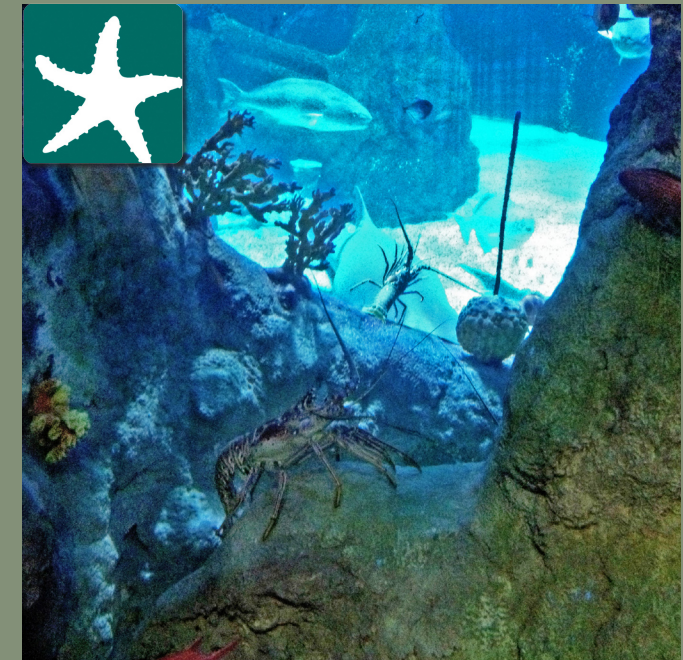


**NCA** ARCHITECTS • PLANNERS

JONES  JONES  
ARCHITECTS + LANDSCAPE ARCHITECTS + PLANNERS



ABQ BIOPARK

MASTER PLAN





ABQ BIOPARK





# TABLE OF CONTENTS



Acknowledgements	ii
A Note from the Mayor	iii
Executive Summary	1
History & Context	3
Inventory & Analysis	6
Planning	16
Mission, Vision & Objectives	24
Thematic Concept	32
Visitor Experience	62
Visitor Services	66
Animals	69
Maintenance Facility	70
Operations Evaluation	71
Attendance & Capacity	79
Circulation & Parking	87
Utility Infrastructure	98
Sustainability	101
Phasing	103





# ACKNOWLEDGEMENTS

## CITY OF ALBUQUERQUE

### MAYOR'S OFFICE

The Honorable Richard J. Berry, Mayor  
John Soladay, Chief Operations Officer

### CITY COUNCIL

Ken Sanchez, President, District 1  
Isaac Benton, District 2  
Klarissa J. Peña, District 3  
Brad Winter, District 4  
Dan Lewis, District 5  
Rey Garduño, District 6  
Diane G. Gibson, District 7  
Trudy E. Jones, Vice-President, District 8  
Don Harris, District 9  
Marti Luick, City Council Liaison

### CULTURAL SERVICES DEPARTMENT

Beatríz Rivera, Director  
Dana Feldman, Deputy Director  
Rick Janser, ABQ BioPark Director  
Lynn Tupa, ABQ BioPark Zoo Manager  
Catherine Hubbard, ABQ BioPark Botanic Garden Manager  
Holly Casman, ABQ BioPark Aquarium Manager  
Amy Landers, ABQ BioPark Marketing Coordinator

## ABQ BIOPARK ADVISORY BOARD

Lorraine (Webb) Higgins, Chair  
Mayling M. Armijo  
Richard Cunningham  
Paul M. Kienzle, III  
Christina M. Miles  
Carol Brusca  
Robert E. Doucette, Jr.  
Dan L. Maxwell

## NEW MEXICO BIOPARK SOCIETY

### BOARD OF DIRECTORS, 2014

Ted Lambert, President  
Nancy Newell, 1st Vice President  
Connie Beimer, 2nd Vice President  
Michelle Ostrye, Secretary  
Al Hernandez, Treasurer  
Paul Mondragon, Past President  
Michael Cassady  
Hubert Hill  
Demian Vargas  
Patti Williams  
Nancy Franchini  
Ruthie Robbins  
Brett Welcher  
Lian Yearout

### STAFF

Julie Miller Rugg, Executive Director  
Greg Swyden, Membership Director  
Barry Bitzer, Development Director  
Judi Civerolo, Special Events Director

## CONSULTANT TEAM

### NCA ARCHITECTS

Robert Calvani, FAIA  
Marc Gonzales

### JONES & JONES ARCHITECTS + LANDSCAPE ARCHITECTS

Mario Campos, FAIA, ASLA  
Garrett Devier  
Emily Fong  
Duane Dietz, ASLA  
Barbara Witt  
Janelle Lotzgesell

### BOHANNAN HUSTON, INC. CONSULTING ENGINEERS

Bruce Stidworthy, Senior Vice President  
Michael Balaskovits, P.E.

### TILGHMAN GROUP

Ross Tilghman

### ConsultEcon

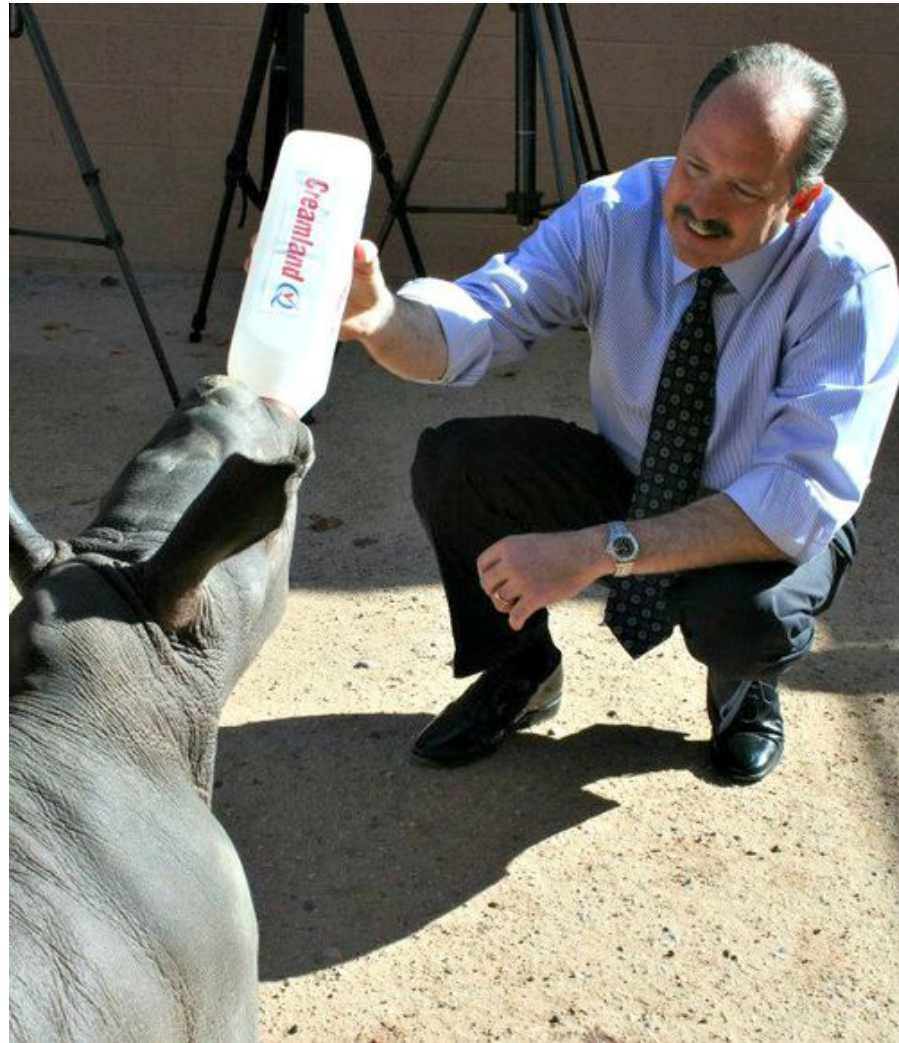
Robert Brais  
Monika Bernotas  
Allison L. Kehn

### ORCA Consulting

Al Shacklett  
John Moss



# A NOTE FROM THE MAYOR



The ABQ BioPark is a special place in the Southwest. Each year, more than 1.5 million visitors come to the BioPark's four facilities—Zoo, Aquarium, Botanic Garden and Tingley Beach—to experience a fun, exhilarating and educational place with family members and friends. For nearly 90 years, the BioPark has been this place to many people. This master plan process is rooted in a desire to ensure the BioPark's future for the next 90 years and more.

In 2011, I assembled a task force comprised of city staff and community members and I asked them to look at the BioPark's present needs and its requirements for a successful future. One of the task force's recommendations was to embark on a new master plan for the four facilities. A new plan was needed. The most recent plan for the zoo was created in the 1970s; and in 1991 for the aquarium and botanic garden. Without the direction that such a plan provides, many new exhibits—especially at the zoo—were created on an ad hoc basis and with little thought to how these new exhibits would be maintained or staffed. Now, with this new plan, the residents of Albuquerque have a guiding document that will direct the BioPark's growth and development for the next 20 years.

I am very pleased with this plan. NCA Architects of Albuquerque, Jones & Jones Architects and Landscape Architects, Ltd. of Seattle, and other consulting partners have thoughtfully crafted an exceptional plan for the BioPark. I'd like to thank Beatriz Rivera, the Director of the City's Cultural Services Department for leading the effort to create this plan. I'd also like to thank the Albuquerque City Council for appropriating the funding to conduct this planning process.

I'd especially like to recognize the involvement of thousands of City of Albuquerque staff, New Mexico BioPark Society members ABQ BioPark Advisory Board members, and members of the general public. Thank you for providing your thoughts, comments and ideas about what you'd like to see for the BioPark. It's you who love and support the ABQ BioPark—the jewel of our city and our state. Thank you for continuing to cherish this special place.

Sincerely,

Richard J. Berry

Mayor



# ABQ BioPark

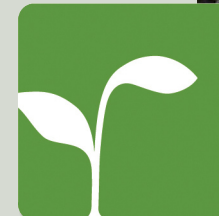
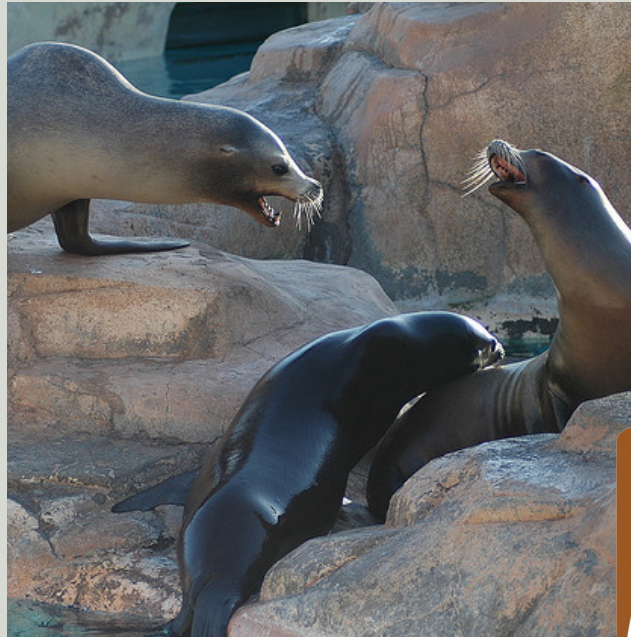
## THE ABQ BIOPARK'S MISSION

TO IMPROVE educational, recreational, and leisure time opportunities for our citizens and visitors.

TO INCREASE interest in the New Mexico environment, local conservation issues, and awareness of global environmental concerns.

TO INCREASE participation in the environmental stewardship, wildlife conservation, and research programs.

TO PROMOTE economic growth through excellence in exhibits and programs.



Photos top: ABQ BioPark; Photos bottom: Jones & Jones



# EXECUTIVE SUMMARY



Built upon the ABQ BioPark's mission, this Master Plan reorganizes and focuses the four elements of the BioPark (Aquarium, Botanic Garden, Tingley Beach, and the Zoo) on conserving and teaching about plants and wildlife from New Mexico's **Rio Grande and the Desert and Semi-Arid Rivers of the World**. This concept capitalizes on the BioPark's cottonwood-cloaked location along the Rio Grande, the diverse plant, garden, and animal collections that create habitats and immerse visitors into the natural environments of the animals that reside at ABQ BioPark.

This new Master Plan will expand the ABQ BioPark's current conservation programs and the New Mexico BioPark Society's educational mission to teach visitors about the wildlife, habitats and even the agricultural environments that exist around them. With this newfound understanding and passion about New Mexico ecology, guests will explore and discover threatened and endangered plants and animals within environments replicating selected river systems from other parts of the world. In each of these environments, visitors will learn about the similarities and differences between the Rio Grande and other rivers of the world, as well as the differing conservation threats that each faces.

This new proposed vision for ABQ BioPark is to be implemented over a 20-year timeline through collaboration between the City of Albuquerque and the New Mexico BioPark Society. Funding will be pursued through both public and private sources. For cost and operational efficiency existing buildings, exhibits, and infrastructure will be reused and modified whenever appropriate. We recommend that the Master Plan undergo a periodic review every six to seven years to track implementation and adjust the Plan's vision as the BioPark grows.



Photo: Katie Mast/ABQ BioPark

## METHODOLOGY

The ABQ BioPark Master Plan will serve as a guide to the development of the Aquarium, Botanic Garden, Tingley Beach, and the Zoo in order to maintain and continually improve upon the care and management of the animal and plant collections as well as provide an important recreational and educational venue to the citizens and visitors of the Albuquerque region.

This plan was created through collaboration between members of City of Albuquerque, Cultural Services Department, ABQ BioPark Staff, the New Mexico BioPark Society and the Albuquerque City Council. The planning process was facilitated by NCA Architects of Albuquerque and Jones & Jones Architects + Landscape Architects of Seattle.

The planning process began with an assessment and inventory of the BioPark's existing conditions coupled with discussion of the BioPark's mission, conservation purpose, intended visitor experience and educational programs. The project made use of visitor and staff surveys, visioning sessions, public presentations, as well as reviewed current and past planning reports, utility studies and storm water reports which are identified a separate Appendix. This information inspired brain-storming and creative evaluation of ideas to reach a unifying BioPark plan and a guiding organizational theme. Implementation of the plan is outlined in three phases. A summary of the work in each phase of the project is included.

The program and organizational theme were tested in draft concept plans and reviewed by the ABQ BioPark, City of Albuquerque Cultural Services Department, New Mexico BioPark Society and the general public. Input from stakeholders was obtained and incorporated into the plan in order to create the master plan presented herein.



Photo: ABQ BioPark



## Public & Focus Group Input

The Master Plan process has included input from the citizens of Albuquerque. Nearly 3,000 people completed an online opinion survey that included questions about how they use the ABQ BioPark, what they like best about the BioPark, what they would like to see changed and what the future of the BioPark can be. This survey was promoted by the BioPark and by the New Mexico BioPark Society. A link to it was included in multiple media releases, the web site and Facebook posts. The New Mexico BioPark Society sent information about the survey to its members through e-mails blasts and included a link to the survey on its web page. The survey collected data in December of 2013 and January and February of 2014. Better Cat exhibits, more aquariums exhibits, New Mexico species, exotic birds and additional reptiles topped the list of requests.

Additionally, citizens were encouraged to attend three public information sessions regarding the progress of the Master Plan. The first session was held on January 16, 2014 at the Albuquerque/Bernalillo County Government Center. The second was held on March 20 in the Baretas neighborhood at the Baretas Senior Center. A video of this session was posted on the BioPark's web site for view by people who were not able to attend. The third was held June 30 just inside the ABQ BioPark Zoo. There was no admission fee on this day to encourage community members to see the proposed plans for the BioPark. Each session was promoted by local print and broadcast media. Also, the members of the New Mexico BioPark Society Board of Directors and the Mayor's ABQ BioPark Advisory Board met with the Master Plan team a number of times.

The Master Plan team members also interviewed many ABQ BioPark staff members, including management and front line staff. The data collected in these interviews was essential to creating the plan. Two surveys were sent to staff members during the creation process to gauge how they felt the process was progressing. Seventy staff surveys were collected. All survey results are included in the Appendix.



Tingley Beach, 1949, Photo ABQ BioPark





## HISTORY OF THE ABQ BIO PARK

The Rio Grande Valley has been home to the Pueblo people for thousands of years. They lived and farmed on the land and had developed a sophisticated culture and advanced skills in stone masonry, ceramics and a wide range of arts and crafts when the Spanish arrived around 1540. By 1706, a group of Spanish colonists, granted permission by King Philip of Spain, established Albuquerque on the banks of the Rio Grande where the river made a wide curve. The river provided a good irrigation source for agriculture and the cottonwoods growing along its banks were used for fires and fencing.

Famed conservationist Aldo Leopold is one of the recognized giants in the environmental movement. As author of *A Sand County Almanac* he emphasized the importance and inherent beauty found in biodiversity and ecology. His development of the 'land ethic' provided subsequent generations with the means of holistically restoring and collaborating with the land. He was a founder of the Wilderness Society and one of the first advocates for scientific management of wildlife and habitats. And it all started in Albuquerque. . . .

What began as a profession in forestry became something much greater for Aldo Leopold. The Yale-trained Leopold began his career as a US Forest Service Forest Assistant when he arrived in Albuquerque in July 1909. He was assigned to survey the forests of the Apache National Forest in Arizona. By 1911 he was Deputy Supervisor of the Carson National Forest north of Santa Fe. He was a strong proponent for forest stewardship as evidenced in his newsletter, the *Pine Cone*. His passion for game preservation was fully stoked in 1915 by a fiery talk given in Albuquerque by the Director of the New York Zoological Park William T. Hornaday.

Hornaday's 1913 book, *Our Vanishing Wildlife*, was dedicated to the plight of North American animal species rapidly being exterminated through overhunting. Meeting Hornaday and listening to his presentation began to shift Leopold's thoughts and philosophy from one of pure forestry management towards a focus on habitat conservation for wildlife. While on a brief break from the US Forest Service Leopold took a position working for the Albuquerque Chamber of Commerce. He saw an opportunity in the cottonwoods of the Rio Grande that would be perfect for habitat conservation. The Bosque was an important stop for game and other wildlife in what was otherwise considered wasted land by the locals. Leopold's position in the Chamber enabled him to work with the property owners along the Rio Grande to donate some of their lands. These are the properties that now form today's ABQ BioPark, which, thanks to Leopold's vision, can proudly be called one of the birthplaces of conservation in the United States.

Leopold returned to the US Forest Service in 1919 and left Albuquerque in 1922. But his influence is visible to this day. The Zoo opened in 1927 and has continuously evolved and grown. Tingley



Sandia Mountains, Photo Wikipedia

Beach opened in 1931. The Botanic Garden and Aquarium opened in 1996. All these facilities are dedicated to increasing interest in the New Mexico environment, local conservation issues, and awareness of global environmental concerns.

## CONTEXT & EXISTING CONDITIONS

The ABQ BioPark serves a city of 545,852 people. The surrounding counties of Bernalillo, Sandoval, Torrance, and Valencia Counties contribute an additional 887,077 people (based on 2010 U.S. Census). Overall the ABQ BioPark is open to the 2.086 million people in the State of New Mexico. Ticketed visitation to the BioPark for the last fiscal year (2014) was 1,221,382 plus an estimated 300,000 visitors at Tingley Beach. The ABQ BioPark is recognized as the top-visited tourist destination in New Mexico.

Albuquerque is also home to the University of New Mexico and brings an annually changing population of students and families to the ABQ BioPark. The University includes courses of study in horticulture, landscape architecture and other programs that provide the ABQ BioPark with opportunities for project partnering, educational programming, research, and information sharing.



# HISTORY & CONTEXT

## ECOLOGICAL CONTEXT

The ecology and geologic history of New Mexico make it one of the more biologically-varied areas in the Southwest, home to more than 4,500 different species of plants and animals.

Albuquerque's ecology encompasses a number of interesting vegetation communities, such as alpine tundra, coniferous forests, woodlands, grasslands, desert shrublands, and riparian areas.

Some of the most diverse flora is found where water is most plentiful, in the river corridors and associative wetlands. Of interest for this Master Plan are these distinct ecoregions that could be replicated on a small scale in the BioPark:

1. Sandia Mountains (north) and Mazano Mountains (south)
  - a. Riparian
    - canyon bottoms
    - springs (cienegas)
    - streams, rivers
    - ponds, lakes, ephemeral water
    - arroyos
  - b. Cliff Faces
    - Rocky Ledges
    - Limestone Cliffs
    - Rocky Slopes/Talus (foothill scrub-shrub)
  - c. Piñon-Juniper Woodland
  - d. Mixed Conifer Forest
2. Chihuahuan Desert
3. Sierra Madre Pine/Oak Woodland
4. Piñon/Juniper Woodland

This desert landscape has long been home to cougar, bobcat, black bear, Mexican Gray wolf, white-tailed deer, badger, porcupine, beaver and otter. Its rivers are home to migratory and resident birds, silvery minnows and other fish, as well as turtles, snakes, and lizards, and a plethora of insect species.

New Mexico geologic history is just as fascinating and has strongly influenced the various habitats in the Southwest. A shallow sea covered the state during the Paleozoic Era (250-500 million years ago). Limestone deposits formed during this time are visible in the karst rocks and resulting soils of the southeastern portion of the state. Near the end of the Paleozoic, the Rocky Mountains began their journey skyward and lifted the central and northern part of the state upward. As the shallow sea receded and evaporated it left large deposits of salt, potash, and gypsum which are visible today.

The repeated advance and retreat of another shallow sea during the Mesozoic Era (65 to 250 million years ago) resulted in a tropical swampland rich with vegetation and fauna resulting in the coal deposits found in New Mexico. The Cenozoic Era (65 million years ago to the present) was punctuated by volcanic activity and the formation of today's Rocky Mountains and Colorado Plateau. During the Pleistocene epoch, the land was again covered by lush marsh vegetation. A cycle of glaciations covered northern New Mexico and etched much of the present day landscape.

Today, geologic forms are evident throughout New Mexico and can be seen from the Sandia Mountains, the Kasha-Katuwe Tent Rocks, the Carlsbad Caverns, down to the boulder-strewn arroyos and washes that feed the Rio Grande.

## CLIMATE

Albuquerque is in the northern tip of the Chihuahuan Desert, near the edge of the Colorado Plateau. The city has an arid desert climate with mild winters and hot summers. Albuquerque's climate is usually sunny and dry with low relative humidity. It averages 275 days of sunshine a year. The Sandia Mountains and foothills beyond the city create a rain shadow effect, due to the drying of descending air movements. This results in the city receiving very little rain or snow, averaging 8–9 inches of precipitation per year.

Spring is typically warm and usually the driest part of the year. March and April tend to see days with wind blowing at 20 to 30 mph and afternoon gusts can produce clouds of blowing sand and dust. The winds tend to subside by May as temperatures start to feel like summer.

The summer heat is relatively tolerable due to low humidity except during the 'rainy period'. There are three to five days when the temperatures top 100°F high, mostly in June and July. There are another 60 days where the temperatures exceed 90°F.

Autumn sees warm days and cool nights with less rain, though the weather can be more unsettled closer to winter. Winters are fairly short, with December, the coolest month, averaging 36°F and the coldest temperatures of the year occur in January and are around 10°F. There are three to five days each year where the high temperature is at or below freezing.

In order to maintain year-round visitation, special consideration must be made for seasonal guest comfort with shade and cool, conditioned areas available during summer, protection from rain and winds, and opportunities for warming in winter.





## SITE CHARACTER

ABQ BioPark lies on the gently sloping uplands of the iconic Rio Grande, a ribbon of water and cottonwood forests running through the heart of Albuquerque. The ABQ BioPark sits on the river's eastern flank and is heavily influenced by the Rio Grande in two ways: a high water table and nutrient-rich soils. At one time the BioPark sat within the river's 100-year floodplain but has been protected by dikes and numerous flood control devices since the early 1930's. The cottonwood forest known as the Bosque is currently undergoing restoration and clean up that allows improved community access to this great ecologic treasure. The Bosque provides not only an appealing visual backdrop to the BioPark, but also a valuable amenity and opportunity for expansion of the BioPark's conservation message and educational mission into native New Mexico riverine habitat.



Rio Grande near Albuquerque, Photo Wikipedia



# INVENTORY & ANALYSIS

## MANAGEMENT & OPERATIONS

The ABQ BioPark is about 150 acres in size and is composed of the Aquarium and Botanic Garden (54 acres), Tingley Beach (33 acres), and the Zoo (64 acres).

The ABQ BioPark is owned and operated by the City of Albuquerque. The governing body consists of the Mayor, Chief Administrative Officer and a nine member City Council. The Department of Cultural Services oversees the operations of the ABQ BioPark. The BioPark, as of June 2014, currently employs 128 full time, 20 part-time seasonal, and 78 temporary contract workers to operate and maintain the BioPark.

The City is supported through the efforts of the New Mexico BioPark Society. The Society is “dedicated to the development of, procurement for and capital improvement of the ABQ BioPark and to providing a quality facility through the support of related conservation, education and recreation programs.” Together, the City and the Society have partnered to develop a number of exhibits and programs that continue to build the BioPark’s reputation as the top tourist destination in the state.

## THE MISSION OF THE ABQ BIOPARK

- **TO IMPROVE** educational, recreational, and leisure time opportunities for our citizens and visitors.
- **TO INCREASE** interest in the New Mexico environment, local conservation issues, and awareness of global environmental concerns.
- **TO INCREASE** participation in the environmental stewardship, wildlife conservation, and research programs.
- **TO PROMOTE** economic growth through excellence in exhibits and programs.



Paseo del Bosque regional trail

## THE PURPOSE OF THE ABQ BIOPARK

- The mission and educational purposes of ABQ BioPark should be articulated throughout its design.
- ABQ BioPark should capitalize on the New Mexico and Rio Grande natural habitats.
- Experiences and educational messages should highlight New Mexico ecology and wildlife, and the ecology and wildlife from similar areas around the world.
- A desirable visitor experience should guide the Master Plan. (recreation/enjoyment-based experiences serves as a basis for learning)



Photo: ABQ BioPark





The following inventory and analysis examines the BioPark's physical assets, constraints and opportunities, and prepares a foundation upon which programming and master planning are built. The inventory also examines the ecological and urban context of the BioPark, existing organization, visitor experience, and physical condition of its exhibits, buildings, public spaces and amenities.

## VISITATION

ABQ BioPark's success is evident in the more than 1,221,382 annual visitors who passed through its gates during the 2014 fiscal year.

Approximately 20,000 to 25,000 students are educated by the BioPark annually by on-site and off-site outreach as well as another 70,000 children who attend as part of field trips.

Society Memberships in 2014 were approximately 21,000 families totaling about 75,000 people.

The Aquarium, Botanic Garden and Zoo are normally open 362 days per year from 9 am to 5 pm, with summer hours between Memorial Day and Labor Day from 9 am to 6 pm. Tingley Beach is open year-round from sunrise to sunset. The majority of attendance is typically weather-driven with peak visitation occurring during summer months and significantly lower winter attendance.

The peak single day attendance in the Zoo is about 17,000 visitors and is tied to its Halloween event Zoo Boo.

The peak single day attendance at the Botanic Garden is about 7,500 visitors and is tied to the River of Lights winter event.

Attendance at Tingley Beach is not tracked but was estimated at about 300,000 in 2014 bringing the overall BioPark attendance to more than 1.5 million a year.

## VISITOR EXPERIENCE

The visitor experience at ABQ BioPark is very park like. Guests see animals set in an open, tree-covered park atmosphere. To communicate mission and educational messages, the Master Plan must define a calculated experience that will focus further development.

- ABQ BioPark's mission must be clear and concise, with specific focus to help differentiate it from other zoos. We are proposing a thematic base of biodiversity in all its forms as a starting point.
- The mission shall be based on experiencing and learning about ecology and New Mexico wildlife compared to similar habitats in other areas of the world.
- The contemplated visitor experiences, such as an exploration of New Mexico ecology, or immersion in similar forests of Africa must guide development alternatives for the zoo.
- Mission and experience should capitalize on assets provided by the Rio Grande and Bosque as well as proximity to Old Town, Downtown, and Central Avenue.
- A visit to the ABQ BioPark should inspire wildlife conservation and ecological sustainability.

## GETTING TO THE BIOPARK

### SIGNAGE

Signage leading drivers to the BioPark from various parts of the region have not been clear nor intuitive. A new vehicular wayfinding plan, currently nearing completion, will provide clear and useful signage that will lead visitors to all portions of the BioPark from as far as ten miles away.

## BY VEHICLE

Auto access is generally very good from regional highways. The BioPark is just 1.3 miles from I-40. Major arterials, including Central Avenue (Route 66), Lead Avenue and Coal Avenue provide access directly to the Aquarium/Botanic Garden and the Zoo. Ample capacity exists on those routes to carry BioPark traffic during the workday, evenings and weekends. To the extent that visitor traffic overlaps with the afternoon commute period, most visitors travel in the opposite direction to commuter traffic.

## BY PUBLIC TRANSIT

Transit access is very good for the Aquarium/Botanic Garden with both regular and Rapid Ride routes on Central Avenue. Stops are located immediately adjacent to the Aquarium. Frequent service is available weekdays and weekends. Transit access to the Zoo is more limited with routes operating on weekday and Saturday schedules one block east of the Zoo on 8th Avenue. All routes connect the BioPark to the Alvarado Transit Center downtown and the Rail Runner commuter train.

## BY BICYCLE & NON-MOTORIZED TRANSPORTATION

Bicycle access to the ABQ BioPark from downtown and surrounding neighborhoods is available via surface streets as well as the Paseo del Bosque, the regional bike trail running along the north bank of the Rio Grande. The City has dedicated bike lanes on Tingley Beach Drive, parts of Central Avenue and 10th Street NW in front of the Zoo; a dedicated bike boulevard on Mountain Road NW; sharrows on Park Avenue SW; and bike signs (share the road) on Iron Avenue SW, 7th Street SW, and New York Avenue SW.



# INVENTORY & ANALYSIS

The Paseo del Bosque trail connections adjacent to the BioPark occur at Mountain Road NW at the north end of the Botanic Garden, at Rio Grande Valley State Park to the south of the Botanic Garden adjacent to the northwest corner of the Central Avenue bridge, and at two connection points within Tingley Beach. The City has designated bike lanes and has a bicycle master plan showing improvements to the system surrounding the BioPark.

## BY FOOT

Pedestrian access to the ABQ BioPark from downtown and surrounding neighborhoods is available via sidewalks alongside surface streets as well as the Paseo del Bosque. Visitors can enter the Aquarium/Botanic Garden entrance from the New York Avenue/Central Avenue sidewalks. Pedestrians going to the Zoo arrive via the sidewalk along Tenth Street. There are several walkways and paths that allow pedestrians to access Tingley Beach.

## VEHICLE PARKING

BioPark attendance peaks in the spring and summer and on various special event days. Special events generate the highest numbers of visitors, such as Zoo Boo, the River of Lights and summer evening concerts. Throughout the year, the vast majority (approximately 95%) of visitors arrive by car. This is true of visitors who are area residents as well as those who are tourists from elsewhere. Parking demand meets or exceeds supply at the Zoo on approximately 60 days per year. On those days, visitor vehicles spillover to the neighborhood, or to the Aquarium/Botanic Garden lots. For some special events, visitors may also park downtown and ride a shuttle to the Zoo.

Parking is almost evenly divided between the Zoo and the Aquarium/Botanic Garden yet demand is tilted more heavily toward the Zoo.

This imbalance in supply and demand means that visitors need to move between the two areas on busy days to use available parking.

At the Aquarium/Botanic Garden, parking demand exceeds supply on approximately 15 to 20 days per year due mainly to the River of Lights Festival. Spillover parking for that festival mostly goes to the Zoo, requiring a shuttle to get visitors back and forth.

While parking shortages occur individually at the Zoo or Aquarium/Botanic Garden, the BioPark as a whole rarely experiences a shortage. Overall, the BioPark faces parking shortages on only 2 or 3 days per year.

## MOVING AROUND IN THE BIOPARK - VISITORS

### BY SHUTTLE

A high-speed, high-capacity shuttle linking the Zoo-Tingley Beach-Botanic Garden/Aquarium is desired to provide a quick and entertaining connection from 'gate-to-gate' that will maximize visitation and length of stay. This shuttle is needed to efficiently move visitors between the Aquarium/Botanic Garden, Tingley Beach, and the Zoo.

Visitors currently purchase Combo Passes to ride the train connecting the Aquarium/Botanic Garden and the Zoo. However, busier days such as Saturdays through the spring and summer generate more demand than the train can handle. The existing train is the primary means to shuttle visitors from available parking to their destination.

The currently limited frequency (1 train every 30 minutes), means visitors can often face long wait times. This also results in the midday suspension of Combo Pass sales on busier days in order to ensure sufficient return capacity. Any future shuttle should be limited to its own road circulation route and not interact/intersect

visitor pathways. It should also have minimal intersections with service roads.

### BY FOOT

Visitors enter the Aquarium/Botanic Garden entrance from the parking lots to the north and east and from a pathway connection to the train station from the south that goes through the parking lots. At the Zoo visitors enter from the parking lot to the east.

There are few directional signs for visitors within the BioPark, particularly at the Zoo. Directional circulation is currently managed with the distribution of printed maps to visitors that show the layout of the Aquarium, Botanic Garden, and Zoo. A clear wayfinding plan should be part of any new work at these locations.

An additional key to wayfinding is the development of a path hierarchy. The main circulation routes should be wide arterial paths that lead to primary destinations or nodes. From these nodes narrower meandering paths will lead to exhibit viewing areas to create a more quiet and immersive experience.

There are several animal exhibits at the Zoo where paths currently surround multiple sides of an exhibit. This is detrimental to both the animal and to the visitor. It is recommended that defined viewing areas should be created and screened to prevent cross-viewing (visitors seeing other people across the exhibit) as well as give visual areas of relief to the animal on view.

Concessions and retail venues are difficult to find and do not capitalize on "walk-by" visibility. These amenities should either be relocated, or circulation should be directionally adjusted to improve access and visibility.

Separation of service drives and public walks is needed.





## BY VEHICLE

Several other items that were raised in the public survey included additional means of non-pedestrian circulation.

- A people mover (extended golf cart) is desired during the hotter periods to allow for full exploration of the Zoo without tiring.
- The train is desired to remain at the Botanic Garden. It is recommended to expand it to the new exhibits to allow for fuller exploration of the Botanic Garden.

## MOVING AROUND IN THE BIOPARK - STAFF

Within the BioPark, staff vehicles travel the perimeter roads of the Zoo and Botanic Garden the majority of the time. This allows service access to back-of-house facilities. Occasionally service vehicles will travel on internal pedestrian paths that are wide enough to accommodate such vehicles. Emergency vehicle access is provided on these perimeter service roads as well as internal paths where possible.

At the Zoo and the Botanic Garden, service roads should be connected to allow looped and continuous back-of-house circulation with a minimum of security gates.

Where possible, service drives should be separate from public paths.

## VISITOR AMENITIES

A number of small concession buildings at the Zoo lack visibility and directional signage in order for the visitor to find and utilize them. Several of these concession buildings are in need of updating and will be addressed as part of a separate concessionaire contract.

There are five restrooms at the Zoo, two in the Aquarium, two at the Botanic Garden, and one at Tingley Beach. One of the top issues

raised in the public survey dealt with both the quantity and quality of the restrooms. There is an insufficient number of restroom facilities throughout the BioPark and during peak visitation days they are difficult to keep clean.

Another survey item requested more chilled drinking fountains throughout the BioPark. Currently, there is one each at the Aquarium, Botanic Garden, and Tingley Beach. A new drinking fountain will be available at the Botanic Garden with the opening of the Desert Rose Garden. At the Zoo, six drinking fountains are currently available (located at Africa, New Mexico restroom, Cottonwood Park, Birds of Prey, Phoenix Plaza and the Reptile building). During periods of hot weather, there can never be enough drinking fountains.

Spaces (indoor & covered outdoor) are needed throughout the ABQ BioPark to gather small groups for docent-led demonstrations, workshops, lectures, etc.

Provide ample shade opportunities alongside all pedestrian circulation routes.

## BUILDINGS - AQUARIUM & BOTANIC GARDEN

The majority of buildings at both the Botanic Garden and Aquarium were constructed and opened in 1996 and are in relatively good condition. There are some maintenance issues that have been identified as part of a BioPark-wide building assessment. The education classrooms, a collection of temporary buildings pieced together to form a centralized education facility, has reached the end of its usable life and is in need of replacement.

## BUILDINGS - TINGLEY BEACH

The station building was built and opened in 2005 and is in generally good condition.

## BUILDINGS - ZOO

A number of animal holding buildings are adequate for ongoing use if proposed renovations and upgrades (identified as part of a BioPark-wide building assessment) are enacted. There are 22 buildings that are recommended to be demolished and replaced rather than remodeled due to building and utility costs involved.

*Additional assessment information including an individual review of each building and exhibit is available in the Appendix.*

## BUILDINGS - RECOMMENDATIONS

### EDUCATION BUILDINGS

Provide sufficiently-sized climate-controlled spaces for all education staff that includes desks and computers for full-time employees and work stations for volunteers/docents, the ability for both on- and off-site education presentations (cameras for remote learning, etc.), space for education programs and camps, space for small meetings, restrooms, drinking fountains, and outdoor shaded meeting/teaching spaces.

### MAINTENANCE AND HORTICULTURAL BUILDINGS

Provide new horticultural buildings: greenhouses, lath houses, chemicals storage, offices, research space, composting center, bulk materials storage bins (topsoil, bark, gravel, etc.) at the proposed location in the north end of the Botanic Garden.

Provide new maintenance buildings: River of Lights storage, facility storage, shops (fabrication, equipment repair), train maintenance building and covered side tracks, people mover maintenance & storage, trash & recycling, 'boneyard' materials storage



# INVENTORY & ANALYSIS

## ADMINISTRATIVE BUILDINGS (ZOO AND BOTANIC GARDEN)

Provide sufficiently-sized climate-controlled spaces for all administrative staff that includes desks and computers for full-time employees and work stations for volunteers/docents, the ability for both on- and off-site presentations (camera/screen for online meetings), space for small meetings, restrooms, drinking fountains.

## SECURITY (ZOO, BOTANIC GARDEN, TINGLEY BEACH)

Provide a central climate-controlled space for use by all security staff that includes desks and computers for monitoring security cameras and alarms, restroom, and drinking fountain. Provide conditioned security stations at each entry point to the Zoo, Botanic Garden/Aquarium and the Bosque Interpretive Center at Tingley Beach. Provide security fencing around all access doors to the Aquarium and proposed otter exhibit. Provide security fencing around the entirety of the Botanic Garden sufficient to meet Association of Zoos and Aquariums standards for perimeter fencing. Provide wireless means of communication to all security staff on duty (walkie-talkies). Provide security manual at each entry point. Provide a system to verify security personnel have observed all elements of the BioPark (wand/keycard checkpoints).

## ANIMAL HOLDING BUILDINGS

Provide sufficiently-sized climate-controlled spaces for all animal keeper staff that allows for efficient animal food prep, desks and computers for record-keeping and research, small library, mini-fridge for people food, the ability for both on- and off-site animal observation (cameras), space for small meetings, and a restroom. Showers provided where required, lockers for storage, and hot/cold potable water.

## ANIMAL HEALTH CARE - CLINIC & COMMISSARY

ABQ BioPark Zoo Animal Welfare program is directed by Rick Janser and is led by zoo veterinarian(s) Dr. Carol Bradford and Dr. Ralph Zimmerman.

The veterinary clinic (remodeled in 2007) serves as the quarantine facility for the Zoo. It is 7,210 square feet (s.f.) in size with an additional 928 s.f. for Necropsy. The Aquarium has a separate quarantine (built in 1998) dedicated to quarantine and treatment of fish. Both facilities comply with standards published by the Association of Zoos and Aquariums (AZA) and American Association of Zoo Veterinarians (AAZV) standards.

The veterinary clinic holding areas consist of seven small animal holding rooms, three large animal holding cages with indoor/outdoor access and a barn with 6 large inside stalls, with access to variably sized outdoor paddocks.

All of the small animal holding rooms are designed to be adapted to a variety of avian, reptile or mammal species by the addition of branches for perching, rolling (smaller) aluminum caging or left open for larger species. All of the small animal holding rooms have 100% air exhaust separate from adjoining rooms to prevent aerosol cross-contamination.

