Introduction:
Background on Las Cienegas National Conservation Area and the Acquisition Planning District

In December 2000, President Clinton signed into law the Las Cienegas National Conservation Area (NCA) Establishment Act (HR 2941). The Act created a 47,000-acre NCA, including 5,000 acres of State Trust Lands, within a 143,000-acre Sonoita Valley Acquisition Planning District (SVAPD) in southeastern Arizona. (See Map 1 in Appendix D.) Congressman Jim Kolbe, the Sonoran Institute, and the Sonoita Valley Planning Partnership (SVPP), an ad-hoc volunteer group of local residents and environmental, ranching, and recreational interests, worked together to achieve passage of the legislation. The Act directs the Bureau of Land Management (BLM) to manage the NCA using the adaptive management plan collaboratively developed over the past six years by the BLM and SVPP.

In order to move the Las Cienegas legislation through the House and Senate in 2000, the final version of the bill was amended from the original in two important ways:

> First, in addition to the 47,000-acre core of BLM and state lands that make up the initial Las Cienegas NCA, 96,000 acres of state, federal, county, and private lands were placed within the SVAPD boundaries. This designation did not immediately afford these lands direct protection, but does identify them as a high priority for protection and eventual inclusion in the NCA. The bill provides the Secretary of the Interior, and by extension the BLM, with the authority to reach agreements with the State of Arizona and private landowners within the planning district to acquire these lands for inclusion in the NCA.
>
> Second, approximately 50,000 acres at the north end of the watershed were left out of the initial federal designation. Although these lands link the NCA to national park and forest lands in the Rincon Mountains east of Tucson (hence the name "Missing Link"), they comprise a mix of state, county, and private lands (see outlined area on the map on page 4), which raised concerns in Congress and the Arizona State Land Department about how they would be acquired and managed. In order to move the bill through Congress in 2000, these lands were not included within the SVAPD.

> At Sonoran Institute's suggestion, however, the NCA legislation did require that the Secretary of the Interior submit a report to Congress within two years that describes "the most effective measures to protect the lands north of the [SVAPD and NCA] within the Rincon Valley, Colossal Cave area and Agua Verde Creek corridor north of Interstate 10 to provide an ecological link to Saguaro National Park and the Rincon Mountains." (Section 8.a.)

The successful outcome of the Cienega Creek watershed assessment that Sonoran Institute conducted for the BLM in 1999 (particularly the public involvement process) led the BLM's Tucson Field Office to invite Sonoran Institute to take the lead on gathering and compiling the resource information and public input necessary to prepare the report required by the NCA legislation. With additional support from Saguaro National Park, the BLM contracted with Sonoran Institute to conduct a series of workshops and public open houses designed to:

1. Generate as much information as possible about the significant natural and cultural resources—including ecological linkages—found in the Missing Link (i.e., the Rincon Valley, Colossal Cave area, and Agua Verde Creek corridor).
2. Solicit feedback from resource experts and the lay public on alternative protection options and management strategies.
3. Compile and analyze this information, and provide recommendations about which protection measures would be most effective.

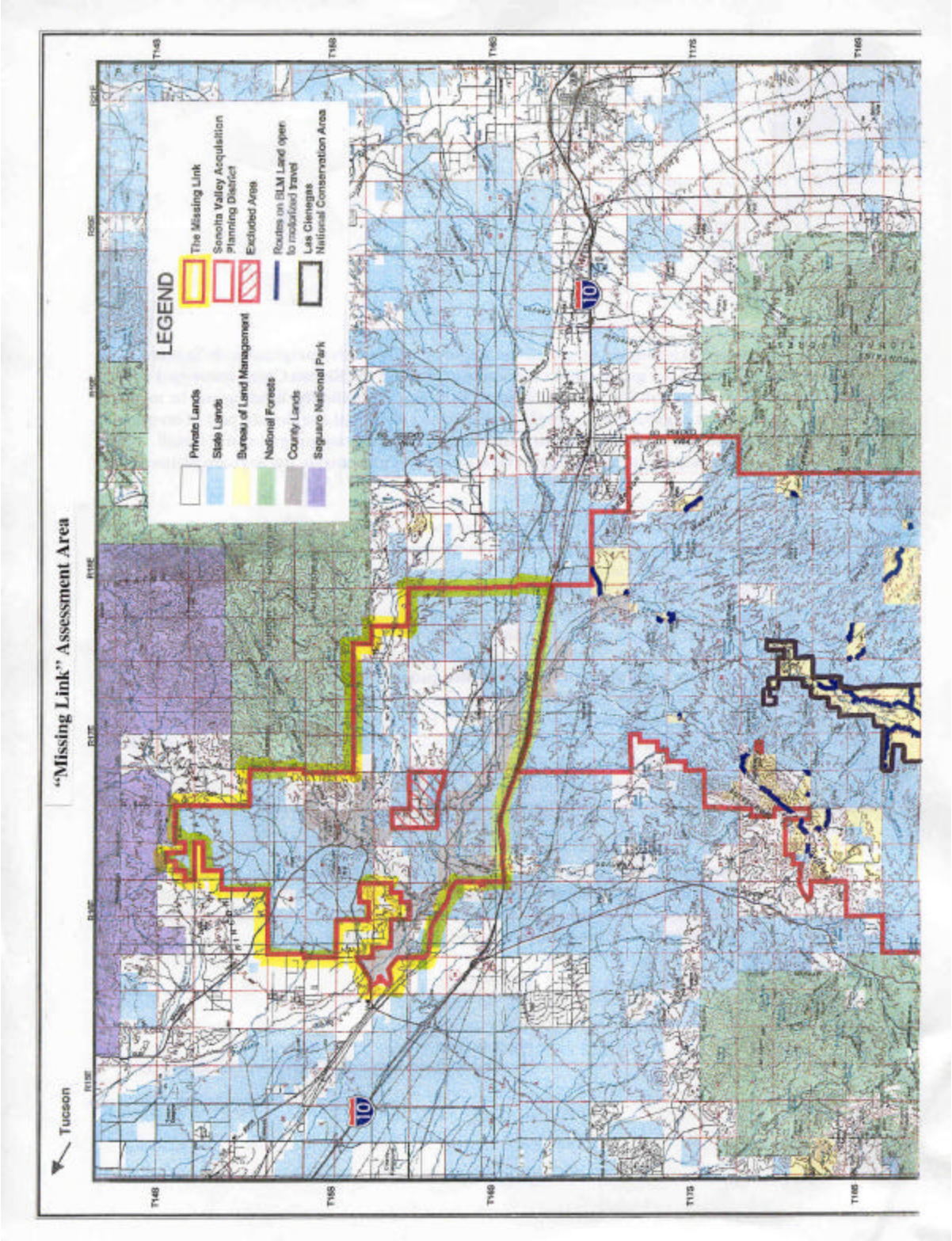
This report represents the culmination of these tasks, completed during 2001 and 2002. Results indicate there is broad consensus among stakeholders and science experts that the Missing Link is an important and valuable area, and that some form of protection is necessary, and urgently needed, for its varied cultural and natural resources. These include endangered and/or rare wildlife and plant species, open spaces, cultural and economic resources, watershed for recharge of Tucson's groundwater, and recreational opportunities. In particular, there was a strong emphasis on the importance of wildlife corridors in the Missing Link, including riparian corridors. But the area is under imminent threat of development.

Since 1990, Pima County has grown by more than 26 percent, and projections are for an annual growth rate of 2 percent through 2020, adding an additional 416,000 new residents. Because of critical habitat designations for endangered species in northeast Tucson, it is expected that much of the future growth will occur in the Southeast sector—the Missing Link, which is highly desirable for development because it is adjacent to existing large-scale development on the burgeoning Houghton Road corridor and on Old Spanish Trail. It also offers many amenities including stunning views of and access to protected natural areas such as Saguaro National Park, Coronado National Forest's Rincon Wilderness, and Cienega Creek Natural Preserve.

Additionally, the majority of the lands in the Missing Link are Arizona State Trust Lands, most of which are currently leased for cattle grazing. The Arizona State Constitution mandates that State Trust Lands produce the maximum economic benefit for the beneficiaries of the Trust, most of which are school districts. One of the primary ways in which the State Land Department raises funds is to auction its Trust Lands for commercial or residential development. Over two

sections (1,300 acres) of State Trust Lands were auctioned off in the region this year; pressure mounts to earmark more of the Missing Link lands for sale for development.

If not protected soon, the important cultural and natural values—including the most important wildlife corridor linking Saguaro National Park and Las Cienegas NCA—will be lost forever.


"Missing Link" Assessment Area
Tucson
LEGEND
The Missing Link
Sonoita Valley Acquisition Planning District
Excluded Area
Routes on BLM Land open to motorized travel
Las Cienegas National Conservation Area
Private Lands
State Lands
Bureau of Land Management
National Forests
County Lands
Saguaro National Park
10
10

Section One:
Missing Link Resource Experts Technical Workshop Results

A. Overview

As Phase I of the assessment process for the Missing Link, the Sonoran Institute sponsored a day-long technical workshop on May 24, 2001, for resource experts. The geographic focus was the area approximately ten miles southeast of Tucson, Arizona, that lies between the Rincon Mountains and Saguaro National Park East on the north and the Sonoita Valley Acquisition Planning District (SVAPD) and Las Cienegas National Conservation Area (NCA) to the south. The area has been dubbed the "Missing Link." The goal of the experts workshop was to gather as much scientific information as possible about the area and its resources, and to explore options for protecting those resources.

Over 100 resource experts were invited to the workshop, including representatives from local, state, and federal agencies; various nonprofit environmental organizations; and experts in disciplines including wildlife biology, botany, geology, hydrology, ecology, history, archaeology, recreation, and other fields. The forty attendees and the organizations and/or professions they represent are listed in Appendix A. In addition, four experts who were unable to attend participated in the assessment by submitting data on priority resources and providing feedback on alternative protection measures, both before and after the workshop.

B. Process

Prior to the workshop, invitees were sent "homework" packets and asked to (a) identify and document important resources in the Missing Link by filling out a *Resource Description Form* for each of the resources they knew well; and (b) comment on the advantages and disadvantages of various potential protection measures by filling out an *Alternative Protection Measures Form*. Copies of these forms are included in Appendix B. (See also Maps 2 and 3 in Appendix D.)

During the first half of the workshop, participants were divided into five breakout groups based on their main area of expertise:

1. Cultural (i.e., Historical & Archaeological), Recreational, and Social/Economic Resources
2. Hydrology, Water Quality, Geology, Hydrogeology, Caves, and Soils
3. Plant Communities, Rangeland Resources, and Wildlife Habitat
4. Species-Specific Wildlife Resources
5. General Wildlife Resources and Landscape Connectivity

To ensure that no resource information possessed by an expert was overlooked because he or she was sitting with a breakout group that was focusing on another type of resource, some experts participated in more than one group. In addition, the general and species-specific wildlife groups shared their results with each other midway through the resource identification portion of the workshop.

Within the breakout groups, each high priority resource identified by individual participants was discussed, and each resource that the group agreed was a priority was recorded on an easel pad. In addition, every group received an aerial photograph of the Missing Link study area on which to mark the locations of the priority resources they identified. (Note: not all resources could be mapped; e.g., some wildlife species are found throughout the entire area.) The groups also discussed and agreed on what, if any, threats to each of the resources exist; noted any data gaps that need to be filled; and recorded that information on their easel pads.

When all five groups had completed this task, a spokesperson from each group presented to the rest of the workshop participants the priority resources, associated threats, and data gaps their group had identified. At that time, members of the other four groups had the opportunity to clarify, correct, or add any missing information to the group's list of priority resources, threats, and data gaps. The results of the breakout groups' work, which follow this section, therefore represent the sum of the workshop attendees' knowledge about Missing Link resources.

During the second half of the workshop, participants broke out into four groups to discuss some of the alternatives available for protecting resources in the Missing Link, and the advantages and disadvantages of these options. The seven alternatives discussed included:

1. Expand Las Cienegas National Conservation Area
2. Expand Saguaro National Park
3. Expand Coronado National Forest
4. Expand Pima County's Colossal Cave Mountain Park and/or Cienega Creek Natural Preserve
5. Establish a new non-governmental, community-based organization whose mission is to protect resources in the Missing Link (e.g., a local land trust, watershed council, or informal Sonoita Valley Planning Partnership-type organization)
6. Combination approach (different parcels in the Missing Link would be acquired and managed by a combination of the previous entities)
7. Maintain the status quo

Participants also contributed ideas on additional protection measures for the Missing Link.

The four breakout groups then reported back to the entire group, and all of the comments on the various alternatives were discussed, agreed on, consolidated, and recorded.

C. Resources Information Results

In addition to discussing overarching large-scale resources and issues, workshop participants identified the following specific priority resources, threats, and data gaps. These have been

grouped into eight categories for the purpose of this summary. References provided by the experts are included in Appendix C. The maps of the results are included in Appendix D.

