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Desert Discovery Center Task 1100 Project Definition Report

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EXECUTIVE SUMMARY

Thinc Design is pleased to present a Project Definition Report for the Desert Discovery Center in Scottsdale, Arizona. It is a privilege to work on this City of Scottsdale project, an exemplar of passionate local commitment to a vision. That vision—to create a signature experience for Scottsdale with the potential to develop inclusivity, stewardship and education outcomes for the local communities, be a must-do exceptional tourist experience that is grounded in authenticity and develop a unique research mandate that will attract attention around the world and play a critical role in science communication—is an inspiring foundation for our work. The collaboration with the City of Scottsdale, the Desert Discovery Center Scottsdale, John Sather of Swaback Partners, and the many, dedicated stakeholders we have met, is a fertile and exciting environment, and we are honored to be a part of bringing this vision to life.

This Report summarizes the preliminary concept and major experiences of our initial concept. The written document includes a summary version of the Trip Report shared after our first Workshop in August 2016. Building on the project aspirations and content themes identified in August, this Project Definition Report articulates the concept and experience as it has developed since, following Workshop II in New York, and a presentation of concept to the Desert Discovery Center Scottsdale Board in September. This Report also defines a collaborative model for working with Arizona State University and other stakeholder communities and organizations.

Thinc Design

Thinc is a leading exhibition design firm located in New York, serving clients across North America and around the globe in Asia, Africa, and Europe. With more than 20 years of experience, Thinc has successfully completed projects for a wide range of institutions, including museums, science centers, aquariums, zoos, attractions, corporations, and governments. In current and recent projects—including the Cleveland Museum of Natural History and the Sustainability Pavilion for Expo 2020 Dubai—we are engaging an increasing focus on the relevance of the museum for elucidating the complexities of living in a changing world. We are very excited about the potential of the City of Scottsdale Desert Discovery Center to inspire people to consider how we contribute to change and become stewards of our environment, through a deep connection with and understanding of the Preserve and the desert’s ecological systems. This is a local story that is also vitally important in many places around the world. A critical component of our design approach is a process that works towards enabling institutions to grow out of true engagement with the communities they represent and the constituents they showcase and serve. The

initial stages of planning and design are driven by listening, conversation, outreach to scholars, educators, community leaders, and others who will ultimately interact with the new institution.

INTRODUCTION

(We Are) Living in the Desert

Educate and inspire a global audience to value, thrive in, and conserve desert environments through transformative experiences based on scientific studies in Scottsdale’s McDowell Sonoran Preserve and from around the world.

- Desert Discovery Center Scottsdale, mission statement

A Sense of Place

At its heart, the mission of the Desert Discovery Center Scottsdale is to inspire the current and especially coming generations to not only take up the challenge, but claim the future in the spirit of possibility: our future and the future of this planet. We start with the idea that we protect what we love, and love what we know. In the Center, experiences that excite us, rouse emotions, provoke reactions, awaken our senses and make us feel differently can inspire a shift in perspective with enduring impact. Stirring our imaginations and emotional responses can lead to deeply felt connections with ideas and the surrounding landscape. This is the transformative potential of a visit to the Center.

The experience is grounded in a “sense of place” that starts with a surprising lens on the location of the Center itself. Located at the perimeter of the McDowell Sonoran Preserve, the Center offers views in all directions to the spectrum of “living in the desert”: the natural environment, the suburban streets and, visible in the southwest distance, the city. Views into the Preserve are further delineated by the variety of biomes: rocky mountainous outcrops, lush riparian washes and shrub-filled valleys. The breadth of desert life—not limited to wildlife but rather encompassing the local urban and natural environments—is the beginning of the story and the opening for exploring potential futures of coexistence and wellbeing.

Our design concept interweaves these distinctive vistas out to the land with impactful indoor experiences and linking spaces that transition from indoors to out.



This is envisaged as a fluid journey that may or may not have a linear pathway. Its signature move is a consistent but varied flow of three types of experiences: looking in (exploring exhibits and experiences), transitioning (experiencing spaces that cross from inside to outside) and looking out (carefully framed views to the landscape).

Locating the experience within the boundary of the McDowell Sonoran Preserve also demonstrates the Center’s mandate: to reflect and develop the commitment that started the Preserve in the first place, and grow it into a 21st-century version for responsible investment in future generations: from preservation to sustainability. The Desert Discovery Center Concept offers the potential to educate and progress a long-term vision for local stewardship of the Preserve and further support other similar Open Space efforts.

Being in this place can establish a connection to the landscape as part of a journey that stirs us to see it differently—as a part of *who we are* and ourselves as a part of *what it is*. This is the potential of experiencing the Center as a gateway to the Preserve, and this is why the Preserve is the right place for the Center. The Salt River Pima-Maricopa people express their sense of place with sacred songs, each representing a mountain that marks the boundary of visible lands. These songs ground the people in time and space: they connect them with their ancestors who also saw and sang about the same ancient landforms, and singing the songs brings the landscape to life when they are far away from the region. The songs are passed from generation to generation.

The Salt River Pima-Maricopa conception of their homeland is a potent and beautiful idea. Interpreting this worldview in the Center—in collaboration with the Community—is one way to open hearts and minds to the desert and a deeper understanding of our (human) place within the ecological system. We have also discussed an accurate retelling of ancestry and the unbroken lineage from the Huhugam to the O’odham. For thousands of years the O’odham people and their ancestors (“huhugam”) have lived with an innate and deeply felt connection to the desert. This can be a foundation for how we can interpret what it means to be “living in the desert” and focus closely on how we live in the present and look to the future, while acknowledging what we learn from our past.

The Desert Discovery Center is positioned to inspire generations of local residents and tourists to see the desert with a fresh perspective: not as a separate, uninhabited landscape, but as the ground beneath our feet. As an environment that people live in, everyday, with many fellow species, and share in the supply of water and air. A place that inspires us to meet the challenges of the environment with both research and creativity.



Located at the perimeter of the McDowell Sonoran Preserve, the Center offers views in all directions to the spectrum of “living in the desert”: the natural environment, the suburban streets and, visible in the southwest distance, the city.

CONTEXT

Awakening

On the 28th of September this year the European Union and ten countries ratified the Paris climate treaty. Collectively their emissions top the 55 percent threshold needed for the treaty to take effect. The day was described by many as “a turning point for our planet”.

“It’s possible.” With these two words, the Director of The Nature Conservancy’s Arizona chapter Patrick Graham recently expressed the outcome of new research by The Nature Conservancy to the Desert Discovery Center and Thinc team. The goal of the research was to find out if worldwide conservation efforts could collectively and positively impact the effects of pollution and habitat loss and maintain growth for the GDP “Conservation By Design” is a visionary strategy for achievable conservation goals that also support a growing economy.

These are two instances of a movement that is happening at all levels: global, regional, national and local. Communities, grass roots organizations, peer-to-peer groups and online forums, families and individuals are awakening to what we can all do to institute new modes for sustainable and resilient living. Significant focus is on models for coexisting with our fellow species and creating smart urban environments. Exploring these topics in the context of “living in the desert” is a thought-leadership opportunity for the City of Scottsdale, the Desert Discovery Center and its partnership with Arizona State University.

With the groundswell of activity comes a perceptible shift in attitude: the doom-and-gloom message of environmental loss and damage is slowly but surely being updated by a sense that what we contribute matters, we can all do something, and a good outcome “is possible.” Pessimism is shifting to optimism as positive ways forward become evident.

SUMMARY OF OUTCOMES FROM WORKSHOP 1, 8–14
AUGUST 2016

This summary followed an information-gathering trip by the Thinc team to Scottsdale and Phoenix 7—14 August 2016 (“Workshop I”). Throughout the week we encountered not only a wealth of generously shared information, we also witnessed a desire to push past assumptions and norms and find creative and innovative solutions: in design, in sustainability, in education, social equity and experience. Solutions that reflect the local community and situate the Center on a world stage.

We identified the following touch-points that stood out from the week’s discussions:

The DDC will inspire future generations to preserve and protect

Understanding that biodiversity is critical for the planet—and recognizing the Preserve’s role—will be an important part of the Center’s story: this is a theme we heard in many discussions. The story of the Preserve is also an invitation to all guests to see the potential and value of local preservation, at all scales, and it will inspire local pride and ownership that will grow stewardship in current and future generations.

The Center and its partners will play a visible role in conservation of the desert environment that inspired and informed the creation of the Preserve. The Preserve has been a place of human habitation and use over many generations. It tells a rich story of human impact and restoration, a story that is inspiring. It demonstrates local dedication and is part of a global movement to restore ecological systems.

The Preserve has facilitated research and conservation through the McDowell Sonoran Conservancy (See page 17 for MSC resolution.). Arizona State University has robust programs that will expand beyond these programs. All of this will be accessible to guests to the Center through exhibits, live interpretation, guided tours and programs. The Center will also be a venue for international symposia to share research on desert species, arid environments, and urbanization—particularly for regions facing increasing aridification.

The DDC will educate

We heard strong support for the educational mandate of the Center. Alignments with STEM and STEAM frameworks will inform design concepts and exhibits.

For all guests, there will be opportunities to discover more about the desert systems, cycles and species, history and land use. Our approach will encourage social engagement and intergenerational learning for families, with experiences, interactivity and live programming. These are strategies that can “open people up” to exploring. They include encounters with live species brought in by rescue organizations, and guided outdoor experiences. Guests will be equipped with knowledge that will enrich their experience in the landscape.

Local native communities speak of seven generations as a way to consider our responsibility for what we provide for the coming generations: our stories, our customs and knowledge, our impact on the land.

In a place of active learning, people build respect and empathy for their environment—natural and built, ecological and cultural. Exploration is empowered by knowledge and can transform into stewardship. Education is an essential partner to the work of ecological preservation.

The DDC will build anticipation for exploration

“We are all curious about our environment: we are all scientists.”
- Lindy Elkins-Tanton, Director, School of Earth and Space Exploration, ASU



The Desert Discovery Center will be an experience that stirs people’s imagination, curiosity, and sense of discovery. People will share a sense of awe and delight at what the Center *reveals* about the Preserve: a thriving desert environment. They will be excited about their own figurative or literal journey into the landscape, and what they might discover. For those who cannot hike, that might be an immersive indoor experience. For many, it will be their first exposure to the undeveloped desert. The Center is a threshold, the beginning of a great adventure. It is also the place that people will return to for questions unanswered, and to deepen and expand their journey of exploration.

The DDC will be inclusive

“The Desert Discovery Center could be a tipping point to bring the Scottsdale communities together.”

- Melinda Gulick, former Chair of the McDowell Sonoran Conservancy

During our discussions it became obvious that desert hikes are a popular and beloved activity for many residents. But we also heard that there are many people in Scottsdale and Phoenix that do not hike or have access: people with disabilities or of an age that prevents them from enjoying a hike, families without transport to get to a trailhead, or without awareness that the Preserve is open to them, as well. We also heard a desire to engage all ethnic groups; importantly the Native American community and Latino residents. Given local investment in the Preserve, how can the Center demonstrate that it is inclusive of constituent communities?

Design planning will address accessibility for all guests, including experiences that can replicate some of how the desert feels for those who cannot have a direct encounter. We also suggest that public transport to the Center is an important point of discussion for the City.

Native American worldviews on the species, ecological systems and cycles of the desert will be an integral part of the content, and inform the design. We also see much potential for indigenous concepts to inform the strategic framework for the Center: our responsibility for seven generations into the future, a deep respect for the landscape and models for resilient resource use—all highly relevant for local sustainability. An ongoing partnership with the Salt River Pima-Maricopa Indian Community could also include training young Native Americans as docents, developing live programming and guided desert hikes with a focus on indigenous knowledge of the desert.

The DDC will enhance tourism

“The desert is the signature of Scottsdale”.

- Kim Cole, Director of Guest Services, Four Seasons Scottsdale

For the past two years, Experience Scottsdale has named the Desert Discovery Center as one of its top three priorities. We learned that Scottsdale’s tourism industry is witnessing a shift in travelers’ priorities to a preference for *experiences*. Many people seek experiences that connect them with the “real place”: authentic knowledge, cultural practices and activities. People want to know what is unique and special about a place, and often seek out the one or two experiences that will fulfill an accurate understanding of the environment and history.

The Desert Discovery Center is not only aligned with tourism trends, it has the potential to be the:

“Quintessential Scottsdale/Sonoran Desert must-see experience that makes people fall in love”

- Pam Gilbert, Fairmont Scottsdale Princess

If designed to demonstrate sustainability and sensitivity to its environment, the Center can be a landmark tourism destination in part based on its design and architecture alone. As a gateway to a desert experience, the Center will not only engage people with the Sonoran Desert and the Preserve, it can assist people with practical information about a safe and enjoyable hike. It provides amenities for a comfortable desert experience and a variety of things to do for different ages and interest groups. All of this is of course also relevant for local visitors. Grounding the experience in Native American concepts adds another layer of local authenticity for guests.

The Center is ideally placed to align with the strategy of the Scottsdale Tourism Advisory Task Force, currently working on partly redefining Scottsdale as a destination for “family and adventure”. The Taskforce also has a long-term plan for interpretation on climate and ecology in the desert. Their research shows that experiences like the Center and the desert are of great interest to future generations and family.

The DDC will be a model of sustainable living, design and practice

The City of Scottsdale and Arizona State University have been leaders in region, the nation, and the field on issues of sustainability, conservation, and land rights. Their contributions to policy and research inspire us to create a place that carries forward this tradition of stewardship for the environment in which we live.

What does sustainability mean for the Desert Discovery Center? This will be a holistic plan that informs the strategic direction of the Center. We gathered a lot of useful feedback about the potential impact of the Center; these comments aim to reflect concerns and discussions, and will be addressed in collaborative planning with DDC and the architects:

In its architecture and exhibit design, the Center will be sensitive to the landscape and create the least amount possible of visual interruptions and impact on the environment. The eventual size of the Center has been of particular concern and we will aim to define its size in terms of what is needed to achieve the mission and economic and environmental viability. In its operations, the Center will follow practices for sustainable cohabitation with neighboring residents, including traffic and parking management.

Not only will the Center demonstrate sustainable practices in its build and operations, it can be an exemplar of best practice construction and systems in arid regions. Working in collaboration with the architects, we will fully interpret the building’s infrastructure for guests and we see it becoming a venue for discussions about sustainable practices and what it means to function in synchrony with the environment.

The Center can also be a model for economic sustainability in the development of its audience and of revenue streams, and a financial model that continues to attract operational funding for maintenance and for updating content and exhibits with new research and technologies. The ASU partnership will play an important role in this strategy, as part of a model for collaboration with numerous partners.

Finally, the Center can demonstrate social and cultural sustainability through a mandate for education and inclusion, as outlined above, informing a long-term objective for local stewardship. In all these ways, the Center can demonstrate a commitment to the vision for sustainability that informed the Preserve Ordinance and the Preserve’s creation. It will also increase visibility of the Preserve on a local and global stage, ensuring its longevity for coming generations.

Living in the Desert

WHAT IS THE STORY? CONCEPT

Small footprint, big vision

Workshop II was held in New York, 8—9 September 2016. Over two days, the Desert Discovery Center Scottsdale, Thinc, and Swaback teams brainstormed a concept for the Center that built on the outcomes of Workshop I, and Swaback’s deep knowledge of the area and the project parameters. We also met with Terrapin Bright Green and discussed the potential for demonstrating sustainable practices in the building and interpreting models and modes for sustainable desert living as part of the guest experience.

We continue to work with the assumption and the principle that whatever we design will be both responsive and sensitive to the landscape: as a built form or series of forms and outdoor or transitional spaces, it will work in visual synergy with the contours of the landscape as much as possible. At the same time its impact as both a guest experience and place for current research will be impactful and highly “visible”. Locally specific knowledge will—over time—attract global attention and a sharing of relevant research. Immersive, sensory, emotive and fun experiences will work in balance with in-depth and discursive experiences, as well as a dynamic program of up-to-date content delivered through temporary exhibits, lectures and symposia. In short, a small footprint and a big vision.