The quarantine area for the Aquarium consists of a large open room within the Aquarium containing a number of variably sized tanks, ranging from 10-foot diameter pools to small 10-gallon glass fish tanks. There is also a building in the Zoo maintenance area used as fish quarantine and holding. This building contains two 20-foot diameter pools and two 16-foot diameter pools for holding sharks and other large fish, as well as two multi-tank systems containing 50-gallon glass aquariums and several stand-alone tanks ranging in size from 300 gallons to 1000 gallons.

All animal food for the Zoo, Aquarium and Heritage Farm is ordered,

stored and prepped in the Commissary at the north end of the Zoo and finished in the various animal holding buildings. There is also a freezer at the Aquarium to hold smaller quantities of fish.

Recommended Clinic Improvements:

1. The outdoor holding yards backup with water during storm events, provide adequate drainage.
2. Remove the attic at the holding barn, install a new roof, and install large fans for air movement.
3. Provide an additional set of quarantine rooms roughly 12 foot by 12 foot in size.
4. Update kitchen to remove all wood cabinets, replace with stainless steel cabinets and countertops, new floor and freezer
5. Provide additional storage
6. Research use of a tissue digester in lieu of incinerator (technology may not exist in state, may need new incinerator)
7. Add scales & squeezes at all animal holding buildings in the zoo to enable vet management insitu.

## HABITATS & EXHIBITS

Existing exhibits are currently grouped both taxonomically (e.g. Cats, Reptiles) and bioregionally (e.g. Africa). Many were built during the late 1970s through the mid 1990s and are smaller than desired. Most are at or below the visitor's eye level, do not display the animal in optimal conditions, and require keeper management through a behavioral enrichment program to maintain animal well-being. There is an abundance of faux rock and dirt walls made from concrete that reflect heat onto the public walkways and into the animal exhibits. Shade structures have been installed to provide some relief from direct sunshine during periods of warm weather for zoo visitors and animals.



# INVENTORY & ANALYSIS



A more detailed understanding of each animal's native habitat should be communicated by creating exhibits that mimic specific eco-regions based on the desert and semi-arid regions of the world.

All exhibits should be further developed with a well-researched and thorough understanding of the world region and habitat that they are meant to represent. Topography, rockwork, vegetation, soil, water features and natural light levels should match the animal's natural habitat conditions.

Landscapes should extend beyond exhibits to enclose the visitor and create a sense of "immersion" in the animal's natural environment.

Each animal should be offered a variety of environments including water, sun, shade, protection from weather, behavioral enrichment, and off-view areas.

Exhibits should be designed to display the animal at an elevation above the viewer's eye level, creating a psychological sense of security for the animal, and increased respect from the visitor.

Older exhibits should be demolished or remodeled where noted/proposed.

Fenced exhibits should be reconfigured to focus views onto the animals, screen containment barriers from visitors, and eliminate cross viewing of other visitors.

## STAFF ACTIVITIES & SUPPORT

### EDUCATION AND PROFESSIONAL DEVELOPMENT

Currently, the BioPark is active in a number of professional organizations, conferences, presentations, research, goal setting - includes participation and leadership in a number of Association of Zoos and Aquariums (AZA) and American Public Gardens Association (APGA) conservation programs.

Conferences and Organizations attended by BioPark staff:

- Association of Zoos and Aquariums Annual Conference
- Association of Zoos and Aquariums Mid-year Conference
- Association of Zoos and Aquariums Regional Conference
- American Association of Zoo Keepers



- Association of Zoological Horticulturists
- American Public Gardens Association
- Animal Behavior Management Association
- American Association of Zoo Veterinarians
- Association of Zoo Veterinary Technicians
- Elephant Manager's Association
- Conference on Elephant TB Research
- Conference on Environmental Enrichment
- Animal Training Conference
- Aquatic Animal Life Support Organization
- Zoo & Aquarium Association Australia
- Regional Aquatic Workshop
- African Painted Dog Conference
- Invertebrates in Education and Conservation
- Botanic Garden Conservation International
- New Mexico Think Trees
- Southwest Marine and Aquatic Educators Association
- New Mexico Organic Farming
- North American Japanese Garden Association

Conferences and Organizations attended by BioPark staff, cont.:

- Cactus and Succulent Society of America
- Southwest Rare Plant Conference
- American Iris Society Regional Conference
- American Rose Society Regional Conference
- National Education Outreach Network
- New Mexico Science Teachers Association
- Environmental Education Association of New Mexico
- Women in Science
- Association of Science and Technology
- New Mexico Dreambuilders Workshop



# INVENTORY & ANALYSIS

## CONSERVATION PROGRAMS

Conservation Programs currently within the BioPark and led by or in participation with BioPark staff:

### Amphibians and Insects

- Northern Leopard Frog Breeding & Reintroduction Program
- Rare & Endangered Tarantulas (10 species currently)
- Walking Stick Breeding Program
- Terrestrial Invertebrate Taxon Advisory Group
- Monarch Watch
- North American Pollinator Protection Campaign
- Xerces Society

## Animals

- Association of Zoos and Aquariums Accreditation Inspector
- Ape Taxon Advisory Group
- Felid Taxon Advisory Group
- African Painted Dog Taxon Advisory Group
- Koala Species Survival Program
- Monotreme and Marsupial Taxon Advisory Group
- Tasmanian Devil Species Survival Program
- Tasmanian Devil Studbook Keeper
- Snow Leopard Studbook
- Flamingo Studbook
- Herpetology Taxon Advisory Group
- Crocodile Biology & Captive Management
- Zoo d'Abidjan in Cote d'Ivoire
- US Dept. Fish & Wildlife - silvery minnow, sand dune lizard
- NM Game & Fish Dept . - Jemez Salamander & Narrow-headed Garter Snake

## Plants

- New Mexico State Forestry
- New Mexico Natural Heritage Foundation
- New Mexico Rare Plant Technical Council
- New Mexico Penstemon Society
- APGA Plant Sentinel Network
- Agave parryi var. cousei (from Arizona) – Couse Agave
- Agave parviflora var. parviflora (from Arizona) – Small-flower Agave
- Amsonia fugatei Fugate's amsonia
- Ancistrocactus tobuschii (from Texas) – Tobusch Pincushion Cactus
- Argemone pinnatisecta – Sacramento Prickly Poppy
- Atriplex griffithsii – Griffiths Salt Bush
- Coryphantha ramillosa (from Texas) – Bunched Cory Cactus
- Coryphantha robustispina var. scheeri – Scheer Pincushion Cactus



*Phoenicopterus ruber ruber*, Caribbean flamingo



*Brachypelma boehmei*, Mexican Fireleg



*Sarcophilus harrisii*, Tasmanian devil



# INVENTORY & ANALYSIS



- *Cylindropuntia* unnamed species – Organ Mountain Cholla
- *Cylindropuntia viridiflora* – Santa Fe Cholla
- *Echinocereus fendleri* var. *kuenzleri* – Kuenzler Hedgehog Cactus
- *Escobaria sneedii* var. *koenigii* – Koenig Snowball Cactus
- *Escobaria sneedii* var. *leei* – Lee Pincushion Cactus
- *Escobaria sneedii* var. *organensis* – Organ Mountain Pincushion Cactus
- *Escobaria sneedii* var. *sandbergii* – San Andreas Mountain Pincushion Cactus
- *Escobaria sneedii* var. *sneedii* – Sneed Pincushion Cactus
- *Escobaria sneedii* var. *villardii* – Sacramento Mountain Pincushion Cactus
- *Opuntia arenaria* – Sand Pricklypear
- *Pediocactus knowltonii* – Knowlton Pincushion Cactus
- *Peniocereus gregii* var. *gregii* – Night-blooming Cereus
- *Penstemon neomexicanus* – New Mexico Penstemon
- *Sclerocactus mesa-verdae* – Mesa Verde Cactus
- *Panax quinquefolius* - American Ginseng
- *Sanguinaria canadensis* - Bloodroot
- *Actaea racemosa* - Black Cohosh
- *Caulophyllum thalictroides* - Blue Cohosh
- *Echinacea* spp.
- *Hydrastis canadensis* - Goldenseal
- *Cypripedium* spp. - Lady's Slipper Orchid
- *Lomatium dissectum*
- *Ligusticum porteri*, L. spp. - Osha
- *Drosera* spp. - Sundew
- *Dionaea muscipula* - Venus' Fly Trap
- *Dioscorea villosa*, D. spp. - Wild Yam
- *Arnica* spp.
- *Asclepias tuberosa* - Butterfly Weed
- *Frangula purshiana* (*Rhamnus*) - Cascara Sagrada
- *Gentiana* spp.
- *Lobelia* spp.
- *Adiantum pendatum* - Maidenhair Fern
- *Mahonia* spp. - Oregon Grape
- *Salvia apiana* - White Sage
- *Anemopsis californica* - Yerba Mansa



*Agave parviflora* var. *parviflora*, Small-flowered agave



*Opuntia arenaria*, Sand pricklypear  
Wphoto: Gary A. Monroe



# INVENTORY & ANALYSIS

## UTILITIES & STORM WATER MANAGEMENT

While this assessment does not include a full utility evaluation, a few general observations can be made:

- Several areas employ combined storm water and sanitary sewers. A storm water management strategy should separate the storm water from the sanitary sewer pipes.
- Irrigation water is drawn from the municipal water system. Irrigation design should use natural storm water or recycled grey-water.
- A study of the Rio Grande flood patterns should be conducted to anticipate physical impacts.
- Storm water management should strive to reduce dependence on piped systems and employ natural cleansing, surface storage and restoration of natural hydrology.
- The Rio Grande's hydrology (affect on ground water and the water table) and sustainable storm water management should be demonstrated and interpreted.

## UTILITIES RECOMMENDATIONS

Through the study of the existing conditions of the BioPark as a whole there are a number of recommendations that can be noted within this Master Plan that include improvements and procedures to be completed for each site. Following is a list of those recommendations starting with general overall best management practices that are recommended to be implemented, followed by more site specific recommendations.

### GENERAL

From a utility standpoint there are a few general procedures the ABQ BioPark should consider to help determine future steps needed to help ensure the BioPark as a whole is running efficiently with sustainable practices.

- An audit should be performed on all buildings to remain associated with the BioPark by an independent company to determine the exact efficiency of each building as it relates to other similar buildings. This audit shall include a review of the existing buildings' power usage, water usage, and current roof drain runoff system. The audit will monitor each building and determine areas that the building could improve upon based on a metric of comparison. The recommendations may include (but are not limited to) updating lighting and plumbing fixtures, solar panel usage, cistern use, implementation of water treatment facilities to use grey water for irrigation, among others.
- Separate private electric meters should be provided to each building or building cluster so the BioPark staff has an opportunity to measure the usage of each building and can closely study and address areas of the BioPark that might cause issues and escalated power usage.

- Areas noted by BioPark staff that have storm event related flooding and ponding issues shall be addressed by completing a detailed topographic survey of the affected areas and engaging a civil engineering firm to determine the best approach to resolving the issue.
- Specific utility corridors in the back of house shall be considered for major trunk infrastructure (i.e., water, sewer, power, IT, gas, etc.) to create a centralized location for repairs and service while avoiding conflicts or shuts downs within public park areas.
- A sustainability component shall be closely considered when planning new exhibits. Areas and opportunities for water harvesting and roof runoff usage are strongly encouraged and recommended.

## BOTANIC GARDEN AND AQUARIUM

The Aquarium and Botanic Garden should follow the general recommendations. Any new construction (i.e. structures, parking, etc.) shall consider all aspects of sustainable design including, but not limited to, water harvesting areas, bio-swales to convey drainage, pervious surfaces for parking or other proposed hardscape, and opportunities to explore rainwater usage onsite.

- The BG currently utilizes pervious areas for overflow parking at the south end. This same pervious treatment should be considered for a portion of the existing parking to the north to reduce the amount of runoff. Alternatively, providing curb openings within the islands in the main parking lot allows for drainage to enter the landscaped area.
- Covering the existing parking with solar panels which in turn serves the facility to help supplement the current usage should be considered.



- Based on the water meter data, the Aquarium and Botanic Garden use a significant amount of water but have stayed consistent over the past eight to nine years. Understanding the water requirements and ways to improve the usage should be considered where possible and include the use of non-potable water where available. Evaluation of the Aquarium's filtration system and backwash may allow for significant water savings through the use of new filter media as well as constructed wetlands to recycle and backwash water before reuse elsewhere in the Botanic Garden.

## TINGLEY BEACH

Tingley Beach should follow the same general recommendations. Any new construction (i.e. structures, parking, etc.) shall consider all aspects of sustainable design previously mentioned.

Based on the current water billing, Tingley Beach appears to have

two water meters associated with the site. Over the past 6-7 years there has been a rise in their usage. Steps should be taken to identify the reason(s) behind this increase and determine if any actions are needed to reduce water use.

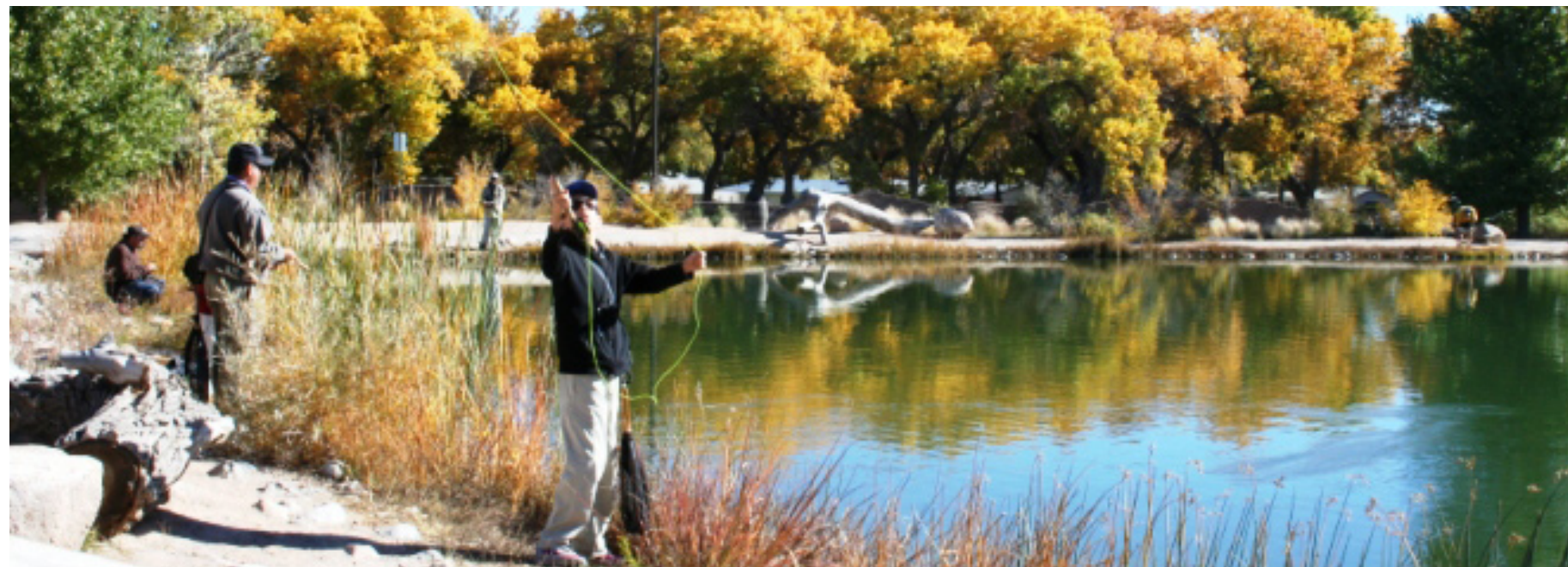
## ZOO

The zoo, being the oldest of the four areas that define the BioPark, has the majority of recommendations. There appear to be a number of areas that cost the zoo staff a great deal of time and money coordinating basic improvements and maintenance on a regular basis. The following recommendations are based on the information received from staff, utility billing information and site visits.

- The zoo is currently being served by only one 8" water meter from 10th Street. This single point of service and internal distribution lines do not allow for adequate pressure during required and basic

maintenance procedures of the various exhibits. We recommend that the zoo install a new 8" meter at the north end of campus and connect directly into the existing onsite distribution lines to allow for both a redundant feed and an opportunity to reduce the pressure issues currently encountered. The redundant feed allows the zoo to operate continuously should one of the metered services need repair or if a public waterline shutdown is required.

- Utilize the well water which currently feeds the existing pond for irrigation rather than directly discharging into the sanitary sewer system. The existing pond could be connected to an irrigation pump and redistributed to the zoo campus irrigation system. This would significantly reduce the total potable water usage.
- Curb openings should be incorporated within the parking lot islands to allow storm drainage to enter the landscaped areas and allow water harvesting to occur.
- Covering the existing parking with solar panels as shade structures for the parking area also serves the facility in supplementing the current electrical usage.
- Staff interviews and public records reveal that some of the existing sanitary sewer is composed of clay pipe. Root intrusion is causing maintenance issues. A formal survey and investigation of the aging onsite sanitary sewer lines should occur to determine specific lines that require removal and replacement.





# PLANNING

## HISTORY

This Master Plan is possible due in large part to the efforts of previous and successfully-implemented master plans. The zoo was opened in 1927 and animal exhibits were added as new species arrived. The **Rio Grande Zoological Park Master Plan**, developed in 1976 by architect Jerry Torr, was responsible for creating the Zoo's first organizational framework. Torr was also the architect for a number of animal exhibits that exist today, such as the Nocturnal House, Tropical America, and the Reptile House. The goal of this 1976 zoo plan was to create "a natural park that simply happened rather than that of a man-made compound."

Equally successful was the 1992 **Albuquerque Biological Park Master Plan** authored by Architectural Research Consultants which led to the creation of the Rio Grande Botanic Garden and the Albuquerque Aquarium in 1996 and the renovation of Tingley Beach Aquatic Park in 2005.

## OTHER PLANNING EFFORTS

There are a number of governing documents (plans, overlays, etc.) created by City, County, State and Federal agencies that may have potential impacts to the implementation of the ABQ BioPark Master Plan. Incorporation of these plan elements as part of BioPark improvements should be considered where feasible when it does not conflict with carrying out the BioPark's mission and Master Plan.

- City of Albuquerque Pedestrian Master Plan
- City of Albuquerque Cultural Plan
- Rio Grande Valley State Park Master Plan
- Rio Grande Vision
- Route 66 Action Plan

- 50 Mile Activity Loop
- Mid Rio Grande Conservation District Irrigation Ditch Plan
- Barelas Neighborhood Sector Plan
- Barelas Pedestrian Bridge Project
- West Central Improvement Plan
- Central Avenue Neon Sign Design Overlay Zone
- Historic Central Metropolitan Redevelopment Plan
- City of Albuquerque Transportation Master Plan
- City of Albuquerque Bikeways and Trails Facility Plan
- Bus Rapid Transit Plan for Central Avenue

## ZONING

The ABQ BioPark is not uniformly zoned. Both Tingley Beach and the north end of the Botanic Garden are zoned R-1 (Residential: Houses). The south end of the Botanic Garden nearest Central Avenue is zoned C-2 (Community Commercial Zone) and the Zoo is zoned SU-2 (Special Neighborhood Zone, Redeveloping Area). See zoning map on pages 16-17.

Currently the R-1 zoning does not readily allow for further Tingley Beach development or new non-residential projects in the northern half of the Botanic Garden. Members of the neighborhood that adjoins the north end of the Botanic Garden have asked whether or not the storage building in this area is allowable, based on the R-1 zoning. The City ultimately ruled that storage buildings for agricultural use were allowed, but this question will likely be raised when Master Plan implementation commences. In addition, the Master Plan proposes both new and remodeled buildings throughout the BioPark which may not be allowed under current

zoning designations noted above.

We would strongly recommend working with the Environmental Planning Commission to re-zone all portions of the ABQ BioPark to 'SU' (Special Use zone) with an 'ABQ BioPark' overlay designation. This would make the entire BioPark a single cohesive planning and permitting unit and allow for a smoother implementation of the entire Master Plan in a timely and coordinated manner.

## LAND USE & FLOOD ZONES

The Land Use designation for the ABQ BioPark varies from vacant (north end of the Botanic Garden); Parks/Recreation (south end of Botanic Garden, Tingley Beach, Zoo); and Public/Institutional (the sewer lift station and fire training tower at the north end of the Zoo). These designations are in line with the current land uses of the BioPark. See land use map on pages 18-19.

The BioPark is flanked by on the south by the Rio Grande and has occasionally flooded. The map on pages 20-21 note that the entirety of the BioPark is protected by levees and is thusly considered to lie within a the '.2% Annual Change Flood Hazard Zone.'





## NEIGHBORHOODS

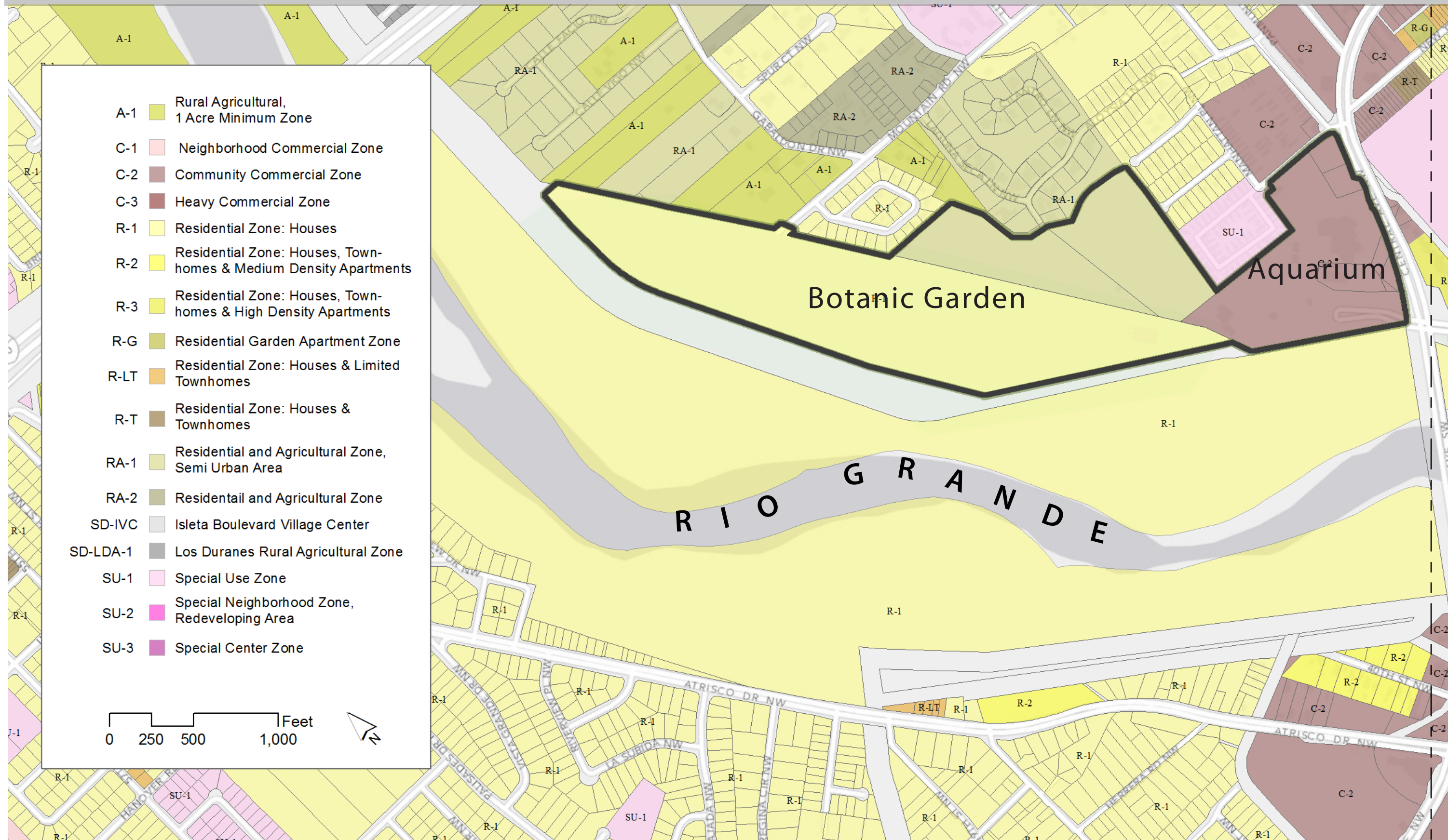
The ABQ BioPark is flanked by the Rio Grande as well as a number of neighborhoods. The Zoo is within the Barelás neighborhood and is the most impacted by overflow parking for Zoo events. The Zoo's service and maintenance entry at the north end abuts the Huning Castle neighborhood. This abutment occurs in alignment with Kit Carson Park. The Huning Castle and West Park neighborhoods also abut the east side of Tingley Drive SW. Note that Tingley Beach does not fall within a designated neighborhood. The Botanic Garden is fully within the West Old Town neighborhood.

The Barelás Neighborhood Association and the Barelás Community Coalition, who are focused on maintaining and improving Albuquerque's oldest neighborhood, are among the most active of the citizen groups near the BioPark. They have been instrumental in getting pedestrian footbridges to span the acequia and connect the neighborhood to Tingley Beach and the Bosque. Their input and collaboration will be vital to the success of the Master Plan.



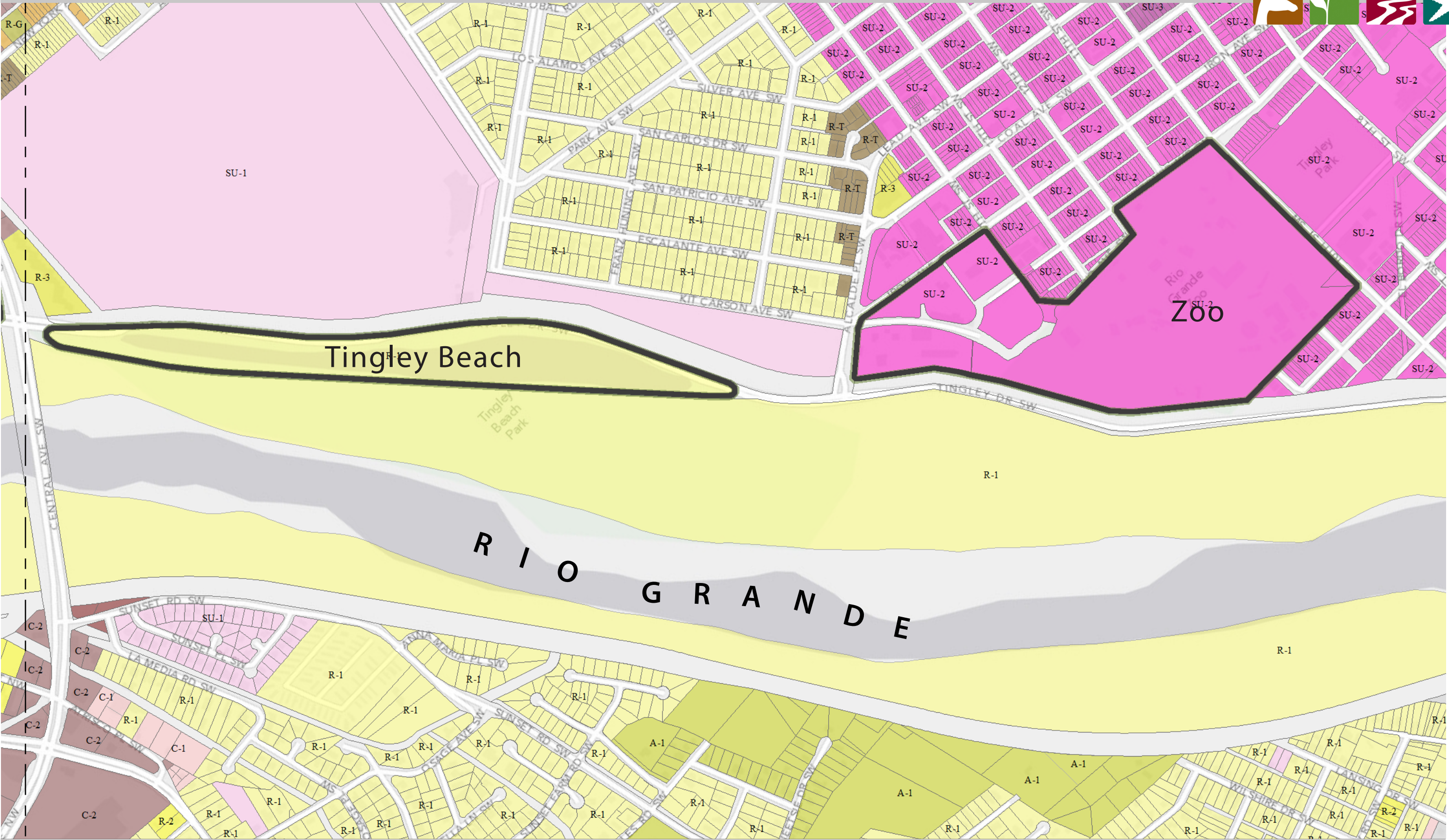


# ZONING



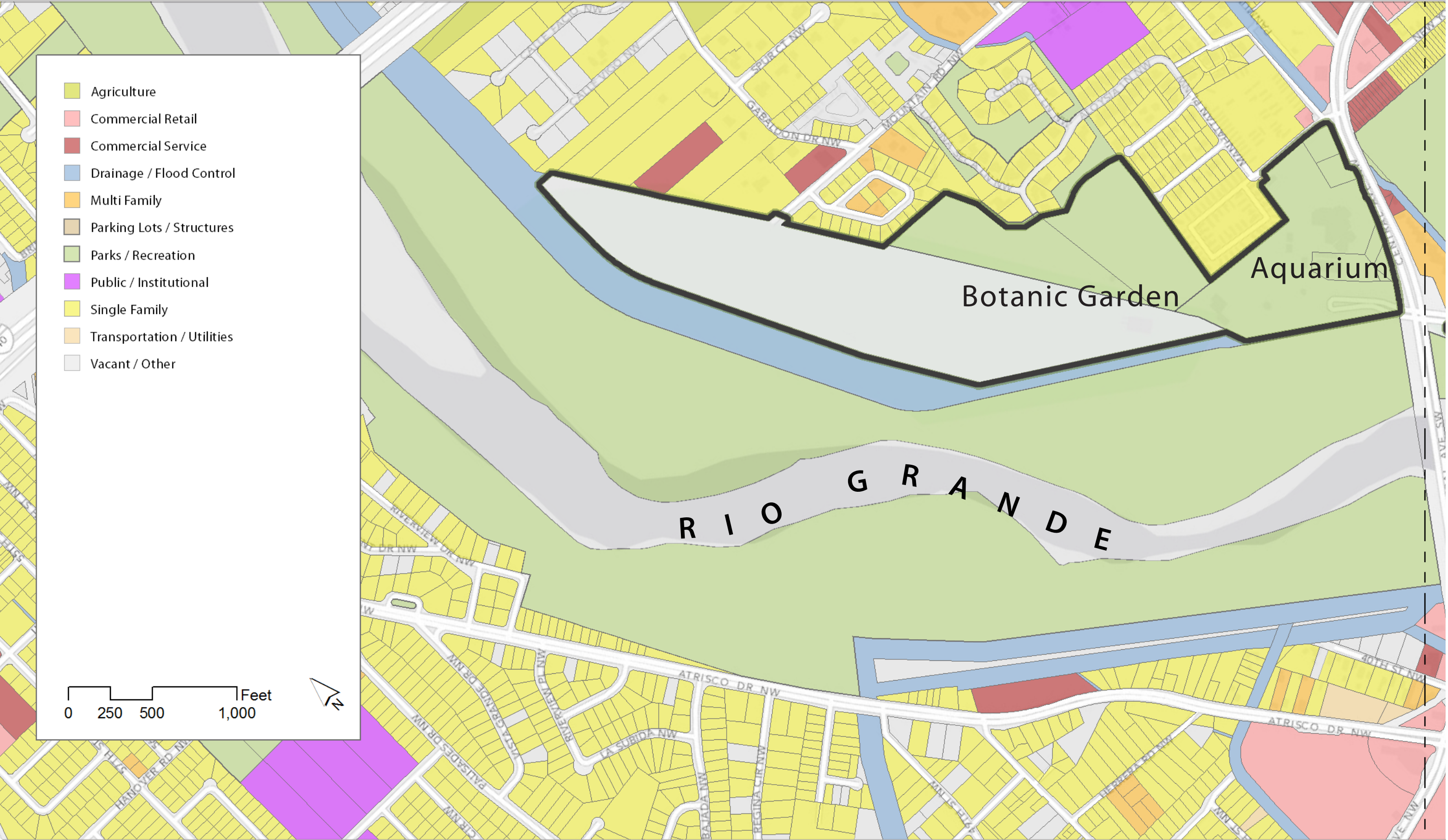


# ZONING



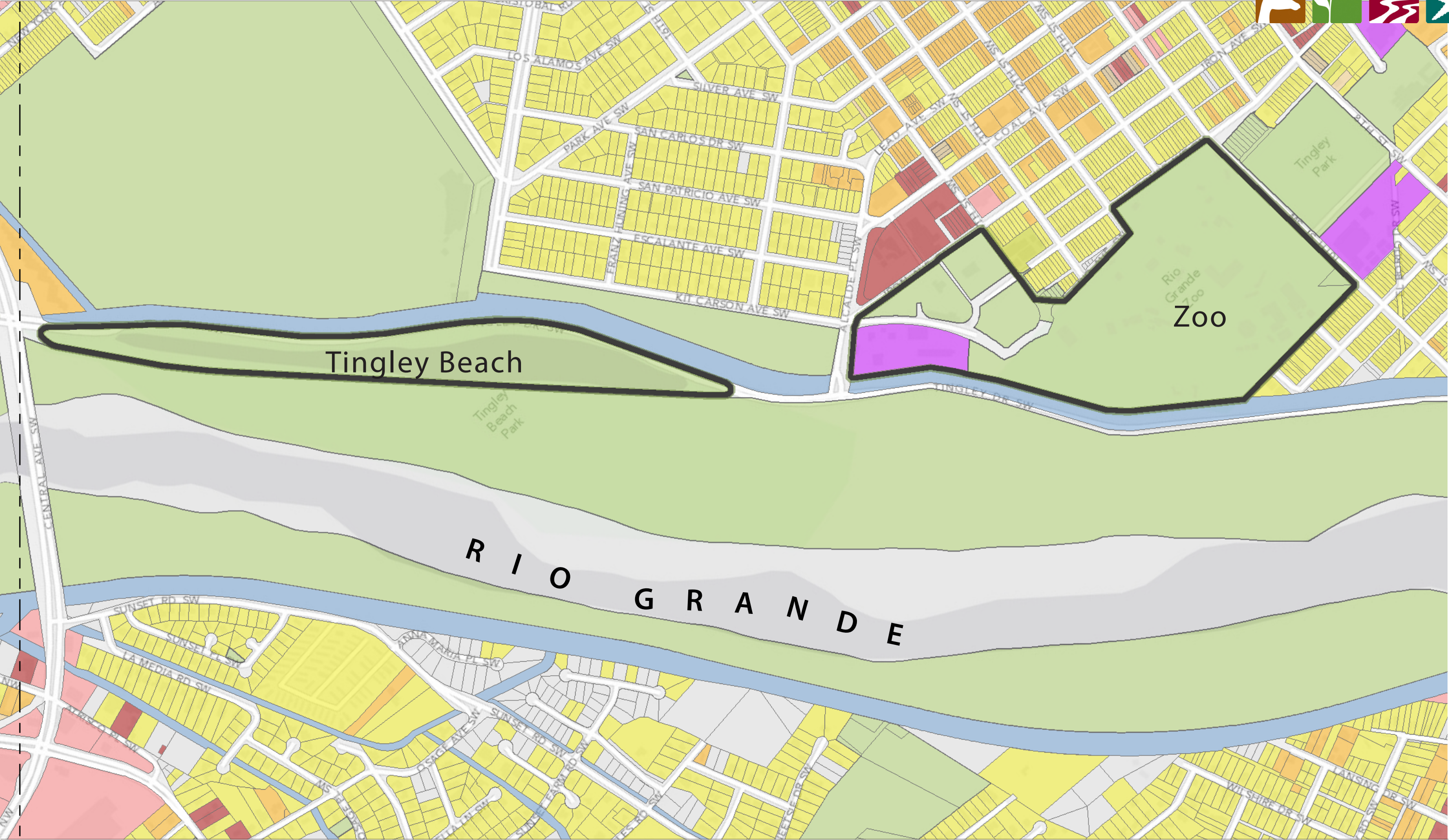


# LAND USE



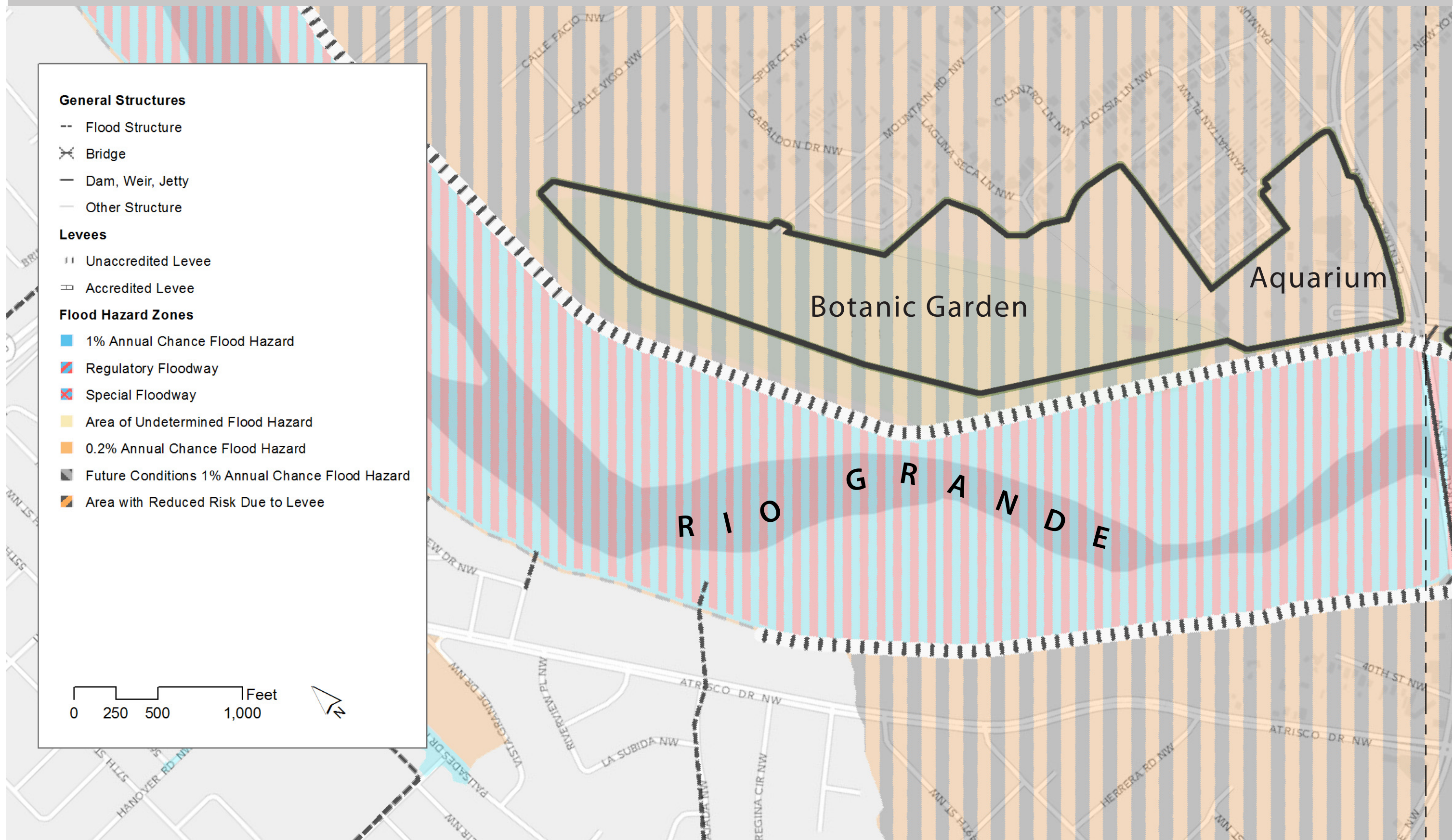


# LAND USE



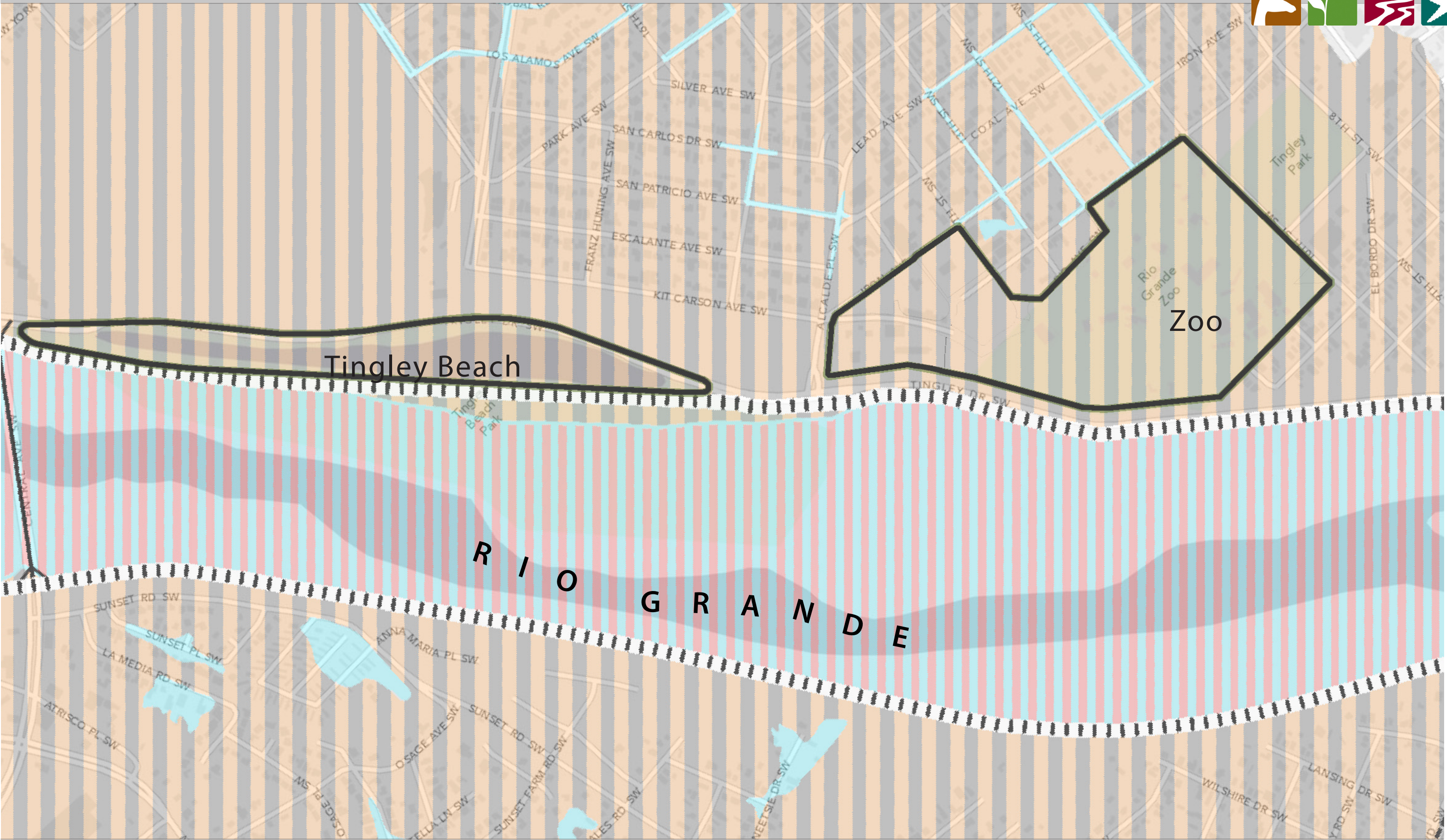


# FLOOD ZONES





# FLOOD ZONES





# MISSION, VISION & OBJECTIVES

## MISSION

This Master Plan for the ABQ BioPark provides habitats and facilities that are critical to managing plants and animals in healthy environments and to ensuring that visitors have meaningful experiences in authentic, realistic environments and contexts. The master plan represents the integration of sustainability, education, recreation, animal husbandry, state-of-the-art technology and outstanding visitor amenities and is designed to further facilitate understanding and appreciation of wildlife and conservation. It is a guideline for the BioPark's future as an established institution. It sets a direction for growth and progress, and lays out a new structure for its development. It is a decision making tool to explore new possibilities, and is intended to be a flexible and dynamic document. The Master Plan should be a vital document and establish essential guidelines. As implementation occurs, the Plan should be revised and updated every six to seven years to ensure that new ideas, technology, and animal husbandry practices are incorporated.