1. Caves and Geology

Resources

The Missing Link contains a wide variety of caves and other geological resources that are unique in Arizona and vital to the ecology and integrity of the area. (See Map 4 in Appendix D.) The following priority resources were identified by workshop participants:

1. Unique and rare limestone caves such as Colossal, Arkenstone, and Carter. These caves are important because they:
    - Provide habitat and roosting sites for the endangered lesser long-nosed bat and the threatened Mexican long-tongued bat.
    - Provide habitat for several species of endemic invertebrates such as the Arkenstone Cave pseudoscorpion.
2. Rincon apokryptic karst, a distinctive landscape topography formed by the dissolving of carbonate bedrocks, potentially resulting in underground water pockets and streams of unknown location and quantity.
3. Talus slopes, the habitat of the rare, endemic talus snail.
4. Limestone soils and substrates, including a fine-grained Holocene floodplain alluvium, Pantano clay, and red siliceous breccia. These geologic features are important because:
    - Limestone soils provide habitat for endangered plant species such as the Pima and needle-spined pineapple cacti.
    - Red siliceous breccia provides substrate for a high concentration of rare cacti and saguaro.
    - Limestone substrates contribute to the structure of flow of the ground and surface waters of the area.

Threats

The major threats to caves and geologic resources in the Missing Link are due to human impacts on the area. Without some form of protection and/or management, these very sensitive and rare geologic resources could easily be degraded or destroyed, which could lead to the endangerment and/or extinction of species and the undermining of ecological and hydrological systems.

Specific threats identified by workshop participants include:

1. Increased development of mineral and mining operations
2. Development that reduces soil stability and results in erosion
3. Groundwater pumping and/or pollution, which undermines the karst watershed and cave systems
4. Vandalism and detrimental impacts on caves and cave habitats by human overuse

Data Gaps

Workshop participants noted a few significant gaps in the knowledge of cave and geologic resources. The two principal data gaps include:

1. Karst hydrology
   The hydrologic resource of the regional karst—Rincon apokryptic karst—is poorly understood at this time because burial by pediments (erosional benches) and the structural complexity of the matrix make it difficult to perform a thorough evaluation of the extent of the resource. What superficially appear to be discreet units of sedimentary strata may be hydrologically interconnected.
2. Caves within the karst areas
   Knowledge of caves and associated biological resources is incomplete at best, since many caves have no entrances that allow human access for study.

2. Water

Resources

Several important springs and riparian areas with perennial or intermittent surface water and the potential for groundwater recharge are present in the Missing Link. (See Map 5 in Appendix D.) Riparian areas provide habitat for native aquatic species, including vulnerable species such as the lowland leopard frog, and can potentially serve as reestablishment and recovery sites for native fish including the endangered Gila topminnow. The experts repeatedly mentioned the area's value as an intact watershed, and stressed the importance of its riparian resources to wildlife and the health of the surrounding desert ecosystem. They also emphasized the critical need to protect and maintain the connectivity of these valuable areas.

Hydrological resources in the Missing Link include:

1. Linkage/connectivity of water resources and riparian areas
2. Cienega Creek and its watershed
3. Davidson Canyon, including numerous springs
4. Box Canyon
5. Rincon Creek
6. The surface water diversion and dam on Cienega Creek in T16S R16E S14 owned by the Vail Valley Water Company
7. Agua Verde Creek and Mescal Arroyo, major tributaries of Cienega Creek
8. Posta Quemada Wash – a major tributary of Agua Verde Creek that flows out of the Rincon Mountain Wilderness and through Colossal Cave Mountain Park
9. Chimney Canyon and Distillery Canyon – major tributaries of Agua Verde Creek that link the creek with the Rincon Mountain Wilderness
10. Cumaro Canyon/Wash – links Mescal Arroyo to the Rincon Mountain Wilderness
11. Wakefield Canyon – links Cienega Creek with the Whetstone Mountains
12. Numerous streams and springs with perennial or intermittent water
13. Several known areas with shallow groundwater (<50 feet below surface)
14. Limestone outcroppings and caves, which are connected to groundwater flow

Threats

Water resources and accompanying riparian corridors are both very rare and very important in the dry desert of the Southwest. There is a direct connection between surface water flows, groundwater movement, and aquifer recharge. Changes to either affect the entire hydrological

and ecological system. The experts identified the following threats to the Missing Link's hydrological resources:

1. Groundwater overdraft (there is a high potential for water development in the future on as-yet-undeveloped state and private land along both sides of I-10)
2. Surface water diversion
3. Unregulated "wildcat" development (makes overuse of water supply more likely)
4. Water quality/groundwater contamination from septic systems and leach fields
5. Increased flood peaks and erosion and sediment transport due to channel down-cutting
6. Fragmentation leading to loss of migratory corridors, habitat, and connectivity
7. Inappropriate or environmentally incompatible development
8. Increased silt from clay pits
9. Non-contiguous ownership patterns with differing management goals
10. Hazardous waste spills from the railroad or Interstate 10 (I-10)
11. Increased turbidity and metal concentrations from mining waste

Data Gaps

Workshop participants noted that gaps in the data regarding water in the Missing Link are due to either lack of study or no personal knowledge. Gaps identified included a lack of information about actual flows of surface water, groundwater, and water quality. Specifically, information is needed on:

1. The significance of the relative contributions of Davidson Canyon and Mescal Arroyo to the base flows of Cienega Creek
2. The persistence of flow along Agua Verde Creek
3. How much potential flow could be restored without the surface water diversion at Vail
4. Hydrologic connections within and between limestone units, and between limestone and surface flow segments
5. Regional variation in water quality
6. Fluorine, arsenic, radon, and total dissolved solids for safe drinking water standards
7. Quantification of groundwater withdrawals
8. High-resolution mapping of the groundwater potentiometric surface in the Missing Link region

3. Wildlife

Resources

Workshop participants concurred that the Missing Link is extremely valuable for wildlife. (See Map 6 in Appendix D.) In addition to its water resources and unique habitats such as caves and riparian corridors, the experts repeatedly identified the large open spaces and connectivity of the region as vital to wildlife protection. With ever-increasing development around the city of Tucson, these open spaces provide much-needed habitat, migratory corridors, and food and shelter resources for local fauna including such species as javelina, deer, coatimundi, black bear, and mountain lion; sensitive or endangered species like the desert tortoise, lowland leopard frog,

and lesser long-nosed bat; and numerous species of birds, including the endangered Southwestern willow flycatcher.

The following species that live in or use the Missing Link are currently classified as endangered or threatened:

Federally Endangered and Threatened Species

1. Cactus ferruginous pygmy-owl
2. Southwestern willow flycatcher
3. Lesser long-nosed bat
4. Gila topminnow

Arizona Game & Fish "Wildlife of Special Concern" or Forest Service "Sensitive" Species

1. Southern yellow bat
2. California leaf-nosed bat
3. Pale Townsend's big-eared bat
4. Western red bat
5. Merriam's mesquite mouse
6. Swainson's hawk
7. Western yellow-billed cuckoo
8. Desert tortoise
9. Lowland leopard frog
10. Mexican garter snake

Workshop participants also identified the following species as important wildlife resources in the Missing Link:

Birds

1. Rufuous-winged sparrow
2. Abert's towhee
3. Gray hawk
4. Bell's vireo
5. Burrowing owl

Bats

1. Mexican freetail
2. Mexican long-tongued
3. Desert pallid

Mammals

1. Mule deer
2. Black-tailed prairie dog (potential for reintroduction)
3. Black bear
4. Migratory movement of mountain lions, bobcats, coatimundis, skunks, and opossums

Invertebrates

1. Arkenstone Cave pseudoscorpion (endemic to Arkenstone)

2. *Serradigitus sp*. Undescribed species (a rock-dwelling scorpion)
3. Talus snail (an endemic rare species found on a few talus slopes in Pima County)
4. *Nicoletia sp*. Undescribed species (a rare obligate cavernicole endemic to Arkenstone Cave)
5. *Brackenridgia sp*. Undescribed species (a troglobitic terrestrial isopod)
6. *Neocryphoeca sp*. Undescribed species (a blind spider)
7. *Sitalcina sp*. Undescribed species (a troglophilic laniatore arachnid)
8. *Ageniella evansi* (a cave-nesting spider wasp)

Fish, Aquatic Species and Reptiles

1. Frogs – *Rana yavapaiensis* and *R. chiricahuensis*
2. Sonoran mud turtle
3. Longfin dace
4. Giant spotted whiptail (potential)
5. Gila monster
6. Desert box turtle
7. Texas horned lizard

Three species were noted as being of special concern in the region: (1) mule deer, due to isolation and decline of populations; (2) black bear, due to its need to move between different mountain ranges; and (3) desert tortoise, due to a contiguous population along the foothills of the Rincon Mountains.

Threats

Threats to wildlife are numerous and varied. The most pervasive threat to wildlife in the Missing Link was identified as development that causes:

1. Habitat loss and fragmentation
2. Loss of wildlife movement
3. Pressure on existing protected areas
4. Population/genetic isolation
5. Roost disturbance
6. Predation on wildlife by pets

Development is not the only hazard faced by wildlife—workshop participants noted all of the following as major threats to wildlife in the Missing Link:

1. Dewatering of riparian areas (from groundwater pumping or surface water diversion)
2. Deterioration of water quality
3. Improper livestock grazing
4. Recreation impacts
5. Lack of management and enforcement
6. Over-collection/poaching
7. Disrupted fire regimes (Although fires are common and necessary in grasslands to keep shrubby vegetation at a minimum and maintain community structure, fires in wooded riparian areas may seriously threaten community integrity. The invasion of non-indigenous grasses like red brome increases fuel in these communities and further increases the chance and destructiveness of fires.)

8. Uncertain status of State Trust lands
9. Mineral and mining development
10. I-10, the railroad, and roads (fragmentation of habitat and increased chance of roadkill)
11. Toxic spills (from I-10 & the railroad)
12. Utility corridor hazards
13. Invasion of non-indigenous species including bullfrog, exotic fish/crayfish, tamarisk, Lehman's lovegrass, red brome (leads to increased fire occurrence), feral cats/dogs/pigs, disease, and parasites
14. Problematic species such as coyotes, grackles, cowbirds/starlings

Data Gaps

Data gaps that the experts identified for wildlife resources revolved around migration and movement of wildlife; hard data on species abundance/numbers; and the use of various areas by wildlife. More research is needed on:

1. The use of corridors by specific species and the use of specific areas and corridors (culverts, bridges, underpasses, bottlenecks). (Note: This data gap is being addressed by the Sky Island Alliance – see Appendix M.)
2. Baseline information for species occurrence and distribution in the southern Rincon Mountains
3. Biological information for south of I-10 as well as north
4. Quantification of animal movements
5. Large animal use of upland areas
6. Local effects of utility corridors, roads, railroads, etc.
7. Wildlife population sources and destinations
8. Hydrological regimes (groundwater)
9. Fire regimes
10. Species distribution and abundance data for:
    - Box turtle
    - Upland birds
    - Riparian reptiles and amphibians
    - Small mammals
    - Snails
    - Non-indigenous species
    - Bats
    - Large mammals

4. <u>Vegetation</u>

Resources

According to experts, the Sonoran Desert is one of the most diverse deserts in North America. Not only does it harbor a multitude of rare and important wildlife species, it also provides special environmental conditions that support a wide variety of distinctive desert plant species. Most of these species have adapted over thousands of years to the conditions and seasons unique to the Sonoran Desert, and many cannot be found in any other place.

This is particularly true in the Missing Link. (See Map 7 in Appendix D.) For example, experts indicated that within Colossal Cave Mountain Park alone, ongoing studies have already documented more than 1,000 species of plants. The diversity of the region is augmented by the convergence of the Chihuahuan and Sonoran Deserts, where species from both regions flourish.

The experts identified several specific plant species growing in the Missing Link that are particularly important, rare, or endangered, and especially in need of protection. These include:

1. Saguaro cactus – Protected Native Arizona Plant
2. Needle-spined pineapple cactus – Protected Native Arizona Plant
3. Pima pineapple cactus (at the easternmost boundary of its range) – Federal Endangered Species; also protected by the Arizona Native Plant Law, as a Forest Service Sensitive Species and from international trade by the Convention on International Trade in Endangered Species of Wild Fauna and Flora
4. Huachuca water umbel – Federal Endangered Species
5. Sacaton grass – the tallest of southern Arizona's native bunchgrasses, grasslands dominated by sacaton once occupied millions of acres of fragile riparian ecosystems in the semi-arid Southwest, but presently cover only an estimated 5% of their former range

The plant communities noted as most significant by workshop participants are:

<u>Riparian communities</u>

Riparian communities are defined as those that depend on the presence of water, either full time or during part of the year, or as subsurface flow. Riparian communities in the Missing Link include deciduous cottonwood-willow gallery forests, mesquite bosques (woodlands), xero-riparian communities (areas that do not have permanent water but in which the vegetation is similar to, but more lush than, that of the surrounding area), and sacaton grass bottomlands.