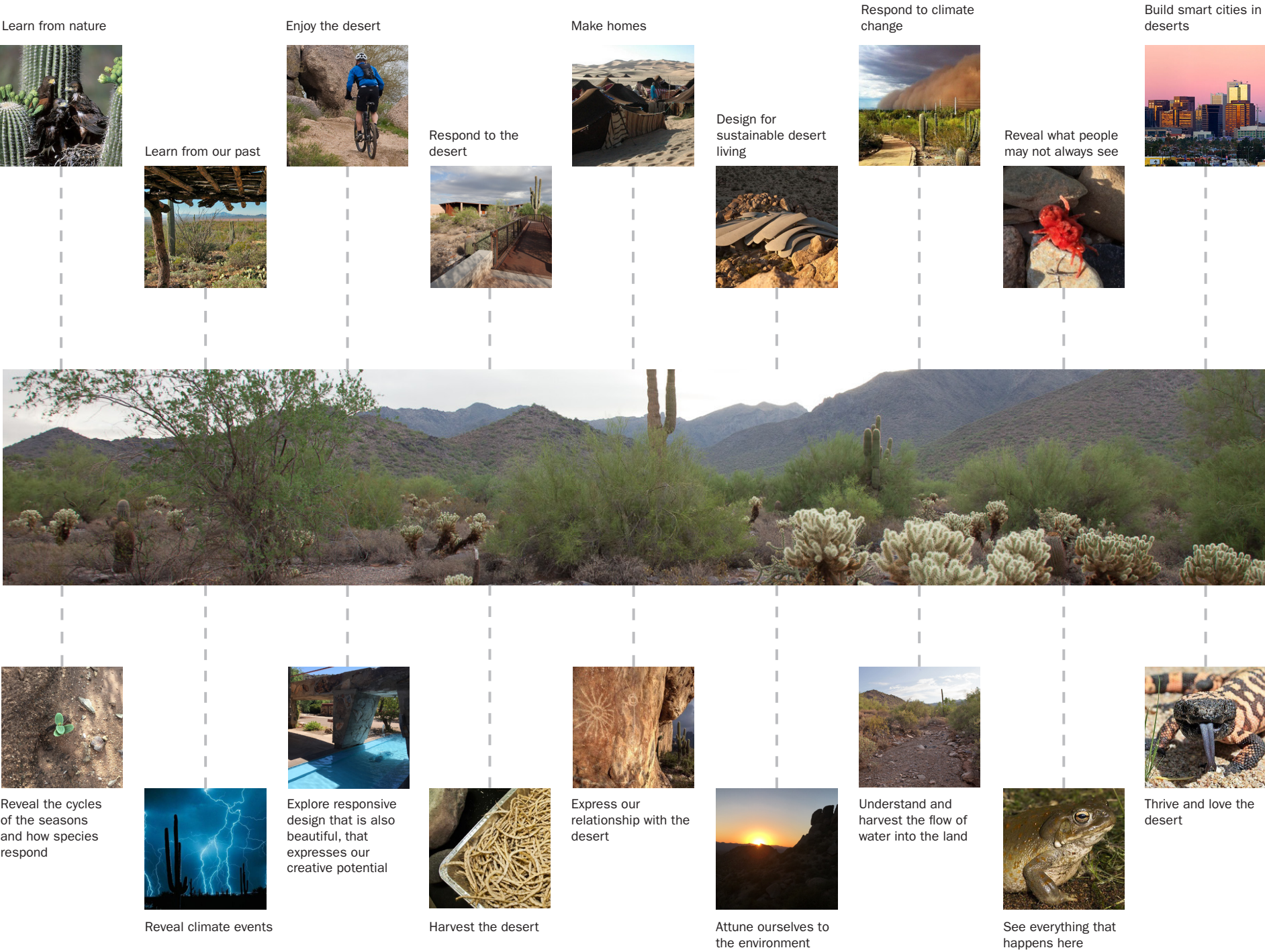
We propose that a program of global research relationships and programs can inform a long-term plan, growing the relationships and programs over time to achieve their fullest potential: start local, go global. This long-term plan for research and development would fall into the scope of ASU’s partnership with the Center.

What is the story? Living in the Desert

The storyline of the Desert Discovery Center is defined as “living in the desert”. Rather than “life [in the desert]”, which suggests species and ecosystems adaptation and a passive narrative, the inflection here is on how we—humans and our fellow species—have actively developed relationships with the desert, with a focus on local Sonoran topics and how they demonstrate some universal characteristics of desert life. The emphasis is on the present-day; the spectacular environment around us and what we are learning and doing to take us forward into a sustainable future.

We inhabit, restore and urbanize the desert. We attempt to manage and share resources in the desert through our policymaking and water rights. We also

How do we...



interpret it with art, poetry and architecture—the desert finds its way into our soul. The extremes of the climate and habitat challenge: the heat, light, and dryness, provoke and energize us. And we respond through our creative practices and our philosophical approaches to place.

More people are and will be making their lives in the desert as arid environments increase in number and scale around the world. The emphasis of research is on resilient and creative responses to the challenges of the environment: habitats, availability of water and food, efficient energy cycles, and how to harmonize the ecological footprint of desert urbanization. This is a critical narrative for the future of the planet and a call to opportunity: the Center can be a place that addresses this challenge head on. Over time, the Center can develop a signature research portfolio with the potential to welcome a global audience to its doorstep—physically and digitally—for the sharing of knowledge and an ongoing dialogue. This is the Center’s opportunity: to take up the question of what it means to live in the desert in this century, to focus leading research on all its aspects, and to become a globally-connected hub for desert studies around the world.

Further details about the research partnership can be found in Section 6, Partnership with Arizona State University, p. 16.

Reveal the desert: four questions

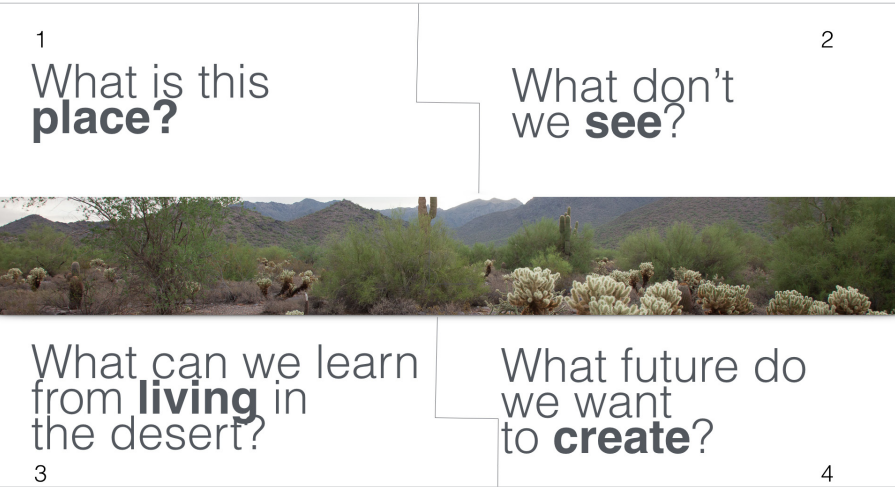
The concept “living in the desert” suggests peeling back the layers of the local environment, and the history, myths and assumptions about the desert to reveal its variance, dynamism and potential.

For instance, many aspects of the Sonoran ecological system are not easily visible or visible all the time. There are few but dramatic climate events. There is also a record of both natural history—including geology—and human history that laid the foundation for understanding the place and how people live and have lived there, including how the indigenous huhugam (ancestors of the O’odham) sheltered, harvested resources, and thrived as desert inhabitants.

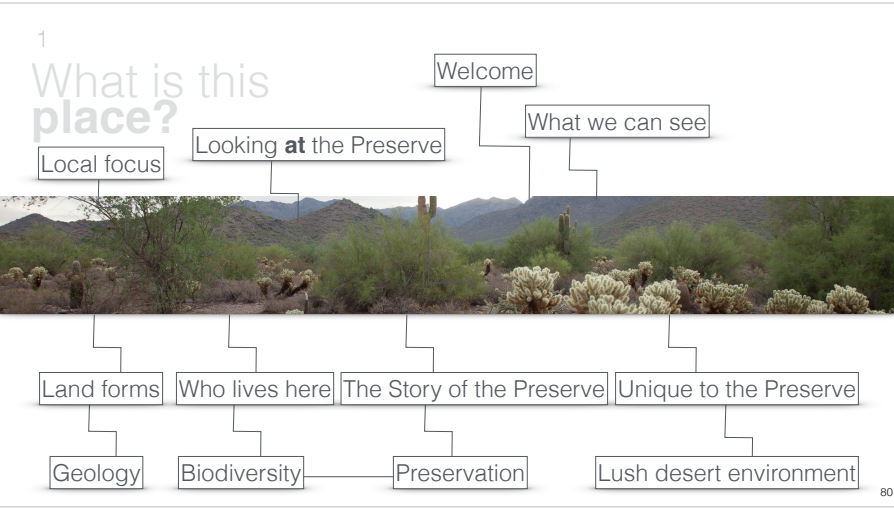
We identified four questions to define our concept:

- 1. What is *this* place?
- 2. What don’t we see?
- 3. What can we learn from living in the desert?
- 4. What future do we want to create?

Questions (1) and (2) place a lens on the Preserve, the Sonoran and locally focused research. (3) and (4) include a global perspective, whilst maintaining local examples to showcase Scottsdale and Phoenix as desert cities that can share research and practices for smart desert living with other places in the world. At the heart of this proposition is the reminder that human habitation in the desert is not limited to the past nor is the desert limited to the natural environment: Scottsdale and Phoenix are as much part of the desert as is the Preserve.



Current research informs all parts of this storyline, from life sciences to sustainable urbanization and human physiological responses to the sound of water, for example. Why does the desert appear to inspire such a wealth of emotional and creative responses? How have its species inspired biomimic design? The breadth of research suggests a unique trans-disciplinary approach that is progressive and world leading. The following notes outline the potential range of content under each of these questions but are not limited to a single experience or exhibit.



(1) What is *this* place?

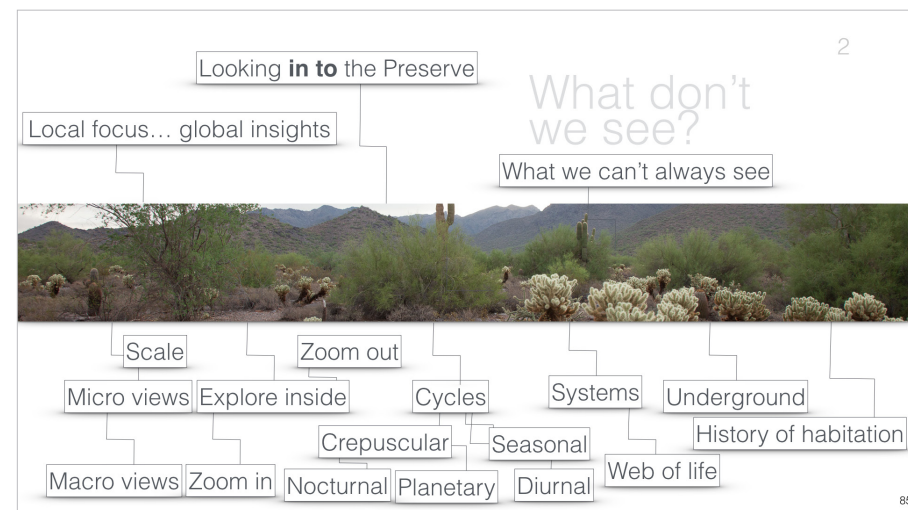
Guests are oriented to the location of the Center: at the limits of the Preserve with views to the natural landscape and the city, a vision for the interdependence of the urban and natural environments. Introduced here, this idea also weaves into all the Center’s experiences. The desert is one place: what is the interface of species, habitats, climate events, water and air across this land? How is the desert present in our urban places, and how are we continuing to learn from adaptations to its challenges?

Guests are introduced to the history of the Preserve, its creation and the significance of preserving this environment. The story of the Preserve started as a vision for sustainability—30,000 acres of preserved ecosystem to protect the land from urban development. Now, the Preserve is a model for restoration and ecological systems protection and research, part of a global movement for local preservation efforts.

Exhibits focus on the distinctive features of the Sonoran Desert and Preserve environment: “looking at the Preserve”. The experience is about making sense of what we can see—the immediate Preserve environment—as a departure point for exploring the diversity of the Preserve’s 30,000 acres: the different ecosystems of the south and north, its diverse plant life, visible changes in density, and the unique seasonality of rainfall. Features of the geology include calcium carbonate (caliche), desert varnish and the soil crust—a living organism.

We introduce people to a systems approach from the beginning: there are many and varied species, habitats and climate effects, all interconnected in the desert ecosystem. Its verdant plant life and riparian communities thrive thanks to the amount and seasonality of rainfall.

This section could include live displays including insects and reptiles (in partnership with the Phoenix Herpetological Society) and daily appearances from rescued birds and mammals (Liberty Wildlife, Southwest Wildlife and others.)



(2) What don't we see?

The desert cannot be seen in a day, or on a single hike: diurnal and seasonal cycles; things happening below the surface and inside plants; off-trail locations where species are known to congregate, or ancient sites with petroglyphs that must stay undisturbed.

Here, guests will immerse themselves in surprising and fun experiences that offer unexpected perspectives on the spectrum of time and space in the desert. We “peel away the layers” to uncover the “mysteries” of the desert and challenge assumptions. The stories are local but will include some examples of relevant universal characteristics and research.

The desert invites discovery and exploration: it is filled with life but can appear uninhabited. Look more closely and the environment is thriving with plant and animal life and cycles of rain and growth. This place reveals an extraordinary geology, biodiversity and dynamic cycles. Look beneath the soil crust. Reveal what happens inside a saguaro skeleton, what a haboob feels like, the smell of rain on the desert, the sounds of insects and spadefoot toads, the intensity of heat and contrast with shade. Stories of adaptation are throughout this section, demonstrating not only what happens, but why. Here, we are “looking *into* the Preserve”.

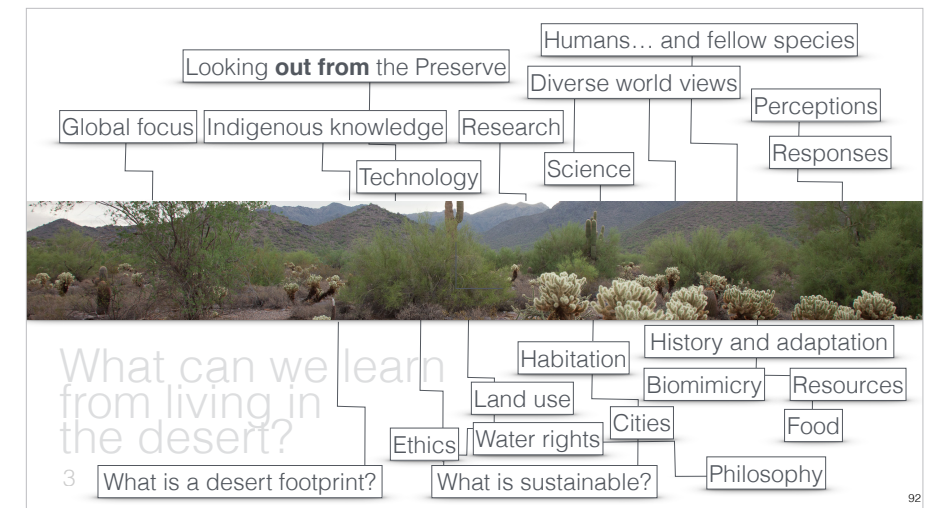
Guests will also discover what happens over time: the diurnal, nocturnal, crepuscular and seasonal cycles and climatic events of the desert. These changes in the environment are not always visible and cannot be seen within an hour or a day.

Look closely at the life cycle of a saguaro, including its skeleton that has become a habitat for a lizard, for example. Experience the transformative moments of sudden and extreme climate events. Discover why plants bloom over a range of times, keeping a unique schedule in response to limited pollinators. Guests will explore deep time through a view into the evolution of the ecosystem: from its formation to its current geological and biological status.

Many current things cannot be seen by guests or hikers (and will remain that way) but can be reproduced as part of the experience. Creating “windows” to the Preserve demonstrates the outcomes of ecological protection and can be displayed as with images, film and possibly a live feed, including a water hole that attracts species, petroglyphs, archeological sites and eagle nests, as examples. We also reveal the impact of invasive species, the damage and restoration projects in the Preserve.

In this section, guests will also “zoom out” to see the Preserve within the context of the Sonoran Desert and its adjacent biomes, for example its relationship with Tonto National Forest: the two areas create a single ecological system large enough to support apex predators— lions, coyotes, raptors, bobcat and bears—and prevent an ecological island.

Interactions between humans and the desert are examined through the history of habitation and use and the potential of our relationship with the environment: Native American lifeways and historic periods of ranching and minor agriculture, mining and more recent recreational activities, and understanding the impact on the soil crust in the Preserve. Heavily ranched areas are compacted and ants are playing a significant role in restoring the soil. How have humans also lived in relative harmony with this desert environment? This story includes the history of the surrounding urban development, and stories, concepts and names that interpret the O'odham relationship with this region of the Sonoran. Native American stories are explored as part of a continued and strongly contemporary indigenous knowledge about how we are living—and can live—in arid environments. Plants are revealed for their medicinal and edible parts; changes in light are revealed as a way to read the desert. Guests are introduced to some of the ways people have interpreted and responded to the desert with art and design; this lends itself to using a range of interpretive programs such as creative activity and participatory programs to highlight the pure fun of discovery.



