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Arizona Daily Star

COVER STORY

A giant lab under glass

By Kristen Cook
ARIZONA DAILY STAR

After miles upon miles of scrubby brown desert, there it is, Biosphere 2.

Orderly arrangements of milk-white and clear geometric shapes stack into domes and pyramids that tower above the trees and brush. It looks every bit like a set from a hokey '60s sci-fi TV series, which is fitting since the facility was conceived as a prototype for bases on the moon and Mars.

Nearly two decades ago, the super-sized terrarium captured the world's attention when eight people — dubbed Biospherians — were sealed inside for two years. Some researchers dismissed the spectacle as nothing more than pseudo science.

These days, the 3.14-acre glass-and-steel facility is all about science.

It was inactive for years until the University of Arizona took over the Biosphere's management in 2007. Now it's "a place to address the grand challenges facing society," says Biosphere 2 assistant director John Adams, who then ticks off the biggies: population dynamics, water use, pollution.

For us non-scientist types, though, Biosphere 2 (Earth is the original biosphere) is a cool way to blow a few hours.

Let's take a look at the place Time Life Books recently named one of the 50 must-see "Wonders of the World!"

It takes about an hour, from the center of Tucson, to drive out to Biosphere 2 in Oracle. A winding road guides you to the visitors' center. Then, tourists can stroll through a brightly colored stucco village, where visiting researchers and conference attendees stay.

On this warm morning, photographer Judy Natal has her casita door thrown wide open. An artist in residence who has been at the complex since November, Natal can watch bobcats and quail in the backyard. Out the front window, she can gaze at Biosphere 2.

"It's a really fabulous place to be," said Natal, a professor of photography at Columbia College Chicago. "When I get up, I look outside and see the structures. I think it's one of the most beautiful structures I have ever seen!"

That first year the UA took over Biosphere 2, about 38,000 people traipsed through its ecosystems. This year, more than 100,000 people — plus the occasional ringtail (they like to sneak in) — are expected to visit.

It's a kick to step through the actual airlock where the Biospherians entered before they were sealed inside. On the other side of that submarine-type portal, you understand what a lizard in a terrarium feels like. The bright sun pierces an endless stretch of glass. Sunglasses would be nice.

Guided tours, which take a little over an hour, show visitors what the introductory movie describes as

JILL TORRANCE / ARIZONA DAILY STAR

The tropical rain forest habitat consists of 20,000 square feet of man-made jungle inside what amounts to a big terrarium. Visitors can get a view of the beach section from a walkway.

90 years of history at the Biosphere 2 site

1920s
Dr. Lackner homesteaded the property, builds a hunting lodge and runs a sprawling cattle ranch.

1957
Lady Margaret, Duchess of Suffolk, England, purchases the property and builds Casa del Oro, her private estate.

1960s
Motorola Corp. purchases the site and develops an executive-training center and conference facility.

1979
The University of Arizona Foundation, by virtue of land exchange with Motorola, gains control of the property and utilizes it as a university-related retreat and conference facility.

1984
Attracted by the topography, climate and site amenities, Space Biosphere Ventures purchases the property.

1987
Ground is broken for Biosphere 2.

September 26, 1991
A crew of eight enters Biosphere 2 and lives in the enclosed artificial environment for two years.

1994
Last group of seven lives inside the Biosphere for 6 1/2 months when the administrative decision is made to change the direction of the mission.

January 1996
Columbia University of New York City begins management.

December 2003
Columbia University relinquishes management.

July 2007
University of Arizona takes management of Biosphere 2 and establishes B2 Earthscience and the B2 Institute.

SOURCE: WWW.B2SCIENCE.ORG

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UA SCIENCE Biosphere 2

www.B2science.com

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Did you know?

Probably the most-asked question about Bio 2, according to John Adams, Biosphere 2's assistant director, is if the 1996 Pauly Shore movie "Bio·Dome" was filmed there. The answer: Nope.

Pant away.

If you find yourself winded climbing up and down stairs, don't think you're woefully out of shape. The Biosphere 2 facility is perched at an elevation of nearly 4,000 feet.

Fast facts.

