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# MEMORANDUM

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**Date:** October 20, 2014

**To:** The Honorable Chair and Members  
Pima County Board of Supervisors

**From:** C.H. Huckelberry  
County Administrator 

**Re:** Southern Arizona Regional Orientation Center Update and Report

In my September 19, 2014 memorandum to the Board of Supervisors regarding the Regional Orientation Center (ROC), I noted how Pima County has worked extensively for a number of years with a variety of stakeholders, interest groups, and potential partners in developing a concept plan and programming for the Center, which will make it the focal point of downtown redevelopment west of the Santa Cruz River and the gateway to Tucson Origins Heritage Park. To further engage the public, the City of Tucson sponsored a stakeholder meeting attended by approximately 50 stakeholders and neighbors. County staff presented the concept for an ROC, and the Rio Nuevo District gave an update on their property. At the conclusion of the meeting, stakeholders voiced unanimous support for the ROC.

Following this public meeting, Tucson Mayor and Council met on September 23, 2014 and approved the conveyance of a five-acre parcel within Tucson Origins Heritage Park to Pima County as the site of the future ROC, provided the proposed bond project is approved in a future bond election.

In further support of the proposed ROC, I am pleased to provide the Board with the attached report that was prepared by staff and our partners for presentation to the Pima County Bond Advisory Committee, which will consider the project on October 24, 2014. The proposed ROC is envisioned as a public/private partnership that will serve to enhance the community's economic development efforts by revitalizing tourism in our region. The report reviews the scope of the proposed project, defines goals for its successful mission and includes data and information on economic viability; tourism development and geo-tourism; partnerships with the Western National Parks Association, Visit Tucson, and other organizations for facility management, operation and maintenance; comparative examples of notable visitor and orientation centers; themes showcasing heritage and natural attractions from the "Feasibility Study for the Santa Cruz Valley National Heritage Area"; and 10 stories as examples for interpretive programming that capture the uniqueness of southern Arizona.

A regional tourism center has been envisioned for many years, and the economic impact of tourism in Tucson and our region is substantial; creating local employment opportunities that cannot be outsourced. In fact, travel spending in 2013 led the top five industries in Arizona

The Honorable Chair and Members, Pima County Board of Supervisors  
Re: **Southern Arizona Regional Orientation Center Update and Report**  
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with \$5.4 billion in direct earnings, which nearly equals Aerospace, Agriculture and Mining combined.

The research, information and analyses in this report promote the regional center's potential to expand and enhance the unique travel and tourism attractiveness of southern Arizona. I am, therefore, recommending this project to the Bond Advisory Committee as a means to further economic development and job creation through travel and tourism-related spending that also increases local and state tax revenues and creates jobs in our community.

CHH/mjk

Attachment

c: Chairman and Members, Pima County Bond Advisory Committee  
Hank Atha, Deputy County Administrator for Community and Economic Development  
Linda Mayro, Director, Sustainability and Conservation  
Nicole Fyffe, Executive Assistant to the County Administrator  
Diana Durazo, Special Staff Assistant to the County Administrator

## Southern Arizona Regional Orientation Center



A report prepared for the  
Pima County Bond Advisory Committee

October 24<sup>th</sup>, 2014

## Regional Partners:



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## **ORIENTATION CENTER EXECUTIVE SUMMARY**

Southern Arizona is a unique region with a rich cultural heritage, diverse environment, and exceptional biodiversity. In this arid region, water is a scarce and valuable resource, highlighting the adaptation, persistence, tradition, and innovation that have enabled unique cultures and plant and animal life to flourish here for millennia. The Santa Cruz River has been the lifeblood of this diversity, and the source of its resilience and transformation for many thousands of years, connecting our region as a linear oasis. Our rivers and mountains are also what continue to attract people here.

To take advantage of our natural and cultural assets that can serve to revitalize tourism in our region, this report was prepared for consideration by the Pima County Bond Advisory Committee in support of the Southern Arizona Regional Orientation Center. Prepared by Pima County and the University of Arizona College of Social and Behavioral Science, and the College of Science, and other partners, the report includes data and information on (a) economic viability; (b) tourism development and geo-tourism; (c) partnerships with Western National Parks Association and other organizations for facility management, operation and maintenance; (d) comparative examples of notable visitor and orientation centers; (e) themes showcasing heritage and natural attractions from the “Feasibility Study for the Santa Cruz Valley National Heritage Area”; and (f) ten stories for interpretive programming that capture the uniqueness of Southern Arizona. The report also lists a set of goals for the regional orientation center, and provides an appendix of the most recent WNPA Strategic Plan.

The research, information, and analyses in this report promote the regional orientation center’s potential to further enhance the unique travel and tourism attractiveness of Southern Arizona, thereby inducing economic development and job creation through travel- and tourism-related spending that increases local and state tax revenues; details are provided in the “Orientation Center Economic Viability” chapter.

### **Southern Arizona Regional Orientation Center: Bond Project Description**

The proposed Southern Arizona Regional Orientation Center will be located on 5 acres of land on the west bank of the Santa Cruz River with Tumamoc Hill as a backdrop, in Board of Supervisor District 5 and City of Tucson Ward 1. The Center is estimated to cost \$15 million in anticipated bond funds with project start and finish dates of FY 2015-16 and FY2017-18. Other funding sources have not currently been identified; however, all options will be left open as plans for the Center are finalized by Pima County and its partners, the City of Tucson, Rio Nuevo District Board, University of Arizona, Western National Parks Association, Visit Tucson, Tohono O’odham Nation, Pascua Yaqui Tribe, and local stakeholders.

The scope is to create a Regional Orientation Center including land acquisition, environmental remediation, planning, design, and construction of a facility and related infrastructure that may include indoor space for exhibits, educational programs, auditorium, interpretive retail store, offices, and outdoor cultural plaza. The Center will showcase our region’s many natural, cultural, and science-based attractions and serve as the gateway to understanding the very origins of Tucson, located at the base of Sentinel Peak between Tumamoc Hill and the Santa Cruz River. This is one of Pima County’s most beautiful and historic landmarks, where native people lived and practiced agriculture for more than 4,000 years and where Father Kino in 1694 encountered the Piman village of *Stjuckshon*, giving Tucson its name. This Center will provide the opportunity to encourage visitation to attractions in Tucson, the Santa Cruz Valley, and Southern Arizona; and, it will provide visitors and residents alike a one-stop, point-of-access to information on educational opportunities,

events, activities, and information related to these destinations. Accordingly, six specific goals have been identified for the orientation center:

1. Promote economic development in the region by defining Southern Arizona as a unique geo-tourism destination to attract visitors and new residents;
2. Provide an authentic, diverse, bio-regional experience of the region through science and cultural education;
3. Coordinate and promote the region's diverse tourism activities and attractions by serving as a hub for desert-living education, outreach, and research, and directing people to the myriad of inspiring places, opportunities and experiences in the region;
4. Serve as a site for interpreting scientific research to further our understanding of the nexus of nature, culture and society;
5. Adopt a fiscal plan and strategies to be financially sustainable over the long-term; and,
6. Create strong collaborations and partnerships that leverage institutional assets of the community, UA, local jurisdictions, regional interpretive and educational institutions, public lands agencies, Native American Nations, and Mexico.

### **Economic and Community Benefit**

The Regional Orientation Center will help to enhance the community's economic development efforts by revitalizing tourism in our region. A regional tourism center has been envisioned for many years, and recent tourism studies show that exploring and experiencing the natural environment of Southern Arizona is Tucson's greatest attraction. The Center will:

- promote local and regional tourism that sustains and enhances the region's geographical character, environment, culture, aesthetics, heritage, and the well-being of our residents;
- serve as an 'Information Hub' for regional attractions, natural areas, heritage destinations, and public outreach/education;
- utilize the high visitation to the area to benefit local restaurants, hotels and local businesses;
- use the increased visitation to stimulate future investments and reinvestment in the West side;
- take advantage of the central location to market, coordinate, and direct visitors/residents to attractions in Southern Arizona; and,
- showcase the 'Gateway to Tucson Origins Heritage Park' that commemorates the Birthplace of Tucson, educational programming about *Stjuckshon*, the San Agustín Mission and Gardens, and Tucson's history.

### **Public-Private Partnership**

The proposed Southern Arizona Regional Orientation Center is being developed as a public-private partnership project to design, build, manage, operate and maintain the facility. With a successful bond-authorization, the facility will be (a) designed by a private architectural firm, (b) built by Pima County, and (c) managed, operated, and maintained by the Western National Parks Association (WNPA), which has conveyed a strong interest to locate their facility in the new regional orientation center. Other private and public entities have also expressed an interest in partnering in its daily operation, including Visit Tucson, the National Park Service, the U.S. Forest Service, and others.

Since their creation in 1938, WNPA has successfully worked to advance education, interpretation, and research about our national parks and historic sites through community engagement and outreach, and they are exceptionally qualified to operate the proposed facility. They were established by Congress as a cooperating association to promote national parks and monuments and to manage

sales areas in national parks so that the proceeds are donated to support the park or parks in which they operate. WNPA currently serves 67 national park areas in the western United States and has donated over \$80 million in park aid in its 76 years of operation. The aid has enhanced the experience of visitors to national parks by providing programs, publications, and customer service for more than 9 million parks visitors. Throughout its history, WNPA has more than demonstrated its management acumen and its ability to be financially successful. At this stage of planning, WNPA has prepared some preliminary budget and cost estimates on facility management, operation, and maintenance to demonstrate that it can effectively operate the new orientation center, expand its mission to include local partners and attractions, and continue to be financially successful.

### **Sustainable Geo-Tourism**

The National Geographic Center for Sustainable Destinations defines “**geo-tourism**” as *tourism that sustains or enhances the geographical character of a place—its environment, culture, aesthetics, heritage, and the well-being of its residents*. Geo-tourism’s focus on resident citizens stems from an expectation that acquiring a more extensive knowledge of the unique characteristics of a region provides residents a means to understand, take pride, value, and protect the natural, cultural, and historical features in their region. Such affection and ownership enhance geo-tourism when residents share their physical environment and its assets with visitors and articulate the essence of what makes the place so valuable and unique. The regional orientation center will provide a venue and resources for residents to visit and showcase the region. Additionally, most visitors to the region have ties to people who live here – family, friends, business associates, and acquaintances. So, when potential visitors make travel plans, a compelling description of Southern Arizona from their social ties can influence travel decisions in favor of ‘Baja Arizona’ and residents with a pronounced understanding and appreciation of the region would more likely take their visiting guests to local attractions and destinations, spending money in the process.

Southern Arizona is abundantly wealthy in natural, cultural, historical, and scientific resources; and, tourism is one of its greatest industries, supported by Tucson and Pima County’s well-developed physical, social, and cultural infrastructure. There are several organizations, agencies, and businesses dedicated to tourism; and, geo-tourism features a large presence with initiatives undertaken by the University of Arizona, Pima County, City of Tucson, Western National Parks Association, and Visit Tucson, among many others.

In 2011, the *UA Science Geotourism Initiative* was launched by the UA College of Science in partnership with the Arizona-Sonora Desert Museum, Kartchner Caverns State Park, UA Science: Biosphere 2, and UA Science: Mt. Lemmon SkyCenter, and the business community to highlight Southern Arizona’s natural and scientific wonders “including astronomy, ecology, evolutionary biology, geology, hydrology and tree-ring research” (<http://uanews.org/story/college-science-partnering-local-geotourism-attractions>).

The proposed Southern Arizona Regional Orientation Center (the Center) will serve as a base to promote geo-tourism that showcases the vibrant identity and unique characteristics of the upper Sonoran Desert, and the mountain ‘Sky Islands’ of ‘Baja Arizona’ – a region with its age-old stories and interwoven relationships of people and their landscape brought about through architecture, commerce, music, myth, literature, food, dance, and land stewardship, each mutually shaping the other to create the cultural landscape of the resilient borderlands. The Center will bring place-based, sustainable economic development that will (a) create community-centered jobs that cannot be

exported; (b) foster locally-driven creative entrepreneurship; (c) build on existing local assets; and (d) engender partnerships with Federal, state, local, and private entities.

The Center is planned for a location west of the Santa Cruz River at the base of Sentinel Peak - the birthplace of Tucson. Here, it will serve to tell Tucson's origin story and about our Native American, Spanish, Mexican, and American Territorial past and traditions that remain very much a part of our region's vitality; it will serve as a regional information, education, and outreach center, and direct residents and visitors to inspiring places and attractions of the Sonoran Desert and Sky Islands for that unique Southern Arizona experience; and it will serve as the headquarters for the Western National Parks Association and as the visitor services center for Visit Tucson. There will be ample public spaces for workshops, classes, lectures, and demonstrations. The Center will host temporary and permanent exhibits that provide visitors and residents alike with compelling experiences of the region, including opportunities to (a) explore Native American history and living traditions (Tohono O'odham Nation and Pascua Yaqui Tribe); (b) learn the layers of agricultural history of the continent's longest-cultivated region; (c) experience the Spanish, Mexican and American frontiers; (d) understand the traditional wisdom and practice of our working landscapes; and (e) gain appreciation of how traditional cultural knowledge and modern scientific and technological advances work together to make Tucson an exemplary and cutting-edge desert city, among other experiences.

Eight public and private visitor facilities, in six groups, have been researched to create a composite model on which the Southern Arizona Regional Orientation Center could be developed to fulfill the six primary goals identified. These visitor facilities are the: Blue Ridge Natural Heritage Area and Blue Ridge Parkway Visitor Center; Natural History Museum of Utah; National Geographic Center for Sustainable Destinations; Museum of Science in Boston; Western National Parks Association; Yellowstone Park Foundation; Museum of Northern Arizona, Flagstaff; and Morris Thompson Cultural and Visitor Center, Fairbanks.

This report also features nine regional themes that characterize our region; these themes are drawn from the "Feasibility Study for the Santa Cruz Valley National Heritage Area" to describe related attractions, events, and institutions that will guide the development of visual, experiential, and information content of the proposed Southern Arizona Regional Orientation Center. The nine themes are: Sky Islands and Desert Seas; Desert Streams; Native American Lifeways; Spanish and Mexican Frontiers; A Working Landscape; Expressions of Many Cultures; Health and Fitness; Research and Innovation in a Desert City; and Sustainable Desert Living.

# ORIENTATION CENTER MANAGEMENT AND OPERATION

The proposed Southern Arizona Regional Orientation Center will require a reputable management organization with a robust strategic plan to manage, operate, and maintain it. Such an organization must possess the financial/fiscal and technical means, and the availability of expert personnel and means to (a) sustain the Center's operations; (b) anticipate its future planning and budgetary needs; (c) ensure a continued validity by adopting digital and other technological innovations; and, (d) retain its relevance and programming to all age groups of visitors and residents.

## Western National Parks Association

Headquartered in Southern Arizona and with a tenure of over 76 years in management, operations, revenue generation, budgeting, and technological knowledge, WNPA [<http://www.wnpa.org/>] has expressed interest and enthusiasm to relocate their offices to and assume the responsibilities for managing, operating, and maintaining the proposed Center.

### Brief History

Founded in 1938, WNPA is a 'cooperating association' authorized by the U.S. Congress under the aegis of the National Park Service (NPS). Today, WNPA has operations at 67 NPS sites in 12 states, ranging from Kansas to California, and Montana to Texas, with annual donations to NPS in excess of \$4 million. Its key strategy is to raise money for education in national parks, and its mission includes (a) aiding affiliated national parks; (b) providing education and interpretation; (c) sustaining national parks stores; (d) fostering outreach; and (e) performing research.

### Facilities on the Cutting-edge

The forward-thinking approach of WNPA has been demonstrated at El Pueblo de Los Angeles Historical Monument, in partnership with UCLA REMAP (Center for Research in Engineering, Media, and Performance, UCLA School of Theater, Film and Television), where culture, history, and ecology are going to be interpreted by applying innovative media and technology.

The Independence Visitor Center in Philadelphia, as well as the Golden Gate Bridge Pavilion and Lands' End Lookout in the San Francisco area are three visitor centers with strong interpretive retail programs that WNPA is studying as potential models for the proposed regional orientation center. As a larger partner of the NPS, WNPA has also been studying new media and other models of interpretation and education across the national parks system.

### Preliminary Draft Budget and Operating Space Assumptions

As funding for constructing the regional orientation center becomes available, WNPA's needs as well as contributions to budget for, manage, operate, and maintain the Center will be appropriately defined and developed. The following information on an operating budget, physical space, and personnel constitutes a very preliminary assessment and includes other partners, such as VisitTucson, NPS,

#### **WNPA by Numbers**

**76-year** partnership with the National Parks Service

**67** national parks supported by WNPA

**58** parks at which WNPA furnishes staff to supplement park service employees

**12** states in WNPA network

**80+** visitor centers offer WNPA stores

**9 million+** visitors assisted

Almost **\$2 million** in research aid provided

**\$80 million+** in park aid provided

and the U.S. Forest Service. The estimate for (a) operating costs offset by revenue equal about \$1.5 million; (b) physical space is roughly 24,000 square feet; and (c) personnel = 15 full-time employees.

## Visit Tucson

Created in 1982, *Visit Tucson* [<http://www.visitucson.org/>] is a 501(c)6 non-profit organization that markets Tucson as a leisure travel and convention destination. Its mission is to drive economic development that connects visitors and their ideal travel and meeting experiences in Southern Arizona.

*Visit Tucson* offers access to a wide array of destinations, attractions, events, programs, and lodging facilities in Southern Arizona. Visitors and residents of all age groups have an impressive selection of activities from which to choose, such as, the arts, music, heritage and culture, lore and history, science and technology, outdoor experience, family fun, hiking, biking, golf, horse-back riding, rock-climbing, bird-watching, experiencing plants and animals, gaming, shopping, and eating out. It also features a range of hotels and resorts for both active and passive experiences across a broad price range and for differing lifestyles.

*Visit Tucson* takes great pride in promoting the region that is a little off the beaten path where “we attract the free-spirited and genuine. A haven for the free thinkers and the free at heart.” It offers travel guides, such as, *Visit Tucson: Official Destination Guide* (digital and hard copy); *Digital Arizona Golf Guide - Tucson & Southern Arizona*; *iTunes Official Travel Guide*; and *Digital Uniquely Tucson Destination Downtown*.

## Economic Impact

The economic impact of *Visit Tucson* is estimated at over \$214 million, where it was able to deliver \$33 for every dollar invested in the region. Of all consumer inquiries with *Visit Tucson*, 92 percent ended up booking or taking a leisure trip to Tucson. Most of the visitors are from Arizona, California, Illinois, Nevada, and Texas, averaging a three-day stay and spending almost \$1,000.

*Visit Tucson's* governmental partnerships with Tucson, Pima County, and Oro Valley enhance the regional economic development mission of the Tucson Metro Convention and Visitors Bureau. This association with key government stakeholders facilitates the implementation of various tourism-related sales and marketing programs to boost travel, lodging, and spending in the region that increases local and state tax revenues.

## U.S. National Park Service

The idea of a national park was first sparked in September 1870 at “a campfire in the wilderness of the Yellowstone one autumn night” ([http://www.cr.nps.gov/history/online\\_books/kieley/kieley2.htm](http://www.cr.nps.gov/history/online_books/kieley/kieley2.htm)) among a few intellectuals. By late-1871, a ‘park bill’ was introduced in the U.S. House of Representatives; and “[I]t was adopted by the House on January 30, 1872, passed by the Senate on February 27, and received the signature of President Grant on March 1.”

After four decades of expanding the parks system under a disjointed method of operation, “its very deficiencies exposed the plan as unsatisfactory and inefficient” leading to a restructuring and re-

### **NPS by Numbers (2008)**

**401** national parks  
**84 million** acres of land  
**\$48 billion** in investments (incentivized)  
**11.7 billion** visitors  
**\$2.75 billion** annual budget  
**218,000** jobs supported in gateway communities  
**400** endangered species

organization, after which, “on August 25, 1916, President Wilson signed a bill creating the National Park Service.” Today, the U.S. National Park Service (NPS) safeguards more than 400 places and receives over 275 million visitors each year (<http://www.nps.gov/aboutus/index.htm>).

More details on the presence of NPS at the regional orientation center are anticipated to develop when this proposal finds a firm foundation of approval, adoption, and funding.

## **U.S. Fish & Wildlife Service**

The United States Fish & Wildlife Service (USFWS) has a history going back to 1871 when the U.S. Commission on Fish and Fisheries was created with an initial appropriation of \$5,000 (roughly \$95,000 in 2014). In 1940, the Department of the Interior reorganized to consolidate “the Bureau of Fisheries and the Bureau of Biological Survey into one agency to be known as the Fish and Wildlife Service” (see [http://www.fws.gov/help/about\\_us.html](http://www.fws.gov/help/about_us.html)). The mission of USFWS is to “work with others to conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people.” The national and several field offices of USFWS “manage the 150 million-acre National Wildlife Refuge System of more than 551 National Wildlife Refuges and thousands of small wetlands and other special management areas.” It is anticipated that USFWS will provide information at the regional orientation center; more details are expected to develop over time as this project is adopted with funding.

## **U.S. Forest Service**

The United States Department of Agriculture Forest Service was established in 1905 with the mission “to sustain the health, diversity, and productivity of the nation’s forests and grasslands to meet the needs of the present and future generations” and to manage “public lands in national forests and grasslands, as well as other congressionally designated areas” (see <http://www.fs.fed.us/about-agency>). The Forest Service manages 154 National Forests and 20 Grasslands on 193 million acres; 439 Wilderness Areas on 36 million acres; 20 National Recreation Areas; six National Scenic Areas; six National Monuments; and two National Historic Areas. More details of USFS involvement at the regional orientation center are expected to develop over time, pending project adoption and funding.

## **U.S. Bureau of Land Management**

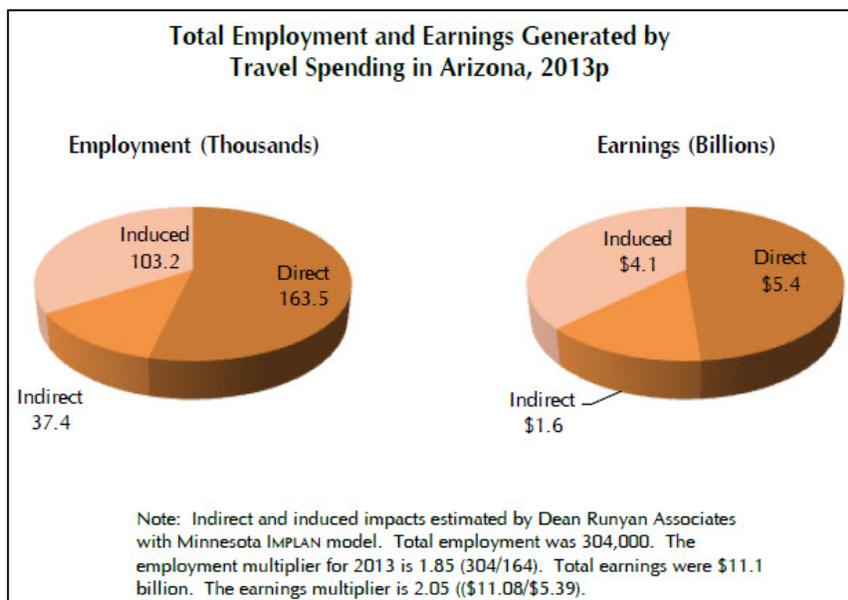
The origins of the United States Bureau of Land Management (BLM) go back to the Land Ordinance of 1785 and the Northwest Ordinance of 1787 that dealt with land-settlement and ceding of lands to the Federal government in the original 13 colonies. Then, with the creation of national parks, forests, and wildlife refuges in the late-1800s, “Congress recognized that they should be held in public ownership” for resource values other than human settlement. After a series reorganizations over the ensuing years, “[I]n 1946, the Grazing Service was merged with the General Land Office to form the Bureau of Land Management” ([http://www.blm.gov/wo/st/en/info/About\\_BLM/History.html](http://www.blm.gov/wo/st/en/info/About_BLM/History.html)). More details of BLM’s function at the regional orientation center are expected to develop over time, pending project adoption and funding.

# ORIENTATION CENTER ECONOMIC VIABILITY

## Arizona

‘Travel and tourism’ forms one of the most important industries in Arizona, where about 60 percent of visitors arrive from other U.S. states, and another 17 percent come from foreign countries, including Mexico and Canada; visitors spend on food, lodging, retail, recreation, and transportation, which generate tax revenues, jobs, and tax benefits for Arizonans (See *Arizona Travel Impacts, 1998-2013p*, May 2013 – prepared for the Arizona Office of Tourism by Dean Runyan Associates - [https://d2f9gx89v2x88d.cloudfront.net/sites/default/files/documents/files/Arizona%20Travel%20Impacts%2012p%20FINAL\\_0.pdf](https://d2f9gx89v2x88d.cloudfront.net/sites/default/files/documents/files/Arizona%20Travel%20Impacts%2012p%20FINAL_0.pdf)).

In 2013, the “total direct spending” by visitors in Arizona equaled \$19.8 billion, which created 163,500 direct jobs, \$5.4 billion in direct earnings, and a gross domestic product (GDP) of \$7.7 billion. The secondary impacts from the travel-industry businesses and employees re-spending their earnings were 141,000 indirect and induced jobs, and \$5.7 billion in indirect and induced earnings, for a combined 304,500 jobs and \$11.7 billion (See Pie Chart).



According to Dean Runyan Associates:

*Direct* impacts represent the employment and earnings attributable to travel expenditures made directly by travelers at businesses throughout the state.

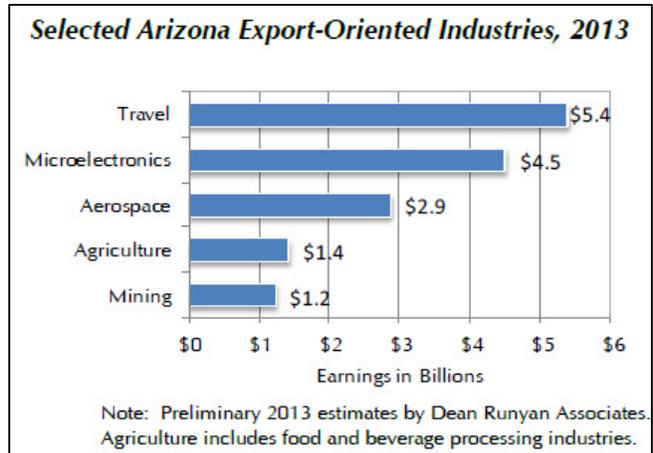
*Indirect* impacts represent the employment and earnings associated with industries that supply goods and services to those businesses that receive money directly from travelers throughout the state.

*Induced* impacts represent the employment and earnings that result from purchases for food, housing, transportation, recreation, and other goods and services made by travel industry employees and the employees of the indirectly affected industries.

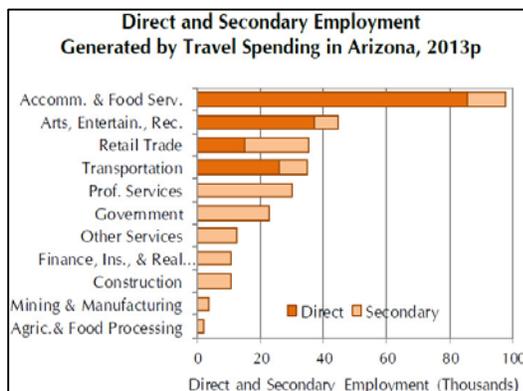
*Earnings* include wage and salary disbursements, other earned income or benefits, and proprietor income, (i.e., earnings attributable to travel expenditures).

## Export-oriented Industries

‘Travel’ led the top five export-oriented industries in Arizona, with \$5.4 billion in direct earnings, which almost equals Aerospace, Agriculture and Mining combined (See graph – *Selected Arizona Export-Oriented Industries, 2013*).



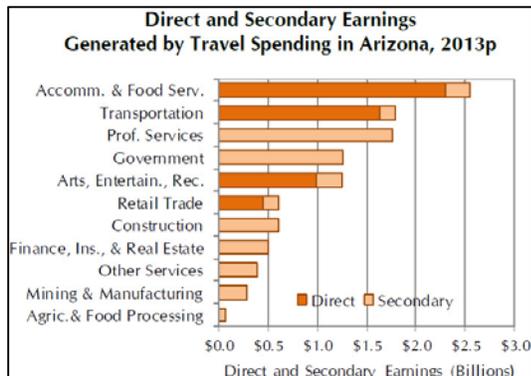
## Employment and Earnings Generated by Travel Spending



**Direct & Secondary Visitor-Generated Employment in Arizona, 2013p**  
(thousand jobs)

Industry Group	Direct	Secondary		Total	Grand Total
		Indirect	Induced		
Accomm. & Food Serv.	85	4	8	12	98
Arts, Entertain., Rec.	37	5	2	8	45
Retail Trade	15	3	17	20	35
Transportation	26	5	4	9	35
Prof. Services	0	8	23	30	30
Government	0	1	22	23	23
Other Services	0	5	8	12	12
Finance, Ins., & Real Estate	0	4	7	10	10
Construction	0	1	10	10	10
Mining & Manufacturing	0	1	2	4	4
Agric. & Food Processing	0	1	1	2	2
All Industries	164	37	103	141	304

Source: Dean Runyan Associates and Minnesota Implan Group. **Note:** Details may not add to totals due to rounding.



**Direct & Secondary Visitor-Generated Earnings in Arizona, 2013p**  
(\$ Million)

Industry Group	Direct	Secondary		Total	Grand Total
		Indirect	Induced		
Accomm. & Food Serv.	2,309	73	165	238	2,546
Transportation	1,631	123	36	160	1,791
Prof. Services	0	520	1,244	1,764	1,764
Government	0	85	1,180	1,265	1,265
Arts, Entertain., Rec.	997	196	56	252	1,249
Retail Trade	458	13	140	153	611
Construction	0	48	562	611	611
Finance, Ins., & Real Estate	0	175	326	502	502
Other Services	0	186	201	387	387
Mining & Manufacturing	0	109	179	287	287
Agric. & Food Processing	0	32	35	67	67
All Industries	5,394	1,560	4,125	5,685	11,079

Source: Dean Runyan Associates and Minnesota Implan Group. **Note:** Details may not add to totals due to rounding.