(3) What can we learn from living in the desert?

Guests encounter the richness of this topic through a spectrum of displays and live programming that showcase current research from Arizona State University and potentially additional research partners. Part of this experience could be access for guests to select areas of the ASU research lab, enabling them to interact with the staff in short, scheduled (and possibly unscheduled) conversations and participatory programs.

The spectrum ranges from “the poetry of the desert”—artistic and literary interpretations—to the ethics and philosophy of land use and water rights. There are many ways to explore this content, to inform a perspective on how we can live well in the desert. Stories can be largely local, with many references to universal characteristics or parallels and contrasts with other arid environments. This is “looking out from the Preserve”.

We have identified three broad areas of research: habitation, resource rights and sensory and aesthetic response. Within this, there are many stories and questions explored through the lens of their potential for shaping our current and future desert living. Guests are invited to feel like part of the research, to see where the current work is “tracking to the edge of what’s known” and get involved in looking beyond. Displays with updateable content and data augment live programming with many topics.

Indigenous knowledge about living well in the desert includes the history of built forms—ramadas and other structures that create an effective balance of shaded areas and dappled light. There are habitats in many desert places that use practical technologies for cooling and protection. As part of an exploration into habitats or even the broader idea of “shade”, these technologies could be demonstrated as one of a suite of temporary exhibits and talks. There is a long history of built forms as

adaptation: from mud building, seasonal adaptation, to sleeping porches and air-conditioning that can be reexamined in the context of new technologies and the need for energy efficiency.

Energy can also be looked at thematically: how it can be harvested and efficiently used in the desert for a decreased footprint. How do we understand energetic flux and the cycle of energy in the ecosystem as a way to measure carbon sequestration? How do we feel and react to “natural energy” from dynamic forces in the environment: from wind, light and shade, heat and cool, water and the microorganisms in the soil crust? How does it affect our physiological state? As a felt quality of the environment: why have many artists been inspired to live and work in this environment? How have they transformed perceptions and impressions—of light, heat, the acute contrasts and extremes—into art, design and built forms?

Access and management of water and how we respond, revere and think about water is a rich topic for discovery: what can we learn from the water cycle in the desert and in the Preserve, and the history of water management and conservation in the region (from huhugam canals to Indian Bend Wash and xeriscaping)? Changing weather and rainfall patterns and their effect on the ecology of the Preserve. The alluvial fan in the north and how the water moves through the Preserve.

Some of these investigations can also be demonstrated through the Center’s building, through technologies like radiant cooling, partial air conditioning and perceptual cooling approaches. Biophilia and biomimicry projects are also rich potential for guests to discover how we are learning directly from nature, and could be demonstrated in the design and architecture.



(4) What future do we want to create?

The content of this “section” will often interweave with that of Question (3), and is likely to be mostly in the form of temporary exhibits, demonstrations, education programs and live events. Exploring the future is an opportunity for the Center—with its research partners—to position itself as a place for current thinking, research and exploration into the questions and challenges of our epoch. The vision is for something that can grow in stature (not size) over time: as the Center gains its footing, this is in incremental program of research topics with increasing visibility, becoming a local, national, regional and eventually global center for the study of desertification and arid environments. This is looking “beyond the Preserve”.

The content is contingent on—and can respond to—themes that are topical, locally and globally relevant, and provide opportunities for many people to participate: student competitions, workshops and maker events.

Sustainability will be at the heart of the discussion, with a hopeful tone and a view to living well in the desert. How can we continue to adapt in the face of increasing temperatures, population numbers and increasing demands on food and water? Within this context, what is the future of Phoenix [metropolitan area]? How can it become a smart city, decreasing the city’s footprint even as it may grow in its capacity? What is the future of food production and harvesting in the desert? The future of renewable energy, closed-loop systems and the range of technology that will lead us into a sustainable future.

There are also opportunities for understanding the impact of personal and small-scale actions: how to care for local flora and fauna, and why; how to interact with the animals in your urban environment. It could also have some simulations of the future in digital-game form, and invite people to choose from potential futures to understand the impact of certain decisions and actions.

HOW DO WE TELL THE STORY? DESIGN, INTERPRETATION AND GUEST EXPERIENCE

Design Vision

This diagram expresses the flow of experiences and a rhythm of interior exhibits and experiences, transitional spaces and framed views to the landscape. Guests experience the distinctiveness of each space through a variety of fun, emotional, sensory and cognitive interactions. A guest journey can include few or many of these experiences allowing for short or long visits and suggesting frequent revisits for locals. Overall, the balance of experiential moments, visceral interactions and deep investigations into knowledge with views out into the surrounding environment consistently reminds people of where they are as they develop a full understanding of the place and its future.

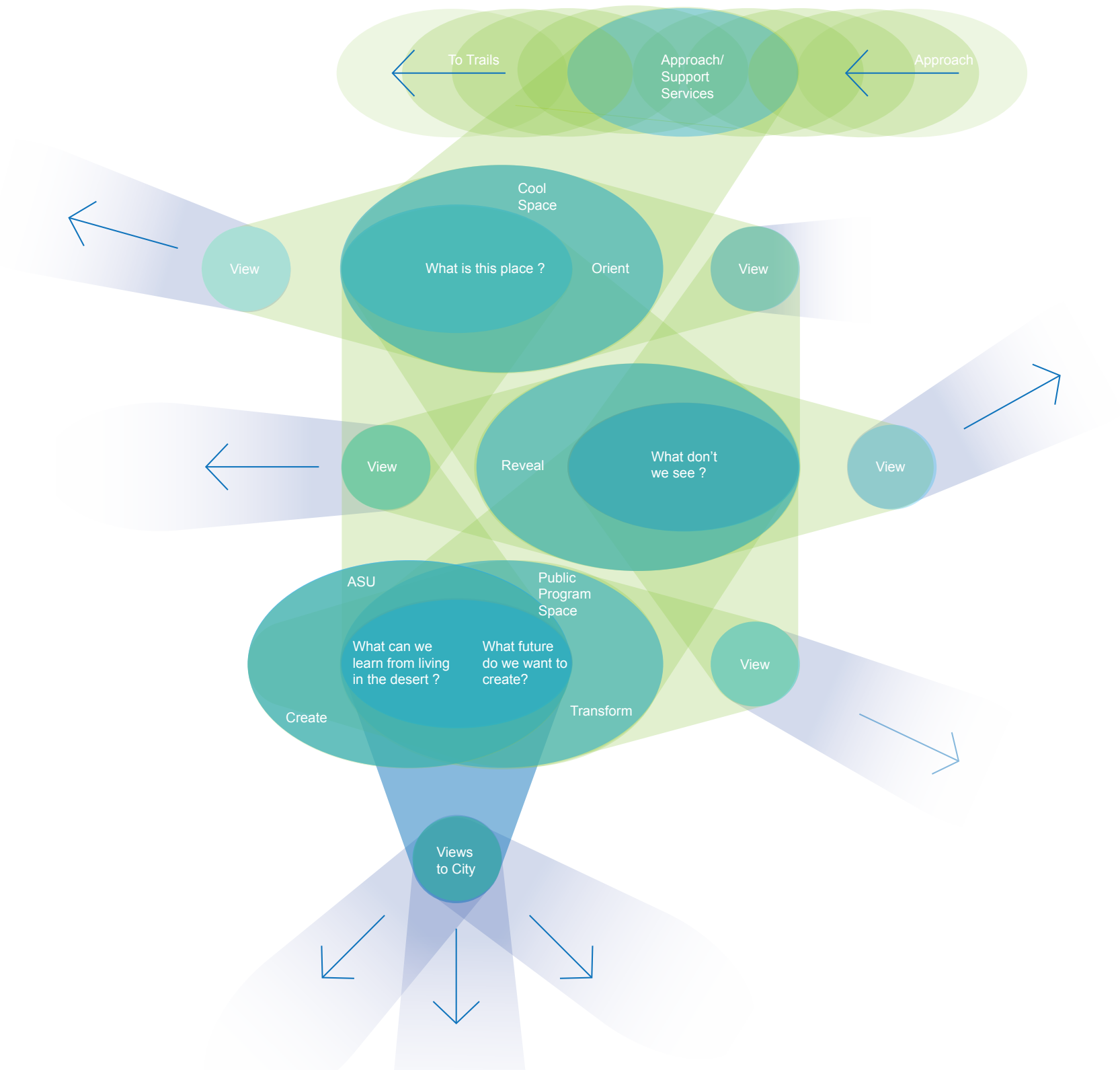
Interpretation approach

In the coming phase of work we will develop an Interpretation Plan that outlines the tone and approach for interpretation, and methodologies: live exhibits, digital media and physical interactives, video, sound and sensory experiences, digital and graphic imagery and text.

Overall, our approach aims to engage people with unexpected and surprising perspectives that make us feel, think and see things in new way and create memorable encounters. We do this with stirring video, live animals, changes in scale, sensory environments, framing devices, layering of content in digital media, game-technology that challenges us and other methods that can shift people’s perspectives. We also ensure that interpretation stays current and relevant with updated data, changing/temporary displays and a comprehensive program of live interpretation and education programs. This requires a significant investment in front of house staff that will be addressed as part of operational planning in concert with our design work.

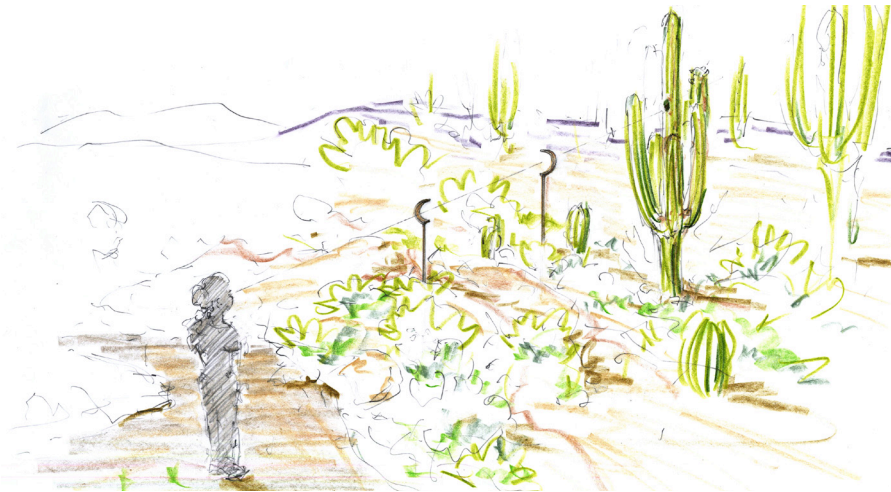
The interpretative style will encourage guests to think critically about the content, using questions and prompts to help people consider what is known, what is still being discovered, and how their contributions can be a meaningful part of research. This is an empowering experience that aligns with schools’ emphasis on critical inquiry and encourages all guests to feel welcome and part of the experience. We focus on many opportunities for intergenerational learning: experiences that are accessible to all ages and encourage adults to interact with children, and inspire children to interpret and recount to their parents.

The Interpretation Plan will address the potential of online and offsite programming and how social media can be leveraged to develop a community of ambassadors for the Center and channels for contributing content through Citizen Science and similar programs.



Sensory Experiences

- Sensory interactions will happen in both enclosed and transitional spaces, and accentuate our reactions and awareness of light/shade, temperature, sounds and even replicated smells from the desert.
- We demonstrate in our design and architecture and interpret our reactions to radiant cooling, our perception of temperature in response to hearing water and our response to biophilic design.



View Scope

Transitional spaces

These are places where people are sheltered enough to be comfortable and still be surrounded by the desert. These spaces not only link indoors and outdoors, but they invite people to stay long enough to take in the beauty of their surroundings. At some points they may provide ways to focus the senses on specific qualities of the landscape, such as light or sound.



Pause points and whisper galleries

For outdoor trail settings:

- Resting spots that encourage people to stay and witness changes: feel shifts in temperature and breeze, for example.
- A parabolic enclosure over a seating area will allow guests to pick up subtle sounds in the surrounding environment



Listening Point

Teaching spaces

Spaces for education will allow for a variety of teaching styles, guided and unguided school groups and be flexible enough for weekend programming and other uses. The education mandate covers early childhood, K-12 and university level. We will continue to develop the design of these spaces in collaboration with teachers, Arizona State University and in alignment with the Arizona curriculum, allowing for a focus on STEM and STEAM outcomes.



- Integrated and porous spaces for groups of 30 people within the exhibits
- Dedicated teaching lab for science, art and design projects
- Places for pop up teaching events
- A public programming space for seminars and symposia



Guest experience

Each journey unfolds a tangible narrative that takes people from the visible to the revealed systems and history of the desert, from local stories to universal characteristics of the desert, and from the present to the future.

Experiences

1. Arrival

- A trail that for people with limited mobility and children

2. Approach/ramp down

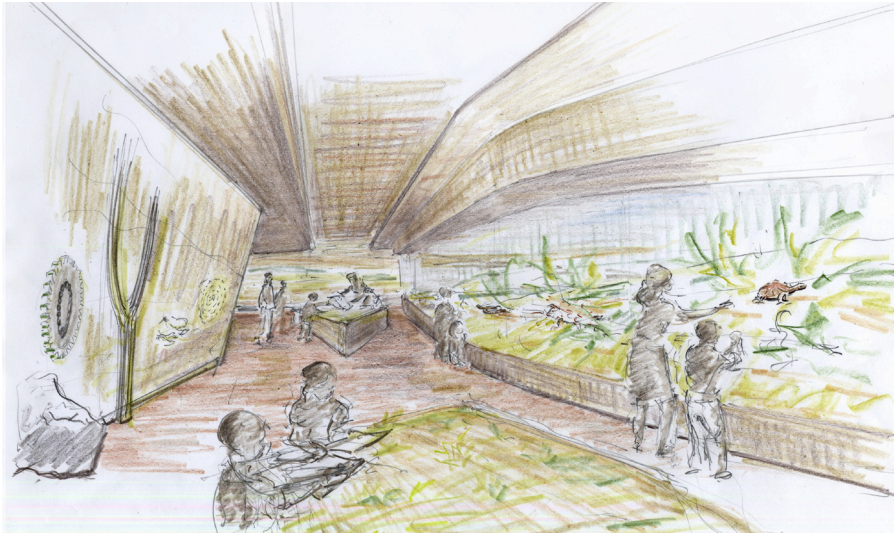
- A path that gradually ramps down, so that the desert floor rises up
- Guests can get really get close and touch the desert
- Ramp down among piers of desert earth
- Conceal the entry so there's some mystery to the approach
- Create places of shade and shelter outside

3. Cool Space

- Cool, shaded room where you hear the sounds of water and see patterns of light on water reflected onto the architecture
- The design and architecture introduced and interpreted (light touch)
- Awe inspiring, tactile, visceral experience, people “decompress”
- Sound, light and touch; very little interpretive material
- Reveal the design as a living force in the landscape, “breathing”, consuming energy in synergy with the environment (plants, water, air)
- Dappled Light
- Water Sounds
- Ripple Patterns
- Perceptual Cooling
- A threshold to other experiences
- A place that is comfortable and meditative
- You can return to this, a hub



4. What is this place? Orientation



What is the desert?

5. View to the desert “floor”: a panoramic view of the near landscape—species, soil crust, even a trail: deconstructing our typical view—what we can see.