Biosphere 2

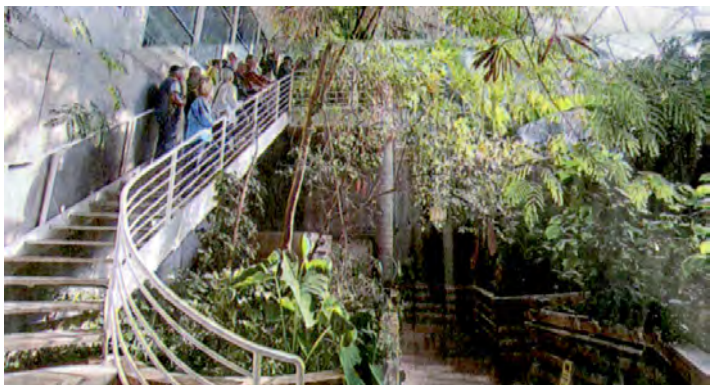
- 3.14-acre facility.
- 7,200,000 cubic feet of sealed glass; 6,500 windows.
- 91 feet at the highest point.
- Sealed from the earth below by a 500-ton welded stainless steel liner.
- 40-acre campus.
- 300,000 square feet of administrative offices, classrooms, labs, conference center, housing.
- The main structure — which is the size of three football fields — is named Biosphere 2 because the Earth is the original biosphere.

SOURCE: BIOSPHERE 2

Housing and more.

What's the deal with the colorful casitas outside the visitor center? Built when Columbia University managed Bio 2, the casitas were used for student housing. Now they're used for conference attendees as well as artists-in-residence. Some casitas harvest rainwater. and the goal is to outfit the houses with sustainable technology so that visitors can see close-up what options are available for their own homes.

Casitas are used for hosting conferences and as housing for visiting scientists and artists in residence.



The orchard was the food production area during the enclosed-mission era of the early 1990s, but these days nothing is harvested. Instead it drops to the ground and becomes part of the ecosystem.

"The Lung" regulated air pressure and flow into the facility in the years when eight people — the Biospherians — went inside to use it as a model for moon and Mars bases.

"the world's largest experiment in environmental science!"

What makes Biosphere 2 so revolutionary, explained Matt Adamson, the facility's education and outreach coordinator, is the chance to do large, field-scale experimentation in a controlled environment.

Case in point: the Landscape Evolution Observatory, or LEO. This is one of the first things visitors see after coming through the airlock. Although right now, LEO doesn't look like much — just a huge, glass-domed area with dirt piles and random pieces of equipment scattered around. Construction won't begin for another month or so on the three, 2-million-pound artificial landscapes.

Once completed, the artificial hills will allow scientists to study how rainwater moves through landscapes and how biological activity changes landscapes over time. The goal is to predict how the water cycle responds to climate change, which is a crucial question around these parts.

"The desert Southwest is predicted to be one of the hardest hit by climate change," Adamson said.

While LEO looks toward Biosphere 2's future, a peek into the past — and the various ecosystems created by man years ago — lies behind an unassuming door. Swing it open and there's the orchard. Giant green trees and wide-leafed plants stretch to the glass ceiling. Crickets chirp. Coffee beans and fat, green papayas hang from branches. No one harvests them. The fruit just drops to the ground, becoming part of the ecosystem.

A short climb up stairs leads to an even more impressive sight in the desert: the ocean.

A trail system, built for the tours, leads visitors past a 40-foot cliff that overlooks the salt water, originally brought over in milk trucks from San Diego, tour guide Steve Wigard explained.

The tour meanders through a savanna, a coastal fog desert, and even snakes through Biosphere 2's "technosphere," where a mass of labeled pipes and tanks make up the electrical, plumbing and mechanical systems that control the different environments.

But the most impressive of the biomes under glass is the rain forest. At more than 20,000 square feet and modeled after the Venezuelan rain forest, it's the largest of the ecosystems. It's lush and green with more than 150 species of plants, and vines cascade through the thick, foggy haze. High above, a tiny waterfall trickles.

A jungle of greenery, the rain forest is filled with bamboo and banana trees and Jurassic-looking ferns. Some loom taller than 60 feet. Standing here, it's hard to believe that the Sonoran Desert sits just on the other side of the glass.

Contact Kristen Cook at kcook@azstarnet.com or 573-4194.

If you go...

- **Hours:** 9 a.m. - 4 p.m. daily. Tours happen regularly.
- **Where:** 32540 S. Biosphere Road in Oracle.
- **Cost:** $20 for adults, $13 for children ages 6-12.
- **Best time to visit:** Weekdays aren't as busy as the weekends. Peak visitation time tends to be from January through Easter.
- **For more info:** 838-6200 www.B2science.org
- **Etc.:** Comfortable walking shoes are recommended. No pets allowed. No food or drink, except for bottled water, is allowed on the premises. A cafe sells sandwiches, coffee and light bites. Vending machines are also available.