



Hermitage program celebrates 26 years of providing solitary sojourns in desert wildlands.

Cascabel Conservation Association

Supporting Conservation, Community, and Contemplation in the Middle San Pedro Valley

2021 CCA NEWSLETTER



Kat Ehnorn

We gratefully announce the donation by Sandra Michael of her 26-acre parcel overlooking the valley and Hot Springs Canyon. It has become part of our Hermitage Lands to delight, instruct, and comfort members and sojourners. Thank you, Sandra!

Hermitage Program: Grounded and Growing

“The story of CCA’s hermitage program is one of people giving of their lives and resources in the service of providing a semi-primitive experience of Sonoran Desert wildlands. That service is inspired by a faith in the sacredness of the earth and the importance of our relationship to it, both for the sake of the human and natural community’s survival as well as a deeper understanding of our integrated humanness.” —Daniel Baker

IN MAY OF 1995, FATHER JOHN KANE, then in his 70s and Director of the Tucson Desert House of Prayer, initiated the Cascabel Hermitage Association by camping for five days on the land. In a conversation afterwards with Jim Corbett and Daniel Baker, Fr. Kane said that it was a very good experience and that the hermitage land held promise for sojourners. He also told Jim: “I have known you as an activist. Now I know you as a contemplative as well.” Jim replied, “They both go together, of course.”

Twenty-six years later, the CCA and Saguaro-Juniper lands continue to “hold promise” for those desiring to sojourn in simplicity and solitude in this Sonoran Desert wildlands. The current state of our world in 2021 cries out for reflection and contemplation so that wisdom and heart can be the grounding for our actions to safeguard our planet and all life upon it.

The hermitage program is in an exciting time of growth. We have been re-visioning the

program to honor the past and seed the present for future sojourners. Part of that ongoing process is our monthly “Sabbatical Gatherings,” welcoming anyone interested in spending a few hours with feet planted on the earth and hearts open in “attentive stillness” to each other and the land we steward. There is no agenda; we simply begin by reading aloud the preamble to our Land Covenant and the Land Bill of Rights for remembrance. Sometimes we walk together, sometimes we sit and reflect together. Our aspiration is that this sacred time of communion will help ground us in our personal practice and in the land.

Many things are growing out of this re-visioning:

- The Corbett Retreat Center has a new rainwater catchment system/ramada, so we can better accommodate small groups and demonstrate sustainable desert-adapted living. We also have a

Continued on page 5.

Sources of Perennial Water in the San Pedro River

Chris Eastoe

SINCE JAMES AND I BOUGHT OUR PROPERTY in Cascabel in 2006, we have been watching the perennial reaches of the San Pedro River become shorter and drier. These reaches are the parts of the river that have some surface flow even at the driest times of the year; they are wonderful, green oases, and are essential for the diversity of animals for which the San Pedro Valley is famous. *Figure 1* shows how the perennial reach at Three Links Pastures in Cascabel has declined since 2010. It is based on the Wet-Dry Mapping Project that many of you have participated in. Understanding why this and other reaches are declining is important if we are to live in this valley without destroying it.

At the University of Arizona, I used to run a laboratory that provided me with some tools for studying the water supply. I've collected and measured numerous samples, and I have combined that information with a great deal of other information gathered by other scientists along the San Pedro River. The result was a paper published in 2020 about sources of perennial water in the San Pedro Valley between the international border and Redington (*Figure 2*). This newsletter article is a sampling of findings from the paper.

How does the river basin function as a water storage?

There are six kinds of geological features (*Figure 3*) that govern how water moves and is stored:

- (1) The well-watered mountain areas, where winter snow may accumulate. These areas provide runoff that infiltrates the sediments that occupy the basin. At times, this water reaches the San Pedro River as surface flow.
- (2) Coarse gravel deposits filling the valley from the mountain fronts to the valley center. These units are aquifers through which groundwater flows from mountains towards the central axis of the valley.
- (3) Thick clay-rich beds near Benson and south of Sierra Vista. These beds cap aquifers in underlying sand and coarse gravel. In the Benson area, some of the groundwater underneath the clay is ancient, in some cases more than 13,000 years.
- (4) A trench-like valley in the middle of the basin, mostly coinciding with the present course of the river. It was excavated at the end of the last Ice Age, since 20,000 years ago. The last Ice Age didn't generate any glaciers



Chris Eastoe

The perennial reach of the San Pedro River at Three Links Pastures, photographed in July 2020.