Close view

6. What can't we see? Reveal

Experiences:

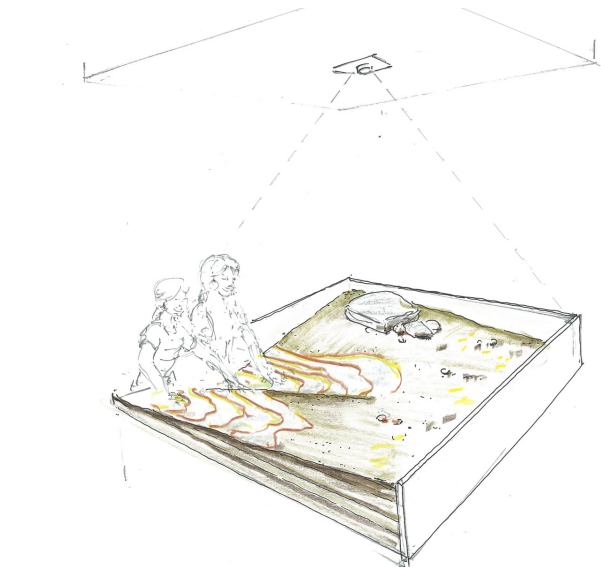
Time windows

- Electrochromic LED screens
- A camera above each window films the exact view for 24 hours
- The most exciting image of the night is displayed
- Each window has a different time frame: 12 hours ago, three nights ago, last rainy season, showing how much a cactus grew in a year



Digital sandbox

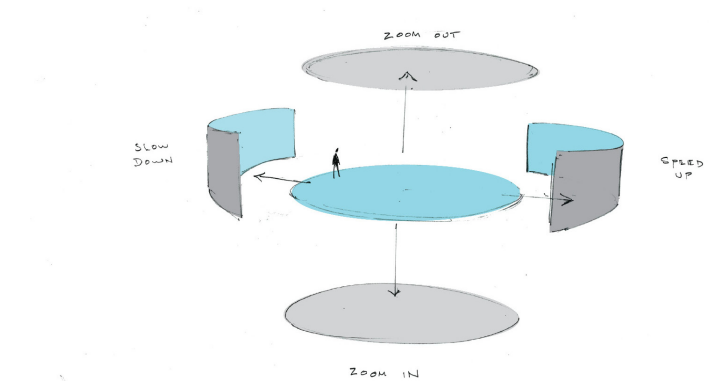
- A sandbox with kinect sensors and projectors
- Sand is covered with an accurate topographical contour map as the kids sculpt and re-sculpt the sand
- Dig away a layer of desert crust and discover the “ants”



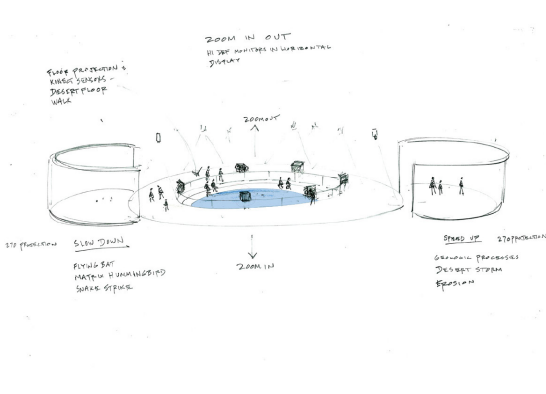
Micro macro

- Immersive digital display
- Zoom in and out with fast motion and slow-motion imagery.
- Zoom in: high definition imagery of desert species, guests feel as though they are at small scale, exploring desert floor
- Zoom out: see the Preserve in the context of the Sonoran, the whole Sonoran, relationships natural and urban areas
- Updateable with new research imagery and data
- Speed Up: super high frame footage of desert changes like shadow movement and plant growth, detailed images of weather events, geologic processes that shape the desert

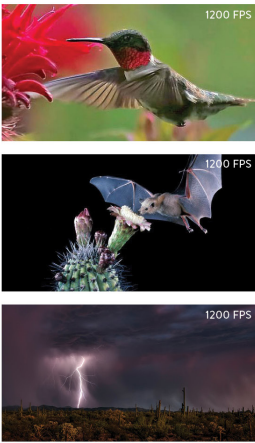
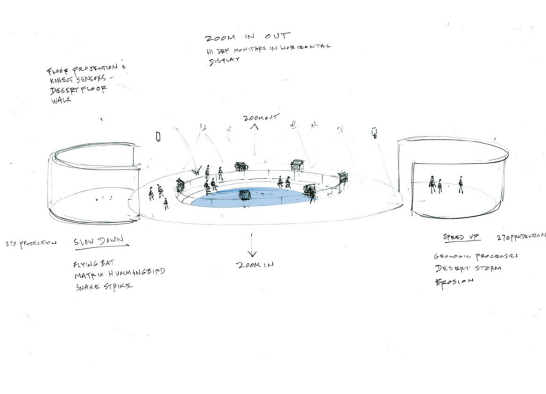
MICRO MACRO



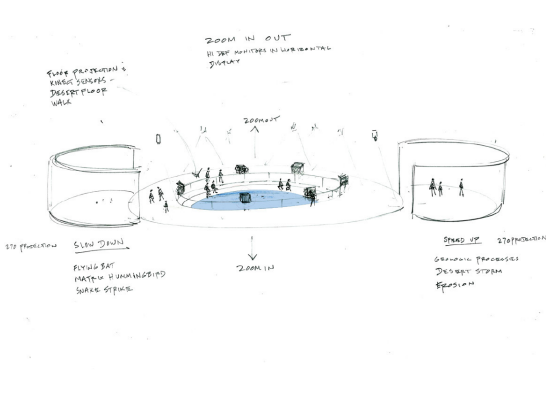
SPEED UP



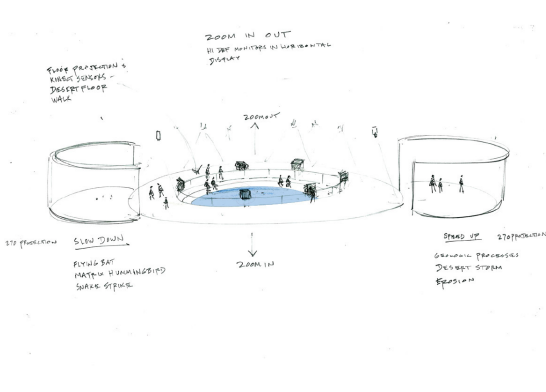
SLOW DOWN



ZOOM IN



ZOOM OUT



7. View to a wash

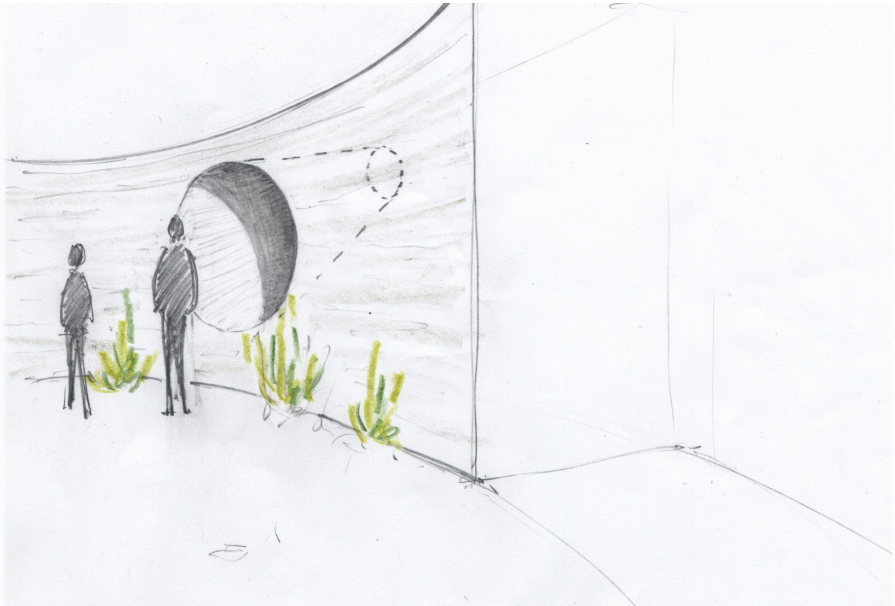


8. Transform

- An immersive experience transforms the desert with a storm event, profound, moving
- Interpretation: seasons, transformations, annual and planetary cycles, O’odham annual cycle
- 360 film, sound and light



9. View to the sky



10. What can we learn from living in the desert?

ASU:

- Some areas that are open to guests at scheduled times
- Mini-labs could be connected as auxiliary spaces to the main laboratory and be real working spaces for the staff
- At scheduled or un-scheduled times, a door or window into the exhibits area opens for a talk, demonstration or activity with a group of guests.



11. Public Programming Space

A flexible, multi-use space will host a range of public programs, such as ASU seminars, symposia, and presentations, as well as, an exciting and changeable array of exhibit activities and led discussions.

12. View: to the city

13. What future do we want to create?

- Temporary exhibits
- Pop-up demonstrations
- Symposia, talks, expo
- Display student competitions
- Crowd-sourced data, Citizen Science
- People can explore the world’s research on our future smart cities
- Contribute and participate

14. View to the mountains



COLLABORATION

The City of Scottsdale Desert Discovery Center will be a hub for local organizations that will collectively provide a wealth of research, knowledge and practical assistance for the operations of the Center. Many of the partners will also play a critical role in the design process itself. Over August and September 2016 the Thinc Team met with the following organizations:

Partnerships

The McDowell Sonoran Preserve Commission

City Ordinance Chapter 21 established the McDowell Sonoran Preserve Commission. Commission members are appointed by the City Council. The role of the Commission for the development of the Center is critical to contribute to the design process and the Center's alignment with the Preserve's mission and vision.

Purpose

The McDowell Sonoran Preserve Commission, with the assistance of city staff, makes recommendations to the City Council on such items as: preservation strategy, funding, land acquisition, education/promotional programs, master planning and other Preserve-related issues. A full description of the Commission's Purpose, Powers and Duties can be found in Chapter 21 of the Scottsdale City Code.

Arizona State University

Since our initial discussions in Scottsdale, August 2016, a concept is emerging for the Desert Discovery Center that has implications for including a broad range of research on local and global themes.

The goal of this collaboration is a trans-disciplinary selection of research and applied research topics to inform the content of the Center and create a platform for ASU. The selection will become a signature storyline and concept for the Desert Discovery Center. It will bring a variety of disciplines into dialogue to form a one-of-a-kind guest experience and position the DDC as one of the world's most innovative and future focused centers for the study of deserts.

In discussions with ASU so far, we have identified the potential for creating a trans-disciplinary study that focuses on creative content making; a democratic and inclusive approach to bringing graduate students on board from the beginning; and a fluid leadership committee. The research will be interpreted for impactful exhibits and presentations that openly encourage guests to participate and contribute,



recognizing where the research is “tracking to the edge of what’s known” and inviting guests to participate in the work that pushes beyond that boundary.

Content will be delivered through visible research, updateable exhibits, live interpretation, symposia, lectures and seminars. The program can include a series of talks and demonstrations for guests that could be presented by students as well as faculty staff. The Center represents a unique public-facing channel for the projects in-progress and the outcomes. There are opportunities to work with ASU’s technical expertise in digital media and earth observation technology to develop updateable digital exhibits.

Discussions about the onsite presence for ASU staff and fieldwork facilities are ongoing and will be presented as part of our reporting in Spring 2017. For example, mobile display and presentation modules could be used indoors or out to demonstrate applied research and augment lectures for guests, staffed conversations or workshops, over an hour, a day, or a week. The Center will be positioned to attract experts from other research institutes—in particular, experts on arid environments—to participate in these programs. The “Open Door” programs at ASU—which allow staff to showcase their research and invite people to participate in experiments, craft models and discuss the work— have inspired us to consider how research can be experienced by guests.

Research concept

The emerging concept is an interpretation of the universal characteristics of the human relationship with deserts: “Living in the desert.” We have organized this into two areas of research according to ASU’s focus and potential for onsite research:

1. Life Sciences and Earth Observation projects

School of Life Sciences

- Soil crust research
- Intersection of open space preserves and people
- Sonoran Desert Species

Space Exploration

- Earth images: satellite imagery of Scottsdale and the Preserve, alluvial fan and waterways, Indian Bend Wash

Note, we can also learn from the center’s model for trans-disciplinary research and interpretation approaches: science can track to the edge of what’s know, challenge guests to look beyond.

2. Sustainability and the urban interface

Julie Ann Wrigley Global Institute of Sustainability

There are many potential collaborations with the Institute’s research themes:

- Water quality, use, and supply research program
- Biodiversity and preservation of natural environment
- Climate change and adaptation
- Urbanization
- Ecology Explorers — K-12 outreach and teacher training

School of Historical, Philosophical and Religious Studies

- Conservation and interpretation of environment
- The “wild-land/urban interface”
- Technologies of building that connect us to the present
- Modern cities and environment, learning from the past
- Complex adaptive systems
- Deserts and nomadism

Biomimicry Center

Operations and exhibit development:

Biogeochemistry, Past and Future Evolution of the Earth

- In house team with technologist who makes virtual field trips, some in-house programmers, and dedicated learning design team
- Graduate students do education research for the projects
- Partner on virtualization of biodiversity, digital interactive for trophic web

School of Community Resources and Development

- Design formative and ongoing user research

Design student project Industrial Design

General and ongoing partnership:

- ASU will showcase research and review content for updating exhibits and for conferences, lectures and symposia as a fulfillment of public education and outreach— NSF grant applications, ASU vision for world class status for research and innovation and impact on communities
- Students can work as guides/docents and provide live interpretation
- Provide a portal to the global community for global partnerships in research and innovation, public talks for visiting scholars, visibility for news and events



McDowell Sonoran Conservancy

The McDowell Sonoran Conservancy, a not for profit, embodies the original vision for preservation that led to the creation of the Preserve, and is dedicated to maintaining its protection and care. The Conservancy has over 500 volunteers: trained guides and educators that create opportunities for visitors to expand their experience with a guided hike in the Preserve.

The Conservancy has a wealth of knowledge of the Preserve and its onsite programs encourage people to make a real connection with the place and what they experience there, including for families and after-school groups and through a Citizen Science program that enables people to become accredited. The range of programs plays a vital role in educating the community on the Preserve and its ecological systems onsite.

In 2016 the McDowell Sonoran Conservancy adopted this Resolution: The McDowell Sonoran Conservancy believes that the City of Scottsdale, its businesses, its residents and its visitors could benefit from a desert discovery center located in, or near, its McDowell Sonoran Preserve. If the City Council approves construction and operation of a desert discovery center in the Preserve, we believe that such a facility should be built and operated in strict accordance with the current versions of existing documents, rules, regulations, policies, and ordinances having an impact on the Preserve.

The McDowell Sonoran Conservancy prefers that if a desert discovery center is built, it should be outside of the Preserve. It recognizes that a center consistent with the purpose of the Preserve may be in line with the mission of the Conservancy.

The McDowell Sonoran Conservancy believes a desert discovery center should:

- Respect the integrity of the Preserve and have a limited environmental impact;
- Provide an important amenity for the hospitality and tourism industry; and
- Reflect the community’s financial resources not only to fund the construction of such a center but also to finance the ongoing operational costs of such a center.

The McDowell Sonoran Conservancy looks forward to engaging with all interested parties, the City of Scottsdale, Desert Discovery Center Scottsdale, Inc., educational institutions, the tourism community, and community support groups to consider a center that encourages life-long learning and an appreciation of the Preserve’s value for this and future generations. Most importantly, the Conservancy remains fully committed to its core mission, its responsibilities under its agreement with the City of Scottsdale, and its education and research activities in the Preserve.



McDowell Sonoran Conservancy Field Institute

Per our meeting with the Conservancy Field Institute in September, we see many opportunities for the Center to support the Institute’s programs of outreach and research and provide an ideal context and space for educating and inspiring people in their relationship with the Preserve and the desert.

We discussed ideas for presenting the Field Institute’s research results and demonstrating applied research, the type of content we will design into exhibits that can be updated with current findings. Similarly, programs that can combine live interpretation in the Center and a guided Conservancy hike are an exciting prospect for visitors and—we hope—for the Stewards and Tour Guides. We believe there are many more opportunities for exhibits and programs that will enable the Conservancy and the Center to collaborate with positive outcomes for all.

Tourism Development Commission/Experience Scottsdale

- Experience Scottsdale has named the Desert Discovery Center as one of its top three priorities for the past two years
- The Center can be a landmark tourism destination that is the “must-do” Sonoran Desert experience and demonstrates sustainability and sensitivity to its environment
- The Center can assist people with practical information about a safe and enjoyable hike
- It provides amenities for a comfortable desert experience and a variety of things to do for different ages and interest groups

Salt River Pima-Maricopa Indian Community

Following two meetings with members of the Salt River Pima-Maricopa Indian Community, we see potential for not only collaboration on concepts, narrative and stories for the human history, ecosystem and species, but to also work with the Community on an accurate retelling of their ancestry and the unbroken lineage from the Huhugam to the O’Odham. We have also discussed ideas for an ongoing presence in the Center, as a foundation for how we can interpret what it means to be “living in the desert” and how we live in the present and look to the future, while acknowledging how we learn from our past. This could even extend to a café offering local Native American dishes made with desert plants.

We see the potential for members of the Community to host events, lectures and tours through the Center and into the Preserve, as part of an ongoing partnership. Members of the Community generously shared the concept of their relationship with the environment, as it is manifest in the songs and stories that represent the mountains and features of the landscape. This concept is a potent and beautiful idea that we believe will open many people’s minds and hearts to the desert and a deeper understanding of our (human) place within the ecological system. We will also love to work with the Community on how to express this concept as part of our design. With all aspects of this work it is essential to us to keep working together to

ensure that whatever we design delivers on the Salt River Pima-Maricopa people’s aspirations for expressing their story—past, present and future—as the indigenous people of this place.