Riparian areas in general:

1. Provide refuge for plant species that would otherwise die during dry seasons – i.e., they promote plant diversity
2. Provide thermal cover for wildlife
3. Serve as migratory corridors for more than 200 wildlife species
4. Provide for aquifer recharge
5. Are used by 95% of all vertebrates
6. Provide habitat for migratory songbirds
7. Are used by large mammals as cover
8. Are used by 80% of the bird species in the Missing Link

Mesquite bosques*:*

1. Provide habitat for the mesquite mouse and Bell's vireo
2. Provide flood and erosion control

Sacaton bottomlands*:*

1. Provide habitat for sparrows (Botteri's sparrow is the most sacaton-dependent bird species)

2. Are well used for cover and feeding by javelina, deer, and other wildlife
3. Provide flood and erosion control
4. Are fire-tolerant, which helps keep the riparian corridor stable in fire-prone grassland areas

Upland communities

Important upland vegetation communities in the Missing Link include:

1. Saguaro-palo verde communities (these communities are found most frequently on south-facing, rocky slopes)
2. Semi-desert grasslands (these communities include agaves, an important food source for hummingbirds and bats; see Threats below).
3. Creosote bush communities (although creosote is a common perennial plant across valley floors in the Sonoran Desert, it plays an important ecological role)
   - Many plants—including the saguaro—grow up in the shade of creosote bushes, which act as protective "nurse" plants.
   - Creosote is more cold tolerant than many Sonoran Desert plants, and can survive in soils that most other plants are unable to draw sufficient water from.
   - Over 40 species of insects are wholly or partly dependent on creosote, and a dozen species of small mammals depend on it for food, nesting sites, and refuge from the elements.
   - Side-blotched lizards, desert iguanas, snakes, and toads burrow beneath it, and chuckwallas feed on its flowers and fruits.
   - Both local and migratory birds frequent stands of creosote bush to look for seeds and insects, while roadrunners hunt for snakes and lizards.
   - In the Missing Link, creosote uplands provide important habitat linkages for the declining populations of mule deer moving between the slopes of the Rincon Mountains and riparian corridors in the valley bottoms.

Threats

Native plant species are especially sensitive to development and disturbance because they cannot just move to more habitable areas as wildlife can. In addition, experts assert that important species might be overlooked because they are not as "charismatic" as large animal species. However, many of the endangered animals in the Missing Link depend on the area's unique plant life for habitat and/or food. For example, the agaves that thrive on the area's limestone soils are the main source of food for several hummingbirds as well as for bats including the endangered lesser long-nosed bat.

Workshop participants identified the following as the greatest threats to native vegetation:

1. Development
2. Groundwater overdraft
3. Dewatering of riparian zones
4. Irresponsible ATV/OHV (all terrain vehicle/off-highway vehicle) use
5. Improper livestock grazing
6. Non-indigenous species (tamarisk, red brome, Lehman's lovegrass, buffelgrass, fountain grass)
7. Fire

Data Gaps

The lack of site-specific vegetation maps of the uplands was identified as the major data gap for vegetation resources. These types of maps are needed by the BLM, Arizona State Land Department, and Natural Resources Conservation Service.

5. Landscape Integrity, Connectivity, and Ecological Communities

Resources

Workshop participants repeatedly identified large, unfragmented open spaces and their connections as one of the most significant resources of the Missing Link. These areas are important for many reasons, one of which is the potential to harbor healthy and intact plant and animal communities. Fragmentation of habitat and migratory corridors threatens many sensitive species; the fact that the Missing Link is still relatively intact and connects several large protected areas makes it a critical regional resource. (See Map 8 in Appendix D.)

Experts highlighted as particularly important the following Missing Link resources related to landscape integrity, connectivity, and ecological communities:

Riparian/Aquatic Zones

The importance of riparian areas as habitat and movement corridors for almost all wildlife species in the region was discussed above in the vegetation section. Riparian areas also provide flood and erosion control, aquifer recharge, and other important ecosystem functions.

The streambeds and surrounding riparian habitat of Cienega Creek and its tributaries reduce flooding in the downstream communities of Vail and Tucson by slowing and absorbing runoff. They also provide the Tucson Basin with 6,200 acre-feet of high-quality groundwater each year through natural recharge. If significant portions of the Missing Link are developed, the amount of runoff entering streams will rise greatly due to creation of impervious surfaces on the uplands. In addition, water will move more rapidly through the streams due to the construction of flood control measures (e.g., soil-cemented banks). Such watershed changes would produce dramatic increases in downstream flooding problems and reductions in aquifer recharge.

Sonoran Desertscrub Uplands

1. Connect large protected areas
2. Are less inhabited by humans
3. Link Las Cienegas NCA/the SVAPD with the Rincon Mountain Wilderness in Saguaro National Park and Coronado National Forest
4. Support watershed health in general
5. Are important for wildlife movement and foraging, especially deer, mountain lions and bears

General Landscape Resources

1. The juxtaposition of three or more biomes (the Sonoran Desert, Chihuahuan Desert, and the biologically diverse sky island mountain ranges) make the area a unique resource
2. The area is still relatively intact and unfragmented
3. Colossal Cave Mountain Park, a geologically unique area that is home to more than 1000 plant species, numerous bats, butterflies, endemic cave invertebrates, and other wildlife
4. Continuous riparian corridors, particularly Davidson Canyon and Cienega Creek.
5. Large swaths of connected uplands (desertscrub and grasslands)
6. Sizeable blocks of State Trust land in areas where there is not yet much private development

Threats

Threats to landscape integrity, connectivity, and ecological communities are related to the loss or degradation of open spaces and vital community types. Threats include specifically:

1. Unplanned, "wildcat" development or other development that causes:
   - Open space and habitat loss
   - Corridor fragmentation
   - Pressure on existing protected areas
   - Reduction of groundwater levels from pumping
2. Fragmentation caused by I-10 and the railroad (I-10 needs to be more "permeable" – there are only 2 major underpasses at Cienega Creek and Davidson Canyon)
3. Potential for toxic spills along I-10 and the railroad
4. Invasion of non-indigenous species
5. Fire (lack of, or too much)
6. Undocumented/illegal immigration (camps, trash, rogue roads, and fire)
7. Wood harvesting in Cienega Creek
8. Lack of management and enforcement due to insufficient funding (for example, Cienega Creek Natural Preserve receives only $5,800/year for management)
9. Dewatering of riparian areas
10. Improper livestock grazing
11. Recreation impacts (primarily creation of unplanned, illegal roads by off-road vehicles)
12. Uncertain status of state lands (they could be sold at auction to the highest bidder, usually a developer)
13. Mining/mineral development

Data Gaps

Data gaps regarding landscape connectivity and communities in the Missing Link include lack of information about:

1. The potential for protection through conservation easements, acquisition, and future land use/zoning plans
2. Species distribution in the southern Rincon Mountains

3. The effects of future development, including roads and utility corridors, on the area's intact open spaces
4. Large mammal usage of the uplands

6. Historical and Archaeological Resources

Resources

Experts indicate that the Missing Link has been used by humans for perhaps as long as they have been in this region, due to the presence of water, food, and shelter along the area's many riparian areas. (See Map 9 in Appendix D.) There has been evidence of human use of the area for hunting and gathering as early as the Archaic period (8000 BC-500 AD). It is also a natural travel route from the San Pedro River and Sonoita valleys to the Santa Cruz River valley/Tucson Basin. Signs of human use can easily be found in many locations, even by the casual hiker.

Workshop participants identified numerous sites of significant historical or archaeological value in the Missing Link, including sites from the European settlement of the West and even older Native American ruins and archaeological sites. These were:

1. Town site of Pantano and historic cemetery
2. Ranch house northwest of Cienega Creek and northeast of Davidson Canyon in the Pantano area
3. Old Mill ruin at Red Hill Road/railroad
4. Harrington Place Homestead on Agua Verde Creek
5. Leon Family Cemetery and historic irrigation ditch
6. Railroad tri-bridge over Cienega Creek along Marsh Station Road
7. Gauging station on Cienega Creek
8. Mescal pit houses
9. Indian ruins on 60 acres near Davidson Canyon
10. Historic hand-dug mining district (unknown mineral)
11. X-9 Ranch – two homes nominated for age and historical significance
12. Butterfield Stagecoach (possibly) adobe buildings on the northwest side of Rincon Creek
13. Butterfield Stage Route north of Cienega Creek
14. Colossal Cave – listed on the National Register of Historical Places
15. Carter Cave and several rock shelters and Civilian Conservation Corps (CCC) buildings from the 1930s

Threats

These important and unique historical sites are at risk of degradation or destruction from vandalism and graffiti, pot hunting, and looting of historical sites, as well as lack of sufficient management or enforcement to protect them.

Data Gaps

Data gaps identified for historical and archaeological resources include a general lack of study and data for cultural/archaeological resources in the area, and the lack of an inventory or

database that lists all the historic buildings and sites. The experts also mentioned the uncertainty about the exact location of the Butterfield Stage Route as a data gap.

7. Recreation

Resources

Workshop participants noted that recreational opportunities and sites are a valuable resource within the Missing Link, and that protection of these sites is important to many people. (See Map 9 in Appendix D.) The area provides the inhabitants of Tucson, Vail, Corona de Tucson, Mountain View, Benson, and surrounding areas with numerous outdoor recreational opportunities including:

1. Mountain biking
2. Horseback riding
3. Scenic drives
4. Hunting
5. Hiking
6. Birdwatching
7. Camping
8. Picnicking

Destination recreation sites include Colossal Cave Mountain Park and Cienega Creek Natural Preserve. Workshop participants also identified the following specific recreational resources in the Missing Link as important:

1. Old Spanish Trail and Colossal Cave Road (very popular scenic driving and biking routes)
2. Trails to swimming holes in Cienega Creek
3. Bow hunting area
4. The Arizona Trail
5. The Colossal Cave complex (Colossal Cave, Carter Cave, and CCC work)

Threats

Recreational opportunities in the Missing Link are threatened by a wide variety of human activities and land uses. Some are relatively minor threats; others are more widespread and serious. The experts listed the following as the main threats to recreation in the Missing Link:

1. Inappropriate (destructive or disruptive) quad/ATV traffic – primarily in Davidson Canyon and Cienega Creek
2. Target shooting at trestles, clay pits, birds, etc.
3. The landownership pattern (threatens the completion of the Arizona Trail, and curtails other recreational activities)
4. Illegal dumping
5. Garbage/littering
6. Visual impacts from urban encroachment
7. Lack of community focus (no social structure/gathering places; no more Rincon Valley Fair; store not a community center anymore) (Note: This situation has

improved since the experts workshop due to the successful opening of the Rincon Valley Farmers' Market (subtitled "A Community Gathering Place") in October 2001).

8. Stray bullets from hunters and homeowners using with guns
9. Increasingly limited access to and from public lands (primarily due to new landowners who do not want to provide access anymore)
10. Exposure of the El Paso Natural Gas line in places (a potential hazard)
11. Illegal drug drops and undocumented/illegal immigration traffic (both discourage recreation)
12. Urban park management problems
13. Invasive non-indigenous species (e.g., housing encroachment increases populations of brown-headed and bronzed cowbirds, nest-parasites that have deleterious effects on songbird populations and therefore birdwatching)

In addition, some experts expressed concern that placement of the Arizona Trail may be in conflict with the wildlife corridor under I-10 at Davidson Canyon. (Note: This issue qualifies as a data gap, as data has not been collected to determine wildlife use of this area. However, most wildlife move along the corridor at night while human users would be there during the day.)

Data Gaps

Data gaps relating to recreation in the Missing Link identified by the experts included hard data/statistics on usage, and what kinds and levels of uses are appropriate for the area. The following information is needed:

1. Recreational carrying capacity
2. Real knowledge of usage of Cienega Creek Natural Preserve (perhaps only one out of eight or ten people using the area obtain a permit)
3. True state land recreational use
4. Zoning plans and future uses of private lands (both private and commercial)
5. The potential for protection of private and state lands through the use of conservation easements, acquisition, and other means
6. Access and roads needed for future uses (including trails for hikers, horseback riders, mountain bikers, and hunters)
7. Impact of recreation, especially placement of the Arizona Trail, on wildlife corridors

To acquire this information, interagency cooperation on surveillance and data gathering (e.g., with the Border Patrol), as well as funding for the research, will be needed.

8. Economic and Social Resources

Resources

In addition to the many natural and cultural resources found in the Missing Link, experts noted several economic resources in the area. (See Map 9 in Appendix D.) In addition to the revenue brought in by tourism and recreation, endeavors such as ranching and mining are a source of income for local businesses and landowners. The area's open spaces and wide variety of

resources have made it ideal for these types of economic activity, as well as a rural lifestyle that is highly valued by local residents.

Workshop participants identified the following as the Missing Link's primary socioeconomic resources:

1. Grazing allotments (According to Arizona State Lands Dept. 2001 Annual Report, there are seventeen grazing allotments in the Missing Link area, ranging from 160 to 22,147 acres per lessee.)
2. Mining leases for clay
3. Tourism and recreation – Colossal Cave Mountain Park is the major tourist destination in the Missing Link, providing cave tours, camping, picnicking, and horseback riding. Local businesses also benefit from patronization by sightseers and recreationists. For example, Old Spanish Trail is a popular bike route, and bicyclists often stop at the Rincon Creek General Store.
4. Excellent school district (Vail)
5. 4-H program
6. Real estate development potential (on private and state lands)

Threats

Threats identified by the experts include:

1. Current zoning plan in the Vail/Posta Quemada area
2. Possible overgrazing between Marsh Station Road and the Cienega Creek Natural Preserve boundary

Data Gaps

The primary data gap relating to economic resources that was identified by the experts is information about the conditions and capabilities of rangelands in riparian areas like Cienega Creek, as well as in the uplands.