- in southern Arizona, but it was a time of cooler, wetter climate when the river had more surface flow than at present. The trench has been filled and partially re-excavated several times. At present, it contains sand, gravel and clay deposits, and is being re-excavated so that the river flows between steep cuts up to 6 yards deep in the pre-1850 flood plain.
- (5) Rock barriers in the riverbed (*Figure 2*). These act as dams for groundwater upstream of each barrier. Under natural conditions, the groundwater would fill the upstream sediments until it flowed over each barrier in the river channel. This still happens near Sierra Vista.
- (6) Old river channels running parallel to the active channel of the San Pedro River. These contain permeable sand or gravel and can focus the flow of groundwater.

Most of these components are present in or near Cascabel. The Rincon and Galiuro Mountains supply water to some of the large tributary washes. Some wells draw water from the coarse gravel deposits east of the river, where the

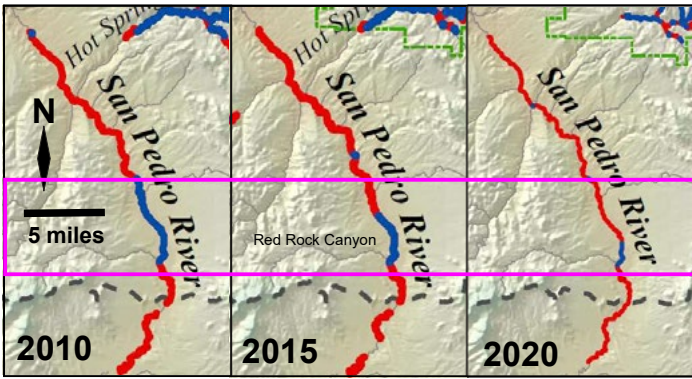


Figure 1. Results of the wet-dry mapping in Cascabel. The perennial reach at the Three Links Pastures are in the pink rectangle. Source: The Nature Conservancy, http://azconservation.org/downloads/san_pedro_wet_dry_mapping

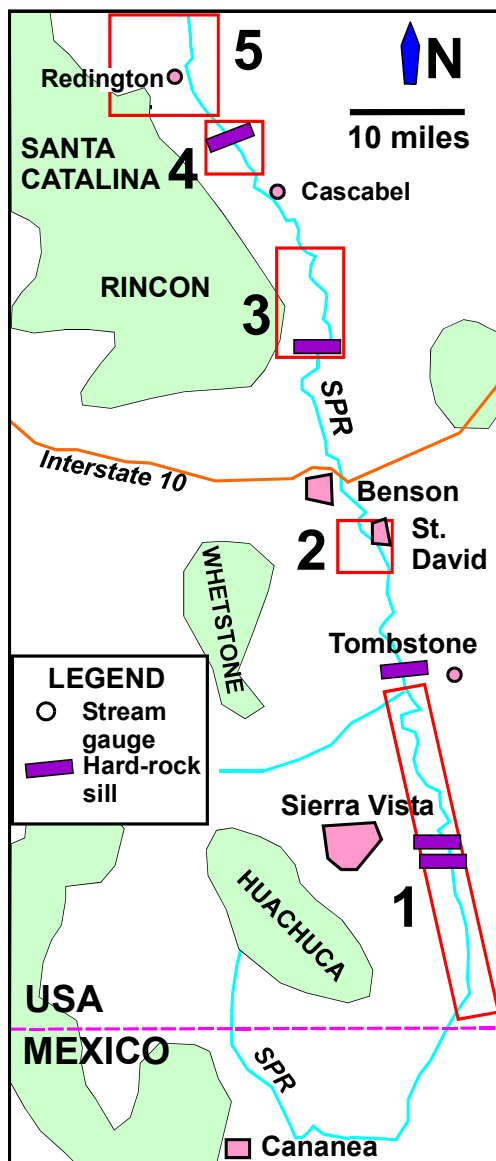


Figure 2. Map of the study area. SPR = San Pedro River. Areas that have (or recently had) perennial flow are: 1. South of Sierra Vista; 2. St. David to Benson; 3. Cascabel at Three Links Pastures; 4. Cascabel near Gamez Road; 5. Redington near Bingham Cienega.

wells produce enough water for domestic supply, but not for large-scale irrigation. It appears that an old river channel conveys groundwater along the east bank of the river from Hot Springs Canyon to Gamez Road. Most Cascabel wells draw water from the sediments that fill the post-Ice Age trench. Lastly, we have two rock barriers in the riverbed: one of granite at the Benson Narrows, and another of impermeable clay-rich beds near Gamez Road.

How are different parts of the river interconnected?