Scottsdale Community College, Paradise Valley Community College and other learning institutions

- Research and resources on species and ecosystem
- Students can work as guides/docents and provide live interpretation: SCC students teach 4th graders as part of their training; opportunity to partner with Indigenous Scholars Institute to train docents and guides?
- SCC butterfly and bird counts with ASU can start at the Center and results exhibited
- Work with the PVCC student Sustainability Club
- Assist in designing tortoise enclosure, if desired

Scottsdale Unified School District

In partnership with ASU and Global Institute of Sustainability:

- Curriculum development for both public and charter schools K-12 in partnership with ASU
- We will also design a way to measure local impact through schools





Ongoing Dialogue

Nonprofit Wildlife Community
Displays with live animals and programs

- Liberty Wildlife
- Phoenix Herpetological Society
- Southwest Wildlife Conservation Center
- Arizona Game & Fish Department
- Center for Native and Urban Wildlife

Museums Community

Western Spirit: Scottsdale’s Museum of the West

- Desert Botanical Garden**
- Learning opportunities for developing the DDC vision and operations; integrating research; docent programs and accreditation

- Heard Museum**
- Share information about Native American docent program
 - Information about Native American lifeways

Native American Community

- Gila River Indian Community
- Salt River Pima-Maricopa Indian Community
- Native American Connections

Nonprofit Conservation Community

- Arizona Forward
- The Nature Conservancy
- Global Institute of Sustainability
- Sonoran Institute
- Audubon Arizona

Scottsdale Community

- Scottsdale Citizens
- Homeowner Associations

**Scottsdale Area Chamber of Commerce
Economic Development Advisory Council**

Scottsdale Cultural Council

Taliesin West

Scottsdale Environmental Quality Advisory Board



Appendix:
Concept Presentation
27 September 2016



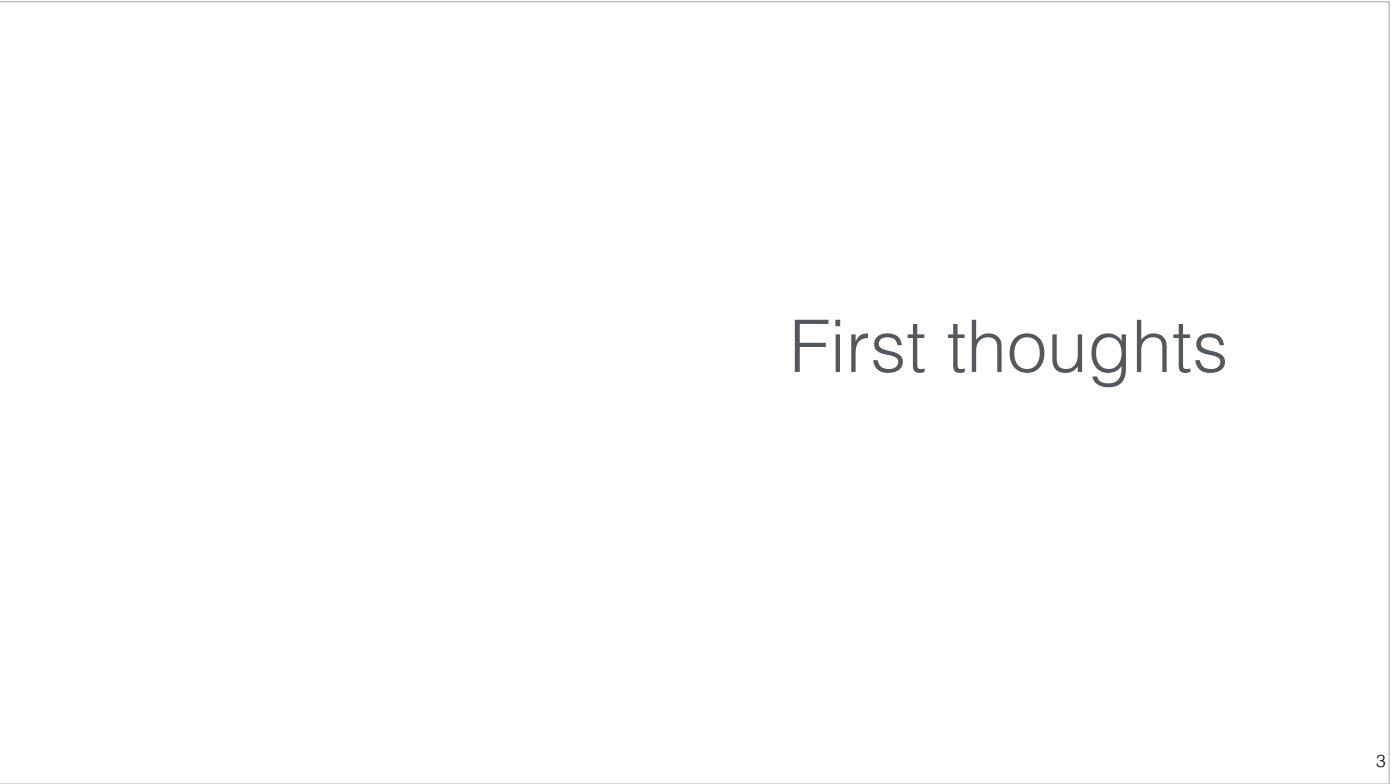
Desert Discovery Center Scottsdale, Arizona

Thinc™
September 2016



Concept Presentation

Thinc™
September 2016



First thoughts



- Build anticipation for **exploration**
- Educate**
- Support **tourism**
- Inspire future generations** to preserve and protect
- Show people the **the hidden desert**
- Be **inclusive**
- Be a model of **sustainable** design and practice
- Be a hub for **globally relevant** research

Aspirations

Thriving with plant and animal life
Cycles and climatic events
The diversity of 30,000 acres
Geology
Water
Human habitation and use
Preservation

Content

5

City of Scottsdale
The McDowell Sonoran Preserve Commission
Arizona State University
McDowell Sonoran Conservancy & Field Institute
Tourism Development Commission/Experience Scottsdale
Salt River Pima-Maricopa Indian Community
Scottsdale Community College, Paradise Valley
Community College, & other learning institutions
Scottsdale Unified School District

Collaboration

7

Geology, soil, water
Biology and biodiversity
Ecology, Adaptation, Environmental Life Science
Sustainability
Urbanization
Biomimicry
Human history

Research

6

Emerging Concept



8

Immersive, educative, emotive, fun experiences
Local
Locally specific knowledge
Design that is responsive to the landscape



A Center with global visibility
Universal characteristics of desert life
Global
In depth, discursive experiences; temporary exhibits

16

Peel back the layers of the desert
and its history



Reveal its thriving ecosystem
and how people live in arid places

22

Small footprint



Big vision

18



"Under the climate change scenario, nearly
half of the world's population in **2030** will be
living in areas of high water stress. In some arid and semi-arid
areas, it will displace up to between 24 million and 700 million
people."
- United Nations Decade for Deserts and the Fight against
Desertification

From **Preservation** to **Sustainability**

24

From **Preservation** to **Sustainability**



The Desert Discovery Center is a **critical**
next step for the
McDowell Sonoran Preserve.

26

From **Preservation** to **Sustainability**



25

From **Preservation** to **Sustainability**



Why?

27

From **Preservation** to **Sustainability**



Know?