The Master Plan embodies the mission of the ABQ BioPark:

**TO IMPROVE** educational, recreational, and leisure time opportunities for our citizens and visitors.

**TO INCREASE** interest in the New Mexico environment, local conservation issues, and awareness of global environmental concerns.

**TO INCREASE** participation in the environmental stewardship, wildlife conservation, and research programs.

**TO PROMOTE** economic growth through excellence in exhibits and programs.



Southern White Rhinoceros calf - Photo: ABQ BioPark



Harbor Seal Pup with Mom - Photo: Katie Mast/ABQ BioPark



Snow Leopard Twins - Photo: Katie Mast/ABQ BioPark





## VISION

Currently, no overriding organizational theme for the entire ABQ BioPark exists, but several areas of the ABQ BioPark are structured taxonomically (by animal or plant species), biothematically (by world region) or behaviorally. For example, Tropical America, Africa, and Australia, the Desert Garden, and the Japanese Garden are examples of biothematically-grouped exhibits. Amphibians-Reptiles, Great Apes, Large Cats, Rose Garden, are grouped taxonomically. The Nocturnal House and the Children's Fantasy Garden are examples of behavioral organization.

The existing layout allows for an enjoyable visit, but the visitor experience can be enhanced and the BioPark's conservation mission and messages more clearly delivered if an organizational framework is further developed.

- We are proposing that the overarching theme of the ABQ BioPark focus on **Biodiversity in all forms**. This allows existing and future exhibits to be organized taxonomically, biothematically or under other categories as they are developed in the future.
- Site organization should educate visitors about New Mexico wildlife and ecology while drawing parallels/comparisons to other world areas.

The ABQ BioPark can accomplish this by focusing on New Mexico's Rio Grande regional flora and fauna in conjunction with analogue world regions displaying similar desert riverine ecosystems.

## BIODIVERSITY, CONSERVATION & EDUCATION

Biodiversity is a term coined to describe the great richness in plant and animal life of our world. It is more or less equivalent to diversity, when applied to living systems, and it can also be simply defined as species richness, the total of the number of species present in the world or in any region of it.

There are millions of species of animals in the world, and they are disappearing at an ever more rapid pace because of human activities.

An important mission for zoos, aquaria and botanic gardens therefore is to educate the public about biodiversity. These institutions should also participate in efforts to conserve that diversity. Thus a productive way of looking at present and future exhibits is to showcase biodiversity and the ways to conserve it.

### Principles of Biodiversity

- Species richness relates inversely to latitude. In many taxonomic groups diversity is highest in the tropics and declines toward the poles. This is more evident in terrestrial than freshwater organisms and is not always a simple gradient, as it is affected by both climate and topography. The amazement of a temperate-zone naturalist when first visiting the tropics was well expressed by Darwin on his voyage of the Beagle.
- Diversity increases with structural complexity. For example, diversity is much higher in a complex coral reef than on an open sand bottom and much higher in an old-growth forest than an open prairie.
- Rainfall has a strong effect on diversity, as regions of higher rainfall at any given latitude generally have lush, more complex vegetation and thus support more species.

Diversity can be measured at many levels. Ancient diversity can refer to the diversity of higher taxonomic groups at the base of phylogenetic trees—orders and families. Modern diversity can refer to the diversity of lower taxonomic groups at the branch tips—genera and species. One of the goals of the BioPark is to show the public the great variety of plant and animal life and emphasizing ancient diversity can be a good way to accomplish this.

### Conservation Planning

Pick almost any habitat anywhere in the world, and there are likely to be species adversely affected by human activities. Conservation planning by necessity has usually been at the species level. If a species is considered under threat in the wild, then zoos, aquaria and botanic gardens can attempt captive breeding or horticultural propagation. The BioPark already has an impressive breadth of animals, such as: Mexican Gray Wolf, Tasmanian Devil, Micronesian Kingfisher, Komodo Dragon, Ocellated Mountain Viper, and Rio Grande Silvery Minnow (in association with the Aquatic Conservation Facility), but might wish to add more if facilities were to be designed for them. Additionally, the conservation efforts at the Zoo can be coupled with efforts at the Botanic Garden with programs targeting endangered plant species.

For any geographic area or taxonomic group, common species can be used to introduce the public to their endangered relatives. For example, a Hyacinth Macaw exhibit could be used as an introduction to closely related but endangered macaws. The Zoo's help with the conservation of West African Slender-snouted Crocodiles in Cote d'Ivoire could be featured at the Zoo's crocodilian exhibits.



# MISSION, VISION & OBJECTIVES

## New Mexico Plants and Animals

New Mexico has a unique asset in that it lies at the junction of two global life-zones, or ecoregions, with mountain forests surrounding Albuquerque and the northern extent of the Chihuahuan Desert. New Mexico's ecology can be further divided into five recognized sub-ecoregions describing the diverse environments encountered in the state.

In addition to diverse ecoregions, the BioPark has another asset in its unique location bordering the Rio Grande. With the Bosque as a backdrop, the ABQ BioPark has the opportunity to adopt as its purpose the role of interpreting and communicating the rich riverine environmental habitats to the public.

The unused land in the Botanic Garden would lend itself nicely to exhibit complexes featuring native New Mexican/Southwestern animals and plants. The Arizona Sonora Desert Museum and Living Desert State Park are other southwestern institutions that very effectively exhibit small native animals together with the plants of their habitats, and as a major zoo, the BioPark has a similar ability to accomplish this.

## Wish List - Animals to Fill Biodiversity Gaps

The BioPark has a varied collection of animals that present biodiversity quite well, but one aspect of following this theme would be to try to acquire animals from as wide a taxonomic range as possible. For example, the BioPark has representatives of about half of the mammalian orders (Monotremata, Didelphimorphia, Diprotodontia, Proboscidea, Cingulata, Primates, Lagomorpha, Rodentia, Erinaceomorpha, Artiodactyla, Perissodactyla, Carnivora).

Therefore, when additional mammals are considered for various exhibit complexes, attempts could be made to acquire species of these additional orders: Macroscelidea (elephant shrews),

Afrosoricida (tenrecs), Tubulidentata (aardvark), Sirenia (sirenians), Pilosa (sloths & anteaters), Scandentia (tree shrews), Dermoptera (colugos), Soricomorpha (most insectivores), Trichechidae (manatees), Chiroptera (bats), and Pholidota (pangolins). The majority of these animals are missing from most zoos, although bats would be easy to add to the list. Any of the others would be compelling additions to the BioPark's collection.

Small passerine birds are quite underrepresented, considering their diversity, ecological importance, and beauty in both appearance and voice. They can be kept in outdoor aviaries in the Zoo and, if desired, at the Botanic Garden.

## Conservation Opportunities

While the ABQ BioPark's current mission, experience and educational programs promote conservation and participation in a number of programs dedicated to the survival of threatened or endangered species noted in the Association of Zoos and Aquariums (AZA) Species Survival Plans, the new thematic organization of the Zoo will help focus these efforts and introduce a basis for new initiatives.

Currently, the Zoo is active in the following AZA Species Survival Plans:

- |                           |                             |
|---------------------------|-----------------------------|
| • African hunting dog     | • African lion              |
| • Andean condor           | • Asian elephant            |
| • Cheetah                 | • Chimpanzee                |
| • DeBrazza's monkey       | • Golden lion tamarin       |
| • Great hornbill          | • Guam kingfisher           |
| • Hippopotamus            | • Jaguar                    |
| • Komodo dragon           | • Mexican grey wolf         |
| • Ocelot                  | • Palm cockatoo             |
| • Polar bear              | • Siamang                   |
| • Snow leopard            | • Southern white rhinoceros |
| • Sumatran orangutan      | • Thick-billed parrot       |
| • Tree kangaroo           | • Toco toucan               |
| • Western lowland gorilla | • Wolf's guenon             |

Development of the New Mexico **Rio Grande and the Desert and Semi-Arid Rivers of the World** concept will open doors to new conservation efforts for plants and animals, both locally and abroad. This can happen by partnership with existing efforts or through direct action led by the BioPark.

The Botanic Garden is active in conserving the following 'at risk' plant species:

- American Ginseng - *Panax quinquefolius*
- Bloodroot - *Sanguinaria canadensis*
- Black Cohosh - *Actaea racemosa* L.
- Blue Cohosh - *Caulophyllum thalictroides*
- Echinacea - *Echinacea* spp.
- Eyebright - *Euphrasia* spp.
- False Unicorn Root - *Chamaelirium luteum*
- Goldenseal - *Hydrastis canadensis*
- Lady's Slipper Orchid - *Cypripedium* spp.
- Lomatium - *Lomatium dissectum*
- Osha - *Ligusticum porteri*, L. spp.
- Peyote - *Lophophora williamsii*
- Sandalwood - *Santalum* spp. (Hawaii only)
- Slippery Elm - *Ulmus rubra*
- Sundew - *Drosera* spp.
- Trillium, Beth Root - *Trillium* spp.
- True Unicorn - *Aletris farinosa*
- Venus' Fly Trap - *Dionaea muscipula*
- Virginiana Snakeroot - *Aristolochia serpentaria*
- Wild Yam - *Dioscorea villosa*, D. spp.

## Conservation Partnerships

Through partnership with other organizations, the BioPark is able to promote awareness of research, restoration and conservation efforts of other groups to its guests, while gaining exposure to the larger



# MISSION, VISION & OBJECTIVES



audience these groups provide. The efforts can be highlighted in interpretive signage, video, web links, classes and presentations at the zoo. The BioPark can introduce visitors to the national parks and lakeshores, wilderness areas, nature preserves and state parks that illustrate the Rio Grande and house many of New Mexico's distinct geology, native plants and animals. While further investigation and outreach discussion will be needed after completion of the Master Plan, the BioPark's current partners include:

- US Fish and Wildlife
- New Mexico Game and Fish
- New Mexico Native Plant Society
- University of New Mexico Molecular Genetics & Microbiology Department
- University of New Mexico Landscape Architecture Department
- University of New Mexico Anthropology Department
- Army Corps of Engineers
- Middle Rio Grande Conservancy District

## Local Conservation Efforts

With the City of Albuquerque staff and the New Mexico BioPark Society support, the ABQ BioPark has the ability to take an active leadership role in local conservation efforts. While surrounded by numerous opportunities, one possibility would be adoption of the adjacent portion of the Rio Grande.

Located on its banks, the ABQ BioPark could become the protector, care-giver and interpreter of Albuquerque's river. Mobilizing BioPark members, citizens, and school groups, the BioPark could organize clean up days, restoration planting, and creation of waterfowl nesting sites. Plant and animal inventories (BioBlitz) could be conducted, and if appropriate, wildlife breeding and reintroduction could be led by the BioPark. As interpreter of the river habitat, the BioPark could assist in the creation of public access trails and boardwalks with interpretive signage about the native wildlife in

the Bosque. These efforts will raise public awareness of the BioPark as a community steward.

There are a number of unique conservation efforts already underway at the BioPark, including work with local garden clubs, the collection of human hair for oil spill clean up and collection of eagle feathers for donation to local Native Americans.w

## Global Conservation Efforts

As the exhibits at the BioPark focus on specific rivers of the world, the conservation efforts abroad may also become focused on specific issues. Areas to be replicated and species to be exhibited may be selected based on research efforts led by BioPark staff or partners such as University of New Mexico (UNM). In addition, efforts led by non-profit and non-governmental organizations may be highlighted to raise public awareness. Exhibits should be developed in conjunction with research into the efforts of groups such as:

- World Wildlife Fund
- Nature Conservancy
- Conservation International
- United Nations Educational, Scientific and Cultural Organization (UNESCO)

## Educational Messages and Program

The BioPark has a current educational program and goals are focused on conservation, biodiversity, wildlife behavior, and animal adaptations targeted primarily toward school age children and students from nearby University of New Mexico. The primary education programs correspond with multiple subjects in the New Mexico Common Core state standards and offer an opportunity for learning outside of the classroom. In Fiscal Year 2013, there were about 320,000 educational interactions at the BioPark and 69,684 off

site interactions made possible by the Zoo-to-You van. The success of the educational programs is aided by the BioPark's volunteers. More than 31,000 hours were contributed by 596 volunteers in the 2013 fiscal year. These dedicated volunteers led tours and outreach programs in conjunction with local teachers.

- The New Mexico BioPark Society's goal is to extend education beyond school children to all BioPark visitors, increasing awareness and respect for the natural world. ABQ BioPark would like to become a learning campus for the region.
- ABQ BioPark's education programs should focus on three targeted groups: school groups, the casual BioPark visitor, and the larger Albuquerque audience beyond the BioPark.
- Education should focus on both the conveyance of information as well as problem-solving to encourage critical thinking and active participation in conservation issues.

**School groups** include students who visit the BioPark, or participate in internships and distance learning. While successful programs are in place, expansion could include:

- Programs that introduce students to Rio Grande region environments and animals with comparison to other river ecosystems, identifying what makes New Mexico and the Rio Grande unique. Education funding may be available by identifying sponsors for programs or forming public-private partnerships.
- New Mexico agriculture and agricultural history programs. What is commonly grown in New Mexico and why it is successful here in this climate, where our food comes from, and the concept of a 'foodshed'.
- Distance learning programs which expand the Rio Grande curriculum to school groups across the state and region. (Zoo-to-You van)



# MISSION, VISION & OBJECTIVES

- Animal health programs demonstrating vet procedures offered to students of all ages.
- Expanding connections to include UNM. Capitalize on the existing research connections between the BioPark and UNM, encourage connections with more departments, such as landscape architecture, horticulture, management and operations, and education.

**Casual visitors** include society members, families with young children, young adults, senior citizens and tourists. These visitors may not need formal programs or tours, but would benefit from:

- Expansion of the current interpretative program to include a message of conservation successes and benefits, and resource management. Interpretative messages should also highlight the unique features of the local New Mexico ecology and the Rio Grande ecosystem.
- Take home information about conservation (local bird species of interest, native plants, the history of the region, how the Rio Grande ties into the larger watershed). Tangible items that can be purchased or offered to BioPark guests such as native wildflower and grass seeds, or zoo doo compost.
- A lecture series for members. This can begin with presentations by staff about animal health, travels, or back of house tours. As the series grows, it can be opened to outside speakers, strengthening the value of BioPark membership.
- Informal hands-on demonstrations by docents providing the visitor with opportunities to touch, smell, and see artifacts such as a snake skin or porcupine quills.
- Self-guided tours for casual visitors such as seniors, adults, and parents with young children.
- Live internet images of back of house facilities providing a better

understanding of animal husbandry.

**The larger City of Albuquerque region** will recognize ABQ BioPark as a learning campus as a result of:

- Expanded partnerships with local and regional institutions (Audubon Society, nature centers, City of Albuquerque Conservation District, New Mexico Department of Game and Fish).
- Presentations, speakers, and special events hosted at the BioPark with local partner organizations.
- Programs with local groups that will draw the conservation-minded public to the BioPark (birders, master gardeners, cyclists).
- Work with the Parks and Recreation Department to incorporate interpretative material along the river trail that draws trail users into the Aquarium, Botanic Garden, Tingley Beach and the Zoo.

**Expansion of the Educational program** will require the following physical upgrades:

- Signage throughout the BioPark to reinforce the consistent message of conservation.
- Updated or relocated amphitheater space and outdoor classroom space for school groups and public presentations, ideally located close to the BioPark entries and education centers.
- Information technology and broadcast procedure improvements to increase the number of distance learning programs offered.
- Improvements at Tingley Beach to create the Bosque Interpretive Center, that will serve as an educational resource center about the Rio Grande.



- Expand all the existing education facilities to include additional storage and classroom spaces that can also be used for presentations.





## OBJECTIVES

### VISITOR EXPERIENCE

Make every visitor feel welcome and important, and engage them in a journey of discovery and recreation.

Provide natural areas and garden spaces which are reflective and inspiring and allow visitors to connect in an emotional manner.

Provide a safe and enjoyable learning environment for all visitors.

Enable visitors to optimize their time at the BioPark through clear and intuitive directional signage, interpretive programs, concessions, and venue rentals.

Provide visitors with a fast and easy shuttle connection between the Aquarium, Botanic Garden, Tingley Beach and the Zoo. This shuttle allows for an additional opportunity for the BioPark to enhance the visitor's experience through audio and visual interpretive elements.

### Guest Services, Circulation & Infrastructure

In addition to an immersive and educational experience, visitor needs must be met in order to create a comfortable and fulfilling experience. Space is needed for families and school groups to gather for discussion or to sit and rest. Restrooms and drinking fountains must be appropriately spaced throughout all areas of the BioPark and properly identified. Appealing food and beverages must be available for purchase and the gift shop must provide shopping options for all ages.

### Gathering Spaces

There are several existing gathering spaces that may require some modifications to meet the needs of increased visitation:

- Orientation Space at the Zoo - Near the main entry, the Welcome Plaza will allow people to meet, review maps and interpretive information to plan their visit. Here, school groups or tours can be organized.
- Orientation Space at the Botanic Garden and Aquarium - This Welcome Plaza has two access points, one from the north for general admissions and one from the south for shuttle riders and school groups. Ticketing is available near the administration building and tickets will be scanned at the entries to both the Aquarium and Botanic Garden.
- The Band Shell Lawn (Zoo) - An event lawn will be modified to accommodate up to 2,000 people for special events. People could view the stage from a variety of angles and temporary seating could be provided.
- The Festival Green (Botanic Garden) - This event lawn will accommodate up to 2,000 people for special events around a permanent stage. People could view this stage from a variety of angles during events or watch the Dancing Waters show in the lake.
- Heritage Farm (Botanic Garden) - The Farm can be set up to seat approximately 30 to 50 people in view of a presenter. This space should be covered for shade and protection from rain or snow.
- African Amphitheater (Zoo) - The Master Plan proposes to retain this 90-seat amphitheater with the addition of shade structures.
- Informal Seating - Throughout the Zoo and Botanic Garden, small spaces with adequate seating for a group of 6 to 8 people will be provided. These spaces should be located near exhibit viewing

areas to encourage more leisurely, long-term viewing of the animals exhibited. Seating should take advantage of shade, and be unobstructed by other circulation. Informal seating should be located to allow a visitor to sit and rest every 10 to 15 minutes during their visit.

### Restrooms & Drinking Fountains

The public survey was quite clear: restroom access and cleanliness has a significant impact on visitor experience. New restrooms will be created throughout the BioPark.

- New drinking fountains will be added at all restroom locations as well as at tram, train and shuttle stops.
- Additional way-finding signage will be added along BioPark paths to help guests locate the restrooms and drinking fountains.

### Food Services

All improvements to the existing concessions within the BioPark are covered under a separate contract. Currently, year-round food service is available at the Aquarium's Shark Reef Cafe and the Zoo's Cottonwood Cafe. There are seasonal food services available: one at the Botanic Garden, one at Tingley Beach, and four at the Zoo.

- Concessions and menu choices could highlight conservation and sustainability by promoting organic farming, and locally available food.
- Food should be an expression of culture with menu choices and a dining environment based upon the local environment or a unique region of the world.
- Menu choices should appeal to all age levels (children and adults), as well as all budgets
- The menu should offer both quick "grab-and-go" items, as well as sit-down options



# MISSION, VISION & OBJECTIVES

- Waste reduction, composting and recycling should be demonstrated by the BioPark concessionaire.
- Concession seating should include areas of shade and protection from rain and snow.
- Food service opportunities should be expanded to include mobile kiosks or stands in additional locations within the BioPark. An example might be in the farm area with healthy items such as fruit snacks or creative beverages such as “Bug Juice.”
- Merchandise at the gift shops should reflect and support the environments and cultures that the BioPark is teaching about. For example, in addition to souvenirs, the stores could provide books about New Mexico wildlife, artwork depicting scenes of New Mexico’s natural environment and crafts from local artisans. Similar items could be provided from the other regions of the world that the BioPark is teaching about.

## Play Areas

Active play is necessary for children to understand their environment, since they learn not only by observing and hearing, but by touching, exploring, mimicking and discovering. Play is also needed to channel energy toward positive, happy experiences and provide interaction with parents, friends and peers. Currently, two specific areas for child play are at the Children’s Fantasy Garden in the Botanic Garden and the playground adjacent to the Education Center at the Zoo. A proposed carousel at the Zoo will add another play dimension to the BioPark. These should be supplemented with hands-on play opportunities spaced throughout the BioPark that will provide brief 10 to 20 minute recreation experiences that also support the immersive environment and educational themes. They should be respectful of their context and have high play value while also teaching about the natural environment, wildlife, and culture. Play elements should be sited in or near gathering spaces with

seating and opportunities for informal docent presentations. All play areas should be ADA accessible and developed in compliance with Consumer Product Safety Council (CPSC) and American Society for Testing and Materials (ASTM) guidelines.

Themes available for further development include:

- Animal sculptures illustrating cultural interpretations and connection to the environment
- Water splash pads illustrating the behavior and dynamics of water
- Climbing structures simulating the natural environment
- Puzzles and mysteries that promote exploration and discovery
- Cultural elements, artworks, games and instruments that connect visitors to the geographic environment

## Retail

The ABQ BioPark currently has four gift shops: two at the Zoo (one at the main entry and the other at the African Village); the Aquarium Gift Shop and the Botanic Garden gift shop both located on the Entry Plaza. Most of the gift shops are positioned to allow guests to purchase souvenirs prior to exiting the BioPark. Based on observations and discussions with staff, retail sales could be developed to address the following:

- As BioPark visitation grows, additional retail opportunities could be provided with seasonal carts. Carts could be located near specific exhibits, such as at the Conservation Center, selling merchandise related to the geography, culture, and messages embodied in the exhibit. These could be operated when justified by high visitation based on historical attendance patterns.
- Expand the Gift Shops to increase the quantity and variety of merchandise displays. Most botanic gardens around the United

States offer a large selection of gardening books and supplies. Expansion of the Botanic Garden Gift Shop would bring the BioPark’s retail offerings to match their peer institutions.

## STAFF SUPPORT

Make every staff member feel welcome and valued. All staff are key to fulfilling the visitor’s journey of discovery and recreation. Finally, the institutional knowledge of the staff is invaluable and forms the basis for the success of this Master Plan.

Provide a safe and enjoyable working environment for all staff. This includes all keeper areas within animal holding buildings as well as providing conditioned spaces with small offices, kitchens, lockers, showers, and restrooms for all staff to use.

Develop, implement and maintain industry-standard best practices for staff development, research and education. Empower staff through on-going training, memberships, seminars, webinars, conferences, workshops, education, and other professional development opportunities. This could include taking leadership roles within organizations, managing studbooks, Species Survival Plan programs, hosting regional and national conferences, etc.

Provide staff with the necessary tools required to care for the plant and animals within all areas of the BioPark meeting or exceeding their peer institutional standards (Association of Zoos and Aquariums; World Association of Zoos and Aquariums, American Public Gardens Association, National Parks and Recreation Association, American Association of Zoo Keepers, Association of Zoological Horticulture, etc.).



# MISSION, VISION & OBJECTIVES



## EDUCATION

We want to tell stories and turn visitors into story tellers in order to share the message and mission of the ABQ BioPark. We can do this through the following methods:

Challenge the public's curiosity about the natural systems, history, flora and fauna of the Rio Grande and the New Mexico region in an engaging and entertaining way.

Provide opportunities for visitors to learn and pursue knowledge at a personal level and pace through a variety of media, both at the BioPark and off-site.

Expand outreach programs to encourage active interest in the natural environment as well as the BioPark's habitats and exhibits in support of its mission and goals.

Develop opportunities for the public to understand and explore the natural beauty of New Mexico.

Raise public awareness of international conservation issues through special event days at the BioPark (Sea Turtle Awareness Day, Cactus Day, Shark Week, Raptor Awareness Day, etc.)

## EXHIBITS & HABITATS

Develop exhibits that present the relationships of all parts of nature, including plants and animals, and the presence of human culture as part of the whole.

Develop connections between all BioPark habitats and exhibits to reflect complexities and links within and among desert-based natural systems.

Demonstrate leadership and innovation through habitat and exhibit design to create immersive environments that compell visitors to feel respect and awe for the all the plants and animals in the BioPark.

Present animals as residents and include enrichment programs that support the animals' natural behaviors.

Maintain a holistic exhibit design and presentation of comprehensive stories involving the visitor as an active participant.

## ANIMAL POPULATION

Select, acquire and maintain an animal population that best supports the ABQ BioPark mission.

Maintain the highest standards in meeting the physiological, psychological, medicinal, and social needs of the animals in the care of the ABQ BioPark.

## GARDENS & PLANT COLLECTIONS

Acquire plants and construct gardens and selected habitats that support the ABQ BioPark mission.

Maintain the highest standards in meeting the growth needs of all plants through sustainable means.

Develop a strategy for replacing the aging shade-giving cottonwoods at the Zoo and Botanic Garden as part of a BioPark Canopy Management Plan. Nearing 100 years old, most of the BioPark's cottonwoods are reaching the end their viable lifespan and will require increasingly more resources and horticultural creativity to maintain animal and human safety. Yet these trees truly define the visual character of the Rio Grande. One suggestion would be to replace them with native Fremont Cottonwoods (*Populus fremontii*). They provide the same characteristics as the existing cottonwoods but have greater branching vitality and would require less maintenance over the next 50 years.

## CONSERVATION

Establish and maintain research and outreach programs which support the ABQ BioPark's objectives and goals.

Demonstrate relationships between the Rio Grande regional environment and analogue environments around the world.

Demonstrate leadership in conservation practices with respect to sustainability, facility operations, programs and exhibits.

Practice and encourage the conservation of natural resources, especially within the Rio Grande watershed through thoughtful and interactive displays.

## FISCAL & ENVIRONMENTAL SUSTAINABILITY

Complement ABQ BioPark's conservation efforts in all aspects of design and operations.

Harmonize design utilizing the local climate, watershed, and regionally available materials.

Lead by example and communicate environmental sustainability to the public.

Be financially sustainable.

Focus on regional animal and plant species that demonstrate conservation efforts being climate-appropriate.

Develop sustainability guidelines to govern architecture, gardens, utilities, and building systems as part of the Master Plan implementation.



# THEMATIC CONCEPT

As public gardens and zoos strive to provide a visitor experience based upon plants, animals and habitats, exhibit organizational structure has shifted from taxonomical, where similar species are exhibited together, to biothematic, where animals from similar parts of the world are housed together in realistic replications of their habitats. This shift is evident at ABQ BioPark. The zoo's late 1970s-era structures, such as the primate house and feline house were intended to exhibit animals taxonomically. More recent efforts such as the development of the African Village, is an example of biothematic presentation. Today for example, when one enters the Zoo, he or she is guided by a fold-out map illustrating the continent from which each animal originates, presenting an effort to organize biothematically and provide the guest with a better understanding of worldwide ecology.

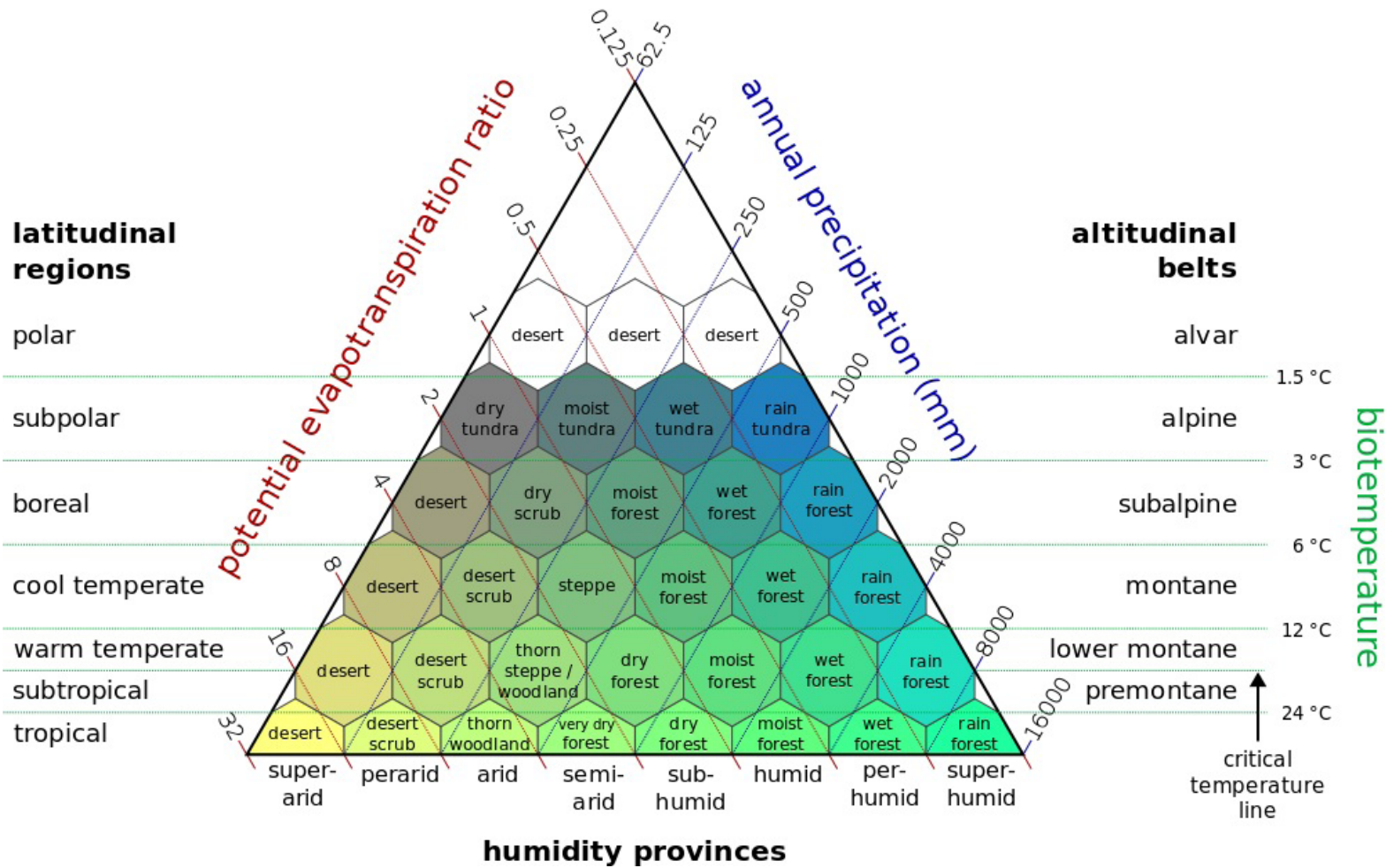
To develop a thematic organization for ABQ BioPark, it was first decided which portions of the world on which to focus. The life zones of the natural world can be organized under a broad classification based on latitude, altitude, and precipitation. This system, known as the Holdridge classification, divides the world into 33 zones of tundra, scrub, steppe, desert, and forest environments that range from polar, boreal, temperate, subtropical, and tropical. Illustrating all 33 of these zones is beyond the reach of any zoo, but selected zones may be well illustrated based on a zoo's location, climate and natural environment.

As noted in the Vision section above, we are proposing that the overarching theme of the ABQ BioPark focus on **Biodiversity in all forms**. This allows both existing and new exhibits to be organized to either taxonomically, biothematically or under other categories as they are developed in the future

New Mexico has a unique asset in that it lies at the junction of two global life-zones, or ecoregions, with mountain forests surrounding

Albuquerque and the northern extent of the Chihuahuan Desert. As previously discussed in the inventory and analysis section of this report, New Mexico's ecology can be further divided into five recognized sub-ecoregions describing the diverse environments encountered in the state.

In addition to diverse ecoregions, the BioPark has another asset in its unique location bordering the Rio Grande. With the Bosque as a backdrop, the ABQ BioPark has the opportunity to adopt as its purpose the role of interpreting and communicating the rich riverine environmental habitats to the public.



Holdridge Habitat Classification Chart





## THEMATIC CONCEPT: RIO GRANDE AND THE DESERT AND SEMI-ARID RIVERS OF THE WORLD

The Desert & Semi-Arid Rivers of the World organizational theme comes to life in ABQ BioPark by reorganizing and developing the BioPark into a series of immersive habitats in which the visitor moves through a variety of diverse landscapes including dense evergreen forests, leafy deciduous forests, and open grassland savannas encountering animals within their natural environments. This approach groups animals by ecoregion, placing all New Mexico animals together, all African savanna animals together, etc. These habitats will transition seamlessly from one to another, and within them, the separation between visitors and animals will be hidden resulting in a sense of entering the animal's world. The result is a shift away from looking into animal "exhibits" to a true nature-based experience in which visitors are immersed in the animal's natural environment.

The Master Plan organization makes use of the BioPark's existing tree canopy to determine forest locations and open savanna/grasslands. It also organizes the various environments and animal species to make use of existing buildings, exhibits and infrastructure where possible. The resulting plan introduces the desert river concept into new areas of both the Zoo and Botanic Garden while also being developed around the existing animal and garden exhibits. The plan makes use of the existing exhibits and buildings where possible to supplement the organizational theme.

This thematic organization proposed for ABQ BioPark is based upon immersing visitors in the ecoregions of New Mexico and the ecology of the Rio Grande; and then, introducing guests to other great desert and semi-arid river environments elsewhere in the world. This experience will organize the zoo's diverse animal collection and

conservation efforts into a unified and understandable message that will communicate to visitors an understanding of their home environment and its similarities to, and differences from, other parts of the world.

The ecoregions in the master plan were identified based on:

- Contribution to the ABQ BioPark mission
- Suitability to the New Mexico climate
- Similarity to the ecoregions of New Mexico and the Rio Grande
- Adequacy of space available to comfortably house the animals and their social groups (fewer large, well created habitats are preferred over many smaller, less developed habitats)
- Adequacy of climate to successfully grow and maintain the plants needed to create realistic habitats
- Conservation priority (priority given to species whose global population is in greatest need of conservation)



Riverine Forest

## NEW MEXICO AND THE RIO GRANDE

Upon entering any part of the BioPark, interpretive messaging will greet visitors with the geologic history that gave birth to the Rio Grande and landforms of New Mexico. Then they will tour the diverse environments offered at each of the BioPark's locations.

The Rio Grande is an example of a desert river. A desert river is a river that is able to maintain its flow through a desert because of water received from outside the desert. The Rio Grande landscape changes with the seasons. Exhibiting vibrant spring blooms, a lush summer tree canopy, spectacular fall colors and snow dusted evergreen forests in winter, inviting return visits to witness the ever changing display. Acclimated to New Mexico's climate, the animal inhabitants will be comfortable and exhibit natural behavior year round.

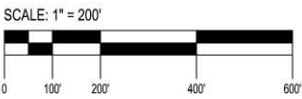
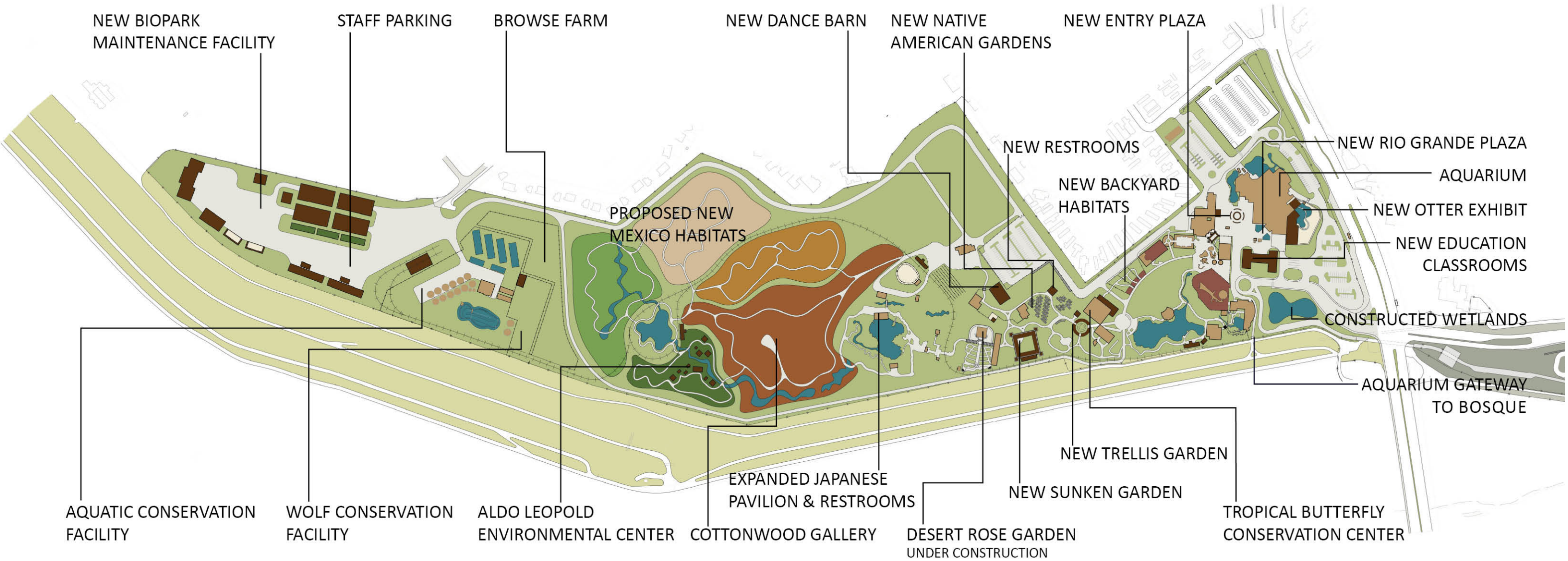
In order to share the widest possible message about the Rio Grande and New Mexico, the Master Plan proposes a number of exhibits that highlight four distinct ecosystems as well as a conservation area that allows staff to continue their critical endangered species work.



