

Call for a *Sky Island Corridor Initiative*

A White Paper prepared by Borderlands Restoration, L3C

The Madrean Sky Islands emerge from the high deserts and grasslands straddling the border states of Sonora, Chihuahua, Arizona and New Mexico. Also known as the Apachean montane outliers of the Sierra Madre Occidental, the Sky Islands and northern highlands of Sierra Madre Occidental massif form a globally-heralded center of biological diversity recognized by the International Union for Conservation of Nature (IUCN) and the World Wide Fund (WWF).

The Sky Island region, with an estimated 4,000 plant species, untold number of invertebrates including over 600 species of bees alone, and almost 500 species of vertebrates, remains one of the most biologically diverse semi-arid and subtropical eco-regions of North America despite 10,500 years of documented human history, including four centuries of Euro-American exploitation. This exceptional diversity results from the confluence of four great biogeographic domains and the intermingling of their unique floras and faunas. Because of the rugged topography and arid climate, much of the biological wealth of the region has remained mostly intact, but that is changing rapidly. Urban development, persistent drought, and disappearance of streams and riparian forests are resulting in highly fragmented landscapes and in increasingly isolated and imperiled wildlife populations.

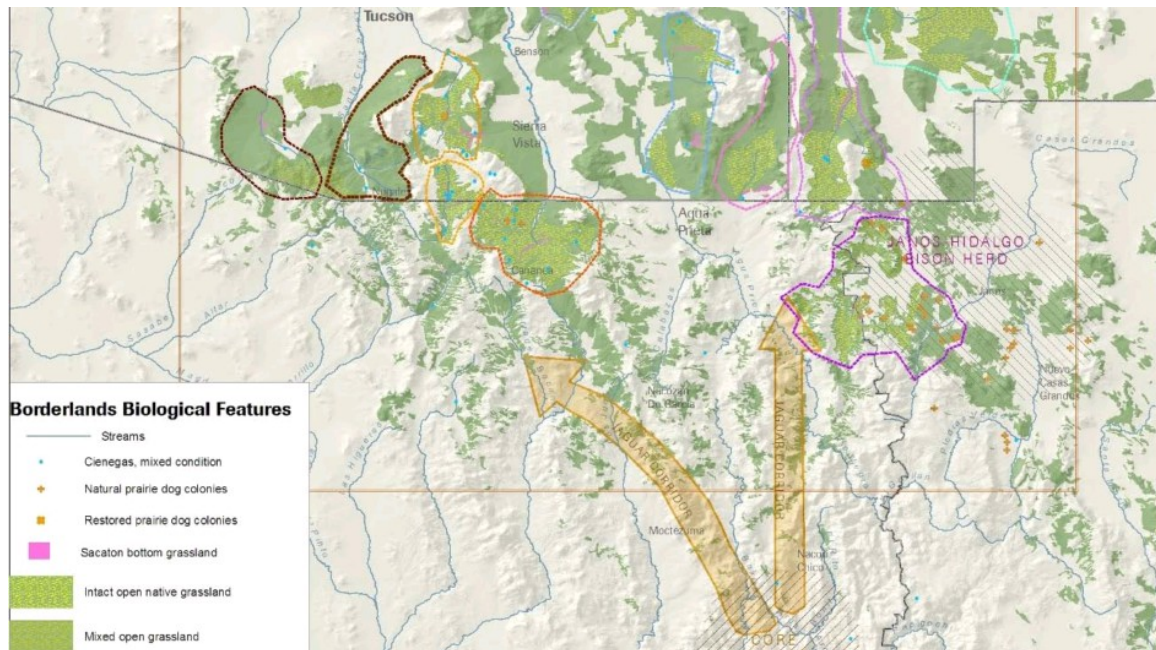
The key to ensuring the survival of the unique biological diversity of the Sky Islands region is protecting the migratory corridors linking the otherwise isolated mountain ranges. Predominately north-south oriented mountain ranges and their parallel river valleys form natural corridors of movement from northern Mexico into the United States for many animal species. Even plant species and many less mobile animals enter the U.S., albeit over intergenerational timescales, via a series of stepping stones connecting the Sky Islands to the Sierra Madre Occidental massif. In some cases, the rates of migration of less mobile species are so low and the periods of temporary connections between mountain ranges so infrequent, endemic taxa have been spawned by the repeated process of isolation and speciation. For the majority of species, however, the individual mountain ranges harbor small, isolated populations that are occasionally connected by gene flow and population rescue from nearby ranges.