28

From **Preservation** to **Sustainability**



Experience creates knowledge and empathy. Love. **Protection.**

30

From **Preservation** to **Sustainability**



Experience

29

From **Preservation** to **Sustainability**



Experience **what we preserve.**

31

From **Preservation** to **Sustainability**



Experience **why we preserve.**

32

From **Preservation** to **Sustainability**



Experience **why we live in the desert.**

34

From **Preservation** to **Sustainability**



Experience **how we preserve.**

33

From **Preservation** to **Sustainability**



Experience **how we live in the desert.**

35

From **Preservation** to **Sustainability**



Experience **why we live in the desert.**

36



Living
in the desert

38

Living in the desert

37



Living
in the desert

39



Living
in the desert

40



Living in the desert

42



Living
in the desert

41



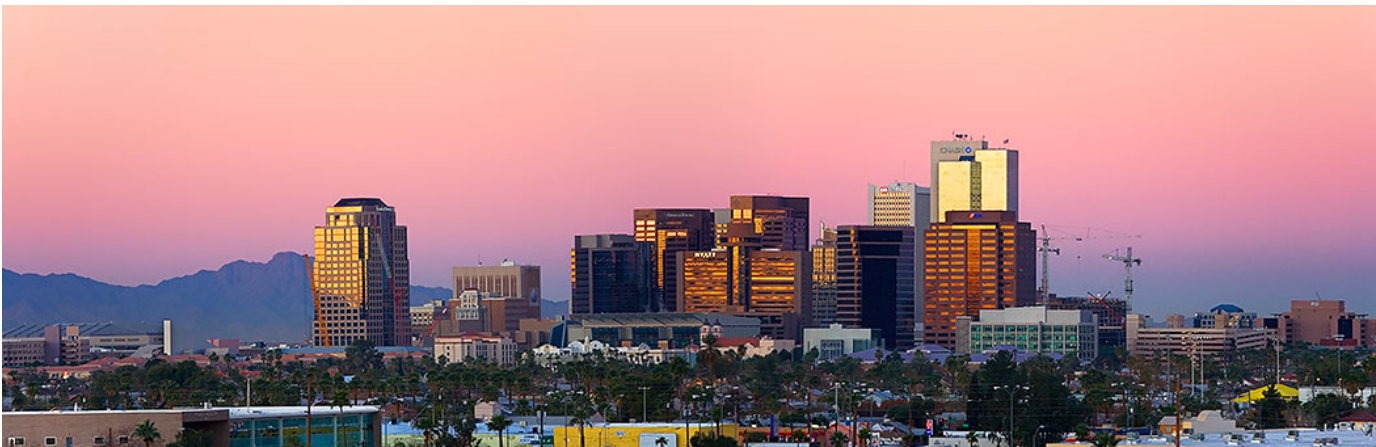
Living in the desert

43



Living
in the desert

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Living in the desert

46



Living
in the desert

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Living
in the desert

47



Living
in the desert

48



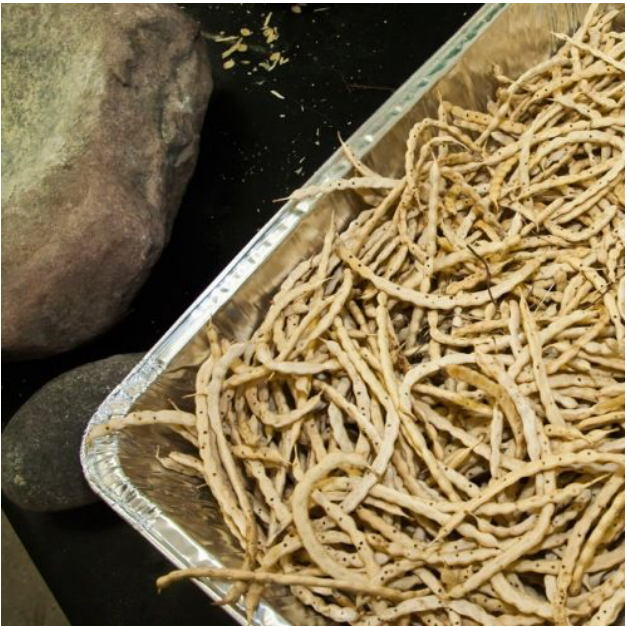
Living
in the desert

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Living
in the desert

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Living
in the desert

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Living
in the desert

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Living
in the desert

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Living
in the desert

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Living
in the desert

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Living in the desert

56

Reasons for Repeat Visits
Longer Stays

1
What is this
place?

2
What don't
we **see?**



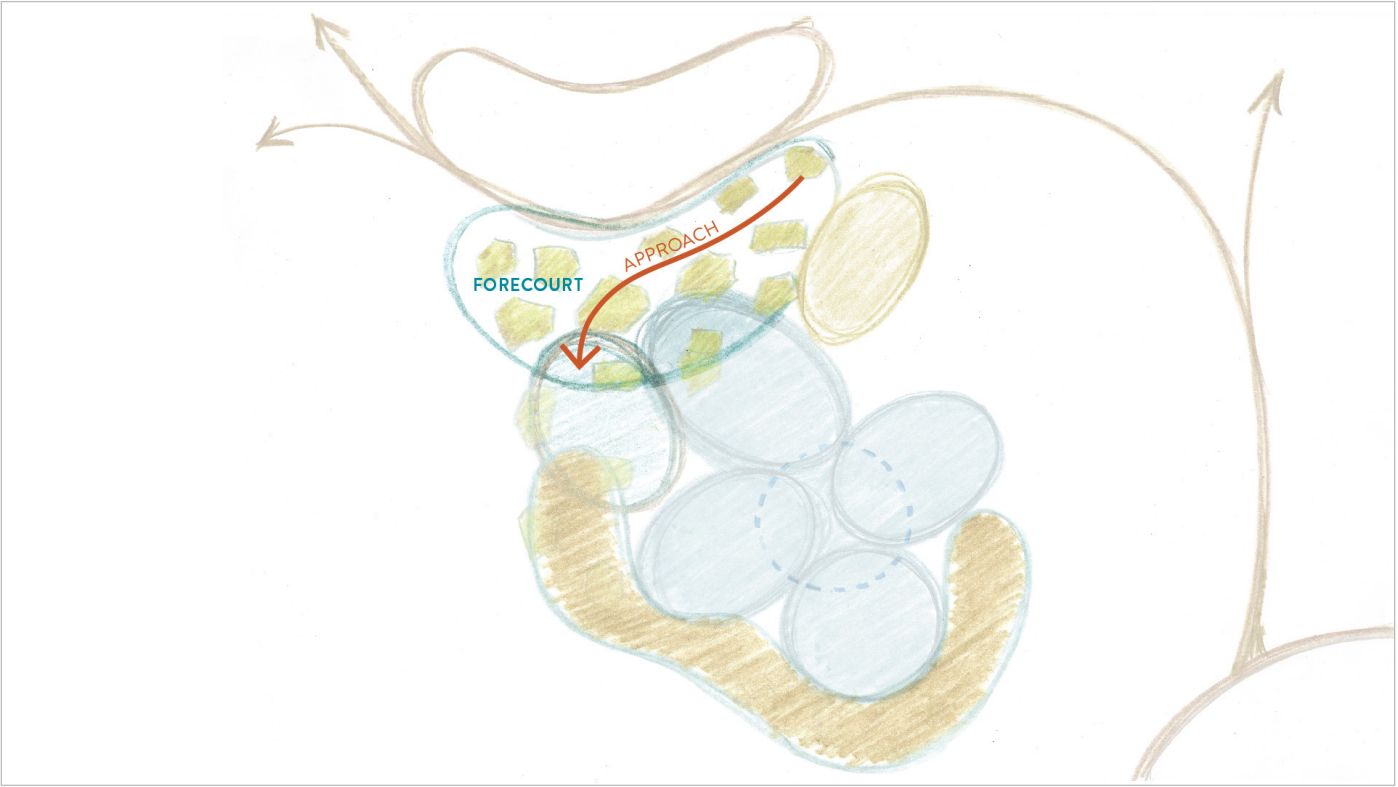
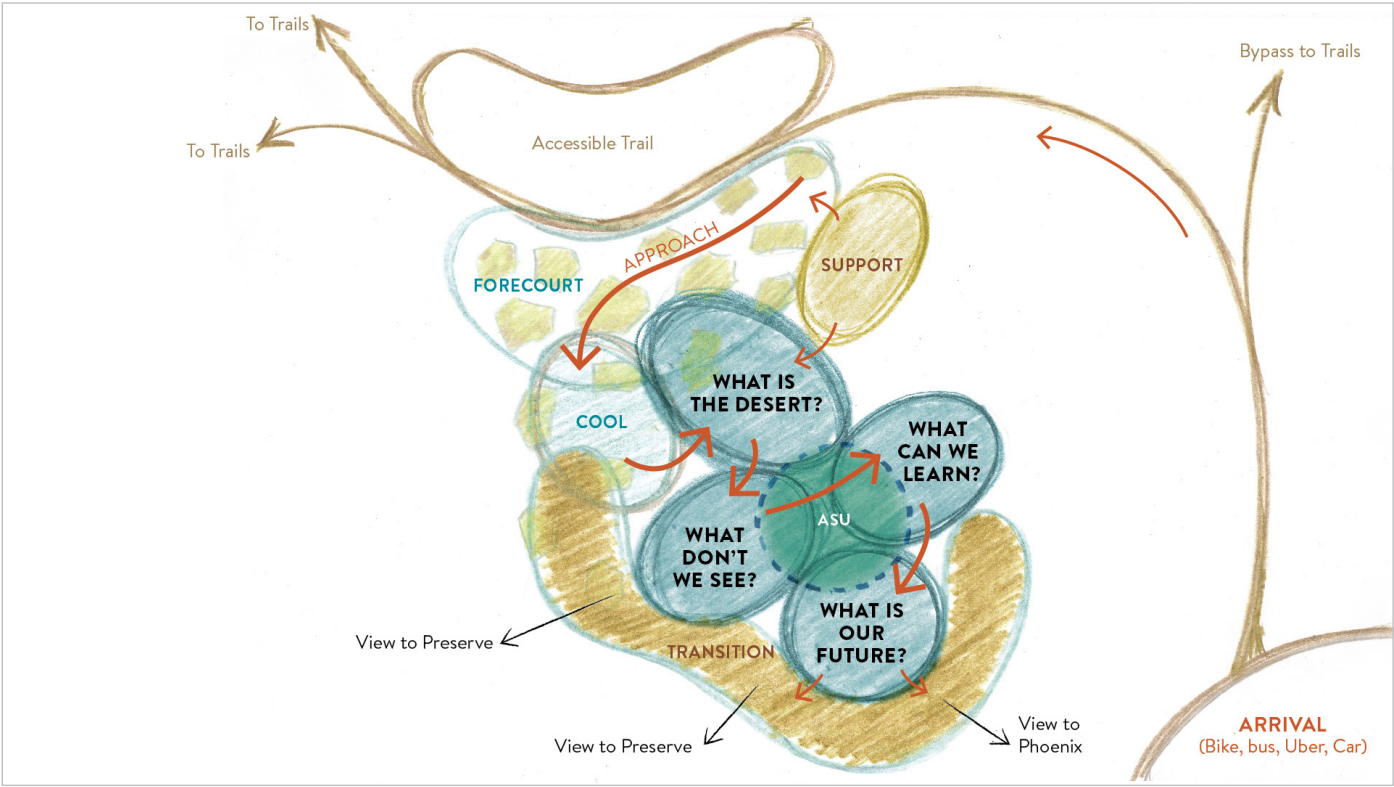
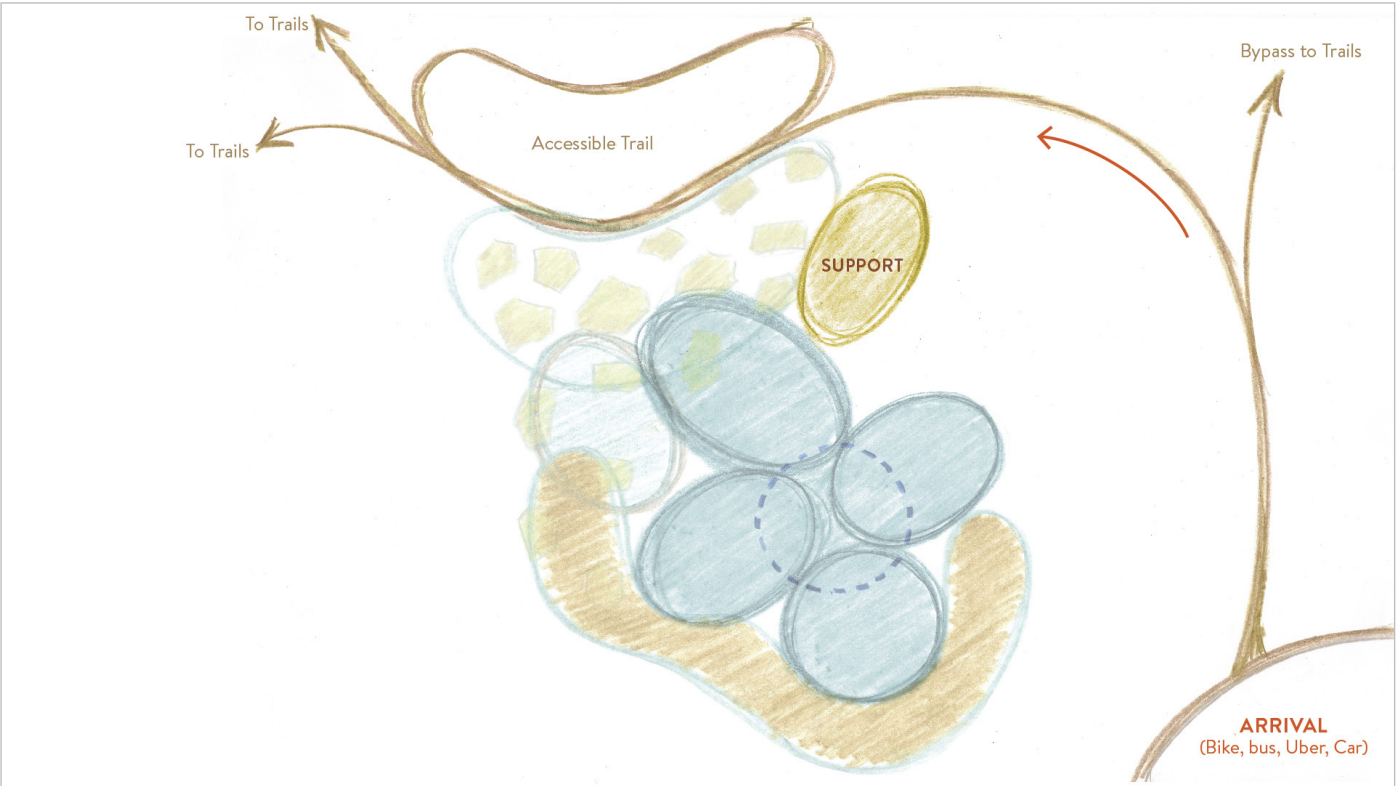
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What can we learn
from **living** in
the desert?

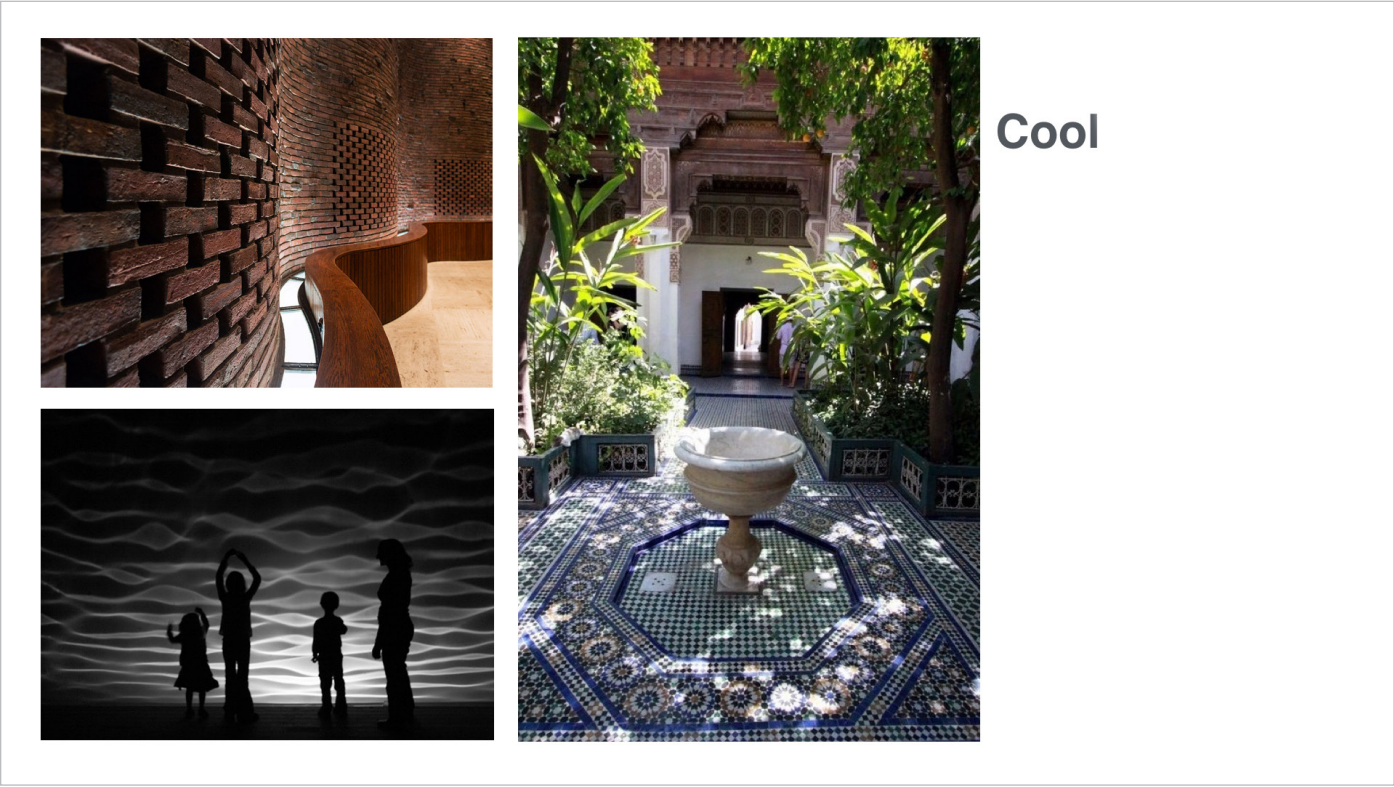
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What is the future
we **create?**

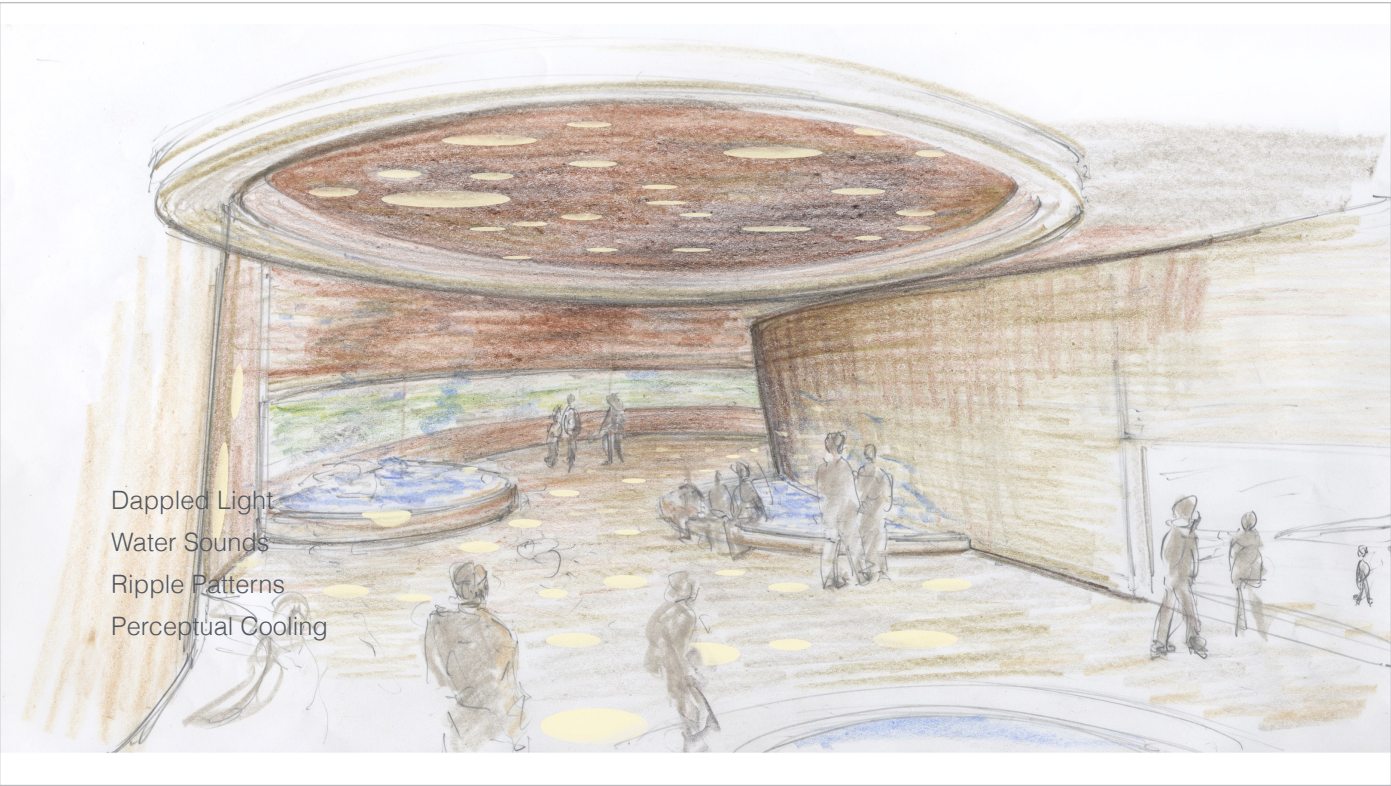
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Improving Access