# OVERALL PLAN - BOTANIC GARDEN & AQUARIUM

**LEGEND**

- Existing Building
- Proposed Building

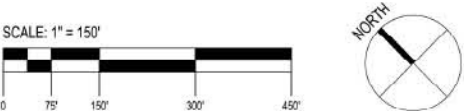
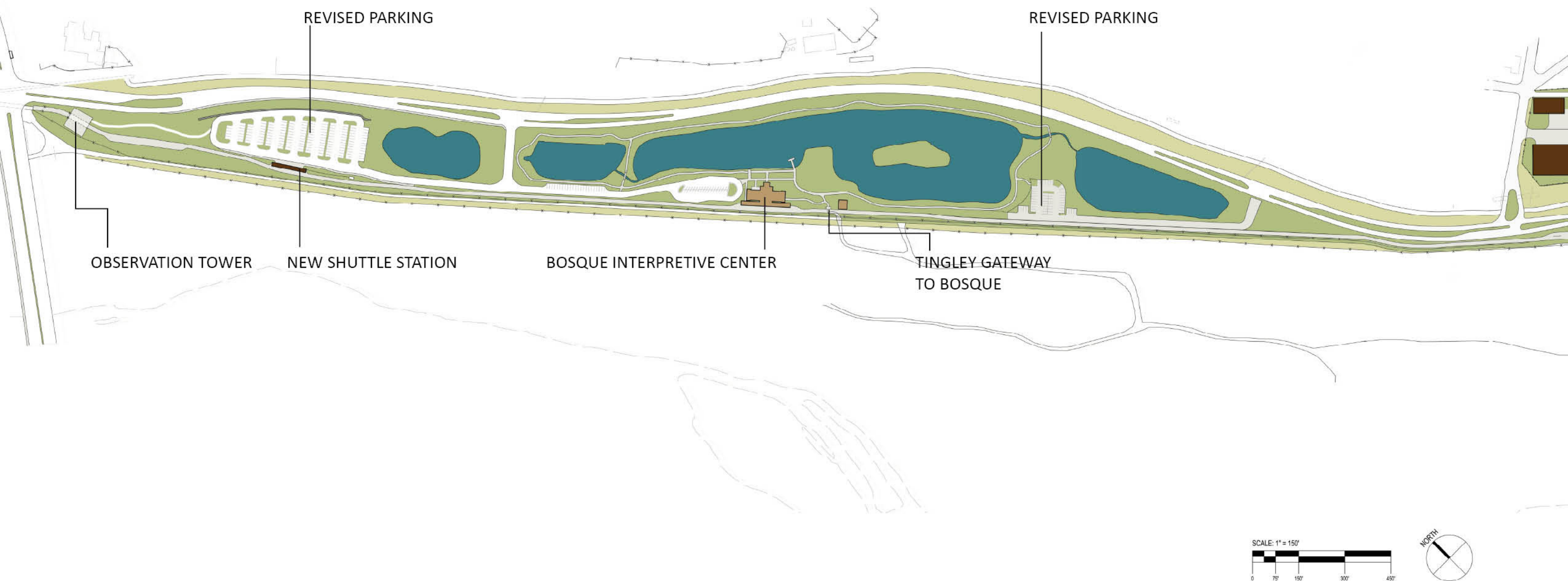


# OVERALL PLAN - TINGLEY BEACH



**LEGEND**

- Existing Building
- Proposed Building





# OVERALL PLAN - ZOO





# THEMATIC CONCEPT - BOTANIC GARDEN



## NEW MEXICO AND THE RIO GRANDE

Travelling through the New Mexico Rio Grande, visitors will proceed from Cottonwood Gallery, through the Sierra Madre Pine-Oaks, to the Chihuahuan Desert Grasslands and finally the Piñon-Juniper Woodlands. Within these varied landscapes, many of New Mexico's native plants and naturally-occurring wildlife will provide guests with an opportunity to experience the beauty brought on by the changing Southwest seasons and develop an understanding and appreciation for New Mexico's unique wildlife and landscapes.

The Rio Grande is an example of a desert river. A desert river is a river that is able to maintain its flow through a desert because of water received from outside the desert. The Rio Grande landscape changes with the seasons. Exhibiting vibrant spring blooms, a lush summer tree canopy, spectacular fall colors and snow dusted evergreen forests in winter, inviting return visits to witness the ever changing display. Acclimated to New Mexico's climate, the animal inhabitants will be comfortable and exhibit natural behavior year round.

In order to share the widest possible message about the Rio Grande and New Mexico, the Master Plan proposes a number of exhibits that highlight four distinct ecosystems as well as a conservation area that allows staff to continue their critical endangered species work.

## NEW MEXICO WILDLIFE CONSERVATION COMPLEX (BOTANIC GARDEN)

The BioPark is engaged in the conservation and restoration of a number of endemic threatened and endangered species, such as the Silvery Minnow and Mexican Grey Wolf currently spread throughout the BioPark. Located to the north of the constructed New Mexico habitats, the Conservation Complex is currently home to the Silvery Minnow program. It is envisioned that this area would allow for very limited public access during select times of the year. This quiet area would enable conservation biologists and BioPark staff to carefully rear, raise, and release threatened and endangered species. The Zoo's relocated Browse Farm will buffer the Conservation Complex from the rest of the Botanic Garden.

Current Animal species in ABQ BioPark collection that would be applicable here: Mexican Grey Wolf and Silvery Minnow

Possible new species to be determined on a space-needed basis.

Landscape: Deciduous riverine forest – predominately cottonwoods with peachleaf willow, New Mexico olive, coyote willow



## COTTONWOOD GALLERY (BOTANIC GARDEN, AQUARIUM)

Modeled after the forested banks of the Rio Grande, this environment is characterized by slow moving waters, sandy/silty soils, periods of inundation, and a high water table. This is the proposed location of the Aldo Leopold Environmental Center. In addition to the naturally-occurring free-ranging wildlife (birds, mammals, reptiles, etc.) the Environmental Center would also have small animal exhibits & tanks within and immediately adjacent to the building that would allow visitors to see these creatures in a respectful way.

Current Animal species in ABQ BioPark collection that would be applicable here: Raven

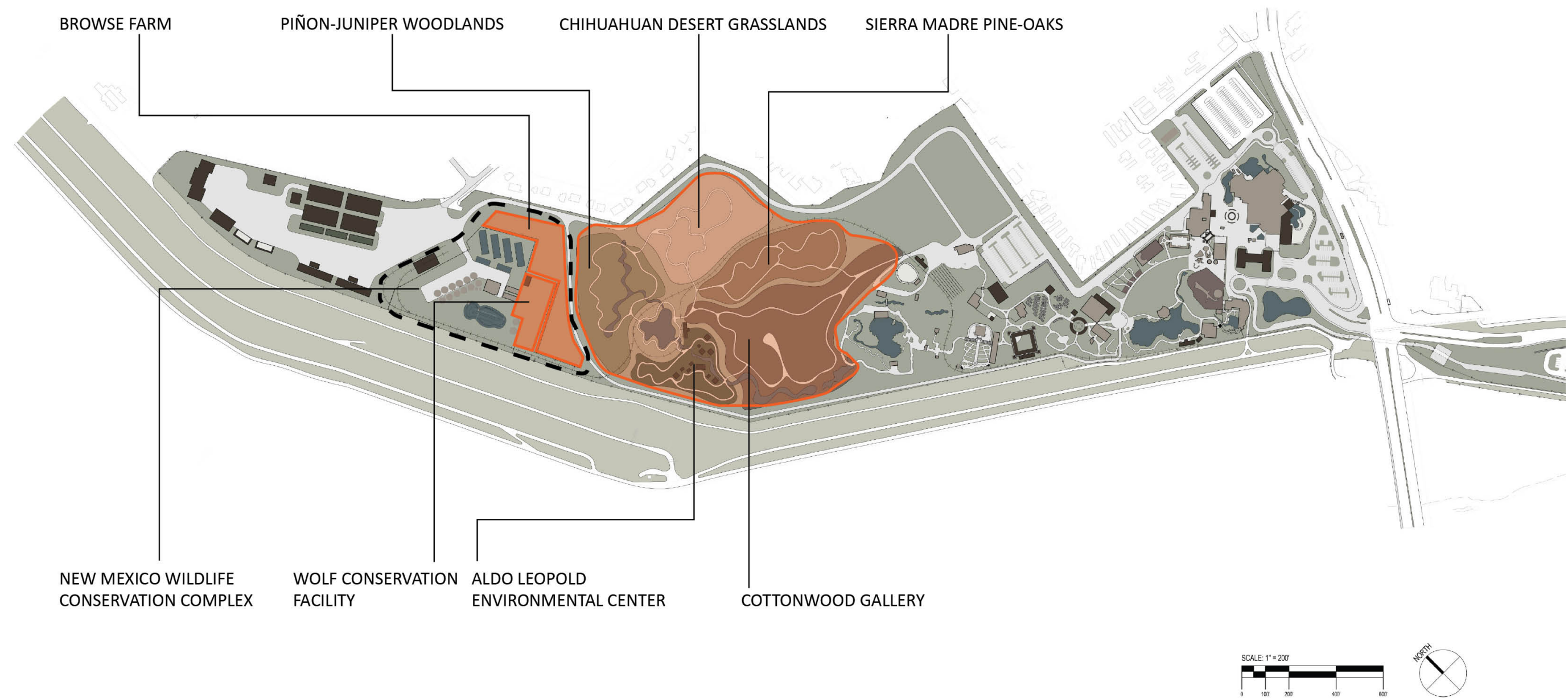
Possible new species:

- Mammals - bats (bat houses), jackrabbit
- Fish – Rio Grande Shiner, Red Shiner
- Reptiles & Amphibians – spiny softshell turtle, western painted turtle, garter snake, bull snake, western chorus frog, northern leopard frog, New Mexico whiptail
- Birds – attracting free-ranging native and migratory species through a variety of feeders, water, and nesting sites
- Insects – focus on native bees and pollinators and native species undergoing conservation effort, such as butterflies

Landscape: Deciduous riverine forest – predominately cottonwoods with peachleaf willow, New Mexico olive, coyote willow



# THEMATIC CONCEPT - BOTANIC GARDEN





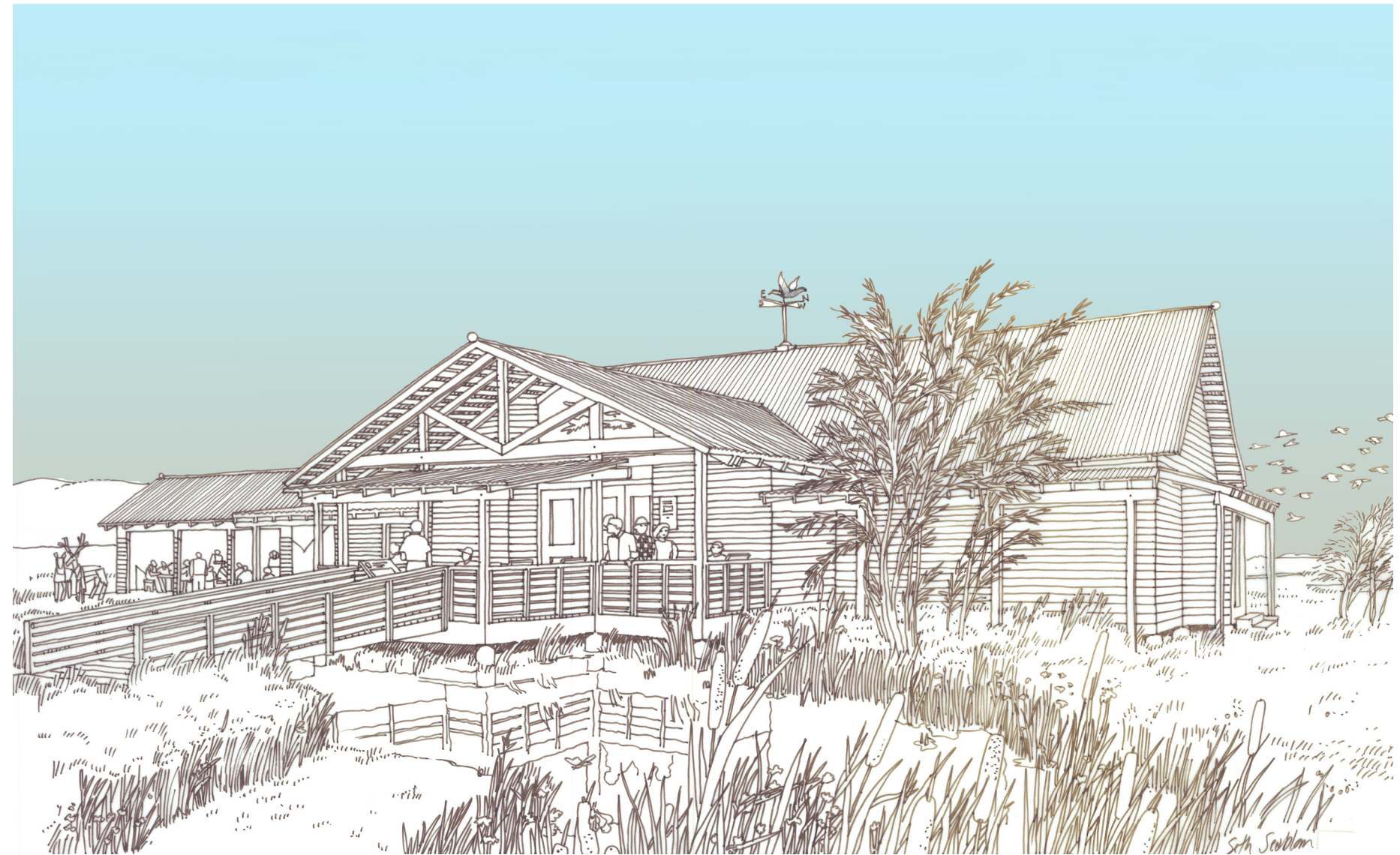
# THEMATIC CONCEPT - BOTANIC GARDEN



## ALDO LEOPOLD ENVIRONMENTAL CENTER

Nestled under the shady Cottonwood Gallery lies the new Aldo Leopold Environmental Education Center. Named after famed conservationist Aldo Leopold, the Center serves as a base camp for hands-on exploration of the Rio Grande's biological diversity, ecology, and cultural importance. Here guests will view interpretive exhibits, attend classes and witness native fish, reptiles, amphibians and invertebrates that inhabit the Bosque and learn what they can do as stewards and protectors of this ecosystem.

Exhibits will illustrate the aquatic and terrestrial species of the Rio Grande and its tributaries, including an arroyo, a cienega, and an abandoned beaver pond. These small water bodies could be home to small native fish and as well as endemic and migratory birds. Interpretation can explain the taxonomic and geologic history of the Rio Grande valley. And the Center can tell the story of how invasive species like Siberian Elm, Russian Olive, and Salt Cedar threaten the biological integrity of the Bosque and how it is being addressed. Interpretation can explain conservation threats from pollution and how feral cats are decimating the small song bird population while providing links to on-site conservation initiatives. Here, guests may learn of current environmental legislation, volunteer opportunities for natural restoration projects, and places to further study the New Mexico Rio Grande environment.



## ENVIRONMENTAL EDUCATION CENTER



# THEMATIC CONCEPT - BOTANIC GARDEN

## CHIHUAHUAN DESERT GRASSLAND (BOTANIC GARDEN)

Capitalizing on the higher, drier part of the botanic garden, this environment will illustrate the mosaic grasslands and bisecting arroyos typical of north central New Mexico.

Animal species in ABQ BioPark collection: Black-tailed prairie dog, Roadrunner.

Possible new species:

- Mammals - native bats (bat houses), jackrabbit
- Reptiles & Amphibians – Lizards
- Birds – free-ranging native species
- Insects – focus on native bees and butterflies

Landscape: Arid upland composed of grama grasses, agave, mesquite, yucca and cactus



Chihuahuan Desert



CHIHUAHUAN DESERT ARROYO HABITAT



# THEMATIC CONCEPT - BOTANIC GARDEN



## PIÑON-JUNIPER WOODLANDS (BOTANIC GARDEN)

Illustrating New Mexico's mountainous habitats, the Piñon-Juniper woodlands can illustrate the role of biodiversity in a fire-based ecology.

Animal species in ABQ BioPark collection: Raven

Possible new species:

- Birds – free-ranging native and migratory species
- Insects – focus on native bees and butterflies (swallowtails)

Landscape: Juniper, Piñon Pine, Manzanita, annual grasses, cholla, yucca, penstemon, optunia



Piñon-Juniper Woodland

## SIERRA MADRE PINE-OAKS (BOTANIC GARDEN)

This ecoregion is defined by higher-elevation pines and Douglas Firs with lower elevation oak-wooded grasslands flanking the bases of the steep Sierra Madre mountain range.

Animal species in ABQ BioPark collection: None.

Possible new species:

- Birds – free-ranging native and migratory species
- Insects – focus on native bees and butterflies

Landscape: Oaks, Pines, Douglas Fir, seasonal grasses



Sierra Madre Pine-Oaks



Common Raven - Wikipedia



# THEMATIC CONCEPT - BOTANIC GARDEN

## NATIONAL TROPICAL BUTTERFLY CONSERVATORY

The Master Plan proposes that the existing tropical conservatory be renovated and upgraded to create the National Tropical Butterfly Conservatory. This year-round facility would become an immersive exhibits for visitors and provide a very humid look into the rainforests of Central and South America. Supplemental heat, light, and humidity would simulate the conditions necessary to sustain these colorful flying jewels and give the BioPark a opportunity to tell compelling stories of pollination, migration, and transformation.

Such an endeavor would require working with local insect experts to ensure that the butterfly chrysalis are responsibly raised in sustainable rainforest farms.

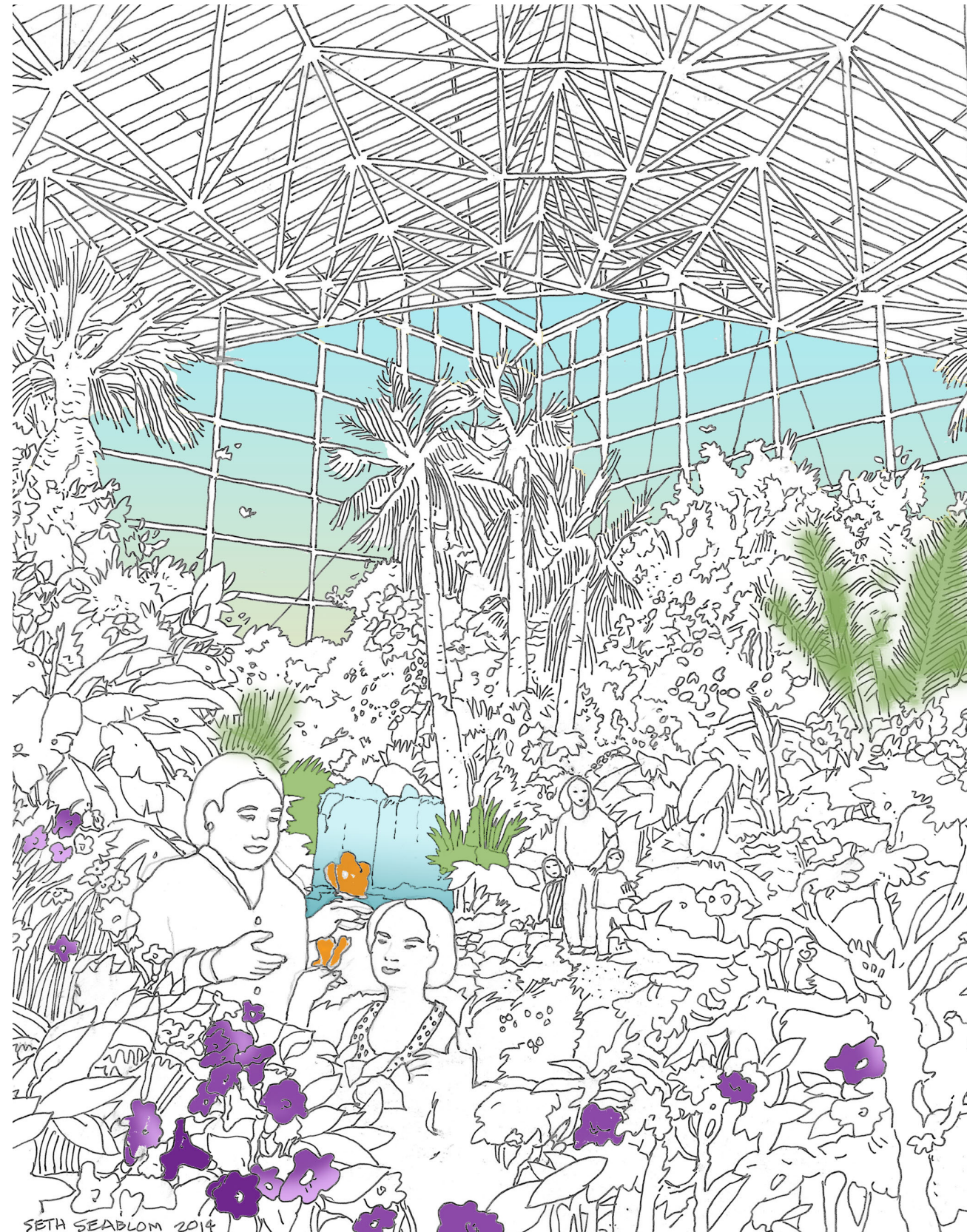
The current seasonal butterfly house can be easily converted into a Hummingbird facility for feedings, observation, and breeding.

## BACKYARD HABITATS

Currently, the Botanic Garden has a Pollinator Garden that gives homeowners an opportunity to see potential plants for use in their gardens. The Master Plan proposes building four backyards, complete with fences, walls, gates and patios that allow the visitor to more easily visualize how these plantings can be used in the home garden. These backyards can also be used for event rentals or for by sponsors during special events and concerts.

## THE SUNKEN GARDEN

Given the high water table throughout the BioPark, a formal sunken garden in the Mayan or Aztec vernacular would provide a shaded and peaceful place to rest, observe colorful wetland plants and water lilies.



NATIONAL TROPICAL  
BUTTERFLY CONSERVATORY

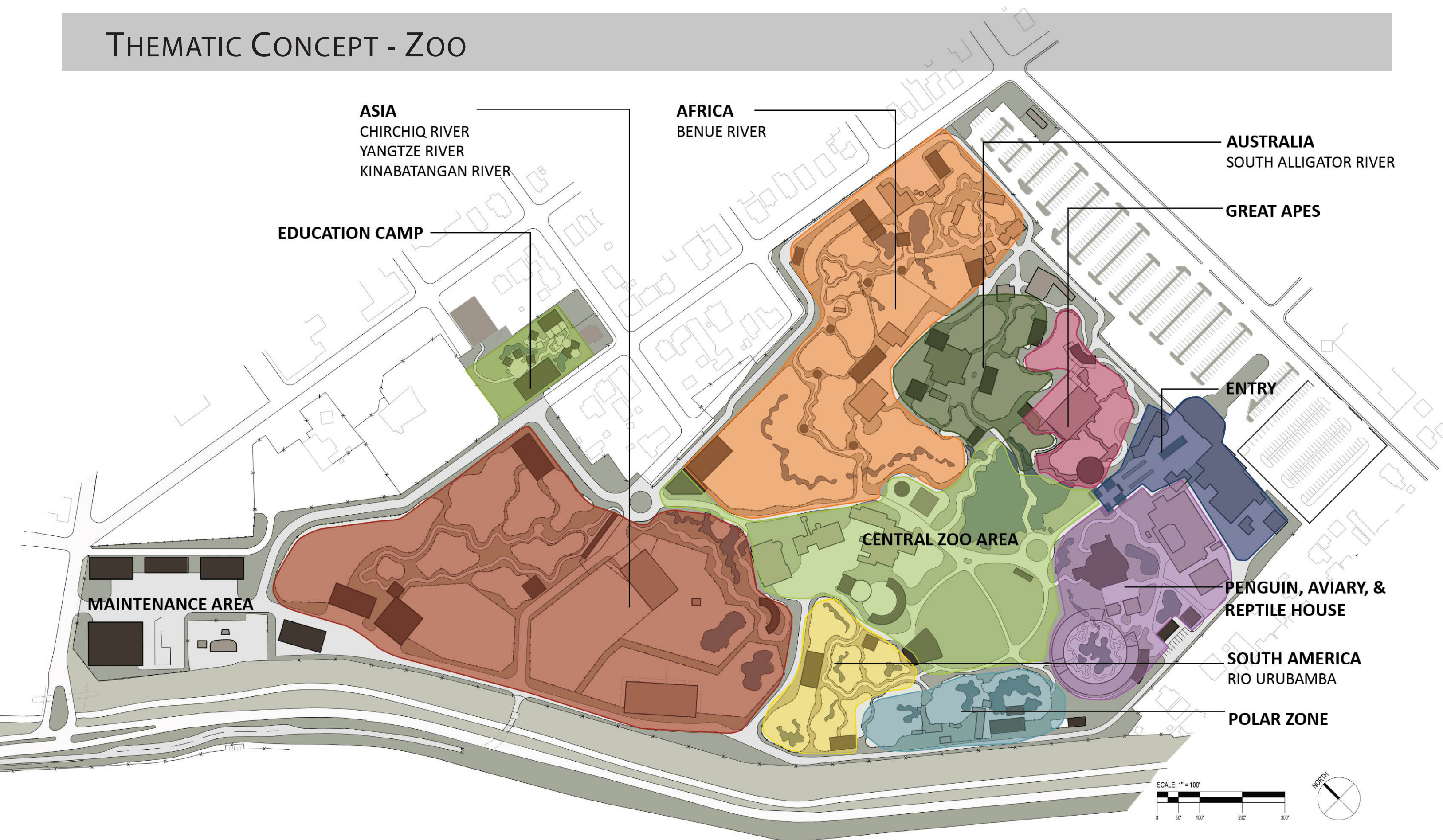




Photos: Linda Rockwell



# THEMATIC CONCEPT - ZOO







## DESERT & SEMI-ARID RIVERS OF THE WORLD

Building upon the understanding of the biodiversity of the Rio Grande as a desert river, visitors can then explore similar desert and semi-arid river systems from around the world within the BioPark.

As linear green corridors that move water and wildlife, river habitats similar to the Rio Grande in South America, Africa, Asia, and Australia have been identified. This organization will make use of the BioPark's existing animal and plant collections while providing opportunities to add new plant and animal species. For example, the Zoo's proposed Penguin Exhibit can be interpreted as part of an environment associated with a Peruvian river delta, tying the exhibit to a real geographic location with identifiable conservation initiatives. This approach will further base each species in a specific place, and provide a detailed understanding of habitat, while introducing world conservation efforts.



Rio Urubamba

## CENTRAL ASIA - TIEN SHEN MOUNTAINS

The **Chirchiq River** passes through Central Asian grasslands that occupy portions of Mongolia and Uzbekistan. Open grasslands are home to grazing animals such as the takin and muntjac. To the south, this region is bordered by dense forest inhabited by the red panda. Though portions of this region are isolated from human populations, this grassland habitat is under threat from agricultural development.

Animal species in ABQ BioPark collection: Takin, muntjac, houbara, Snow Leopard

Proposed additional species: houbara bustard, jerboa, caracal, snow leopard, saiga, markhor, Eurasian spoonbill, Greater Flamingo, snakes/birds/insects

Landscape: High desert scrub-shrub and grasslands (nearly identical to Albuquerque in climate)



The Chirchiq River

## SOUTHERN AND SOUTHEAST ASIA - THE YANGTZE

The **Yangtze River** is the longest river in Asia and the third-longest in the world. It flows for nearly 4,000 miles from the glaciers on the Qinghai-Tibet Plateau in Qinghai eastward across China before emptying into the East China Sea at Shanghai.

Animal species in ABQ BioPark collection: Snow leopard, Chinese alligator, Reeve's muntjac, Bengal slow loris, Pygmy slow loris

Proposed additional species: Amur leopard, Clouded leopard, Gibbons

Landscape: Freshwater river from alpine mountains to semi-tropical delta.



The Yangtze River



# THEMATIC CONCEPT - ZOO

## SOUTHERN AND SOUTHEAST ASIA - BORNEO

The **Kinabatangan River** is the longest river in Sabah, Borneo. It starts high in the mountain range and meanders through the interior and coastal lowlands for 350 miles before reaching the Sulu Sea on the East coast of Sabah. The lower reaches of the Kinabatangan River are home to an ecosystem of amazing richness - stranded ox-bow lakes, swamp and mangroves - which supports a rich, and diverse, concentration of wildlife.

Animal species in ABQ BioPark collection: Asian Elephant, Orangutan, Tiger, Matschie's tree kangaroo, Binturong, Siamang, Hornbills

Proposed additional species: sun bear, mouse deer, hornbill, macaque, gibbon, snakes/birds/insects

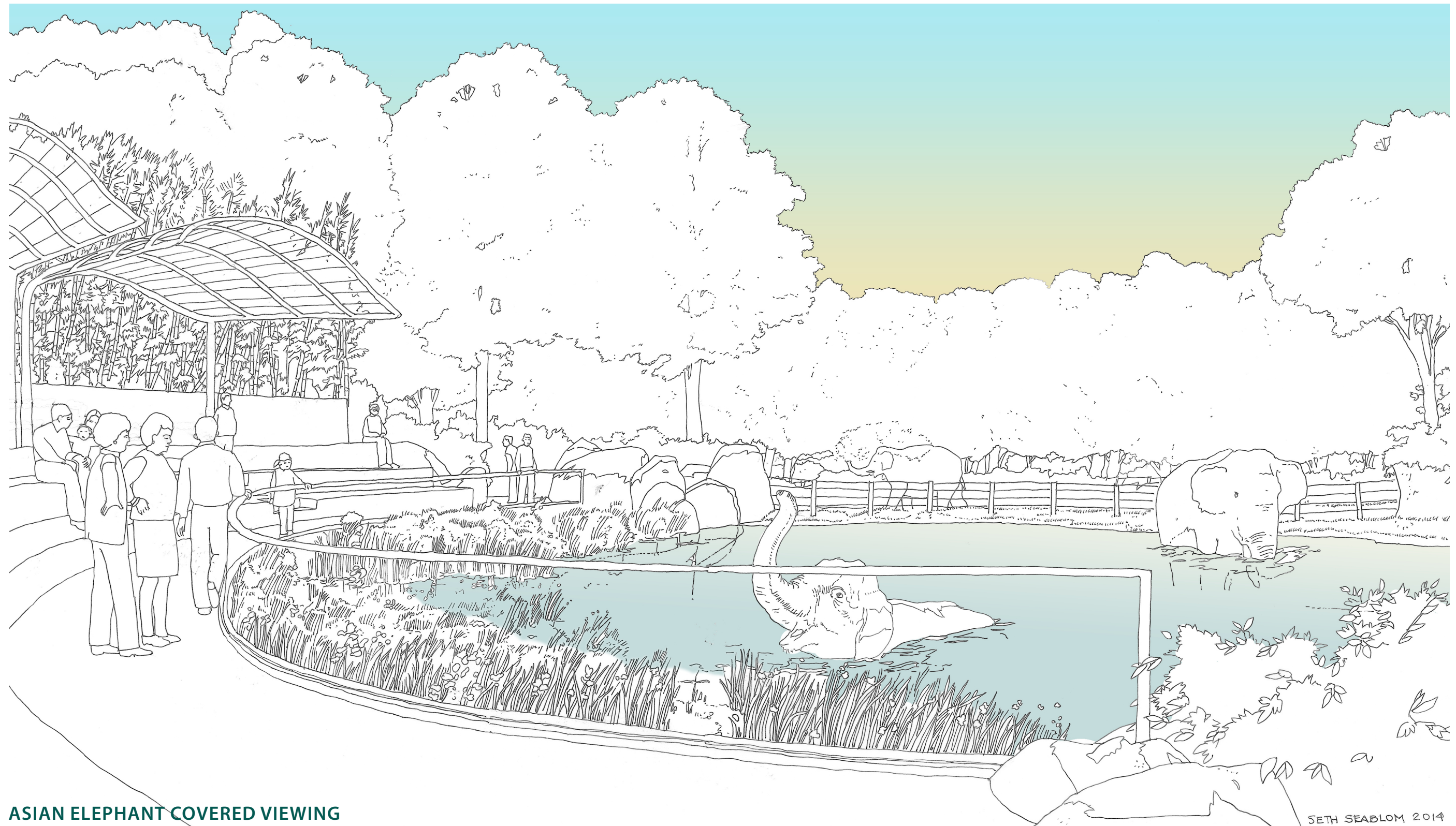
Landscape: Tropical rainforest



The Kinabatangan River







ASIAN ELEPHANT COVERED VIEWING



# THEMATIC CONCEPT - ZOO

## AFRICA

The **Benue River** is the longest tributary of the Niger River and flows through northwestern sub-Saharan Africa, chiefly northern Cameroon and eastern Nigeria, before joining the Niger River. One of the Benue River's tributaries is the Gongola River, home to Gombe Stream National Park and made famous by Jane Goodall's behavioral research into chimps. The headwaters of the Benue also originate in the Sudanese savannas and Cameroonian forest-savannas and then pass through tropical forests on its way to the Atlantic.

Animal species in ABQ BioPark collection: Gorilla, hippo, chimp, cheetah, serval, lion, hyena, red river hog, giraffe, Rock hyrax, DeBrazza's monkey, Wolf's Guenon, Crested porcupine, Grant's Zebra, Southern White Rhino, Warthog/Red River Hog, Meerkat

Proposed additional species: sable antelope, roan antelope, snakes/birds/insects

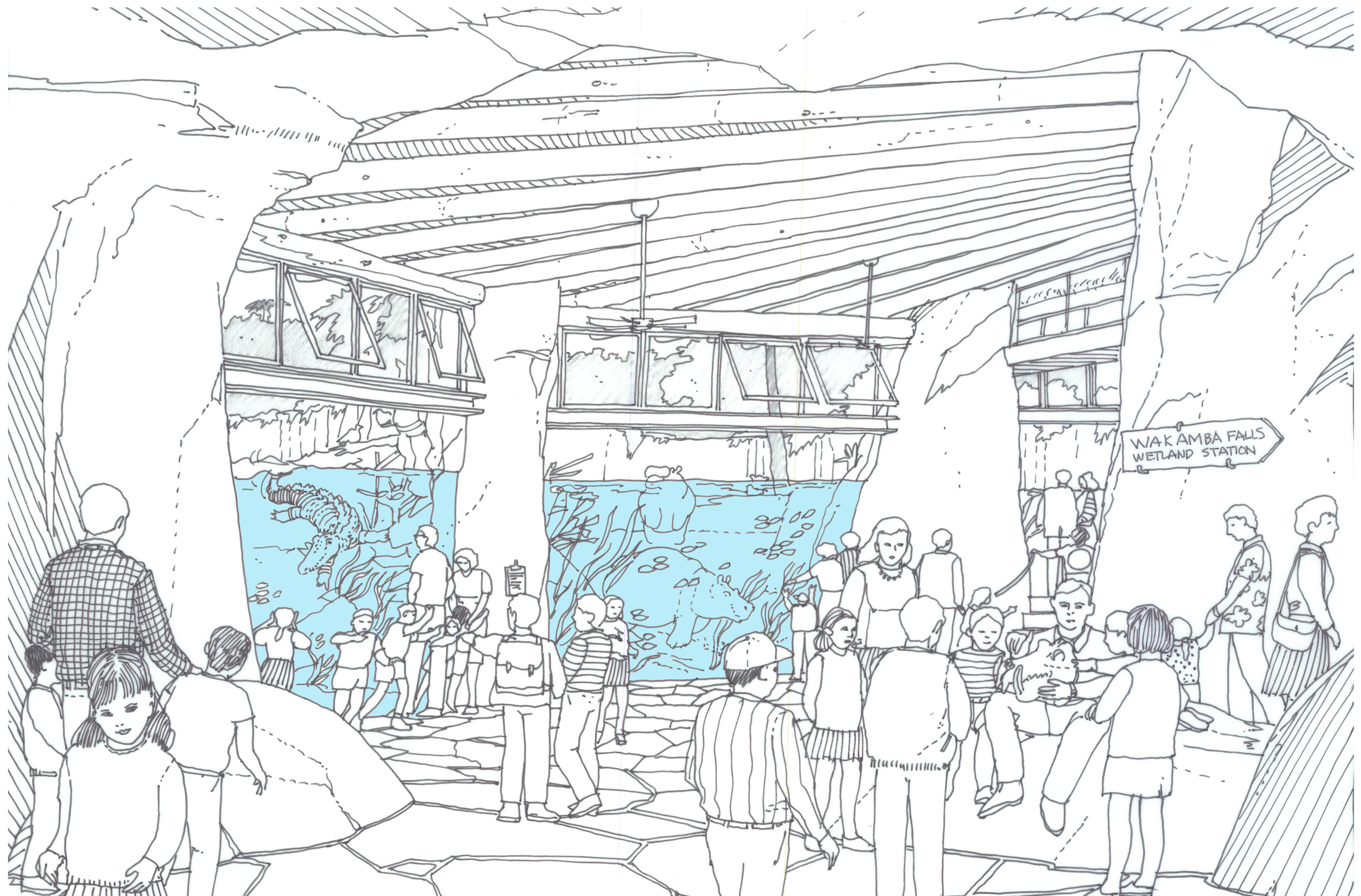
Landscape: Tropical rainforest to savanna



The Benue River







UNDERWATER HIPPO  
& CROCODILE VIEWING



## THEMATIC CONCEPT - ZOO



HYENA VIEWING



# THEMATIC CONCEPT - ZOO



## SOUTH AMERICA (PERU)

**Rio Urubamba** is a partially navigable headwater of the Amazon River. It rises in the Andes to the southeast of Cuzco, flowing in the Urubamba Valley below the legendary Incan city of Machu Picchu.