Because they often exist as small populations on the edge of their geographic ranges and in isolated mountain ranges, an unusual proportion of Sky Island species are rare and many are considered imperiled. An analysis of the NatureServe Species at Risk (G1 to G3 and T1-T3 rankings) for every county in Arizona and New Mexico reveals that Santa Cruz County, Arizona has the highest density (species/area) of at-risk species and that neighboring Cochise County ranks second. In general, counties along the US-Mexico border have disproportionately more species, and those counties containing cross-border mountain ranges are especially rich in rare species.

This brief white paper makes the case for a major bi-national effort, tentatively called the *Sky Island Corridor Initiative*, to protect the unique biological diversity of southern Arizona and New Mexico and adjacent areas of northern Mexico by protecting two primary migratory corridors linking the Sky Islands to the northern Sierra Madre Occidental as well as a number of strategically selected secondary corridors linking the Sky Islands to one another. The Sky Island Corridor Initiative will require a substantial source of funding for land purchases, restoration, community engagement, and other conservation actions.

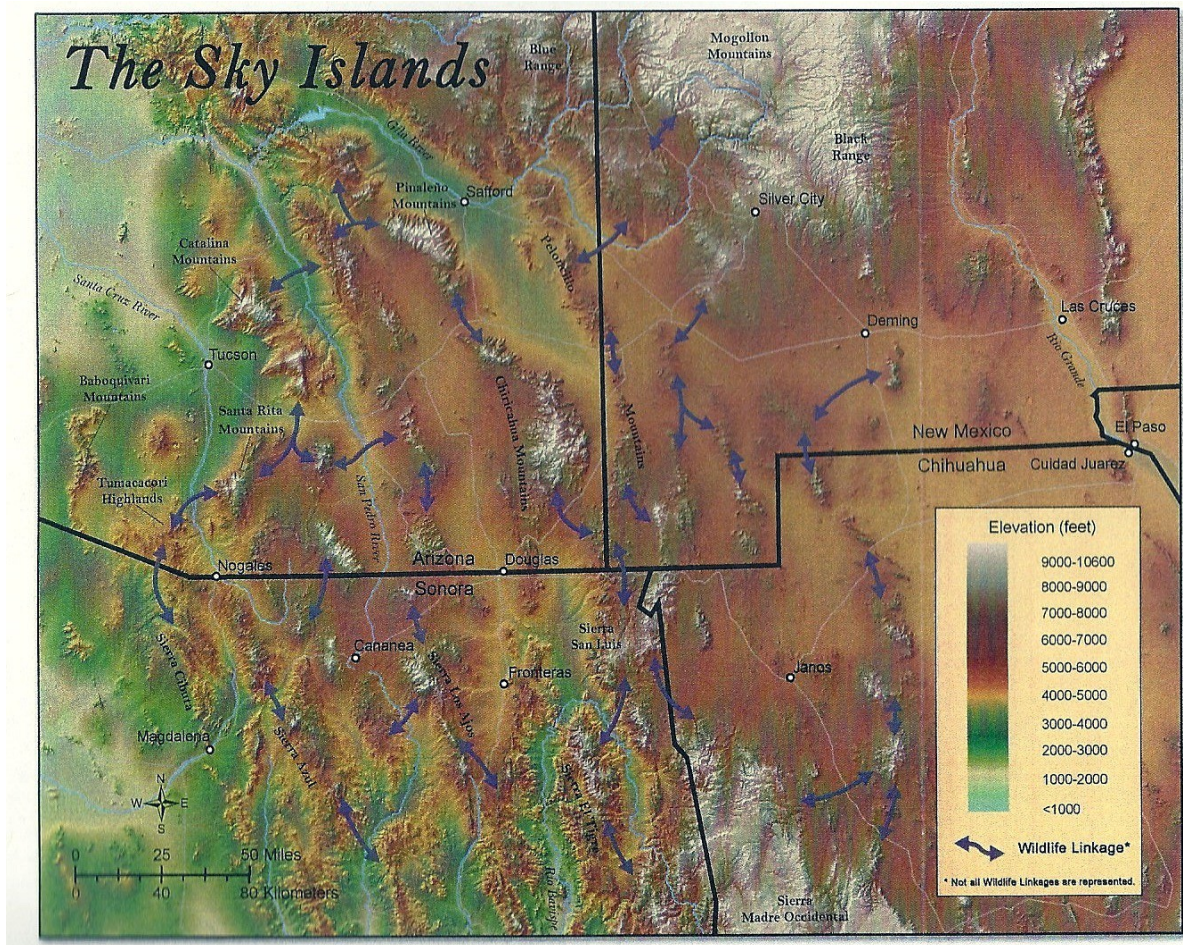
Biological Corridors and Community Connections