D. Alternative Protection Measures

The advantages and disadvantages of the alternatives for protecting the Missing Link that were discussed at the workshop are listed in no priority order below.

1. <u>Expand Las Cienegas National Conservation Area</u>

Advantages

1. An NCA designation is not limited to BLM jurisdiction – it allows for multiple partnerships.
2. The original Las Cienegas NCA proposal included lands in the Missing Link, and had local support for inclusion.
3. It would ensure local buy-in for protecting the area from Las Cienegas NCA supporters.

4. Federal management and national directives for the area may allow for more focused management.
5. Single-entity management of the majority of the watershed would be an advantage.
6. NCAs provide for multiple use.
7. The Las Cienegas NCA legislation provides authority for the acquisition of conservation easements and land.
8. It could be added to an existing framework/structure.
9. The existing management plan could be expanded.
10. There would be a federal nexus, and easier Endangered Species Act compliance.

Disadvantages

1. Increased land values may lead to the sale of State Trust lands.
2. There is currently no contiguous BLM land. (Note: this will change once the BLM acquires some or all of the northern parcels of the SVAPD.)
3. The intermixed landownership pattern would complicate management.
4. Expanding Las Cienegas NCA or creating a new NCA requires an act of Congress.
5. Managing it would stretch BLM resources/staff that much further.
6. Multiple uses might endanger resources.
7. Acquiring Missing Link lands may not receive as high a priority as acquiring lands within the SVAPD closer to the NCA.
8. Expansion of federal lands may conflict with current political agendas at the Federal level.
9. Possible loss of tax dollars and economic input from future development [of private lands]. (Note: local property tax revenue does not entirely disappear when land is put into federal ownership because of the Payment in Lieu of Taxes program.)
10. The BLM does not have relationships with landowners in portions of the area.

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2. <u>Expand Saguaro National Park</u>

Advantages

1. National park designation provides greater protection of natural, archaeological, and historic resources.
2. The National Park Service's Enabling Act covers acquisition of these land types.
3. There is an established infrastructure (the National Park Service).
4. Expansion could be logical, i.e., between the existing park boundary and Colossal Cave Mountain Park.
5. There would be great research potential (e.g., the park could expand ongoing ecological studies).
6. The park has established relationships with landowners in the area.

Disadvantages

1. Expansion of a national park requires an act of Congress.
2. National park units are more restrictive than NCAs (they are not multiple use).

3. May remove [private] land from the tax roll. (Note: local property tax revenue does not entirely disappear when land is put into federal ownership because of the Payment in Lieu of Taxes program.)
4. It could be another disjunct district for the park to manage.
5. Managing it would stretch existing park resources.
6. Some of the area is not "park quality" land.
7. Expansion of federal lands may conflict with current political agendas at the federal level.
8. Possible perception by some of the public of a federal land grab.
9. Possible opposition from private property owners and the Arizona State Land Department.

3. Expand Coronado National Forest

Advantages

1. There would be management continuity with the NCA.
2. National forests provide for multiple use.
3. There would be an established infrastructure and higher staffing level.
4. The Forest Service has a larger land base in the area than the BLM does, with closer proximity to the Missing Link.
5. The Forest Service may have established relationships with adjacent landowners and leaseholders.
6. It would provide protection to species through the Forest Protection Act and the Federal Land Policy and Management Act of 1976 (FLPMA).

Disadvantages

1. Expanding a national forest requires an act of Congress.
2. There are some public perception problems regarding the Forest Service (relating especially to fire and grazing management, roadless areas, and endangered species).
3. May remove [private] land from the tax roll. (Note: local property tax revenue does not entirely disappear when land is put into federal ownership because of the Payment in Lieu of Taxes program.)
4. Multiple uses might endanger resources.
5. The Forest Service may not be interested in expanding.
6. The Forest Service may not want to use a community plan approach.
7. Lower-elevation land is not usually included in National Forests.
8. Possible perception by some of the public of a federal land grab.
9. Possible opposition from private property owners and the Arizona State Land Department.

4. Expand Pima County's Colossal Cave Mountain Park and/or Cienega Creek Natural Preserve

Advantages

1. Would not be constrained by federal mandates.
2. Would tie together disjointed segments of county lands—it makes sense to have the county manage the lands located between the two existing county parks.
3. A high level of public buy-in is likely.
4. More timely decisions could be made (fewer layers of bureaucracy).
5. May be a better fit with current political agendas.
6. Offers local control.
7. Would not be perceived as a federal takeover/land grab.
8. There is good funding potential.
9. The county has already had positive outreach with the public.
10. The county has established relationships with landowners in the area.
11. There would be more money for flood control protection.
12. Timing may be good in terms of development of Pima County's Sonoran Desert Conservation Plan (SDCP).
13. Pima County may have the highest priority for acquisitions in the area.
14. If acquired, the area would be managed according to the SDCP, which provides the framework for protecting sensitive resources.

Disadvantages

1. The county's cost to implement the SDCP would increase.
2. Such a large area may be too much for the county to manage (does the county have sufficient resources/infrastructure to manage the area?).
3. The county applies different management strategies to its parks.
4. It would be difficult for the County to acquire State Trust land at this point.
5. May remove [private] land from the tax roll.

5. <u>Establish a Non-governmental, Community-Based Organization Whose Mission is to Protect Resources in the Missing Link</u>

The intention here was to consider whether creation of a citizens group dedicated to protecting resources in the Missing Link—e.g., a local land trust, watershed council, or informal Sonoita Valley Planning Partnership-type organization—would be an effective protection measure. Another approach could be to expand or refine the mission of a current non-governmental group with similar resource protection goals to specifically include protection of the Missing Link.

Advantages

1. Cannot be perceived as a federal takeover.
2. Could be entirely local, with more local buy-in.
3. Would have a single purpose/focus.
4. If established as a nonprofit, tax-exempt charitable organization, the group would be able to obtain grant money and donations that federal agencies cannot.
5. Would be very responsive to needs in the area.
6. Would enhance other local efforts.

7. Would make it easier and quicker to acquire easements and make other agreements with local landowners (would just need board approval).
8. Would allow more flexibility (would not be not constrained by federal mandates).
9. May provide more protection for resources, as private lands under conservation easement could be closed to public use.

Disadvantages

1. May not provide for public use.
2. Would start with no existing structure/infrastructure.
3. Lack of organizational experience and infrastructure could lead to chaotic moments.
4. Could become dominated by personal interests/agendas.
5. Power could become concentrated.
6. Would not have secured funding (would rely on grants and private donations).
7. Would have no more enforcement authority than a private owner (enforcement would have to be pursued through the court system).
8. Some government protective/management mandates would not apply.

6. Combination Approach (i.e., different parcels in the Missing Link would be acquired and managed by some combination of the previous entities)

Advantages

1. Does not stretch anyone's resources for acquisition or management too far.
2. Can expand common management to contiguous areas.
3. Would have many established relationships with landowners in the area.
4. Could reduce political conflicts.

Disadvantages

1. Would not have a unified management strategy for the area.
2. Coordinating management for common resource issues would be a challenge.
3. Differing agency mandates would be a challenge (e.g., multiple use vs. natural resource protection).
4. Logistical problems with management would be intensified.
5. May be more confusing for the public.

During the workshop, one of the breakout groups experimented with combining specific expansions of various agency units into contiguous sections of the Missing Link, along with other measures to protect the area. Their "plan" is presented here to illustrate a possible hybrid approach to resource protection.

1. Extend the Sonoita Valley Acquisition Planning District/Las Cienegas NCA north to Agua Verde Creek and east of the protected Agua Verde corridor.
2. Extend Coronado National Forest ½ to 1 mile south towards Agua Verde Creek.
3. Make a land exchange between the BLM and the private owner of the 1,600 acres north of the Marsh Station (Pantano) exit.

4. Obtain conservation easements on lands in the Agua Verde corridor.
5. Expand Colossal Cave Mountain Park to Pistol Hill and pick up more Vail limestone.
6. Expand Cienega Creek Natural Preserve north to Marsh Station Road and south to I-10.
7. Keep the X-9 Ranch low density through county zoning measures. (If sold for development, the area between Rincon Creek and Pistol Hill to be kept low density.)
8. Establish a Rincon Valley community group to augment support for conservation of lands in the area.
9. Restore surface flow to Cienega Creek at the diversion dam by acquiring surface water rights.
10. Build a "gateway" to the Missing Link on I-10 state land.

7. Maintain the Status Quo

Workshop participants unanimously agreed that there are no advantages to maintaining the status quo. They believe that taking no action in the area will result in the eventual loss of the possibility of linkage between Las Cienegas NCA and Saguaro National Park/Coronado National Forest as private and state lands are urbanized. Everyone agreed that *something* must be done to preserve the important land and resources within the Missing Link.

8. Other Protection Options

The experts added the following alternatives and protection tools to the list of potential measures that could be used to protect the Missing Link:

Additional Alternative Protection Measures (see Appendix E for additional information)

1. Establish a National Wildlife Refuge
2. Designate a National Heritage Area
3. Establish a state preserve system
4. Establish a state park
5. Create an Arizona Game and Fish Wildlife Management Area
6. Create a city refuge
7. Incorporate a "Colossal City" (so local government can do its own planning and zoning)
8. Work with an existing nonprofit organization such as The Nature Conservancy to protect key private lands

Potential Protection Tools (see Appendix E for additional information)

1. Acquire or designate State Trust lands for conservation purposes
2. Obtain scenic highway designation for appropriate lands (and funding to acquire scenic easements on them)
3. Establish and enforce zoning restrictions (currently, it would have to be county zoning since the area is not incorporated)

4. Pursue aggressive acquisition of conservation easements by a county, state, or federal agency or a non-governmental organization
5. Establish a ranch conservation program (Note: this tool is currently being explored as an option as part of Pima County's Sonoran Desert Conservation Plan.)
6. Get Land and Water Conservation Fund money earmarked for the state or county for purchase of open space in the Missing Link
7. Pursue a conservation designation ("Resource Conservation") under the Sonoran Desert Conservation Plan that would increase the likelihood of acquisition funding from Pima County. The current designation in the Pima County Comprehensive Land Use Plan is "Low Intensity Rural" (1 house/3.3 acres).
8. Seek funding for protection from Ted Turner or other wealthy conservation-minded individuals

Workshop participants also expressed concern over the "beachfront effect." The beachfront effect describes the tendency for the value of land adjacent to a protected area to increase, which can be considered both an advantage and a disadvantage. It can be disadvantageous for current property owners who plan to keep their land, since their property taxes may increase, and it could prevent agencies from acquiring land for conservation because the value may increase beyond their price range. On the other hand, it could be advantageous for landowners selling property, who could bring in higher profits, as well as for the county, whose tax revenue would probably increase.

E. Conclusions

The workshop succeeded in gathering a large amount of scientific data about the wide variety of important natural and cultural resources present in the Missing Link, and led to open discussion about possible alternatives for resource protection in the area (see Section Three: Protection and Management Alternatives Discussion and Recommendations for Protection Measures).

There is significant evidence of the Missing Link's value, both from an ecological standpoint—particularly as a critical landscape link in the sky island region—and due to its archaeological, historical, recreational, and economic resources. The evidence is also strong that these resources are threatened, primarily by expanding urban development, and that many may be lost if nothing is done to protect undeveloped open space in the area.

Although there was no consensus among the experts on the "best" measure to protect the important areas and resources within the Missing Link, everyone did agree that (1) maintaining the status quo is not an acceptable alternative; and (2) a combination of the measures discussed, and perhaps some that have not yet been thought of, may create the most effective and realistic protection strategy for ecological linkages and other critical resources in the Missing Link.

Section Two:
Missing Link Public Open House Results

A. Overview

On July 28 and August 25, 2001, the Sonoran Institute, the BLM, and Saguaro National Park sponsored day-long public open houses for residents, landowners, local business people, and other concerned citizens in the Missing Link and surrounding areas. Pima County, Colossal Cave Mountain Park, the Rincon Institute, and the Sky Island Alliance also contributed information and staff. The open houses were held from 10 a.m. to 3 p.m. at the Old Vail Middle School Cafeteria in Vail, Arizona, on the southwest side of the Missing Link. Total participants in the two public workshops were 169 attending in person, with others submitting comments by mail, email, or by phone.

The goals of the two open houses were to:

1. Present the Missing Link resource information learned from the experts at the technical workshop to the public;
2. Learn more about the Missing Link's natural and cultural resources from local landowners and other stakeholders familiar with the area; and
3. Solicit their feedback on the various measures that potentially could be used to protect those resources.

Local landowners, residents, and businesses were notified of the open houses by direct mail (flyers were sent to all box holders in the area and advertisements were posted in the local newspapers on the Sunday and Wednesday before each open house). Copies of the flyers and ads are included in Appendix F. Flyers were also posted at the local post office, schools, and general store, and press releases were sent to all regional newspapers.