Animal species in ABQ BioPark collection: Llama, alpaca, dwarf caiman, matamata, Andean tinamou, Andean condor, Black howler, Prehensile-tail porcupine, Three-banded armadillo, Caribbean flamingo

Proposed additional species: tapir, northern pudu, emperor tamarin, marmoset, maned wolf, capybara

Landscape: varies from river valley rainforest to desert/alpine



Rio Urubamba





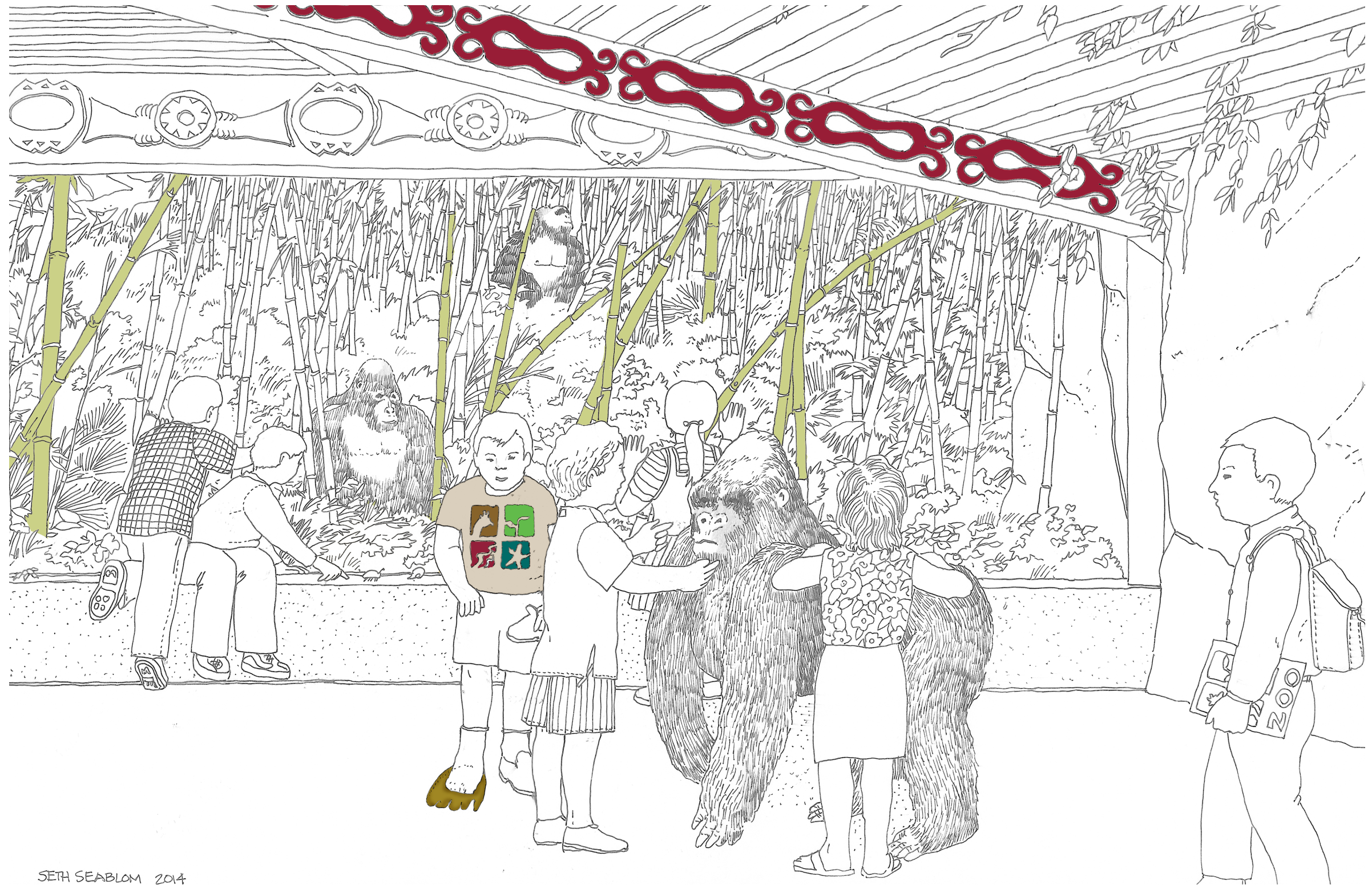
# THEMATIC CONCEPT - ZOO

## GREAT APES

The Great Apes will continue to be grouped together around a common service area and holding building. The Master Plan proposes to remove the existing ramp at the entry as well as the seating area at the top of the ramp. It would be replaced with an at-grade approach to a new gorilla viewing shelter. The goal is to create a shaded structure with an expansive length of glass viewing where visitors can be just inches away from gorillas. This will also provide the gorillas with deep shade and add a multi-level layer of complexity as the elevations of the exhibit will now include the existing moat. From this initial viewing area a new ramp will take visitors upward to the second gorilla exhibit. Here, an elevated platform will again offer opportunities for gorillas and visitors to interact face to face by means of glass viewing. Continuing upward on the path to orangutans, visitors will reach a 'treetop' structure that will have cantilevered platforms extending out from glass viewing on three sides. Artificial vines from trees within the exhibit will connect to the platforms and offer orangutans the means to visually interact with visitors. A new addition to the Great Apes will be one of the smallest members: lemurs. This lush exhibit is viewed from the lake boardwalk and gives lemurs an opportunity to frolic in relative comfort.







GORILLA  
COVERED VIEWING

SETH SEABLUM 2014



# THEMATIC CONCEPT - ZOO

## AUSTRALIA, TASMANIA, NEW ZEALAND

### South Alligator River (Northern Territory)

The South Alligator River is the Northern region of Australia and is regarded as one of the country's richest biological regions. At almost 100 miles long the river winds its way through seasonally-flooded wetlands and abandoned uranium mines. Animal exhibits here could be the focus of a fictional Outback Wildlife Rehabilitation Center.

Animal species in ABQ BioPark collection: Saltwater crocodiles, Queensland Koala, Short-nosed echidna, Tasmanian wombat, Tasmanian devil, Tammar wallaby, Red kangaroo, Kookaburra, Emu, snakes, insects

Proposed additional species: flying fox, snakes/birds/insects

Landscape: varies from dry temperate forest to desert



The South Alligator River





# THEMATIC CONCEPT - ZOO



OUTBACK WILDLIFE  
REHABILITATION CENTER



# THEMATIC CONCEPT - ZOO

## AVIARY AND REPTILE HOUSE

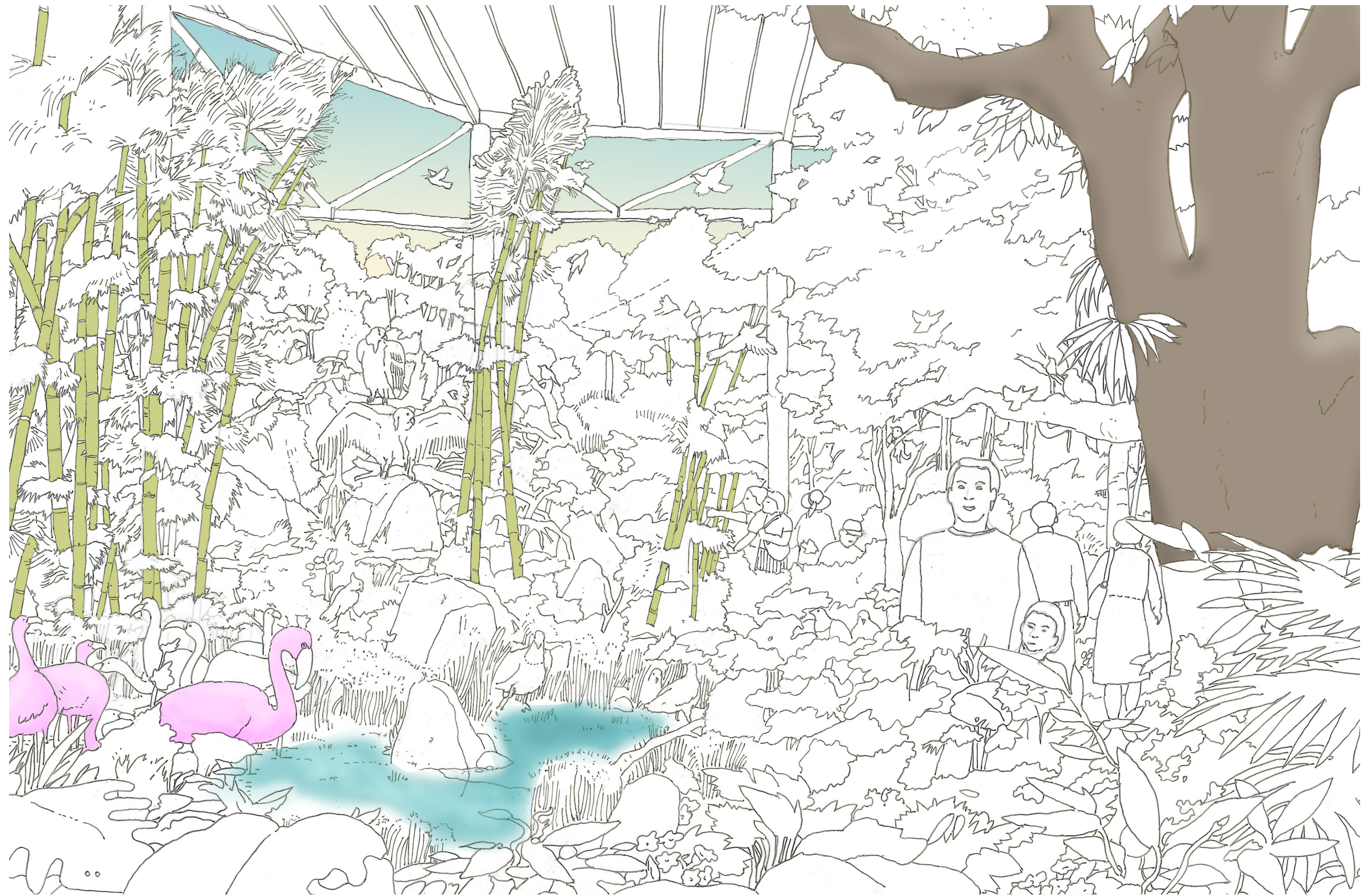
Another taxonomic exhibit, the birds and reptiles will be grouped together to form an interpretive adjacency that can speak to their common dinosaur ancestry. Utilizing the existing Birds of Prey aviary as one of the walls of the 150' diameter by 50 foot tall Walk-Thru Aviary will help to create one of the largest aviaries in the United States. Coupled with the addition of a second aviary wall of parrots allows the Zoo to display an amazing number of birds to the visitor.



Dwarf Caiman







WALK-THRU AVIARY



# THEMATIC CONCEPT - AQUARIUM

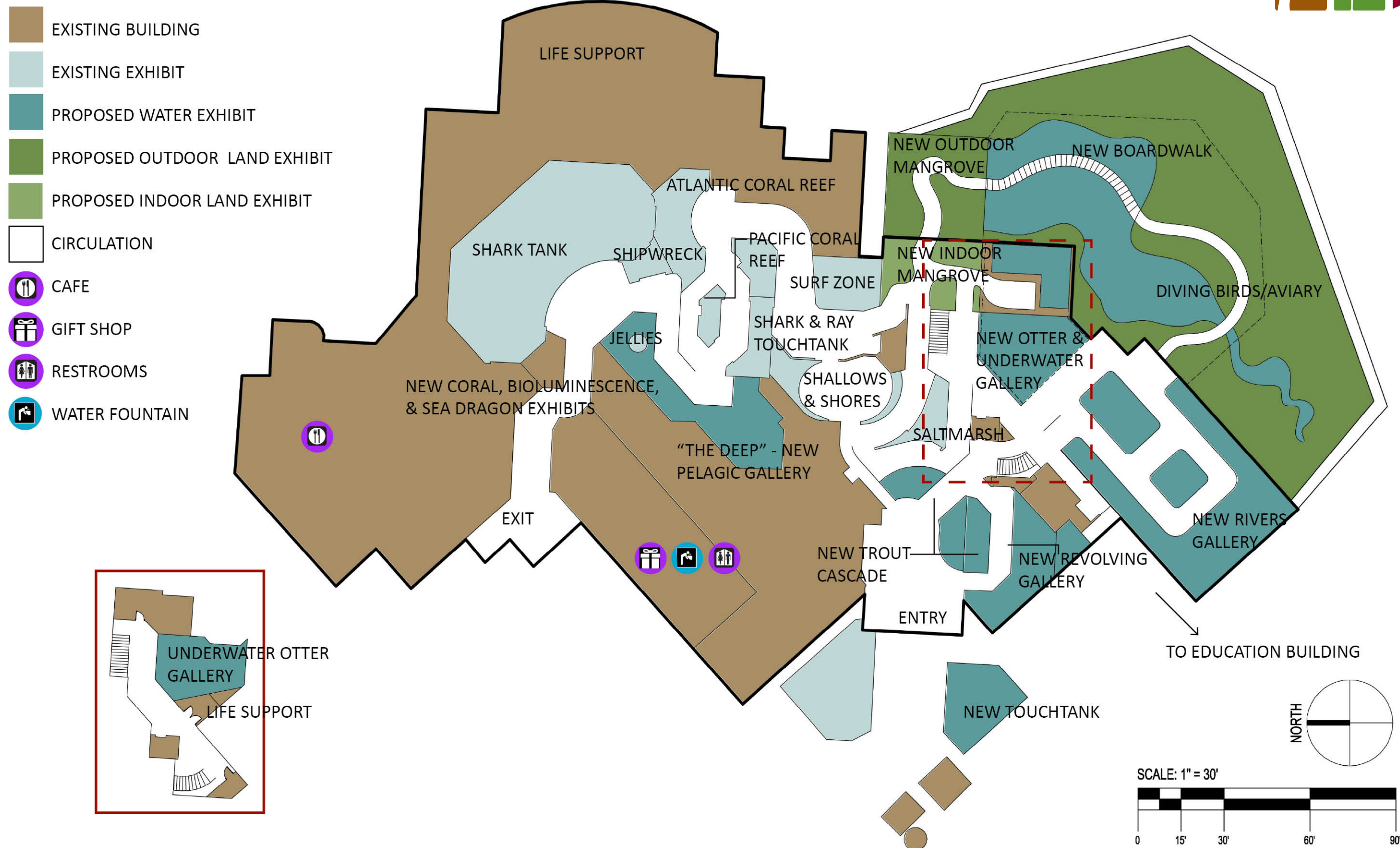
## AQUARIUM

Building upon the taxonomic part of the Biodiversity theme, the Aquarium's collection of fish, coral, and invertebrates would be expanded to include new Amazonian fish, an expanded coral exhibit, pacific octopus tank, an expanded Gulf Coast gallery, and a pelagic gallery. Expansion of the Rio Grande ecosystem will lead to new outdoor exhibits would include local fish, river otters, and diving birds.





# THEMATIC CONCEPT - AQUARIUM





# THEMATIC CONCEPT - SUMMARY

## SUMMARY

One of the objectives in developing the Master Plan was to create suitable and larger spaces for animals and visitors. At the Zoo, this is accomplished in three ways. First, we propose to move Zoo maintenance functions not vital to the Zoo's operation to a new area at the north end of the Botanic Garden. This results in a 53% gain of space at the Zoo which will be used, in part, create the new Asia exhibits. Second, we propose a similar solution in relocating the greenhouses and lath houses to the same new maintenance area at the Botanic Garden. This space can then be used for a new outdoor-based education camp. Thirdly, we propose moving all new animal holding buildings closer to the perimeter service roads as well as grouping them together where possible around common service courtyards. The combined service courtyard for Chimps, Bonobos, Rhino, African Big Cats, and Australia is a good example of this concept. The linear court yard of Giraffe, African Hoofstock, and Hyena pulls these builds much closer to the Zoo's eastern edge which allows the exhibit spaces to become much larger. While difficult to quantify in square footage, such consolidation and relocation also provides the added benefit of reducing the amount of utility improvements as well as minimizing hard surfaces that would need storm drainage capabilities.

BOTANIC GARDEN			
Exhibit	Existing SF	Proposed SF	Increase or Decrease in Size
Maintenance (BG)	218,925	430,204	97%
Refugarium	159,486	175,495	10%
Wolf Conservation Center	17,197	48,867	184%
Sunken Garden (BG)	0	10,000	
New Mexico Habitats	22,650	471,390	1981%
Cottonwood Gallery	227,201	267,609	18%
Education Buildings	22,283	166,418	647%
Browse Farm	69,518	83,722	20%
Heritage Farm	331,140	355,046	7%
AQUARIUM			
Exhibit	Existing SF	Proposed SF	Increase or Decrease in Size
Aquarium Building	41,432	47,435	14%
Outdoor Exhibit	1,264	13,213	945%
Entry Courtyard	833	3,350	302%
Tingley Beach			
Exhibit	Existing SF	Proposed SF	Increase or Decrease in Size
Train Station	5,249	7,885	50%
Playbay	0	5,200	



# THEMATIC CONCEPT - SUMMARY



As evidenced in the chart to the right, the majority of the animal exhibit spaces are increasing in size. However, there were numerous comments in the public survey about giving the Big Cats big spaces in which to roam. The existing Cat Walk has approximately 20,270 square feet of outdoor exhibit space split into five exhibits. Cats, when they are not sleeping, like to visually stalk their prey. The current exhibits give the cats little opportunity to see the world around them or to stimulate their minds. The proposed new cat exhibits, totaling 100,915 square feet (an almost 400% increase) will be new in several respects. Each area (Asia, Africa, and South America) will have three cat exhibits that are rotational...i.e. linkable to each other. Overhead transfer tunnels will take the big cats safely to their exhibits as they pass above the visitors. Keepers can vary the cat's daily experience by letting it into other animal habitats as well (but not at the same time!). For example, in the South America exhibit, the jaguar could be in its exhibit, in the capybara exhibit, or the puma exhibit, or in all three at once. Exposure to animal smells and vistas will give the jaguar more behavioral enrichment opportunities and allow it to act naturally.



Gathering public input at Workshop 4

ZOO			
Exhibit	Existing SF	Proposed SF	Increase or Decrease in Size
<b>Great Apes</b>			
Gorilla exhibit	9,529	13,250	39%
Orang	5,194	16,880	225%
Siamang	3,594	12,560	249%
<b>Africa</b>			
Klipspringer	1,128	3,013	167%
Hyena	4,259	8,286	95%
Warthog-Red River Hog	4,277	5,954	39%
African Aviary	2,354	5,800	146%
Hippo	3,692	4,122	12%
Crocodile	1,125	2,455	118%
Chimp exhibit	7,028	12,774	82%
Bonobo exhibit	0	12,315	
Rhino	24,643	26,883	9%
Giraffe + Hoofstock	46,498	65,352	41%
Africa Exhibits	34,800	26,515	-24%
<b>Australia</b>			
Australia Exhibits	9,582	63,419	562%
<b>Arctic</b>			
Seal-Sea Lion	7,958	16,726	110%
Polar Bear	11,321	25,066	121%
<b>Asia</b>			
Asia Exhibits	4,586	101,627	2116%
Elephant	114,178	170,258	49%
<b>South America</b>			
South America Exhibits	4,616	28,372	515%
<b>Birds and Reptiles</b>			
Reptile Building	14,385	16,643	16%
Reptile Outdoor Exhibits	1,909	3,620	90%
Reptile Conservation Bldg.	4,088	4,088	-100%
Birds of Prey - existing	5,800	9,011	55%
Main Aviary - New	4,597	16,741	264%
Parrot Aviary	3,437	6,429	87%
Parrot Building	2,085	1,900	-9%
Penguin	0	11,400	
<b>To Be Removed/Relocated</b>			
Tropical America	12,890	0	-100%
Nocturnal House	7,327	0	-100%
Mexican Gray Wolf	17,197	0	-100%
Small Primate Walk - bldg	4,536	0	-100%
Small Primate Walk - exhibits	3,235	0	-100%
Camel	9,739	0	-100%
Cat Walk	20,269	100,915	398%
<b>Other</b>			
Education Buildings	11,645	48,951	320%
Maintenance (Zoo)	274,634	128,356	-53%

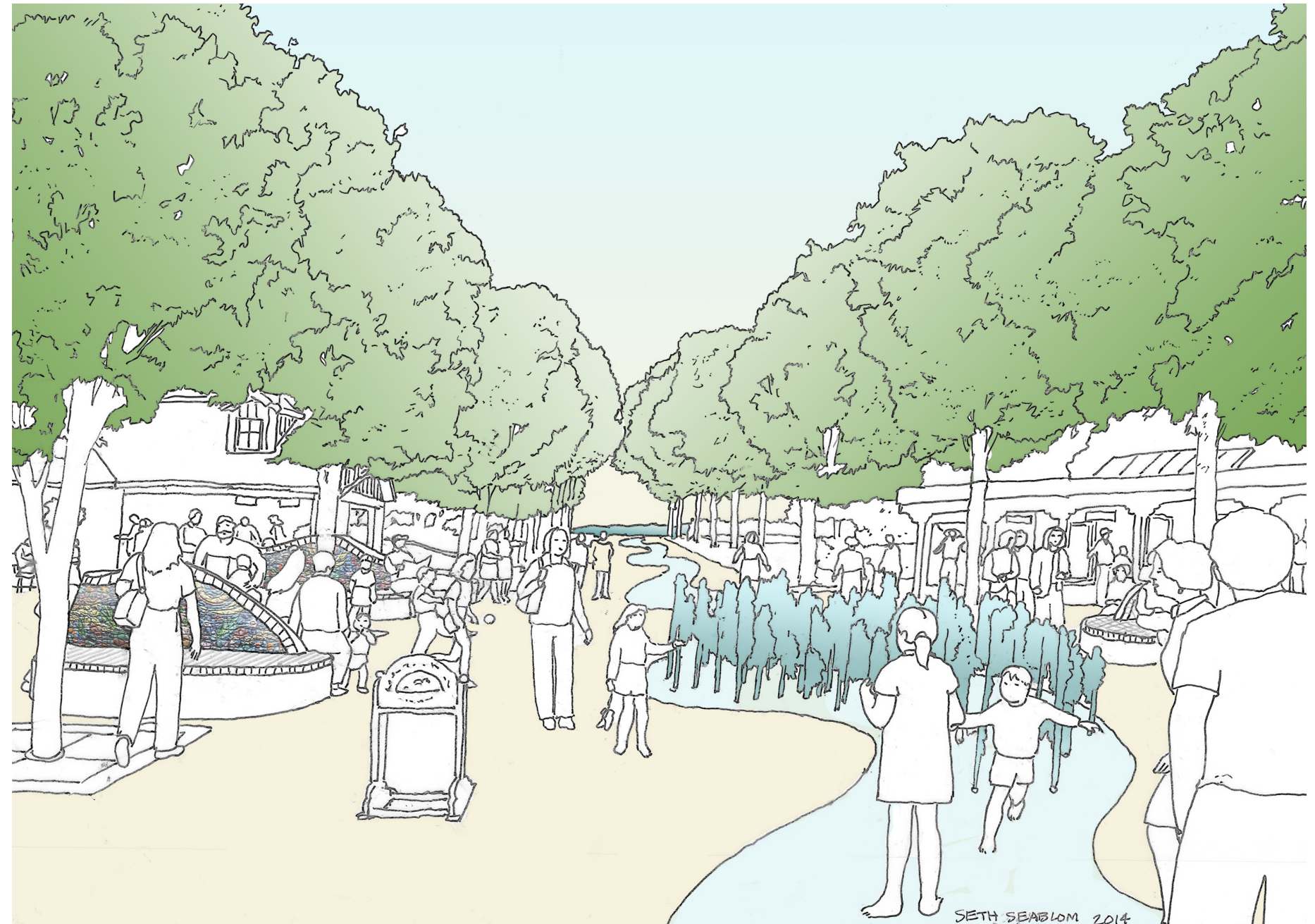


# VISITOR EXPERIENCE

## A JOURNEY THROUGH THE ABQ BIOPARK

The Zoo's entry experience will welcome visitors and prepare them for the experiences that await. Improved walkways from the existing parking lots and garage will bring guests to a covered ticketing area where the experience will be friendly and brief, speeding guests into the Plaza of the Animals. In the plaza they will be greeted by a new fountain plaza backdropped by the existing café and gift shop.

The plaza has the potential of becoming a new iconic place at the BioPark as larger public spaces allow for easier movement into the zoo, provide distant views, and serve as a sculpture courtyard celebrating birds and flight. It will provide comfort, shade, seating and orientation for more than one million visitors annually. In the summer, the plaza will provide enhanced and new opportunities for special events, gathering, resting or simply to enjoy the shade of the surrounding trees. The plaza will be a lively place and will include outdoor seating and meeting spaces punctuated with plants, sculpture and other outdoor furnishings. Most noticeably, the plaza will be dominated by a beautiful view towards the lake and through a mosaic forest of deciduous trees inviting guests to explore the great rivers of the world.



ZOO ENTRY PLAZA



# VISITOR EXPERIENCE - BOTANIC GARDEN



## HERITAGE FARM - NEW MEXICO FARM AND CULTURAL LANDSCAPE

Prior to the European settlement of the southwest, the Rio Grande Valley was home to a fertile and vibrant farming method colloquially known as 'waffle gardens' to grow the 'three sisters' – corn, beans, and squash. These small, flood-irrigated patches of desert soil were built through generations of living on the land and understanding the dynamics of climate, weather, and water. It is proposed to create a waffle garden as part of the Heritage Farm complex to show all cultural forms of New Mexican agriculture. The natural environments in and around Albuquerque were largely replaced by agriculture between 1650 and 1930.

Painting a picture of the agricultural areas surrounding Albuquerque, Heritage Farm is planted with crop and garden plants along with native trees, shrubs and grasses to illustrate desert/farm edges that are important to many animal species. Within this landscape, guests will encounter a variety of farm animals, learn about the relationship between farms and wildlife, and the agricultural shift from family farms to today's specialized organic farms. Within this context the concept of a "foodshed," the process by which food is created, can be shared and explored with visitors. The harvested crops could also be incorporated into the Shark Reef Cafe as part of a 'locavore' menu.

## BOTANIC GARDEN STAGE AND FESTIVAL GREEN

The Botanic Garden Stage and Festival Green serves as home to a summer concert series, special events (Shakespeare in the Shade), and provides a reference point for visitors as they tour the surrounding formal and informal garden environments. The lawn will continue to be an inviting place to relax under the shade trees or enjoy a picnic. Near the Festival Green will be new restrooms and drinking fountains.

## DANCE BARN

Literally a pole barn, the open space inside this 40 foot by 80 foot building will provide the BioPark with a flexible climate-controlled space for special events, seminars, or rentals. The overflow parking lot adjacent to the Dance Barn will allow for easy access to those not visiting the Botanic Garden.

## LANDSCAPE STRATEGY

### *Transforming Landscapes*

Throughout the BioPark, visitors will be guided by landscape – the land is a framework for learning. The Desert and Semi-Arid Rivers of the World will be built upon a landscape framework that can provide a foundation for learning and will transform the visitor experience primarily through landscape immersion. The landscapes of the ABQ BioPark will be transformed to lush, exotic, natural landscapes of each selected river system, and complemented by the formal botanic gardens. Each built landscape must maintain and reflect a sense of unity of man and nature as well as the unity of learning and experience. The rivers selected for the BioPark must therefore be replicated in such a way as to initiate comparison and discussion as part of the education on adaptation by plants, animals and peoples to their environment.



Tropical Conservatory



Heritage Farm



# VISITOR EXPERIENCE - TINGLEY BEACH

## BOSQUE INTERPRETIVE CENTER

The Master Plan proposes converting the Station at Tingley Beach into the Bosque Interpretive Center. The Center will serve as a jumping-off point for learning about the plants, animals, geology, and the Rio Grande before entering the Bosque for hiking and other nature activities.

The Station would continue to provide parking and restrooms to Tingley Beach users and serve as the security office location for this part of the BioPark.

## OUTDOOR SCULPTURE WALK

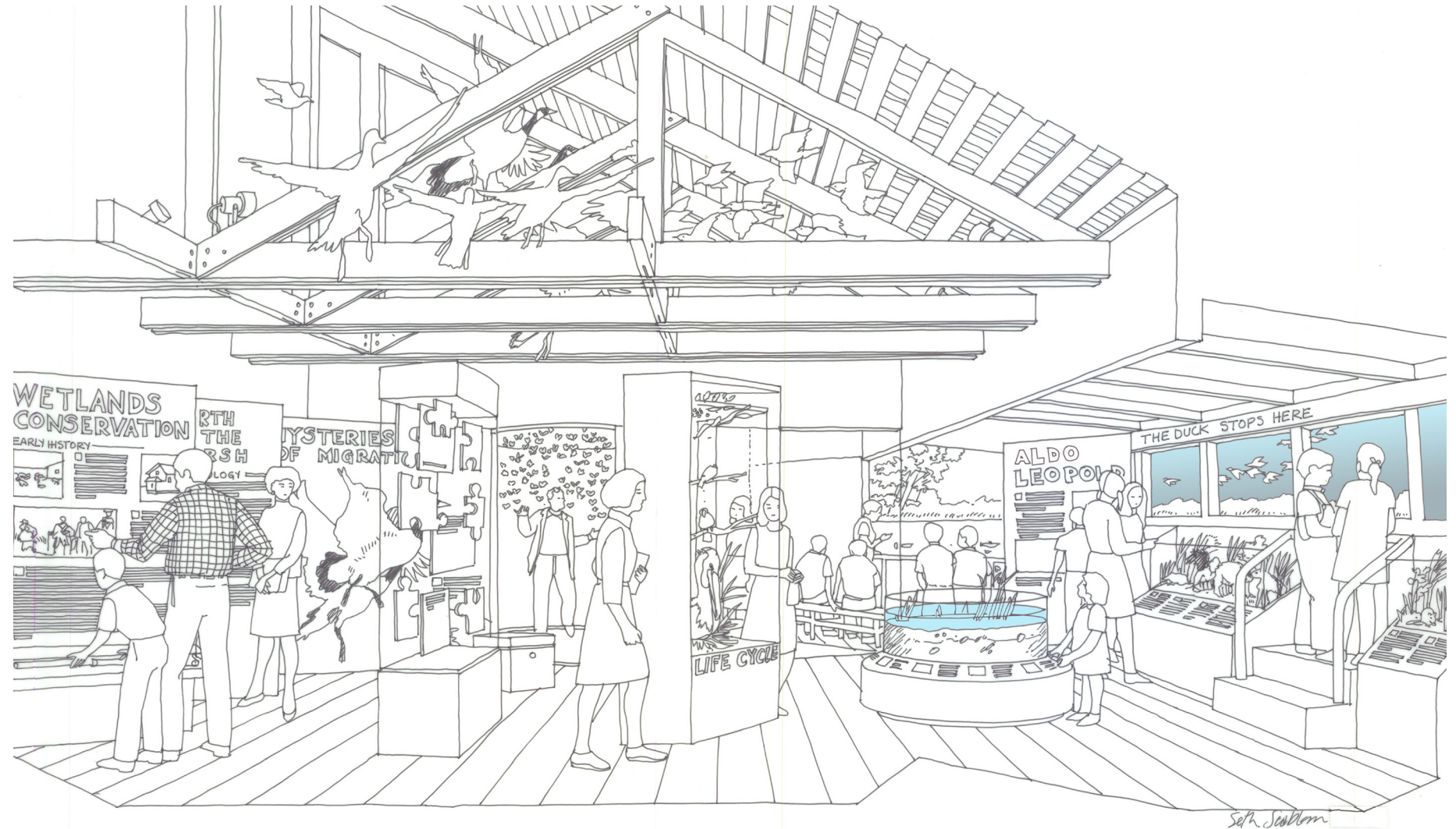
Tingley Beach has a large quantity of outdoor sculptures distributed throughout the park. Additional pieces should be added where appropriate and consideration given to an outdoor arts festival during the fall to celebrate Albuquerque's art collection.

## THE PLAYBAY

There were comments on the public survey requesting a small playground for children at Tingley. Such a play structure would require summer shade, fencing, and be located near a restroom and drinking fountain. This play opportunity would be in addition to the existing trail exercise equipment installed in 2005.

## TINGLEY TOWER

This observation tower, located at the north end of Tingley Beach near Central Avenue, will allow visitors to rise above the Bosque's cottonwoods and see the Rio Grande, Route 66, the Sandia Mountains and the valley for miles in all directions. The tower would become an iconic feature of the historic Route 66 era and a popular destination for those seeking a new way of seeing Albuquerque.



**BOSQUE INTERPRETIVE CENTER**



# VISITOR EXPERIENCE - ZOO



## KID COURTYARD (ZOO)

The Kid Courtyard is a dynamic area where active learning takes place as kids play and engage in hands-on activities. This area features a splash play zone, carousel, pond and natural play opportunities that encourage climbing and more physical activities. Additionally, the Kid Courtyard could offer special seasonal experiences crafted specifically for kids' different learning styles.

## COLORES EDUCATION OUTPOST

This centrally located building will highlight wildlife conservation efforts and provide a place where the zoo staff can teach about animals from geographic regions beyond those developed in the zoo. Animals from the education collection will find a new home in this climate controlled building. Classes and interpretive displays will connect the Albuquerque community and its visitors to the world's conservation needs and efforts. The showpiece of the Conservation Outreach Center will be a central changing exhibit which will highlight conservation efforts from around New Mexico and the world, and exhibit animals on loan for a limited duration. This changing attraction will provide variety and stimulate return visits to the zoo with exhibit changes.

## THE ZOO BAND SHELL AND PICNIC LAWN

The centrally located Band Shell and Picnic Lawn provide a reference point for visitors and serve as the gateway to each of the zoo's landscaped animal environments. Ideally, the Picnic Lawn becomes an inviting place to relax under the shade tree canopy, or enjoy a meal at the Cottonwood Cafe. Within this building, restrooms and drinking fountains will also be available. The plaza connecting the Conservation Center and restaurant provides informal seating and a place for small demonstrations and keeper talks. It will also serve as a staging area for larger presentations or events utilizing the

Band Shell. When the Band Shell reaches the end of its expected lifespan in 20 years it should be replaced and moved to the location shown on the plans. This will enhance the visitor experience, open the views throughout the Zoo and allow for the completion of a naturalistic lakeside habitat.

## NATURE THEATRE & BIRD SHOW

The Nature Theater and Bird Show at the Zoo will continue to be a popular education and entertainment feature for visitors. Upgraded to provide more seating, better views of the stage, more shade, and new holding facilities for the animals, this 500-seat theater will become a focal point for all visitors.













## EVENTS PAVILION

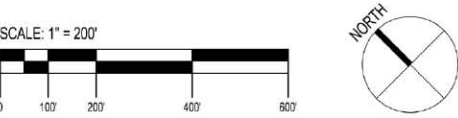
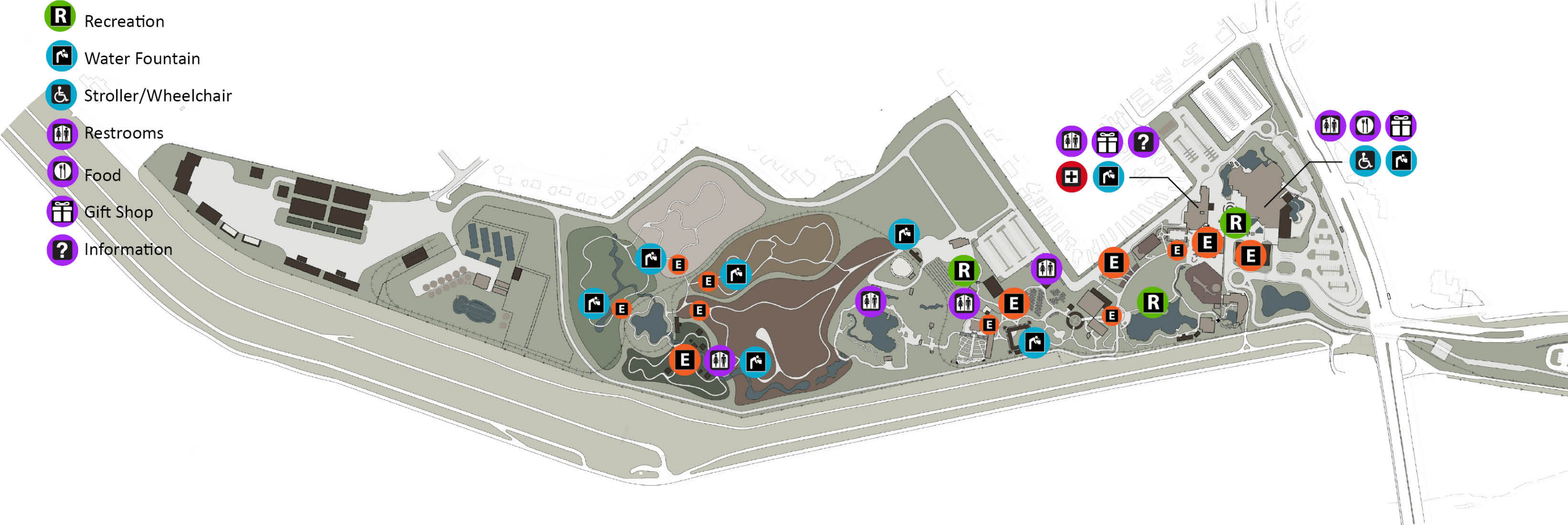
The Events Pavilion is a 100-seat climate-controlled multi-use space adjacent to the Giraffe Building, near the Colores Education Classrooms, and near the entry to the Asia exhibits. There is a potential to make this space unique by having a shared glass wall with the Giraffe's outdoor holding area, thus allowing people to be visually connected to these elegant animals.



# VISITOR SERVICES - BOTANIC GARDEN

LEGEND

-  First Aid
-  Education - Indoor, seated
-  Education - Outdoor, kiosk
-  Recreation
-  Water Fountain
-  Stroller/Wheelchair
-  Restrooms
-  Food
-  Gift Shop
-  Information










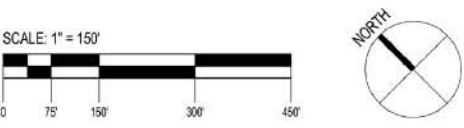


# VISITOR SERVICES - TINGLEY BEACH



**LEGEND**











-  Education - Indoor, seated
-  Education - Outdoor, kiosk
-  Recreation
-  Water Fountain
-  Restrooms
-  Food
-  Information

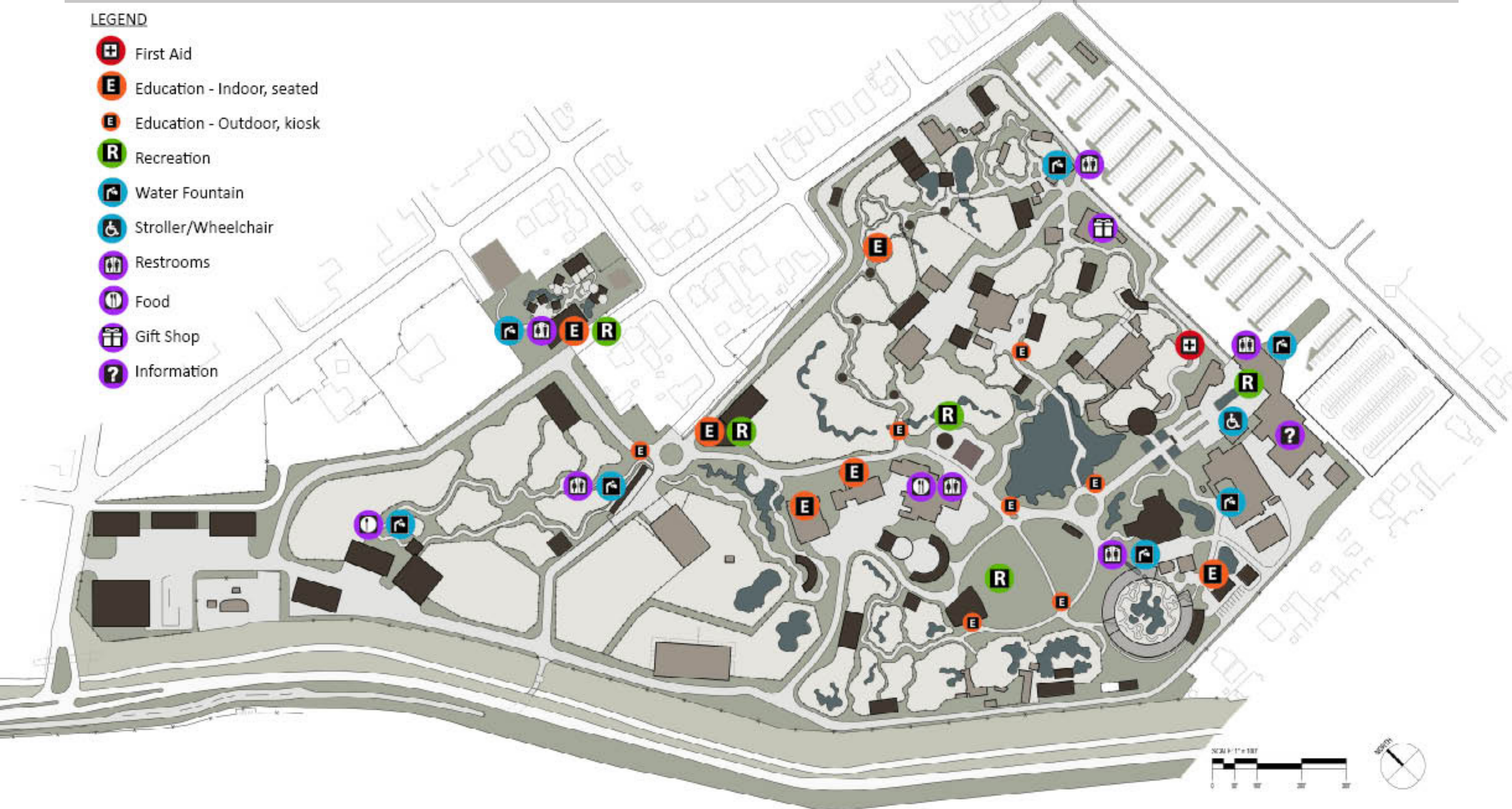




# VISITOR SERVICES - ZOO

## LEGEND

-  First Aid
-  Education - Indoor, seated
-  Education - Outdoor, kiosk
-  Recreation
-  Water Fountain
-  Stroller/Wheelchair
-  Restrooms
-  Food
-  Gift Shop
-  Information







## ANIMAL POPULATION

### EXISTING ANIMALS

The new thematic organization for ABQ BioPark makes use of the existing animal population while providing guidance for selecting new species, and brings cohesion to the collection. The following is a summary of the existing animals, followed by recommendations for new species.