Biologists have long recognized the connections between the biological diversity of the Sky Islands and that of the Sierra Madre Occidental massif to the south and have repeatedly called for the protection of the corridors linking the Sky Islands to one another and to the Sierra Madre. No fewer than five regional plans, all with the same message, have been prepared by various conservation organizations seeking to protect the biological heritage of the region. The message of each plan is fundamentally the same: in order to protect the biodiversity of the region, linkages among the Sky Islands and between them and the highlands of the Sierra Madre must be protected.



The exceptionally high diversity of plants and animals of the U.S. Sky Islands results from natural corridors linking the isolated mountain ranges of southeastern Arizona and southwestern N.M. to the Sierra Madre massif. The map in the figure above, taken from the National Fish and Wildlife Foundation Sky Islands Grasslands Initiative Business Plan, shows two large-scale routes, referred to here as the *easterly* and *westerly macro-corridors*, originating in the Sierra Madre Occidental and trending northward towards the U.S. boundary. Although the map was prepared to highlight important grassland areas and illustrate migratory movements of jaguar, the same routes are used by many other mobile animal species. The *easterly macro-corridor* originates in the headwaters of the Rio Bavispe and winds northward through the Sierra San Luis and Pelloncillo Mountains into the Chiricahua Mountains, and the *westerly macro-corridor* runs northward along the Sierra Los Ojos, reaching the U.S. in the Huachuca and Patagonia Mountains. In addition to these two macro-corridors, many secondary corridors stitch the landscape together, linking the various otherwise-isolated mountain ranges.

The second map (below), available from the Sky Island Alliance, identifies some of the important secondary linkages among the otherwise isolated mountain ranges. SIA has employed teams of volunteers to identify paths of animal movement by recording animal tracks along the routes between ranges. Other researchers have used genetic markers to identify important migratory corridors. The most extensive study of linkages between mountain ranges in Arizona was undertaken by Northern Arizona University. In a series of *Arizona Missing Linkages* reports, the NAU research team carefully considered the habitat requirements, dispersal, and demographic characteristics of 22 species and the physical barriers to their movement, and identified *biologically best corridors* for each species.



Many separate analyses have come to the same conclusion: the biological diversity of the individual mountain ranges is in peril if the migratory linkages among them are jeopardized. Given that many groups have come to the same conclusion and the most important linkages have been identified, one must ask why so little has been done to secure the corridors.

From Biological Knowledge to Conservation Actions

The beginnings of a Sky Island Conservation Corridor are already in place. The Ajos Bavispe and other federal reserves in northern Mexico, along with the Cuenca los Ojos properties along the easterly route and the Los Fresnos reserve along the westerly route, provide important linkages to the Sierra Madre Occidental. Several U.S. National Wildlife Refuges and designated Wilderness Areas plus additional Cuenca los Ojos ranches are isolated patches along the easterly macro-corridor into the northern Chiricahuas. Similarly, state and federally protected lands combined with various properties already under conservation easements in the San Rafael Valley and along the Santa Cruz watershed provide important bits and pieces of protected land along the westerly macro-corridor.

The existing protected areas constitute isolated pieces that need to be stitched together into a coherent whole. This need has been long recognized but progress toward the goal has been very slow. There are at least two major reasons for the lack of progress: 1) there has never been a major coordinated funding effort by the foundations and agencies at the scale necessary to address the needs of the region and 2) most of the efforts to protect land in the region have focused more on the biological issues and have not paid significant attention to the economic and cultural issues that impede conservation.