To enable people who could not attend either workshop to submit their input, the Sonoran Institute's phone number and a Missing Link email address were advertised in the flyers and newspaper ads. This information was also printed in the newspaper articles about the open houses that were published on August 30 and October 6, 2001 (see Appendix G).

B. Process

The open houses were designed so that participants could move at their own pace and contribute their knowledge and opinions in a way that was comfortable and unhurried. The following display stations were set up for people to visit:

Station 1: Sign-In table and Overview of the Missing Link Assessment

This sign-in station included a poster describing the Missing Link assessment process (why it was occurring, where we were in the process, and what the overall timeline was). Each workshop attendee was given a handout explaining the purpose of the open house and how it was set up (see Appendix H), and three blue "voting dots" (round stickers) and three white voting dots to use at two of the other stations. At the August open house, attendees were also given an exit survey on which to provide comments on the format and effectiveness of the open house.

Station 2: Background Information

This station included several maps of the sky island region of southeast Arizona and a map of Las Cienegas NCA. Handouts included maps of the Missing Link study area, a "What is the Missing Link?" information sheet, and a variety of background information on the NCA (a history of how it was created, a copy of the bill as passed by Congress, and two fact sheets – see Appendix I).

Station 3: Missing Link Resource Displays and Public Input Map

At this station, people had the opportunity to view maps and posters summarizing the important resources identified during the technical workshop. Two large maps prepared by the University of Arizona were posted, one showing current landownership in the Missing Link and all current well sites (this gave a good visual indication of the location and density of development); and a second indicating the location(s) of many of the resources identified at the workshop (some resources could not be shown well on the map, such as wildlife species who use the entire area).

Following the maps, the resources identified by the experts were presented in eight poster displays:

1. Wildlife
2. Plants and Habitat
3. Geology
4. Water
5. Open Spaces and Connectivity
6. History and Archaeology
7. Social and Economic
8. Recreation

Each poster summarized important Missing Link resources through photographs and text.

After viewing the resource displays, participants had the opportunity to identify and locate resources they had knowledge of that had not been identified by the experts. One of the large aerial photograph maps used at the technical workshop was laminated and hung up so that people could draw and label resources on it. This was the "Public Input Map."

Next to the map was a stack of Resource Information Forms (see Appendix J) for participants to use to describe the resource(s) they wanted to see added to the assessment.

Station 4: Resource Values Identification

Next, participants were asked to take part in a Resource Values Identification dot voting activity. Eight empty poster boards labeled for each of the resource categories illustrated in the previous activity were posted, and each person was instructed to use their three blue voting dots to indicate which resources were most important to them. People could place their three dots on the resource boards in any combination they wished: one dot each on three different resources, all three dots on the same resource, or two on one resource and one on another.

Next to the Resource Values boards were Values Identification Comment Forms (see Appendix K) on which participants could write further comments or concerns, or provide more specific information about the resources that were important to them.

Station 5: Alternative Protection Measures

Following the Resource Values Identification activity, participants were given the opportunity to participate in the second dot voting activity, add their own ideas for protecting the Missing Link to the protection measures presented, and voice any concerns regarding specific options or protection in general.

The seven alternatives for protecting the Missing Link that had been discussed at the technical workshop were displayed on poster boards, along with the advantages and disadvantages of each option as expressed by the experts. Also presented were six protection measures taken from the list of additional options the experts had suggested:

1. Expand Las Cienegas NCA
2. Expand Saguaro National Park
3. Expand Coronado National Forest
4. Expand County Parks (Colossal Cave Mountain Park and Cienega Creek Natural Preserve)
5. Create a Community-based, Non-Governmental, Non-Profit Organization whose Mission is to Protect the Missing Link
6. Combination Approach
7. Maintain the Status Quo (i.e., take no action)
8. Establish a National Wildlife Refuge
9. Designate a National Heritage Area
10. Create an Arizona Game and Fish Wildlife Management Area
11. Establish a State Park
12. Establish a State Preserve System
13. Create a City Refuge

Each display board included space for the white voting dots to be placed as well as space for participants to add their own thoughts on the advantages and disadvantages of that option. As with the Resource Values Identification activity, people could place their dots on any combination of protection measures they wished.

In addition, another display board labeled "What are Your Ideas?" was posted with space on which people could write their own ideas about additional options not already listed.

The instructions (and Sonoran Institute staff) made it clear to participants that no specific proposal as to what should be done to protect the Missing Link had been defined at that point. Rather, the goal was to gather the public's opinions and ideas about the alternative protection measures that could be taken—including taking no action. They were informed that their input, along with that of the experts, would be included in this report to Congress, and used to help develop an effective protection plan for ecological linkages in the Missing Link.

After using their three white dots to identify which of the various protection options appealed the most to them, and adding their opinions and ideas to the display boards, participants had the opportunity to fill out an Alternative Protection Measures Comment Form (see Appendix L). This form allowed people to add their own ideas for protection of the area, along with their advantages and disadvantages; and provide input about any concerns they might have about any of the potential protection options presented.

Station 6: Listening Post

In addition to the three public comment forms available at display stations, there was a Listening Post manned by a representative from the BLM and/or the Sonoran Institute for those with further questions, or who wished to discuss comments or concerns about the Missing Link and the possible protection options.

Other Displays

Representatives from various organizations and agencies participating in the Missing Link study—including the Sky Island Alliance, Saguaro National Park, Wildlands Project, and Colossal Cave Mountain Park—hosted display tables and helped answer attendees' questions about the Missing Link and its resources.

C. Resources Information Results

Following is a summary of the knowledge, opinions, and ideas gathered from the public at both open houses and from phone calls and emails. This summary incorporates:

1. The information and opinions open house participants provided on the three forms that were handed out at the display stations, and on the display boards themselves.
2. A description of the resources participants added to the public input map.
3. The results of the two dot voting activities.
4. Comments received via phone and email.

5. The verbal comments received at the open houses during one-on-one conversations with representatives from the BLM, Sonoran Institute, and other collaborating organizations.

Date of Open House	Total Number of Attendees	Number Who "Voted" on Resource Values	Number Who "Voted" on Alternative Protection Measures	Average Participation
July 28, 2001	39	23 (58%)	18 (47%)	52%
August 25, 2001	130	122 (94%)	107 (82.5%)	88.25%

1. Resources Information

Members of the public identified the following Missing Link resources as important. Some of these resources had already been identified at the technical workshop, others had not.

The information provided by the public on Resource Identification Forms, on the Public Input Map, and through conversations and emails during and following the open houses is summarized below.

Resources

1. Historic gravesite of 3 children on the north bank of Pantano Wash (Cienega Creek) at the Vail Road bridge (within the new Rancho del Lago development)
2. Wildlife:
   - cougar/mountain lions
   - javelina
   - bobcats
   - bears
   - eagles
   - red tail hawks
   - badgers
   - owls
   - deer
   - desert tortoises
   - coatimundi
3. Archaeological site at I-10 and Marsh Station Rd. (the Pantano interchange)
4. State Trust land north of Old Spanish Trail
5. Open spaces
6. Views of the night sky
7. The Arizona Trail
8. Cienega Creek and the Rincon Valley area
9. Cienega Creek at the diversion dam and the adjacent riparian area
10. Crestate saguaro
11. Ancient cultural site near railroad tracks

Threats

1. Impending construction/development
2. Too many people
3. Noise pollution
4. Light pollution
5. Litter
6. Ground and surface water depletion, primarily from increased groundwater pumping by new developments (Note: many people indicated concern about this issue)
7. 4-wheel-drive vehicles going off road
8. Buildings
9. Water contamination

2. Resource Values

Summarized below are the responses provided by the public through the Resource Values dot voting activity and forms at the open houses, and through phone conversations and emails following the open houses.

Open house attendees identified:

1. The resources and qualities of the Missing Link they value the most and want to see preserved.
2. Special concerns they have about local resources.
3. What they would like the area to be like in the future.

Resource	August 25, 2001 Open House	July 28, 2001 Open House	Total Number of Dot "Votes"
Open Space and Connectivity	94	20	114
Wildlife	82	17	99
Water	80	11	91
Plants and Habitat	64	7	71
Recreation	14	5	19
History and Archeology	12	4	16
Geology	11	4	15
Social and Economic Values	10	0	10
Total	*367*	*68*	*435*

Note: Each attendee received three voting dots to place on the resource boards (in any combination they chose), and so the number of "votes" presented is not the same as the number of people participating.

Resources and Qualities Valued by the Public (i.e., what they want to see preserved)

1. Open spaces
2. Water
3. Rural lifestyle
4. Views of pristine areas
5. Wildlife

Special Concerns Voiced by the Public

1. We can't stop growth but can plan for it.
2. It seems that the local government is more concerned with a tax base than with traffic problems and the destruction of the desert plants and wildlife.
3. Contain man-built environment to urban cores.
4. Stop at all costs "leap frog" development of greater than 5 acres.
5. Increased development threatens the character of the area.
6. Protect the area from development but *don't* encourage anything that is cost-prohibitive or increases bureaucracy.

Public Desires for the Future of the Area

1. Preserved expanses of open spaces via "set-asides"
   (Note: many people voiced this desire)
2. Protect the area from development
   (Note: many people voiced this desire)
3. A rural area
4. Opportunities for recreation (horse riding and hiking)
5. To see the area stay the way it is today
   (Note: many people voiced this desire)

D. Alternative Protection Measures

The responses provided by the public on the Alternative Protection Measures display boards, dot voting activity, and forms at the open houses, and through phone conversations and emails following the open houses, are summarized below.

<u>Display Boards</u>

1. Expand Las Cienegas National Conservation Area

   Advantages
   1. "Multiple use broadens political base of support"

   Disadvantages
   1. "State land can be traded to land developers without any control"

2. [Regarding previous comment] "– This is not true – It cannot be traded and if it were allowed it would have controls"
3. "Any protection plan will increase land values, not just this one"

Other comments
1. "NCA must continue to allow hunting"

2. Expand Saguaro National Park

Advantages
1. "More employment of locals in land management"

Disadvantages
1. "NPS stinks"
2. "NPS is more law enforcement than conservation enforcement"

3. Expand Coronado National Forest

Advantages
1. "Land can be included as a 'Wilderness Area' restricting illicit use"

Disadvantages
1. "Multiple use means less protection"

4. Expand Pima County Parklands (Colossal Cave Mountain Park and/or Cienega Creek Natural Preserve)

Advantages
1. "Subject to local influences ($) more"
2. "County is ill-prepared to fund such a purchase or manage it thereafter"
3. "Co. Parks cannot manage current holdings"
4. "The Co. Parks is not adequately managing current areas – mostly due to political/fiscal constraints"
5. "County taxpayers need to be prepared to support this"

5. Create a Community-Based, Non-Profit, Non-governmental Organization to Protect Resources in the Missing Link by Working Cooperatively With Landowners and Agencies (e.g., a Land Trust)

Advantages
1. "Looks like Sedona"

Disadvantages
1. "Easy to get rid of protections"
2. "Not a good idea, no future in sight!"

6. Combination Approach

Advantages
1. "Sonoran Institute has protection control for Rincon Valley along Rincon Creek" (Note: This person must have confused the Sonoran Institute with the Rincon Institute (RI). However, although RI has established ecological monitoring sites along Rincon Creek in cooperation with private landowners, it has no protection or management control over any lands.)

Disadvantages
1. "Divided command is a prescription for failure"

7. Maintain the Status Quo

Advantages
1. "Private ownership with no government intervention"
2. "People enjoy what they have worked and paid for including allowing wildlife to remain unharrassed by hikers"

Disadvantages
1. "Inaction will lead to development and destruction of this very habitat area"

8. Establish a State Park

Advantages
1. "If provided good, sustainable operating capital, state parks are capable of doing a lot toward realizing this goal. But do they want to?"

Disadvantages
1. "State Parks cannot manage what they now hold"
2. "The state park system is not prepared for something like this"

9. Designate a National Heritage Area

Disadvantages
1. "I don't believe there is enough heritage to make this option viable"
2. "Not really a 'settled landscape' "

Questions
1. "What about developers? What can or can't they do?"

2. "Need to know more about this alternative"
3. "Not enough information"

10. Other State-led Initiative (Alternative Added by the Public)

1. Two members of the public wrote comments next to the "Establish a State Park" alternative indicating their desire that the state to do something about protecting Trust lands in the Missing Link. Other members of the public voted for this "alternative" (four voting dots were placed below these comments).

2. "The vast majority of land in the area of interest appears to be <u>public</u> land <u>administered</u> by the state (not owned by the state). Due to obvious fiscal constraints, it appears the state is key to the successful preservation of the land. It takes political will, not money, to maintain the status quo, i.e. undeveloped, of these state lands." (Note: State Trust lands are not public land in the usual sense—they are owned by the citizens of Arizona but are held by the Arizona State Land Department for their "highest and best use" for the beneficiaries of various trust funds, primarily educational. The public can enter and use Trust lands only by acquiring special permits, and lands near urban areas are often disposed of for development.)