### ANIMAL WELFARE

Animal welfare is a foremost concern to ABQ BioPark staff, and exhibits will be designed with animal welfare in mind. To be housed at ABQ BioPark, animals must be adapted to the climate and environment of the zoo.

Habitats created in the new master plan shall provide animals with the option to exercise control over their environment, provide a habitat-immersive and appropriate experience for the animal, provide a variety of experiences, and alleviate noise and other nuisances.

### INSTITUTIONAL COLLECTION PLAN

ABQ BioPark's animal care staff have assembled criteria to evaluate existing animals and provide guidance for future determinations. The staff acted on behalf of the animal population while supporting the zoo's mission. Existing animals scoring highly in this exercise include the North American river otter, snow leopard, Magellanic penguin, bald eagle, Puerto Rican crested toad, massasauga rattlesnake, firefish and giant clam. The results of this study are available in a separate document titled *ABQ BioPark Institutional Collection Plan*.

### PUBLIC & FOCUS GROUP INPUT

ABQ BioPark has surveyed the public and worked with staff regarding existing animals and types of animals or exhibits the public would like to see in the future. Otters, bears, and big cats topped the list of requests. In particular the visitor survey results noted that new exhibits for the big cats should be a top priority.

### PRIORITY ANIMAL SPECIES IN EXISTING POPULATION

ABQ BioPark participates in several animal conservation programs, and BioPark staff have identified several key animals as ones that must remain for conservation purposes. These are: Southern white rhino, snow leopard, African lion, Asian elephant, reticulated giraffe, snow leopard, apes, koala, komodo dragon, salt water croc, Socorro dove, tinamu, flamingo, and hornbill. The BioPark's existing animals within the Association of Zoos and Aquariums Species Survival Plan are also a priority, but may be phased out if inconsistent with climate, concept or conservation goals of the zoo.

If a species is phased out due to an aging population, or other reasons, existing animals will be cared for at the highest standard while they remain at the zoo.





# MAINTENANCE FACILITY

To maximize the visitor experience at the Zoo we recommend moving many of the maintenance functions to a new Maintenance and Operations Facility at the far north end of the Botanic Garden, accessed by Mountain Road NW. The greenhouse and lath house at the Zoo are in below average condition and are not set up mechanically to provide suitable conditions (temperature, humidity, light) for research projects. Relocating the greenhouse and lath house functions to the new Maintenance and Operations Facility will allow for construction of state-of-the-art greenhouses as well as lath houses. It also frees up the space at the Zoo to build a new education camp.

The current Zoo maintenance area contains the following buildings/uses:

- |                               |                             |
|-------------------------------|-----------------------------|
| • Graphics Department         | Welding Hut & Welding House |
| • Trash/Recycle/Compost Area* | Commissary*                 |
| • Hay Barn*                   | Fabrication Shop            |
| • Construction Offices*       | Maintenance Shop & Shed     |

\*need to remain at the Zoo

The expansion of the Asian Desert Rivers into the existing Cottonwood picnic area adjacent to the Elephant exhibit and the construction of a new Maintenance and Operations Facility at the Botanic Garden create an opportunity to shrink the maintenance space at the Zoo. As noted above, there are certain buildings whose functions require a strong proximity to the Zoo. The other buildings can be relocated to the new Maintenance and Operations Facility. This is an opportune time to reconfigure the entire maintenance area at the Zoo, starting with a new entry road just west of the existing entry at Alcalde Place SW. The existing entry will be maintained as a driveway to staff parking. A new entry road will allow for a normal turning radius for service vehicles to easily navigate off of Alcalde

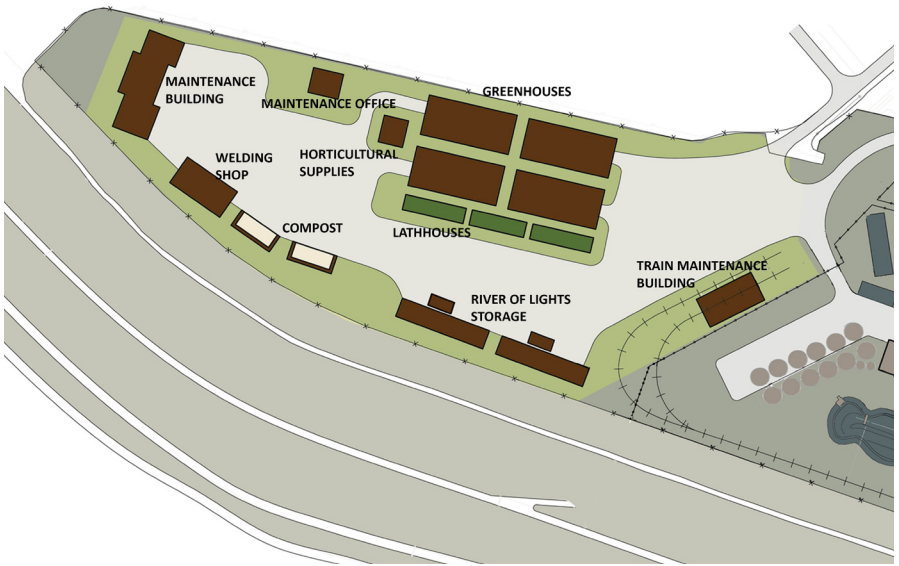
into the Zoo. The new commissary and hay barn will be laid out to allow for simple unloading of materials without blocking the main service drive.

The new Maintenance and Operations Facility at the Botanic Garden will include other buildings that help the BioPark meet its sustainability goals. A new compost facility will allow for all organic waste (vegetation cuttings, animal waste, food scraps, etc.) to be composted on site to a much greater control than currently exists. There is a potential to add a biodigester to this area that would give the BioPark even greater latitude in terms of the materials it can compost. The finished product can then be used throughout the BioPark by the horticultural staff.

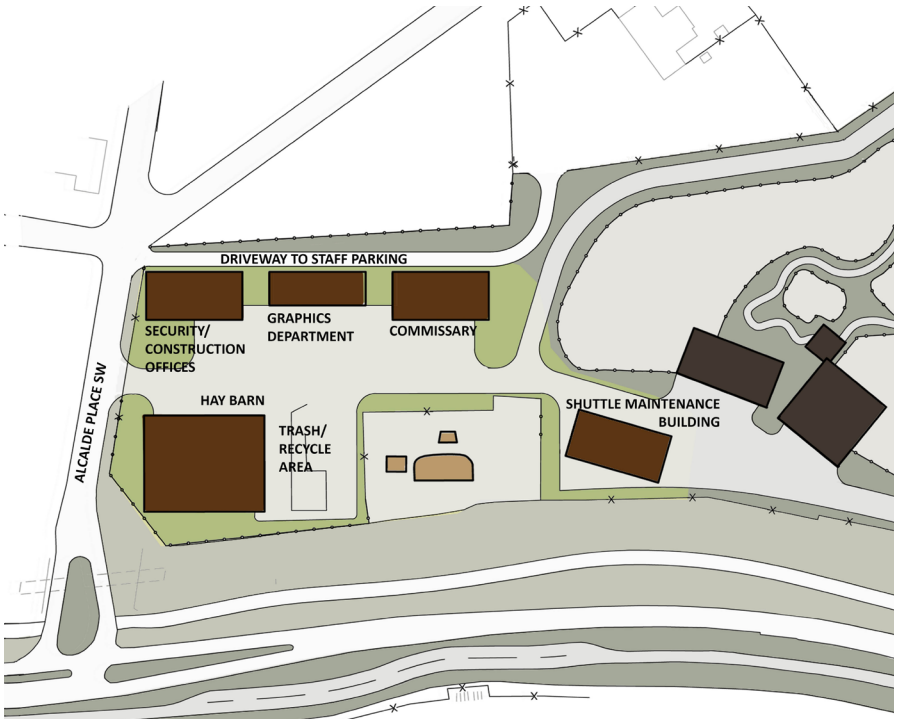
The new Maintenance and Operations Facility will also create storage building opportunities for the BioPark by relocating the existing River of Lights building to this new location. Moving this building will enable the expansion of the New Mexico Exhibits to occur. There are plans for a second River of Lights storage building which would also go here.

In summary, relocating the majority of maintenance and operation buildings to the northernmost part of the Botanic Garden will free up much needed space for animals at the Zoo, enable the expansion of the Botanic Garden northward, and reduce the visual impact of the back-of-house services to visitors.

## BOTANIC GARDEN MAINTENANCE AREA



## ZOO MAINTENANCE AREA







## INTRODUCTION

ABQ BioPark has increased attendance, ticket revenue and operating budgets substantially over the past 15 years. The expansions and investments made during that time period have yielded attendance increases of about 32% from 1999 through 2013 to 1,238,000 attendees. Effective management, marketing and operations, along with the support and close cooperation of the New Mexico BioPark Society have yielded these strong results. However, attendance increases are leveling off and the infrastructure and exhibits of the BioPark are in need of substantial reinvestment. Ticketed attendance has declined in recent years and is being offset with member visits and evening events. Therefore there is a need to create additional reasons to visit and a need to enhance on-site conditions. The Master Plan addresses specifically improvements that can increase attendance and earned revenues for both the BioPark and the New Mexico BioPark Society. It also addresses physical conditions in need of repair and replacement. These enhancements to the public experience and to safe, secure and efficient operations are essential to secure the future of the BioPark.

Investments in the physical infrastructure of the BioPark alone are not sufficient. To realize the potential benefits of the investments included in the Master Plan, there will also be a need for increased staff, operating budgets and marketing expenditures. In turn, the additional attendance and visitor spending that the Master Plan can generate will help to support such increased operations.

As is the case with most visitor attractions, without reinvestment in facilities and in operations, it is likely that there would be erosion in attendance, earned revenues and other measures of activity at the ABQ BioPark. As well, there would be decreases in community and education benefits and economic impacts associated with the BioPark.

Following is a summary of findings and recommendations related to future attendance and operations as the Master Plan is implemented.

## MASTER PLAN OPPORTUNITIES FOR ATTENDANCE AND OPERATIONS

### Investment Opportunities

- Signage, access / parking
- Arrival sequence
- Internal circulation
- Animal exhibits and visitor experiences
- Aquarium expansion and enhancements
- Signature New Mexico exhibit
- Tingley Beach improvements / becomes a destination attraction
- Food service and retail
- Event infrastructure
- Additional “up-charge experiences”
- Branding
- Investments in back-of-house and zoo basic infrastructure

### Market Opportunities

- Tourists
- Repeat visitation
- Memberships

- School groups
- Events
- Facility rentals

### Operating Opportunities

- Multi-day ticketing and out-of-state pricing
- Summer evening hours
- Aquarium as event venue
- Bosque tours
- ABQ BioPark Transportation system / parking improvements

## OUTCOMES AND IMPLICATIONS

- Staffing / expenses for internal circulation / parking
- Operating costs of new exhibits
- Higher maintenance costs
- Substantially increased earned revenue
- Energy / water efficiency
- Internal circulation benefits operating efficiency
- Marketing of complex facility
- Need enhanced visitor testing
- Need for enhanced Management Information Systems and Point of Sale capacity
- Improved results measured against initial investment and ongoing operating budgets
- Substantially enhanced community / economic benefits



# EVALUATION OF ATTENDANCE POTENTIAL

## ASSUMPTIONS AND METHODOLOGY

The evaluation of attendance potential is based on implementation of the Master Plan's investments in the physical infrastructure of the ABQ BioPark and expansion of its personnel, operating budgets and marketing. The extent of growth in attendance also depends on the success of the New Mexico BioPark Society as it builds membership, and contributes to successful operations, events, programs and capital investments. Following are the analyses conducted to evaluate the attendance related potential of Master Plan implementation.

- Master Plan Attendance Impacts – How and why the Master Plan will benefit visitors
- Attendance Potential
- Attendance Potential over 25 Year Time Horizon
- Attendance Implications of Not Implementing Master Plan
- Future Audience Mix – Tickets by Type
- Ticket Revenue
- Memberships Benefits

The full Attendance and Operations Report is included in the Master Plan Appendix. It includes data and analyses that underpin the findings and recommendations. These data include analysis of past operating and attendance patterns, the characteristics of the resident and tourist markets, comparable zoos and aquariums analysis and survey research of area residents – both members and non-members.

## HOW AND WHY THE MASTER PLAN WILL BENEFIT VISITORS

### New and rehabilitated exhibits and visitor experiences:

- New reasons to visit on an ongoing basis as Master Plan is implemented
- The most up-to-date exhibit and interpretive techniques
- Better spaces for zoo animals
- Enlarged and improved gardens with targeted themes
- Tingley Beach becomes a destination for additional audience segments

All of these increase visitor length of stay and frequency of visit while attracting new audiences

### Visitor arrival and internal circulation infrastructure:

- More parking for “peak” attendance days
- Better and/or more proximate parking locations
- BioPark Shuttle (to move from Zoo to BG/Aquarium)
- People Mover (to move within the Zoo)
- BioPark Train (to move within the Botanic Garden)

### Operating Enhancements:

- Marketing, education programs, public programs, enhanced facility rentals, new approaches to ticketing, increased staffing

### New visitor infrastructure focused on the visitor experience including

- Event and rental spaces, Lake rehabilitation and boardwalk, food service and retail, restrooms, entry plazas, education and Interpretive spaces, Sculpture Park, Lakeside Fountain Show etc.

### Long term attendance erosion due to lack of reinvestment is avoided:

- Audience expectations have changed
- Visitor areas are now physically depreciated and or “behind the times”
- Lack of new experiences

### Changes in audience makeup effect future attendance potential:

- Albuquerque's population is growing, but is also maturing
- Tourism market is also growing, but at a moderate pace



# EVALUATION OF ATTENDANCE POTENTIAL



Following are opportunities that the Master Plan presents for Attendance and operations. These are included in the Master Plan evaluation and recommendations.

ABQ BioPark With Master Plan	AQ / BG	Zoo	Total
Low Range Estimate	550,200	801,600	1,351,800
Mid Range Estimate	611,300	890,700	1,502,000
High Range Estimate	672,400	979,800	1,652,200
<i>Comparisons</i>			
Actual FY2013 Attendance	519,300	718,900	1,238,200
Potential FY2037 Without MP	460,500	637,400	1,097,900

Source: ConsultEcon, Inc. and Jones & Jones

ABQ BioPark Attendance Potential at Full Build Out with Comparison to Current Attendance and to the results of Not Undertaking the Master Plan

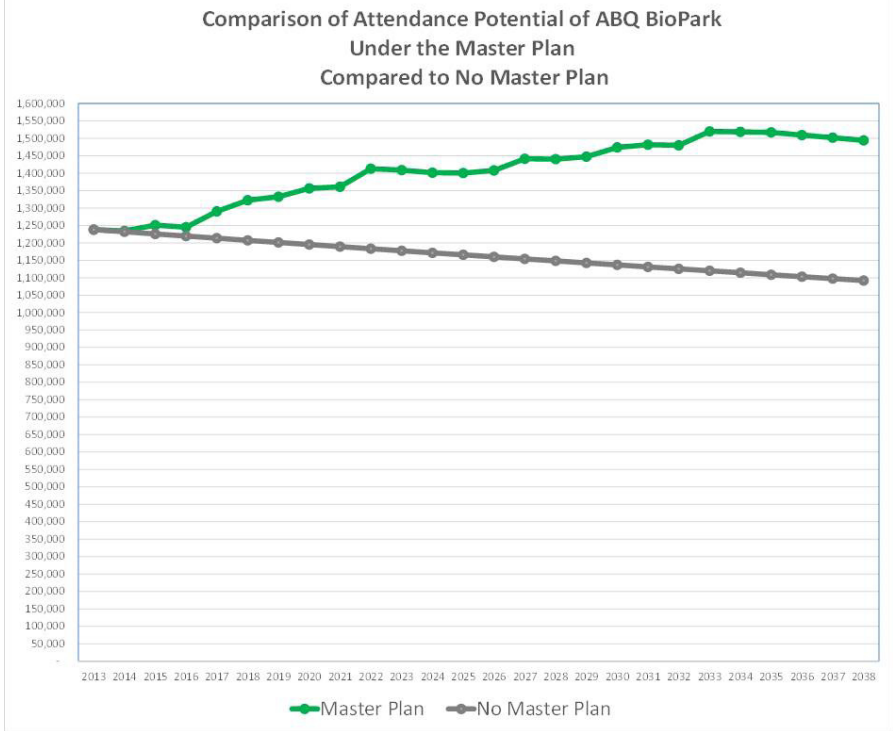
- Mid-range Attendance potential estimated at 1.5 million for targeted Master Plan completion year of FY2037
- A 10% range above and below the “best estimate” mid-range attendance potential is used to establish the low and high range attendance potential
- A summary is provided in the table of Attendance increases over time as Master Plan is implemented
- A comparison is provided in the table of current attendance and Mid-Range estimate of NOT undertaking Master Plan

	FY 2013	FY 2037	% Change
AQ / BG	519,000	608,000	17.1%
Zoo	719,000	886,000	23.2%
ABQ BIOPARK	1,238,000	1,494,000	20.7%
FY 2037 Potential Attendance			
	Without MP	With MP	
AQ / BG	460,000	608,000	32.2%
Zoo	637,000	886,000	39.1%
ABQ BIOPARK	1,097,000	1,494,000	36.2%

Source: ConsultEcon, Inc. and Jones & Jones

Percentage Mid-Range Attendance Growth Potential of By AQ / BG and Zoo Under the Master Plan

- Zoo has a higher percentage growth potential than AQ / BG as River of Lights (which is a major portion of AQ / BG attendance) attendance is not expected to increase at the rate of the Zoo
- Without Master Plan, ABQ BioPark attendance is expected to decline; therefore, the percentage increases in attendance due to Master Plan is much higher when compared to the projected attendance without Master Plan
- Tingley Beach is proposed to stay as a free facility, therefore its attendance is not included in this analysis, but it is expected to increase at a similar rate to AQ / BG and Zoo



ABQ BioPark Mid-Range Attendance Potential Compared to No Action

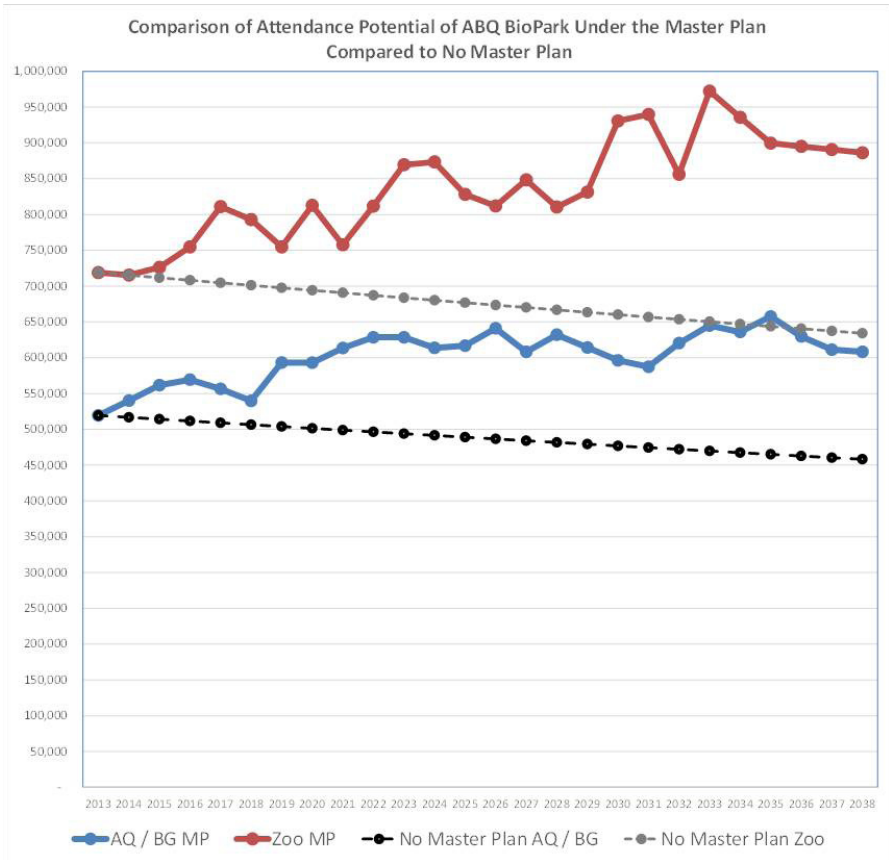
- Implementing Master Plan also prevents deterioration of attendance over time due to lack of reinvestment. Total potential difference in future attendance between the Master Plan and No action is 400,000 attendees or 37% or more attendance than No Master Plan
- Tingley Beach is proposed to stay as a free facility; therefore, its attendance is not included in the attendance potential estimate

ABQ BioPark Mid-Range Attendance Potential Compared to No Action

- This chart tracks attendance growth potential for AQ/ BG and the Zoo over time as the master plan is implemented
- The uneven growth pattern is due to implementation of individual elements of Master Plan that create temporary surges in attendance at either campus; but that also increase the baseline attendance over time.



# EVALUATION OF ATTENDANCE POTENTIAL



Source: ConsultEcon, Inc. and Jones & Jones

## ABQ BIOPARK MASTER PLAN INCREASES ATTENDANCE POTENTIAL BY MAJOR VISITOR TYPE

### Ticketed visitors attendance increases due to:

- Zoo exhibits brought up to audience expectations
- Better experience in viewing and interacting with animals
- Ongoing array of new exhibits attract new visitors from the resident market to “try” the BioPark, and also increases frequency of visits
- New exhibits/ improved reputation attracts new tourist attendees

- Improved circulation throughout BioPark enhances visit, increases combo ticket sales
- Possibility of selling two day passes so visitors can take full advantage of BioPark
- Enhanced parking allows more visitors on peak days, attracts families who are concerned parking will be a “hassle”
- Enlarged and improved BG attracts new visitors with a focus on BG experience – often these are adults
- AQ rises to status of visitor attraction in its own right under MP

### School Group attendance increases due to:

- Dedicated facilities such as: Bosque Interpretive Center at Tingley Beach; the Education Classrooms and the Leopold Environmental Center at the Botanic Garden; the Education Camp and Colores Education Center at the Zoo
- Overall improvements and connectivity
- Additional earned revenues to support outreach and programming

### Events attendance increases due to:

- Improved spaces for rentals and events
- Parking for peak periods such as River of Lights
- Internal circulation improvements to support peak periods

Future Estimated Audience Mix in 2037			
	AQ / BG	Zoo	BIOPARK
Ticketed	202,900	353,700	556,600
Combo Ticketed	42,000	107,800	149,800
Baby	46,700	72,000	118,700
Members / Reciprocal	145,500	201,300	346,800
School & Recreation	30,600	80,200	110,800
River of Lights	116,100	8,900	125,000
Day/Night Events & Other	27,500	66,800	94,300
Total	611,300	890,700	1,502,000
Composition of Attendance Increase			
	AQ / BG	Zoo	BIOPARK
Ticketed	17,600	28,900	46,500
Combo Ticketed	18,100	48,000	66,100
Baby	6,700	12,700	19,400
Members / Reciprocal	21,700	39,100	60,800
School & Recreation	9,500	24,600	34,100
River of Lights	14,000	7,400	21,400
Day/Night Events & Other	4,300	11,100	15,400
Total	92,000	171,800	263,800
FY 2038 Percent Increase From FY2013			
	AQ / BG	Zoo	BIOPARK
Ticketed	9.5%	8.9%	9.1%
Combo Ticketed	75.9%	80.3%	79.0%
Baby	16.9%	21.3%	19.6%
Members / Reciprocal	17.6%	24.1%	21.3%
School & Recreation	44.9%	44.4%	44.5%
River of Lights	13.7%	502.6%	20.7%
Day/Night Events & Other	18.8%	19.9%	19.5%
Total	17.7%	23.9%	21.3%

Source: ConsultEcon, Inc. and Jones & Jones



# EVALUATION OF ATTENDANCE POTENTIAL



## ABQ BIOPARK – TINGLEY BEACH ATTENDANCE POTENTIAL

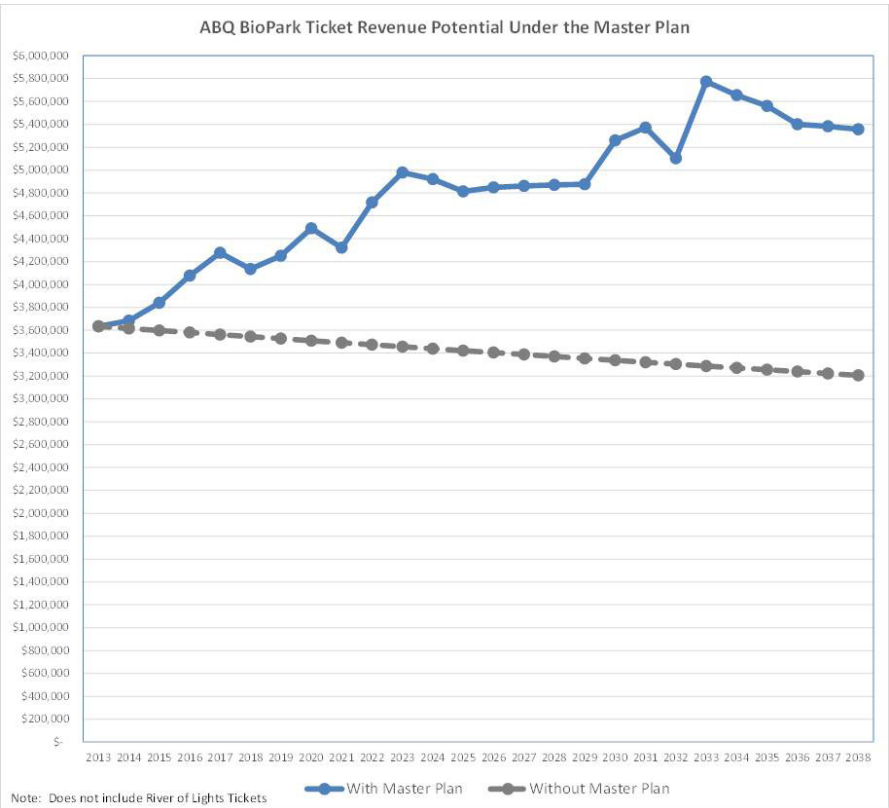
- Estimated 350,000 Current annual users per ABQ BioPark
- Free Admission to continue under Master Plan
- Operated by ABQ BioPark departments and budgets
- Largely Albuquerque resident use
- Opened in 2005 with a series of improvements thereafter. Currently Offers: Three fishing lakes and a model boating lake; Fitness course; Train station and rail line; Gift shop and concession stand; Access to Bosque
- Master Plan enhancements include: ABQ BioPark Shuttle Station and enhanced parking and signage; (This will make Tingley Beach a third access point to overall BioPark); Bosque Interpretive Center – a remodeling of the existing station; a sculpture garden; Tingley Tower as a distinctive landmark. These will make Tingley Beach an enhanced destination serving more Albuquerque residents and also out of town visitors
- Attendance increases anticipated to increase at rate of the rest of ABQ BioPark. A 20% increase would indicate future attendance potential of 420,000 annual visitors

## ABQ BIOPARK MID-RANGE TICKET REVENUE POTENTIAL COMPARED TO NO ACTION

Ticket Revenue will increase due to:

- More attendees
- A higher percentage of attendees buying tickets and combo tickets
- Opportunities to increase prices over 25 years–conservatively assumed at 17% (not including inflationary price increases). Higher ticket prices certainly possible, but the financial sustainability of the plan is not predicated on higher increases.

- Total effect is an opportunity to increase ticket sales by 47% to \$5.36 million annually by 2037
- Ticket revenue when Master Plan is complete is 67% higher than without Master Plan
- During 25 year Master Plan period, \$36 million in additional ticket sales are achieved. For attendance potential and operations 25 year time horizon is used to reflect stabilized years of operations after the plan is implemented.



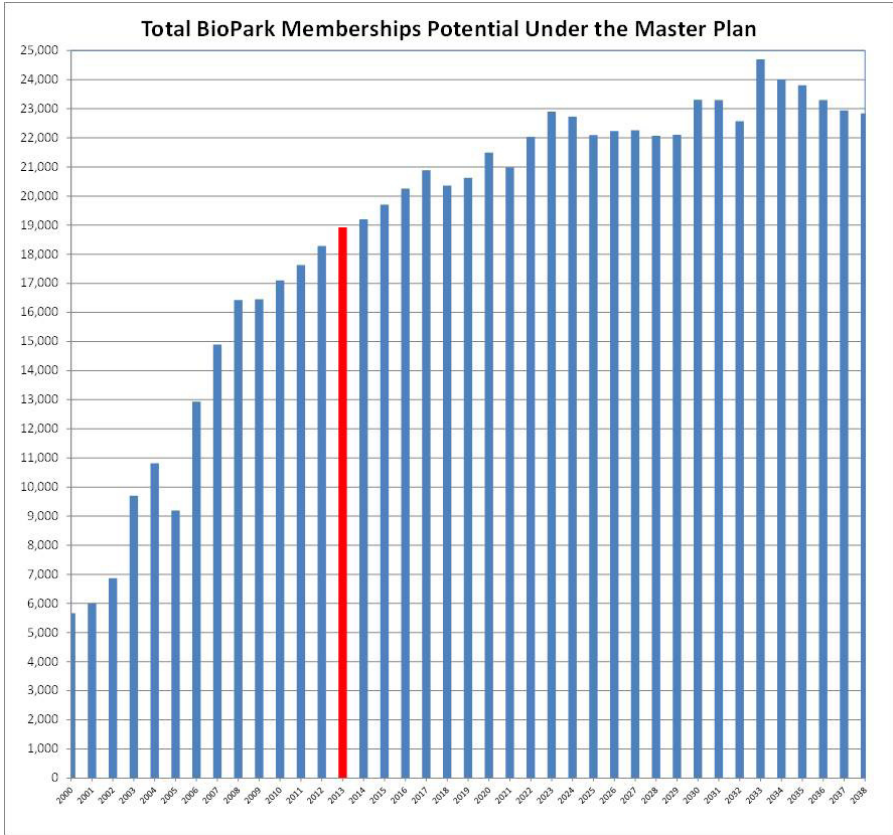
Source: ConsultEcon, Inc. and Jones & Jones

## ABQ BIOPARK MID-RANGE MEMBERSHIP POTENTIAL

Number of memberships and membership revenue are forecast to increase under Master Plan:

- Potential for 22,800 memberships upon completion of the Master Plan

- Future membership pattern shows “spikes” in increases in memberships after major new exhibit openings
- Potential for 345,000 member attendances at MP completion
- Membership prices: conservatively assumed to increase 10% to \$110 for families and \$60 for Individuals (not including inflationary price increases). Higher membership prices certainly possible, but the financial sustainability of the plan is not predicated on higher increases.
- Total Membership revenue potential \$2,480,000 a 33% increase based on additional memberships and the increased value of memberships
- In addition, other “per capita” spending for all visitors will increase e.g. lorikeet /giraffe feeding, train, events etc.



Source: ConsultEcon, Inc. and Jones & Jones



# EVALUATION OF RECOMMENDED FUTURE OPERATIONS

## INTRODUCTION

To realize the potential benefits of the investments included in the Master Plan, there will also be a need for increased staff, operating budgets and marketing expenditures. The improvements in operations, maintenance, marketing, education and animal and horticultural care will make significant improvements to the attractiveness and sustainability of the ABQ BioPark. In turn, the additional attendance and visitor spending that the Master Plan can generate will help to support such increased operations.

Following are the topics which are summarized below

- Summary of Current Operating Profile
- Investment Opportunities / Market Opportunities / Operating Opportunities / Outcomes and Implications
- Operations – Recommended Personnel
- Operations – Recommended Budgets

## Summary of Current Operating Profile

- City of Albuquerque operations, supported by New Mexico BioPark Society
- Baseline \$12.8 million budget supplemented by \$2 million BioPark Society operating expense support and City LTD Funds that have averaged \$2 million to \$2.5 million annually
- Capital improvements are funded by City and vary by year and are supplemented by BioPark Society fund raising
- ABQ BioPark personnel currently includes about 190 positions and includes FT, PT Seasonal as well as a

number of temporary contract workers. There are typically over 40 vacant permanent positions whose duties are fulfilled by temporary contract workers. An important plan goal is to convert these to permanent positions. In addition BioPark Society directly supports 4 – 5 positions.

- Earned revenues include admission tickets (remitted to the City); admission tickets to special events, retail and food services, fees for education programs, facility rentals, animal feedings (remitted to the BioPark); and memberships, train tickets and other animal feedings (remitted to the Society). Admission ticket revenues remitted to City; other revenues support directly support BioPark activities

The Master Plan will increase attendance and earned revenues for both the ABQ BioPark and the New Mexico BioPark Society. These will support increased operating costs; and the investments of Master Plan require increased operating budgets to realize the benefits of the investments in the ABQ BioPark.

- Additional personnel and operating expenditures will be needed to realize the potential of the investments made in the Master Plan.
- Additional resources recommended for: animal curation, maintenance, education, marketing and events.
- Increases in attendance and revenue will also allow ABQ BioPark to address current shortfalls; particularly in personnel, maintenance and marketing.
- ABQ BioPark Leadership has identified personnel needs related to Master Plan and organization development, below:

## Personnel

- Currently ABQ BioPark has about 190 positions including FT, PT Seasonal and temporary contract workers; BioPark Society in addition directly supports 4 – 5 positions
- ABQ BioPark Leadership has identified personnel needs related to Master Plan and organization development estimated at 89.5 full time and part time positions added over time until 2037.
- Shifting from temporary contract status for many zoo staff to permanent positions and thus filling the ABQ BioPark vacant positions is an important goal of the Master Plan. This will support efficiency and lower costs in staff training; improve staff productivity and also generally boost morale
- Augmenting staff capacity required to sustain investments and to serve increased attendance and programming that will result from Master Plan

Note: all dollar amounts are expressed in the current 2014 value of the dollar; New personnel will be mostly front-line staff including transportation and animal/horticultural staff.



# EVALUATION OF RECOMMENDED FUTURE OPERATIONS



Year	Number of New Personnel
2014	1.25
2015	9.25
2016	0.50
2017	14.50
2018	9.75
2019	3.25
2020	2.00
2021	3.00
2022	12.50
2023	0.25
2024	1.00
2025	1.50
2026	2.00
2027	2.00
2028	0.25
2029	6.75
2030	5.00
2031	2.00
2032	0.25
2033	5.25
2034	2.00
2035	5.25
2036	-
2037	-
2038	-
Total	89.50

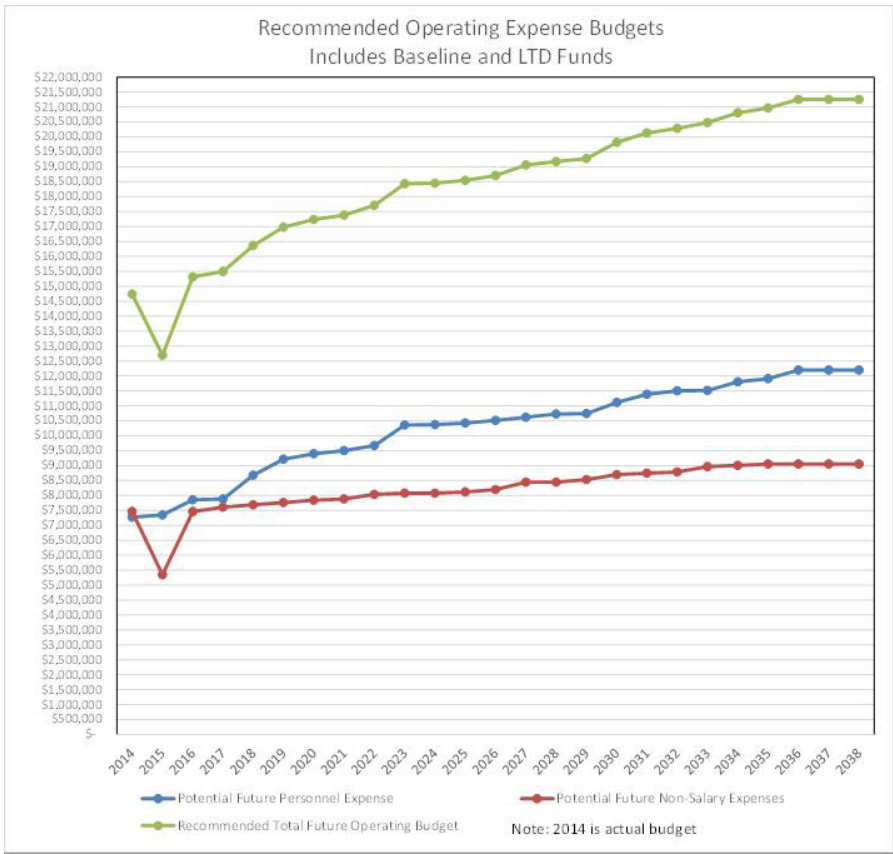
Source: ABQ BioPark, ConsultEcon, Inc. and Jones & Jones

## Operating Expense Budgets

- At Master Plan completion, Baseline Operating Budget recommended at \$19.0 million, supplemented by \$2 million BioPark Society operating expense support (Operating Budget includes an assumed \$2 million City LTD Funds which vary annually)
- Total increase in recommended operating costs from 2014 is \$6,510,000 – about 44%
- Recommended Increases in ABQ BioPark Operating Budgets will optimize the potential benefits and outcomes of the Master Plan
- The increases in operating costs are offset by increases in attendance; and, there will be increased economic impacts and community and education benefits



Photo: City of Albuquerque



Source: ConsultEcon, Inc. and Jones & Jones

Note: all dollar amounts are expressed in the current 2014 value of the dollar



# ATTENDANCE AND OPERATING SUMMARY

## SUMMARY

- ABQ BioPark Master Plan addresses deferred maintenance and needed investments and reinvestments in animal enclosures, exhibits, public spaces, education and back of house facilities.
- ABQ BioPark Master Plan also addresses needs to augment operations due to increased attendance, increases in developed ABQ BioPark acreage, enhanced exhibits and new programs; and to fully realize the community, educational and economic benefits that the Master Plan offers. Without appropriate operating enhancements, including additional personnel and increased operating budgets, the potential which the capital investments create will not be fully realized.
- Mid-range attendance potential estimated at 1.5 million for target completion year FY2037. Attendance increases over time as Master Plan is implemented. Without Master Plan, attendance is expected to decline. Total potential difference in future attendance between the Master Plan and No action is 400,000 attendees or 37% more attendance than if no Master Plan.
- Ticket revenue at a total of \$5.4 million when Master Plan is complete is 67% higher than if no Master Plan.
- Potential for a total of 22,800 or more memberships by completion of the Master Plan and membership revenue potential \$2,480,000, a 33% increase.
- The Master Plan will increase attendance and earned revenues for both the ABQ BioPark and the New Mexico

BioPark Society. These will support increased operating costs; and the investments of Master Plan require increased operating budgets to realize the benefits of the investments in the ABQ BioPark.

- ABQ BioPark Leadership has identified personnel needs related to Master Plan and organization development estimated at 89.5 full time and part time positions
- At Master Plan completion, Baseline Operating Budget recommended at \$21.3 million, supplemented by \$2 million BioPark Society operating expense support (Operating Budget includes an assumed \$2 million City LTD Funds which vary annually).