Good science is a necessary but not sufficient ingredient for good land conservation. The Sky Islands are fortunate in having attracted the scientific expertise necessary to identify the best biological corridors for connecting the isolated mountains in the region. For some corridors, the biological analysis is more or less complete, and what needs to be done now is to agree on a conservation strategy, identify sources of funding, and work at the local level to bring about concrete conservation actions. The conservation actions required will vary from location to location, but the options include engaging local citizens in local corridor planning, purchasing or acquiring easements on sensitive land, restoring wildlife habitat, mitigating barriers to wildlife movement, monitoring wildlife populations, controlling access and uses of land, easing regulatory burdens that discourage conservation, and educating the public about the importance of wildlife corridors.

Experience with large landscapes and diverse collaborative groups suggests that addressing two types of issues - values and threats - provides an explicit framework for prioritizing, in a clear and transparent manner, conservation actions. Values determine conservation targets; that is, what it is that we wish to protect. Once both values and threats are identified, strategies can be devised to protect the conservation targets in light of the threats to them. Conservation actions that are seen by group members to most effectively address the threats to the conservation targets are ranked as highest priority actions.

This framework provides a structured process for identifying areas of agreement and areas of disagreement among group members. Members may agree on values but disagree on strategies and actions or they may fundamentally disagree on values and therefore on what should and should not be protected. Such efforts often lead to greater understanding and the identification of an explicit “zone of agreement” within a diverse group with distinct values and desires for the future, and such increased understanding can lead to convergence of priorities.

The Sky Islands Corridor Initiative can sponsor both a regional Corridor Oversight Group to establish priorities among corridors and multiple local Corridor Design Groups to implement actions in the highest priority linkages. At both levels, priority-setting workshops can be used to identify joint priorities that will simultaneously drive conservation actions and inspire the confidence of all members of the collaborative groups. This does not mean that everyone must agree on every priority - it is highly likely that different members and their constituencies will have different values, different objectives, and thus somewhat different priorities. However, if the collaborative groups adopt a transparent process that all have agreed to, prior to explicitly determining all priorities, the process and its outcomes provide a foundation for agreement that is able to endure specific differences of opinion that inevitably appear.

Respecting both Science and Cultural Values

The prioritization approach outlined above is simple in concept but quite involved in execution. One of the reasons for difficulty of execution is that the discussions often become overly focused on the biophysical dimensions of the problem and ignore the social and cultural differences of the participants. The approach rarely succeeds unless diverse values, ideas, and points of view are brought to the table for respectful deliberation. Biological information and an interactive mapping capacity can provide a common ground for initiating discussion, but ultimately other values and points of view must be brought to the table and respected. A process that brings conservation practitioners together with local stakeholders with a deep personal knowledge of the landscape provides one way forward.

The landscape prioritization process is most useful if multiple values and threats are identified from the start. To begin, when considering a specific corridor design,

scientists, planners, and local residents can all be asked what it is that should be protected and what the threats are to the things that need protection and what are the risks or threats associated with the potential management actions under consideration. The crucial step is allowing all participants to participate in identifying what is important to them and what the risks are. The result, as illustrated below, is almost always a list that goes beyond simply listing the biological values and threats to include diverse social and cultural values rarely considered by biologists.

What needs to be protected ?

- Rare species and habitat
- Landscape connectivity
- Recreational opportunities
- Access to public land
- Water resources
- Economic contributions
- Educational opportunities
- Health and spiritual renewal

What are the threats?

- Habitat degradation
- Loss of open spaces
- Species extirpation or extinction
- Water loss or diversion
- Loss of land/water productivity
- Hazards (fire, flooding)
- Intergenerational equity
- Regulations and legal battles

The process of identifying values and threats will bring more players to the table, lead to a wider array of management options, and can result in win-win solutions. For example, concerns that land acquisitions may limit recreational opportunities might be addressed by including access right away to public land or appropriate hiking and recreational opportunities on the acquired land. Reluctance of adjacent landowners to participate in joint management activities might be alleviated by forging Safe Harbor agreements and facilitating permits that assure landowners that their participation and success will not be punished for good behavior. Finally, appropriate agricultural and grazing uses, such as grass banking and leases for small scale farming on protected lands might result in more economic opportunities for local landowners and generate local support for long-term stewardship of the corridors.