As shown in the graphs and tables above, 100 percent of both employment (over 91,000 jobs) and earnings (almost \$4.9 billion) in the sectors of (a) Professional Services; (b) Government; (c) Other Services; (d) Finance, Insurance, and Real Estate; (e) Construction; (f) Mining and Manufacturing; and (g) Agriculture and Food Processing result from secondary impacts (*indirect* and *induced*) of travel spending. These employment and earnings figures demonstrate the far-reaching capabilities of the ‘travel and tourism’ industry to catalyze jobs and earnings in spin-off industries, thereby generating more Federal, state, and local tax revenues.

The following descriptions of some of the ‘sectors’ referenced above are from *Arizona Travel Impacts, 1998-2013p* produced by Dean Runyan Associates:

*Professional Services:* Legal, medical, educational and other professional services are utilized by travel businesses (indirect effect) and by employees of these firms (induced effect).

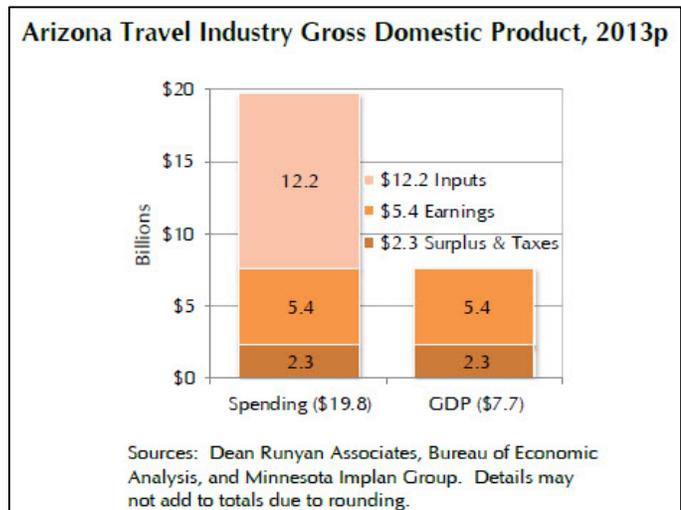
*Government:* Employees of travel-related businesses pay fees to attend public educational institutions and to operate motor vehicles.

*Other Services:* Employees of travel-related businesses purchase services from various providers, such as dry cleaners and repair shops. Similarly, travel businesses utilize a number of service providers, such as laundry, maintenance and business services.

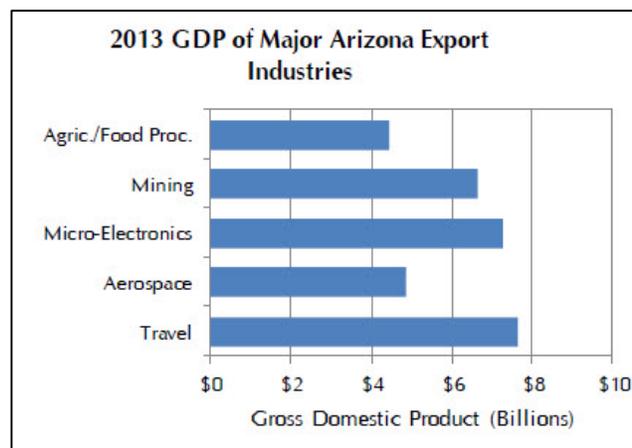
*Finance, Insurance and Real Estate:* Employees and businesses use the services of financial institutions, insurers and real estate businesses.

### Gross Domestic Product

“In concept, the Gross Domestic Product (GDP) of a particular industry is equal to gross output (sales or receipts) minus intermediate inputs (the goods and services purchased from other industries). GDP is always smaller than output or sales because GDP measures only the “value added” of an industry and does not include the cost of the inputs that are also necessary to produce a good or service. Alternatively, GDP can be thought of as the sum of earnings, indirect business taxes (primarily excise and property taxes) and other operating surplus (including profits)” – Dean Runyan Associates.



Typically, agriculture, mining, and manufacturing are easy to understand as being ‘export-oriented’ industries because they depend on export markets; and, products (commodities) from these three sectors are sold in local, regional, and nation-wide markets, contributing to the state’s GDP. Applying this formula to the travel industry reveals its export-oriented characteristics where ‘visitors’ form the export market for Arizona’s sites, attractions, events, and any number of tourism-related products and services.



In 2013, the GDP of Arizona’s travel industry was about \$7.7 billion, which led the other major export industries (see bar graph - *2013 GDP of Major Arizona Export Industries*).

The travel industry, along with the other export-oriented industries, allows Arizona to diversify its economic portfolio and give the local economy a ‘comparative advantage’ within the regional, national, and international markets. The diversification also generates income to develop other local services and amenities.

Travel and tourism generated approximately 6.8 percent of state and local tax revenues (\$1.56 billion); and, “[W]hereas slightly less than one-half of all state and local tax revenue in Arizona was attributable to sales tax collections in the 2012-13 fiscal year, more than 80 percent of all travel industry tax revenue was attributable to sales tax receipts from visitors (68.2 percent) and the purchases of employees in the travel industry (14.4 percent). More than two-thirds of all tax revenues supported by the travel industry were directly related to visitor spending” – Dean Runyan Associates. This is very significant from a ‘return on investment’ perspective of revenue generation because (a) the bulk of tax revenues are generated from sales to individuals who live outside Arizona - 60 percent of visitors from other U.S. states and an additional 17 percent from other countries; and (b) a large percent of the dollars earned are circulated within the region – purchases made by employees in the travel industry (14.4 percent).

	<b>Total</b>	<b>Travel Generated</b>	<b>Percent Travel</b>
<b>Sales and Gross Receipts</b>	11,330	1,280	11.3%
<b>Income</b>	4,520	110	2.4%
<b>Property</b>	6,310	150	2.3%
<b>License and Other</b>	780	20	2.2%
<b>Total Tax Receipts</b>	22,940	1,560	6.8%

Source: Dean Runyan Associates and Bureau of Census, State and Local Government Finance

## Tucson and Southern Arizona Region

Arizona is divided into five travel regions. The “Tucson and Southern Arizona” region is comprised of Cochise, Graham, Greenlee, Pima, and Santa Cruz counties. The table below provides 2013 data on Travel Spending, Earnings, Employment, and Taxes, revealing the significance of ‘travel and tourism’ to the regions and the state.

	<b>Travel Spending</b>		<b>Related Travel-Generated Impacts</b>				
	Total (\$Million)	Visitor (\$Million)	Earnings (\$Million)	Employment (jobs)	Local Taxes (\$Million)	State Taxes (\$Million)	Total Taxes (\$Million)
Northern Arizona	1,491	1,405	404	16,260	62	68	129
West Coast Arizona	1,337	1,205	302	13,120	47	59	106
North Central Arizona	992	916	239	10,330	33	44	76
Phoenix & Central Arizona	12,608	9,565	3,727	94,350	515	481	996
Tucson & Southern Arizona	3,384	2,799	722	29,470	130	140	270
Arizona	19,811	**	5,394	163,530	786	791	1,578

Details may not add to totals due to rounding.  
 \*\*The sum of regional visitor spending is less than statewide visitor spending because a portion of ground transportation is allocated to “other travel” at the regional level. See appendix, page 56.

The data on travel-generated employment and earnings within the “Tucson and Southern Arizona” region show that Graham and Greenlee counties accounted for 4.4 percent of employment and 2.5 percent of earnings in 2013 (the table to the right was excerpted from Dean Runyan Associates’ *Arizona Travel Impacts, 1998-2013p*, page 35).

	Employment		Earnings (\$ Million)	
	Jobs	Percent	Amount	Percent
Cochise	3,720	12.6%	\$77	10.7%
Graham/Greenlee	1,300	4.4%	\$18	2.5%
Pima	22,380	75.9%	\$577	79.9%
Santa Cruz	2,080	7.1%	\$50	6.9%
<b>Total</b>	<b>29,480</b>	<b>100.0%</b>	<b>\$722</b>	<b>100.0%</b>

Source: Dean Runyan Associates

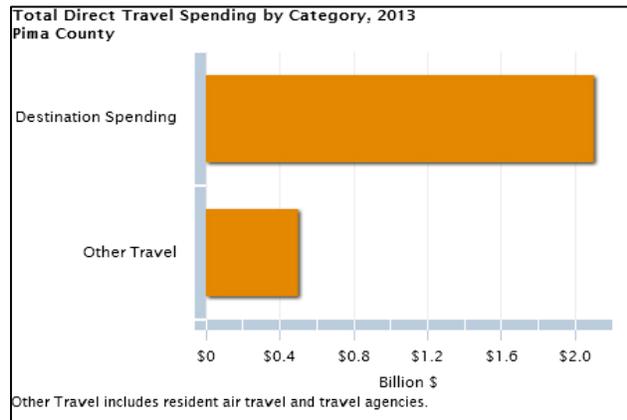
While the data for smaller counties are less reliable due to limitations in survey sample sizes and other factors, it is still safe to say that the outputs for Graham and Greenlee counties are quite low. However, both of these counties have the potential for improvement through partnerships that can occur through the proposed Southern Arizona Regional Orientation Center.

## Pima County

“The analysis of travel impacts at the county level provides a valuable overview of how the economic benefits of travel and tourism are distributed throughout the state” – *Arizona Travel Impacts, 1998-2013p*, Dean Runyan Associates. The *Arizona Travel Impacts Interactive Tool* (<http://www.deanrunyan.com/AZTravelImpacts/AZTravelImpacts.html>) provides travel data for all Arizona counties in the categories of:

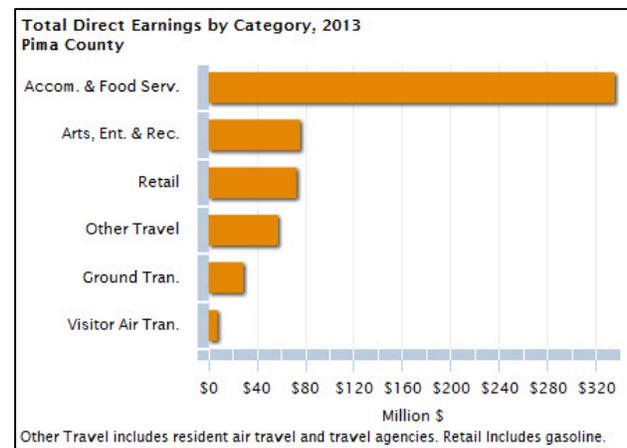
**Direct Travel Spending**, which are purchases by travelers during their trip, including lodging taxes and other applicable local and state taxes, paid by the traveler at the point of sale.

Category	Billion \$	% of Total
Destination Spending	\$2.10	80%
Other Travel	\$0.50	20%
<b>Total</b>	<b>\$2.70</b>	<b>100%</b>



**Direct Earnings** comprise wage and salary disbursements, earned benefits, and proprietor income of employees and owners of businesses that are attributable to travel expenditures.

Category	Million \$	% of Total
Accom. & Food Serv.	\$335.50	58%
Arts, Ent. & Rec.	\$75.60	13%
Retail	\$72.80	13%
Other Travel	\$57.30	10%
Ground Tran.	\$28.70	5%
Visitor Air Tran.	\$7.30	1%
<b>Total</b>	<b>\$577.20</b>	<b>100%</b>



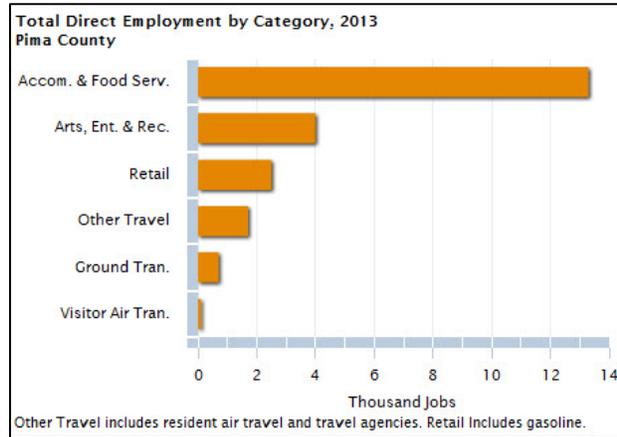
**Direct Employment**, which is employment associated with ‘Direct Earnings’ and includes both full- and part-time positions of wage and salary workers and proprietors.

Category	Jobs*	% of Total
Accom. & Food Serv.	13,300	59%
Arts, Ent. & Rec.	4,000	18%
Retail	2,500	11%
Other Travel	1,700	8%
Ground Tran.	700	3%
Visitor Air Tran.	100	1%
<b>Total</b>	<b>22,400</b>	<b>100%</b>

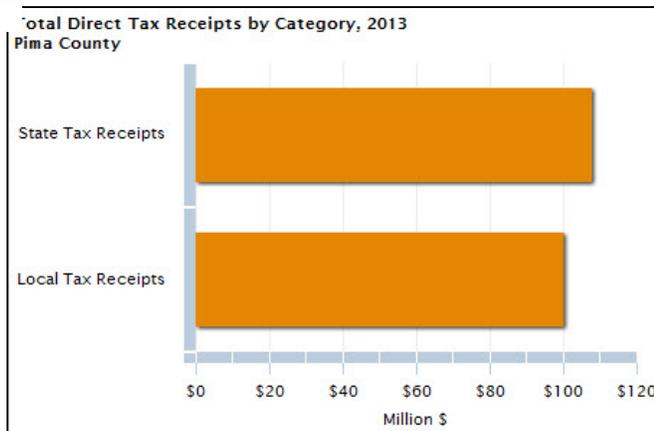
\* rounded

counties and municipalities, as levied on applicable travel-related purchases, including lodging, food and beverage service, retail goods and motor fuel.

Category	Million \$	% of Total
State Tax Receipts	\$107.80	52%
Local Tax Receipts	\$100.20	48%
<b>Total</b>	<b>\$207.90</b>	<b>100%</b>



**Direct Tax Receipts** are those collected by state,



## Travel Impacts: Arizona, Southern Arizona, and Pima County

The following table contains 'travel and tourism information for Arizona, the “Tucson and Southern Arizona” region, and Pima County. As one of the two major urban areas in the state, Pima County generates most of the travel-related activities in the five-county “Tucson and Southern Arizona” region. With Pima County’s highly-developed travel industry infrastructure that includes an international airport, the proposed Southern Arizona Regional Orientation Center presents itself as the best opportunity to unite Southern Arizona’s travel and tourism industry. The benefits of pooled resources, scales of economy, and efficiency will (a) reduce, if not eliminate redundancy; (b) provide resiliency from shared resources; and (c) generate more revenues for all participants.

### Travel Impacts, 2013

Category	Pima County	So. Arizona Region	Arizona
<b>Total Direct Travel Spending</b>	<b>(\$ Million)</b>	<b>(\$ Million)</b>	<b>(\$ Billion)</b>
Destination Spending	2,135	2,799	17.4
Other Travel*	532	585	2.4
<i>Total Direct Spending</i>	<i>2,667</i>	<i>3,384</i>	<i>19.8</i>

<b>Visitor Spending by Type of Traveler Accommodation</b>	<b>(\$ Million)</b>	<b>(\$ Million)</b>	<b>(\$ Billion)</b>
Hotel, Motel	950	1,128	7.9
Private Home	459	590	4.3
Campground	32	46	0.7
Vacation Home	51	60	0.7
Day Travel	643	974	3.8
<i>Destination Spending (Sub Total)</i>	<i>2,135</i>	<i>2,799</i>	<i>17.4</i>
<b>Visitor Spending by Commodity Purchased</b>	<b>(\$ Million)</b>	<b>(\$ Million)</b>	<b>(\$ Billion)</b>
Accommodations	332	397	2.7
Food Service	552	699	3.7
Food Stores	140	302	0.9
Local Transportation and Gas	315	403	3.7
Arts, Entertainment, and Recreation	177	211	2.2
Retail Sales	428	597	2.5
Visitor Air Transportation	190	190	1.6
<i>Destination Spending (Sub Total)</i>	<i>2,135</i>	<i>2,799</i>	<i>17.4</i>
<b>Industry Earnings Generated by Travel Spending</b>	<b>(\$ Million)</b>	<b>(\$ Million)</b>	<b>(\$ Billion)</b>
Accommodation and Food Service	336	416	2.3
Arts, Entertainment, and Recreation	76	94	1.0
Retail**	73	116	0.5
Ground Transportation	29	29	0.1
Visitor Air Transportation	7	7	0.6
Other Travel*	57	60	0.9
<i>Total Direct Earnings</i>	<i>577</i>	<i>722</i>	<i>5.4</i>
<b>Industry Employment Generated by Travel Spending</b>		<b>(1,000s)</b>	<b>(1,000s)</b>
Accommodation and Food Service	13,280	17.3	85.5
Arts, Entertainment, and Recreation	4,030	5.5	37.1
Retail**	2,500	4.0	16.7
Ground Transportation	720	0.7	3.5
Visitor Air Transportation	130	0.1	7.2
Other Travel*	1,710	1.8	13.5
<i>Total Direct Employment</i>	<i>22,380</i>	<i>29.5</i>	<i>163.5</i>
<b>Government Revenue Generated by Travel Spending</b>	<b>(\$ Million)</b>	<b>(\$ Million)</b>	<b>(\$ Million)</b>
Local Tax Receipts	100.2	130.3	786
State Tax Receipts	107.8	140.0	791
Federal Tax Receipts			1,153
<i>Total Direct Government Revenue</i>	<i>215.5</i>	<i>270.3</i>	<i>2,730</i>

Source: Dean Runyan Associates (compiled from three separate tables in *Arizona Travel Impacts, 1998-2013p*)

## Travel and Tourism Infrastructure

Maricopa and Pima counties have well-developed travel industry infrastructure comprising of amusement and recreation areas, commercial accommodation, and transportation networks, which explains why 68 percent of the travel-generated employment occurs in these two counties that succeed in capturing a very large portion of travel expenses through overnight lodging and its associated amenities. The same does not happen in the less-urbanized and less-populous counties where the leisure and hospitality businesses are dependent primarily on visitors. This is where the proposed Southern Arizona Regional Orientation Center can open opportunities for more visitor spending, employment, and tax revenue generation in the “Tucson and Southern Arizona” region.

## Synthesis

Economic data for counties are not available at the level of detail that they are for the state; county-level data are also less reliable. In view of these factors, this Chapter lays a strong foundation with state-level data to demonstrate the significance of travel and tourism for the state, the regions, and counties. The dynamics are about availing opportunities to stimulate more travel spending that will result in more jobs and earnings in the region through the efficient utilization of resources and through partnerships.

In 2013, Pima County experienced a total direct travel spending of \$2.67 billion, leading to \$577 million dollars in earnings, roughly 22,380 jobs, and over \$100 million in local tax receipts, which were all tied directly to the travel and tourism industry (See *Travel Impacts, 2013* table, above). These figures show that 79 percent of direct travel spending, 80 percent of earnings, 76 percent of jobs, and 80 percent of revenues in the “Tucson and Southern Arizona” region were generated in Pima County.

Given Pima County’s established infrastructure, as stated in the *Travel and Tourism Infrastructure* section above, the proposed Southern Arizona Regional Orientation Center offers tremendous opportunities for improving upon these earnings, job opportunities, and other performances by unifying travel and tourism activities throughout the region. This can be achieved at the regional orientation center in the following ways:

1. linking all visitor centers of the region;
2. publicizing attractions, events, and destinations located all over Southern Arizona;
3. becoming the region’s one-stop shop for local and regional travel planning, bookings, tickets, passes, lodging arrangements, tours, etc.
4. establishing a robust digital hub that features destinations throughout Southern Arizona; and,
5. pooling resources to generate revenues for all participating parties; among other activities.

## ORIENTATION CENTER OVERVIEW



Southern Arizona lies ecologically, at the nexus of the Sonoran and Chihuahuan Deserts and the Madrean Sky Islands; politically, across the borderlands of the United States and Mexico and four Native American Nations; and culturally, as an integration of Native American, Spanish, Hispanic, American, and a hundred different nationalities of the people that now call the region home.

### Vision Statement

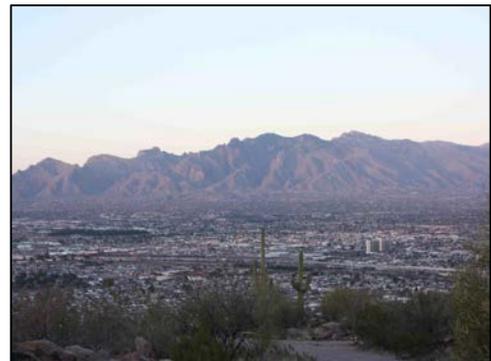
The proposed Southern Arizona Regional Orientation Center – a collaborative effort of Pima County, City of Tucson, Rio Nuevo, University of Arizona (UA), Western National Parks Association (WNPA), Visit Tucson, Federal land management agencies, Tohono O’odham Nation, Pascua Yaqui Tribe, and local stakeholders – will showcase the region’s unique natural landscapes, rich cultural heritage, innovative scientific research, and sustainable desert-living initiatives, while providing educational information to residents and visitors alike. It will evoke a sense of place and regional identity, providing a broad spectrum of opportunities to explore and enjoy a variety of attractions throughout Southern Arizona. The regional orientation center will be a portal to the area’s dynamic and engaging story that provides (a) several temporary and permanent exhibits, interactive maps, and thematic guides; (b) spaces for workshops, seminars, lectures, and other forms of presentation; and (c) opportunities to feature local artists and artisans, and their arts, crafts, and other creations.

### History and Context

The vision of leaders in Southern Arizona has helped to develop several key initiatives leading up to the proposal for the Southern Arizona Regional Orientation Center. The Tucson Origins Heritage Park received astounding voter support as a component of the Rio Nuevo proposal, and extensive research and groundwork have already taken place. The regional orientation center is the latest iteration of the greater-Tucson community’s long-felt need that crystalizes (a) conserving natural and cultural resources; (b) ensuring economic development; (c) promoting regional and sustainable geo-tourism; (d) empowering local businesses; and (e) preserving the region’s unique character. The regional orientation center is also an important element of the proposed Santa Cruz Valley National Heritage Area that aims to honor and celebrate Southern Arizona’s contribution to the history of the United States.

Additionally, in 2013, the Urban Land Institute Advisory Services Panel Study identified the area near the base of Tumamoc Hill along the Santa Cruz River as a key location for an education and interpretive center to explore the region and create a space to recreate its rich history and culture.

Southern Arizona is a forward-thinking region with collaborating jurisdictions and institutions that have already achieved success in conservation, sustainability and scientific innovation, as exemplified by the Sonoran Desert Conservation Plan, the Santa Cruz Valley Heritage Alliance, the Sky Island Alliance, and National Geographic Geo-tourism Map Guide for the Arizona-Sonora Desert Region; as well as through research, education, and outreach efforts at the Arizona-Sonora Desert Museum, UA College of Science, UA College of



Social and Behavioral Sciences, Institute of the Environment, Arizona State Museum, and the Center for Desert Archaeology, among many others. The information, achievements, and resource capacity of these organizations will be utilized in creating the region’s high-impact Orientation Center.

Southern Arizona hosts thousands of visitors each year who come to see the cultural and scientific attractions, recreate in the many state and national parks, forests, other public lands, and participate in the local festivals and international shows.

## Primary Goals

The National Geographic Center for Sustainable Destinations defines geo-tourism as tourism that sustains or enhances the geographical character of a place—its environment, culture, aesthetics, heritage, and the well-being of its residents. The proposed Southern Arizona Regional Orientation Center will be a critical base for geo-tourism, education, outreach, and research, highlighting the vibrant identity of the region. Accordingly, six specific goals have been identified for the orientation center:

1. Promote economic development in the region by defining Southern Arizona as a unique geo-tourism destination to attract visitors and new residents;
2. Provide an authentic, diverse, bio-regional experience of the region through science and cultural education;
3. Coordinate and promote the region’s diverse tourism activities and attractions by serving as a hub for desert-living education, outreach, and research, and directing people to the myriad of inspiring places, opportunities and experiences in the region;
4. Serve as a site for interpreting scientific research to further our understanding of the nexus of nature, culture and society;
5. Adopt a fiscal plan and strategies to be financially sustainable over the long-term; and,
6. Create strong collaborations and partnerships that leverage institutional assets of the community, UA, local jurisdictions, regional interpretive and educational institutions, public lands agencies, Native American Nations, and Mexico.

## Tourism Development

Travel and tourism represent one of the most important industries in Arizona, producing billions of dollars in revenue, providing jobs for Arizonans, and generating local and state tax revenues.

In 2011, Arizona received roughly 860,000 overseas visitors – not including the 728,000 from Canada and 24.4 million from Mexico – making the travel industry one of the top two revenue generators in the state. In 2012, total direct travel-related spending in Arizona was \$19.3 billion, generating 161,300 jobs. The Gross Domestic Product of Arizona’s travel industry reached \$7.7 billion. Secondary impacts – defined as the re-spending of travel-related revenues by businesses and employees – resulted in 139,000 jobs and \$5.6 billion in earnings. Around three-quarters of travel-related revenue come from out-of-state visitors, including 17% from international travel. The combined travel and tourism revenues for Pima, Santa Cruz, and Cochise counties equal approximately \$3.3 billion.

Tucson and Pima County reported 22,340 travel-related jobs in 2012, \$2.66 billion in direct travel spending and \$150.0 million in direct tax revenue from tourism (2012 Arizona County Travel Impacts).
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## 2012 Arizona County Travel Impacts

County	Employment	Travel Spending (\$ Millions)			Related Travel-generated Impacts (\$ Millions)		
		Total	Visitor	Earnings	Local Taxes	State Taxes	Total Taxes
Pima	22,340	\$2,665	\$2,129	\$577	\$50.1	\$100.4	\$150.5
Santa Cruz	1,960	\$271	\$260	\$49	\$5.0	\$10.0	\$15.0
Cochise	3,660	\$348	\$316	\$75	\$10.7	\$14.3	\$25.0

Prepared for the Arizona Office of Tourism by Dean Runyan Associates

### **Pima County Economic Development Plan**

The proposed Southern Arizona Regional Visitor Center furthers the goals of the Pima County economic development plan to revitalize tourism and promote the travel industry as a source of direct income, employment, and tax revenues for the region as defined by the County Administrator to the Board of Supervisors in 2013. The County has endorsed the proposed regional orientation center as a collaborative initiative that will engage the resources of multiple institutions to stimulate economic activity and attract economic benefit to Southern Arizona.

### **Location**

An optimally functioning regional center should:

1. have easy highway or interstate access for visitors and residents;
2. be located facilitating travel to other relevant attractions such as museums, cultural centers, science centers, historic sites, and other information centers;
3. be connected to the downtown and major tourist attractions within a city by main streets and public transportation;
4. be located on a site that is itself culturally and ecologically significant; and,
5. provide adjacent parking as well as space for public events and commercial opportunities such as restaurants, lodging, vendors, and retail enterprises.

Given these considerations, it is proposed that the Orientation Center be located between the Santa Cruz River and the base of Sentinel Peak ('A' Mountain) and Tumamoc Hill. Tumamoc Hill is a National Historic Landmark and recreational magnet. The site is ideally located near the junction of Interstates 10 and 19 to attract visitors from across the state of Arizona, California, New Mexico, Texas and Mexico. The Center will be in close proximity of the De Anza Trail, historic Tucson Presidio, San Agustín Mercado, and the vibrant museums, restaurants, shops and hotels of downtown Tucson with the *SunLink* streetcar to provide public transportation to and from these downtown attractions, as well as the University of Arizona, the Arizona State Museum, and University of Arizona Medical Center, among other locations. Other attractions accessible by car or tourist buses include the Arizona-Sonora Desert Museum, Old Tucson, Saguaro National Park, Coronado National Forests, San Xavier del Bac Mission, Tumacacori National Historic Park, Kartchner Caverns, Fort Huachuca, the Sky Islands, and other public lands.

The site itself is the birthplace of Tucson, where agrarian peoples have farmed the Santa Cruz River floodplain for more than 4,000 years. The Tucson Origins Heritage Park with a re-creation of the San Agustín Mission Convento and Mission Garden will be located here. The Santa Cruz River and De Anza Trail are adjacent to the proposed location, which capitalizes on the iconic nature of Tumamoc Hill and its floodplain surroundings that evoke southern Arizona's enduring cultural history and Sonoran Desert landscape. It provides (a) a relevant historic context; (b) a portal to

regional experiences; and (c) ample opportunities to develop the center as well as nearby parking facilities and future commercial enterprises. The site fulfills all of the access, space and significant requirements for a compelling, effective, and high-impact geo-tourism hub and regional orientation, information and education center.

## **Function**

The proposed Southern Arizona Regional Orientation Center will be located a short walking distance from the *SunLink* streetcar's western terminal. As a guide to area attractions, it will (a) provide general and attraction-specific information; (b) facilitate coordination of travel and other tourism-related activities and events; (c) establish a marketing and promotions strategy; and (d) offer public spaces for workshops, classes, lectures, and demonstrations on innovative desert-living approaches, water re-use and harvesting, permaculture, xeriscaping and other arid-lands landscaping, desert architecture, and green design. It will host temporary and permanent exhibits that provide visitors with compelling experiences of the region, host interactive maps and thematic guides, offer products by local artisans, showcase local sustainability initiatives, and provide a place for people to learn, shop, plan and celebrate the region's unique qualities.

The regional orientation center will direct people to a multitude of enriching experiences, serving as a portal to understanding and exploring the area. It will inculcate the successes of other orientation and visitor centers, science centers, museums, and cultural centers to (a) demonstrate collaborative efforts among city, state and Federal agencies, universities, Native Nations, non-profit organizations, and the public and private sectors; (b) attain maximum efficiency; (c) bear technological and utilitarian relevance, (d) incorporate broad informational and educational content; (e) adopt customer service excellence; and, (f) ensure fiscal solvency, and long-term economic sustainability.

## **Content**

The proposed regional orientation center will be designed to introduce residents and tourists alike to the history, mysteries, and exquisitely interwoven stories of this region. These are stories of adaptation, persistence, tradition, and innovation that have enabled cultures and nature to flourish together, uninterrupted, for over 4,000 years, in the Santa Cruz River Valley.