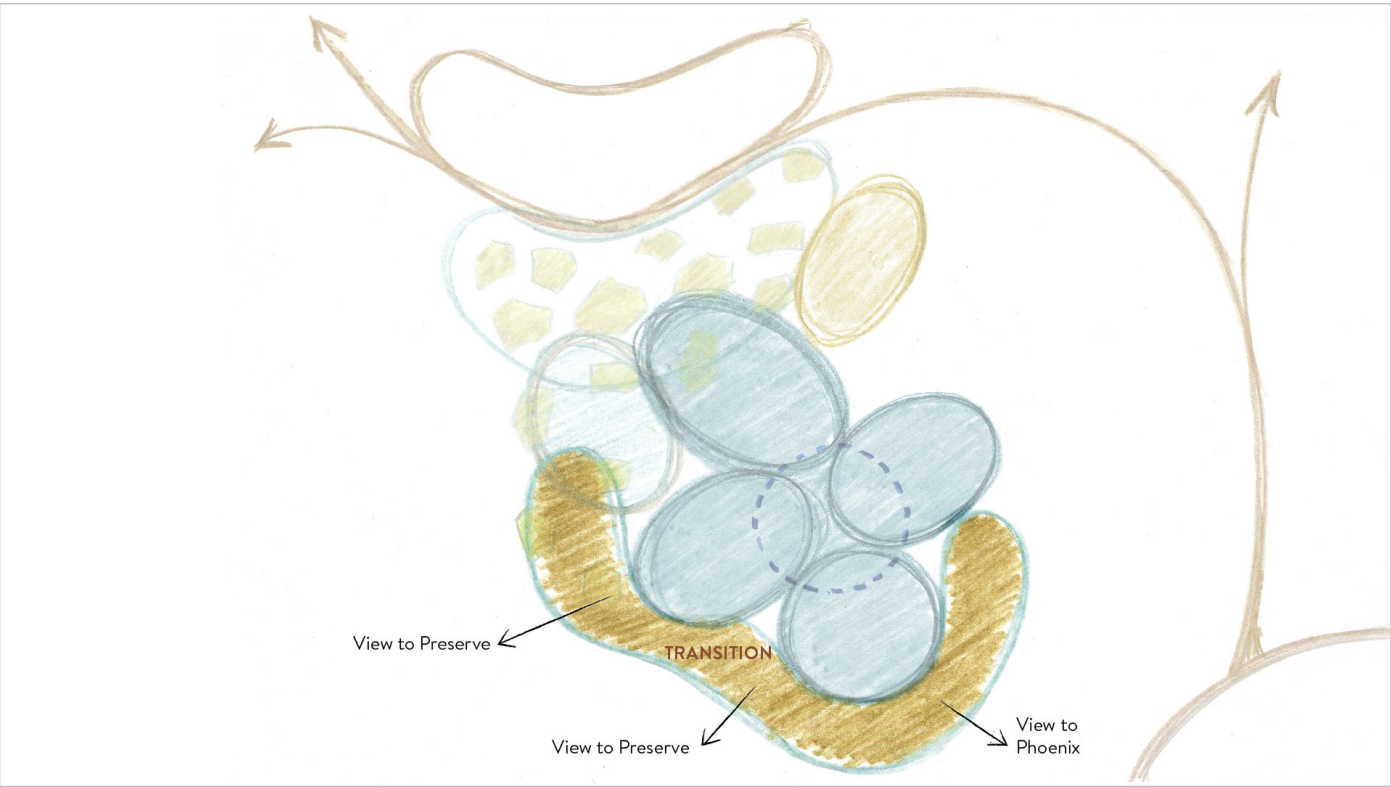
Flexibility

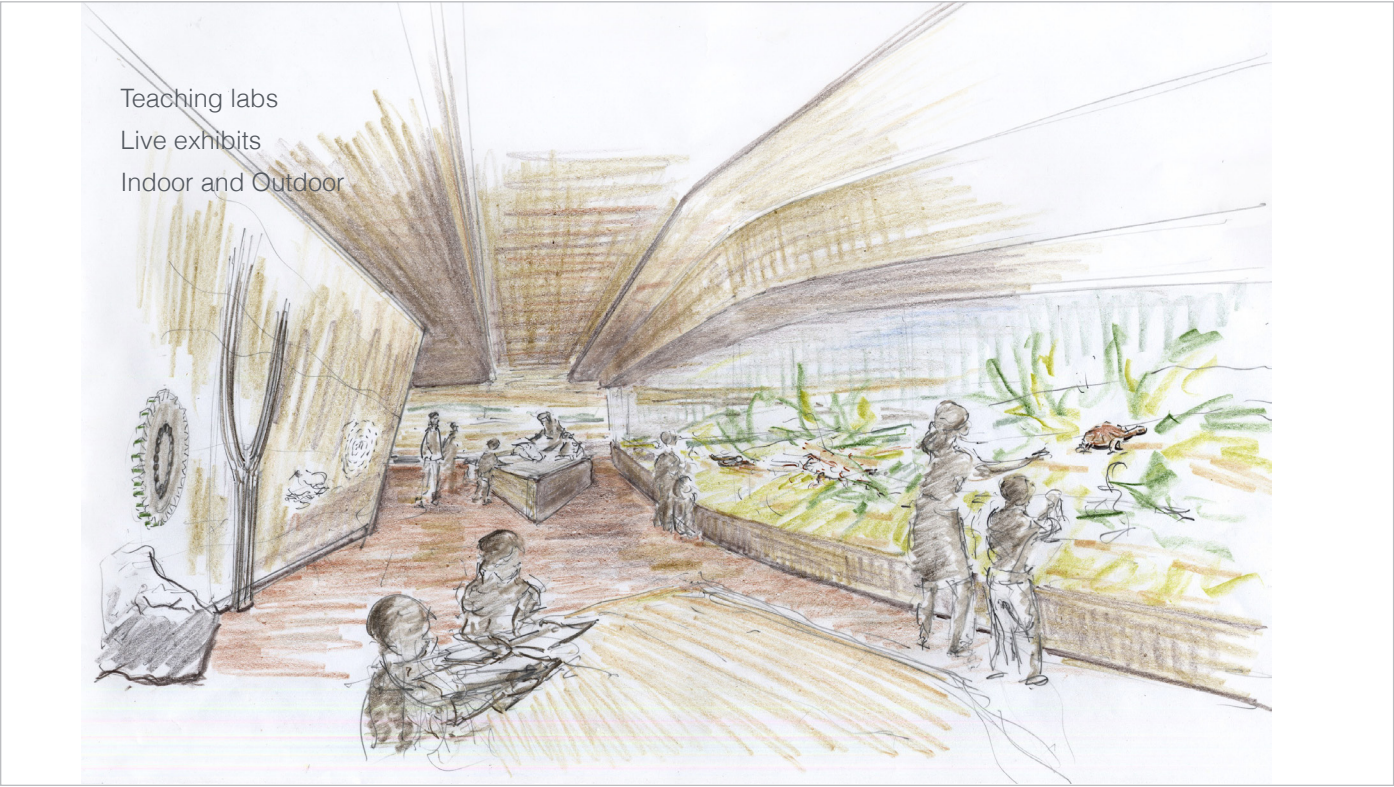


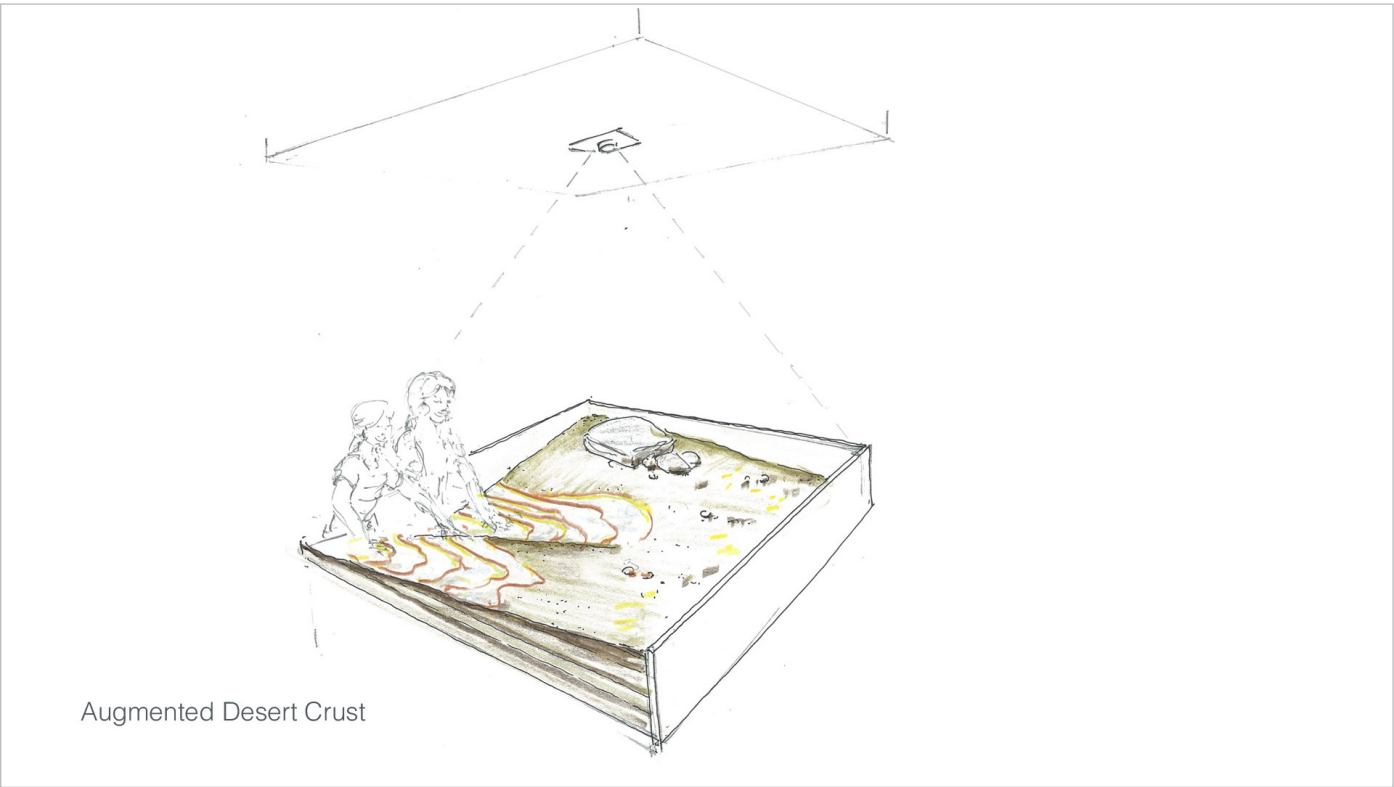
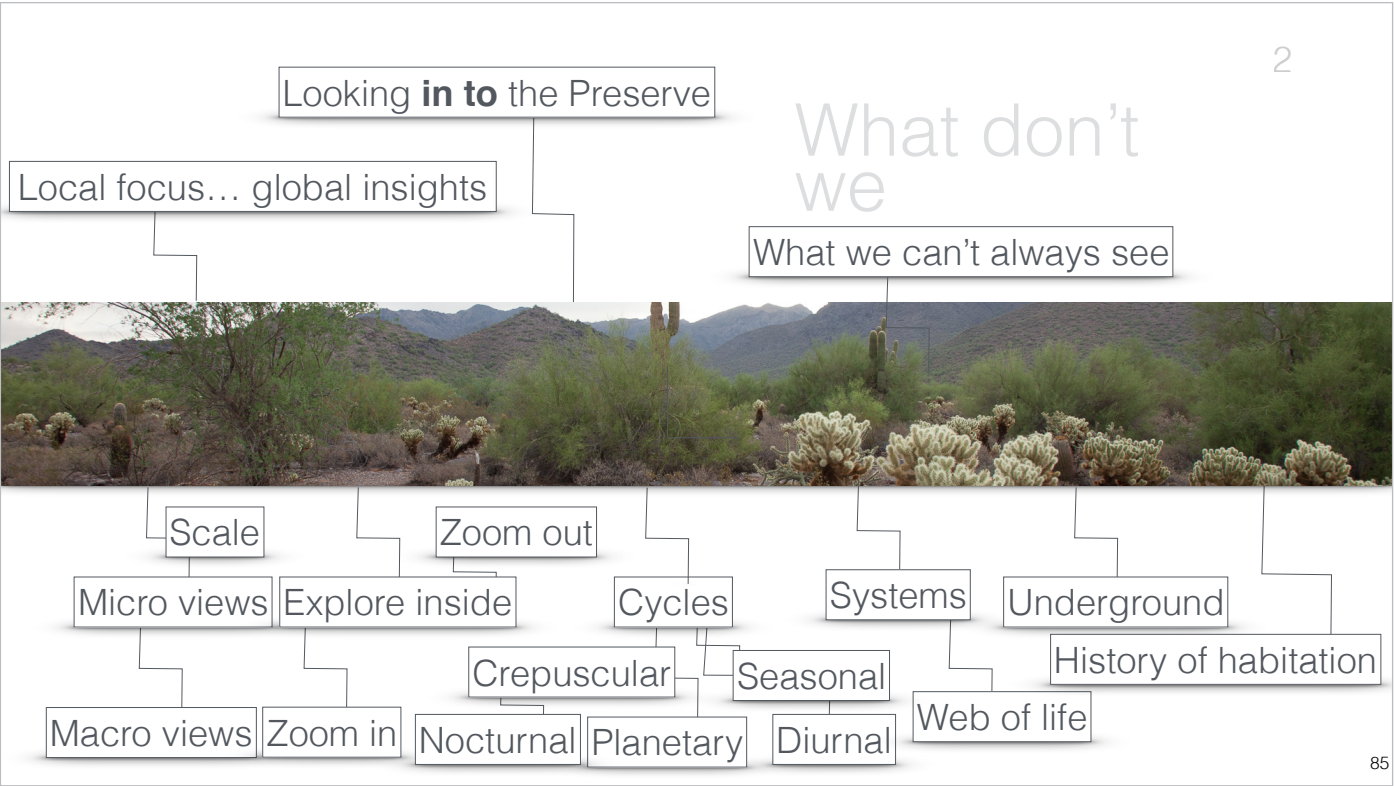