3. "I agree ↑ The <u>state</u> is who should take the conservation lead in the Missing Link corridor."

Alternative Protection Measures Dot Voting

Alternative Protection Measure	July 28, 2001 Open House	August 25, 2001 Open House	Total Number of Dot "Votes"
1. Expand Las Cienegas National Conservation Area	20	113	133
2. Expand Saguaro National Park	13	47	60 *
3. Expand County Parks (Colossal Cave Mountain Park and Cienega Creek Natural Preserve)	10	49	59
4. Expand Coronado National Forest	5	32	37
5. Create a community-based organization	4	28	32
6. Establish a National Wildlife Refuge	N/A **	24	24
7. Combination approach	2	10	12
8. Maintain the status quo	1	6	7
9. Establish a state park	N/A **	6	6
10. Other state-led initiative (Note: this alternative was added by the public)	N/A **	4	4
11. Create an Arizona Game and Fish Wildlife Management Area	N/A **	2	2
12. Establish a state preserve system	N/A **	1	1
13. Designate a National Heritage Area	N/A **	0	0
14. Create a city refuge	N/A **	0	0
Total	*55*	*322*	*377*

Note: Since each attendee received three voting dots to place on the resource boards (in any combination they chose), the number of "votes" presented is not the same as the number of people participating.

* In addition to the 60 dots placed on "Expand Saguaro National Park" at the open houses, two of the people who phoned in their comments because they could not attend an open house indicated their preference for expanding the park.

** At the July open house, this alternative was presented as one of a list of additional alternatives suggested by the experts. When we observed that people had not responded to that list (i.e., no dots or comments were placed by them), for the August open house we printed out each alternative on a separate display board.

The responses provided by the public on the Alternative Protection Measures Forms, and through phone conversations and emails following the open houses, are summarized below. Copies of emails submitted are included in Appendix Q.

1. Expand Saguaro National Park or get the State Trust Lands off the market for development. [*phone call following second open house*]

2. Put a moratorium on large subdivisions (greater than 5 acres) outside of urban/suburban areas of Pima County.
3. Assess a $10,000-$20,000 impact fee per building lot at time of platting on above large 'splits'/subdivisions.
4. Stream/wash/sheet flood protection via 'set-asides'.
5. Public land on the edges of the protected areas should have a buffer overlay that cannot be exempted or changed.
6. Set a minimum of 4.13 acres per lot.
7. ATV's should be completely restricted to tracks and anyone riding on public or private lands should have their vehicles impounded and very stiff fines imposed for the return of vehicle. Break law more than once and no return of vehicle.
8. Seems that a big issue is state lands being Trust Lands and subject to being sold if development occurs on adjacent private lands. Can the state take the lead in conservation of open space in the Missing Link? Maybe lobby the state to make Colossal Cave Mountain Park a state park to include the adjacent state lands.
9. Use conservation easements to protect private lands from further development; acquire State Trust lands.
10. Las Cienegas NCA could buy up or trade for all State Trust lands in this area to limit the state from selling or trading to developers.

E. Additional Input

1. <u>"What Are Your Ideas?" Display Board</u>

1. Do <u>not</u> close to hunting or enlarge 'park status'
2. Philosophy of conservation of habitat - not preservation by exclusion
3. Use conservation easements to preserve private property but <u>limit</u> development
4. Same as the one above ↑
5. <u>No</u> more development - put AT <u>LEAST</u> 25-year moratorium
6. Try 500 yrs.!! ↑
7. Open Cienega Creek to the public - their taxes paid for it

2. <u>Additional Written Input</u>

1. It is now time to do forward planning. Grandfathered development rights to present day owners should be non-transferable.
2. I see a need for planned and approved development. That includes preservation of natural areas, habitat for wildlife, recreation (biking) for people for access and enjoyment.
3. Over-developing will deplete water in [existing] wells.
4. The push and underlying power of the [developers and Vail Water Company] entity. I believe they are strongly connected into local government and are practically untouchable.
5. Protect the land, but do not control behavior of people or pass rules on morality. Permit handguns for self defense, target practice, and hunting.

6. Leave the area open to hunting except within ¼ mile of homes. (Note: according to the Code of Federal Regulations (36 CFR 261.9 and 261.10), shooting within 150 yards of a residence, building, campsite, developed recreation site or occupied area is illegal, and Arizona state law prohibits shooting within ¼ mile of occupied residences.)
7. Trampling on the rights of adjoining property owners to develop and use historically private property as they see fit (graze horses, etc.). Shrinking private lands and high taxes.
8. I think riparian systems are corridors for wildlife because of topography, water, and vegetation cover, but I also think ridges are important dispersal routes. Can the high grassland summit at Mescal Road be included in the Missing Link?
9. Too many laws and rules will restrict private property owners in what they can do with their land.
10. Please ensure that the wildlife corridor is maintained/protected without an opportunity for future development.
11. There are too many habitat conservationists walking the land.
12. There needs to be another road-covering material other than black asphalt. It intensifies the heat, thus changing the surrounding area.
13. Would any of these protection measures change the current zoning?
14. Protection measures might take away current landowner rights (i.e., the right to split land) according to current zoning regulations. Keep the area under RH zoning with a minimum of 4.13 acres per lot.
15. Private land owners need to be strongly considered and access to their lands???
16. Let the landowners protect their own property.
17. Private property owners are protective of their property and wildlife. Government should not get involved. If/when development occurs, hillside ordinance, wash, riparian should kick in for all people to voice concerns. If government wants to restrict uses, it should reimburse landowners for the taking.

3. <u>Verbal Input</u>

Throughout the two open houses, representatives from the Sonoran Institute, the BLM, and other partner organizations spoke one-on-one with citizens, residents, and property owners. These people may or may not have filled out forms or participated in the dot voting activities, but they expressed their concerns, information, and opinions directly to one of the staff representatives at the Listening Post or information tables around the room. Summaries of what those representatives heard from the public are included below.

1. Many of the conversations I had were with residents who were concerned about Pima county involvement and potential for changes in zoning affecting their property and water rights (wells). They also wanted information on how this effort related to the SDCP and the Pima County comprehensive plan.

—Karen Simms, BLM

2. Many residents said they love the area and are deeply concerned about the impacts of increasing development. For example, numerous people said they no longer see the same animals they used to. A number of people were concerned that the federal government might be trying to take over private lands or not let landowners do anything on their own land. A hunter indicated his concern that conservation organizations rarely cooperate with hunting organizations even though they have same cause (i.e., they both want to protect wildlife habitat).

—Carolyn Gorman, Rincon Institute

3. Private landowners expressed concern for new land management strategies that might lessen their ability to use their land as they like or cause loss of their land through condemnation. They didn't want agencies/others to tell them how to use their land. Some expressed interest in the benefits of a conservation easement, but were wary of a larger overarching Missing Link Protection Strategy. There was a clear mistrust of the county and county conservation initiatives, which has made some people distrustful of ANY conservation measure. But overall, people expressed appreciation for the values of open space and wildlife and strong desire that no action result in development of state lands that may undermine those values.

—Kim Vacariu, The Wildlands Project

4. People in general seemed interested in conservation of the fascinating resources in the Missing Link area and were very concerned about more and more development in the region. Most were hopeful for some kind of protection, but many of the long time citizens were slightly to very pessimistic about the future of the area. Many noted that they had attended dozens of meetings and open houses over the years and felt that their voices and concerns were/are being drowned out by developers. Many feel that they have been lied to in the past and feel frustrated that their voices haven't been heard. Many made comments about the water situation in the area and mentioned that their water bills are constantly on the rise in order to help finance increased infrastructure construction and maintenance for development in the area that they do not support. Many long-time citizens also commented on the dramatic decrease of wildlife sightings on their property over the years and most believed that it was a direct result of increased development.

—Cory Jones, Sky Island Alliance

5. Also, lots of general public support for protection of the area has been given to Rincon Institute staff at events like Vail Pride Day, the barn, the Coyote Creek presentation, etc.

—Mary Vint, Rincon Institute

4. <u>Exit Survey Results</u>

Attendance
130 attendees; 70 surveys; 54% response rate

Format

Most people liked the format, commented that the presentation was good, and said it was an effective way to convey the information. Some comments/suggestions included having more staff available for questions, explanations, and for helping people navigate. Although guest organizers were appreciated, some people mentioned that it would have been helpful to have governmental representatives present and available to talk to constituents (Kolbe, County, etc.). Others suggested that experts should have been present to answer questions. Although there were indeed some experts there, perhaps a future improvement would be the stationing of an "expert post" by the resources post or alternative protection measures post. Several emphasized that equal preference be given to conservation and mixed-use views. A final suggestion was to hold open houses in the evening when it is not so hot.

Opportunities to voice opinions

For the most part, people felt that they had ample opportunity to voice their opinions and that staff were open and available. Several commented that the voting process, forms, and places to add ideas should have been more thoroughly explained at the posts, and perhaps explained in writing in the introduction packets. One possibility would be to have staff stationed permanently at each post to explain activities or answer questions. Also, several people requested a follow up and/or results of the open house. One way to do this efficiently would be to have a sign up station for those interested in follow up reports and summaries.

Decision making process

Most people liked being involved in the process, but some were concerned that the government would not actually heed their opinions. It is important to make sure that residents/landowners in the area have ample opportunity to voice opinions. One person suggested having a public meeting to show the results of the open house. This could then be a forum for discussing the specifics of each protection option. One person complained that there was not enough clarification regarding the decision making process itself. (Note: Though this was explained in writing on the Missing Link Assessment board, perhaps it should have been displayed even more prominently.)

Getting the word out

There were a few complaints about not knowing about the event, or hearing only about the second open house. Although a large effort was made to get the word out (television, radio, newspapers, mailings), perhaps notice should have been given even earlier. One suggestion was to post notices near mailboxes or central areas (perhaps schools or businesses).

F. Media Coverage

Copies of the following newspaper articles about the public open houses are included in Appendix G:

1. "Rural residents backing Las Cienegas," by Rob Bailey, *Arizona Daily Star*, August 30, 2001.
2. "Las Cienegas comment period to be extended," by Tim Ellis, *Arizona Daily Star*, October 6, 2001.

G. Conclusions

In general, responses from the public focused on the threat of continued, increased, and uncontrolled development in the area, and water depletion (of both ground and surface water) due to the development and establishment of additional wells. People indicated a strong desire to protect the area from further destruction and degradation, although many were also concerned about the rights of residents and property owners.

Section Three:
Protection and Management Alternatives
Discussion and Recommendations for Protection Measures

A. Overview

As described in Sections One and Two, the Sonoran Institute hosted three workshops between May and September 2001: a technical workshop for resource experts such as biologists and land managers familiar with the Missing Link, and two open houses for residents, landowners, local business people, and other concerned citizens in the Rincon Valley, Vail, and Mescal communities and surrounding areas. During these information-gathering sessions, input was solicited on preferred alternative protection measures.

At the technical workshop, 40 experts weighed in with an analysis of the advantages and disadvantages of seven alternative protection measures (including "Maintain the Status Quo"), providing "advantages" and "disadvantages" comments for each (see Section One, part D). They also added a list of eight other alternative measures as well as eight protection tools to consider. Thirteen alternatives were presented at the two public open houses to solicit public opinion on the advantages and disadvantages of each, and find out which would be most preferred by the participants.

Results from the open houses, with 133 people voting, indicated that "Expand Las Cienegas National Conservation Area" was by far public's top choice. "Expand Saguaro National Park" and "Expand County Parks" were essentially tied for second, with less than half the number of votes given to "Expand Las Cienegas NCA." The only other two alternatives that received a significant number of votes were "Expand Coronado National Forest" and "Create a Community-based Organization."

Throughout the comments from both experts and the public, there were several common themes of concern. First, the majority of the land in the Missing Link area is State Trust land, which is owned by the citizens of Arizona and administered by the State Land Department. State Trust land is held for the "highest and best use" for the beneficiaries of various trust funds, primarily

educational. Lands held in trust, especially those in, adjacent to, or near a municipal boundary, are often disposed of for development. Experts and open house participants alike felt strongly that these lands should be protected, and that the state should take the lead in this effort. Although it is theoretically feasible to manage State Trust land for conservation values while also generating income for the trusts, this is currently not the State Land Department's directive.

Two other concerns were expressed regarding the three alternatives that involve expanding the boundaries of federal lands: (1) they would require an act of Congress; and (2) some members of the public may view such an expansion as a federal "land grab."

B. Discussion of Alternatives

Using the comments received from the experts and public workshops, below we discuss in more detail the advantages and disadvantages of the four most feasible alternatives in order to frame the recommendations later in this section.

1. Expand Las Cienegas NCA

   Advantages
   Strong local support for inclusion of the Missing Link lands in the NCA is already established; BLM provides a flexible and popular method of land management; having management of the majority of the Cienega Creek watershed under one jurisdiction is the best way to manage the resource; the NCA Act provides authority for acquisitions of conservation easements and land; and finally, federal jurisdiction allows for streamlined compliance with the Endangered Species Act.

   Disadvantages
   The disposition of State Trust lands currently within the contiguous NCA boundary and Sonoita Valley Planning District (SVPD) boundaries south of Interstate 10 is still not resolved, making the case for extensions to the north more difficult to justify; and additional acreage would further stretch BLM management resources.