Feature events will include Native American history (Tohono O'odham Nation and Pascua Yaqui Tribe); the Spanish, Mexican and American frontier; traditional wisdom and practice of our working landscapes; expressions of our diverse population; research and innovation highlights of the University of Arizona and the region; and the best synthesis of cultural knowledge and modern scientific and technological advances that make Southern Arizona an exemplary and cutting-edge desert community (See Orientation Center Content: Ten Stories).

## **Collaborating partners**

The proposed Southern Arizona Regional Orientation Center is collaboration among representatives from Pima County, City of Tucson, University of Arizona, Rio Nuevo, Western National Parks Association, Visit Tucson, Friends of Tucson's Birthplace, Santa Cruz Valley Heritage Alliance, Tohono O'odham Nation, Pascua Yaqui Tribe, U.S. Forest Service, National Park Service, U.S. Fish & Wildlife Service, Bureau of Land Management, and other stakeholders to develop a visionary project aligned with the needs and best interests of the Southern Arizona community.

# ORIENTATION CENTER COMPARATIVE REPORT

In a comparative analysis of visitor and education centers worldwide, the proposed Southern Arizona Regional Orientation Center stands out as an ambitious and unique endeavor, intended to be a critical base for promoting geo-tourism and highlighting the vibrant qualities of Southern Arizona. While no single visitor center, museum, science or cultural center provides a perfect model, the following are a few public and private facilities that we feel will help us achieve the six Primary Goals.

- Blue Ridge National Heritage Area (BRNHA) and Blue Ridge Parkway Visitor Center;
- Natural History Museum of Utah;
- The National Geographic Center for Sustainable Destinations;
- The Museum of Science in Boston;
- Western National Parks Association, and Yellowstone Park Foundation; and,
- Museum of Northern Arizona, Flagstaff, Arizona, and the Morris Thompson Cultural and Visitor Center, Fairbanks, Alaska.

The ultimate goal is to create a highly successful facility, and this comparative analysis provides the opportunity to draw on and learn from the strengths and weaknesses of the referenced centers, while fulfilling the six specific goals.

## 1. Economic Development

### Blue Ridge National Heritage Area (BRNHA) and Blue Ridge Parkway Visitor Center



In 2003, the foothills and mountains of North Carolina were designated by the U.S. Congress as the Blue Ridge National Heritage Area (NHA) to promote, showcase and celebrate the region's Cherokee heritage, pioneer history, and natural landscapes. This institution has successfully organized and promoted economic development in the region through its NHA designation, which resonates well with the Santa Cruz Valley National Heritage Area (SCVNHA). While BRNHA and Visitor Center receive less revenue from

travel and tourism than our region (BRNHA receives approximately \$2.0 billion annually, compared to \$3.3 billion for Pima, Santa Cruz and Cochise counties), they have utilized their NHA designation to develop a comprehensive tourism attractions website, visitor center, and consortium of local travel- and tourism-related industries.

Established in 2004 as a private 501(c)3 non-profit corporation, the BRNHA Partnership provides (a) programs, management plans, strategic plans, and facilitates partnerships to leverage the impact and economic potential of the heritage area; and, (b) access to travel brochures, maps, itineraries, website links, smart-phone apps, and tours that feature local attractions and business. During 2010, BRNHA marked successes in media partnerships, visitor and travel guide stories, a traditional artist directory, a new mini-website optimized for mobile-device use, visitor services, new map and brochure, new signage, educational programs, and special events. Their website provides

opportunities to explore local traditions, including Cherokee agriculture, arts and crafts, music (blues, ballads, and bluegrass), dance, mountain lore, and local foodways and scenic areas.

The Blue Ridge Parkway Visitor Center is located in Asheville and offers information and orientation services to the entire NHA. It has a 70-person theater to feature their award-winning film, titled “The Blue Ridge Parkway – America's Favorite Journey.” The center has a staff of 32 volunteers who dedicated 1,300 hours and received 88,000 visitors in fiscal year 2009/2010.



The Blue Ridge National Heritage Area has a well-developed management plan and collaborative structure and is divided into “host groups.” Consortiums of hoteliers, restaurateurs, attractions, outfitters, merchants, and other businesses within the BRNHA help visitors find accommodation, food, and fun to create a memorable journey. Attractions within the NHA include national parks, railroads, arboretums, museums, galleries, ski centers, white-water rafting opportunities, mountain climbing and mountain biking trails, wineries, orchards, and festivals.

The Center receives Federal oversight and funding from the National Park Service and works in close partnership with the Cherokee Preservation Foundation, Golden LEAF Foundation, Z. Smith Reynolds Foundation, and the National Endowment for the Arts; it also works with North Carolina’s General Assembly, and the departments of Commerce, Cultural Resources, and Transportation.

The 2006 Baseline Economic Impacts Survey of BRNHA found a low Sales Activity Index when compared to other U.S. counties; however, the Travel Industry Association of America states that BRNHA brought in \$2 billion from travel and tourism. Additionally, the NHA (a) had secondary impacts of \$800 million in revenues; (b) created 35,000 primary travel/tourism jobs; and (c) attracted approximately 21.5 million day and overnight visitors who spent an average of \$90.24 dollars each per day in the region. A subsequent survey conducted in the visitor center in 2010 found that 54% of visitors came from outside the region with an overnight stay; and 57% used the internet and national heritage area website to plan their visit.

The Blue Ridge National Heritage Area Partnership offers matching grants to provide and leverage funding for regional projects, which preserve, protect, and promote the historical, cultural, and natural heritage of Western North Carolina, while stimulating economic opportunity. These grants are supported by the National Park Service, totaling \$225,000 in 2013; and, since the NHA’s inception, it has received more than \$1.2 million in overall Federal funding, leveraging \$2.2 million in non-Federal matches. Funded projects include art, culture, history, and natural history exhibits; agri-tourism development; historic building restoration; films; maps; and, educational and interpretive plans and installations. In the last comprehensive report in 2010, the NHA received \$737,000 in Federal funding that covered all expenses related to marketing and visitor services, planning, grants, administration, and operation. The Blue Ridge NHA Partnership leveraged these Federal funds through state, local, and private organizations for an additional match and in-kind support of \$755,000. For more information, visit: <http://www.blueridgeheritage.com>.

## ***Analysis***

The economic development successes of BRNHA include: (a) forming the 501(c)3 to organize, raise funds, develop a management plan, and direct operations; (b) locating the center in a popular town, staffed by volunteers to promote the region’s attractions; (c) supporting an interactive full-service website with photographs, a calendar of events, and stories about the region’s natural and cultural attractions; (d) establishing host groups of tourist-related businesses to more effectively advertise and link tourist opportunities in the region; and (e) leveraging Federal, state, and private funding through grants to help individuals, businesses, and organizations in the region to develop projects that attract more visitors. Despite struggling with low visitation and tourist revenue to the area in general, BRNHA has utilized resources in strategic ways to increase their visitation base around their cultural and natural assets. Likewise, in the “Tucson and Southern Arizona” region, Cochise, Graham, Greenlee, and Santa Cruz counties face visitation struggles; but, our proposed regional orientation center could adopt methods and measures like BRNHA to become and remain a successful venue.

## **2. Place-based cultural and natural sciences education**

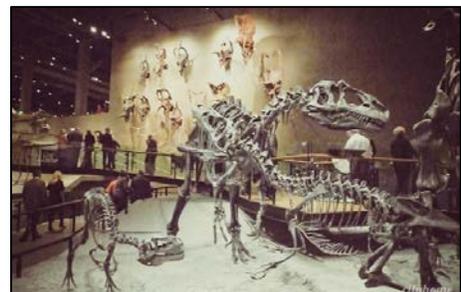
### **Natural History Museum of Utah**

The Natural History Museum of Utah (NHMU) is operated by the University of Utah. As a world-class facility, it provides a distinct and defining sense of place, while illustrating how people and environment influence one another through time. It exemplifies a Center that utilizes science and cultural education, the quality of its material and informational content, its regional relevance and close relation to the University of Utah, and its national recognition as a natural history museum to impart multisensory education about place to the general public.



The museum was inaugurated in 1969. In 2011, a new facility, the Rio Tinto Center opened at the foothills outside Salt Lake City, featuring a wide range of natural history fields: paleontology, anthropology, entomology, mineralogy, malacology, botany, and vertebrate zoology. Aligning its mission to illuminate the natural world and humans’ place within it, the museum interprets the natural and cultural history of Utah through science, history, art and more than 1.2 million objects in its collection for research and education. It offers rotating exhibits in the areas of geology/paleontology, anthropology, and biology with exhibitions simply titled: Sky, Native Voices, Life, Land, First Peoples, Gems and Minerals, Great Salt Lake, Past Worlds, Our Backyard, and Utah Futures, which offer an astounding array of multi-sensory experiences that introduce visitors of all ages to the vivid natural and cultural wonders, discoveries, and mysteries of Utah.

Museum curators and docent volunteers offer ‘traveling education’ kits containing specimens and activities for circulation in schools statewide. The museum provides site and trail access to the physical landscapes surrounding the facility, and an interactive map and virtual Trailhead to Utah, which orients visitors to the museum’s galleries through online tours and smart-phone applications. The museum also offers (a) additional educational content through films, audio



tours, podcasts, and other media; and, (b) programming for kids, young adults, adults, and families through school tours, a junior science academy, classes, workshops, lectures and special events.

The Rio Tinto Center received funding from the Federal government, Utah State legislature, Salt Lake County bond support, and philanthropic donations from individuals, corporations, and foundations. As per a 2012 Utah System of Higher Education (USHE) request to the governor and Utah State Legislature, the Center receives \$656,200 a year to operate the museum. In 2013, USHE made a one-time additional \$300,000 operation cost request.

The Center – which occupies 17 acres and cost \$102 million to build has received LEED Gold Certification and several awards for architectural design and sustainability. The building is clad in 42,000 square feet of copper sheeting; it sports a rooftop garden with native plants and solar panels to generate a portion of its electric power. The building features a 60-foot tall central atrium called The Canyon, switchback paths leading through displays of compressed geologic time, a dinosaur quarry, demonstrations of wind and water erosion, and a floor map of the Great Salt Lake.

The museum serves as a model of regional research, regional destination, university student engagement, and Native American collaboration. Its strategic goals include (a) “true sustainability” through investing in the development of staff, board, and volunteers; (b) seeking strategic partnerships; (c) exceeding earned income goals and building a financial reserve; (d) exceeding attendance goals; and (e) measuring, documenting and communicating the economic impact of the museum and the return on investment of the Rio Tinto Center. The Indian Advisory committee – with representation from the White Mesa Ute, Navajo Nation, Goshute Tribe, Paiute Tribe, Shoshone, Utah division of Indian Affairs, and University of Utah American Indian Resource Center – (a) advises the museum on the use, care, disposition, and interpretation of Native American collections; (b) plans programs and exhibits that meet the needs of Indian communities in the Intermountain West; and (c) implements the Native American Graves Protection and Repatriation Act (NAGPRA). For more information visit: <http://nhmu.utah.edu>.

### *Analysis*

The Natural History Museum of Utah is nationally recognized as an institution that: (a) provides deep multisensory (visual, audio, performance, recreational) educational opportunities; (b) has mobile exhibitions and informed docents; (c) features exhibitions developed by the University of Utah experts; (d) is a “sustainable” facility; and, (e) has focused on developing a Native Nations Advisory Committee with several Native Nations, State, and University representatives. The Southern Arizona Regional Orientation Center has an opportunity to model aspects of the Natural History Museum’s building design, institutional credibility, high quality science and cultural content, and collaboration with groups indigenous to the area to foster an authentic, diverse, and bioregional identity.

## **3. Orientation hub**

### **The National Geographic Center for Sustainable Destinations**



This virtual hub serves as a perfect digital corollary that attracts visitors and redirects them to a multitude of digital and physical geo-tourism sites throughout the region.

The National Geographic Center for Sustainable Destinations website offers information on geo-tourism, and provides a list of places and educational resources for travelers, educators, policy makers, tourism professionals, universities, and conservation institutions. It features lists of (a) international policy organizations, (b) multipurpose sustainable tourism sites, and (c) sustainable tourism assistance institutions with a focus on ecotourism, cultural and heritage tourism, and related academic and research institutions. The site also features an interactive map that provides options for site-specific maps to 550 geo-tourism regions around the globe. Visitors to the website can find geo-tourism news and events; information on how to establish a new geo-tourism site; stewardship and collaboration; and funding, conference, research and information resources. Its new collaborative website and blog, <http://DestinationCenter.org>, allow visitors to access the National Geographic geo-tourism charter (<http://travel.nationalgeographic.com/travel/sustainable/pdf/geotourism-charter.pdf>). The Arizona-Geotourism map and the John Muir Geotourism Center are examples of the Sustainable Destinations site's subdirectories.

The Center for Sustainable Destinations projects have involved multiple funding partners, including national, state, private, nonprofit, and international institutions, such as the Inter-American Development Bank and the World Bank.

The site itself is supported through National Geographic. For more information, visit: <http://travel.nationalgeographic.com/travel/sustainable/>.

### *Analysis*

The National Geographic Center for Sustainable Destinations is an exemplary model of a virtual hub that provides easy access to (a) a broad range of travel attractions and destinations; (b) interactive maps and itineraries; (c) conservation and ecotourism education; (d) research, data, and information; (e) excellent presentations and display content; (f) high quality images, information, and journalism; and (g) compelling stories that inspire people to travel and experience the nature and culture of places. It demonstrates a collaborative spirit that can help regions organize and promote their own tourism assets. The proposed regional orientation center's goals to (a) coordinate and promote the region's diverse tourism activities and attractions; and (b) serve as a 'combination hub' of a physical location and a virtual site for desert-living education, outreach, and research stand to be fulfilled by adopting tried and true measures set by the Center for Sustainable Destinations.

## **4. Interpretive Science Center**

### **The Museum of Science in Boston**



The Museum of Science in Boston is the third most visited science center in the U.S., according to the "Museum Planning 2012 World's Top 10 Science Centers." As a leading educational facility, it demonstrates success in science education and its university partnerships to facilitate research and community participation in its Discovery Center "Living Laboratory." The museum facilitates science-explorations for people of all ages, through interactive exhibits, and experimental and hands-on approaches.

Located in Science Park, on the Charles River, the museum features over 700 interactive exhibits such as the Butterfly Garden, Seeing is Believing, Natural Mysteries and the Theory of Electricity, and live presentations such as Science Live!, Science Magic, An Uncertain Climate, and Lightning!

The Discovery Center's Living Laboratory is an on-site research program and innovative public education model, funded by the National Science Foundation (NSF), where scientists share and conduct research with members of the general public on current topics like child development, participate in research studies, and perform hands-on scientific activities. Participating institutions include Harvard University, Boston University, Boston College, Tufts University, Boston Children's Hospital, and Northeastern University. The model features interaction among museum professionals, academic professionals, and the public, collaborating on research, education, and outreach. The success of this effort greatly impressed the NSF to have its Division of Research on Learning in Formal and Informal Settings (DRL) initiate similar facilities in the (a) Maryland Science Center in collaboration with Johns Hopkins University; (b) Madison Children's Museum in collaboration with University of Wisconsin at Madison; and (c) Oregon Museum of Science and Industry in collaboration with Lewis & Clark College. For more information, see: <http://mos.org> and [www.mos.org/collaborations/living-lab-and-national-living-lab](http://www.mos.org/collaborations/living-lab-and-national-living-lab).

### ***Analysis***

The Museum of Science in Boston, with its University and hospital partnerships in the greater Boston area, is a very well-reputed and successful research and education center. Its curricula and activities form a very appropriate model to adopt in creating the proposed Southern Arizona Regional Orientation Center, which will serve as a site for scientific research toward understanding the nexus of nature, culture and society in our region.

Just like the Discovery Center's Living Laboratory at the museum with its collaborations, Pima County has already initiated a comprehensive partnership with the University of Arizona, City of Tucson, Western National Parks Association, Visit Tucson, Rio Nuevo, Friends of Tucson's Birthplace, Native American Nations, land management agencies, and other stakeholders toward a full-fledged regional orientation center. Future partnerships could include the Arizona State Museum, the University Medical Center, and Pima Community College, among others. Additionally, several sources of funding could be drawn on, to conduct research on the regional orientation center itself (green architecture, solar energy, water harvesting, permaculture, and public education on desert living) and on the satellite facilities and sites associated with it. This research could be funded through the University of Arizona (Institute for the Environment, Drachmann Institute, Sustainable Cities Project, Arizona State Museum, Southwest Center, and Arid Lands Resource Sciences, among many others) and also through non-profit organizations such as the Santa Cruz Valley Heritage Alliance, Tucson Meet Yourself, Audubon Society, and Sonoran Institute.

## **5. Financial Sustainability**



### **Western National Parks Association, and Yellowstone Park Foundation**

These 501(c)3 non-profit organizations support public places, including the landscape and museums within national parks, information centers, and interpretive retail stores, providing an excellent model of financial sustainability for adoption by the Southern Arizona Regional Orientation Center. These organizations operate such that the Federal government, through the National Park Service (NPS), provides direct support for the parks; and, the non-profit organizations leverage sales and

membership revenues, donations from regional agencies, private entities, and corporations, and staffing in some instances, utilizing a combination of annually generated revenues and income from established endowments.

### **The Western National Parks Association**

Founded in 1938 and renamed in 2002, the Western National Parks Association (WNPA) is a ‘cooperating association’ authorized by the U.S. Congress under the aegis of the National Park Service. Cooperating Associations, first begun by the U.S. Congress in 1936, are non-profit organizations formed to support national park programs and projects not covered by government funding, and allowed to operate within national parks. Today, WNPA has operations in sixty-seven NPS sites across 12 western states, ranging from Kansas to California, and Montana to Texas, with annual donations to NPS in excess of \$4 million. Its key strategy is to raise money for education in national parks, and its mission includes (a) aiding affiliated national parks; (b) providing education and interpretation; (c) sustaining national parks retail stores; (d) fostering outreach; and (e) performing research. For more information, visit: <http://www.wnpa.org/>.

The Western National Park Association publishes more than a half million free maps, trail guides, and newsletters each year, as well as, field guides, cook books, reference literature, and scientific publication. They offer natural and cultural interpretive events at their stores and a lecture series at their headquarters in Southern Arizona.

The revenue sources for WNPA are diverse, including profits from retail store sales (\$4,379,756 gross in 2011); contributions (\$4,366); membership dues (\$59,279); and other revenue (\$4,288). For fiscal year 2011, total assets equaled \$9,280,337; total revenue was \$4,657,863; and total expenses = \$5,226,083 (See <http://store.wnpa.org/annualreports/annualreport2011.pdf>).

The Western National Park Association donates \$4.3 million each year to its park affiliates and has contributed more than \$64 million, including \$1.9 million in research funding, since its inception.

With its tenure in operational management, revenue generation, and budgeting expertise, WNPA demonstrates the needed qualities to assume operations and maintenance responsibilities for the Southern Arizona Regional Orientation Center.

### **The Yellowstone Park Foundation**

The Yellowstone Park Foundation (YPF) was formed in 1996 by a group of concerned citizens in association with NPS. Supported entirely by private citizens, foundations, and corporations, YPF is structured to fund projects under six initiatives: (a) Wildlife, Wonders and Wilderness; (b) Visitor Experience; (c) Cultural Treasures; (d) Ranger Heritage; (e) Greenest Park; and (f) Tomorrow’s Stewards. For more information, visit <http://www.ypf.org>.



For the fiscal year ending in June 2013, the Park had generated \$6,261,260 in revenue from (a) in-kind gifts (\$291,316), corporation gifts (\$709,096), foundation gifts (\$420,949), individual gifts (\$4,563,143), government grants (\$5,500), investment incomes (\$53,857); and Other Programs including Guest Donation Dollar per Night Program, Yellowstone license plates (Montana), and

Yellowstone credit cards (\$205,935). For the same fiscal year, the Total Assets equaled \$9,970,496 of which Total Current Assets were in the amount of \$7,976,676 (subtracting investments, endowment investments, unconditional promises, and furniture/equipment depreciation). The Total Net Assets equaled \$9,818,803 and Total Liabilities were in the amount of \$141,693, bringing the Total Liabilities and Net Assets to \$9,970,496 (same as Total Assets). For more information, visit: <http://www.ypf.org/pdfs/AR2013/document.pdf> (pages 14 and 15).

### ***Analysis***

These two non-profit foundations/associations have demonstrated what financial sustainability and success are about.

The Western National Parks Association has been around for over 76 years, serving as a vehicle through which financial, technical, material, and personnel support are provided to parks, monuments, and historic sites throughout the western United States. It has survived economic downturns and the financial dynamics of both state and Federal governments, enabling its sites to do the same. While the Yellowstone Park Foundation has been in existence for less than 20 years, the upstart has become a destination for visitors from all over the world. In terms of revenue generation, WNPA and YPF are comparable at just under \$10 million a year for each.

These non-profit institutions tell a compelling story about preserving, protecting, and presenting unique public spaces for the enjoyment of visitors from around the world. The proposed Southern Arizona Regional Orientation Center can find a true-and-tried financial sustainability model in these organizations and must envision the creation of a similar facility to support and promote the region in perpetuity by effectively leveraging funds from private, foundation, and corporate donors, as well as local, state, and Federal governments.

## **6. Collaboration**

### **Museum of Northern Arizona, Flagstaff, Arizona; and the Morris Thompson Cultural and Visitor Center, Fairbanks, Alaska**



These two museum facilities are demonstrative of collaboration among private organizations, non-profit organizations, state agencies, and Native American Nations to integrate and leverage the institutional assets of the collaborating entities, and to promote their respective regions.

#### **Museum of Northern Arizona**

The Museum of Northern Arizona’s mission “is to inspire a sense of love and responsibility for the beauty and diversity of the Colorado Plateau through collecting, studying, interpreting, and preserving the region’s natural and cultural heritage” (<http://musnaz.org/>). The museum was founded in 1928; today, it has a 200-acre campus composed of a building with exhibits, research laboratories, and over 5 million artifacts of natural science, fine art, and Native American culture and lore.



The facility is known for its collaboration with northern Arizona Native American Nations, such as the joint project between the museum and the Hopi Cultural Preservation Office to research the

expression of Hopi values and lifeways in pottery, mural painting, basketry, petroglyphs, and other media, with funding support from the National Endowment for the Arts and the Rockefeller Foundation. The Museum of Northern Arizona signed a Memorandum of Understanding with the Hopi Tribe that provides for consultation and collaboration on educational initiatives including “development of exhibits and education programs relating to Hopi culture; reorganization of the Hopi Mural Project, an exhibit initiative in process at MNA; Hopi involvement in the management of culturally sensitive collections; collaboration with the Hopi Tribe and Northern Arizona University on the establishment of training programs for Hopis in the field of Museum Studies; MNA assistance in the establishment of a new Hopi Tribal Museum and education center on the Hopi Reservation; and mutual exploration of new directions for the annual Hopi Festival in support of the perpetuation of Hopi art and craft traditions. MNA will also continue to serve as a repository for special Hopi tribal collections.” – Memorandum of Understanding, 2005, Attachment A.

Artists, performers, and educators from the Hopi, Navajo, and Zuni Tribes come to Flagstaff to share their traditions through creative expression. In 2013, the museum hosted the 23d annual Zuni Festival of Arts and Culture, the 64th Annual Navajo Festival, and the 80th Annual Hopi Festival of Arts and Culture.

The Museum of Northern Arizona has a long-standing partnership with Northern Arizona University to facilitate education, research and community outreach. The museum has collaborated with several agencies and organizations on the Northern Arizona Native American Culture Trail Initiative to launch a “native art, culture, and trip planning website for northern Arizona” to encourage tourism on tribal lands. Other collaborating organizations include Arizona Office of Tourism, Native Americans for Community Action, Navajo Nation Tourism, the Hopi Tribe, Rio Nuevo Publishers, and Northern Arizona University, with funding from the U.S. Department of Labor, Women’s Bureau, and Employment and Training Administration. The museum also collaborates with the Flagstaff Arts and Leadership Academy on the Colton Community Youth Garden, a summer internship program that offers wages, job-skill training, and leadership development to local high school youth.

The museum focuses on four interrelated disciplines: anthropology, biology, geology, and fine art. Content includes the ‘Native Peoples of the Colorado Plateau’ exhibit, which documents 12,000 years of indigenous peoples in the region and an ethnology gallery that gives visitors insight into the daily lives of the tribes such as the Hopi, Zuni, and Navajo. The museum features a biology exhibit with information about the region’s climate, ecology, and natural history; and the geology gallery houses geologic models, fossils, mineral specimens, and information on the millennia of changes in the Colorado Plateau. The Lockett Fine Arts Gallery, Chase Gallery, and Babbitt Gallery hold an array of original easel art and sculpture and a collection of 151 prehistoric and contemporary ceramic vessels. Education programs include local tours, discovery programs, the Colton Community Youth Garden, and opportunities to avail a variety of workshops and field courses with local scientists, writers, and artists. For more information, visit

<http://www.musnaz.org>.



## Morris Thompson Cultural and Visitor Center



Located on the banks of the Chena River in downtown Fairbanks and named after a famous Native Alaskan leader, businessman and political appointee, the Morris Thompson Cultural and Visitors Center is a collaboration of the Fairbanks Convention and Visitors Bureau, the Alaska Public Lands Information Center, and the Tanana Chiefs Conference.

The Center's mission is to celebrate Interior Alaska's people, land, and culture; promote economic development in rural Alaska via tourism; and be a community gathering place, where diverse cultures come together to understand, appreciate and respect one another. It also (a) informs and guides people to explore the State's interior and arctic regions; (b) serves as a cultural center to preserve Athabascan languages and traditional knowledge and practices; (c) serves as a bridge among cultures, specifically working to promote dialogue and understanding between Alaska's Native and non-Native communities; and, (d) offers field trips, scavenger hunts, and classes for kids, along with films, family portrait opportunities, photography and art shows, cultural connection events and music festivals.

In spite of being a small facility, the Morris Thompson Cultural and Visitors Center (a) has a primary interactive exhibit called "How We Live: The People and the Land", which features indigenous life in the four seasons; and, (b) features cultural program workshops, including hands-on learning opportunities to learn traditional Athabascan art such as basket making, caribou hair tufting, beadwork, porcupine quill work, snowshoes, moose skin bags, and suncatchers.

Funds to build the center came from over a thousand donations from private, public and nonprofit institutions, totaling 29.3 million dollars, which includes the Federal government funding of \$16.7 million; State government funds of \$7.6 million; Fairbanks North Star Borough (\$250,000); and private monies (\$4.7 million). Other funding sources include mining companies like ConocoPhillips, Sumitomo Pogo, and Kinross Fort Knox that operate in the region. The center is managed jointly by the Fairbanks Convention and Visitors Bureau, the Alaska Public Lands Information Center, and the Tanana Chiefs Conference.

For more information, visit <http://www.morristhompsoncenter.org>.

### *Analysis*

The Museum of Northern Arizona and the Morris Thompson Cultural and Visitors Center have utilized effective collaboration strategies by adopting clear Memoranda of Understanding and equal participation in funding and operations among their partner agencies. They have successfully integrated the arts, culture, customs, and regional history of various ethnicities into one harmonious entity. The Southern Arizona region has an opportunity to create a regional orientation center that embraces similar strategies to maximize collaboration among Pima County, City of Tucson, University of Arizona, regional interpretive and educational organizations, public lands agencies, Native American Nations, tourism entities, Mexico, and other local and regional stakeholders. Collaboration efforts should occur at the grass-roots level to leverage assets, provide fair representation, and create a space for an authentic, diverse, and bioregional identity.

## Synthesis

These eight highly successful facilities assembled within six categories of orientation and visitor centers were chosen because they allow us to study each category's strength with the potential to incorporate them into the proposed Southern Arizona Regional Orientation Center. The range of strategies will help in developing content, programming, and funding partnerships in a variety of ways: (a) economic development in the Blue Ridge National Heritage area; (b) place-based natural history and cultural education in the Utah Museum of Natural History; (c) research excellence in the Museum of Science in Boston; (d) a digital and virtual hub such as the National Geographic Center for Sustainable Destinations; (e) financial sustainability seen in WNPA and Yellowstone Parks Foundation; and (f) strategies of collaboration demonstrated by the Museum of Northern Arizona and the Morris Thompson Cultural and Visitors Center.

The featured facilities collectively emphasize excellence in programming that includes guided and self-guided outdoor adventures; youth and elderly programs; traditional knowledge workshops; archives and libraries; university-nonprofit-community research programs; digital information hubs; development of a sense of place through preservation of unique natural and cultural resources; a combination of funding sources, including Federal, state, and municipal governments, non-profit organizations, as well as private companies and individuals; collaboration among stakeholders for equal representation (financially, in decision-making, and in operations); and through Memoranda of Understanding; among other notable strategies. As we continue to develop the storyline, physical design, and community and regional partnerships for the proposed Southern Arizona Regional Orientation Center, these six sets of examples can serve as a guide for education, outreach, research, and geo-tourism excellence.

# ORIENTATION CENTER CONTENT COMPENDIUM

## Introduction

This section features selected themes and related attractions, events, and institutions that will guide the development of the visual, experiential and information content of the proposed Southern Arizona Regional Orientation Center. These were drawn from the “Feasibility Study for the Santa Cruz Valley National Heritage Area” and incorporate additional themes that reflect a continued conversation around the ideas. Each theme has sample subchapters that may be used as exhibit features that highlight the issues and unique character of the region, which are further developed into stories (*Orientation Center Content: Ten Stories* chapter), weaving several ideas together in each to represent the cultural landscape of our region. The Content Compendium themes are:

1. **Sky Islands and Desert Seas**
2. **Desert Streams**
3. **Native American Lifeways**
4. **Spanish and Mexican Frontiers**
5. **A Working Landscape**
6. **Expressions of Many Cultures**
7. **Health and Fitness**
8. **Research and Innovation in a Desert City**
9. **Sustainable Desert Living**

## 1. Sky Islands and Desert Seas

The Sonoran Desert stretches from southern Arizona to southeastern California and south into Mexico, encompassing much of Sonora, the Baja California peninsula, and the Gulf of California, hosting all of the world’s major biomes – including tropical forest, thornscrub, deciduous forest, and tundra. It covers approximately 100,000 square miles and supports some 60 different mammal species, 350 bird species, 100 reptiles, 20 amphibians, 30 native fish, and 2,000 species of plants. From among the desert’s rich bio-diversity, two plant types stand out, distinguishing this desert from others: leguminous trees like the palo verde and mesquite, and columnar cacti like the famous saguaro. Much of the plant and animal life have adaptations that allow them to survive the extreme heat, temperature variations, and long periods with little rain.