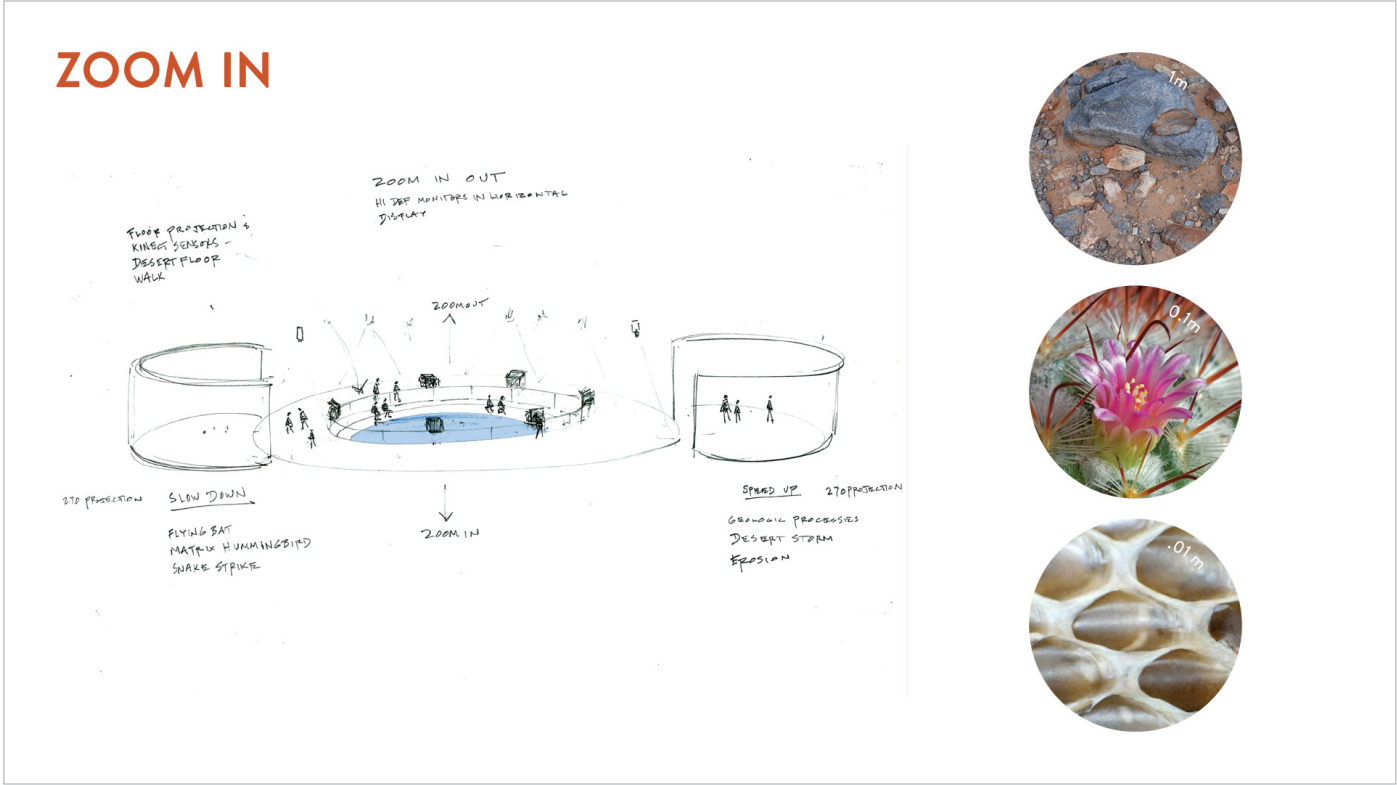
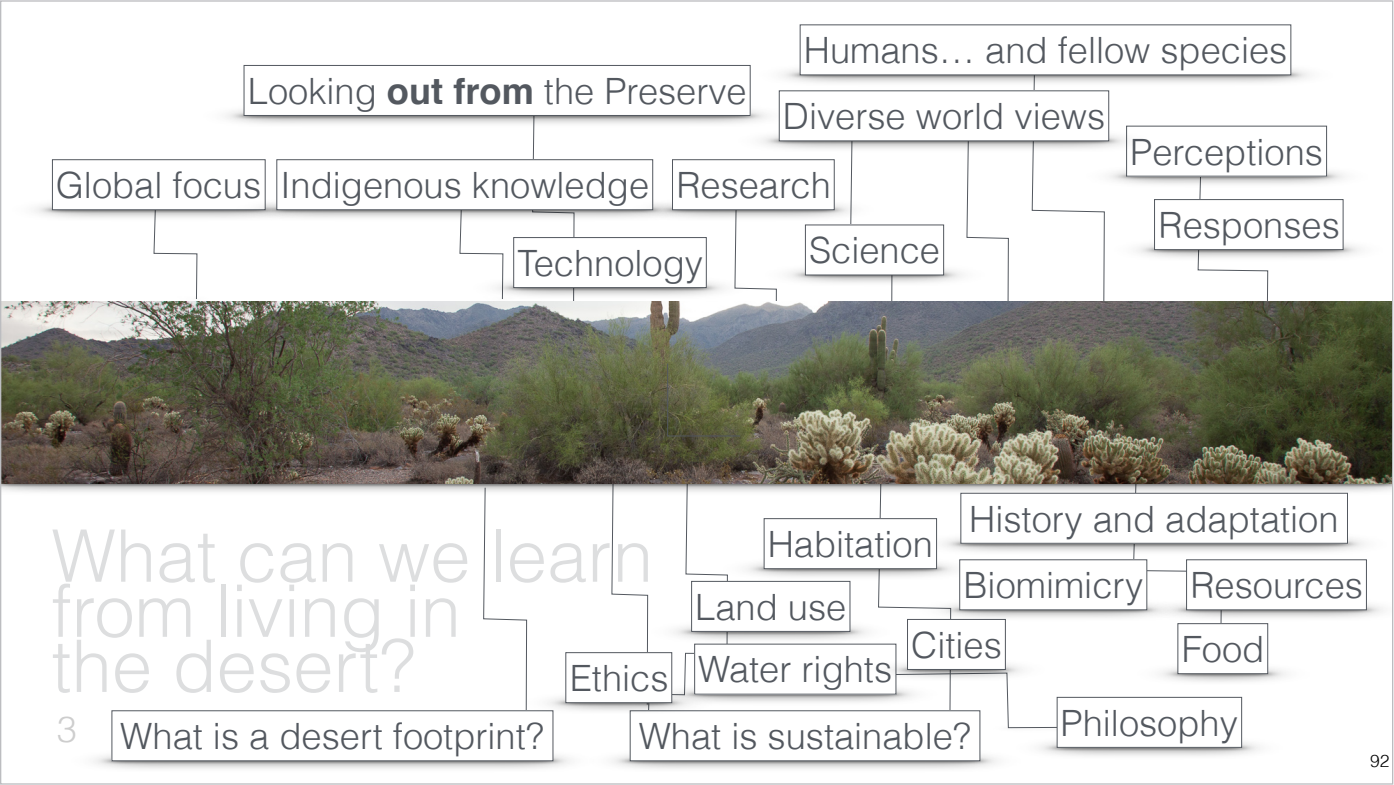
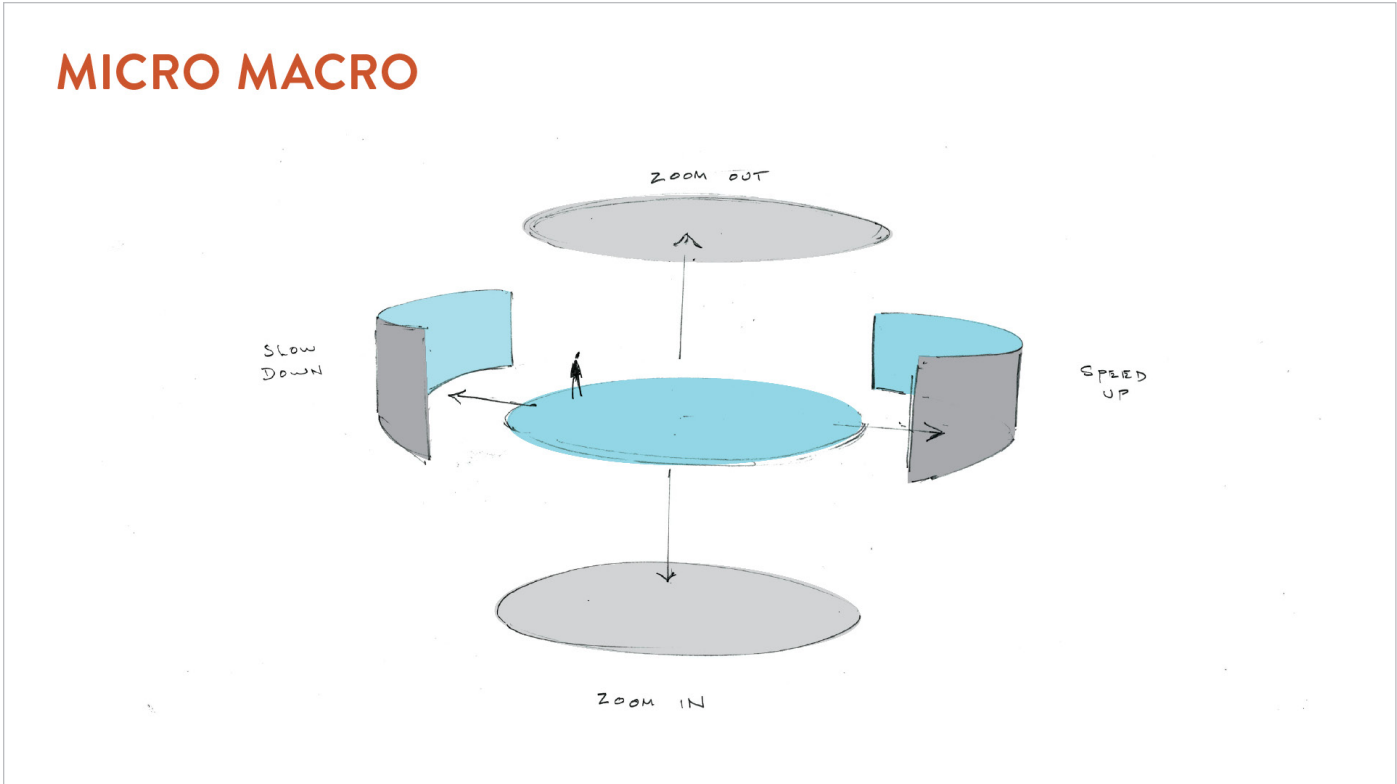
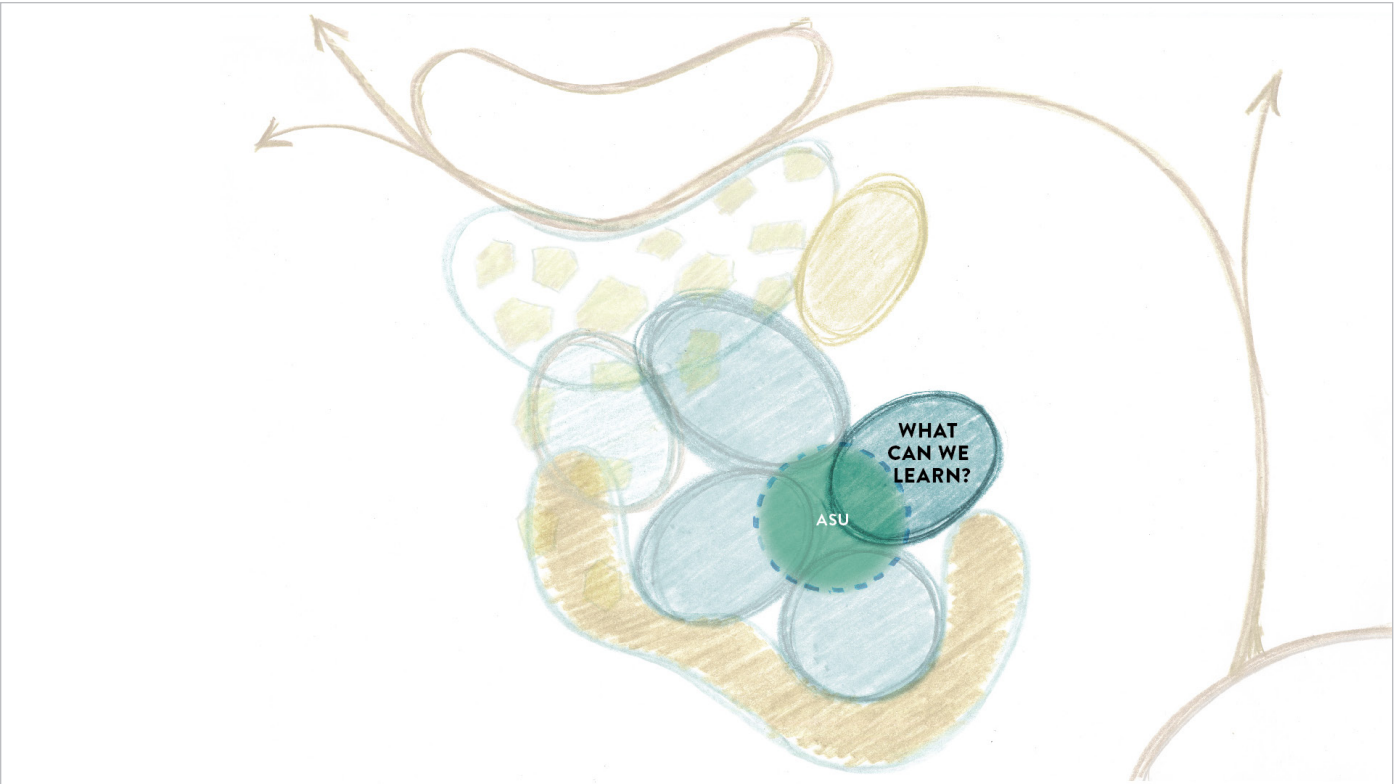


**Sheltered
Outdoors**

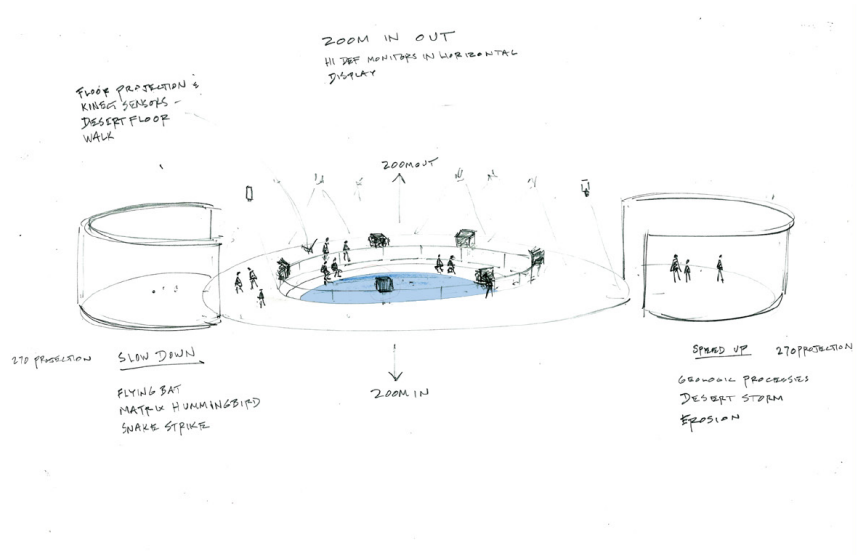




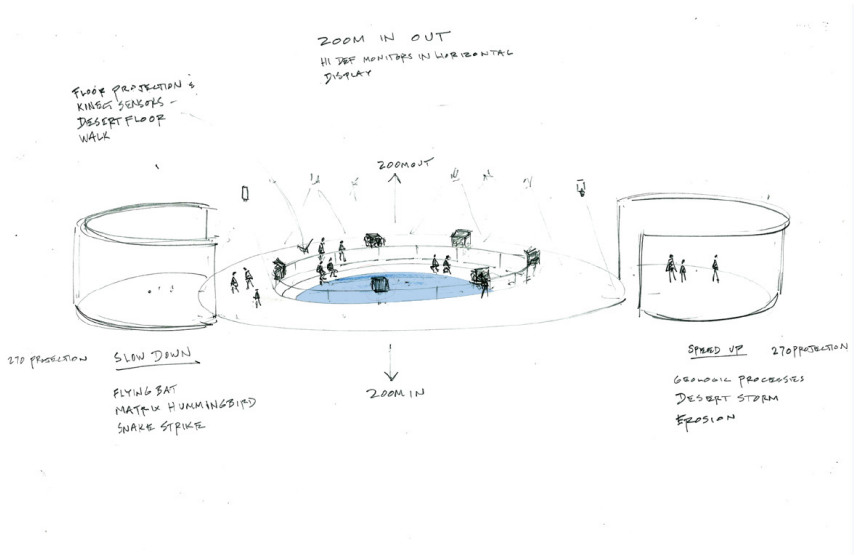




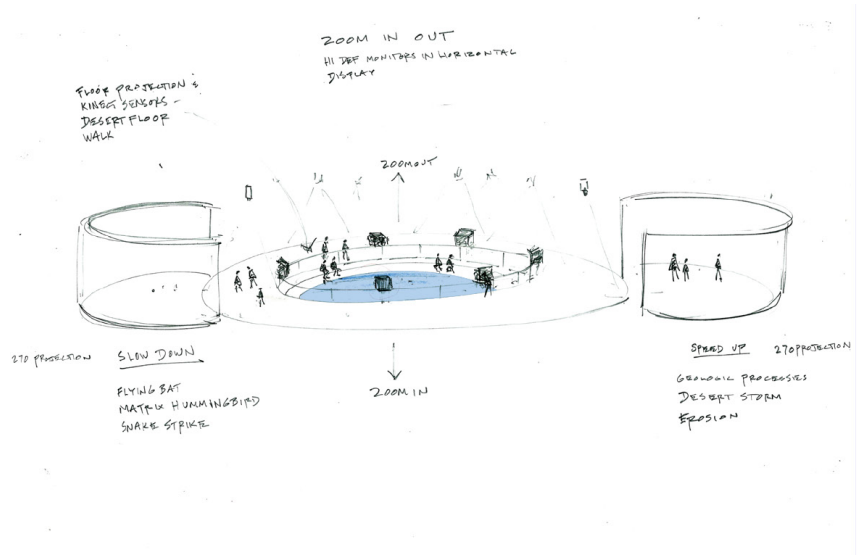
ZOOM OUT



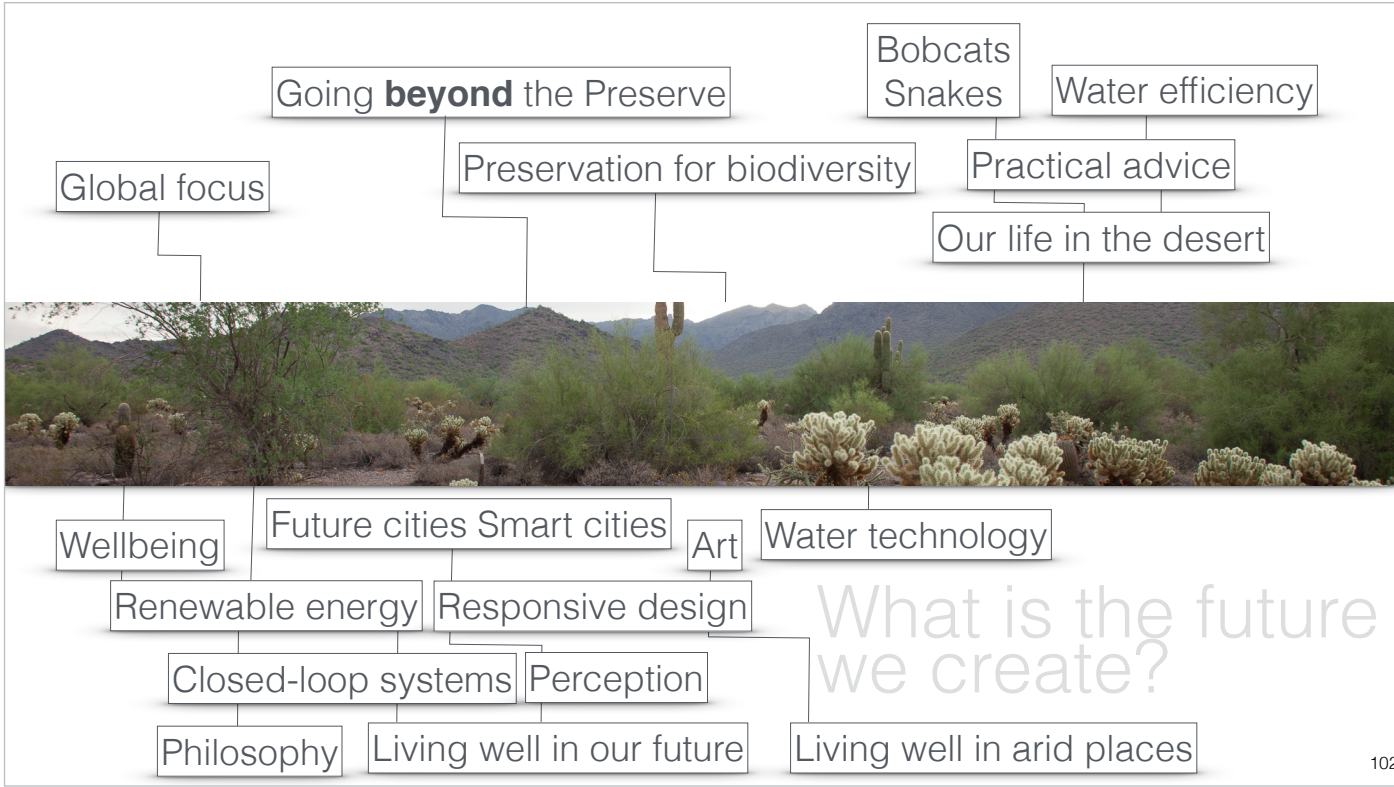
SLOW DOWN



SPEED UP



Flexibility





Teaching
spaces

Sensory
experiences



Research
collaboration

Dynamic
content

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How

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Teaching
spaces



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Sensory
experiences

How do we **feel**
in the desert?

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September 2016

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the universal characteristics of the human relationship with deserts | histories of habitation in deserts | current adaptations in the face of increasing aridification | how people respond to the desert with: built environments—looking to the future | desert cities/smart cities | art and cultural practice—how does the desert inspire? | conservation, protection, preservation | philosophical and policy-approaches to land and water use and rights | geology, biology and environmental science woven in with human interaction | the unique seasonal cycles In the Sonoran Desert, with two rainy seasons and staggered periods of fertilization and growth | biophilia | how are desert species responding to climate change and specifically in the Sonoran Desert? | how people respond to the effects of temperature change, the presence of water and the effects of light and shade, why our physiological state is affected | how do space, color and light affect people, health and wellbeing within the desert? | how does human adaptation make use of this knowledge to create built environments that are both sensitive to the environment and sensitive to human comfort? | the natural cycles of the planet and the cosmos: diurnal, crepuscular, lunar and seasonal. How they are captured in the art and customs of Native American groups, including built forms and diagrams that mark the solstice and equinoxes as they impact the Earth.

Research
collaboration

Our wish list for ASU...
and the world

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