Photo: City of Albuquerque



Photo: ABQ BioPark



# ATTENDANCE AND CAPACITY ASSESSMENT



## DISCUSSION

The following report includes a review of the proposed Master Plan for the City of Albuquerque's ABQ BioPark and its primary public attractions, the Zoo, Botanic Garden (BG) and Aquarium (AQ) by ORCA Consulting LLC. This review addresses capacity, circulation, and operational issues associated with the new design, based upon attendance projections through the year 2037. ORCA's review references the most recent Master Plan document along with revised concept sketches specific to the Zoo's Africa, Australia and South America exhibits, which were issued in early July 2014.

## ATTENDANCE PLANNING FACTORS

Based on visitor surveys, more BioPark BG & AQ visitors go to the Botanic Garden than the Aquarium. It is assumed that 90% go to the Botanic Garden, 80% go to the Aquarium, and 72% go to both. With this assumption, annual attendance at each venue for 2013 and 2037 are summarized in the following table

Annual Attendance by Venue				
Year	AQ/BG Combined	AQ	BG	Zoo
2013	519,330	415,464	467,397	718,917
2037	611,309	489,047	550,178	890,629

The Design Day attendance represents a busy day during the summer season, as is calculated as the attendance level at which only 15% of the annual attendance occurs on days higher than the Design Day. The Peak Day attendance represents the average of the 2nd and 3rd highest attendance days of the year. Based on these definitions, the following table summarizes Design Day and Peak Day attendance levels for 2013 and 2037:

Design and Peak Day Attendance by Venue				
Year	Day	AQ	BG	Zoo
2013	Design Day	2,560	2,880	5,870
	Peak Day	4,240	4,770	7,980
2037	Design Day	3,010	3,390	7,270

Assuming that an average of 20% of the daily attendance arrives during the peak arrival hour, the following table summarizes estimated hourly arrivals during the peak period at each venue for 2013 and 2037:

Peak Period Hourly Arrivals by Venue				
Year	Day	AQ	BG	Zoo
2013	Design Day	510	580	1,170
	Peak Day	850	950	1,600
2037	Design Day	600	680	1,450

The following table provides estimates of the average visitor length of stay at each ABQ BioPark venue for 2013 and 2037:

Average Length of Stay by Venue			
Year	AQ	BG	Zoo
2013	1.0	1.5	3.0
2037	1.3	1.8	3.3

The existing lengths of stay are based on the recent visitor survey, and the estimated increases for each venue reflect the estimated impact of the master plan program.

Based on the above attendance and length of stay figures, the following table summarizes the estimated instantaneous number of visitors at each venue during the peak period:

Number of Visitors Onsite during Peak Period by Venue				
Year	Day	AQ	BG	Zoo
2013	Design Day	500	900	3,200
	Peak Day	800	1,400	4,400

The increased numbers of onsite visitors for 2037 include the impact of both increased attendance and increased length of stay. The public areas of the onsite facilities need to be designed with sufficient capacity to accommodate these visitor counts on



# ATTENDANCE AND CAPACITY ASSESSMENT

the Design Day. This issue is addressed for each venue within this report.

## ZOO CAPACITY ASSESSMENT

A visitation model was developed to estimate the visitor capacities for each public area of the zoo, including:

### ENTRY AREA

Existing Zoo: Ticketing, Entry Plaza, restrooms, food service, gift shop, flamingo exhibit, path, Administration/Clinic.

Master Plan: Ticketing, control access point (turnstile), expanded Entry Plaza, restrooms, food service, gift shop, gardens, path, Administration/Clinic.

### EAST ZOO AREA

Existing Zoo: Tropical America building, tortoise, birds, Raptor Roost, parrot walk, restroom, food service, paths.

Master Plan: Penguin building, penguin plaza, tortoise, penguin plaza, Raptor Roost, walk-thru aviary, parrot aviary, Reptile Conservation Center, paths.

### CENTRAL ZOO AREA

Existing Zoo: Picnic lawn, Band Shell and viewing, classrooms and education buildings, café, restroom, paths, Bird Show/Theater.

Master Plan: new stage, stage viewing area, Picnic lawn, carousel and splash ground, classrooms and education buildings, café, restroom, paths, new Bird Show/Theater.

### SOUTH AMERICA

Existing Zoo: cats, lion, outdoor llama holding, paths.

Master Plan: primates & capybara, three South American cat exhibits, maned wolf, tapir, new bear, llama, paths.

### ARCTIC

Existing Zoo: Polar Bear, Mexican Wolves, paths.

Master Plan: Polar Bear, new polar bear, seal/sea lion, paths.

### AFRICA

Existing Zoo: giraffe (indoor & outdoor areas), zebra, large animal, rhino, chimps, wild dogs, hyenas, cats, birds, hippo, gardens, small rhino, medium animal, monkey, restroom, food service, train station, art, path.

Master Plan: Savanna – main path, Savanna paths, Savanna nodes, carousel and splash ground plaza, dogs/cats, caracal, chimp, hippo, croc, hippo/croc underwater viewing, restrooms, food service, chimp, hog, Hyrax & Klipspringer, Guenon, gardens, art.

### AUSTRALIA

Existing Zoo: koala, lorikeets, Tasmanian devil, wombat, kangaroo, small plaza, paths.

Master Plan: Koala, lorikeets, Tasmanian devil, wombat, kangaroo, saltwater crocodile, flying fox, wallaby, paths.

### ASIA

Existing Zoo: camel, elephant, path.

Master Plan: elephant, expanded elephant, new elephant, three cat exhibits, hoofstock, bear, aviary, paths.

### EDUCATION CAMP/CLASSROOMS

Existing Zoo: greenhouses, service area.

Master Plan: Education camp and outdoor learning area.

## VISITOR CIRCULATION

New Circulation Hubs (Shuttle station, tram stop, restroom)

New Lakeside Boardwalk and wetlands

## CAPACITY ASSESSMENT

Based on measurements of the public areas of the existing zoo and zoo master plan listed above, achievable density factors, and estimated length of stay, the following table summarizes ORCA's



# ATTENDANCE AND CAPACITY ASSESSMENT



estimates of visitor capacity (i.e., number of visitors that can be realistically supported in each area of the Zoo):

The figures in the above table assume that there is no entertainment program scheduled for the band shell, so band shell viewing capacity is not included in these capacity figures.

Visitor Capacity for each Zoo area (Design Day)

Zoo Area	Visitor Capacity			Primary capacity increase driver
	Existing	Master Plan	Capacity Change	
Entry	470	580	23%	Increased visitation and expanded entry plaza
East Zoo	530	810	53%	New Aviary & Penguins
South America	240	540	125%	Increased capacity of new configuration & exhibits
Central Zoo	490	1,140	133%	New Bird Show, Carousel, Splash Ground
Africa	850	1,000	18%	Increased capacity of new configuration & exhibits
Australia	310	460	48%	Increased capacity of new configuration & exhibits
Asia	140	590	321%	Expanded elephants & other exhibits, new exhibit paths
Arctic	130	220	69%	Increased capacity of new exhibits
Apes	190	270	42%	Increased capacity of new exhibits
Education Camp	0	280	+	New educational facilities
<b>Total</b>	<b>3,350</b>	<b>5,890</b>	<b>+76%</b>	

The above table shows the estimated visitor capacities for each area for both the existing zoo and the zoo master plan, along with the estimated capacity changes for each area. As shown in the previous attendance section, it is estimated that, on the 2013 Design Day, the Zoo experienced an average of 3,200 visitors onsite during the peak period. The above table shows that the existing Zoo facilities can comfortably accommodate 3,300 visitors on the Design Day, so the existing capacity is well-matched to the Design Day attendance. For the 2037 Design Day, it is estimated that the Zoo will have 4,360 visitors onsite during the peak period, which can be comfortably supported by the estimated visitor capacity of 5,300.

For the 2013 Peak Day, it is estimated that visitor demand exceeds the exhibit/attraction capacity by 16%, indicating that backups and crowding occurs at many exhibits and attractions; although this may be reduced by scheduling of events at the band shell and/or other locations. For the 2037 Peak Day, it is estimated that visitor demand exceeds the exhibit/attraction capacity by 10% (excluding the potential additional capacity of the new stage and/or other special entertainment events). This is less of a capacity shortfall than the 2013 Peak Day, but will still provide an improved visitor experience over existing peak days.

This analysis indicates that the Design Day and Peak Day for the peak year of 2033 (projected annual zoo attendance = 972,273) will experience visitation conditions that are similar to those for 2013.



# ATTENDANCE AND CAPACITY ASSESSMENT

## ZOO PLAN – OVERALL CIRCULATION

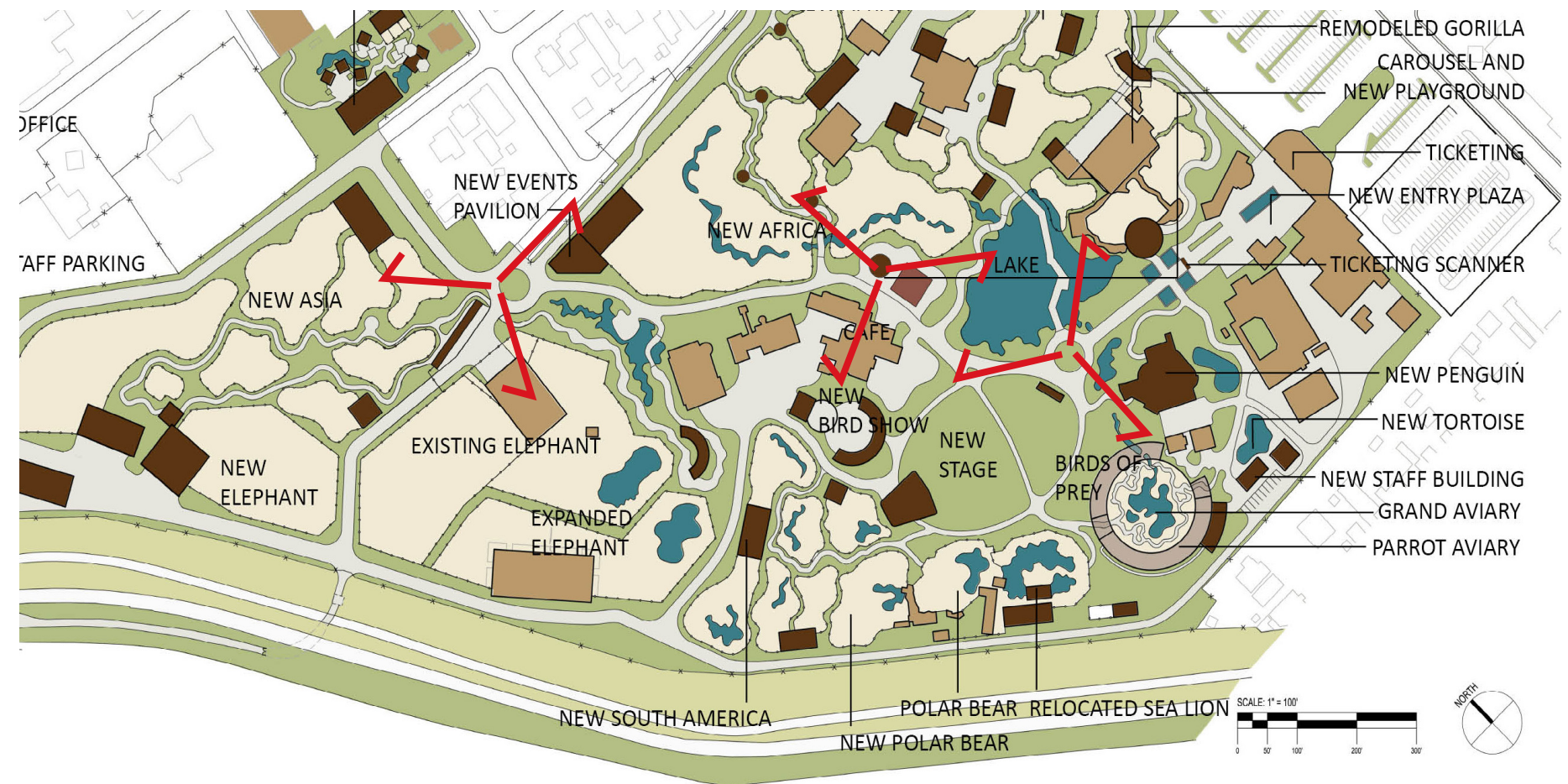
The new plan proposes four primary circulation hubs:

1. Entry Plaza
2. Lake/Performance Lawn
3. Café/Playground
4. Asia/Africa/Elephants



Though the proposed circulation hubs effectively provide more well-defined circulation routes, decision-making points, and areas for families to re-group; reducing the number of hubs would increase ease of navigation and visitor orientation even further. Because of the close proximity of the Entry Plaza and Lake/Performance Lawn hubs, it is recommended that these two hubs be combined in a centralized location that maintains the path connections to all areas accessed by the hubs as seen in the diagram below.

For all hub areas, paths feeding the primary collection areas should connect directly to the hubs, as shown above, to facilitate visitor orientation and navigation. Hubs should be planned for purposes of family/group gathering, orientation, and relaxation/resting. Ample bench space should be provided within the hub areas, particularly at the northernmost hub (new Asia/Africa/Elephants), which most visitors will experience toward the latter part of their Zoo visit and will be most fatigued.





# ATTENDANCE AND CAPACITY ASSESSMENT



## Zoo Entry Plaza

### Ticket Sales

Based on the Master Plan attendance estimates and existing ticket sales characteristics, it is estimated that 8 ticket sales windows will be needed to support the 2037 Design Day (two additional windows over the existing capacity). However, with the potential future implementation of online ticket sales and associated shift to online sales, no additional capacity should be needed.

### Access Control

We propose the establishment of an access control point separate from the ticketing area, for three primary purposes:

- As a service to members and pre-ticketed visitors, who would be able to completely bypass the ticketing area and proceed directly into the Zoo;
- To place the food and retail locations within the Entry Plaza outside of the Zoo's ticketed space, enabling access to these venues by the general public (increased public awareness and revenue generation); and,
- Reduce the risk of internal theft, as all visitors and members must have proof of purchase or membership to enter the Zoo at the access control point.

At the access control point, tickets and membership cards would be scanned, both to validate the membership/ticket and to capture daily attendance. Assuming an average transaction time of 5 seconds for each ticket or membership card being scanned, a total of three scanning stations are needed to meet projected attendance levels through the year 2037. To meet arrival surges during concerts and private events, additional scanning points can be provided through the use of portable, hand-held scanning devices.

Based on the proposed redesign of the Entry Plaza, the optimum location of the access control point is just to the east of the four-square water feature, as indicated below:



### Entry Pathway Width

The path shown below serves as the primary circulation artery for arriving and exiting visitors, both for general visitation and during evening concerts and other activities planned at the new stage:



Peak congestion on the path occurs just prior to and immediately after concert activity on the stage, particularly after the event. To support arrivals and exits for planned concert audience sizes up to 6,000 visitors, the main path above should be sized to a clear width of at least 20 feet, which on event days should be free of carts and other amenities that would otherwise restrict visitor flow – this width will enable the peak exit rush after concert events to be cleared in 15 minutes.

Also to support peak restroom demand during concert events, the following total minimum restroom fixture counts (currently served by two restroom locations) should be provided in close proximity of the concert viewing area:

- Women: 20 toilets + 10 sinks
- Men: 15 toilets & urinals + 5 sinks



# ATTENDANCE AND CAPACITY ASSESSMENT

The Master Plan proposes a highly efficient transit and circulation hub at the entrance to the new Asia section. This is an optimum design due to the following visitor circulation and service benefits:

- Convenient connections between the Zoo's internal tram and BioPark shuttle;
- Adjacency between the transportation stations and the primary pedestrian circulation hub, maximizing visitor comfort and convenience.



## Africa-Australia Circulation

The Africa and Australia sections within the new Zoo plan proposes new paths which cross over both existing and new water features, such as the existing lake and the new pond areas at the hippo and chimp exhibits. There will be occasions in which animal viewing is ideal from the bridges, so sufficient space must be provided to accommodate two-way circulation and viewing from both sides. With the exception of the new boardwalk over the lake, a consistent bridge with of 8 feet is recommended. Because the boardwalk over the lake provides viewing opportunities over a far greater area, a smaller width of 6 feet is sufficient.

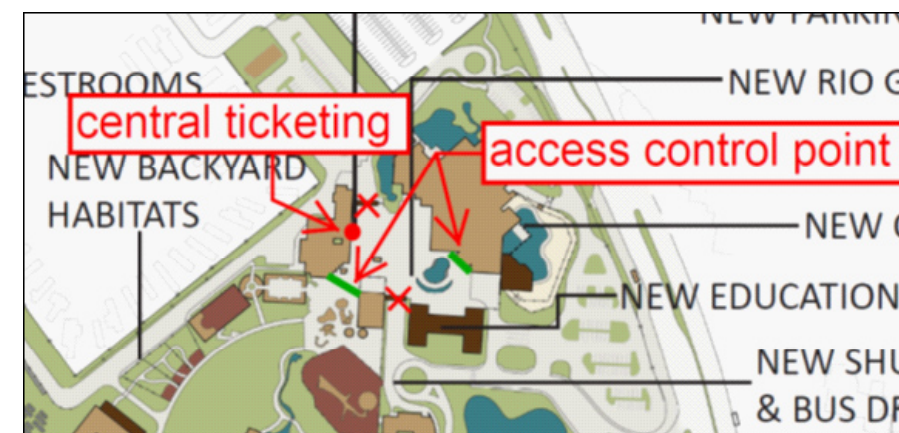
A number of viewing nodes have been developed as part of the circulation paths which will provide enhanced viewing opportunities without impeding circulation along the adjacent pathways. To provide sufficient viewing space during peak hour design day attendance levels, a linear viewing distance of at about 25 feet should be allocated at each of these areas, with a depth of at least 5 feet.

With the configuration of the circulation paths through Africa and Australia on the new plan, and path connection to the lake boardwalk, travel routes through these areas will be somewhat confusing and require visitors to backtrack to see all the exhibits. Clear signage will be critical at the path intersections to ensure that visitors can clearly identify the routes to the major animal exhibits.

## BOTANIC GARDEN/AQUARIUM ENTRY PLAZA

### Plaza Layout and Operation

Ticketing and access control for the Botanic Garden and Aquarium currently operates as a two-touchpoint process in which visitors first stop at a ticketing window area serving both the Botanic Garden and Aquarium (currently located at the Aquarium entrance, and at a seasonally-operated portable sales booth at the center of the Entry Plaza), then proceed to an access control point at the entrance to



either attraction. This design establishes the Entry Plaza as “unpaid space,” allowing unticketed visitors to patronize the amenities and services within it. The Master Plan appears to indicate that the Entry Plaza be reconfigured as a ticketed space, as indicated below. As discussed during ORCA’s site visit, ticketing and access control should be configured consistently between the north and south sides of the BioPark – a two-touchpoint configuration is recommended, for the merits previously outlined in this report.

To optimize circulation within the new Entry Plaza, ticketing should be positioned at a central location, convenient and visible to visitors approaching the Entry Plaza from either of the two main parking lot areas, and to those arriving via the new ABQ BioPark shuttle. The optimum location for a centralized ticketing location within the Plaza is at the Administration building, as indicated in the sketch below; assuming that space within the Administration building can be allocated for a ticketing sales window area. To ensure the portal into the Entry Plaza from the main/north parking area remains unobstructed from any queue lines formed at the ticket sales area during peak periods, the sales windows should be located toward the center of the existing Administration building façade, as indicated below:

### Ticket sales capacity

ORCA’s analysis indicates that increased ticket sales capacity is needed based on current demand characteristics (one additional window over the existing four sales windows). However, with the potential future implementation of online ticket sales and associated shift to online sales, no additional capacity should be needed.



# ATTENDANCE AND CAPACITY ASSESSMENT



## BOTANIC GARDEN

### CAPACITY ASSESSMENT

With the extensive network of paths and plazas throughout the Botanic Garden, there is ample capacity for more than 1,500 onsite visitors in the existing Garden and 2,600 for the Master Plan. These capacities are both sufficient to accommodate both the Design and Peak days for 2013 (estimated 1,400 onsite visitor count for the Peak Day) and 2037 (estimated 2,020 onsite visitor count for the Peak Day)

### BOTANIC GARDEN SERVICES

The distribution pattern of Visitor Services components throughout the Botanic Garden will ensure a comfortable Guest experience and help maximize length of stay and overall satisfaction levels, with two notable exceptions:

There is an absence of any type of food and beverage facility anywhere within the Botanic Garden, with the exception of the Entry Plaza. This will cause some visitors to cut their visit short, particularly families with small children, and general visitors during periods of extremely hot or cold weather. At a minimum, beverage sales should be available inside the Garden, and a centrally-located point such as in or around the Japanese Garden, or adjacent to one of the existing or planned restroom facilities. During periods of higher attendance, expanded offerings at such a facility including snack items (e.g., pre-made sandwiches) are recommended.

Train stations within the Botanic Garden will function as key decision-making points, and as such are ideal for the use of unstaffed “mini” information stations, inclusive of park map, wayfinding signs and a display of the day’s special activities. The Master Plan currently proposes a single Information location at the Entry Plaza.

### BOTANIC GARDEN CIRCULATION

Much like the Zoo’s Shuttle/Tram combined station, a similar station would provide a highly efficient transit and circulation hub at the entrance to Botanic Garden and Aquarium

This is an optimum design due to the following visitor circulation and service benefits:

- Convenient connections between the Botanic Garden’s internal train and BioPark shuttle;
- Adjacency between the transportation stations and the primary pedestrian circulation hub, maximizing visitor comfort and convenience.

## AQUARIUM

### CAPACITY ASSESSMENT

A visitation model was developed to estimate the visitor capacities for each public area of the aquarium, including:

- Existing Aquarium: Entry, Rio Grande, theater, trout stream, Gulf Coast/Indoor Mangrove, Salt Marsh, model ships, Shrimp Boat, Shark & Ray touch tank, Surf Zones, Shallows & Shores, Coral reefs, shipwreck, South Pacific Gallery, Shark Tank, Jellies, Coral, Bioluminescence, Sea Dragon, Café, Gift Shop, and exit area.

- Master Plan: renovation of several existing spaces, including Jellies, “The Deep”, New Trout Cascade; new exhibits, including Revolving Gallery (replacing existing theater), Indoor mangrove (replacing Gulf Coast Gallery), new Outdoor Mangrove (replacing Shrimp Boat), Rivers Gallery, Underwater Otter Gallery, Boardwalk/Diving Birds/Aviary, outdoor Touch Tank.

ORCA’s capacity assessment indicates an 11% increase in the visitor capacity of the existing Aquarium spaces, excluding outdoor spaces (existing capacity of 500 visitors and future capacity of 570), and the renovated exhibits will also help create an improved visitor experience. This increase is achieved primarily by the new Revolving Gallery, new Trout Cascade, and new Pelagic Gallery. The new exhibits in the expanded Aquarium area have a major contribution to the Aquarium’s visitor capacity with an existing capacity of 30 visitors (Shrimp Boat) increasing to 230 visitors (Outdoor Mangrove, Rivers Gallery, Underwater Gallery, Boardwalk/Diving Birds/Aviary). Overall visitor capacity is estimated to increase from 530 (existing) to 800 (future).



Photo: City of Albuquerque



# ATTENDANCE AND CAPACITY ASSESSMENT

As shown in the previous report section on attendance planning factors, it is estimated that there were an average of 500 visitors in the Aquarium during the peak period on the 2013 Design Day, so the existing capacity (530) is well-matched to the Design Day attendance. For the 2037 Design Day, it is estimated that there will be 780 visitors in the Aquarium during the peak period on the 2037 Design Day, which also can be readily accommodated by the estimated future capacity of 800 visitors. The existing and future visitor capacities are exceeded by the Peak Day visitation levels, but these days can be accommodated with either a waiting line or timed ticketing system.

ORCA's analysis indicates that the Design Day and Peak Day for the peak year of 2033 (projected annual Aquarium/Botanic Garden attendance =641,770) will experience 820 visitors in the Aquarium during the peak period on the Design Day – this is just slightly higher than the estimated capacity of 800 visitors, so the Aquarium's visitor capacity will still be able to readily accommodate the Design Day visitation.

## AQUARIUM – NEW EXTERIOR TOUCH TANK

The proposed new touch tank at the Aquarium entrance will help “activate” the Aquarium entrance area and thereby heighten visitor interest in the attraction. Touch tanks are popular but tend to have relatively low visitor throughput capacities because of their inherently longer experience times – visitors will stay long enough to both view and interact with the collection, and even longer if there is active interpretation by a keeper or docent.

The planned location of the new Touch Tank, immediately outside the Aquarium entrance within the Entry Plaza, will experience high demand levels due to the following:

It is the very first exhibit offered to Aquarium visitors, so it will likely be visited by almost all Aquarium visitors; and,

It will draw additional visitation by others within the Entry Plaza, including visitors to the Botanic Garden, and unticketed visitors patronizing other amenities in the Entry Plaza (restaurant, gift shop, etc.).

To maximize throughput capacity, the Touch Tank should be designed for access from all sides.

## REVOLVING GALLERY

The planned new Revolving Gallery will experience high visitation levels as it is the first exhibit encountered when visitors enter. The entry area to the path through this gallery should be designed with

ample width to ensure that visitor backups do not occur at this location, such as a flared configuration that narrows down to the normal path width. It is recommended that a path width of at least 8' width be planned.

## NEW EXTERIOR BOARDWALK

To accommodate the both visitor volumes on this boardwalk and provide viewing areas along the path, it is recommended that this path be designed for a width of 6 feet.



Photo: City of Albuquerque



# CIRCULATION AND PARKING - RECOMMENDATIONS



## GETTING TO THE BIOPARK

### SIGNAGE

A new wayfinding system is needed to provide helpful and consistent directions to people trying to get to the BioPark. Existing directional signs use conflicting names as well as inconsistent colors and lettering, and many have weathered or been damaged such that they need replacing. A new system would focus on:

- Consistent appearances so that visitors easily recognize BioPark directional signs
- Current names that match maps and visitors guides to eliminate potential confusion
- Primary routes to the BioPark from regional highways and major arterials
- Routes that minimize adding traffic to single-family residential neighborhoods

Additionally, website directions and printed materials would supplement road signs for visitors planning their trips in advance. Transit maps could also identify the BioPark's location and routes serving it.

### BY VEHICLE

Primary access to the Aquarium & Botanic Garden will remain at the intersection of Central Avenue and New York Avenue. This route leads visitors to the majority (81%) of parking at this location. Secondary access will continue to occur at the Central Avenue-Tingley Drive intersection. Recommended improvements include:

- Realign the Tingley driveway to improve circulation to surface

parking and to give buses easier access to the bus drop-off circle. This realignment creates a more gracious and legible entry.

- Continue to use the drop-off circle for buses and the new BioPark shuttle.
- At the intersection of Central Avenue and New York Avenue, allow left-turns from the curb lane (making it both a left- and right-turn lane) to add a second lane for lefts. This will increase exiting capacity, reduce delay, and shorten back-ups on New York Avenue at busy times. This change becomes possible due to the recent closure of New York Avenue on the opposite side of Central Avenue.



Primary access to the Zoo and Zoo parking will continue from 10th Street.

However, there is an option, via the wayfinding system, to possibly direct visitors to use 8th Street to Stover and then onto 10th. 8th is designated an urban collector street south of Lead Avenue, and is also the street used by many vehicles departing the zoo. It better connects regional arterials such as Bridge Blvd. and Central Avenue, and has somewhat less single-family residential use than does 10th.

Accordingly, it can more appropriately carry increased zoo traffic. At Central, the roundabout intersection provides a useful landmark for giving directions to the zoo. It is expected that long-time visitors would continue to use their preferred routes, but that new visitors could be re-directed in order to reduce traffic growth in the core of the neighborhood.



### BY PUBLIC TRANSIT

The proposed Bus Rapid Transit line on Central Avenue with a center-running option could affect locations now allowing left-turns from Central. While it is too soon to know how the BRT plan will accommodate left-turns (a draft plan is expected in late July 2014), it is important to recognize that center-running transit typically provides for left-turns at key intersections, even though more minor left-turns may be eliminated.

The scale of the BioPark's visitation as well as its dependence on Central Avenue for access means that its access points are key intersections, and that maintaining those left-turns is essential to its future success. This means retaining the east-bound left-turn at



# CIRCULATION AND PARKING - RECOMMENDATIONS

New York Avenue, and the west-bound left-turn at Tingley Drive. Potential changes in public transit serving the BioPark relate mainly to the proposed Bus Rapid Transit (BRT) line on Central Avenue. By operating in a dedicated lane, BRT is intended to provide somewhat faster service with greater schedule reliability than currently occurs with the Rapid Ride 766 and local Route 66. It is anticipated that a BRT stop would be located near Tingley Drive. This would be the primary stop serving the BioPark.

The BioPark could benefit from the visibility that BRT gives to the route and its stops, making it a more attractive service to visitors and staff who stay or live close to its route. However, it will be crucial to monitor the plans as they develop to understand how BRT will operate in terms of its frequency, connections with other regional transit, and fare policy. Changes to other existing routes could be expected and should be closely followed to assess their effect on BioPark users. Creating good pedestrian connections to BRT stops and to nearby destinations will also be of the highest importance to the BioPark. And good signs will benefit visitors in navigating between the bus and their destinations.

## OTHER TRANSIT OPTIONS

The community has mentioned the opportunity for a “Cultural Shuttle” to connect museums and the BioPark. Such services have an intuitive appeal but experience elsewhere shows that they rarely succeed due to high operating costs and low ridership. For Albuquerque, it would be appropriate to explore the idea by gathering data on visitors’ actual activities to see if a Cultural Shuttle could work. A partnership of the cultural institutions and the City could sponsor gathering useful data and testing the idea.

## BY BICYCLE & NON-MOTORIZED TRANSPORTATION

Bicycles can access the ABQ BioPark via a number of access points along the Paseo del Bosque Trail as well as on surface street. Signage should be updated to direct cyclists to the various ticketing areas. Provide secure and shaded bicycle racks at each ticketed entry point to the BioPark.

## BY FOOT

Pedestrian access to the ABQ BioPark from downtown and surrounding neighborhoods is available via sidewalks alongside surface streets as well as the Paseo del Bosque. Visitors can enter the Aquarium/Botanic Garden entrance from the New York Avenue/Central Avenue sidewalks. Pedestrians going to the Zoo arrive via the sidewalk along Tenth Street. There are several walkways and paths that allow pedestrians to access Tingley Beach.

## VEHICLE PARKING

A modest expansion of parking is recommended to accommodate more days of high demand within the BioPark, limiting spillover to neighborhoods. More parking will also support higher attendance. Specific recommendations include:

## BOTANIC GARDEN & AQUARIUM:

Revise surface lots at south and east sides of the Aquarium/Botanic Garden to create clearly delineated, paved parking. The revised lots will also provide a more obvious connection between the Tingley Drive entrance and the main parking area north of the Aquarium.

Add a single deck over the main lot to provide more parking near the entry plaza. This addition near the entry will better serve visitors on high attendance days. The deck will also create shaded parking at the surface level and, with the addition of photovoltaic panels,

will offer shaded parking on the upper level.

Reduce the size of the existing overflow lot to approximately 120 spaces. This reduction will allow expansion of the Heritage Farm. Paving and striping the remaining spaces will maximize the efficiency of this lot.

## TINGLEY BEACH:

Pave and mark the north lot to create approximately 148 spaces. This lot will serve mainly as an overflow location for both the Aquarium/Botanic Garden and the Zoo. A shuttle will link this lot to visitors’ destinations.

Formalize small lots towards the south end of the ponds to maximize efficiency and to keep vehicles from creeping ever closer to pond and road edges to park on busy days.

## ZOO:

Add a two or three level deck over the south end of the Zoo’s main lot. This adds spaces near the entrance making them the most convenient spaces for visitors, and creates shaded parking at both the surface and upper levels (assuming installation of photovoltaic panels).

Revise the orientation of aisles at the main lot’s north end to match those in the rest of the lot. That revision frees up room to create

Parking Expansion Summary			
Location	Existing	Net New	Future Total
South Campus	642	70	712
North Campus	385	42	427
North Campus Overflow	205	-83	122
Tingley Beach	118	148	266
Total	1,350	177	1,527
Practical Capacity @ 95% of Supply	1,283	168	1,451



# CIRCULATION AND PARKING - RECOMMENDATIONS



a greener edge. This edge faces the neighborhood and provides arriving visitors their first glimpse of the Zoo. Appropriate plantings can enhance the lot's appearance making it a better neighbor and a more welcoming view for visitors.

The following charts show how the relationship of demand to the recommended supply, based on attendance data from 2013. The new Tingley Beach north lot is assumed to be available as overflow parking for high days at the Zoo or the Aquarium/Botanic Garden.

Busy days at the Zoo will still experience overflow parking. In

addition to using Tingley Beach, Zoo overflow can frequently be accommodated at the Aquarium/Botanic Garden depending on the day.

For example, data from 2013 indicate that the Aquarium/Botanic Garden had sufficient reserve capacity to handle all Zoo overflow on 46 out of the Zoo's top 60 days. With a more frequent shuttle, this shared parking will become more convenient for visitors. The very busiest days (from the 1st to 10th highest days) will necessitate continued Zoo use of nearby downtown lots or garages to meet all demand.

The Aquarium/Botanic Garden will continue to have sufficient parking for most busy days when including the new north lot at Tingley Beach.

The amount of attendance growth that this modest parking expansion can support will depend on how long visitors stay. Visitors are likely to stay longer as new attractions open at the BioPark and an improved shuttle makes trips between the Aquarium/Botanic Garden and Zoo easier. More visitors would be expected to purchase Combo tickets allowing them to visit multiple attractions. That trend would increase the number of vehicles parking at one time. Precise information about visitors' duration of stay does not currently exist but a broad view of duration was gained from a recent visitor survey.

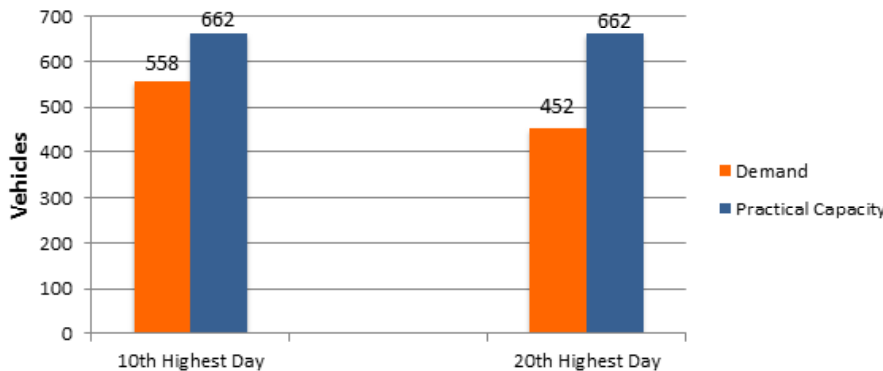
A small shift in the percentage of visitors present at one time can greatly influence parking patterns. For example, a shift of just one percentage point on the current 10th highest day's attendance would mean a change of 30 vehicles parking. Anticipating a three-point increase would mean 90 more vehicles, before any growth in attendance.

It is recommended that additional information be collected on visitors' lengths of stay on busy days in order to fine tune projections of parking demand. Methods to collect such information could include:

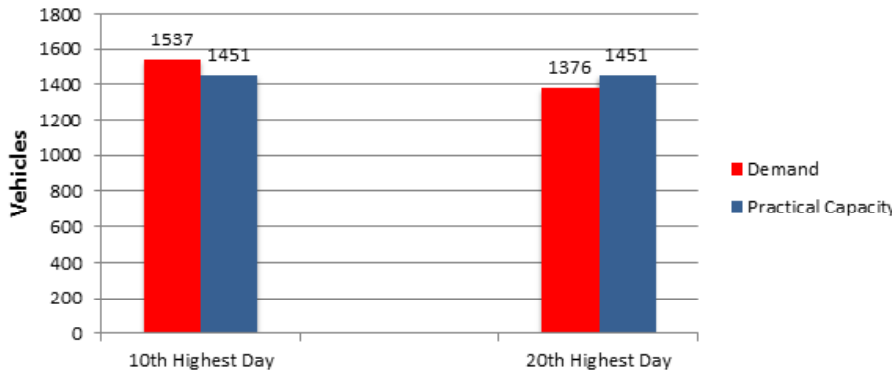
Exit interviews asking for the time that visitors arrived and noting the time of the interview.

Sample counts of parked vehicles to determine their length of stay. Counts could be done in a portion of the main lots every half hour on a busy day.

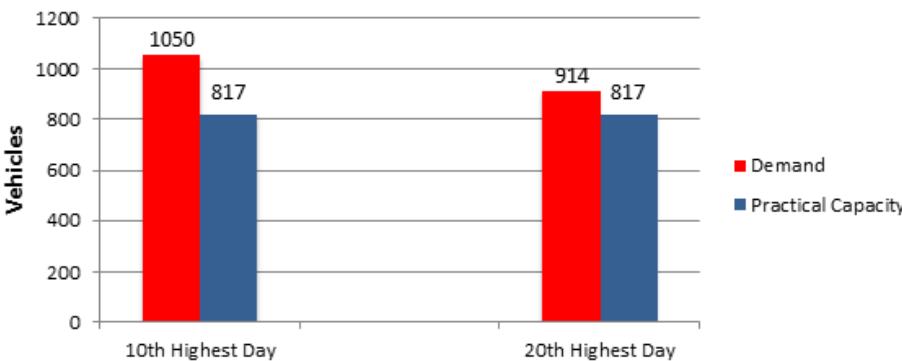
**Aquarium/Botanical Garden Parking Demand (2013) Compared to Recommended Supply with Tingley North Lot**



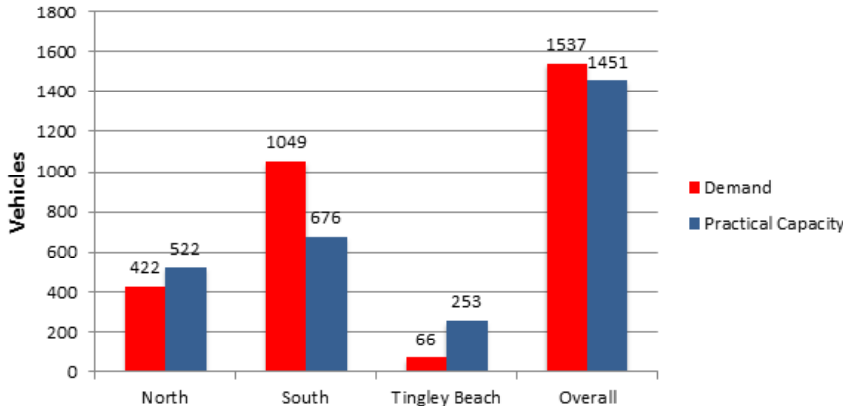
**BioPark Overall Parking Demand (2013) Compared to Recommended Supply**



**Zoo Parking Demand (2013) Compared to Recommended Supply with Tingley North Lot**



**BioPark's 10th Highest Day Demand by Venue 2013 Compared to Recommended Supply**





# CIRCULATION AND PARKING - RECOMMENDATIONS

By phasing parking expansion along with other BioPark improvements, parking patterns can be monitored and adjustments can be made to subsequent parking phases to meet visitors' needs. For example, should the Zoo need more parking, a second deck could be considered over the main lot.

## GETTING AROUND THE BIOPARK - VISITORS

### BY SHUTTLE

Once visitors arrive at the BioPark, they face two important circulation needs:

- Moving between the north and south portions of the BioPark to visit other attractions. The existing train serves this function now but with limited frequency and capacity.
- Moving within both the Botanic Garden and the Zoo where visitors may tire after long walks. While courtesy rides are provided for some visitors, most must now manage the walk unaided.

To improve visitor circulation, and the visitor experience the plan recommends:

A new BioPark Shuttle linking the Botanic Garden and Aquarium to the Zoo via Tingley Beach. This shuttle would replace the train using a rubber-tired vehicle running on the same path as the current train tracks. Key features of the shuttle would include:

Capacity for up to 100 passengers per shuttle. A power car would pull up to 3 trailers, depending on demand. For less busy days, one or more trailers could be detached.

Shuttles would depart every 10 minutes on busy days. On the busiest days, up to 4 shuttles would operate. For low attendance days, a single shuttle could operate every 20 minutes.

Maximum hourly capacity should be approximately 1,000 persons per direction, a significant increase over the existing capacity of 160 persons per direction.

Stops at the Zoo, at Tingley Beach (both at the current station if it is redeveloped as an interpretive center and at the new north parking lot), and at the existing turnaround near the south entry to the Botanic Garden/Aquarium Plaza.