The desert is also shaped by its weather patterns, a unique blend of bi-modal winter and summer precipitation due to its location relative to the Pacific Ocean and the Gulfs of California and Mexico. The months of December to March may bring gentle, widespread storms from the northern Pacific Ocean. The July to mid-September monsoon brings dramatic surges of moisture northward from the two gulfs, with fierce thunderstorms, sudden downpours, and flash floods. The biota of the Sonoran Desert has distinct adaptations to make the most of these two rainy seasons and survive long, dry intervals.

The Madrean Sky Islands form a link between the Sierra Madre Occidental in Mexico with the southern end of the Rocky Mountains and Colorado Plateau. These sky islands, surrounded by desert ‘seas’, form an archipelago of mountain ranges that reach from tropical to temperate latitudes. There are approximately 27 ranges in the United States and 15 in northwest Mexico within the Sky Island region, whose peaks rise over 5,000 feet in elevation, with Mount Graham in the Pinaleno Mountains as the tallest at 10,720 feet. The extreme elevation changes, between 1,250 to over 6,000 feet above

the valley floors, transition from the saguaro, ocotillo, mesquite and acacia to quaking aspens and spruce-fir forests within just a few miles of each other. The forested ranges are surrounded and isolated by low valleys of the desert scrub and grasslands of both the Chihuahuan and Sonoran Deserts. It is the most bio-diverse region in the United States and is home to over half of the bird species in North America, 29 bat species, over 3,000 species of plants, and 104 species of mammals. Some species remain isolated on the mountaintops, while others, such as mountain lions and black bears, depend on movement between the ranges for their habitat and to maintain the genetic diversity of their populations. The Madrean Sky Islands represent the northernmost reaches for tropical and subtropical species such as the jaguar, ocelot, elegant trogon, and thick-billed parrot, while the ranges and valleys in between provide north-south migratory corridors for hundreds of mammal, bird, butterfly and bat species. This unique, complex, highly-diverse, and fragile landscape faces unprecedented global threats, including land development, resource extraction, poor management practices, water scarcity, and climate change, giving rise to habitat loss and further fragmentation, which can lead to species endangerment and extinction.

Southern Arizona has extensive open lands, managed by Federal, state, county, municipal, tribal, non-profit, and private entities. National Parks, Monuments and Memorials, National Forests, Wildlife Refuges, National Conservation Areas, Wilderness Areas, and other protected areas help to preserve vast areas of open space and wildlife habitat in the region. The Sonoran Desert Conservation Plan has been very instrumental in a large portion of the critical biological areas being protected through acquisition and conservation easements. Institutions such as The Nature Conservancy, Arizona State Parks, and the Arizona Land and Water Trust protect thousands of acres of wildlands within the region.

## **Subchapters:**

### **Santa Cruz Biodiversity**

Species diversity in the Santa Cruz watershed of southeastern Arizona is especially high because of the varied landscape, bi-modal (summer and winter) precipitation, and merging of four biomes: Neotropical Sierra Madre, temperate Rocky Mountains, Sonoran Desert, and Chihuahuan Desert. These diverse habitats provide unique conditions for species, many of which are endemic (found nowhere else in the world), but also endangered and/or threatened. The Santa Cruz watershed alone holds 15 endangered species, including five plants (the Huachuca water umbel, Kearney's blue star, Nichol's turk's head cactus, Pima pineapple cactus, and the Madrean ladies' tresses); two fish (Gila topminnow and desert pupfish); two amphibians (Sonoran tiger salamander and Chiricahua leopard frog); four birds (southwestern willow flycatcher, masked bobwhite, cactus ferruginous pygmy-owl, and Mexican spotted owl); and two mammals (lesser long-nosed bat and jaguar). The region also supports numerous species listed as threatened and sensitive, and in need of protection.

### **Biological Corridors**

These landscape features that connect large areas of isolated natural areas or wilderness are the key to maintaining biodiversity in the region. Many species depend on movement between habitats to find food, keep viable populations (breeding and dispersal of juveniles), and for seasonal migrations. The corridors may follow the river valleys, with riparian vegetation and water resources supporting migratory songbirds, mammals, and waterfowl on their way between tropic and temperate latitudes. The linkages may be between mountain ranges, with the valleys facilitating movement of animals that live in the isolated mountainous habitats. The mountain ranges themselves also form corridors of stepping-stones for species that prefer habitats at a higher elevation. The Sky Island Regional

Working Group identified 18 critical landscape linkages within southeastern Arizona. As groundwater pumping decreases the water available in the river courses and urban development fills in the valleys; the remaining biological corridors are an essential asset in the region.

## **A Changing Climate**

Over the next century, scientists project a hotter and drier region, which can lead to reduced habitat and species vulnerability. As the temperatures increase and precipitation decreases, the desert vegetation of the valley floors may extend higher up the mountains, and the alpine vegetation at the mountain tops could shrink in area. This trend is not new; the sky islands were isolated from each other and the contiguous woodlands of the Sierra Madre Occidental by a warming and drying climate since the last ice age. The rate of change has accelerated and many species are unable to move to more favorable habitat or adapt. The shrinking habitat also affects migratory species that use the Sky Island ranges as stepping stones; the distances between suitable habitats and available food resources might be too far apart to support them on their migrations. The highly variable and changing climate also alters the timing of growth, flowering, and fruiting of many plants, which in turn can affect those species that depend upon them or serve as pollinators and seed dispersers. This can lead to a mismatch in timing that has adverse effects on many plant and migratory species.

### **Attractions:**

- Agua Caliente Park
- Aravaipa Canyon Wilderness
- Arizona-Sonora Desert Museum
- Buenos Aires National Wildlife Refuge
- Boyce Thompson Arboretum
- Catalina State Park
- Chiricahua National Monument
- Cochise Stronghold
- Colossal Cave Mountain Park
- Coronado National Forest/Coronado National Memorial
- Gila Box National Riparian Conservation Area
- Huachuca Mountains/ Ramsey Canyon
- Kartchner Caverns State Park
- Las Cienegas National Conservation Area
- Leslie Canyon National Wildlife Refuge
- Madera Canyon
- Mount Lemmon Scenic Byway
- Muleshoe Ranch Preserve
- Patagonia Lake State Park
- Pima & Finger Rock Canyons
- Ramsey Canyon Preserve
- Rillito River Park
- Sabino Canyon
- Saguaro National Park
- San Bernardino National Wildlife Refuge
- San Pedro Riparian National Conservation Area
- San Rafael State Park
- Santa Rita Experimental Range and Wildlife Area
- Sonoita Creek State Natural Area
- Tohono Chul Park
- Tortolita Mountain Park
- Tucson Botanical Gardens
- Tucson Mountain Park
- Tumamoc Hill
- Wild Chile Botanical Area
- Willcox Playa Wildlife Area

### **Related Institutions**

- Arizona-Sonora Desert Museum
- Arizona Native Plant Society
- CLIMAS – Climate Assessment for the Southwest
- Friends of Saguaro National Park
- National Park Service
- Nature Conservancy
- Pima Trails Association
- Rincon Institute
- Sky Island Alliance

- Southeast Arizona Butterfly Association
- Sonoran Institute
- Tucson Audubon Society
- Tucson Cactus and Succulents Society
- UA Department of Ecology and Evolutionary Biology
- U,S, Forest Service
- UA Department of Geosciences
- UA Institute of the Environment
- UA School of Natural Resources and the Environment
- Western National Parks Association

## 2. Desert Streams

The Santa Cruz River watershed has almost 90 miles of stream and river stretches that flow year-around; but, more of the stream courses in the watershed are ephemeral, flowing or holding water only after a rainy period, or from snow-melts in spring. The Santa Cruz River and many of its tributaries are dry much of the year but a few natural cienegas (riparian marshlands) still exist, including Potrero wetlands, Cienega Creek, and Sonoita Creek. Several human-facilitated riparian areas provide habitat for wildlife and recreational opportunities. In the upper Santa Cruz River, just north of the U.S.-Mexico border, the release of treated effluent into the river has resulted in the revival of several miles of stream flow. Similarly, effluent recharge from Pima County's metropolitan water reclamation facilities has also regenerated a section of the Santa Cruz River. Other such sites include the Sweetwater Wetlands; Kino Environmental Restoration Project; riparian restoration/ rehabilitation projects such as Wa:k hikdañ on the San Xavier District of the Tohono O'odham Nation; Tucson Audubon's Santa Cruz River Habitat Project; and, North River Road near the City of Nogales.

The waterways support unique riparian vegetation that in turn provide habitat for birds, mammals, insects and reptiles. Much of the life in the desert can be found within or at the edges of these waterways, including 60 to 70 percent of wildlife and up to 90 percent of the bird species. The north-south river corridors of the Santa Cruz and neighboring San Pedro River provide critical migratory flyways for over two hundred species of birds. The valleys also provide corridors that link the mountain ranges on either side, crossed by coyotes, bobcats, mountain lions, and black bears, among many others. Ground and surface water also support human communities, including water for agriculture, ranching, mining, industry and domestic use. Southwestern river corridors have served as the circulatory systems of human society – travelers, explorers, traders, and migratory peoples as well as settled farming cultures – for thousands of years.

The Santa Cruz River begins in southeastern Arizona near the town of Patagonia, just north of the U.S.-Mexico border. The headwaters originate in the San Rafael Basin – a high, semi-arid grassland, bounded by the Patagonia Mountains and the Canelo Hills, where, a two-mile stretch of the Santa Cruz flows year round – while the rest of the river is ephemeral. The river course runs south into Mexico, and then takes a sweeping turn to flow back into the U.S. – near the twin cities of Nogales, Arizona and Nogales, Sonora – continuing northward into the Tucson Basin. Past the Tucson Basin, the river meets the Gila River and traverses Arizona, westward, to join the Colorado River, and eventually the Gulf of California. The Santa Cruz flowed in discontinuous segments for at least the past 6,000 years, and until the late 1800s, supported extensive wetlands along the river course.

The Santa Cruz River provided the basis for over 4,000 years of indigenous cultures who settled in the river's watershed and diverted its ephemeral flow into a series of canal systems to support their Mesoamerican crops, including corn, squash, and beans; they also cultivated a type of tobacco. Their fields and canal systems are the oldest and most enduring hydrological and agricultural systems

known in the present-day United States. At Las Capas – the site of a recent Pima County wastewater reclamation facility – archaeologists uncovered an extensive irrigation system, believed to be as old as 3,200 years and contemporaneous with the oldest known in Mexico. Then, the farmers of the Hohokam culture, who arrived in the area between 500 and 1450 CE, constructed their own skillfully-engineered canal system to plant new varieties of crops they brought, while also growing the native tepary bean, agave, little barley, panic grass, and devil's claw. Early farmers also developed areas higher on the mountain slopes (bajadas) for run-off farming and built rock pile mounds and terraces to cultivate agave.

The area continued to be farmed by descendants of the Hohokam when Father Kino, a Jesuit missionary, first arrived in the late 1600s. The Spanish developed their own canals, called acequias, and introduced Old and New World crops, livestock species, and agricultural practices. After the 1854 Gadsden Purchase, Hispanic, Anglo, and non-Anglo farmers of many nationalities practiced flood irrigation on the floodplains above the Santa Cruz River. Throughout the settled history of the basin, different peoples have adopted existing agricultural practices and crops to blend with new methods and species, creating a four-millennium agricultural continuum.

Subsequent natural and human events precipitated the decline of the Santa Cruz River, interrupting the unbroken chain of the riverine agriculture. By the late-1800s, Tucson had become a thriving population center, part of the United States, though still very much tied to its Sonoran Past. A few local entrepreneurs with an eye toward expanding regional agricultural production diverted river water upstream of the Mexican-American community's traditional acequia systems. Their irrigation projects – designed to intercept the subsurface flow of the Santa Cruz – eventually led to massive arroyo cutting and erosion of the river floodplain. Overgrazing, woodcutting, and other resource extraction activities, tied to the growing population and economy, aided in the landscape's transformation. Soon, aquifer levels dropped and farming became a costly and more difficult endeavor in the region. Groundwater pumping and deeper canal structures enabled agriculture to continue until catastrophic floods in 1940 irreparably damaged most of the irrigation systems in the Tucson basin. Modern technologies for water extraction, and population expansion fueled by pro-growth economic development strategies, have placed further demands on the declining aquifer. Urban development has now filled in the once fertile agricultural valley, and the oases of the Santa Cruz River have all but disappeared.

Until the early 1990s, Tucson was the largest city in the United States entirely dependent on groundwater. The city and surrounding suburbs have expanded to include almost a million people, tripling in size since the 1960s. Meanwhile, water tables have dropped precipitously – two hundred feet in less than a century – causing ground subsidence and forcing residents and municipal water companies to dig ever deeper wells.

To satiate the increasing water needs of Southern Arizona, the Central Arizona Project (CAP), a trans-Arizona canal, now brings diverted water from the Colorado River. Completed in 1993, the system of aqueducts, tunnels, pump-stations, and pipelines travel 336 miles from the Colorado River to the border of the San Xavier District, 14 miles southwest of Tucson. The canal provides the largest single source of renewable water in the state, and is also the single largest energy user and carbon emitter because of the pumping stations needed to lift the water over the mountains. The highly mineralized and salinized water, from evaporation, is not suitable for direct use; Tucson and Marana's share of it are pumped into the aquifer to be blended with groundwater and cycled back into the municipal water systems.

Though water use far exceeds the local water supply, Tucson has taken some critical steps to combat urban water issues in this arid region, including building codes that mandate new commercial buildings to supply 50 percent of their landscaping water needs through harvested rainwater, and local non-profit and community groups support private business and residences in harvesting and storing rainwater for domestic and landscaping purposes. Neighborhoods have found new ways of diverting street run-off for tree plantings on city rights-of-way. The University of Arizona's College of Architecture, Planning and Landscape Architecture offers green building and water harvesting programs and showcases several innovative techniques at the Sonoran Landscape Laboratory and across the University campus; UA hydrologists excel in water-quality research and are actively investigating the potential for supplying the city's water needs through harvested and reclaimed water. At the regional scale, Pima County has developed large-scale rainwater and wastewater harvesting projects and effluent recharge projects in the Santa Cruz River. Rainfall on the city exceeds Tucson's yearly water budget, offering immense potential for the capture and use of local water.

## **Subchapters:**

### **A Riverine Oasis**

Ecologically, an oasis is a place where groundwater reaches the earth's surface in an arid environment and creates a permanent or ephemeral riparian habitat. It is also a cultural construct where humans use the scarce local resources to create a sustainable environment in an arid surrounding. This cultural construct of water resources, knowledge, and technology for non-industrialized farming communities to thrive along river courses of the Sonoran Desert has lasted for over 4,000 years. The cultures and landscapes in the U.S.-Mexico borderlands embody the essence of oases for the natural and built environments, shaped by migratory peoples over time.

### **A Bird-Watcher's Paradise**

The elevation gradients of the Sky Island ranges offer a range of habitats for resident and migratory species, including the low riparian corridors, deserts and grasslands, and alpine forests and meadows that provide unsurpassed birding opportunities to see over 400 species of songbirds. The region lies at the northern extent of the ranges for Mexican species such as the elegant trogon, gray hawk, buff-collared nightjar, magnificent hummingbird, and thick-billed parrot. The north-flowing Santa Cruz and San Pedro rivers are critical migratory flyways for over 200 sub-tropical songbirds, as well as wintering and migrating waterfowl. Migratory birds pass through these river corridors during spring (late-March to mid-May) and fall (September to November).

## **Attractions:**

- Agua Caliente Park
- Cienega Creek Natural Preserve
- Esperero Canyon
- Headwaters of the Santa Cruz River, San Rafael Valley
- Kino Environmental Restoration Project
- Las Cienegas Natural Conservation Area
- Madera Canyon
- Patagonia Lake State Park
- Patagonia-Sonoita Creek Preserve
- Potrero Wetlands, Nogales
- Ramsey Canyon/Carr Canyon
- Sabino Canyon
- San Pedro River
- Santa Cruz River
- Sonoita Creek Natural Area
- Sweetwater Wetlands
- Willcox Playa

## Events

- Fiesta de los Aves International Migration Celebration
- National Audubon Society Great Backyard Bird Count
- Nogales Christmas Bird Count
- Patagonia Annual Christmas Bird Count
- Santa Cruz River Research Days
- Southwest Wings Birding and Nature Festival
- Tucson Audubon Christmas Bird Count
- Tucson Bird and Wildlife Festival
- Wings over Willcox

## Related Institutions

- Arizona Hydrological Society
- Arizona Native Plant Society
- Audubon Society
- Biosphere 2
- Cienega Watershed Partnership
- Friends of Madera Canyon
- Friends of the Santa Cruz River
- National Phenology Network
- Nature Conservancy
- Sky Island Alliance
- Sonoran Institute
- Sonoran Joint Venture
- Southeastern Arizona Bird Observatory
- UA Department of Hydrology and Water Resources
- UA School of Geography and Development
- UA School of Natural Resources and the Environment
- U.S. Forest Service
- UA Water Resources Research Center

## 3. Native American Lifeways

The earliest prehistoric cultures in the Santa Cruz region date back to the end of the last ice age, around 11,000 BCE, when Paleo-Indians of the Clovis culture hunted mammoths, camels, ground sloths, and other now extinct mega-fauna, evidenced by the spear points of that era found in this region. A general warm period between 6500 and 3500 BCE might have caused desertification from rivers, streams, springs, and lakes largely disappearing. This period also correlates with an incision of the Santa Cruz River and an abandonment of the region by early indigenous cultures.

At the beginning of the late-Holocene period, circa 3000 BCE, a cooler, wetter period began, and hunter-gatherer groups returned to the area, utilizing the river during their seasonal movements from the uplands to the lowlands. Bones found in their riverbank camps indicate that they hunted bison, which had also returned to the area with the changing climate.

The first maize arrived in the floodplains of Southern Arizona from Mexico around 2000 BCE, beginning a cultural transition that included agriculture to supplement their hunting and gathering practices. It is believed that around 1200 BCE, they were diverting river water through canals for crop-cultivation. During this same late Archaic phase, settlement patterns changed; people began living in larger villages along the floodplains for longer periods of time. The nature of the river irrigation systems necessitated community collaboration to divert water, construct and maintain canals, and control the flow of water to the fields. Archaeological evidence of house groups and social buildings from around 800 BCE indicate that family groups were integrated through public meetings and ceremonies and close social connections were maintained with distant peoples of the Southwest, California and Northern Mexico for trading volcanic glass and seashells to make arrowheads and jewelry.

Between roughly 550 to 750 CE, the Hohokam culture spread from the Phoenix Basin into the Santa Cruz Valley, ushering new styles of artifacts, graphic symbols, burial practices, and architecture – including central plazas and ball courts. New varieties of maize, beans, squash, cotton and tobacco were also introduced from Mexico. Innovative crop-irrigation methods were implemented to sustain both new and existing crops in the area. The people of the Santa Cruz River valley were also influenced by the Trincheras culture to the south, facilitated by the river corridor that served as a trade route for jewelry, pottery, textiles, copper and macaws.

The region experienced a population decline around 1400 CE, perhaps due to population expansion, malnutrition, drought, and floods that destroyed the canal systems. The O’odham peoples (Piman and Papago) moved into the region and practiced both hunting-gathering and farming along the river floodplain. Apaches arrived from the north and began invading the O’odham villages at about the same time as the Spanish arrived from the south to establish mission and cattle ranches in the region.

The O’odham trace their heritage to the Hohokam peoples that lived in the region from 450 to 1450 CE. Related O’odham cultures lived in the greater Southwest, from Jalisco, Mexico to Phoenix, Arizona and from the San Pedro River to the Gulf of California. The O’odham bands are now broken up into four federally recognized, politically and geographically distinct tribes: the Tohono O’odham Nation, the Gila River Indian Community, the Ak-Chin Indian Community, and the Salt River (Pima Maricopa) Indian community. Though not federally recognized, people of another band, the Hia-C’ed O’odham Nation reside throughout southwestern Arizona. All the tribes speak a dialect of the O’odham language, derived from the Uto-Aztecan language group. Throughout history, these peoples lived in small, dispersed villages and cultivated corn, squash, melons and beans with flood irrigation during the summer rains. During winter, they relocated to villages in higher elevation where there was game to be hunted and water provided by springs and wells. They practiced the saguaro wine festival to mark the beginning of the New Year, and utilized both cultivated and wild desert plants such as the devil’s claw and bear grass to weave baskets and produce their farming and cooking implements. Today, the Tohono O’odham Nation has a population of about 30,000 living in 11 districts on 2.8 million acres, making it the second largest Native American Nation in the U.S.

The Yoemem (Yaqui) people are native to the Yaqui Valley in Sonora, Mexico, many of whom traveled north during the early-1900s to escape persecution by the Mexican government, settling in southern Arizona as political refugees. They have since established communities in the Southwest, including the Pascua and Barrio Libre in Tucson, the Yoeme Pueblo in Marana, and Guadalupe on the outskirts of Phoenix, where they continue to practice many of their traditional rituals and ceremonies, including Lent and Holy Week ceremony, a blend of indigenous and Christian beliefs, and Killing-the-Deer ceremony, which takes place on the first anniversary of the death of a relative. In 1964, the Pascua Yaqui Association received two hundred acres of land southwest of Tucson, and in 1978, they gained official recognition as a tribe by the United States government.

## **Subchapters:**

### **Las Capas**

The site of Las Capas, dating back to 1250-750 BCE, is located at the confluence of the Santa Cruz and Rillito rivers, and Canyon del Oro wash. It comprises several layers of deeply buried archaeological remains, of which, the most significant archaeological findings were the irrigation canals dating back to possible 1200 BCE. Excavations at the site revealed layer upon layer of farming plots, irrigation canals, pit houses, over 468 cultural features, 107,129 cultural artifacts, and

proof of over 3,000 years of continuous habitation from radiocarbon dating performed on 46 samples of maize. Las Capas is a unique borderlands site based on the (a) duration and continuity of occupation; (b) thickness of midden deposits, artifacts, and feature densities; (c) intensity of flaked stone reduction; and, (d) high degrees of wear, maintenance, and recycling of ground stone tools. The canal sequences show an increase in length, use, labor requirements, efficiency, water control, and irrigated area, which corresponds with sustaining a larger population than before. These agricultural systems with small-scale water management represent the beginning of complex agricultural societies such as the Hohokam that later flourished in the region.

### **Ak-Chin farming**

Ak-Chin in O’odham means, “at the mouth of the wash,” or “where the wash disappears into the sand,” referring to a method of farming that depends on the ephemeral water of desert washes. During the summer monsoon storms, floodwater rushes off the land surface and channels in low desert washes, and in certain areas, the water spreads out or pools in temporary catchment basins. The O’odham people facilitated this by planting cottonwoods and willows in living fencerows to slow the current and spread the floodwater over a broad area and trap the suspended silt and organic matter. When the waters receded, the O’odham planted seeds of many different traditional crops such as corn, beans and squash on the moist, fertile ground innovatively making the most of their limited water resources.

### **The Apaches**

The Apache tribes of the Southwest were nomadic, hunter-gatherers who arrived in the area from Canada between 1000 and 1500 CE. They were culturally and linguistically related Athabaskan groups that were relatively new arrivals to the area. They traded with but also challenged the sedentary farming pueblo communities as well as the encroaching Spanish for social and political control of the region. Originally buffalo hunters, they became skilled horsemen and raided farms and livestock to defend and expand their territory. The Apaches were adept warriors with desert-adapted strategies of raiding, survival, and endurance, which enabled them to hold out against the Spanish and later Anglo settlers. Early Sonoran Tucson lay at the mercy of Apache raids, and they largely defined the progress of the town. A Spanish decree implemented between 1786 and the 1790s assured that any Indians who lived near Spanish garrisons would be supplied with food, alcohol and old firearms, which ensured a period of relative peace; hundreds of Apaches lived near the community of Tucson. When more Mexican miners, ranchers and settlers arrived to the region, Apache raiding resumed with ferocity. Conflicts between the Apaches, Mexicans, and arriving Anglos continued for a while, as the United States fought with Mexico for control of the territory; some of the most brutal battles had occurred between the United States Military and Apache warriors, who were eventually defeated and many were taken by train to reservations in Florida, Alabama, and later, to Oklahoma. The last band of Chiricahua Apaches, led by Geronimo, did not surrender until 1886, after the region had become the property of the United States.

### **Attractions**

- Amerind Museum
- Arizona Folklore Preserve
- Arizona Historical Society Museum
- Arizona State Museum
- Native Seeds/SEARCH store, seed bank and conservation farm
- Signal Hill petroglyphs
- Tohono O’odham Nation Cultural Center
- Tumamoc Hill

## Events

- Ha:san Bak: Saguaro Harvest Celebration
- Southwest Indian Arts Fair
- Wa:k Powwow (Mission San Xavier)
- Waila Festival
- Yaqui Easter Festival

## Related Institutions

- Arizona Archaeological and Historical Society
- Arizona Historical Society
- Arizona State Museum
- Archaeology Southwest/Center for Desert Archaeology
- City of Tucson Historic Preservation Office
- Gila River Indian Community
- Native Seed/SEARCH
- Pascua Yaqui Tribe
- Pima County Cultural Resources and Historic Preservation Office
- Tohono O’odham Community Action
- Tohono O’odham Nation
- Tucson Indian Center
- UA School of Anthropology
- UA American Indian Studies Program

## 4. Spanish and Mexican Frontiers

Arizona, New Mexico, and California were once the northernmost extent of Spanish colonization in the New World, a conquest that spread out from Mexico City to include vast expanses in North and South America. Jesuit missionary Eusebio Francisco Kino was the first to reach Pimería Alta – the upper lands of the Pimas – lands of the O’odham farmers in present-day northern Mexico and Arizona. Padre Kino, as he is known, arrived in the Santa Cruz River region in 1691 and established a series of missions and visitas, some of which still exist, such as Tumacacori National Historic Park (1691) and Mission San Xavier del Bac (1692).

The Spanish mission strategy was to convert the indigenous peoples to Catholicism and create a productive citizen base to provide basic food and living supplies for the miners, ranchers, and military and increase the wealth of New Spain, which they accomplished by reducing the native peoples into small, sedentary farming communities with a mission building, fields, and surrounding land for raising livestock. The missionaries introduced new crop and livestock species to the region, including annuals such as winter wheat and perennials such as figs, pomegranates, apples, pears, peaches, grapes, olives and date palms. Together, missionaries and the indigenous people blended old and new crops and farming techniques to cultivate during winter and summer. They irrigated fields and orchards with water diverted from the Santa Cruz River and raised cattle, horses, sheep and goats. The new immigrants’ European diseases spread among and decimated the indigenous population.

The Spanish Military established three presidios (military outposts) – Santa Cruz de Terrenate (1776-1780), Tubac (1751-1776 and 1787-1821), and Tucson (1776-1821) – in the Santa Cruz Valley to protect the missions and Spanish settlers from Apache and rebellious Piman attacks, firmly establishing Spanish presence in the northern edge of New Spain.

The Spanish missionaries, military men, and colonists who arrived and settled in the region were a hardened people, adapted to the desert, the Indians, and isolation. They were largely self-sufficient, utilizing the water of the Santa Cruz to cultivate lentils, wheat, barley, chickpeas, onions, and garlic,

as well as native maize, beans, squash, pumpkins, chili, tobacco, and cotton. They built adobe houses within the presidios' compounds to be protected from the raiding Apaches. After Mexican Independence in 1821, new settlers began arriving from the south and establishing their lives and families in the rugged frontier of the Santa Cruz River valley, who remained in the region even after the 1854 Gadsden Purchase that transferred Tucson from Mexico to the United States. These Sonoran families were the first freighters, cattlemen, farmers, Indian fighters, and merchants, who became the citizenry and political leaders of a new nation, building schools and churches and exerting profound influence in early Tucson, as quoted by historian Tom Sheridan, "In Tucson, the Mexican elite ran some of the largest business, founded many of the greatest ranches, and held the most important political offices in town."

In the ensuing decades, immigrants arrived from northern Mexico, Europe and elsewhere in the United States. Newly arrived Anglo entrepreneurs competed with resident Mexican families for access to water, land, and a share of Tucson's emerging business sector. Porfirio Díaz's politics in Mexico drove many landless peasants north across the border to settle in Tucson and the surrounding areas, beginning a cross-border familial and cultural connection with Mexico that strengthened the Sonorensis culture of Southern Arizona.

When the railroad arrived in 1880, the region's economy plummeted as Mexican businessmen could not compete with the cheaply freighted goods. The expanding cattle population overgrazed rangelands, over-zealous irrigation projects dropped surface water levels on the Santa Cruz River, and the mining industry suffered, adversely affecting many of the Hispanic Tucson families. As Tucson grew, the Anglo influence overwhelmed the early Hispanic prominence; and, though many families firmly established themselves in Tucson's middle class, today, the thriving Sonoran culture is seen mostly in South Tucson.

The railroads from Mexico and the United States meet in the Santa Cruz Valley at the twin cities of Nogales, Arizona and Nogales, Sonora. Mining ore and cattle both cross the border, and Nogales also serves as a major port of entry for produce entering the United States from the agricultural regions of northern Mexico.

The City of Tucson has several historic buildings that feature old Hispanic architecture in adobe and wood. The city also celebrates its rich Mexican heritage through food, rodeo, music, dance, art, and celebration of Mexican holidays. However, along with the flavors and sounds of a rich Mexican culture, the borderlands also present moral and ethical challenges. Each year, many Mexican migrants die in the hot desert trying to cross the border illegally for a chance at a better life; and, Tucson continues to struggle with issues of food insecurity, discrimination and poverty among its Mexican population.