Towards a Restoration Economy

The idea of conservation is continually evolving. Early proponents of wilderness advocated for protecting the last remnants of wilderness in the US, especially in the American West. This approach was partially successful, protecting vast acreages of pristine land and resulting in a network of National Parks and Wilderness Areas second to none. In addition to federal and state programs that created a network of protected lands, conservation organizations bought and protected large numbers of smaller sites of exceptional conservation value, often “fencing off” properties and limiting public access to protect rare habitat and species. As wilderness dwindled and the public voiced complaints that too much land was being tied up in conservation reserves, the conservation community continued to purchase and protect ecologically sensitive lands, but also began to reach out more to neighbors. The paradigm shifted to what is now known as community-based collaborative conservation. It promotes incentives for landscape scale conservation and restoration on privately-held lands as well as on publically-held protected areas. This approach too has seen many successes and resulted both in conservation of important habitat and in greater acceptance of conservation efforts.

Over the last decade, the notion of a “restoration economy” has been taking root among the community-based conservation alliances in the West. The restoration economy includes a wide variety of economic activities that heal the land and reconnect people to the natural world. Restoring streams, rivers, forest and grasslands provides immediate jobs and prospects for more sustainable future uses. Enhancing grassland productivity helps ranchers stay in business, improves habitat for wildlife, and keeps open land open for

scenic views and wildlife viewing. Restoring streams and streamside vegetation improves wildlife habitat, provides water for towns and farms, and enhances opportunities for hikers, bikers, birders and campers. Restoring degraded agricultural lands improves wildlife habitat, builds carbon- and water-holding capacity in arable soils and provides opportunities for small scale farms and nurseries at a time when rural economies are otherwise lagging.

The restoration economy goes far beyond restoring wildlife habitat *per se*. It enhances the natural landscape, making rural areas more likely destinations for tourists and retirees. The restoration economy attracts visitors and new residents who shop in local stores in refurbished historic buildings, stay in local bed and breakfast establishments, buy from local craftsmen and artists, eat at local restaurants, and purchase supplies, gas, and services from independently-owned businesses. Organic wastes from woodcutting, wine or food production or cross-border produce brokers are used to produce compost for farms and gardens, or biodiesel fuel for vehicles. Broadly defined, the restoration economy also includes a variety of health and healing activities that restore the minds and bodies of visitors and residents alike. Health spas, natural foods markets, spiritual retreats, recreational activities, and communing with nature are all part of an economy that restores people and their connections to the natural world.

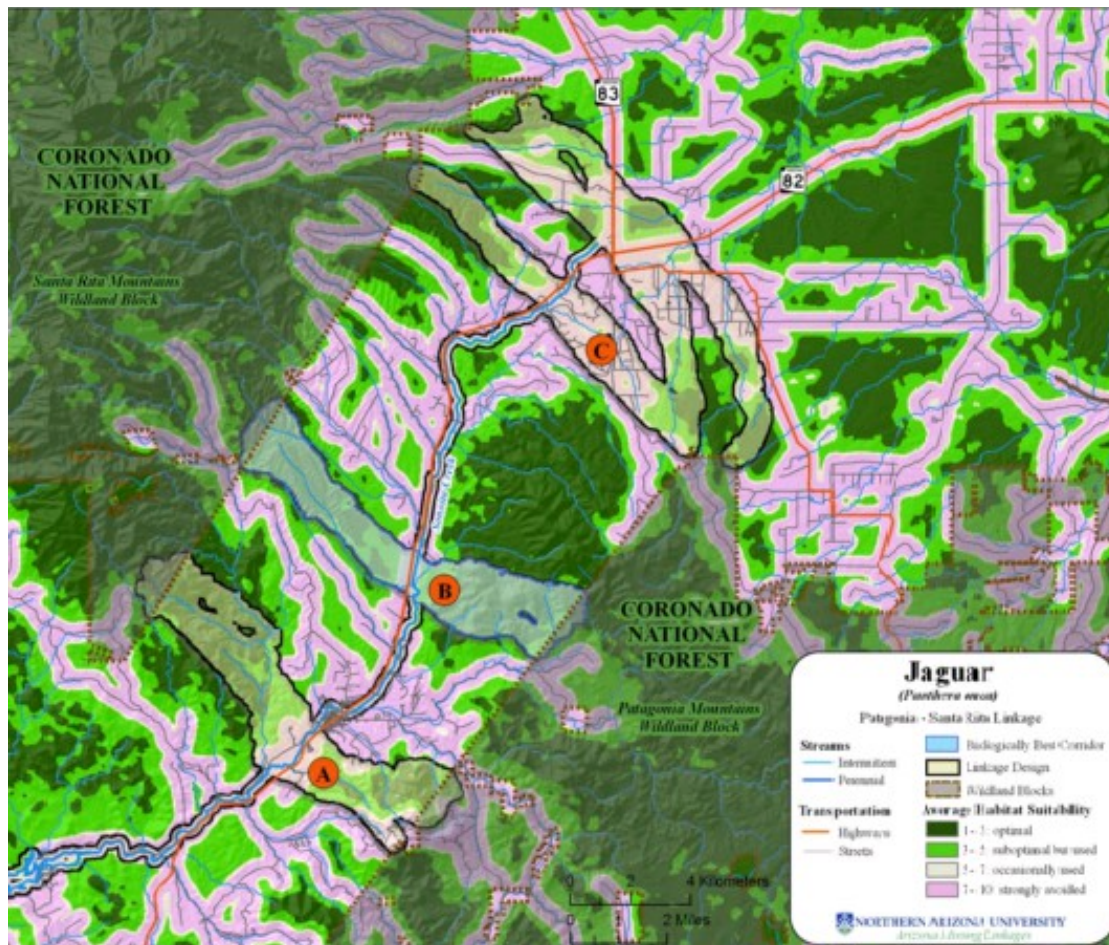
The broader point is that conservation, in general, and protecting wildlife corridors in particular, can be seen as part of a broader goal of revitalizing rural economies, and restoration of habitat for both wildlife and people should be a vital part of every regional conservation plan. Of course, we should protect more land and occasionally even fence it off to protect rare and sensitive species and habitat, but we cannot let that alone define what conservation is. Conservation, including protection of wildlife corridors, is an essential part of a bigger effort to restore rural economies, to reconnect people to the land, and to provide habitat for wildlife and people.

