphorus, sulphur and other cycles — and deep Earth processes. Life too is an integral part of the Earth system. Life affects the carbon, nitrogen, water, oxygen and many other cycles and processes. The Earth system also includes human society and social and economic systems. In many cases, the human systems are now the main drivers of change in the Earth system.

Ecosystem: All the living things in a particular area as well as components of the physical environment with which they interact, such as air, soil, water, and sunlight.

Effluent: Treated or untreated wastewater that flows out of treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Effluent-Dependent Water (EDW): A surface water that consists of a point source discharge of wastewater. Without the point source discharge of wastewater, it would be an ephemeral water.

Energy Star Qualified: An energy performance rating system administered by the U.S. government for consumer products. Devices carrying the Energy Star service mark generally use 20-30% less energy than required by federal standards.

Emissions Scenarios: Quantitative illustrations of how the release of different amounts of climate altering gases and particles into the atmosphere from human and natural sources will produce different future climate conditions. Scenarios are developed using a wide range of assumptions about population growth, economic and technological development, and other factors. In climate modeling, emissions scenarios are referred to as representative concentration pathways or RCPs.

Evapotranspiration: Evaporation of water from soil and plant leaves.

Extreme Events: A weather event that is rare at a particular place and time of year, including, for example, heat waves, cold waves, heavy rains, periods of drought and flooding, and severe storms.

Feedback: The process through which a system is controlled, changed, or modulated in response to its own output. Positive feedback results in amplification of the system output; negative feedback reduces the output of a system.

Food Deserts: An area where affordable healthy food is difficult to obtain, usually found in impoverished areas. This is largely due to a lack of grocery stores, farmers' markets, and healthy food providers.

GLOSSARY (CONT.)

Food Security: When all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life.

Food Systems: A series of interlinked activities that aims to integrate food production, processing, distribution, consumption, waste management, and relevant governance structures in order to enhance the environmental, economic and social health of a particular place.

Geographic Information System (GIS): A computer application that integrates hardware, software, and data for capturing, managing, analyzing and displaying all forms of geographically referenced information.

Global Climate Models (GCM): Mathematical models that simulate the physics, chemistry, and biology that influence Earth's climate system.

Global Warming: The observed increase in average temperature near the Earth's surface and in the lowest layer of the atmosphere. In common usage, "global warming" often refers to the warming that has occurred as a result of increased emissions of greenhouse gases from human activities. Global warming is a feature of climate change; it can also lead to other changes in climate conditions, such as changes in precipitation patterns.

Grey Water: The relatively clean gently used water from baths, sinks, washing machines, and other kitchen appliances.

Green Purchasing: Purchasing products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance or disposal of the product or service.

Greenhouse Gas (GHG): Any gas that absorbs infrared radiation in the atmosphere, preventing it from escaping into space. As the atmospheric concentration of GHGs increase, the average temperature of the lower atmosphere will gradually rise. Greenhouse gases include carbon dioxide, methane, nitrous oxide, ozone, water vapor, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

Goal: A broad overarching aim or desired result outlined within a chapter.

Groundwater: The water beneath the surface of the ground, consisting largely of surface water that has seeped down. It is the source of water in springs and wells.

Guiding Principles: Fundamental tenets that provide a basis for decisions and define priorities.

Heat Island Effect: A "dome" of elevated temperatures over an urban area caused by structural and pavement heat fluxes, and pollutant emissions.

Implementation Guide: Outlines core areas, responsible parties, targets, performance measures, and recommended implementation strategies for each corresponding chapter.

Invasive Species: Non-native or alien species to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. In some locations, climate change is accelerating invasions by alien species. The U.S. currently spends \$30 billion/year on eradication efforts.

Kilowatt-hour (kWh): A unit of measure for energy typically applied to electricity usage and equal to the amount of energy used at a rate of 1,000 watts over the course of one hour. One kWh is equivalent to 3,412 Btu, or 3,600 kJ.

Lead Department: The primary department responsible for implementing appropriate sustainability strategies and overseeing the progress toward achieving its target(s).

Life-Cycle Cost Analysis: A technique to assess the environmental aspects and potential impacts associated with a product, process or service throughout its lifespan.

Mitigation (climate change): Measures to reduce the amount and speed of future climate change by reducing emissions of heat-trapping gases or removing carbon dioxide from the atmosphere.

Performance Measure: Quantitative or qualitative measures used to assess performance relative to a target.

Phenology: The pattern of seasonal life cycle events in plants and animals, such as timing of blooming, hibernation, and migration.