## **Subchapters:**

### **San Xavier del Bac Mission**

Established in 1692 by Jesuit missionary Eusebio Francisco Kino, it is one of the oldest European constructions in Arizona, and church services are attended to this day by the original peoples of the area. Kino located the mission in the O'odham village of Bac, meaning, "where the water merges from its underground flow." Though the adobe church was constructed after the Jesuits were expelled from the region and all Spanish colonies, it is still one of Kino's most famous missions. Beginning in 1783, architects and artisans from Mexico and local O'odham peoples fired adobe

bricks and raised the cross-shaped chapel, convent, and bell towers. Mission orchards and fields as well as the surrounding desert provided the sustenance for the resident indigenous community. The San Xavier del Bac Mission offers baptisms and weddings solely to the Tohono O’odham people, though services are open to others.

### **The Carillo Gardens (1885-1903)**

Fed by natural springs, the Carillo Gardens formed a lush and luxurious oasis in the center of downtown Tucson, comprising of extensive rose gardens, fruit trees, man-made lakes, a saloon, shooting gallery, restaurant, dance pavilion, private rooms, twelve bath houses with hot baths, a zoo, and a circus where “upstanding” Tucson citizens held formal dance parties with orchestral music. It was also the place to enjoy picnics, go boating, eat ice cream, and listen to music on weekend afternoons.

The founder, Leopoldo Carillo, was a wealthy Tucson rancher and businessman born in Sonora, Mexico in 1836. He had traveled widely for his business, and wanted to build gardens in Tucson like the ones he had seen in California. So, he fashioned the public park on eight acres near the Santa Cruz River, where he developed three lakes and planted 2,000 grape vines, 500 peach trees, 200 quinces, 60 pomegranates and 9 apricots. His rose garden was one of the finest in Tucson, and his creation symbolized the end of the frontier days of Tucson and a rise into a regal, desert city.

### **Luisa Espinel Rondstadt**

A professionally trained musician and dancer, Luisa Espinel exemplified Tucson’s Mexican elite in the early 1900s. Her father was the leader of Club Filarmónico, one of Tucson’s most famous orchestras, and she grew up performing in the Saturday Morning Musical Club. Luisa had trained and performed in San Francisco, Paris and Madrid, and journeyed throughout the Spanish countryside learning traditional songs and dances and experiencing the roots of Hispanic folk music. Her name would eventually become a symbol of Hispanic folk music across Europe and the United States, though Tucson remained her heart’s anchor. “There were summer evenings I remember when the moon shadows of the grape leaves latticed the arbor, and my father sitting there, his face illumed, would accompany songs on his guitar and later tell us marvelous stories of when he was a boy,” she would recall. Luisa later settled in Los Angeles, performing in the Olvera Theater and teaching music. In 1946, she published *Canciones de Mi Padre*, a collection of Mexican folk songs dedicated to her father and her childhood in Tucson.

### **Attractions**

- Barrio Historico
- Calabazas
- Cordova House
- DeGrazia Chapel
- El Rio Neighborhood Center Mural
- El Tiradito Wishing Shrine
- Guevavi
- Juan Bautista de Anza National Historic Trail
- Tubac Presidio
- Presidio San Agustín de Tucson
- San Xavier del Bac Mission
- Sosa-Carillo-Fremont House History Museum
- St. Augustine Cathedral
- San Agustín Mission Garden
- Stone Avenue Temple
- Tumacácori National Historic Park

## Events

- Cinco de Mayo Festival
- Día de Los Muertos Parade
- Día de San Juan Celebration
- Fiesta de los Vaqueros Rodeo and Parade
- Fiesta de San Agustín
- Fiesta de Tumacácori
- Mexican Independence Day
- Tubac Anza Days
- Tucson International Mariachi Conference

## Related Institutions

- Arizona Historical Society
- Arizona State Museum
- City of Tucson Historic Preservation Office
- Friends of Tucson's Birthplace
- National Park Service
- Missions Initiative
- Pima County Cultural Resources and Historic Preservation Office
- Santa Cruz Valley Heritage Alliance
- Tubac Historical Society
- Tucson Hispanic Chamber of Commerce
- UA School of Anthropology
- UA Center for Latin American Studies

## 5. A Working Landscape

### Agriculture

Irrigation from surface flow ceased in the early 1900s as the water table dropped and the river channel incised into the floodplain. Today, many farmers in the greater Tucson region still farm using groundwater, which is supplemented by CAP water from the Colorado River. The region grows cotton, wheat, alfalfa and pecans; there are also fruit orchards and vineyards in some locations. Pecan production is highest in Green Valley, south of Tucson, where 4,500 acres of pecan trees make it one of the largest irrigated pecan orchards in the United States. Farms in the Marana area, northwest of Tucson produce cotton and wheat; a durum wheat produced in the area is exported to Italy to make flour for pasta. The San Xavier Co-op Farm on the Tohono O'odham Nation has started cultivating traditional crops of tepary beans, squashes, and melons as well as alfalfa. Subsistence farming of native crops has great economic and environmental value but factory farming water-intensive and non-native plants defeats the concept of sustainability, as these farming practices abuse resources and adversely impact the climate.

The region supports several local farmers' markets, pick-your-own farms, wineries, research and conservation farms, agriculture- and food-related non-profit organizations, and annual planting and harvest festivals, making it a vital source of food production. Native Seed/SEARCH is a local non-profit that has worked since 1983 to conserve, document, and distribute traditional crop varieties to prevent the loss of agricultural diversity. They maintain a seed bank of 2,000 different arid-land adapted crops and operate a 60-acre conservation farm in Patagonia. The Kino Heritage Fruit Trees project, supported by the National Park Service, the Arizona-Sonora Desert Museum, Desert Survivor's Nursery, and Native Seed/SEARCH promotes heritage fruit production through collecting, identifying, and propagating fruit trees descended from the original Spanish stock in southern Arizona and northern Sonora, Mexico. The University of Arizona also operates several agricultural experiment farms and conducts research on arid-land crops, irrigation, and range management. The Santa Cruz Valley region has a vibrant spirit of agriculture, heritage foods, and local food resilience.

## Attractions

### Farmers' Markets

- Bisbee Farmers' Market
- Broadway Village Farmers' Market
- Civano Farmers' and Artisans' Market
- Community Food Bank Farmers' Market
- Douglas Mercado Farmers' Market
- Downtown Mercado Market
- El Barrio Farmers' Market
- Elfrida Farmers' Market
- El Presidio Mercado
- El Pueblo Farmers' Market
- Green Valley Village Farmers' Market
- Horse Country Farmers' Market
- Jesse Owens Park Farmers' Market
- Loft Cinema Farmers' Market
- Marana Farmers' Market
- Nogales Farmers' Market
- Our Garden Produce
- Oro Valley Farmers' Market
- Plaza Palomino Saturday Market
- Rincon Valley Farmers' and Artisans' Market
- Santa Cruz River Farmer's Market
- Sierra Vista Farmers' Market
- Sonoita Growers' Market
- St. David Farmers' Market
- Tubac Farmers' Market
- Tucson Farmers' Market, St. Phillips Plaza
- Tucson Farmers' Market East
- Tucson Farmers' Market at Maynards

### Community Gardens, Community Supported Agriculture and Pick-Your-Own Farms

- Agua Linda Farm, Amado
- Apple Annie's Orchard and Produce, Willcox
- Apollo Garden, Tucson
- Arizona Children's Association Garden, Tucson
- Avalon Organic Gardens, Tumacacori
- Beantree Farm
- Benedictine Monastery Garden, Tucson
- Blue Moon Garden, Tucson
- Briggs and Eggers Orchards, Willcox
- Chaverim Garden, Tucson
- Doublecheck Ranch CSA, Winkelman
- Down on the Farm CSA, Tucson
- Forever Young Farm, Amado
- Josh's Foraging Fowls CSA, Willcox
- Howard's Orchard, Catalina
- Manso Elementary School Garden
- Rezonation Farm, Marana
- Richcrest Farms/Vinaigretta, Cochise
- Sleeping Frog Farm, Cascabel
- Sonoran Kitchen Gardens, Tucson
- Suhr Family Farm, Cochise
- Sunizona Family Farm, Willcox
- Tucson CSA
- Tucson Village Farm, Tucson
- UA Community Garden

### Wineries

- Arizona Vineyards
- Callaghan Vineyards, Sonoita
- Charron Vineyards, Vail
- Dark Mountain Winery, Vail
- Sonoita Vineyards, Sonoita
- Village of Elgin Winery, Elgin

### Research and Conservation Farms

- Campus Agricultural Center, University of Arizona, Tucson
- Marana Agricultural Center, University of Arizona, Tucson
- Native Seed/SEARCH Conservation Farm
- West Campus Agricultural Center, University of Arizona, Tucson
- Ramona Farms

- Santa Rita Experimental Range, University of Arizona, Pima County
- San Xavier District Farmers' Co-op
- West Campus Agricultural Center, University of Arizona, Tucson

### Events

- Autumn Harvest Festival, Tucson
- Blessing of the Seeds, Native Seed/SEARCH Conservation Farm, Patagonia
- Blessing of the Vineyard Festival, Elgin
- Blessing of the Harvest Festival, Elgin
- La Fiesta de los Chiles
- Pima County Fair
- Southern Arizona Food and Wine Festival
- Willcox Christmas Apple Festival
- Willcox Wine Country Fall Festival

### Related Institutions

- Baja Arizona Sustainable Agriculture
- Edible Baja Arizona
- City of Tucson Historic Preservation Office
- Community Gardens of Tucson
- Cultivate Santa Cruz
- Food Conspiracy Co-op
- Friends of Tucson's Birthplace
- Native Seed/SEARCH
- Pima County Cultural Resources and Historic Preservation Office
- Pima County Food Alliance
- Santa Cruz Valley Heritage Alliance
- Sonoran Permaculture Guild
- Slow Food Southern Arizona
- Sabores Sin Fronteras
- Tucson Community Food Bank
- Tucson Community Supported Agriculture
- Tucson Organic Gardeners
- UA College of Agriculture and Life Sciences
- UA Cooperative Extension
- UA Southwest Center

### Ranching

The Santa Cruz Valley has had a long ranching tradition, first introduced during the Spanish colonial and mission period along with farming, making them a mainstay of the economy for the last 300 years.

The earliest ranches were centered round the Spanish missions, beginning in 1687, comprising of desert-born and bred cattle called criollos that adapted to the local vegetation and harsh arid climate. Later, the ranches located close to the presidios; and eventually, were established by owners of large Spanish land grants. The criollos dominated ranges in northern Mexico and the southwestern U.S. until the late-nineteenth century. After the Gadsden Purchase and the Civil War, American and Mexican ranchers established many new ranches along the Santa Cruz and its tributaries, adopting desert-adapted practices and livestock from the Mexican vaquero tradition and introducing European breeds and ranching practices.

Ranchers use a mosaic of private land and Federal, state, and Tribal lands to raise cattle. Some of the largest ranches in the valley are the Empire, Cienega, Babocomari, Sopori, San Ignacio de Canoa, San Rafael, Buena Vista, El Potrero, Rhodes, Reventon, Amado, Moyza, Rancho Seco, Santa Lucia, Arivaca, McGee, and Santa Rita.

Today, Hispanic, American, Mexican, and Native American ranching continues in the region as a living and historical tradition. With increases in population, demand for water, urban and urbanizing issues, and greenhouse gas emissions, ranching can no longer occur in the manner it did a hundred years ago. Thus, many ranching communities have formed coalitions to manage their ranches as open space, to increase the health of their livestock and rangelands, to preserve ranching traditions, and to protect habitat for plants and wildlife. The Sonoran Desert Conservation Plan identifies ranching as one of its six elements for conservation. Pima County has also bought several ranches to maintain them as open space in perpetuity, while allowing ranchers to continue with their traditional activities and preventing unscrupulous land speculators from fragmenting large open areas and thereby desecrating its valuable natural resources. This partnership has preserved critical habitat for a number of species, proving to be a benefit for the ranchers and the County. Also, conservation easements on many ranches in the Santa Cruz and San Pedro River valleys ensure that they will remain natural open space in the future.

## **Attractions**

### **Western Heritage**

- Ranchers' Heritage Center, 1904 Courthouse in Nogales
- San Rafael State Park
- Sonoita Rodeo Grounds
- Tombstone

### **Ranches open to the Public**

- Canoa Ranch
- Empire Ranch
- La Posta Quemada Ranch, Colossal Cave Mountain Park

### **Conservation Ranches**

- Babacomari Ranch
- Canoa Ranch
- Empirita Ranch
- King's Anvil Ranch
- Lazy J-2
- O-O Ranch
- San Rafael Ranch
- Sands Ranch
- Santa Lucia/Rancho Seco
- Six-Bar Ranch
- 47 Ranch

## **Events**

- Empire Ranch Roundup
- Town of Marana Western Heritage Committee Events

## **Related Institutions**

- City of Tucson Historic Preservation Office
- Altar Valley Conservation Alliance
- Arizona Land and Water Trust
- Borderlands Habitat Restoration Initiative
- Malpai Borderlands Group
- Pima County Cultural Resources and Historic Preservation Office
- The Nature Conservancy
- Town of Marana Western Heritage Committee

## **Mining**

The 1736 discovery of silver at Planchas de Plata, near the O'odham village of Arizonac, gave the region an influx of Spanish colonists with dreams of prospecting for gold and silver. Soon, mines opened in the Santa Rita Mountains, the Guevavi area near Nogales, Arizona, and the Arivaca Township, southwest of Tucson.

The Piman Revolt of 1751 forced many of the early miners to flee the area, as did later Apache attacks. During the 1800s, small-scale mining continued in the region under the increased protection of the presidios; and, prospectors established new mines around Tubac, Tumacácori, and along Arivaca and Sonoita Creeks. The continued Apache attacks and being a good distance from supply centers kept the mineral yield low until the region became part of the United States.

In the late 1800s, Anglo mining companies such as the Sonora Exploration and Mining Company, the Hermosa Mining Company, and the Duquesne Mining and Reduction Company began operating in the region; and, a series of mining booms and busts followed with the Mowry Mine at Patagonia, Hermosa Mine in the Santa Rita Mountains, and the mining towns of Harshaw, Washington Camp, and Greaterville. During the same time, as the age of electricity and WWI increased demand for copper throughout the United States, the Helvetia Mining Company and the Twin Buttes Mining and Smelting Company began mining the mineral. Soon, others followed, but with the decline in demand and price, mining ghost towns sprang up and can still be found throughout the mountains of southeastern Arizona.

Copper mining resurged in the Santa Cruz Valley during WWII but declined during the 1980s due to a global depression in copper prices. More recently, there has been a surge in prices to stimulate renewed interest in old and new mine sites in the area.

## **Attractions**

- Arizona History Museum
- Bisbee Mining and Historical Museum
- Ghost towns of Harshaw, Mowry, Washington Camp and Duquesne
- Morenci Copper Mine
- Queen Mine Tours, Bisbee

## **Related Institutions**

- Arizona Historical Society
- Pima County Cultural Resources and Historic Preservation Office
- UA Department of Mining and Geological Engineering
- UA Lowell Institute for Mineral Resources
- UA Western Mining Safety and Health Training Resource Center

## **Military**

In 1856, shortly after the Gadsden Purchase, the U.S. Military established an army post to protect early-American farms and ranches from Apache attacks, thus beginning a long history of presence in the region, culminating in today's modern training facilities of Fort Huachuca and Davis-Monthan Air Force Base.

Early military activity in the region included skirmishes with the Apaches, a few fights between Union and Confederate soldiers during some of the farthest-west conflicts of the Civil War, and defense of the U.S.-Mexico border during the 1910 Mexican Revolution. During WWI, the 10<sup>th</sup> Cavalry Buffalo Soldiers were stationed at Nogales to protect the border. After WWI, all army posts in Arizona were closed except for Fort Apache and Fort Huachuca. With potential involvement in WWII, Davis-Monthan Field – the Tucson Municipal Airport – was taken over by the military. Throughout the war, Davis-Monthan, and the nearby Marana Field and Ryan Field, served as pilot-training bases for military bombers and fliers. At war's end, Davis-Monthan Air Force Base was selected as a suitable site to store many decommissioned aircraft because of its dry climate and available open space. During the Cold War, Davis-Monthan served as the base for many operations; it continues to play a critical role in global defense and the local economy. The base features Aerospace & Arizona Days, an annual airshow of historic and modern aircrafts.

Today, the Pima Air and Space Museum (a) has become an international tourist attraction, featuring many of the early warplanes; (b) is home to the Arizona Aviation Hall of Fame; and, (c) is the world's largest, non-government-funded aerospace museum.

The Titan Missile Museum in Sahuarita, a National Historic Landmark, highlights the role of the Intercontinental Ballistic Missiles during the Cold War.

In 2011, Business Facilities Magazine identified Tucson as the 6<sup>th</sup> largest Aerospace/Defense Manufacturing Cluster. The city has also received the award of Best Southwest Cities for Defense (2010) and Top Ten Cities for Defense Jobs (2009).

### **Attractions**

- Arizona Historical Society
- Cochise Stronghold
- Davis-Monthan Air Force Base
- Fort Bowie National Historic Site
- Fort Huachuca
- Fort Lowell Museum
- Museum of the Horse Soldier
- Pima Air and Space Museum
- Pinal Airpark
- Ryan Field
- Titan Missile Museum
- Tubac Presidial State Historic Park and Museum

### **Events**

- Aerospace & Arizona Days
- Arizona Aircraft Expo
- Thunder and Lightning Over Arizona

### **Related Institutions**

- Arizona History Museum
- Davis-Monthan Air Force Base
- Fort Huachuca
- Raytheon
- UA Army ROTC
- U.S. National Park Service
- UA Department of Military Aerospace Studies

## **6. Expression of Many Cultures**

From Native American Nations to Spanish, Hispanic, American and now immigrants from around the world, Southern Arizona exhibits a vibrant artistic heritage that emerged from its cultural diversity and inspiring landscape, representing a long history of regionally-inspired artistic expression and a global melting pot of media, styles, ideas, and creativity, as featured in festivals like Tucson Meet Yourself and others. The region showcases such highlights as the DeGrazia Museum of the Sun; Ansel Adams archives at the UA Center for Creative Photography; Chicano murals in South Tucson; and the Museum of Contemporary Art. There are also countless private art studios, galleries, and performing arts venues, allowing the region to be a center of artistic expression, education, and engagement.

The region's Native American Nations display their heritage through the Waila dances and woven baskets of the Tohono O'odham, and deer dances and musical instruments of the Pascua Yaqui Tribe, among others. The Jesuit missions of Tumacacori and San Xavier del Bac, as well as several churches in town reflect the mission and Spanish influences on the region.

Over the years, western cowboy and folk arts have emerged from the ranching heritage of the borderlands.

### **Subchapters:**

#### **Chicano Murals of Tucson**

Old and new Spanish, Hispanic and Chicano artistic expression can be found throughout the region. The mural project began in south Tucson in the mid-1970s as part of a broader movement throughout the American West and Southwest, documenting and celebrating Chicano identity and political victories, such as the neighborhood centers in the Mexican American areas of Tucson. The murals can be found in both public and private domains, and reveal the symbolic as well as the real, mysterious, wondrous, and creative spirit of the region's multi-cultural communities. A guide published by the Tucson-Pima Arts Council in 1993 identified 135 murals, some of which have since disappeared, only to be replaced by new ones every year. The Tucson Murals project and blog provide maps, information, photographs and stories of the region's many faces.

#### **Ansel Adams**

Iconic American photographer Ansel Adams (1902–1984) co-founded the UA Center for Creative Photography in 1975 where his works are displayed, spanning over 70 years and a range of artistic styles including portraits, landscapes, architecture, and still life. In 1946, Adams had received a Guggenheim Fellowship to photograph United States National Parks and Monuments, a body of work very central to his career. Archives at the Center for Creative Photography include more than 2,500 of his fine prints, as well as unpublished writings and correspondence, interviews, publications, negatives, transparencies, and photographic equipment. Adams was also deeply committed to the conservation movement, serving on the Sierra Club Board of Directors for more than 37 years.

#### **Tucson Meet Yourself Festival**

The annual Tucson Meet Yourself festival celebrates over sixty nationalities and their unique art, dance, music, food, traditions, and culture, giving these diverse communities the opportunity to represent and express their unique heritage and blended identities.

## Attractions

### Museums and Galleries

- Amerind Museum
- Arizona Folklore Preserve
- Arizona Historical Society Museum
- Arizona-Sonora Desert Museum
- Arizona State Museum
- DeGrazia Museum in the Sun
- Mini Time Museum of Miniatures
- Museum of Contemporary Art
- Pima County Sports Hall of Fame
- Sonoran Glass School
- Southern Arizona Transportation Museum
- Southern Arizona Watercolor Guild Gallery
- Temple of Music and Art
- Tohono Chul Park
- Tubac Center for the Arts
- Tucson Mural Maps and Tours
- Tucson Murals Project
- Tucson Museum of Art and Historic Block
- Tucson Rodeo Parade Museum
- UA Center for Creative Photography
- UA Museum of Art
- UA Poetry Center

### Performing Arts Venues

- 2<sup>nd</sup> Saturdays
- Beowolf Alley Theatre
- Fox Tucson Theatre
- Gaslight Theatre
- Rialto Theatre
- Rogue Theatre
- Tucson Convention Center
- Temple of Museum and Art
- UA Centennial Hall
- UA Presents

### Events

- All Soul's Procession (Day of the Dead Parade)
- Loft Film Fest
- Tucson Meet Yourself

### Related Institutions

- Arizona Friends of Chamber Music
- Arizona Onstage Productions
- Arizona Opera
- Arizona Theatre Company
- Ballet Arizona
- Ballet Tucson
- Batucaxe
- Broadway in Tucson
- Carnival of Illusion
- Downtown Tucson Partnership
- Flam chen
- New ARTiculations Dance Theatre
- O-T-O Dance
- Old Pueblo Playwrites
- Pima Community College Center for Arts
- Sonoran Glass School
- Southern Arizona Watercolor Guild
- Tohono O'odham Nation Cultural Center and Museum
- Tombstone Association for the Arts
- Tucson Art Information
- Tucson Arts Brigade
- Tucson Jazz Society
- Tucson Meet Yourself
- TucsonMurals.org
- Tucson Pima Arts Council
- Tucson Symphony Orchestra
- UA Center for Creative Photography
- UA Poetry Center
- UA School of Art
- UA School of Dance
- UA School of Theatre, Film and Television

## 7. Health and Fitness

The arid climate of Southern Arizona had made it a health destination since the 1880s, attracting patients with pulmonary and respiratory diseases from the east coast. After World War I and into the late-1920s, it had also become a destination for people suffering from tuberculosis. From its early sanitarium and the Mexican and Native American herbal traditions to the internationally recognized medical research facilities at UA, Tucson has had a long history of being a healing location.

Founded in 1967, the UA College of Medicine is one of the leading primary care and health research medical schools in the U.S., offering state-of-the-art medical education, patient care, and groundbreaking research. The college is part of the UA Health Sciences Center, which is a network of health- and healthcare-related organizations and entities across Arizona that offers treatment and education in every field of health and medicine, housing renowned research and education centers, such as the (a) Dr. Andrew Weil's Arizona Center for Integrative Medicine, designated as one of 10 centers of excellence in 2008; (b) UA Cancer Center, established in 1976; (c) Arizona Center on Aging; (d) Arizona Emergency Medicine Research Center; (e) Valley Fever Center for Excellence; (f) Arizona Telemedicine Program, (g) Arizona Aids Education and Training Center; (h) Arizona Respiratory Center; (i) Sarver Heart Center; (j) UA Arthritis Center; and (k) Steele Children's Research Center. The region is also home to several other hospitals, healing centers, and medical research institutions.

Southern Arizona is internationally renowned for its spas, health resorts, and wellness hotels that offer healthy-living programs of guidance, relaxation, and recreation. Canyon Ranch, Miraval, JW Marriott Starr Pass, Hilton Tucson El Conquistador Golf and Tennis Resort, Casino Del Sol Resort and Spa, Tubac Golf Resort and Spa, Loews Ventana Canyon Resort, Omni Tucson National Resort and Spa, Westward Look Wyndham Grand Resort, and Westin La Paloma Spa are a few of the well-known names where one can enjoy yoga and meditation classes, attend lectures by local health experts, enjoy massages and healing therapies, play golf, or hike/bike the surrounding desert trails.

The Sonoran Desert and Sky Islands offer unlimited recreational possibilities. Around 86 percent of Pima County is open land, owned by Federal, state, local and Native American jurisdictions where unobstructed scenic landscapes and thousands of miles of back country trails are available for hiking, backpacking, bird-watching, riding, and cycling. The Santa Catalina, Rincon, Santa Rita, Tucson, and Tortolita mountain ranges cradle the greater Tucson region with endless camping, hiking, riding, skiing, swimming, rock climbing and other recreational opportunities. The elevation gradients from low desert to high-altitude, alpine forests provide venues for every season. These include Mount Lemmon, Sabino Canyon, Madera Canyon, Saguaro National Park, Kartchner Caverns State Park, and the local section of the 1,200-mile Juan Bautista De Anza National Historic Trail that begins in southwestern Arizona and follows the Santa Cruz River through Tucson.

Bicycling Magazine ranked Tucson as one of the top cycling cities in the United States because of its urban bikeways, Pima County's extensive trail system, and Southern Arizona's mild climate. Featured events include Southern Arizona's premier El Tour de Tucson, a 110-mile road bike event that attracts close to 10,000 participants each year; the Annual Tucson Bicycle Classic, a three-day USA cycling stage race; and the popular annual April Bike Fest. Mountain biking trails include venues in Pima County, such as the Aspen Draw trail near the top of Mount Lemmon, the Catalina State Park trail system, the Elephant Head Trail in the Santa Rita Mountains, Chiva Falls trail in the Rincon Mountains, and the 800-mile La Milagrosa that traverses Arizona from Mexico to Utah.

## Health Attractions

### Hospitals, Medical Centers and Medical Research

- St. Joseph's Hospital
- St. Mary's Hospital
- Tucson Medical Center
- UA College of Public Health
- UA Medical Center

### Resorts and Spas

- Canyon Ranch
- Casino Del Sol Resort and Spa
- Hilton Tucson El Conquistador Golf and Tennis Resort
- JW Marriott Starr Pass
- Loews Ventana Canyon Resort
- Miraval
- Omni Tucson National Resort and Spa
- Tubac Golf Resort and Spa
- Westin La Paloma Spa
- Westwood Look Wyndham Grand Resort

### Health-Related Institutions

- Pima County Office of Public Health
- St. Joseph's Hospital
- St. Mary's Hospital
- Tucson Medical Center
- Tohono O'odham Nation Department of Health and Human Services
- UA Arizona Aids Education and Training Center
- UA Arizona Center on Aging
- UA Arizona Center for Integrative Medicine
- UA Arizona Emergency Medicine Research Center
- UA Arizona Hispanic Center of Excellence
- UA Arizona Prevention Research Center
- UA Arizona Public Health Training Center
- UA Arizona Respiratory Center
- UA Arizona Telemedicine Program
- UA Arthritis Center
- UA Asthma Clinical Research Center
- UA Cancer Center
- UA Canyon Ranch Center for Prevention and Health Promotion
- UA Center for Rural Health
- UA College of Public Health
- UA Global Health Institute
- UA Health Sciences Center
- UA Medical Center
- UA Sarver Heart Center
- UA Skin Cancer Institute
- UA Sonoran UECCD
- UA Steele Children's Research Center
- UA Valley Fever Center for Excellence
- UA VIPER

## Fitness Attractions

### Hiking

- Rincon Mountains
- Saguaro National Park
- Santa Catalina Mountains
- Santa Rita Mountains
- Tortolita Mountains
- Tucson Mountains

### Biking

- Arizona Trail
- Aspen Draw Trail
- Brown Mountain Loop Trail
- Bugs Springs Trail

- Catalina Highway
- Catalina State Park
- Chiva Falls Trail
- Elephant Head Trail
- Molino Basin Trail

- Rillito River Park Trail
- Santa Cruz River Park Trail
- Starr Pass
- Tucson Urban Loop

### **Horseback Riding**

- Apache Spirit Ranch
- Circle Z Ranch
- Elkhorn Ranch
- Hacienda del Sol Guest Ranch Resort
- Historic C.O.D. Ranch
- Paniolo Ranch

- Pantano Riding Stables
- Pusch Ridge Stables
- Sunglow Ranch
- Tanque Verde Guest Ranch
- Triangle T Guest Ranch
- White Stallion Ranch

### **Rock Climbing**

- Carr Canyon
- Catalina State Park
- Cochise Stronghold
- Elephant Head
- Gates Pass
- La Milagrosa Canyon
- Mendoza Canyon

- Red Boulder
- Sabino Canyon
- Saguaro National Monument
- Silverbell Boulders
- Table Mountain
- Tortolitas Boulder
- Twin Buttes

### **Fitness Events**

- April Bike Fest
- Arizona Winter Circuit Hunter Jumper Horse Show
- El Tour de Tucson
- Father's Day Weekend Golf Classic
- Holualoa Firecracker Triathlon
- Mount Lemmon Hill Climb

- Saguaro National Park Labor Day Run
- Tour of the Tucson Mountains
- Tucson Heart Group Cinco de Mayo 10K Fitness Festival
- Tucson Marathon and Half Marathon
- Tucson Triathlon

### **Fitness-Related Institutions**

- Greater Arizona Bicycling Association, Tucson Chapter
- Green Valley Recreation Hiking Club
- Sonoran Desert Mountain Bicyclists
- Southern Arizona Hiking Club
- Southern Arizona Mountain Bike Association

- Southern Arizona Roadrunners
- Tucson Climber's Association
- Tucson Orienteering Club
- Tucson Saddle Club
- Tucson Volkssport Walking Klub
- University of Arizona Ramblers

## **8. Research and Innovation in a Desert City**

Tucson is home to world-renowned research conducted by several scientists in a range of areas at the University of Arizona and several private and public institutions.

Founded as a land-grant institution in 1885, the University of Arizona is the state's oldest university, well-known for research, receiving over \$600 million in annual research grants and more NASA grants for space exploration than any other institution in the U.S. Currently, UA is actively participating in the: Cassini, Phoenix Mars Lander, HiRise camera (orbiting Mars), MESSENGER mission to Mercury, and OSIRIS Rex (the first U.S. sample return mission to an asteroid). For the 2013-14 Fulbright U.S. Student Program, UA received 10 grants in the category of 'Doctoral/ Research Institutions' (see <http://us.fulbrightonline.org/top-producing-institutions>).