Building Corridors One Link at a Time: The Patagonia-Santa Rita Linkage

Several land trusts and conservation organizations are actively acquiring land and establishing conservation easements in the Sky Islands region. Working closely with county, state, and federal agencies, these organizations have already protected important conservation areas of considerable size. However, the protected areas are not always those of highest conservation concern and collectively, they do not necessarily form a logical corridor of protected areas.

A Conservation Lands Workshop was held November 13, 2012 in Patagonia, Arizona. The meeting was convened by Borderlands Restoration, L3C, and the attendees included the Trust for Public Land, the Arizona Land and Water Trust, the Sonoran Institute, the Sky Island Alliance, Arizona Game and Fish Department, and a number of local ranchers and other citizens. The workshop had two primary purposes: to consider general criteria for prioritizing conservation acquisitions and easements in the upper Santa Cruz watershed, and to determine the interest in purchasing a specific parcel of land, the Sonoita Creek Ranch, that had already been identified as one of highest priorities of several state agencies and conservation groups.

The Patagonia-Santa Rita linkage is one of 16 priority corridors thoroughly analyzed by the NAU Arizona Missing Linkages program. The NAU study compared alternate routes linking the Patagonia and Santa Rita mountains (see map below) and analyzed the value of each route as a wildlife corridor. As with many other important linkages, the Patagonia-Santa Rita linkage has been thoroughly analyzed but little has been done, so far, to protect the corridor. We now need to move from scientific analysis to conservation action.



The 1125 acre Sonoita Creek Ranch occupies a strategic position linking the Patagonia Mountains to the Santa Rita Mountains encompassing of the East side of Corridor B in the map above. The property abuts Forest Service land to the east and it shares frontage on AZ 82 with an existing conservation easement that adjoins Forest Service land to the west. The property has abundant wildlife, three federally-listed endangered or threatened species and a large number of candidate and other species at risk. The property is one of the last remaining un-subdivided tracts between Sonoita and Patagonia. The property also has 544 acre feet of water rights to Monkey Springs, one of the largest freshwater springs in southeastern Arizona. A portion of the land is irrigated for farming, and the land has high value as grazed pasture and for small scale agriculture and could be an important recreational site and provide access to nearly Forest service land for hunters, hikers, and wildlife viewers. At the meeting, several groups expressed strong interest in finding a way to purchase the land under a conservation easement, and those discussions are continuing with the next step being a design charette planned for early 2013.