Potable Water: Water that is safe enough to be consumed by humans with low risk of immediate or long-term harm.

Preparedness (climate change): Climate preparedness involves assessing risks and taking actions to provide a head start towards building resilience to future climate impacts whether they be extreme heat, future storms or associated economic shocks.

Reclaimed Water: Water that has been treated or processed by a wastewater treatment plant or an on-site wastewater treatment facility.

Recommended Implementation Strategy: An internally vetted method of achieving a corresponding target, highlighted in the plan.

Renewable Energy: Any energy source that is replenished at least as fast as it is used.

Resilience: A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

Riparian Area: Areas of interaction that include both terrestrial and aquatic ecosystems. They extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain into the water, laterally into the terrestrial ecosystem, and along the watercourse at a variable width.

Riparian Corridor: A management prescription area designed to include much of the Riparian Area. Within the riparian corridor, management practices are specified to maintain riparian functions and values. As a management prescription area, this includes corridors along all defined perennial and intermittent stream channels that show signs of scour, and around natural ponds, lakeshores, wetlands, springs, and seeps.

Riparian Habitat: The community of plant and wildlife found along the banks of a river, stream, lake or other body of water. Riparian habitats are ecologically diverse and may be home to a wide range of plants and animals.

Scenario: Sets of assumptions used to help understand potential future conditions such as population growth, land use, and sea level rise. Scenarios are neither predictions nor forecasts. Scenarios are commonly used for planning purposes.

Snowpack: Snow that accumulates over the winter, and slowly melts to release water in spring and summer.

Stormwater: Water that originates during rainfall events and snow or ice melt and runs off into water courses, lakes and other water bodies and sewers.

Supporting Department: Departments responsible for supporting the Lead Department in implementing appropriate sustainability strategies and overseeing the progress toward achieving its target(s).

Sustainability: The management of resources and/or disposal of waste that occurs in a way that does not damage the environment and maintains a healthy, diverse, and productive ecological, economic, and social balance indefinitely.

Target: An often-measurable milestone in pursuing the chapter goal(s), to be achieved within the timeframe of the plan.

Urban Heat Island (UHI) Effect: The tendency for higher air temperatures to persist in urban areas as a result of heat absorbed and emitted by buildings and asphalt, tending to make cities warmer than the surrounding countryside.

Vulnerability: The degree to which physical, biological, and socio-economic systems are susceptible to and unable to cope with adverse impacts of climate change.

Wastewater: The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

REFERENCES

- i Union of Concerned Scientists (2011). Climate hot spots. Retrieved from: <https://www.climatehotmap.org/global-warming-locations/>
- ii Garfin, G., Franco, G., Blanco, H., Comrie, A., Gonzalez, P., Piechota, T., Waskom, R. (2014). Southwest: The Third National Climate Assessment. In J. M. Melillo, T. C. Richmond, & G. W. Yohe (Eds.), *Climate Change Impacts in the United States: The Third National Climate Assessment* (pp. 462-486). Washington, DC: U.S. Global Change Research Program. DOI: doi:10.7930/J08G8HMN
- iii Abatzoglou, J. T., & Williams, A. P. (2016). Impact of anthropogenic climate change on wildfire across western US forests. *Proceedings of the National Academy of Sciences*, 113 (42), 11770-11775. doi:10.1073/pnas.1607171113
- iv Garfin, G., Jardine, A. (Ed.), Merideth, R. (Ed.), Black, M. (Ed.), & LeRoy, S. (Ed.) (2013). Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment. Washington, DC: Island Press.
- v Repetto, R. (2012). Economic and environmental impacts of climate change in Arizona. *Demos*. Retrieved from <https://www.demos.org/publication/economic-and-environmental-impacts-climate-change-arizona>
- vi Dean Runyan Associates. 2018. Arizona Travel Impacts 2000-2017p. Retrieved from <https://tourism.az.gov/research-statistics/economic-impact>
- vii Hsiang, S., Kopp, R., Jina, A., Rising, J., Delgado, M., Mohan, S., ... & Larsen, K. (2017). Estimating economic damage from climate change in the United States. *Science*, 356(6345), 1362-1369.
- viii AZDHS (n.d.) Extreme weather & public health: Heat safety - heat related illness. Retrieved from <https://www.azdhs.gov/preparedness/epidemiology-disease-control/extreme-weather/heat-safety/index.php#heat-illness>
- ix CDC (2018). Asthma: Most recent asthma state or territory data. Retrieved from https://www.cdc.gov/asthma/most-recent_data_states.htm



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