Private institutions conduct research in hydrology, environmental assessment, mining, statistics, engineering, defense, and many other fields, to keep Tucson viable as a 21<sup>st</sup> century center of emerging technology. In 2010, Tucson was ranked 19<sup>th</sup> on Forbes' List of 100 Most Innovative Cities in the U.S..

### **Laboratory of Tree-Ring Research**

In 1937, A. E. Douglass established the Laboratory of Tree-Ring Research at the University of Arizona and founded the science of dendrochronology (tree-ring research). In over 75 years since, the laboratory has amassed over two million tree specimens and become the preeminent center for advancing techniques, conducting research, and applying dendrochronology to a wide array of social and environmental challenges. The laboratory's researchers have provided insights into climate change through studies on drought and monsoon patterns in the Southwest, archeological ruins and the behavior of past human cultures, forest function, fire history, insect-forest dynamics, reconstruction of past hydrological events, the environment, and climate and ecological processes.

### **Tumamoc Hill and the Desert Laboratory**

Established in 1903 through a Carnegie Foundation Grant, the Desert Botanical Laboratory on Tumamoc Hill has generated cutting-edge research on desert plant physiology and ecology with such events as (a) botanist Effie S. Spalding's first paper on saguaro cactus and water storage, published in 1905; (b) botanist Volney Spalding's 1905 establishment of the world's oldest permanent plant quadrants to study saguaros and the measuring of saguaros at regular intervals throughout the last century, beginning in 1908; (c) creating the Tumamoc Ecological Reservation Project in 1906, the first of its kind in the world to observe the recovery of native vegetation and study the long-term structure and function of plant communities in the desert environment; and, (d) the 1907 publishing of the scientific journal *The Plant World* (later to become *Ecology*) to feature some of the nation's foremost ecological papers. In 1960, the University of Arizona purchased Tumamoc Hill to promote scientific research and education. Scientists currently conduct physiology, phenology, and mutualism relationships on dozens of plant species. Other research includes archeological and early human habitation; and the UA College of Science's *Tumamoc: People and Habitats* program, which includes the Desert Laboratory, the Alliance for Reconciliation Ecology, and cultural and archaeological research and activities.

Tumamoc Hill is the only three-time designated National Historical Landmark in the country, designated in (a) 1976 for the buildings and small permanent ecology study areas of the Desert Botanical Laboratory's first decade; (b) 1987, recognizing the entire ecological reservation of roughly 860 acres and its significance since 1906; and, (c) 2010 in recognition of the indigenous cultures, history, artifacts, pictographs, mesa-top settlement, and the two-kilometer stone wall, with an additional designation of "Tumamoc Hill Archeological District of the United States of America.

## **Biosphere 2**

Biosphere 2 is an internationally-recognized research institute owned by UA to study the Earth, which includes quantitative experiments on global climate change. The 7,200,000 cubic foot glass enclosure with 6,500 windows sits on 3.14 acres and holds five ecosystems: (a) an ocean with a coral reef, (b) a mangrove wetlands, (c) tropical rainforest, (d) savannah grassland, and (e) cool fog desert.

Several changes in ownership had occurred between the 1800s and the 1970s before Space Biospheres Ventures bought it in 1984 and constructed the current facility in 1986 to develop self-sustaining space-colonization technology. Two well publicized missions between 1991 and 1994 sealed people inside the glass structure to study survivability, resulting in meaningful research on the understanding of ecology.

In 1994, the property changed hands again to have Columbia University manage it from 1996-2003 when the mode of scientific research changed to include curricula on earth systems science and studying the effects of carbon-di-oxide on plants. After leasing the facility for four years, the University of Arizona bought it in 2011.

Biosphere 2 receives thousands of visitors a year who come to see its architecture, experience its ecosystem experiments, and be inspired by the complexity and mysteries of Biosphere 1, i.e., the Earth.

## **Bio 5**

The University of Arizona Bio 5 was launched in 2001 to harness the collaborative power of five core disciplines: Agriculture, Engineering, Medicine, Pharmacy, and Science, to find innovative solutions to the great biological questions affecting humanity. Researchers collaborate to prevent and cure diseases, address environmental issues, and provide for global hunger. The key initiatives include drug development, diagnostic imaging, and bioinformatics, through research on a broad range of biological fields. Bio 5 lends credence to the region as a global hub for bioscience.

## **Space Observatories**

Clear skies, dry desert air, and dark nights make Southern Arizona an astronomy capital of the world. It carries one of the strictest standards for outdoor lighting anywhere in the U.S. Kitt Peak National Observatory, part of the National Optical Astronomy Observatory (NOAO), is located on the Quinlan Mountains in the Tohono O'odham Nation. It is one of two National Solar Observatories, housing the largest collection of optical telescopes in the world. The Mount Lemmon SkyCenter is located at the Steward Observatory's Sky Island site northeast of Tucson at the 9,157-foot summit of Mount Lemmon, featuring the 32-inch Schulman telescope, the largest publicly-dedicated of its kind in the Southwest. The Mount Graham International Observatory, at almost 11,000 feet on the Pinaleno Mountains, is another of UA's Steward observatories with bragging rights to the most powerful telescope in the world (the Large Binocular Telescope). The mountaintop astronomy facilities are complemented by UA's Steward Observatory Mirror Laboratory where scientists excel in developing immense, lightweight and powerful optical and infrared telescopes.

## **Water Reuse/Water Quality**

The Water Resources Research Center at UA is a research and extension unit and state-designated water resources research center that conducts research, educates, and develops policies on water quantity, quality, reuse, management, and law, for surface and ground water. A few key programs

include water harvesting, ground-water governance and management, trans-boundary aquifer assessments, and water sustainability.

### **Climate Change and Adaptation**

Researchers at UA's Institute of the Environment, Department of Geosciences, and Department of Atmospheric Sciences are conducting some of the world's leading research on climate change and adaptation to create such initiatives as the (a) Climate Change Assessment for the Southwest (CLIMAS); (b) U.S. Department of the Interior's Southwest Climate Science Center; (c) UA Institute of the Environment's Translational Environmental Research; (d) Southwest Climate Change Assessment Report (SWCCAR); and, (e) UA Cooperative Extension Climate Science Application Program. Researchers at these facilities have used tree rings, lake cores, ice cores, sea level mapping, climate modeling, and social science methods to understand climate variability, climate history, causes of climate change, and resilience in the face of climate uncertainty.

### **Sustainable Design**

The Underwood Family Sonoran Landscape Laboratory at the UA College of Architecture, Planning and Landscape Architecture integrates the built and natural environments to generate the guiding principles of sustainable landscape architecture: water conservation, reduction of urban flooding, reduction of urban heat island effect, and on-site demonstration and education. An 11,600-gallon cistern collects water from the building's roof and mechanical and water systems to irrigate native vegetation and fill a bioswale arroyo and desert pond that supports native fish while native riparian plants filter water and provide shade and habitat for other desert insects, birds and animals. The system harvests over 230,000 gallons of water annually, supports five Sonoran biome plant communities, and serves as demonstration site and learning laboratory for innovative desert design strategies. The College also conducts research on the relationship of water and energy with architecture to address issues such as climate change, urban heat island effect, deforestation, air quality, and green buildings for urban and arid environments. Several local firms and organizations offer assistance in green building and design. Local jurisdictions have adopted Green Building programs, and water harvesting guidance manuals for residential and commercial buildings.

### **Sustainable Energy**

The University of Arizona's global prominence in sustainable energy solutions, through partnership with the Center for Interface Science: Solar Electric Materials and funding by the U.S. Department of Energy and Office of Science has produced specialized programs, analytical equipment, and research including (a) photoelectron and photoemission spectroscopies; (b) spectro-electrochemical platforms; (c) reflectance FT-IR and ultra-high vacuum Raman spectroscopies; and, (d) laboratory-scale and OPV samples. The Solar Zone at UA's Science and Technological Park offers opportunities for solar research, development, and business. Also, researchers in the Department of Agricultural and Biosystems Engineering are investigating the potential of biofuels and bioprocess engineering for sustainable energy solutions.

### **Attractions**

- Biosphere 2
- Flandrau Science Center and Planetarium
- Kitt Peak National Observatory
- Laboratory of Tree-Ring Research
- Mount Graham International Observatory
- Mount Lemmon SkyCenter
- Smithsonian Institution's Fred Lawrence Whipple Observatory

- Solar Zone, UA tech park
- Tucson City Solar Installations
- Tumamoc Hill
- UA Mirror Lab
- UA Underwood Family Sonoran Landscape Laboratory

### Events

- Arizona Science and Astronomy Expo
- Sun-Day on the Solstice, Kitt Peak National Observatory

### Related Institutions

- City of Tucson Energy Office
- Pima County Water Reclamation Campus
- Pima County/UA Water and Energy Sustainability Technology Laboratories
- Renewable Energy Network
- Tucson Amateur Astronomy Association
- UA Arizona Research Institute for Solar Energy
- UA College of Agriculture and Life Sciences
- UA College of Science
- UA Department of Agriculture and Biosystems Engineering
- UA Department of Astronomy and Steward Observatory
- UA Department of Geoscience
- UA Department of Ecology and Evolutionary Biology
- UA Department of Hydrology and Water Resources
- UA Drachman Institute
- UA Institute of the Environment

## 9. Sustainable Desert Living

Pima County is culturally rich and one of the most biologically diverse counties in the U.S. Through an intensive and visionary countywide coalition, stakeholders developed the Sonoran Desert Conservation Plan (SDCP) to guide regional activities to conserve and protect the county’s natural open lands and resources for future generations of southern Arizona residents.

Identifying and establishing the divide between ‘built’ and ‘natural’ environments define sustainability in Pima County. Initiated in 1998, Pima County’s SDPC is a comprehensive land management strategy that involves consideration and protection of such diverse resources as mountain parks and national preserves, biological corridors and critical habitats, cultural resources, ranch conservation, and riparian systems.

The exhaustive SDPC effort – involving over 200 scientists and peer reviewers, 14 public jurisdictions, over 600 public meetings in four years, more than 215 specialized reports, and overwhelming stakeholder participation – resulted in public approval of over \$164 million dollars for natural open space acquisition in the 2004 bond election. The Sonoran Desert Conservation Plan has (a) established a *de facto* growth boundary for Pima County and its jurisdictions; (b) conserved and preserved vast areas of the region’s natural and cultural resources for posterity and for eco- and geo-tourism; (c) demonstrated the economic benefits – such as reducing costs to expand infrastructure, public services, and other amenities – that result from developing within and adjacent to the urban core; (d) maintained water quality standards by preserving riparian systems; and (e) prevented land fragmentation by purchasing ranch lands, while allowing ranchers to continue their tenured land-stewardship practices; among other efforts.

At the municipal level, the City of Tucson, along with many local non-profit organizations, has established sustainability initiatives to better the lives of people in the region, including progressive rainwater harvesting codes that require new commercial buildings to supply 50 percent of their landscaping water needs with harvested rainwater. The City and County have established offices dedicated to sustainability and conservation to protect the surrounding Sonoran Desert as well as the urban environment. On alternative energy research and infrastructure, Tucson was identified by the U.S. Department of Energy as one of 25 Solar America Cities in 2007-2008. In early-2014, the Davis-Monthan Air Force Base opened its 16.4 megawatt facility generated from 57,000 solar panels on 170 acres, which was made possible by a 25-year power purchase agreement with SunEdison.

The ‘Watershed Management Group’ (<http://watershedmg.org/>) helps people in rural and urban settings to (a) harvest rainwater and storm water; (b) develop green infrastructure; (c) conduct watershed assessments and planning; and, (d) invest in community-based conservation. Local efforts such as ‘Harvesting Rainwater’ (<http://www.harvestingrainwater.com/>) – together with the Watershed Management Group – help people to install small-scale infrastructure at the house, street and community scales. ‘Sustainable Tucson’ (<http://www.sustainabletucson.org/>) works to build regional resilience by raising awareness and establishing partnerships within the community to address pressing environmental and social issues in the city. Several organizations promote urban agriculture and borderlands food resilience, including Sustainable Tucson, Pima County Food Alliance, Tucson Community Gardens, Sustainable Baja Arizona, and Sonoran Permaculture Guild.

Likewise, the Pima Association of Governments (PAG) Sustainable Environment Program facilitates collaboration among Federal, state and local governments, and local environmental and sustainability interest groups, including water resource and quality, wastewater treatment, air quality, wildlife and habitat, invasive species, recycling, travel reduction, and low impact development.

## **Subchapters:**

### **Kino Environmental Restoration Project**

Pima County’s Kino Environmental Restoration Project (KERP) comprises a large-scale storm water detention basin, flood control facility, and riparian ecosystem located in Tucson. The 125-acre site features a seven-acre lake that collects water from a 17.7 square mile watershed and is surrounded by native vegetation of marshlands, grasslands, and mesquite bosque. Storm water harvested in the basin is used to irrigate the KERP site, the nearby Kino Hospital grounds, and the Kino Sports Complex ballpark and practice fields. The ponds and native terrestrial habitats support resident and migratory waterfowl as well as shorebirds, songbirds, raptors, and a wide array of other wildlife. The site attracts bird-watchers year-round and also features a two-mile pedestrian and bicycle trail. The Tucson Audubon Society and UA scientists conduct research and bird surveys in the basin. The Kino Environmental Restoration Project is a unique and innovative site that provides flood control, storm water detention, irrigation, enhanced water quality, wildlife habitat, and recreational opportunities for the region’s residents and visitors.

### **Attractions**

- Biosphere 2
- Kino Environmental Restoration Project
- Sustainable City Project
- Sweetwater Wetlands
- Tucson City Solar Installations
- UA Underwood Family Sonoran Landscape Laboratory

## **Related Institutions**

- Center for Interface Science
- City of Tucson Office of Conservation and Sustainable Development
- City of Tucson Energy Office
- Community Food Security Center
- Desert Harvesters
- Drachman Institute
- Harvesting Rainwater
- Ishkashitaa Refugee Harvesting Network
- Pima County Cultural Resources and Historic Preservation Office
- Pima County Food Alliance
- Pima County Solar One Stop
- Tucson Community Gardens
- Tucson Food Conspiracy Co-op
- Santa Cruz Valley Heritage Alliance
- Sonoran Permaculture Guild
- Baja Arizona Sustainable Agriculture
- Sustainable Tucson
- UA Arid Lands Resources Sciences
- UA College of Architecture, Planning and Landscape Architecture
- UA College of Engineering
- UA Institute of the Environment
- UA Renewable Energy Network
- UA School of Geography and Development
- UA Water Resources Research Center
- Watershed Management Group

## ORIENTATION CENTER CONTENT: TEN STORIES

The Southern Arizona Regional Orientation Center is designed to introduce residents and tourists alike to the mysteries, stories and history of this region. Geographers have long pondered and debated the relationship of humans and the environment, how people, landscape, flora, fauna and climate shape one another. At the extremes, the theory of environmental determinism posits that the environment has a controlling effect on the people who live there, determining human evolution, life and the development of societies. At the other extreme, geographers have argued that cultures develop through human agency and action, regardless of the physical landscape in which they live. Closer to the center of these theoretical underpinnings, cultural and political ecology suggest that environment and people have a mutual effect on each other, and indeed are part of an integrative process that shapes human and landscape evolution. These theories have been powerful influences in their own right, facilitating behaviors that affect how people have treated one another and the natural environment through time.

We consider *place* to be a melding of people and landscape over time, with each mutually shaping the other to create the cultural landscape of the borderlands. Some have called this the region's fingerprint; some say it reflects successive waves of cultures and their ways of engaging with the landscape. We simply call it our *place*, with the relationships expressed in all manner of architecture, music, myth, literature, food, dance, land stewardship, and ecology. To deeply understand these interrelationships and the development of our bioregional, yet global identity, we journey through time and space to experience the geography of southeastern Arizona with its geology, topography, plants, animals, climate and peoples over millennia.

We have chosen ten stories to tell the complex and interwoven story of our *place*, one that is unique on earth. These stories highlight the ways in which the physical landscape, climate, flora and fauna of the borderlands have shaped the region and the peoples who live here, and these stories show how people, from thirteen thousand years ago until today have changed the environment—the plant and animal communities, the shape of the land, flow of water, and even the climate to make this place we call home. The stories of the region reveal layer upon layer of the cultural landscape, each spoken, written and etched into the world we see around us. Each story shows us, in a new way, how we are both a product of the tangible and intangible worlds, how the past is a threading of the mountains, desert, skies, biota, cultures, experiences, memories, and perceptions of this region; how we are and become our place on earth.

We invite you to visit with an open mind and heart and journey into this region. Through science, myth, photography, and poetry, through archaeology, botany, astronomy, and ecology; through recreation, vacation, business, exploration, and education, we invite you to share in the story. Please come to be part of this evocative, life-changing experience. Please join us to be part of our unique, dynamic, and inspiring *place*.



Photo credit: Adriel Heisey

## 1. The Santa Cruz River

The Santa Cruz River provides the central, binding thread of our region's story. The river and its tributaries have been a source of life in the Sonoran Desert region for several thousand years—a riverine oasis of plant life and wildlife where the first peoples who came to the region found a flowing, year-round, water supply. The river supported millennia of settled farming communities and served as a corridor for travelers, traders, explorers and migratory peoples. Tucson's story, since its inception has been inextricable bound to the Santa Cruz River, though this story eventually led to the disappearance of the river's flow. Now, the region's future, and our own, depends on our vision and ingenuity to harvest, utilize and value our region's most precious resource—water.

### River Ecology

Almost 90 miles of stream and river still flow within the Santa Cruz watershed, and much of the life in the Sonoran Desert can be near these waterways—60 to 70% of wildlife and up to 90% of the bird species. The river-ways of southeastern Arizona host over 400 songbird species and provide critical migratory flyways.

The Santa Cruz begins in southeastern Arizona in the semi-arid grasslands of the San Rafael Basin, just north of the U.S.-Mexico border. The river runs south into Mexico, and then takes a sweeping turn to flow back into the United States, northward into the Tucson Basin. Crossing the international U.S.-Mexico border twice, river management is strongly influenced by international water policies, and binds the two countries together.

### Early Agriculture



The Santa Cruz flowed in discontinuous segments for at least the past 6,000 years, and for over 4,000 years, indigenous cultures have diverted its ephemeral flow to grow Mesoamerican crops of corn, squash, beans and cotton. Their fields and canal systems are the oldest and most enduring hydrological and agricultural systems known in the present-day United States. At the site of

Las Capas, northwest of Tucson, archaeologists uncovered extensive 3,200-year old irrigation systems, contemporaneous with the oldest known in Mexico.

The descendants of these peoples were farming along the Santa Cruz River when the Jesuit missionary Father Kino arrived to the area in the late 1600s. The Spanish developed their own canals, *acequias* and introduced Old and New World crops and livestock species and agricultural practices to the region. After the Gadsden Purchase in 1854, Hispanic, Anglo, and non-Anglo farmers of many nationalities cultivated the floodplains above the river. Throughout the settled history of the basin, different peoples have adopted existing agricultural practices and crops and blended them with new methods and species, creating a four-millennia agricultural continuum of mutual landscape and cultural transformation along the Santa Cruz River.

### Water Harvesting

City codes mandate that new commercial buildings supply 50% of their landscaping water needs with harvested rainwater, and local non-profit groups support private businesses and residences in harvesting rainwater for domestic and landscaping purposes.

### Wastewater Re-use

The U.S. and Mexico work together to manage the Nogales International Wastewater Treatment Plant. In the upper Santa Cruz River and north of Tucson, release of treated effluent has resulted in the revival of several miles of stream flow. Pima County has also developed large-scale flood and wastewater initiatives such as Sweetwater Wetlands and the Kino Environmental Restoration Project.

Natural and human events precipitated the decline of the Santa Cruz River, interrupting the unbroken chain of the riverine agriculture. Irrigation projects, designed to intercept the subsurface flow of the river eventually led to massive arroyo cutting and erosion of the river floodplain. Overgrazing, mining, and woodcutting exacerbated the river's transformation. Modern technologies for water extraction, and population expansion fueled by pro-growth economic development strategies have placed further demands on the declining aquifer. Urban development has replaced the once fertile agricultural valley, and the flowing and wetland oases of the river have all but disappeared.

In recent years, Tucson has taken critical steps to become a leader in urban water issues in arid regions. City, County, University, tribal, non-profit and private endeavors are turning the tide of water use and conservation. Though the flowing Santa Cruz has vanished forever, these efforts offer hope for the region's water future and provide a vivid example of how people and the river are tied in an intimately braided story through the region's history.

## 2. Tumamoc Hill



Tumamoc Hill, a landmark of the Tucson valley, rises as an isolated, flat-topped peak in the low, dark volcanic chain of the Tucson Mountains. The iconic peak sits 730 feet above the Santa Cruz River floodplain, west of downtown Tucson, as a witness to several thousand years of landscape evolution, a place of indigenous residence and cosmology, location of the world's oldest scientific plant research plots, and a rigorous daily walk for the people of the city. The presence of the hill has

transformed the region and its own physical topography and plant communities have also changed over time by the people who have lived at its summit and on the floodplain at its base.

For several thousand years, the extension of the volcanic rock beneath the course of the Santa Cruz River forced groundwater upward to form a semi-permanent oasis at the base of the hill. The stretch of flowing water facilitated early settlement of prehistoric cultures that practiced irrigated agriculture on the river floodplain and constructed dry-stacked masonry walls, terraces and pit houses on Tumamoc Hill.

The hill and the oasis at its feet are considered by archaeologists to be the birthplace of Tucson—the hill was occupied by indigenous peoples during the Early Agricultural Period (500 BCE-1CE and the Early Ceramic Tortolita Phase (400-600 CE). Excavations on the hilltop revealed corn cob fragments and kernels, and charred seeds of mesquite, saguaro, woolly Indian wheat, desert hackberry and prickly pear. Hohokam peoples later farmed corn, beans, squash and cotton intensively on the floodplain and rock pile mounds of agave on the bajadas at the base of the hill. During the Colonial period, missionaries, soldiers and settlers established the Mission of San Agustín on the banks of the river, and El Presidio de Tucson to protect the

### A Hilltop Preserve

Tumamoc Hill is now part of an 860-acre preserve within the City of Tucson with official recognition as a United States National Historic Landmark, A National Environmental Study Site, a National Historic Landmark and an Arizona Natural Area, and continues to be a sacred place for the indigenous peoples of the region. Scientists of different nationalities conduct archaeological and ecological research within the Tumamoc Hill preserve, and as many as 7,000 walkers, runners and hikers climb Tumamoc each week to exercise and engage with the desert landscape.



nascent town. During this time period, livestock grazed the hill, and rock quarries at its base provided building materials for the early residents. In 1880, the Southern Pacific Railroad reached Tucson, and in response to requests from railroad executives, the Sisters of St. Joseph of Carondelet established St. Mary's Hospital at the foot of Tumamoc Hill.

In 1903, Tumamoc Hill became the Carnegie Institute Desert Botanical Laboratory to study the adaptations of plants and animals to aridity. For nearly four decades, scientists at the Desert Laboratory pioneered ecological research in deserts and played a key part in the development of ecology as a discipline. Early scientists endured intense desert heat and conducted the first research from a rustic tent camp dubbed Tumamocaville. Later, several structures were built of the native volcanic stone. Seven of the first Tumamoc Hill scientists were among the founders of the Ecological Society of America in 1915, and the journal *Plant World*, published at the Desert Laboratory, became the famed *Ecology* in 1920. Among the earliest of the Desert Lab's scientists, Volney M. Spaulding established permanent perennial plant monitoring plots—now the world's oldest. Spaulding also set out to map every saguaro on the reserve, documenting between 10,000 and 15,000 in the first year. Esteemed botanist Forrest Shreve became the director of the Desert Laboratory and editor of *Plant World* in 1910. After a stint of ownership beginning in 1940 by the U.S. Forest Service, the University of Arizona purchased the preserve in 1956 and took over the research and facilities.

Now Tumamoc Hill is a microcosm of research and public engagement. The UA College of Science developed the Alliance for Reconciliation Ecology to continue the Desert Lab's legacy. Ecological research includes studies of phenology, reproduction and population ecology of desert plants, mapping of winter annuals, spread of invasive species, and other aspects of desert biotic ecosystems. Pima County designated the hill a key component of the Tucson Mountains Biological Corridor, an initiative to link the 19,000-acre Tucson Mountain Park to nearby open space to protect crucial natural areas for wildlife migration corridors and habitat.

### 3. Baboquivari Peak



The weathered granite monolith of Baboquivari Peak symbolizes the complex ways in which topography, ecology and human belief systems are intricately intertwined and have mutually

defined one another in southeastern Arizona. The peak rises as the tallest point in the Baboquivari Mountains, a 30-mile long range that lies 60 miles west of Tucson. The high cliffs leading to the summit, at 7,730 feet can be scaled only by technical climbing. The peak is considered a sacred mountain by the Tohono O'odham who believe that the Creator and Elder Brother I'toli resides in a cave at its base. The exposed granite spire, visible for hundreds of miles in the Arizona borderlands region, lies at the center of Tohono O'odham cosmology.

As legend has it, I'toli brought the Tohono O'odham into this world by changing them into ants so that they could pass through the small hole in the mountain. He



[www.bobaquivari.com](http://www.bobaquivari.com)

*"The very name is like a dream; a hard place to get to - jeeps might do it but will be unwelcome; best come on horseback or like Christ astride a donkey - way past the end of the pavement, beyond the farthest smallest sleepest town, beyond the barbed wire, (invented, some say, by a Carmelite nun), beyond the Papagoan hogans, beyond the last of the windmills, hoving always in the direction of the beautiful mountain."*—Edward Abbey

then transformed them back into people to live in their desert homeland. The emblematic labyrinth leading to the cave symbolizes the choices and experiences that people face on their journey along life's path, called *himdag*. In the center, each person has one final opportunity to look back upon his or her life before facing the sun God and passing on into the next world. Visitors and pilgrims must bring gifts and offerings to the cave to ensure their safe return from its depths. The design of the Man and the Maze, symbolizing I'toli and the *himdag* is depicted on traditional Tohono O'odham pottery, basketry and rock petroglyphs.



The diverse habitats of the Sky Islands provide unique conditions for species, many of which are endemic (found nowhere else in the world), endangered, and threatened.

The Baboquivari range is also one of the Madrean “Sky Islands,” a unique and highly bio-diverse region that spans southwestern New Mexico, southeastern Arizona in the United States and northwestern Chihuahua and northeastern Sonora in Mexico. The mountain ranges form a link between the Sierra Madre Occidental in Mexico with the southern end of the Rocky Mountains and Colorado Plateau. These sky islands, surrounded by desert “seas,” form an archipelago that reaches from tropical to temperate latitudes. The mountains rise from 1,250 feet to over 6,000 feet above the valley floors, providing extreme elevation changes that can transition from the saguaro, ocotillo, mesquite and acacia to quaking aspens and spruce-fir forests. The Sky Islands region is home to over half

of the bird species in North America, 29 bat species, over 3,000 species of plants, and 104 species of mammals. Some remain isolated on mountaintops, while others—mountain lions and black bears—depend on movement between the ranges. The mountains and valleys between also provide north-south migratory corridors for hundreds of mammal, bird, butterfly and bat species. The Madrean Sky Islands represent the northernmost reaches for tropical and subtropical species such as the jaguar, ocelot, elegant trogon, and thick-billed parrot. This unique, highly diverse landscape faces unprecedented global threats, including land development, resource extraction, poor management practices, water scarcity and climate change. These result in habitat loss and fragmentation, which can lead to species extinction.

Once at the center of the Tohono O'odham homelands, Baboquivari peak now lies split between 2,900,000-acre Tohono O'odham Nation and the 2,065-acre Baboquivari Peak Wilderness Area, administered by the United States Bureau of Land Management. Much of southeastern Arizona is managed as open space Federal, state, county, city, tribal, non-profit and private entities. While the Tohono O'odham have requested the sacred mountain be returned to their possession, its location within the wilderness opens it for recreation by back-country hikers and rock climbers. Climbers have established several routes up the high cliffs, and the remote peak continues to be a popular rock-climbing destination and a place of visions in southeastern Arizona, where earth, sky, people and spirits meet.

#### 4. Dark Skies

Around the world, the stars, planets and moons of the night sky have long directed farmers in agricultural practices and served as a means of navigation across land and sea. In southern Arizona, the extremely dry air, few clouds and low desert vegetation yield some of the darkest night skies on earth. Some believe that petroglyphs atop Tumamoc Hill represent astronomical symbols, corresponding with winter and summer solstice, and serving as planting and harvesting calendars. These ancient peoples used the sky to track the year, preparing fields and planting seeds to

correspond with the timing of spring and fall frosts and summer monsoon rains; the region's dark skies were of vital importance to the livelihoods of four millennia of Santa Cruz River farmers.

Now, the same dark skies have given Tucson and southern Arizona the title of *Astronomy Capital of the World*. Standards for outdoor lighting are stricter than anywhere else in the U.S., and the open desert cut by tall mountain ranges provides ideal astronomy viewing opportunities. World-famous astronomical observatories crown many of the peaks. Amateur and professional astronomers alike have seen the rings of Saturn, the cloud belts of Jupiter, and countless stars of the Andromeda galaxy. The region is home to astronomical research and education institutions at the University of Arizona, including the Department of Astronomy and the Flandrau Science Center and Planetarium, the Tucson Amateur Astronomy Association, and the Pima Air and

We use our window into space as a way to know more about ourselves and our place on earth.



The Mt. Lemmon SkyCenter, launched at the Steward Observatory Field Station in 2008 by the University of Arizona College of Science strives to engage the public in innovative scientific discovery. The SkyCenter is part of a broader initiative to develop public-university partnering through accessibility, interaction, leadership, and collaborative learning.

Space Museum, and hosts the annual Arizona Science and Astronomy Expo. In conjunction with mountaintop astronomy, scientists at the UA Steward Observatory Mirror Lab excel in developing immense, lightweight and powerful optical and infrared telescopes for astronomical research. The University has been awarded more NASA grants for space exploration than any other institution in the U.S. and is actively participating in five spacecraft missions: Cassini, Phoenix Mars Lander, HiRise, the MESSENGER mission to Mercury, and OSIRIS Rex, the first U.S. asteroid return mission.