2. Expand Saguaro National Park

   Advantages
   It would afford the greatest protection of natural, archaeological, and historic resources; the management structure is already established; and the dot voting activities showed fairly strong public support for this alternative.

   Disadvantages
   The Enabling Act only allows for very small boundary adjustments, not large acquisitions, without an act of Congress; with the exception of a narrow extension of State Trust land along Rincon Creek, the majority of lands under consideration are not immediately adjacent to the existing park boundary, and thus would be another (third) disjunct district for the park to manage; some of the lands in question are not "park

quality" lands; and there may be less support from recreation groups who would prefer a multiple-use alternative.

3. Expand County Parks

Advantages
It would augment the habitat connection between two existing county parks and protect more of the watershed that affects perennial water in Cienega Creek; local jurisdiction is usually preferable to communities[1]; there would be more county funds available for flood control work along the creeks; and the region is a high priority for acquisition and management of sensitive resources in Pima County's Sonoran Desert Conservation Plan.

Disadvantages
The cost of acquiring the land is higher than the dollars available in Pima County[2]; the existing county parks have different management strategies that may not be entirely compatible; there is distrust of the county among some local landowners; and the county does not have the funds or infrastructure to manage additional large protected areas.

4. "Establish a Community-Based, Nonprofit, Non-Governmental Organization Whose Mission is to Protect Resources in the Missing Link"[3]

Advantages
Involving local stakeholders in management would create strong local incentives to protect resources; it would enable greater fundraising flexibility through grants and donations to augment federal management funding; management options would be more flexible because they would be less constrained by federal mandates; community-based organizations are usually more successful at securing conservation easements than federal entities; inclusion of other land management agencies in the cooperative management organization—National Park Service, Pima County, BLM, Arizona State Land Department, and U.S. Forest Service—would increase the effectiveness of protection of all of the region's resources because of integrated management; and such a group could be relatively apolitical.

Disadvantages
Creating a new NGO in the region—the Rincon Institute and other local groups already exist—may create confusion among stakeholders; management decisions would be subject to the consensus approach and potentially dominated by special interests; formal

[1] There was fairly strong local support for this alternative in the dot voting sessions.
[2] Although the current bonding capacity of the county is estimated at $500 million, local conservation leaders estimate that a successful bond election in 2004 would approve no more than $250 million, which would be earmarked for open space acquisition and riparian restoration county-wide.
[3] The experts also suggested the possibility of working with an existing organization like The Nature Conservancy to acquire the lands (or easements on them), as an alternative to creating a new organization. Although The Nature Conservancy is redirecting its mission and not currently acquiring lands in the region, there are other conservation groups working on habitat protection in the region that could be of help, including the Arizona Open Land Trust, Rincon Institute, and Southeast Arizona Land Trust.

collaborative management organizations do not have a track record in the region, so securing local support and funding would be challenging; enforcement authority would be essentially non-existent for an NGO; because a majority of the lands in the region are owned by the State of Arizona, if the Land Department opts out of a management NGO, such an approach would not be feasible; and changes in agency personnel or the makeup of the governing board could endanger the protection of resources.

The experts also discussed a hypothetical "Combination Approach" in which current land management entities in the region would acquire—by purchase, exchange, or conservation easement—lands in the Missing Link that are contiguous to their current protected areas, thus achieving protection of most of the lands through diverse ownership and management. Although a creative approach worth considering, the experts outlined 10 suggested steps to achieve such a combination approach. This would have the disadvantage of extreme complexity and high cost, as well as the added burden of multiple, unlinked management plans, which would make protection of ecological linkages a challenge.

Of the six other possible alternatives suggested by the experts and reviewed by the public, only four received any votes from the public: establish a National Wildlife Refuge; establish a State Park or preserve system; or incorporate the area into a new municipality that could acquire the lands for creating a city refuge or other form of land preservation. Of these, none is currently feasible: the lands are too disconnected to qualify as a federal refuge without first acquiring considerable amounts of both state and private lands; the state park system is currently in serious financial distress; and there was no public support indicated for incorporating the area.

Finally, "Maintain the Status Quo" was unanimously rejected by the experts because doing so—leaving the lands in their current unprotected state—would result in the loss of permanent connectivity between the NCA, Saguaro National Park, and Coronado National Forest's Rincon Wilderness. (See Appendix M for a review of data from a specially commissioned landscape assessment of the area's importance to biological connectivity). Although a few members of the public voted for this alternative, the vast majority of people expressed concern about the future of the area if nothing is done to protect the area's remaining undeveloped lands, particularly the State Trust lands.[4]

C. Cooperative Management Approach

In consideration of the local economic and political exigencies as explored above, and weighing in the need to act quickly in order to avoid loss of ecological values and connectivity due to imminent development, a collaborative management approach may be the most advantageous to protecting the Missing Link lands in the short term. This approach is being tested in numerous cases in the West, and while they vary in their specific details, they involve partnerships among

[4] The State Land Department has new authority via H.B. 2162 that undermines the statutory provision that says the State Land Department shall "promote the infill and orderly development of state lands in areas beneficial to the trust and prevent any urban sprawl or leapfrog development on state lands." It also sets in place a series of exceptions that would allow the State Land Commissioner to provide service extensions across State Trust lands that are undeveloped to others beyond the urban fringe, thus facilitating checkerboard development and sprawl.

federal, state, local, and/or private partners such as U.S. Forest Service, National Park Service, Bureau of Land Management, non-governmental organizations, community groups, resource user groups, and educational institutions.

The collaborative management approach spreads out the cost of management, increases the staff and technical expertise available for management, increases the likelihood that plans will be implemented due to shared decision-making and ownership, reduces conflict, and nurtures community stewardship of landscapes by involving the citizens who have the closest connections to the land. Such collaborative relationships cross the normal boundaries of organizational or governmental affiliations, geography, perceptions, and interests. It is important to note that the reason for collaboration is not only to protect wild landscapes and manage them most effectively and efficiently, but also to increase understanding between disparate viewpoints and thus create broad support while building capacity for all partners.

> *"This shift, away from the agency as 'expert' and toward shared learning, trust, and responsibility represents a fundamental change in the way public lands are managed. The rewards of effective collaborative efforts are substantial and, for many within the BLM, this approach is at the same time thrilling, risky, and rewarding."* – Bureau of Land Management and Sonoran Institute. 2000. A Desktop Reference Guide to Collaborative, Community-Based Planning. Tucson, Arizona: Sonoran Institute.

According to a University of Michigan study[5], the following reasons prevailed as to why individuals, in both private and public capacities, chose to become involved in collaborative resource protection and management:

1. Empowerment of stakeholders: The collaborative approach allowed their perspective to be heard by others, and was a way to take action and stay aware of activity.
2. New strategy: The partnership provided a break from traditional strategies that were not effective and a different approach was appealing.
3. Direct stake or responsibility in management of resource: Individuals had either a financial, legal, or strong personal stake in the way the resource was managed.
4. Coordination: Individuals were able to avoid duplicate work, accomplish more, and gain pooled knowledge.
5. Community building: Individuals wanted to improve relations, diffuse tensions, and get to know other members of the community.
6. Threat of government action and/or lawsuit: Possible or imminent government regulation or lawsuit triggered participation in some cases.

Following are synopses of three current cooperative management approaches being used to protect undeveloped lands and biodiversity while providing for public access and resource utilization. In each discussion below, the initiative is described and then followed by a discussion of the applicability of such an approach to Missing Link protection.

[5] Coughlin, C., Hoben, M., Manskopf, D., Quesada, S. and J. Wondolleck. 1999. A Systematic Assessment of Collaborative Resource Management Partnerships. Masters' Thesis. Ann Arbor, Michigan: University of Michigan School of Natural Resources and Environment.

1. Federal-Public Trust: The Valles Caldera National Preserve

Background

The Valles Caldera National Preserve, established by an act of Congress in July of 2000 as a means of protecting the historic Baca Ranch in northern New Mexico, comprises 89,000 acres of mixed ponderosa pine forest and lush grasslands. According to the Valles Caldera Preservation Act, the preserve is a unit of the National Forest system, but with a unique management approach. The act stipulated creation of the Valles Caldera Trust, a government corporation made up of nine trustees who oversee the trust. Trustees include the Forest Supervisor of the Santa Fe National Forest, the Superintendent of Bandelier National Monument, and seven others who are experts in: livestock management; game and non-game wildlife and fish populations; sustainable forestry; non-profit conservation organizations; financial management; the cultural and natural history of the region; and state or local government in New Mexico.

The mission of the Valles Caldera Trust, according to the act, is to "protect and preserve the scenic, geological, watershed, fish, wildlife, historic, cultural and recreational values of the preserve, and to provide for multiple use and sustained yield of renewable resources within the preserve. The Baca also must remain a working cattle ranch, and attempt to be financially self-sufficient by 2017."

Because the preserve is so young, and the Valles Caldera Trust is still in the early stages of developing a vision, objectives, and formal management plan, it is premature to assess successes at this point. The creation of a "government corporation" to manage publicly held land, with the stated goal of being financially self-sufficient, has created controversy. The most vocal opponents compare it to privatization of public land, with concerns that ecological values will be sacrificed.

Application to Managing the Missing Link

Because the majority of the Missing Link lands are controlled by the Arizona State Land Department, and the mandate of the department is to manage the lands for the benefit of state schools and other public institutions, the argument could be made for forming a corporation to manage the lands in the Missing Link for their conservation values, with a mandate to produce revenue for the State Trust. Partners could include the Vail School District, Saguaro National Park, Coronado National Forest, Bureau of Land Management, Arizona State Land Department, Arizona Game and Fish, Pima County, Colossal Cave Mountain Park, Rincon Institute, Sonoran Institute, ranchers, and recreation groups (e.g., mountain biking, equestrian, and hunting groups). Fees could be assessed for recreational uses or the organization could raise funds from private and public sources to provide revenue to the state—in essence leasing and managing the land for its conservation values.

Another approach would be one that provides the funding generated by the organization or fees assessed on the land directly to the school district that includes the Missing Link wildlands (the Vail School District). This would produce a win-win situation for the Arizona State Land Department by generating significant income for one school district

while maintaining resource production (grazing) and recreation; for the school district by providing income and ensuring that the land will not be developed and further burden the school system with additional students; and for the community, by permanently protecting open space, recreational, and cultural values.

Advantages
Developing a plan to generate income while protecting biodiversity near an urban center should be more attractive to the state than a conservation lease or acquisition.

Disadvantages
Managing the lands to produce revenue could alienate user groups and the community, especially in a region where wildlands are traditionally thought of as "everyman's" and use of them a right rather than a privilege.

2. Public and Private Land Protection: Steens Mountain Cooperative Management and Protection Area

Background
The Steens Mountain Cooperative Management and Protection Act of 2000 encompasses 425,550 acres in southeastern Oregon. The act included designation of 175,000 acres of new Wilderness; exchange and acquisition of 118,000 acres; grazing retirements on 100,000 acres; and a $5.2 million federal compensation payment to ranchers. The act indicates that the mission of the Steens Mountain Cooperative Management and Protection Area (CMPA) is "to maintain the cultural, economic, ecological and social health of the Steens Mountain area in Harney County, Oregon" through "cooperative and innovative management projects." Grazing, recreational use, historical and cultural traditions, as well as ecological protection and conservation, are also part of the management plan, which under the act must be finished by 2005.

According to the act, the comprehensive plan will include: "a description of the activities of the Cooperative Management and Protection Area, any new developments or plans as a result of studies, initiatives for the cooperation of State, county, and local landowners as well as the Burns Paiute Tribe, design attainable goals in correspondence with the management objectives," all of which must be tracked by a formal monitoring plan.

The Steens Mountain CMPA is unique in that its boundaries take in private as well as public lands. The act creates a de-facto agricultural buffer zone by prohibiting building on public or private lands within the protected area that is inconsistent with the protection act. The purchase of development rights or conservation easements from willing landowners is the mechanism indicated for implementing this part of the act.

The CMPA is divided into several designated subareas for management purposes. These are a newly designated wilderness area; wild and scenic river segments; a redband trout reserve; a mineral withdrawal area; and a wildlands juniper management area (for reintroduction of natural fire regimes). Additionally, a citizens' advisory council and a

science advisory team have been established. The citizens' council comprises 12 voting members, appointed by the Secretary of the Interior (based on nominees from the governor and tribal chairman). The council includes private landowners, ranchers, miners, environmentalists, and numerous recreationists.

Like the Valles Caldera Preserve, the Steens Mountain CMPA is too new to assess successes and challenges.

Application to Managing the Missing Link

The mission of the Steens Mountain CMPA closely parallels the protection goals for the Missing Link area—maintaining ecological, cultural, economic, and social health of a landscape, with both private and public landownership as key components. However, it is likely that, with the successful passage of the Las Cienegas National Conservation Area Establishment Act in 2000, we have seen the last federally approved protected-area designation for this watershed. Therefore, any similar CMPA in the Missing Link region would be based on existing National Park, National Forest, State Trust, county, and privately held protected lands. The shared desires to protect cultural values—especially ranching and Western heritage—as well as strong interest in recreation in the area, including hiking, biking, birding, hunting, and horseback riding, make a good case for establishing a CMPA between Saguaro National Park, Pima County, and the Sonoita Valley Planning Acquisition District/Las Cienegas NCA. Additionally, the region's geography is suited to establishing discreet management areas such as a Mule Deer Habitat Area, Desert Tortoise Preserve, or Cultural Preserve.