The focus on the Sonoita Creek Ranch at the Patagonia meeting had several purposes. First and foremost, it led to discussions that may culminate in the protection of a critical wildlife corridor that is currently under serious threat. A subdivision is currently under construction immediately to the north, lots are already for sale in a subdivision immediately to the south, and the Three Canyons subdivisions across highway 82 is moving out of bankruptcy and beginning to reorganize. The northern end of the Three Canyons Subdivision already has over 600 acres of undeveloped land under a conservation easement and together with Sonoita Creek Ranch provides the prospect of an unbroken corridor linking the Patagonia Mountain Wildland Block of the Coronado National Forest to the Santa Rita Wildland Block of the Forest.

Secondly, the Sonoita Creek Ranch illustrates that what is best corridor for one species is not necessarily best for all species and that land acquisition is not always the best option for protecting corridors. The NAU Arizona Missing Linkages study identified the species most likely to use each of the corridors shown on the map, concluding, for example, that corridor B is the best biological corridor for jaguar A but that linkage A is the best biological corridor for Coue's white tailed deer and badger. This means that acquiring the Sonoita Creek Ranch alone is not enough and a comprehensive strategy is needed to prioritize appropriate conservation actions in all of the alternate corridors. Corridors A and C are more populated with homes than Corridor B, and outright acquisition of the corridors is not a viable option. However, most of the landowners in the affected area are conservation minded, some are already volunteers for local habitat restoration projects, and others have expressed strong interest in participating in a corridor planning effort. The setting is right for establishing a Patagonia-Santa Rita Corridor Design Group and for crafting a strategy that protects all three corridors while being respectful of the values and threats seen by the local landowners.

The collective group attending the November meeting in Patagonia has a strong interest in acquiring the Sonoita Creek Ranch as the centerpiece of a Patagonia-Santa Rita Corridor but none of the participating groups has the ability to move quickly despite the eminent threats. This is, of course, in part due to the high price of the land and the fact that each group is already pursuing other conservation acquisition and easement opportunities that are tying up their resources. The owners of Sonoita Creek Ranch previously had it on the market for \$6.2M, and with the need to purchase some adjacent property and establish a comprehensive corridor strategy, the deal could easily require \$7M to \$8M+ to complete, not including the costs of restoration, operations, and management after acquisition. The participants in the meeting all expressed interest in a more comprehensive approach to regional conservation planning that identifies high priorities for conservation acquisitions and provides bridge funding for immediate acquisition of high priority lands under immediate threat.

The Sonoita Creek Ranch also provides a potential model for both acquiring conservation land that contributes to the local restoration economy and for pioneering new ways to finance landscape scale conservation. The water rights associated with the land provide an opportunity to restore a highly degraded habitat that once was home to many now threatened and endangered species. Stream restoration provides an opportunity to acquire acquisition and restoration funding from mitigation funds associated with section 404 permits under the Clean Water Act. Water rights to Monkey Springs combined with upstream water harvesting projects that slow runoff and favor infiltration can provide water to reconstruct a meandering stream, where a channelized, flood-prone dry stream bed now occurs.

A study has been initiated by USGS scientist Dr. Laura Norman to quantify surface flows and sediment deposition in the drainages that converge on the Sonoita Creek Ranch. The study will permit identification of upstream restoration sites that will be most effective at promoting water infiltration and eventually bringing surface flows back to Sonoita Creek. The Borderlands Habitat Restoration Initiative, sponsored in part by Borderlands Restoration, L3C, is already working on three restoration sites on private land in the Sonoita Creek watershed and is prepared to initiate many more habitat restoration and water harvesting projects in the watershed.

An increase in surface and ground water from water-harvesting projects upstream from Sonoita Creek Ranch combined with the re-purposed water from Monkey Springs will improve wildlife habitat while providing water for small scale crop production and grass banking for local ranchers. Income from leasing water, farm, and grazing rights will provide a permanent source of income for the maintenance and operation of the ranch under a permanent conservation easement.