The Steward Observatory operates telescopes atop the 9,157-foot summit of Mount Lemmon and on Mt. Bigelow northeast of Tucson. Research conducted by the Steward Observatory has yielded a survey of the Moon for Apollo lunar landings, the search for near-Earth asteroids, and the birth of infrared astronomy. The Steward Observatory also features the 32-inch Schulman telescope, the largest public dedicated telescope in the Southwest.

The Mount Graham International Observatory, at almost 11,000 feet in the Pinaleno Mountains of southeastern Arizona, is home to the most powerful telescope in the world, the Large Binocular Telescope. With ten times the observational clarity of the Hubble Space Telescope, scientists use the Large Binocular Telescope to peer deep into space, detect planets in distant solar systems, and observe objects that date back to the beginning of time (14 billion years ago).

Kitt Peak National Observatory, part of the National Optical Astronomy Observatory (NOAO), sits atop the 6,880-foot peak in the Quinlan Mountains, and houses the largest collection of optical telescopes in the world used for nighttime optical and infrared astronomy and daytime solar research. The site hosts 22 optical and two radio telescopes, representing eight astronomical research institutions, and is one of two National Solar Observatories. The McMath-Pierce Solar Telescope on the site is the largest unobstructed reflector and solar telescope in the world.

The highest peaks of the region hold significance for several Native Nations: The San Carlos Apache fought in court battles for decades to protect their sacred Dzil Nchaa Si An (Mount Graham), and in 2005, the Tohono O’odham halted construction of the \$13 million National Science Foundation project on Kitt Peak, the sacred site of I’itoi’s Garden. As these Sky Island peaks symbolize a window into the universe, they also embody a clash of cultures where landscape and universe hold different meanings for the peoples who call this home.

## 5. Saguaro Cactus

The emblematic saguaro cactus is found exclusively in the Sonoran Desert and exemplifies the adaptations needed to thrive in the region. This majestic cactus resembles a human with outstretched arms, embodying an intimate story of interconnected human and landscape relations.

The saguaro is specifically adapted to Sonoran Desert climate—Even though these immense cacti reach 60 feet tall and weigh several thousand pounds, most of their roots extend laterally just below the ground’s surface to catch sheet runoff of summer storms. They have a single taproot that extends down to access deep soil moisture. Expandable ribs allow the cactus to store rainwater and absorb it slowly over the long dry months. Saguaros photosynthesize through green skin; they utilize a special process that involves collecting and storing CO<sub>2</sub> at night and keeping their stomata closed during the day to avoid water loss. Like many desert plants, saguaros have sharp spines to protect them from predation by herbivores. Young saguaros usually grow under a “nurse plant” that protects them from the extremes of the desert until the cacti are large enough to survive on their own.

Saguaro cacti are a critical or “keystone” species in the ecosystem and support many plant, insect, animal and bird species. They provide a home for gilded flickers and Gila woodpeckers, which carve out nest holes in the side of the tall cacti. When these nests are abandoned, elf owls, screech owls, purple martins, finches and sparrows move in. Large raptors use the saguaro as hunting platforms and construct stick nests among the upper arms. Lesser long-nosed bats are the primary pollinators, visiting the blossoms to drink the nectar and eat pollen grains. The saguaro’s floral characteristics are specifically designed to attract bats—night blooming flowers, nocturnal release of fragrance, rich nectar, a position high above the ground, and durable blossoms to support the bats’ weight. The flowers’ pollen and nectar also nourish honeybees and white-winged doves. Saguaro fruit provide a rich source of nutrition and moisture during months of scarcity. When ripe, the fruits split open to reveal the deep red pulp and thousands of black seeds. Birds such as the cactus wren, verdin, ash-throated flycatcher, curved-billed thrasher, and bushtit, as well as the coyote and desert iguana eat the seeds and disperse them through the desert. Doves, quail, jackrabbits, and other desert animals also seek out the ripe and fallen fruit.

The Tohono O’odham people consider the saguaro cactus to be an honored relative; they traditionally harvest the ripe fruit, called *bahidaj* in the hot months of summer just before the arrival of monsoon rains. The fruit harvest, called *Ha:sañ Bak* marks the beginning of the rainmaking ceremony, and the



These tall columnar cacti begin as seedlings with a single trunk and develop branches as they age. The first arm appears when the cactus is between 50 and 75 years old; saguaros can live for more than 150 years. The saguaro was given its scientific name, *Carnegiea gigantea* in honor of Andrew Carnegie, who's Carnegie Institution established the Desert Botanical Laboratory on Tumamoc Hill in 1903.

Tohono O’odham New Year. Before harvesting the first fruits, the Tohono O’odham take a fallen fruit to bless themselves and ask for a clear mind and heart. They use the ribs of the saguaro, tied together as harvesting poles to knock the ripe fruit from the top of the cacti. The skin of the first fruit, placed on the ground, symbolizes how the moisture will be drawn up by the sun to form clouds. Harvesters gather the pulp of fresh fruit and collect partially dried fruit, called *juñ*. They add water to the fruit meat and simmer it for hours. The liquid is then strained through a cloth to remove the seeds, and cooked down further until it thickens into a sweet, rich syrup, called *bahidaj sitol*. Mesquite wood used in cooking fires gives the magenta syrup a smoky flavor. The tiny black seeds are spread out to dry in the sun and ground into flour. The Tohono O’odham also drink a ritual saguaro wine during their traditional ceremony, Nawait I’i to bring rain to the desert.

Saguaros are long lived, and their range is affected by long-term cycles of drought and temperature fluctuations. The cacti are limited in latitude and elevation by freezing winter temperatures—a factor which may lead to a shift in population range with a warmer climate. Scientific research on Tumamoc Hill has revealed that saguaro recruitment occurs in episodic surges when weather conditions are favorable to germination and growth of the young seedlings. The biggest threat to the saguaro cacti is our rapidly expanding urban population and loss of its habitat. The introduction of exotic plants such as buffel grass, *Cenchrus ciliaris* also threatens the cactus through competition for scarce resources and a change in wildfire regimes which damage native fire-sensitive plants including the saguaro cactus.

## 6. Three Sisters (Corn, Beans, Squash)

Maize, beans and squash, known collectively as the three sisters, represent immense agricultural diversity, a co-evolutionary history with their human caretakers, and nutritional and agro-ecological balances throughout the Americas. Relatives of these three were domesticated in Mesoamerica at different times around 7,000 years ago. By 3,500 BCS, the trio of cultigens had spread throughout Mexico, and eventually became an integral part of the diet and agricultural practices of tribes across North and South America. This trio of crops mutually benefit one another; maize provides a structure

### Chapalote Flint Corn



Indigenous peoples have cultivated chapalote flint corn in the Santa Cruz Valley for over 3,000 years.

for bean and squash vines; squash leaves cover the ground, reducing weed growth, helping retain soil moisture, and deterring pests.

Beans, as a legume have root mycorrhiza that make nitrogen available. In traditional Native American diets, beans supplied essential amino acids lacking in maize, making a wholesome dietary combination. These crops symbolize the importance of the development of agrarian societies and the extensive inter-American trade routes linking Mesoamerica and greater U.S. Southwest—seeds and agricultural practices were exchanged, adapted and further developed *in-situ* in response to the unique character of local environments.

### Tepary Beans



Locally domesticated tepary beans are a living example of the human-environment interaction - desert adapted and nourishing, related species grow both cultivated and wild in the Southwest.

Archaeological and historical records indicate that the Santa Cruz River provided a source of water for a four-millennia continuum of agricultural practice. The first maize arrived from Mexico around

2000 BCE, marking the beginning of a cultural transition from hunter gathering to agrarian societies. At the site of Las Capas, irrigation canals date prior to 1200 B.C.E. – the oldest known north of central Mexico. This heritage makes Tucson one of the oldest continuously cultivated areas, with the longest documented history of water control in North America. The nature of the river irrigation systems necessitated community collaboration to divert water, construct and maintain canals, and control water flow to the fields. Excavations at the Las Capas site revealed layer upon layer of farming plots, irrigation canals and pit houses. Canal sequences show an increase in length, use, labor requirements, efficiency, water control, and irrigated area, corresponding with concentrated farming populations. Around 550 to 750 CE, the Hohokam culture of the Phoenix Basin spread into the Santa Cruz Valley, bringing new artifacts, graphic symbols, burial practices, architecture, and new varieties of maize, beans, squash, cotton and tobacco. The people of the Santa Cruz River valley were also influenced by the Trincheras culture to the south, and the river corridor served as a trade route for seeds as well as jewelry, pottery, textiles, macaws and copper.

In the Pimería, native peoples cultivated and selected for a vast genetic diversity of maize, including the ancient chapalote flint corn; the locally domesticated tepary bean; and the large, green and white striped cushaw squash. O’odham peoples still grow several landraces of the three sisters, which they call huñ (maize), bawi (teparry beans), and ha:l (squash). They use locally adapted agricultural practices such as *ak-chin* farming, a technique of diverting ephemeral water from desert washes during monsoon storms into agricultural fields. They planted cottonwoods and willows in living fencerows to slow the current, spread floodwater, and trap suspended silt and organic matter. When the waters receded, they planted corn, beans and squash in the fertile, moist ground. These desert peoples, as many others around the world, developed innovative strategies to make the most of their limited resources, and cultivated crop species that produced well in the extreme environment.

With the disappearance of water in the Santa Cruz River and introduction of modern, high-yielding varieties, many regional cultivars and agricultural practices also vanished, with profound repercussions in the health of local peoples and the environment. A resurging interest in heritage foods and efforts by groups like the Santa Cruz Valley Heritage Alliance, the Tohono O’odham and Gila River Nations, the University of Arizona, and Native Seeds/SEARCH, among many others has promoted the conservation of traditional varieties and arid-lands farming. Though many see Tucson, the Santa Cruz Valley and the borderlands as a harsh region, the region has a vibrant spirit of desert-adapted agriculture, heritage foods and local food resilience.

## 7. Sonoran Hot Dog

A mesquite-smoked, bacon-wrapped hot dog stuffed in a fluffy white Mexican *bolillo* bun, topped with mustard, mayonnaise, pinto beans, chopped tomatoes, onions, and cilantro, red and green salsa, jalapeño sauce, guacamole, and sour cream, and served with a spicy, roasted yellow guero pepper is a perfect symbol of the borderland’s global, local, cross-cultural flare. Some say that the Sonoran hot dog, or hot dog *estilo Sonora* traces its origins to the northern Mexican city of Hermosillo, and that people have been preparing variations of them since 1960s. Regardless of its beginnings, this combination has achieved tremendous popularity throughout the Southwest and northern Mexico; Sonoran hot dog stands can be found in Nogales, Tucson, Phoenix, Douglas and Sierra Vista and as far

### Flavors without Borders



The Sonoran hotdog transcends political, social, and cultural boundaries to bring our vibrant regional heritage to the street corners and outdoor tables of Tucson and southern Arizona.

away as San Diego, Denver and Chicago. Food wagons selling Sonoran hot dogs appear on street corners at nights, line parks on the weekends, or set up in empty lots throughout the week to supply the city's hungry crowds. Tucson alone may have upwards of 200 vendors, known as *hotdogueros* selling the famous dogs. This cross-border pollination, a Mexican twist of an American classic has almost reached a cult status on both sides of the border.



The borderlands region has served as a melting pot of cultures and foodways practices since prehistoric times, and out of this geographical nexus several delicious foodways innovations have emerged. Indigenous peoples cultivated varieties of maize, beans, squash, and melons and harvested foods native to the desert such as mesquite beans, cholla buds, prickly pear and saguaro cactus fruit, and the tiny beans of palo verde and ironwood trees. The Spanish introduced lentils, wheat, barley, and chickpeas; perennial crops such as onions and garlic; and perennial fruits including the mission grape, olive, fig, date palm, sour orange and sweet lime, pomegranate, quince, peach, apricot, apple, and pear trees; as well as domesticated

livestock species—cattle, horses, burros, sheep and goats. A true meal of heritage foods of the region might include the nutty O'odham tepary beans topped with ground, fiery native pepper called the *chiltepín*; translucent white Sonora wheat tortillas the size of bicycle wheels; hot, ground-corn porridge called *atole*; an alcohol made from local agave varieties known as *bacanora*; wine made from mission grapes, and a sweet preserve made of quince fruit.

Immigrants to the area brought their own local cuisines, or adopted local crops and foods into traditional recipes. Chinese laborers who came in the late 1800s to work on the railroads and leased farmland along the Santa Cruz introduced Chinese cuisine and culture to Tucson. This trend has continued with waves of European, Asian, African, and Middle Eastern immigrants and refugees who now call Tucson home. The annual Tucson Meet Yourself celebration hosts over sixty nationalities, each with unique food traditions that have become part of the regional palette of taste. Local non-profit Iskashitaa works with refugees to harvest food resources around Tucson and southeastern Arizona, and then process these in certified community kitchens into jams, syrups, sauces, and pickles to sell at local markets. Gathering unused fruit and vegetables, called gleaning, has enabled refugee families to earn a small living and engage in their new community. Diaspora communities often struggle to redefine their identities, of which food practices play a vital role. The flavors of the desert city are continually being combined in new ways to create a thriving, diverse, global bioregionalism.

This type of food globalization has also negatively impacted local peoples; diabetes and alcoholism are now rampant on many Native Nations. And though Nogales serves as a major port of entry for produce entering the United States, several areas around Tucson and in the borderlands are “food deserts,”—areas where residents must travel a mile or more to access food. Poverty, malnutrition, obesity, and food insecurity affect many of the borderland's urban and rural people. University and community efforts are trying to turn this tide, with health clinics, community and school gardens, cooking classes, educational programs and promotion of the diverse food resources of the region. Just as the Santa Cruz crosses the international border and symbolizes the bi-national heritage of the region, renewed efforts need to cross the multi-cultural divides and ensure a continuing, place-based, vibrant and healthy regional food culture.

## 8. Wilbur-Cruce Spanish Barb Horse

The first horses of the modern genus *Equus*, landed on the North American continent with the ships of Spanish conquistadors in the early 1500s. Called Spanish Barbs, or Berber horses, they came to Spain from North Africa with the Moorish conquest, a small, resistant breed adapted to the harsh conditions of the desert. A key part of the Columbian Exchange, these horses and the similarly rugged *criollo* cattle were among the new breeds of crops and livestock that arrived with the colonizers and adapted to the region over ensuing centuries. The missionaries of New Spain bred livestock on the open lands surrounding their missions as part of their strategy of *reducción* of the indigenous peoples. Padre Kino, the “father on horseback” established a chain of 22 missions throughout the area that is now northern Sonora, Mexico and southeastern Arizona. He attributes much of his success to the resilient Spanish Barb horses that could traverse difficult terrain with little food or water, and survive the extremes of temperature and environment. He established a breeding herd at the Dolores Mission in Sonora, Mexico, and used the young horses to develop missions to the north, throughout the Pimería Alta. These horses capture the story of landscape and cultural transformation in the borderlands region.

### A Ranching Heritage



Adapted to sparse vegetation, rugged terrain, and intense summer heat, *criollo* cattle and horses were first introduced and bred by Spanish missionaries. Later, Spanish, Mexican and American entrepreneurs promoted cattle ranching as a way of turning extensive Southwestern rangelands into productivity and profit. Ranching has transformed and preserved the working landscapes of the borderlands.

Native Americans quickly adapted to the newly introduced domesticated livestock—the Apaches in particular became skilled horsemen, and raided farms and livestock to defend their territory. The Apaches were adept warriors with desert-adapted strategies of raiding, survival and endurance that enabled them to hold out against Spanish, and later Anglo settlers. Early Sonoran Tucson lay at the mercy of these mounted warriors who largely determined the progress of ranching, mining, and general colonization of the frontier. The desert born and bred *criollo* cattle and horses eventually enabled ranching to succeed as an agricultural endeavor in the Sonoran Desert, and for the last 300 years, ranching has provided a mainstay of the region’s economy.

The gradual replacement of the *criollo* cattle by less resistant but higher yielding European livestock breeds, however led to the virtual disappearance of the original Spanish genetics. Once ubiquitous throughout the western United States, the pure Spanish horse was almost extinct by 1950. In 1990, a small herd of Spanish Barb horses was found on one of the large ranches in southeastern Arizona. As the story has it, Dr. Reuben Wilbur purchased 25 horses from a horse trader named Juan Sepulveda, from Sonora, Mexico in 1885. Sepulveda sourced many of his horses from the Mission Dolores, once the location of Father Kino’s breeding herd. Dr. Wilbur used these Spanish horses on his 1,600-acre ranch between Arivaca and Sasabe, in southern Arizona. After Dr. Wilbur’s passing in 1930, his daughter, Eva Antonia Wilbur-Cruce took over ranch operations. In 1989, Eva Wilbur-Cruce, at age 87, sold the ranch to the Nature Conservancy to later become part of the 114,308-acre Buenos Aires National Wildlife Refuge.

The American Livestock Breeds Conservancy led efforts to trap the herd of Spanish horses and disperse them into breeding herds throughout the Southwest. These horses were determined through blood-typing to be a pure sixth strain of the original Spanish Barb horse, with a history of 300 years

in the region, and isolated on the ranch for over a century. In 2005, the Spanish Barb Breeder's Association formally recognized the Wilbur-Cruce horses as a sixth foundation strain. These Spanish horses, fondly called "rock horses" by Eva Wilbur-Cruce possess a calm demeanor and willingness to please, a small but sturdy athletic build, and a hardy resistance to the desert. As a recognized historic breed, they remain a living historic treasure.

Today, Hispanic, American, Mexican and Native American ranching continues in the region as a living and historical tradition. Many cattlemen use the same practices of managing cattle and training horses as the first missionaries and *vaqueros*. Horses are an integral part of ranch operations in the rugged terrain of the Sonoran Desert where most of the landscape is inaccessible by motorized vehicle. The agile, rugged horses must be able to traverse mountains, scrubland and desert alike, and they give their riders an intimate connection with the land. Many ranching communities have formed coalitions to manage ranches as open space, to increase the health of their livestock and rangelands, to preserve ranching traditions, and to protect plant and wildlife habitat for future generations.

## 9. Sosa-Carillo-Frémont House

The Sosa-Carillo-Frémont House, named after three notable families, is one of Tucson's oldest adobe residences. Originally built in a neighborhood known as Barrio Libre, the house and property are now situated in downtown Tucson's Civic Center complex. Like most historical buildings, the old home embodies the dynamic history of Tucson, its people, and the region.

At the time of the Sosa-Carillo-Fremont House's earliest conception, Tucson was a small agrarian and presidial center spanning a flowing Santa Cruz River. The region's first inhabitants used native materials to build simple shelter and shade structures, an architectural response to the environment that varies little from the millennia of Hohokam to the arrival of the Spanish. Tucson's territorial-period architecture followed a traditional Sonoran style, with a rectangular floor plan and thick, smooth adobe walls with small vertical openings. Adobe minimized the need for timber, though it had little structural strength—walls had to be massive and solid with few voids. Heavy timbers, cut from the banks of the Santa Cruz spanned the thick walls, over which layers of cactus ribs and ocotillo branches and cut grass supported the weight of earthen roofs. Lime white wash or plaster was used to protect the exterior. Adobe facades lined the streets, with sidewalls shared, and private spaces located at the back of the house or positioned within the interior of the block. Outdoor streets and plazas were the spaces of society and commerce, and the interior courtyards provided cool microclimates for private, interior family life.

Jose Maria Sosa III, a grandson of a Spanish cavalryman stationed at the Tubac and Tucson Presidios owned the original property and lived with his wife, Solana Mendoza in the adobe



**Sosa-Carillo-Frémont House in Tucson, Arizona.**

A visible symbol of regional desert architecture and Tucson's Spanish heritage, the home's native building materials, design, and history are emblematic of the borderlands cultural landscape.



Early Tucson citizens enjoying a spring-fed lake at Carillo's Gardens, ~1900

home from around 1860 to 1878. Members of the Sosa family have now celebrated more than two centuries in the region. In 1878, Jesuita Suarez de Carillo, wife of a prominent Tucson businessman purchased the Sosa property and home. Jesuita came from an aristocratic ranching family in Sonora, Mexico. Her husband, Leopoldo Carillo, also born in Sonora, arrived as an immigrant to Tucson in 1859 and soon became one of the city's most successful entrepreneurs. He owned ranches, farmland along the Santa Cruz River, and more than a hundred homes in Tucson, operated a long-distance freighting company, and developed the famous eight-acre public park called Carillo's Gardens with spring-fed lakes, a saloon, shooting gallery, restaurant, dance pavilion, hot baths, a zoo, and a circus.

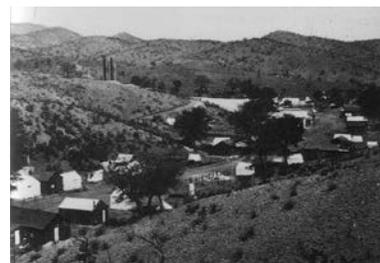
During this time, freight wagons delivered new materials to the frontier town, including milled lumber, tin, and brick, which were soon incorporated into buildings. Rough-sawn pine planks replaced hard packed dirt floors. With the arrival of the railroad around 1880s, Tucson saw an influx of American and Eastern ideas, foods, architectural styles, and new materials, leading to a rapid transformation of the early Sonoran town. The rugged individualism of the Anglo settlers was reflected in the physical separation of structures, and a vision connected to a larger network of culture, communication and technology. In 1881, during the midpoint of this transition period, John C. Fremont, a Civil War general and Arizona's fifth territorial governor rented Carillo's adobe house for his daughter, Elizabeth Fremont who lived in the house for around six months.

Several generations of the Carillo family lived in the historic Sosa-Carillo-Frémont house. Leticia Carillo Fuentes, a great great-granddaughter was the last of the family; she resided there until the late 1960s when an urban renewal project razed the remainder of the barrio to build the Tucson Convention Center. Though new advances have revolutionized architecture within the city, traditional methods in the historic home remain an example of desert living—thick, adobe walls, passive solar, shade and microclimates within interior courtyards, and passive and active rainwater harvesting. The house symbolizes a dynamic history and holds lessons for the future desert city.

## 10. Silver

The search for precious metals and minerals has served as a defining story in the cultural landscape of southeastern Arizona. While Native Americans collected a few of these gems and minerals for ornaments and jewelry, the exploration of the region for mining began with the Spanish soldiers and colonists in the late seventeenth century. Prospecting drove the northward expansion of New Spain, and several new silver mines were established as an economic strategy of the Spanish Crown. The first Spanish miner in the region may have been José Romo de Vivar who established a ranch on the upper Santa Cruz River around 1680.

In 1736, a discovery at Planchas de Plata (Slabs of Silver) near the O'odham village of Arizonac (After which the Arizona territory was named in 1863) attracted waves of prospectors, and they opened mines in the Santa Rita Mountains, the Guevavi area near Nogales, Arizona, and Arivaca, west of Tucson. At this site, located one mile north of the present U.S.-Mexico border, more than two tons of silver were collected from the surface of the ground.



A large vein of silver, discovered in 1877 gave rise to the mining town of Harshaw near Patagonia, Arizona. Harshaw is now one of the region's many ghost towns.



The Mowry Mine, also near Patagonia, drawing by J. Ross Browne 1864

The Piman Revolt of 1751 forced many of the early miners to flee the area, as did later Apache attacks. Small-scale mining continued in the region during the first decades of the 1800s under the increased protection of the presidios, and prospectors established new mines around Tubac and Tumacácori and along Arivaca and Sonoita Creeks. Apache attacks and the distance from supply centers kept the mineral yield low until the region became part of the United States.

The real mining boom came after the region was incorporated into the United States in 1854. In the late 1800s, Anglo gold and silver mining companies such as the Sonora Exploration and Mining Company, the Hermosa Mining Company, and the Duquesne Mining and Reduction Company established in the region, and a series of mining booms and busts followed—the Mowry Mine at Patagonia, Hermosa Mine in the Santa Rita Mountains, and the mining towns of Harshaw, Washington Camp, and Greaterville. Silver continued to play a predominant role, with many claim names reflecting the importance of the mineral—Silver Nugget Mine, Horn Silver Mine, Silver Reef Mine, among many others. Remnants of these mining claims and ghost towns can still be found throughout the mountains of southeastern Arizona. The Arizona Historical Society and other local museums also feature permanent exhibits of local mining history.

At the end of the nineteenth century, the value of silver collapsed. At the same time, copper mining took on a new importance, as the electrical age and WWI increased demand throughout the United States. A few early copper mines opened in the region under the Helvetia Mining Company and the Twin Buttes Mining and Smelting Company. For over a century, the region has been one of the most important copper producers in the world. New and abandoned mines and mining towns, and the repercussions of these resource extraction activities continue to be a relevant and critical issue; the value of copper on world markets is rising, and large copper mines are again gaining momentum, with much at stake for the people and environment of the region.

Tucson is also home to the International Tucson Gem and Mineral Show, with the 60<sup>th</sup> annual show held in 2014. The event takes place every January and February in Tucson, with events and exhibits in almost fifty locations around the city. Artisans, dealers, museums from around the world arrive to the city to display, sell and buy minerals, gems, tools, and finished jewelry, attracting over 55,000 visitors and bringing millions of dollars to Tucson's economy.

Mining continues to shape the economy, people and landscape of southeastern Arizona. Mining embodies social, environmental and political significance, a story at times violent, jubilant, haunting, poignant and polarizing, reflecting the relationship of our people and our place.



Silver Tohono O'odham Overlay Bracelet, by Kristopher Jose.

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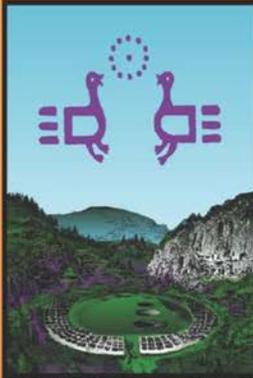
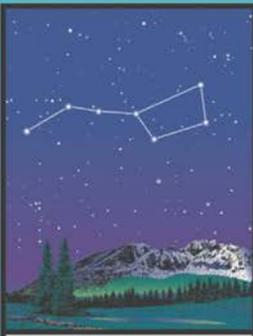
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**APPENDIX**

<p>WESTERN NATIONAL PARKS ASSOCIATION</p>	 <p><b>BANDELIER</b> NATIONAL MONUMENT</p>	
<p><b>STRATEGIC PLAN 2013-15</b></p>		
 <p><b>CAPULIN VOLCANO</b> NATIONAL MONUMENT</p>		 <p><b>GREAT BASIN NATIONAL PARK &amp; LEHMAN CAVES</b></p>

## *Strategic Planning Participants*

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### **WNPA Board of Directors**

James F. Brooks, Ph.D., Board Chair	Eugene Gieseler, Esq.
Nancy Laney, Board Vice-Chair	Edna Romero
Christine R. Szuter, Ph.D., Secretary-Treasurer	Carol Schwalbe
Sue Sirkus, Chair, Strategic Planning Committee	William Shaw, Ph.D.
Marilyn Alkire	Kim Sikoryak
Bill Broyles	Robert Taylor
Jeffrey Froke, Ph.D.	Beth Vershure
	Karen Wade

### **WNPA Staff**

James E. Cook, Executive Director  
Scott Aldridge, Chief Operations Officer  
Dana Garza, Chief Financial Officer  
Todd Berger, Director, Interpretive and Creative Services  
Nancy Kroell, Human Resources Manager

### **NPS Representatives**

Tom Richter, Chief of Interpretation, Midwest Region  
Krista Muddle, Regional Partnership Coordinator, Intermountain Region  
Sheri Forbes, Chief of Interpretation, Pacific West Region  
Kathy Davis, Montezuma Castle/Tuzigoot NM, IM Region  
Diane Chung, Walnut Canyon, Sunset Crater, and Wupatki NMs, IM Region  
Karen Beppler-Dorn, Pinnacles NM, PAC-West Region  
David Smith, Brown vs. Board NHS, MW Region  
Mark Weaver, Nicodemus NHS, MW Region  
Al Remley, San Antonio Missions NHP, IM Region  
Jennifer Haley, Lake Mead NRA, PAC-West Region  
George Elmore, Fort Larned NHS, MW Region  
Linda Lutz-Ryan, Interpretation Specialist, IM Region  
Phil Zichterman, Chief of Interpretation, IM Region

*Designed by Mary Barker, WNPA Volunteer*

We used all WNPA-affiliated park logos that we had available in the creation of this document. The park partners without logos depicted are:

*Eugene O'Neil National Historic Site*

*Juan Batista de Anza National Historic Trail*

*Lewis and Clark National Historic Trail*

*Port Chicago Naval Magazine National Memorial*

*Sand Creek Massacre National Historic Site*

*Santa Fe National Historic Trail*

*Timpanogos Cave National Monument*

## WNPA Affiliated Parks

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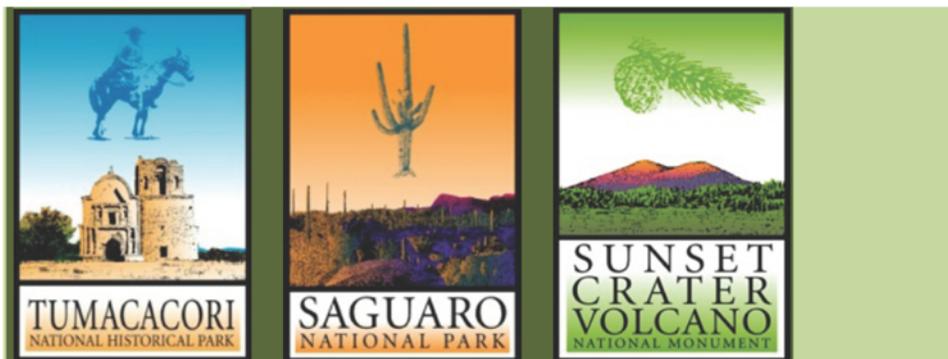
*Message from the Board Chair:*

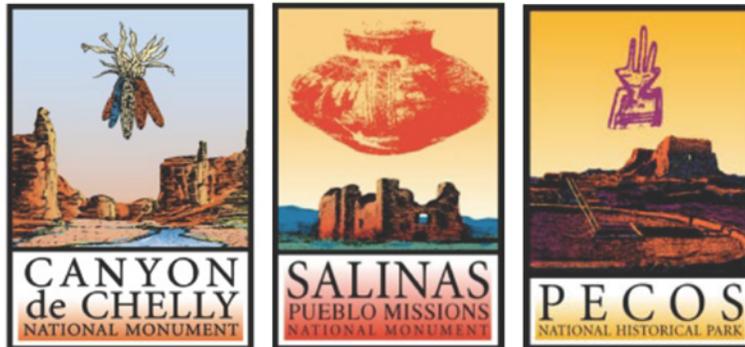
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Very exciting times have come to Western National Parks Association. With a new Executive Director, James E. Cook, on board in 2011, WNPA is repositioning itself for the future to ensure the long-term relevance and mutual benefits of its association with national parks while returning the association to a resilient business model.