Multiple passing zones to facilitate use of more than two shuttles simultaneously.

Battery electric operation (see below). Electric power offers the cleanest and quietest operation, appropriate to the BioPark's mission and atmosphere.

### Developing a Battery Electric Shuttle

The BioPark has the rare opportunity to lead the nation in implementing an all-electric shuttle. A clean, quiet vehicle using renewable electric power would be a first and would set an important example of the BioPark putting its conservation principles into action. While small battery electric vehicles are already used at the BioPark, no battery electric vehicle capable of carrying up to 100 passengers presently exists. It would be possible to combine electric drives used in other applications with a suitable vehicle to create a distinctive BioPark electric shuttle. This is an ambitious goal, but it is one that the BioPark could achieve with a mix of corporate and research institutional support and would establish the BioPark as a clear leader in providing effective and environmentally responsible visitor transportation.



### BY FOOT

Within the BioPark, guests will travel via a hierarchal system of primary and secondary paths.

At the Zoo, a minimum 20' wide primary path will lead visitors from the Main Entry, past the ticketing scanners, and into the Zoo. This main path is sized to easily handle special event crowds quickly and conveniently as well as allow for passage of the Zoo tram from the Shuttle Station back to the Main Entry. This path will be engineered to accommodate a tram vehicle. Primary paths will be 12' to 14' wide and may include a reinforced landscape edge to widen the path of travel if required by local emergency authorities.

At the Botanic Garden, the main path leads visitors along a curved walk to the Conservatory and onwards to the Japanese Garden and the Heritage Farm.

Secondary paths will meander through all of the BioPark's biotematic environments providing an exploratory and immersive experience. Secondary paths will curve and meander allowing the



# CIRCULATION AND PARKING - RECOMMENDATIONS



landscape and wildlife experience to unfold along the journey. These paths will typically be 8'-10' wide with wider areas at animal viewing locations.

All primary and secondary paths will comply with the Americans with Disabilities Act for universal accessibility.

## BY VEHICLE

Expanding the existing train at the Botanic Garden into a stand-alone interpretive loop experience will assist visitors in reaching the most distant parts of the Garden. Ideally, this train would have minimal interactions with pedestrian pathways to minimize the use of the warning bell to maintain the tranquility of the areas it passes through.

An internal tram at the Zoo linking the entry plaza to the shuttle stop located at the far end of the Zoo. This vehicle would be a small, battery electric vehicle that can operate comfortably along a wide pedestrian promenade. The BioPark already owns examples of such vehicles and is encouraged to consider using that type of vehicle for the Zoo tram. Travelling approximately 5 miles per hour (just above normal walking speed), the shuttle would cover the distance in about 2.5 minutes. Thus, a single vehicle would offer service every 5 minutes, while two vehicles would cut that in half to 2.5 minutes. Assuming seating for 14 passengers and use of two vehicles, this service would allow an hourly maximum of 336 passengers per direction. That would allow about 1 in 10 persons present at the busiest hour to ride to the BioPark shuttle stop or back to the main gate. While more vehicles could conceivably be used on busy days, it will be important to maintain a balance between good walking conditions on the promenade with the convenience of the tram ride.

## SERVICE CIRCULATION

To minimize conflicts with guests at the BioPark, vehicular service for maintenance and animal husbandry will be accomplished primarily via service roads located along the east and west zoo perimeter with occasional use of the primary paths. With the Animal Health Care Facility and Commissary located near the existing parking lot, large vehicle deliveries should be limited to this location and the hay barn on the north perimeter of the Zoo. From these locations, deliveries and maintenance operations will be carried out with pick-up trucks on service roads, and with smaller, slow-moving vehicles such as electric carts and Cushman type vehicles during public hours. To prevent public confusion, all service roads will be separated from public paths by gates.

## EMERGENCY CIRCULATION

Emergency vehicles will travel the BioPark via the service roads and Primary Paths which allow emergency equipment set-up and access to all buildings with a 150' fire hose per the National Fire Protection Association (NFPA) code. If additional path width is needed for emergency vehicle access, the paved path cross-section will be supplemented with a reinforced landscape edge to support vehicles.

Estimated Length of Stay at BioPark*				
Venue	Current Pattern		Future Pattern	
	Est'd Length of Stay (Hours)	Est'd Percent Visitors Present at One Time	Est'd Length of Stay (Hours)	Est'd Percent Visitors Present at One Time
Zoo incl. Combo tickets	3.0	55%	3.3	60%
Aquarium/Botanic Garden incl. Combo Tickets	2.2	44%	2.4	47%
Tingley Beach	1.0	12%	1.0	12%
Overall	2.8	47%	3.0	50%

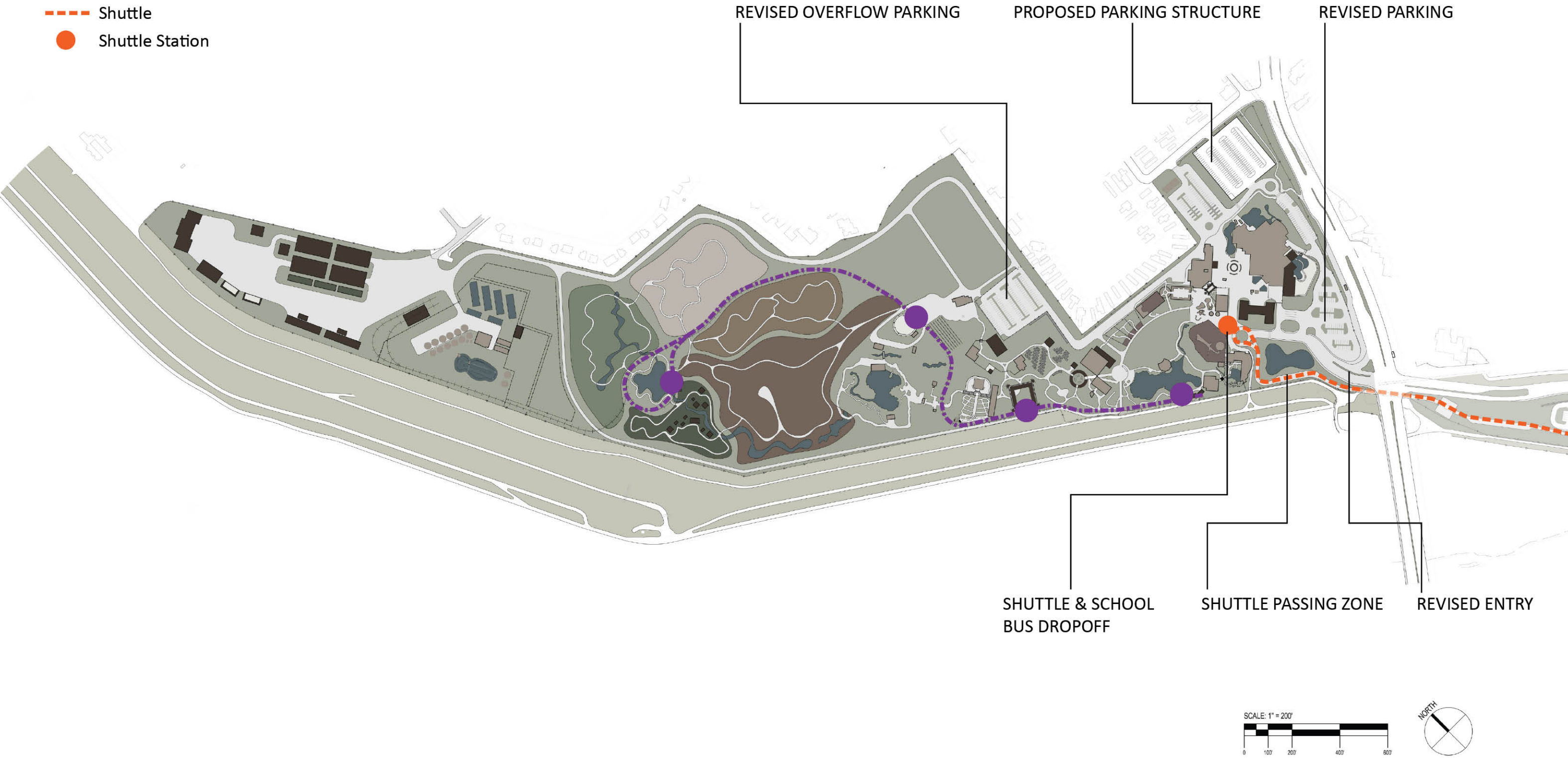
\*Derived from visitor surveys conducted in February 2014



# BOTANIC GARDEN - CIRCULATION

LEGEND

- Train Track
- Train Station
- Shuttle
- Shuttle Station






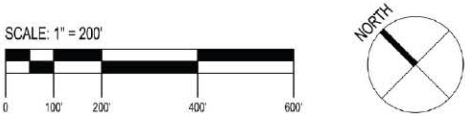


# BOTANIC GARDEN - PARKING



TOTAL SPACES: 549 (PUBLIC + ADA)

-  PUBLIC, 537
-  ADA, 12
-  BUS, 4

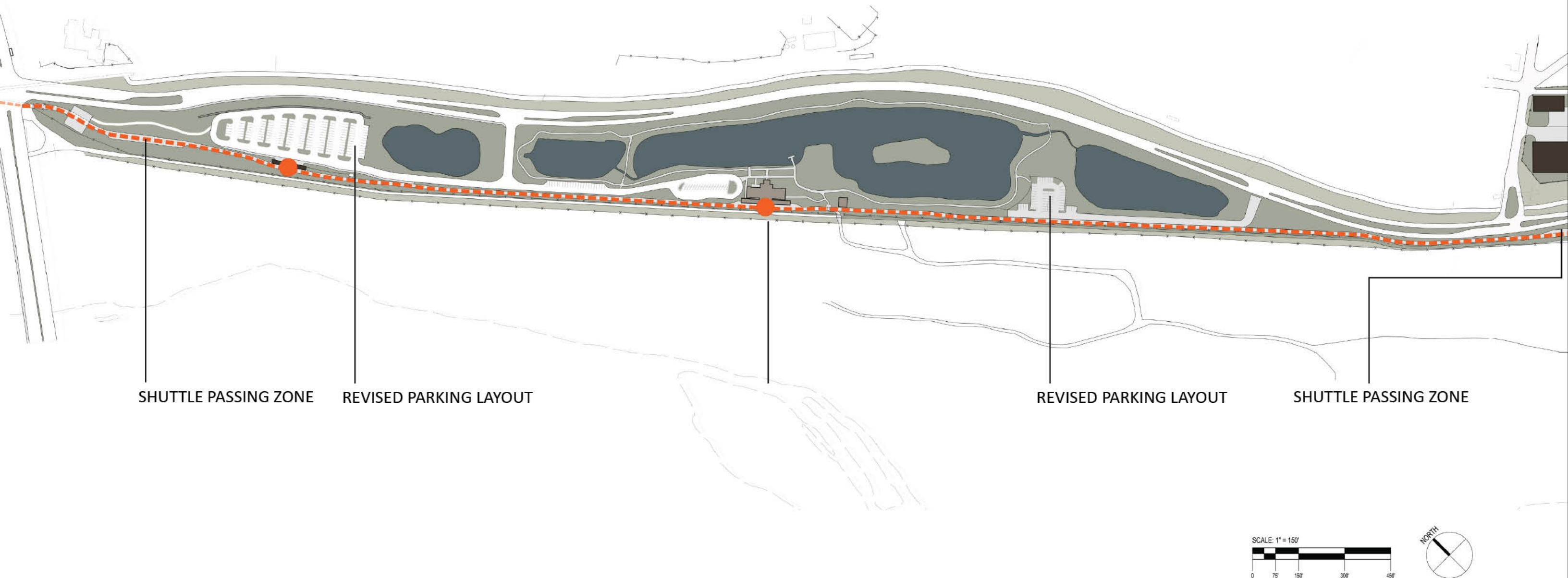




# TINGLEY BEACH - CIRCULATION

## LEGEND

- Shuttle
- Shuttle Station

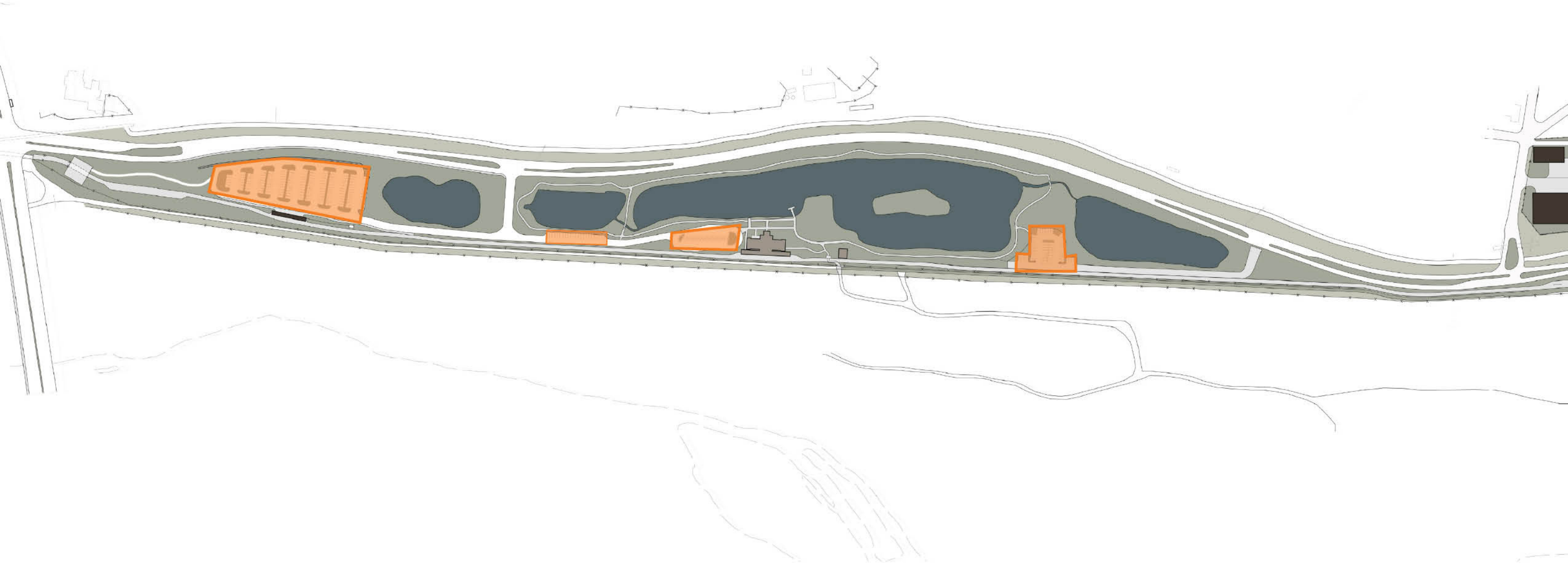




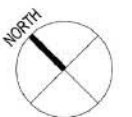

# TINGLEY BEACH - PARKING

TOTAL SPACES: 254

 PUBLIC



SCALE: 1" = 150'





# Zoo - CIRCULATION

LEGEND

- Tram
- Tram Station
- Shuttle
- Shuttle Station

REVISED PARKING LAYOUT

NEW PARKING STRUCTURE

SHUTTLE PASSING ZONE





# Zoo - PARKING



TOTAL SPACES: 780

 PUBLIC, 767

 ADA, 13





# UTILITY INFRASTRUCTURE - RECOMMENDATIONS

## PEDESTRIAN CIRCULATION

### Visitor Experiences

A series of self-guided treks and organized or guided tours provide an opportunity for every visitor to tailor each visit to his or her own interests. Inherent in each trek and tour are opportunities for interactive education and unique experiences for people of all ages. Each of the treks and tours can provide visitors with a specialized focus in one or more areas.

### Tailoring the Experience

The interests of BioPark guests are complex and fluid. Visitors cherish their memories of the BioPark, but they also want and expect something new. “Dynamic Experiences for Every Visitor, Every Time” allows visitors to tailor their experiences before they come to the BioPark.

As visitors prepare for their visit they can check the BioPark’s website and plan their day using the Automated Trek Mapper (ATM). Through a series of simple prompts, the ATM asks each person about his or her preferred language and goals for this visit to the BioPark. It will inquire about such things as how much time does the visitor plan to spend at the zoo, aquarium, and/or botanic garden, the visitor’s age, who is in the visitor’s party, and what type of experience he or she would like to have. The ATM will then guide the visitor through the available options and print or download a customized trek route to follow.

If a young person is coming to the BioPark with his or her friends ready for a full 3- to 4-hour zoo experience, the ATM can download to a smartphone a map that will guide the group through an in-depth, interactive experience that includes all of the conservation areas. Parents coming with a very young child might prefer a hands-on,

intensive children’s experience with exhibits and activities designed at a child’s scale for a child’s learning level. Grandparents coming to the BioPark might have an altogether different idea of what they want from their visit; perhaps they would like to stroll the BioPark for a more contemplative garden experience, or relax under the cottonwood trees. Additionally, the smartphone application could also offer locations of water, shade and cooling stations during hot summer months or warming stations during the winter.

## UTILITY INFRASTRUCTURE

The BioPark is comprised of four separate facilities: Zoo, Tingley Beach, Botanic Gardens and Aquarium. Each facility has its own separate services for all of their associated utilities. The Botanic Garden and Aquarium were opened in 1996 and Tingley Beach underwent a full restoration in 2005. Thus, the following is a summary of the zoo’s existing utility findings as it is the oldest facility of the three and in need of the most attention.

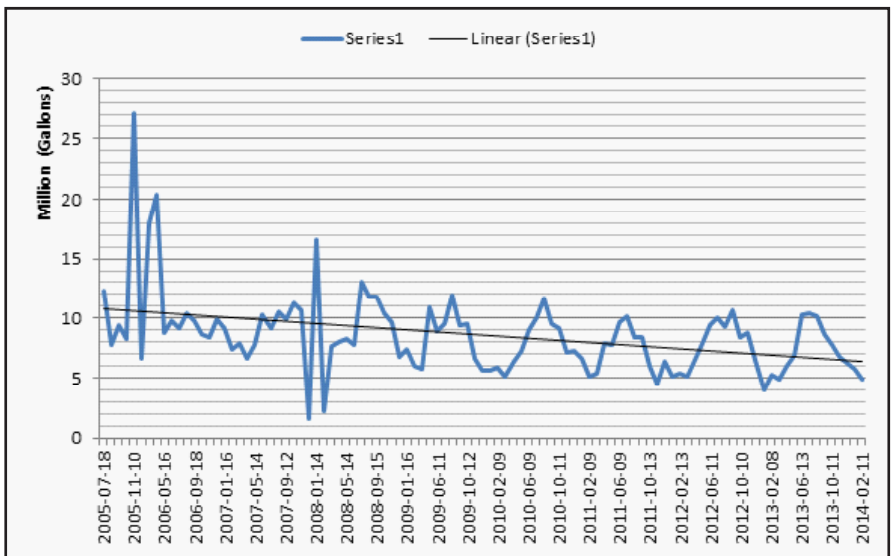
Record drawings provided by the city go back as far as 1961, which would suggest some improvements are likely necessary. The information presented herein was gathered through a series of site visits, coordination with BioPark Staff, with the City of Albuquerque (COA), Public Service Company of New Mexico (PNM), and Albuquerque Bernalillo Water Utility Authority (ABCWUA). Much of the information gathered for this study was not conclusive, so the findings and exhibits provided herein shall not be considered as a formal survey but rather a conceptual overall layout of existing utility conditions to be verified with a formal survey. Further coordination with the other providers is ongoing and will be included with future drafts.

As ABQ BioPark continues to grow, its infrastructure must be developed to support new exhibits and amenities and to promote the conservation and ecological sustainability message of the

BioPark. As new exhibits and buildings are developed, they should be evaluated for their future utility demands. The Zoo’s utilities were evaluated in 1985 and many improvements made including expansion of water and electrical service. Through the study of the existing conditions of the BioPark as a whole there are a number of recommendations that can be noted within this Master Plan that include improvements and procedures to be completed for each site.

As new utility systems are developed, natural systems that harmonize with the site’s hydrology and climate should be favored over traditional engineered solutions. For example, passive heating, cooling and ventilation should be employed to address climate and minimize dependence on electricity and natural gas based heating and cooling. Storm water should be collected and conveyed in wetlands and swales rather than piped systems.

While more detailed discussion of utility infrastructure may follow as the Master Plan is implemented, several general requirements that will guide development of this plan are noted below:



Water Usage information obtained from Oracle USA and ABCWUA





## STORM WATER

To be a good steward of the Rio Grande watershed, ABQ BioPark must carefully cleanse and manage the storm water that enters its site making use of it for irrigation, exhibits, natural ponds and wetlands, or returning it to the river and natural aquifer.

- The existing storm sewer system should be reviewed, and modified where needed to remove storm water from the sanitary sewer system.
- New construction projects should separate storm water from sanitary waste.
- Storm water can be collected in ponds, cisterns or rain barrels for use in irrigation, washing or water features within the landscape.
- Where storm water is returned to the river or ground water, it should pass through constructed bio filtration swales, wetlands or settling ponds to provide filtration.
- Curb openings should be incorporated within the parking lot islands allowing storm drainage to enter the landscaped areas to capture the smaller storm events for water harvesting.
- Any new paving should consider use of pervious paving as a means of addressing on-site runoff from storm events.

## DOMESTIC WATER

To save cost and make efficient use of natural resources, ABQ BioPark should conduct a full assessment of municipal water use to identify and reduce waste.

- Water capacity and demand to support increased visitation, new buildings and exhibits should be evaluated as master plan improvements are further designed and implemented.
- Use of municipal water for wash-down or irrigation should be reduced and, the use of harvested rain water or recycled grey-water should be encouraged.

- Water should be conserved through the use of low-flow kitchen and restroom fixtures.
- Life support systems should incorporate back-wash recovery and other water saving technologies, such as perlite filters and constructed wetlands.
- The Zoo is currently being served by only one 8" water meter from 10th Street. This single point of service and internal distribution lines do not allow for adequate pressure during required and basic maintenance procedures of the various exhibits. We recommend that the zoo install a new 8" meter to be located at the north end of campus which connects directly into the existing onsite distribution lines to allow for both a redundant feed to the zoo and an opportunity to reduce the pressure issues currently encountered. The redundant feed allows the zoo to operate as necessary when one of the metered services is in need of repair or a public waterline outage is required. The approximate cost to complete this work is \$260,000 including an \$155K utility expansion charge required by the Albuquerque Water Utility Authority – ABCWUA)
- Based on the current water billing, Tingley Beach appears to have two water meters associated with the site. Over the past 6-7 years there has been a rise in their usage. Steps should be taken to determine the reason behind this increase and if there are additional measures needed to address this increase.
- Based on the water meter data, the Aquarium and the Botanical Garden use a significant amount of water but have stayed consistent over the past 8-9 years. Understanding the water requirements and ways to improve the usage should be considered where possible and include the use of non-potable water where available.

## WELL WATER

The ABQ BioPark should maximize the use of well water currently feeding the existing pond for other onsite uses rather than directly discharging into the sanitary sewer system. The existing pond water can be pumped to feed additional water features located on site or an irrigation pump and redistributed to a new zoo irrigation system. Steps should be taken to ensure the water quality and quantity is sufficient for use however; this would reduce the total potable water usage on the existing 8" meter. A formal well study will be required to understand the needs of the future development. Depending on the requirements and conditions required to divert water from one water feature to the next the cost could range from \$100K to \$250K per pump system.



# UTILITY INFRASTRUCTURE - RECOMMENDATIONS

## SANITARY SEWER

The existing sanitary sewer systems at the Zoo vary in age. At a few locations, storm water pipes are connected to the sanitary system. Sanitary fees are metered separately from municipal water, so reduction of storm water and waste water in the sanitary system will benefit the zoo with cost savings and promote environmental conservation of water.

- Staff interviews and public records reveal that some of the Zoo's existing sanitary sewer is composed of clay pipe. Root intrusion is causing maintenance issues near the amphitheater and other areas of the facilities existing sewer lines are old and need of repair. A formal survey and investigation of the aging onsite sanitary sewer lines should occur to determine specific lines that require removal and replacement. The estimate cost to remove the lines near the amphitheater is approximately \$160K and includes approximately 1,400LF. The cost to remove and replace the existing lines noted in the as-builts as vitrified clay pipe (VCP) or clay pipe (CP) is approximately \$350K and includes approximately 3,200LF Storm water lines should be disconnected from the sanitary sewer.
- Grey water separation and recycling should be explored in new projects.
- On site treatment of waste water from buildings and life support systems through constructed wetlands and on-site backwash treatment should be explored.

## ELECTRICITY

Similar to water and sewer, the electrical supply to the BioPark should be evaluated and future demand projected based on proposed facilities. To help reduce electric consumption, green technologies should be considered as retrofits to existing facilities and in new projects including:

- LED and compact fluorescent lights.
- Occupancy sensors to control lights in vacant areas.
- Passive heating and cooling strategies.
- High efficiency pumps and life support equipment.
- Covering the existing (or proposed) parking with solar panels which in turn serves the facility to help supplement the current usage should be considered. A specific payback study should be requested to help determine the most efficient quantity and location for a solar system.

## INFORMATION TECHNOLOGY

Advances in information technology are opening new doors to the BioPark's opportunities for distance learning, linking to field conservation, research, cataloging and information sharing. The zoo's information technology should be evaluated for data storage capacity, security and internet capability. In addition, the BioPark's webpage should be examined for its communications potential.

- Information technology requires on-going maintenance and management of equipment and web content necessitating a dedicated information technology manager.
- Many new interpretive elements rely upon internet and cellular phone technology to communicate information to visitors and individuals beyond the BioPark.

- A website is often the "first impression" for visitors planning to come to the BioPark. A clear and captivating website should be developed to instantly communicate "what ABQ BioPark is about"
- ABQ BioPark's Facebook page is a good opportunity for public communication that should continue to be explored.

## REFUSE & RECYCLING

Reducing trash and recycling can save on expenses while helping the environment and teaching responsible resource use. The BioPark's material use and recycling program should be reviewed in conjunction with the City's waste management initiatives. Strategies that can be explored include:

- Allowing visitors to return maps and printed materials for reuse.
- Composting food waste at concessions.
- Making concessions packaging recyclable or compostable (corn based, compostable plates and flatware can be available).
- Establishing on-site composting for landscape and animal waste.
- Installing a biodigester at the BioPark Maintenance Facility.
- Including recycling receptacles next to trash receptacles.





## SUSTAINABLE DESIGN GUIDELINES

Sustainability and nature are intimately connected, in both scientific theory and physical geography. Understanding the interdependence of all living things is of the utmost importance, and is a natural commitment for a zoological institution.

### PLACE BASED DESIGN

Implementation of the master plan must consider the context of the BioPark, as described earlier in this report, to effectively make the most sustainable decisions. Understanding and celebrating the intrinsic natural qualities of a place can inspire meaningful connections.

Exhibits and buildings must be designed for the distinctly seasonal New Mexico climate, which is cold in the winter and hot and humid in the summer. Selecting animal species that are suitable for this climate will contribute positively to animal welfare, create a more authentic educational message for guests, lower BioPark costs by minimizing structures needed to house animals during inclement months, and save energy by not creating, or by eliminating, tremendous heating loads needed to maintain an animal not suited to the climate.

Locally manufactured and obtained materials are best utilized as they support the local economy, do not require substantial transportation costs, reduce fuel consumption and emissions, and create more meaningful connections between community and the BioPark.

## PASSIVE DESIGN STRATEGIES

Passive strategies are the most conducive to sustainability and aesthetic quality, and generally amount to simplicity and inspired, intelligent design. These strategies have little or no cost, but provide significant comfort benefits. Proper location and orientation of buildings, structures and exhibit components is an effective way to reduce energy use, optimize daylighting and natural ventilation, reduce site disturbance, and provide desirable views, both in and out. The following are some examples of passive approaches:

- Locating buildings, structures and exhibits so that they are shaded during the hot summer months while allowing good solar access during the cold winter months.
- Orienting buildings, structures and exhibits to allow natural daylight to illuminate the space while excluding unwanted glare and solar heat gain will reduce the need for electric lighting and provide natural light for human and animal occupants.
- Buildings, structures and exhibits should be oriented to allow natural air ventilation when possible, but provide wind breaks where needed.
- Preserving the existing tree canopy, nearby river, and other special areas from development will allow natural systems to function, providing aquifer recharge and wildlife corridors.
- Keeping building footprints to a minimum, utilizing low impact foundation systems, and combining utility and other infrastructure into corridors will minimize disturbance.

## ACTIVE DESIGN STRATEGIES

Once structures and exhibits are properly sited, more innovative technology may be employed to further reduce energy, water, or other material needs. These technologies should be expressed in interpretive programs, and could include:

- Capturing the sun's rays for energy with solar panels.
- Utilizing geothermal systems for heating and cooling.
- Capturing the wind to provide power or purchasing wind power.
- Utilizing composting toilets to save water and infrastructure.
- Capturing the sun's rays to heat water reduces energy.
- Preserving the night sky by using cut-off type lighting fixtures to prevent light pollution and glare.
- Using vegetated roofs to reduce energy, provide habitat, create microclimates, reduce heat island effect, reduce storm water runoff, and filter out contaminants.
- Harvesting rainwater to use for irrigation or toilet flushing.
- Install permeable pavers for all parking lots and sidewalks
  - Replace raised sidewalks with rubber surface to accommodate tree root growth where needed
  - Develop a verifiable accounting of how much water/power/resources we actually use and/or generate (compost, sewage)
- Utilizing alternative fuels, such as biomass from the BioPark's waste.



## INTERPRETATION

Sustainable features, and technologies should be communicated to the public as part of the BioPark’s interpretive program. Sustainability can be expressed in many ways, such as through the use of recycled materials, and locating solar panels, green roofs and other technologies where they will be visible to the public. Materials for buildings and structures at the farm could be made from recycled agricultural materials. Other sustainable elements could relate directly to the habitat that they are associated with, like using fast-growing bamboo products in Asian exhibits. Sustainability should be communicated on interpretive signage, and explained by docents to integrate conservation work into everything the BioPark does.

## CONSTRUCTION

Construction of buildings, structures and exhibits should be sustainable as well. Contractors should submit and enforce a Recycling and Waste Management Plan during construction that has a goal of significantly reducing waste produced. An Indoor Air Quality Plan should also be submitted and enforced by the contractor to maintain air quality during construction as well as after.

## OPERATION

Sustainability must be integrated into all operations. The BioPark already has recycling plans, planting and mulching programs, as well as special events related to sustainability and conservation. The next steps can include:

- Utilizing sustainable cleaning products throughout the BioPark.
- Composting plant and animal waste. It may be feasible to use a biodigester to process this waste along with food waste generated by the concessionaire.
- Incorporating sustainability into concession operations by serving fair trade, local, and organic food, serving food on reusable or compostable vessels, offering fair trade retail items, and composting and recycling.
- Implementing programs that encourage public transportation and carpooling, utilizing vehicles powered by solar or alternative fuel, and providing bike racks for staff and visitors.

Energy efficiency can be increased by providing signs to remind people to power off equipment and lights, installing sensors and timers on lights and other equipment, adding sub-meters to better track energy use, and installing integrated energy management systems.

Water conservation can be supplemented by performing water audits to locate and repair leaks while determining areas of greatest water usage. Other strategies include:

- Replacing older toilets with dual flush or water saving fixtures
- Reuse of all water from outdoor water features
- Treatment and reuse of water from exhibit filtration systems
- Eliminate use of “dump and fill” type water features
- Develop a verifiable accounting of how much water the BioPark actually uses each month





## IMPLEMENTATION STRATEGY

The master plan will be phased into existence allowing the BioPark to continue functioning while new amenities are constructed. The schedule for implementation will be determined by availability of funds, prioritized by their contribution to ABQ BioPark’s mission, conservation goals, animal welfare and visitor attraction. Early phase projects such as the Seal & Sea Lion exhibit, Desert Rose Garden, Penguin Exhibit, and Otter Exhibit can be constructed in undeveloped areas of the BioPark with little disturbance to the public experience. Later phase improvements such as the Event Lawn will be sequenced to maintain a functional BioPark for visitors and staff, and to provide adequate habitats and holding space for the gardens and the animal population.

## CURRENT PROJECTS

- Desert Rose Garden exhibit (BG) – under construction (BG)
- Bosque Gateways (TB) - plans completed (TB)
- Carousel (Zoo)
- Insectarium (BG) - under construction
- River of Lights Storage Building (new one)
- Japanese Pavilion and Restrooms (BG)
- Jaguar relocation
- Alligator improvements
- New Mexico Habitat One (BG) – Cottonwood Gallery Expansion
- Phase One of listed Maintenance Bond projects (highest priority)
- Maintenance Implementation (labor and materials)

## PHASE 1: 2015-2022

- Seals & Sea Lions (Zoo) - 2017
- Mexican Grey Wolf Conservation Facility (BG) - 2017
- Cats (Asian, African, South American) (Zoo) - 2017
- Entry Plaza (BG/AQ) -2017
- BioPark Shuttle – 2017
- People Mover (Zoo) - 2017
- Utility Infrastructure Improvements - 2017
- River of Lights Storage Building (old one, relocated) - 2017
- Penguin exhibit (Zoo) - 2017
- Aviary Expansion (Zoo) – 2017
- Entry Plaza (Zoo) – 2017
- Keeper Office Building (Zoo) - 2018
- Otter (AQ) - 2018
- Surface Parking (TB, BG) - 2018
- Japanese Pavilion and Restrooms (BG) - 2018
- Maintenance Center/Greenhouse Complex (BG) - 2018
- Structure Parking (Zoo) - 2018
- Lake rehabilitation and boardwalk – east side (Zoo) - 2018
- Structure Parking (BG) - 2019
- Aquarium Exhibits (AQ) - 2019
- Education Classrooms (BG) - 2019
- Asian Tropical Forest (Zoo) - 2020
- Tropical Butterfly Conservatory (BG) - 2021



# PHASING

## PHASE 2: 2022-2029

Education Camp (Zoo) - 2022

New Mexico Habitat One – Leopold Environmental Center (BG) - 2022

Train (move from Zoo to BG) - 2022

Train and stations (BG) - 2022

Australia (Zoo) - 2022

Splash Play (Zoo) - 2022

Gorilla/Orangutan Habitats (Zoo) - 2022

Rio Grande Plaza (AQ) - 2023

Utility Infrastructure Improvements - 2023

Conservatory Restroom and Circular Trellis (BG) - 2024

Bosque Interpretive Center (TB) - 2025

Heritage Farm Expansion, Phase 1 (BG) - 2025

Sculpture Park (TB) - 2026

Aquarium Exhibit Renovation - 2026

Elephant Expansion (Zoo) - 2027

Lakeside Fountain Show (BG) - 2028

New Mexico Habitat Two – Piñon-Juniper Forest (BG) - 2029

## PHASE 3: 2029-2035

Picnic-Concert Lawn and Stage (Zoo) - 2029

Lake rehabilitation – north and west sides (Zoo) - 2029

Bird Theater (Zoo) - 2029

South America (Zoo) 2030

New Mexico Habitat Three – Chihuahuan Desert (BG) - 2031

Polar Bear (Zoo) - 2031

Utility Infrastructure Improvements - 2031

Heritage Farm Expansion, Phase 2 – The Dance Barn (BG) - 2032

Aquarium Exhibit Renovation - 2033

Africa (Zoo) - 2033

The Walled Garden (BG) - 2034

Backyard Habitats (BG) - 2034

New Mexico Habitat Four – Sierra Madre Pine-Oaks (BG) - 2035

Administrative Complex (Zoo) - 2035

Aquatic Conservation Facility Renovation (BG) - 2035

## CONCLUSION





The next steps in implementing this Master Plan is development of a funding strategy and beginning concept design of the Phase 1 and Phase 2 improvements. The residents of City of Albuquerque have shown support for ABQ BioPark through passage of a five year millage for City of Albuquerque. The Mayor’s Advisory Board for the ABQ BioPark and the New Mexico BioPark Society have begun exploring possible funding sources. Key to this strategy will be communication and coordination between the three groups to align a funding source with the most appropriate project. This document should serve as a tool to communicate the vision and future of ABQ BioPark and serve as a map to guide its development. As improvements are implemented, this master plan should be referred to for guidance and as new ideas for ABQ BioPark reveal themselves, they should be tested for compliance with the mission and vision established herein.

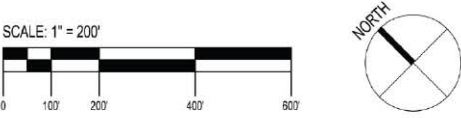


# BOTANIC GARDEN & AQUARIUM - PHASING



**LEGEND**

-  Current Projects
-  Phase 1 - 2015-2022
-  Phase 2 - 2022-2029
-  Phase 3 - 2029-2035

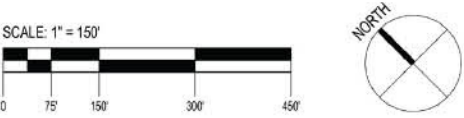
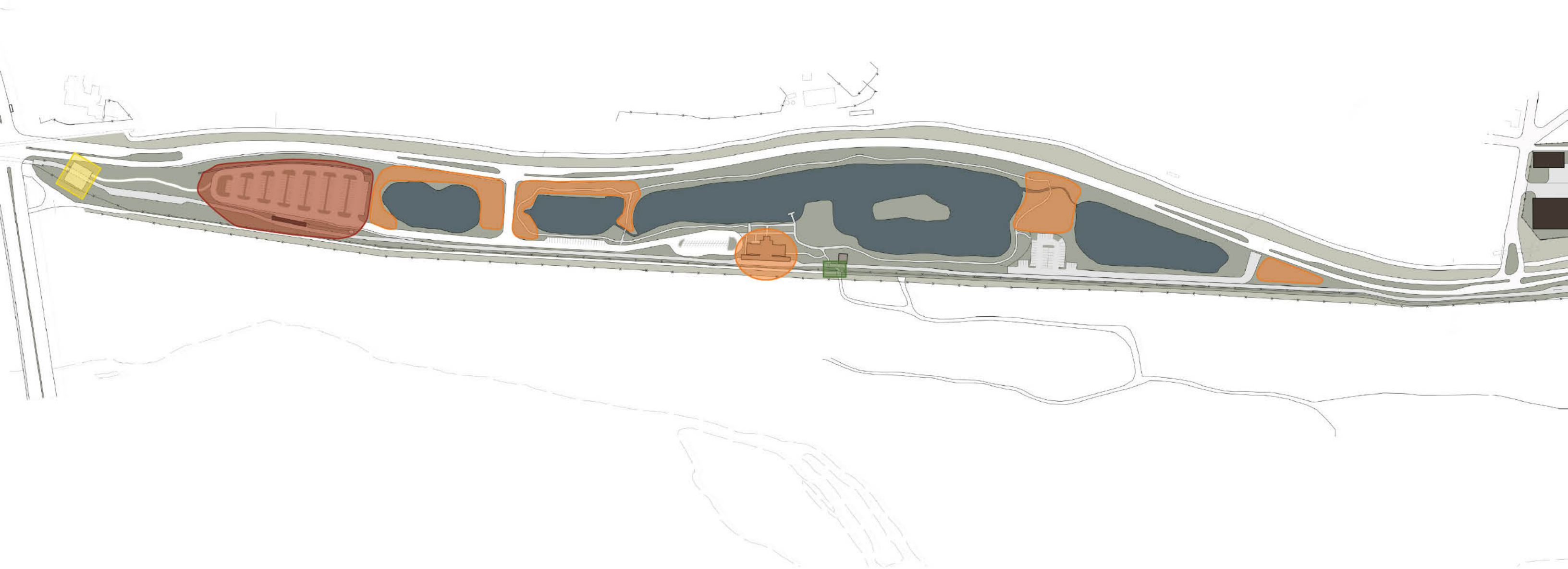




# TINGLEY BEACH - PHASING

**LEGEND**

- Current Projects
- Phase 1 - 2015-2022
- Phase 2 - 2022-2029
- Phase 3 - 2029-2035





# Zoo - PHASING



**LEGEND**

- Current Projects
- Phase 1 - 2015-2022
- Phase 2 - 2022-2029
- Phase 3 - 2029-2035











ABQ BIOPARK







ABQ BIOPARK

**NCA** ARCHITECTS • PLANNERS

JONES  JONES  
ARCHITECTS + LANDSCAPE ARCHITECTS + PLANNERS