Advantages

The cultural and ecological fabric of the region lends itself to this type of cooperative approach, with a citizens' advisory council, a science team, and a management plan to ensure the ecological, cultural, and recreational integrity of the lands. Given the strong independent nature of residents, a self-governing model would most likely be well received. Recreation interests are strong as well, with active equestrian groups and an active mountain biking community. Numerous archaeological (Hohokam) and Western heritage (Butterfield Stage routes, historic ranches, railroad) sites could be developed into a Cultural Preserve area. The coalition that supported Las Cienegas NCA continues to exist, and would likely support a Missing Link cooperative management model. There would be no need for an act of Congress to designate or acquire any more protected lands or authorize exchanges. Funding for acquiring conservation easements on state and private lands could be available through Pima County bond sales or the State Heritage Fund.

Disadvantages

Because the Arizona State Land Department controls the largest amount of land in the Missing Link, any collaborative approach to land management will need to have the full backing of the Land Department, and clear advantages to the department will need to be identified and carried out, including financial incentives.

3. Community-based Cooperation: The Blackfoot Challenge

Background

The Blackfoot River Valley in west-central Montana, near Missoula, is the core of a 1.5-million-acre watershed that spreads westward from the pine-clad 10,000-foot peaks of the Bob Marshall Wilderness to prairie grasslands and sagebrush steppes. Home to peregrine falcons, grizzly bears, bull trout, and bald eagles, the watershed comprises 50% federal land, 7% state, 20% corporate timber holdings, and 23% private ranches and homes. With a rich cultural heritage, gorgeous views, and nearby recreation, the area has seen a recent dramatic increase in population. The primary threats to the valley are unsustainable land use practices and private and commercial land development, which have brought related problems of invasive weeds, human-wildlife interaction challenges, and loss of the rural character that attracted people to the area in the first place.

These concerns sparked initial dialogue between agencies, landowners, and community leaders twenty years ago. In 1991 the Blackfoot Challenge, now a 501(c)(3) non-profit organization with an executive director, was formed. Members include over 100 private landowners and representatives from Montana Trout Unlimited, local businesses, recreation groups, The Nature Conservancy, Plum Creek Timber Company, National Fish and Wildlife Foundation, North Powell Conservation District, the Montana Land Reliance, U.S. Forest Service, the Bureau of Land Management, the Montana Water Quality Bureau, U.S. Fish and Wildlife Service, and the Montana Department of Fish, Wildlife, and Parks. The group's official mission is "to enhance, conserve, and protect the natural resources and rural lifestyle of the Blackfoot River Valley for present and future generations" through the following objectives:

1. Provide a forum for the timely distribution of technical and topical information from public and private sources
2. Foster communication between public and private interests to avoid duplication of efforts and capitalize on opportunities
3. Recognize and work with diverse interests in the Blackfoot Valley to avoid confrontation
4. Examine the cumulative effects of land management decisions and promote actions that will lessen their adverse impacts in the Blackfoot Valley
5. Provide a forum of public and private resources to resolve issues

The Blackfoot Challenge has been operating long enough to have recorded and evaluated outcomes. These include:

1. Providing a venue for communication among community members
2. Providing a basis for developing trust among community members where it didn't previously exist
3. Successfully implementing a noxious weed control program with the help of agency representatives
4. Educating teachers and children in the valley about their watershed through Project Wet.
5. Sponsoring educational workshops and tours throughout the year to encourage local involvement and ownership in resolving resource problems in the watershed

6. Establishing the Blackfoot River Corridor Project, a landowners/agency collaboration that opened up much of the 35-miles of privately owned land along the river for public access (fishing)
7. Managing stream restoration projects

Application to Managing the Missing Link
The Blackfoot Valley and the Rincon Valley/Missing Link area share very similar challenges: intense land conversion and land-use pressures on a rural landscape that is, along with highly scenic surrounding wildlands, the primary asset for residents. The natural resource values, rural Western lifestyle, and recreation uses of the Missing Link area could be likened to a condensed version of the vast Blackfoot watershed's values and recreational uses. The smaller desert-riparian corridors of the Missing Link provide birdwatching and hiking opportunities rather than flyfishing, while upland desert open spaces provide for equestrian and mountain biking uses. Working ranches, archaeological sites, and historic "Old West" structures and sites are interspersed with new developments where urban-oriented families live. The potential for conflict therefore is high, and creating a formal organization modeled after the Blackfoot Challenge, which has proven successful as a facilitator in disputes over management issues such as resource utilization and recreation, could be helpful.

Advantages
Establishing a new non-profit group to manage the Missing Link lands would allow for expanded opportunities to augment federal management funding, since 501(c)(3) organizations are able to apply for private funding sources, and for dissemination of information between stakeholder groups and throughout the community (i.e., as a clearinghouse). Such an entity could hire staff to further its mission, something that is difficult for community volunteers to sustain over time, especially when dealing with widespread and complex resource management issues.

Disadvantages
Another non-profit in the region would be additional competition for a limited pot of regional funding resources. Because it would be a formal organization with federal tax-free status, federal or local agencies may be required to develop cumbersome memoranda of understanding and cooperative agreements before working on collaborative projects.

D. Recommended Next Steps

After 15 months of community scoping, experts' input, literature review, and field study, the Sonoran Institute recommends pursuing a two-part strategy: 1) that Congress strongly consider the following actions:

- Support legislation that would enable land exchange authority between state and federal agencies; this would allow the BLM to move forward on outright acquisition of the important State Trust Lands in the Missing Link and for Congress to authorize appropriations for acquisitions. The management of such

lands could be through cooperative management agreements; transfer of lands to other federal agencies or the county; or remain with BLM.

- Support legislation that would authorize the State of Arizona to amend its constitution to manage State Trust Lands for conservation as well as for economic benefit. (A multiple-stakeholder coalition, including ranchers, developers, educators, and environmentalists, is currently working on drafting reform language for a future initiative.)

In tandem with these important federal actions, 2) local partners launch a community-based, collaborative management approach to protecting the Missing Link lands, including creation of an ad hoc organization with a governing board comprising land managers, landowners, and local stakeholders including ranchers, recreationists, and other land users. This approach would have the effect of moving ahead with locally driven, on-the-ground protection and management of a significant landscape while important Federal actions get underway to support permanent protection of the Missing Link lands. We base these recommendations on the following:

1. Collaborative conservation is effective and cost-efficient:

   - Surveys of cooperative management projects in the West indicate that such an approach yields more successful long-term conservation of landscapes and resources than traditional approaches that are expensive (e.g., federal land acquisition) and do not encourage local stewardship.

   - There is a growing interest at the national level in pursuing collaborative management solutions to complex conservation challenges (e.g., the Department of the Interior's Cooperative Conservation Initiative).

   - The geography of the Missing Link and adjacent lands—a distinct valley linked on three sides to large protected preserves—lends itself well to rallying a core of community support for a collaboration initiative.

   - The fragmented nature of the land ownership and management in the region, as well as limited financial resources and a lack of options for federally funding the acquisition of State Trust Lands, makes outright acquisition of Missing Link lands difficult in the short term.

   - Different resource needs and recreation demands for the different habitats of the Missing Link—riparian, upland desert, and desert grassland—would be better served by a cooperative and variable management approach than by imposing one management style or directive over vastly different landscapes.

2. The area is biologically and geologically significant:

   - The Missing Link provides habitat for six federally endangered plant and animal species, and 12 species of special concern.

   - According to data gathered in field studies conducted by the Sky Island Alliance for this report (Appendix M), the Missing Link lands are important movement corridors for "sky island" mountain mammals, especially black bears, mountain lions, coatimundis, and mule deer.

   - Resource specialists, including biologists working with Pima County on its Sonoran Desert Conservation Plan, place the land in the Missing Link at the highest-level priority for protection because of the presence of important habitat for endangered and threatened species, as well as its value as a wildlife corridor between established "biological core" areas. See Appendix N – "Priority Biological Resources of the Sonoran Desert Conservation Plan, February, 2002".

   - The watershed, including Las Cienegas NCA, provides the City of Tucson with up to 20% of its groundwater recharge system, according to data from the Arizona Department of Water Resources (an average of 16,000 acre-feet per year, out of an estimated 50-60,000 acre-feet total).

   - The area contains some 21 distinct and rare soil types, as well as numerous unique and rare limestone caves such as Colossal, Arkenstone, and Carter Caves. These caves are important because they provide habitat for the endangered lesser long-nosed bat and the threatened Mexican long-tongued bat, as well as for several species of rare invertebrates.

3. The area is culturally and economically important:

   - Numerous archaeological sites dating to 8000 B.C. and many historical sites, including Butterfield Stage stop and working ranches, are scattered throughout the Missing Link on unprotected lands.

   - The open space in the Missing Link provides multiple recreation opportunities for the rapidly growing Tucson population: hiking, birdwatching, biking, horseback riding, scenic drives, photography, cultural site exploration, hunting, camping, cave exploration, and picnicking.

   - Tucsonans are taxing recreation carrying capacity levels of current protected lands adjacent to city limits, including Tucson Mountain Park and Saguaro National Park.

   - The regional identity of the Rincon Valley is strongly based on Western rural lifestyle values, which include ranching and love of wildlife, open space, and outdoor recreation.

- Although the short-term view is to insist that growth is good for the local economy—jobs and home sales adding tax revenue—the long-term economic costs of additional sprawl is staggering: according to a Pima County study in 2000, each new home built in a development outside the city infrastructure (accounting for over 40% of all new, single-family building permits) costs the county $23,000 while contributing only about $1,700 in property taxes. Additionally, providing infrastructure and emergency services to these developments costs between $35 and $55 million a year.

4. There is strong local support for protection of the resources and the climate is ripe for collaboration:

    - Strong support for protecting open space and ecological linkages already exists in the Rincon Valley region, through the work of the Bureau of Land Management, community collaborators in the Sonoita Valley Planning Partnership, the Sonoran Institute, and others to establish the Las Cienegas NCA in 2000.

    - Local land agencies and managers are currently working well together and are favorably inclined toward a cooperative approach to managing the region.

    - A local non-profit conservation and community stewardship organization —the 12-year-old Rincon Institute—already exists in the region and could provide the local stakeholder leadership and contact point necessary for a strong coalition to support a cooperative management area. The Rincon Institute has established community rallying points such as its highly successful Rincon Valley Farmers' Market.

A campaign to develop a cooperative management agreement for the Missing Link would entail:

1. Identifying and helping establish a core leadership group of land managers and local stakeholders to lead the effort to develop a cooperative management agreement for the Missing Link.

2. Hosting additional, more-focused visioning workshops in the Rincon Valley and Agua Verde/Mescal area in order to help people identify what they hold most important in their community, to find common ground among neighbors and land management officials, and take the next steps in protecting their shared values.

3. Helping the group find the tools and financial resources needed to succeed in their goals of protecting open space and resource values in the Missing Link.

Current and potential partners for a collaborative management agreement are:

Bureau of Land Management, Tucson Field Office
National Park Service, Saguaro National Park
Pima County Parks and Recreation Department
Pima County Flood Control District
Arizona Game and Fish Department
U.S. Fish and Wildlife Service
U.S. Forest Service, Coronado National Forest
Arizona State Land Department
University of Arizona, Department of Renewable Natural Resources
Community leaders of the Rincon Valley, nearby settlements, Benson, and Tucson
Rincon Institute
Vail School District
Colossal Cave Mountain Park
Friends of Saguaro National Park
Sonoran Institute
Sky Island Alliance
Tucson Rough Riders
Arizona Open Land Trust
Southeast Arizona Land Trust
Friends of the Sonoran Desert
Center for Desert Archaeology
Sonoita Valley Planning Partnership
State Parks Department
Arizona-Sonora Desert Museum
Mule Deer Foundation
Empire Ranch Foundation
Coyote Creek, Antler Crest, Academy Village, X-9 Ranch, and Rocking K housing development representatives and homeowners associations
Pima Trails Association
Southern Arizona Mountain Bike Association

The timeline for developing a collaboratively produced vision and plan for protecting the lands of the Missing Link is urgent. In the next 20 years population expansion will consume a land base that is as big as the present City of Tucson, and most of this growth will occur in what is now unincorporated Pima County in areas such as the Missing Link. The State Land Department continues to dispose of land which would increase urban sprawl in northeastern Pima County, and private landowners will not be able to withstand pressures to sell land for development for much longer, especially as the first wave of land-hungry, newly retired Baby Boomers arrives in the region.

The Sonoran Institute recommends embarking as soon as possible on developing broad community and agency support for a protection campaign for the Missing Link lands that would encompass both national and state policy changes as well as a collaborative approach to management with the target of a draft plan to be completed by December 2004.