Spearheaded by Jim and Sue Sirkus, chair of WNPA's Strategic Planning Board Committee, the 2013–15 Western National Parks Association Strategic Plan displays ambitious priorities and the organization's planned evolution over the next few years. It is most appropriate for this Strategic Plan to begin in 2013, the 75<sup>th</sup> anniversary year of the founding of the organization. The next 75 years will look very different, and this Strategic Plan is the foundation for much to come.

James F. Brooks  
Western National Parks Association Board Chair





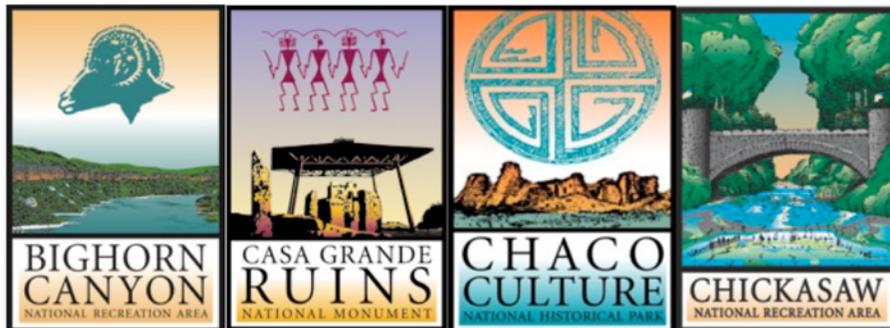
## Introduction

Western National Parks Association (WNPA) plays a critical role in the success of education, interpretive, and research efforts in the National Park System. As the association looks to the future, it is essential that we plan for and deliver even greater success. The 2013–15 WNPA Strategic Plan features a bold vision for the organization, embracing innovation and harnessing technology to engage vast audiences about the value of their national parks.

The Strategic Plan documents WNPA’s plans for a philanthropic renaissance. We are expanding creative efforts under WNPA’s Cooperative Agreement with the National Park Service (NPS) and other initiatives with individual parks. We will achieve greater success in our national park stores by making fundamental improvements to infrastructure.

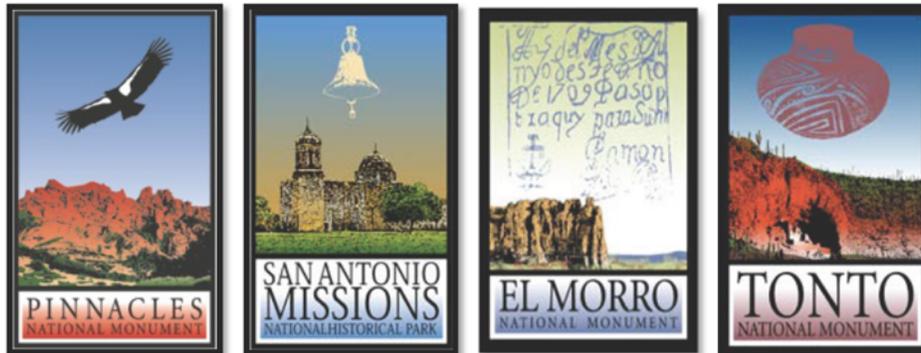
Rather than cite a list of measurable actions—a necessary tool featured in a separate Work Plan for WNPA—this Strategic Plan identifies the mission, vision, guiding principles, and strategic initiatives WNPA will use to guide its activities and priorities through the next three years.

Western National Parks Association believes the National Park System is, in the words of Wallace Stegner, America’s best idea. With your help and support, WNPA and the NPS will ensure the importance of national parks for generations to come.



## MISSION STATEMENT

In partnership with the National Park Service since 1938, Western National Parks Association advances education, interpretation, research, and community engagement to ensure national parks are increasingly valued by all.



## The Five Pillars of WNPA's Mission

1. Aid to Our Affiliated National Parks
2. Education and Interpretation
3. National Park Stores
4. Outreach
5. Research

### Pillar 1: Aid to Our Affiliated National Parks

#### *Success is achieved when:*

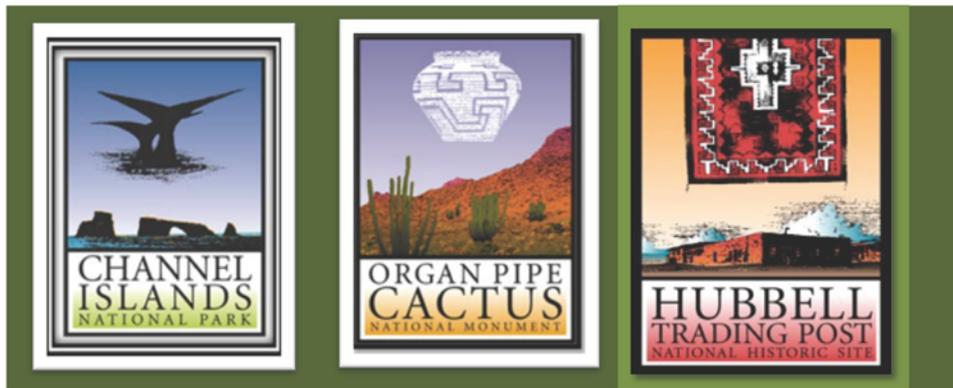
- Direct and indirect aid is utilized and valued by NPS.
- Aid supports the discretionary needs of individual parks.
- Aid supports education, interpretation, and research to advance the NPS's mission, and the results are measurable.

### Pillar 2: Education and Interpretation

#### *Success is achieved when:*

- Interpretive products, publications, and services are purchased/used.
- Interpretive products, publications, and services are high-quality, accurate, engaging, and resonate with diverse audiences.
- Projects are developed in partnership with NPS interpretive staff.

- Interpretive products, publications, and services enhance the experience of visitors; entice virtual visitors to make a real visit; and increase appreciation for national parks among the targeted audiences.
- The stories WNPA relays reinforce the parks' primary interpretive themes and provide opportunities for people to forge their own intellectual and emotional connections to parks.
- Innovation is funded, in part, through philanthropy.



## Pillar 3: National Park Stores

### *Success is achieved when:*

- Retail and online sales produce revenue to support aid and WNPA's mission.
- WNPA retail stores and website create an informative, positive experience for physical and virtual visitors.
- WNPA retail staff and NPS partners are engaging, helpful, and knowledgeable about products.
- The product mix offers a wide variety and accounts for varying tastes and budgets.
- The product mix at on-site outlets is consistent with each site's Scope of Sales.
- WNPA products are available for sale in a wide variety of outlets, including stores in parks, off-site retail locations, WNPA's website, wholesalers and other retailers, and other online sellers of products.

## Pillar 4: Outreach

### *Success is achieved when:*

- People of all backgrounds and ages experience the national parks, connect with park stories, and develop personal, lifelong commitments to their national parks.
- People have tangible, visceral experiences that resonate with their own lives. Parks are seen as experiential places of learning.
- WNPA's outreach efforts encourage larger and broader audiences to connect with their national parks, even if their abilities to visit those resources are limited.

## Pillar 5: Research

### *Success is achieved when:*

- Scientific knowledge serves as the basis for interpretation and education.
- Research adds to the body of knowledge about park resources, visitors, and potential visitors.
- Research and science inform decision-making.
- Research includes audience-value studies for WNPA and NPS to better reach people with interpretive information.

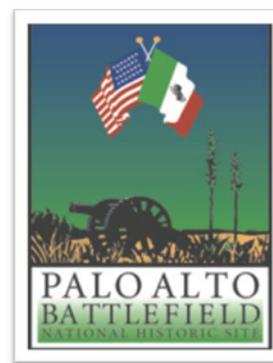
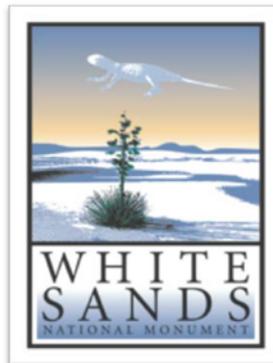
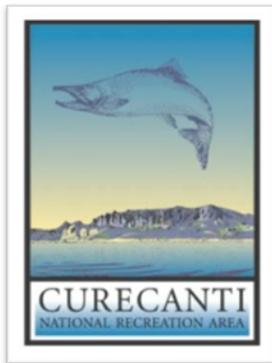


## VISION STATEMENT

Western National Parks Association believes all humanity will find peace in spirit, cultural touchstones, historical knowledge, and grace in nature through our national parks. WNPA will emotionally and intellectually connect everyone to the inherent value of national parks through bold innovation, providing real and virtual experiences, and effectively telling compelling park interpretive stories.

By 2016, the 100<sup>th</sup> anniversary of the establishment of the National Park Service:

- WNPA philanthropic dollars will significantly enhance interpretation, education, and research in parks in new and impactful ways.
- WNPA's national park stores will have "something for everyone" —a wide range of products that provide long-term meaning and connections to parks.
- WNPA will provide in-park experiences to nontraditional visitors, particularly urban and diverse youth, to create lifelong experiences and instill values that are passed down through generations.
- WNPA investments in research will yield important results to parks and the national park system as a whole.



## GUIDING PRINCIPLES

- Education, interpretation, and research are fundamental to stewardship of our national parks.
- National parks, monuments, recreation areas, and historic sites merit the support of cooperating associations.
- WNPA's resources fuel its ability to advance the NPS's education mission. WNPA budgets available resources responsibly and sustainably, balancing the needs of the organization and its affiliated parks.
- WNPA demonstrates operational transparency, as well as organizational and individual integrity. WNPA's actions reflect its commitment to diversity and inclusion.
- WNPA's goals reflect the NPS's strategic direction. WNPA's educational products, publications, and services align with the needs and interests of target audiences.
- WNPA is a leader in pursuing innovative means to further its mission, while continuing to focus on its key role of operating visitor center park stores and enhancing visitor experiences.
- WNPA forges relationships and partnerships to extend the reach of our services and programs.



## STRATEGIC INITIATIVES

Western National Parks Association exists to support our affiliated national parks and the NPS on regional and national levels, to enhance visitor experiences and enjoyment, and to increase the public's appreciation and understanding of national parks. WNPA will take tangible action in support of its Mission, Vision, and Guiding Principles through the following Strategic Initiatives:

***Initiative 1:*** Nurture Lifelong Connections

***Initiative 2:*** Harness Collective Power

***Initiative 3:*** Build, Grow, Innovate

***Initiative 4:*** Make a Difference



### ***Initiative 1:*** Nurture Lifelong Connections

WNPA engages traditional and new audiences by supporting interpretation within parks and beyond. WNPA recognizes an urgent need to reach out to diverse communities and individuals. WNPA will continue its core activities providing interpretive products to visitors, which have deepened the public's connection to national parks for more than seven decades. WNPA will involve the public in new ways to ensure WNPA and the national parks remain relevant and vital to future generations. Through its products, publications, services, and partnerships, *WNPA will:*

## **GOAL 1.1 Engage People to Foster Stewardship of America’s Natural, Historical, and Cultural Treasures**

Strategy 1.1.1 Develop a broad range of products, publications, and services that resonate with diverse audiences

Strategy 1.1.2 Harness the power of technology to enrich interpretation and education for generations to come

Strategy 1.1.3 Create tools to promote interest in and travel to a park, group of parks, or region, among American and international audiences

Strategy 1.1.4 Partner with organizations that serve diverse populations to cultivate connections to national parks

### ***Goal Statement***

*Through educational and interpretive experiences, trips and classes, new technologies, promotional activities, innovative partnerships, and audience-focused products, WNPA will connect people to parks.*

## **GOAL 1.2 Broaden the Audience**

Strategy 1.2.1 Raise philanthropy funds to expand outreach programming and inspire in a wide audience lifelong appreciation and enjoyment of parks

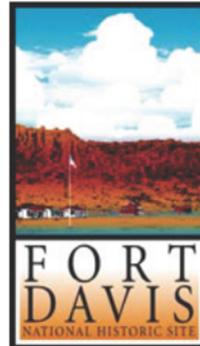
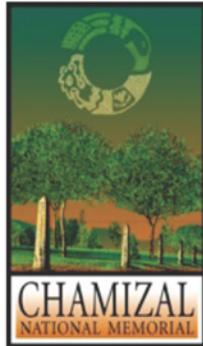
Strategy 1.2.2 Raise philanthropy funds and otherwise apply money toward audience research to improve reach of products, publications, and services

Strategy 1.2.3 Seek and/or invest in research/polling to gain knowledge about the public’s values and to develop ways to effectively and efficiently further the missions of WNPA and the NPS.

Strategy 1.2.4 Continually experiment with new products, publications, and services to find the best ways to engage audiences; raise philanthropic funds to support innovation and capacity building

### ***Goal Statement***

*National parks resonate with audiences in many different ways. WNPA will thoughtfully and continually experiment to become more effective in reaching diverse audiences about the value of national parks.*



## ***Initiative 2:*** Harness Collective Power

WNPA has been a strong partner to the NPS since the association's founding in 1938. WNPA is dedicated to strengthening our support by increasing aid to the NPS and by playing an effective role in its success. Drawing from the wisdom and experience of traditional partners, and by seeking and developing relationships with new and nontraditional partners, *WNPA will:*

### **GOAL 2.1 Strengthen Our Relationships with the NPS at All Affiliated Parks, and on a Regional and National Level**

Strategy 2.1.1 Nurture and enhance relationships with the NPS to achieve shared goals

Strategy 2.1.2 Create the conditions for hand-in-glove cooperation between WNPA and the NPS to provide quality interpretation; develop accurate, profitable, innovative, and well-designed products, publications, and services; and engage in critical retail revenue strategies, including high-level merchandising and broadened product mix

#### ***Goal Statement***

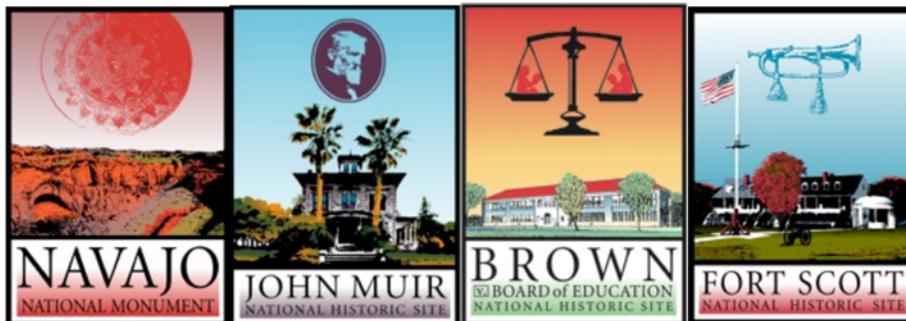
*WNPA's relationships with individuals in the NPS are fundamental to the strength of the organization. We can achieve our mission only through continually working to make human connections and build mutually beneficial relationships based on respect, trust, and a spirit of collaboration to ensure the NPS's and WNPA's success.*

## **GOAL 2.2 Expand Partnerships with Nontraditional Organizations to Extend the Reach and Impact of WNPA’s Interpretive and Education Efforts**

Strategy 2.2.1 Partner with organizations, companies, and individuals with programs and expertise that will increase the effectiveness and reach of WNPA’s interpretive and educational efforts

### ***Goal Statement***

*WNPA as an organization can reach sizeable audiences. By partnering with organizations, companies, and individuals, WNPA will be far more effective in connecting broader, more diverse audiences to national parks.*



### ***Initiative 3: Build, Grow, Innovate***

WNPA is committed to its retail operations and the role they play in enhancing visitor experiences and enjoyment. WNPA will stand on the shoulders of this long tradition to ramp up WNPA’s organizational capacity. We will pursue activities that build on our core business in a manner that ensures the long-term sustainability of the organization. We will raise funds through philanthropy to support aspects of this growth. We will diversify our revenue sources and improve sales at our retail stores and online. We will continually innovate, engaging in entrepreneurship to expand our effectiveness. *WNPA will:*

### **GOAL 3.1 Implement More Efficient and Effective Business Practices**

Strategy 3.1.1 Invest in technology and implement methods that enhance the efficiency of our business operations

Strategy 3.1.2 Work with volunteers and partners to increase operational and financial effectiveness

#### ***Goal Statement***

*Through a variety of methods and improvements—from merchandising to audience research to instituting a point-of-sale retail system to utilizing the expertise of volunteers and partners—we will invest in a strong future.*

### **GOAL 3.2 Expand Core Competencies and Nurture Entrepreneurship**

Strategy 3.2.1 Enhance the shared sense of mission among WNPA and NPS staff to create a greater vision of retail success based on customer focus; positive and informative interactions; and quality interpretive products, publications, and services

Strategy 3.2.2 Develop a culture of innovation within WNPA in which experimentation and entrepreneurship are championed and measured for results

Strategy 3.2.3 Nurture growth of all staff by focusing on building skills, setting shared goals, and developing leaders

#### ***Goal Statement***

*WNPA has valuable assets in its stores, employees, volunteers, and park partners. Through dedication and inspiration, WNPA and NPS employees can innovatively build on these assets to increase the reach of interpretive messages and increase revenue. Both results will increase WNPA's support of park educational goals.*

### **GOAL 3.3 Grow Sales Revenue**

Strategy 3.3.1 Use market research, refined and broadened product lines, improved merchandising, sound business practices, nimble decision-making, visitor-focused customer service, targeted marketing, experimentation, and expanded promotions and programming to increase retail and online revenue

**Goal Statement**

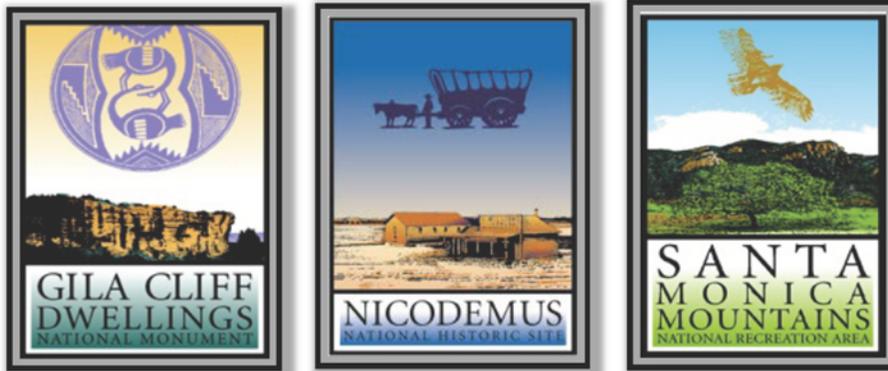
*Numerous proven methods will grow sales. WNPA will empower all staff to employ methods that continually strengthen the organization's bottom line.*

**GOAL 3.4 Market WNPA's Expertise**

Strategy 3.4.1 Build on WNPA's reputation for excellence by leveraging our expertise to expand and enhance NPS interpretive programming in the parks, in urban areas, and online

**Goal Statement**

*WNPA has a wealth of experience in project management, interpretive product development, and oversight of external contractors. Through WNPA's Cooperative Agreement and task agreements with individual parks, WNPA will use this experience to expand and enhance NPS education and interpretive goals and bring in new revenue to WNPA.*



***Initiative 4: Make a Difference***

WNPA is committed to providing discretionary aid to the NPS in support of interpretation, education, and research. WNPA is committed to building a philanthropic culture that will provide additional financial support. WNPA is committed to research that creates new knowledge, furthers resource management, and enhances the ability of NPS and WNPA to serve broader and

more diverse audiences. WNPA will partner with the NPS to promote our collective success stories that can be used to further all three commitments.

*WNPA will:*

**GOAL 4.1 Seek Ways to Optimize the Impact of Direct and Indirect Aid**

Strategy 4.1.1 Create and put into practice a methodology to capture and communicate success stories to donors

Strategy 4.1.2 Enhance the WNPA research program by leveraging grants, measuring impact, and interpreting the results

Strategy 4.1.3 Utilize the information gained under the first two strategies to motivate donors

***Goal Statement***

*How aid is used will be a primary means to engage donors. Having donors that know their money is supporting interpretation, education, and research will be a deciding factor in their willingness to give. The more WNPA knows about the interpretive and educational uses of aid, the more successful our philanthropic efforts will be.*

**GOAL 4.2 Build a Dynamic Philanthropic Enterprise**

Strategy 4.2.1 Engage WNPA members, supporters, and the broader community in advancing WNPA's mission for the benefit of parks and people

Strategy 4.2.2 Expand and strengthen WNPA's philanthropic program to better serve members, donors, and supporters

***Goal Statement***

*WNPA members, staff, and board members; NPS employees; and volunteers support WNPA's fundraising and granting efforts by aiding in the creation of a culture of philanthropy within the organization and at affiliated parks. WNPA supports the goals of friends groups for all parks and is committed to those organizations' continued success in helping parks achieve their mission.*

### **GOAL 4.3 Invest in the Common Good**

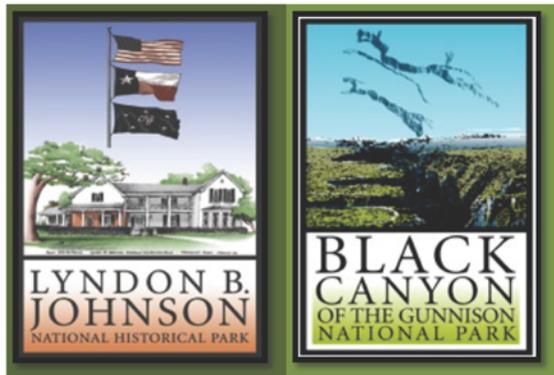
Strategy 4.3.1 Allocate resources to projects that help reach and engage audiences on a broader scale, to help ensure that people value all of our national parks and see the connections between them

Strategy 4.3.2 Tell stories and pursue activities that have impact across the National Park System

Strategy 4.3.3 Allocate resources to projects that have the potential to benefit all parks

#### ***Goal Statement***

*WNPA will pursue projects that will help keep national parks relevant for generations to come. The benefits of these projects will be widespread throughout our affiliated parks and beyond.*



## **WNPA BY THE NUMBERS**

*74-year  
partnership with  
the National Park  
Service*

*66 national parks  
supported by  
WNPA*

*57 parks at which  
WNPA furnishes  
staff to  
supplement park  
service employees*

*12 states in WNPA  
network*

*80 visitor centers  
offer WNPA stores*

*9 million+  
visitors assisted*

*\$1.9 million in  
research aid  
provided*

*\$64 million in  
park aid provided*

## ***Appendix: Detailed Objectives***

WNPA will pursue the following activities in order to advance each initiative in the 2013–15 Strategic Plan. This list is not exhaustive; activities may be added, modified, and refined as situations warrant, opportunities arise, and circumstances require.

### ***Initiative 1*** Nurture Lifelong Connections

#### Goal 1.1 Engage People to Foster Stewardship of America’s Natural, Historical, and Cultural Treasures

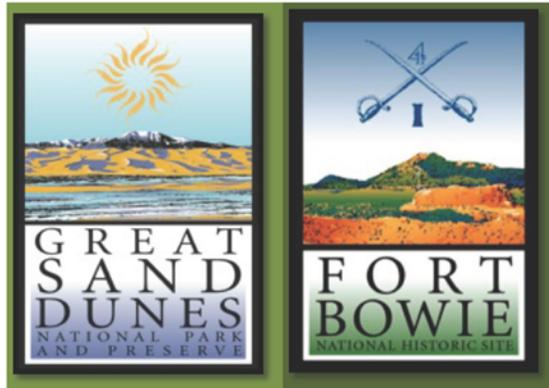
1. Design and implement park educational experiences that connect visitors to parks, particularly youth, baby boomers, families, people of color, and urban residents
2. Develop mechanisms and expertise to clearly identify audiences for all products, publications, and services
3. Organize trips, classes, and other activities to increase the knowledge about and appreciation of national parks among the public
4. Create tools to promote interest in and travel to an affiliated park, group of parks, parks within an NPS region, and parks nationwide
5. Partner with organizations that serve diverse populations to introduce and cultivate connections to national parks
6. Implement ways to bring the stories of parks to people outside physical park sites
7. Develop and nurture relationships with partners and individuals to leverage WNPA’s mission

#### Goal 1.2 Broaden the Audience

1. Produce interpretive products delivered digitally to engage a global audience
2. Establish a vigorously managed product life-cycle program to continuously develop and acquire new interpretive products
3. Install data lines at all affiliated parks to enable transmission of interactive exhibits, downloads of electronic products,

implementation of distance-learning programs, and WiFi connectivity to information on parks

4. Develop promotional materials that highlight travel to parks
5. Train WNPA staff in each park's interpretive themes
6. Reimagine website and web store to create a dynamic, compelling site that encourages repeat visitation
7. Develop web-based kiosk model for all parks to promote visitation, travel planning, opportunities to learn more and purchase products on-site, and enhance virtual experiences for those unable to physically visit the park
8. Continually look to expand outreach programming to wider audiences
9. Support audience research to better understand park visitor values and enhance the effectiveness of interpretive programming
10. Develop in-house expertise and solicit outside help in identifying audiences for products, publications, and services from the concept stage



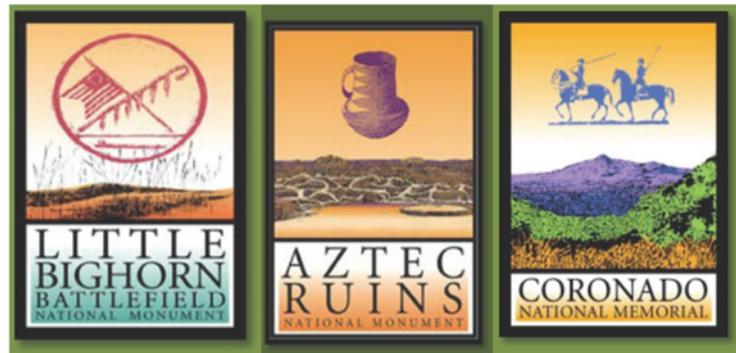
***Initiative 2*** Harness Collective Power

Goal 2.1 Strengthen Our Relationships with the NPS at All Affiliated Parks, and on a Regional and National Level

1. Establish an NPS Advisory Council with representatives from all 3 NPS regions in the WNPA service area to advise on high-level strategic planning for the organization and help measure results
2. Establish training systems to dedicate all WNPA employees to strong, responsive, positive relationships with NPS officials system-wide
3. Work with the NPS to achieve interpretive goals and to use merchandising to enhance revenue from park stores
4. Propose and pursue projects with the NPS on a regional and national level

Goal 2.2 Expand partnerships with organizations to extend the reach and impact of WNPA's products, publications, and services

1. Establish a Youth Advisory Council, engage in APPL's Bridge to Tomorrow program, consider adding a youth board member and/or a board member with academic and professional expertise in demographics, and pursue other tactics to better understand the values of youth
2. Partner with other outside groups to engage diverse audiences with national parks



***Initiative 3*** Build, Grow, Innovate

Goal 3.1 Implement More Efficient and Effective Business Practices

1. Install point-of-sale system at all retail outlets

2. Establish business models to evaluate the feasibility of new products, publications, and services
3. Create an intranet to speed internal communications, minimize redundancy, and facilitate consistency
4. Outsource noncritical business functions
5. Strategically use volunteers
6. Increase sales and reach of new media products and services to reduce physical product storage and shipping costs

Goal 3.2 Expand Core Competencies and Nurture Entrepreneurship

1. Effectively utilize emerging technologies
2. Develop market research analysis skills and resources
3. Facilitate greater engagement of WNPA and NPS staff in retail success
4. Embrace and promote innovation at all levels of the organization
5. Create an organizational marketing capability with a strong brand and message
6. Invest in the development of staff at all levels

Goal 3.3 Grow Sales Revenue

1. Grow sales revenue 3% annually
2. Use market research to identify target audience needs and preferences; use findings to drive product/service planning and development
3. Refine product mix at the store level to appeal to local and regional tastes
4. Thoroughly integrate merchandising with the store product mix
5. Ensure all sites operate optimally
6. Establish retail sites outside park boundaries where feasible, such as in urban areas
7. Create shopping experiences that appeal to emotion—parks as irreplaceable sources of education, inspiration, and scenic beauty—and learning
8. Increase sales staff product knowledge
9. Implement customer service standards and training
10. Incorporate retail promotions with park programming

11. Increase foot traffic through press releases and articles in regional and national publications
12. Expand special event sales

Goal 3.4 Market WNPA's Expertise

1. Develop ideas and contract new interpretive products, publications, and services under the Cooperative Agreement with the NPS and with individual parks
2. Help parks expand interpretive programming
3. Work with individual parks outside the Intermountain Region on projects through individual task agreements
4. Propose projects to work with the NPS on a national level



**Initiative 4** Making a Difference

Goal 4.1 Seek Ways to Optimize the Impact of Direct and Indirect Aid

1. Capture and communicate success stories
2. Support grants for research
3. Work with NPS to seek ways to use a higher percentage of aid for interpretive activities and other endeavors that are compelling to donors

Goal 4.2 Build a Dynamic Philanthropic Enterprise

1. Develop and expand fund-raising impact and effectiveness
2. Pursue grants

3. Increase income from membership program by engaging members
4. Solicit in-kind support
5. Expand community outreach to increase visibility, brand awareness, and base of support
6. Evaluate feasibility of taking on Friends role in select parks where a Friends organization does not currently exist

Goal 4.3 Invest in the Common Good

1. Allocate resources toward projects that build capacity for the NPS and WNPA
2. Whenever feasible, produce sustainable and/or locally produced products, publications, and services
3. Allocate resources toward projects whose benefits can be applied to all affiliated parks
4. Acquire local products for sale in our stores
5. Allocate resources that increase the awareness and appreciation of public lands on a regional and national level