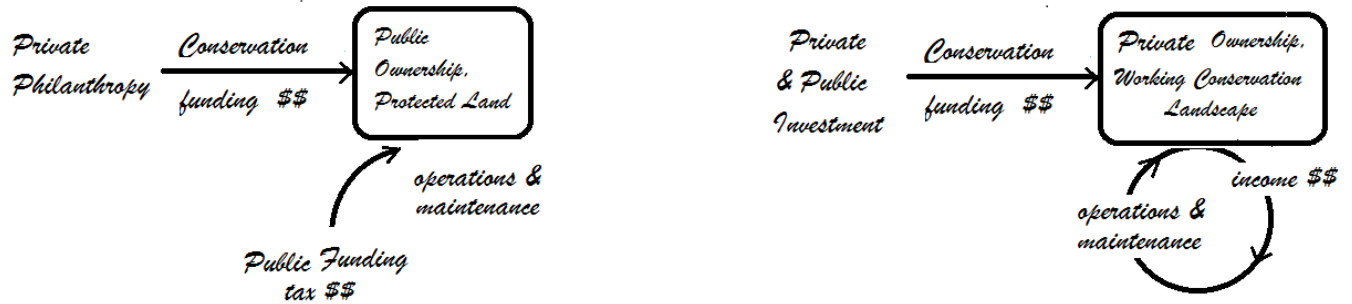
We are currently analyzing the financing options for the acquisition and operations of the Sonoita Creek Ranch. Preliminary analysis suggests the feasibility of approximately 1/3 from philanthropy, 1/3 from “slow money” equity investors or foundation program related investments (PRIs), and 1/3 from mitigation funds. An initial “slow money” investment of \$2M could return a 4 to 5% annual dividend to investors. A document outlining the potential income from farm and ranch income activities is under preparation.

A Collaborative-Conservation Partnership: The Sky Island Corridor Initiative

The time is ripe for a Sky Island Corridor Initiative because the science is largely in place, the beginning of a network of protected lands is already emerging, and the opportunities to protect crucial corridors between the existing protected lands are rapidly vanishing. The collaborative conservation model—largely forged in the U.S. through Arizona-based alliances like Malpai Borderlands Group, Diablo Trust and Altar Valley Conservation Alliance—has brought maturity and empathy to discussions among ranchers, farmers, conservation biologists and environmental activists, and provides a model for the current initiative.

To be successful, the Sky Island Corridor Initiative must be large enough to focus attention of the conservation community and to link the Sky Islands to the Sierra Madre Occidental. A network of twenty plus new projects, each roughly the size of the Patagonia-Santa Rita example and all strategically tied to the existing network of conservation sites, is required. A Sky Island Corridor Initiative with core funding on the order of \$50 to \$80M over ten years could be leveraged 3:1 to protect upwards of 100,000 acres of land on both sides of the border and in both of the macro-corridors identified. Working from a list of priority linkages established by the Corridor Oversight Group, participating organizations could establish local Corridor Design Groups and compete in an open peer-reviewed process for funds that can only be spent in the priority corridors. The review process can be used to choose the best proposals and ensure that the collection of properties protected add up to macro-corridor protection.

The Sky Island Corridor Initiative should be open to the entire conservation community and should encourage a mixture of tried and true and new, innovative models for financing conservation at a landscape scale. The diagram below on the left is a caricature of the “old” model of conservation whereby philanthropic dollars are used to purchase land that is transferred to public ownership and the burden of operation and maintenance is assumed by taxpayers. The “new” model on the right uses a mixture of private investment and public funds for the purchase of land, restores the productivity of the land and supports conservation operations on the purchased property and adjacent land from the income stream generated by sustainable business activities on the protected land. The goal of the new model is to eventually reach a stage where *conservation mostly pays for itself by attracting investment capital and results in more protected land while offering modest returns on investment.*



The advantage of the new model is that it depends less on limited philanthropic and tax subsidy and allows limited conservation dollars to be stretched further. The approach may or may not reach the stage of paying for itself entirely, but the further it moves in that direction, the more land and species can be protected.

This white paper has been prepared by Borderlands Restoration, L3C. We believe that, as a limited-profit company, with an explicit land protection and restoration mission combined with the ability to attract investment dollars, we are in an excellent position to participate in the new model of land acquisition outlined above. However, we also recognize that the new model, that we call the L3C equity investment model, has not been thoroughly tried and that there will always be a need for a variety of approaches and financing mechanisms for acquiring land and establishing conservation easements. We propose, therefore, that the fund be established for a Sky Island Corridor Initiative, that the fund be open to receive proposals from the entire conservation community, and that the L3C equity investment model be given a chance to compete alongside, and in collaboration with, more traditional land trust and conservation approaches. The funding community can then judge, based on the conservation results achieved, what role the new L3C equity investment model might play in future large-scale conservation efforts.