Water flows across the rock barriers near Sierra Vista, even at the driest times of the year. Therefore, perennial water in area 2 south of Benson (Figure 2) is partly dependent on water from area 1 south of Sierra Vista. There has been no perennial flow across the Benson Narrows barrier for many years, and near Gamez Road, flow in June had dwindled to nothing by 2020. Large floods, mainly during the summer monsoon, still flow the full length of the San Pedro River, but for most of the year, the river basin as far as Redington is actually three disconnected basins: south of the Benson Narrows, from the Narrows to Gamez Road, and north of Gamez Road. Near Sierra Vista, where measurements have been made by the US Geological Survey over many decades, the perennial flow has declined steadily for decades, and by 2010 was about half what it was in the 1930s.

Why is flow decreasing?

It is clear that less water is available to provide surface flow in the river now than was the case decades ago. Two main causes can be considered: natural drought and human demand for water. It isn't easy to tell which is the cause. The U.S. Geological Survey has undertaken a detailed accounting of water supply and water use in the San Pedro Valley. Human demand for water has mostly been for irrigation, and that demand peaked in the 1970s. The demand in 2010

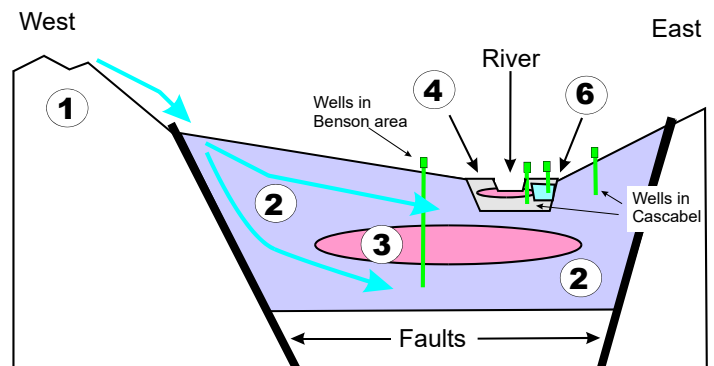


Figure 3. A sketch cross-section of the San Pedro Valley, showing the main hydrologic features. See the text for explanations of numbers 1 to 6 (number 5 is not shown). Blue arrows indicate groundwater flow paths.

in the Cascabel-Redington area was only 1/6 of the peak demand, but was still 20% of the annual amount of water supplied to the area from rain.

Drought operates on a variety of time scales. At a time-scale of 10,000 years, southern Arizona has transitioned from a wetter climate at the end of the last Ice Age to a drier climate at present. One result has been the disappearance of Lake Cochise, a large lake where Willcox and its playa are now located. At a timescale of a few decades, we have had drought since the mid 1990s, and another decadal drought occurred in the 1950s. Rainfall has been recorded at some nearby stations since the 1890s (Figure 4). Drought intervals are not exactly similar at each station. Tombstone in the upper San Pedro Valley has been mainly in drought since 1940, and similar conditions may have occurred over much of the upper part of the valley. This could account for the decline in perennial flow since the 1930s near Sierra Vista. At a timescale of centuries, there is another cycle of drought related to a period that has become known as the Little Ice Age, a time of relatively cool and wet climate between AD 1300 and 1850. The climate was wetter in our region; this is indicated by the presence of large lakes in inland California and in Chihuahua just south of the international border, and by the frequency of large floods in Arizona. Our water resources are probably still adjusting to long-term drying since about 1800.

It seems likely that natural drought is the main reason for the gradual disappearance of water in the San Pedro River, but that human use of water has hastened the drying. Perennial flow has continued to decline despite the reduced demand for irrigation water over the past 50 years. Are there other ways of finding out what time scales of drought are affecting various reaches of the San Pedro River? The isotope measurements made in my laboratory turn out to be useful.

Using tritium to determine groundwater age.

Tritium is a radioactive isotope of hydrogen (Figure 5). It forms in the upper atmosphere as a result of cosmic radiation, and in atmospheric nuclear tests. It is radioactive, and decays to helium with a half-life of 12.3 years. Like other isotopes of hydrogen, it combines with oxygen to form water. It can be measured in rainwater and in young groundwater. Since 1992, when tritium from nuclear tests had effectively disappeared in rainwater in southern Arizona, the tritium level in rain has averaged 5 units on the scale we use to measure it. Water that fell as rain before 1953 no longer contains measurable concentrations of tritium because the original tritium has decayed away.

Water sampled in June 2001 in the riverbed near Bingham Cienega in area 5 (Figure 2) had 4.5 units of tritium,

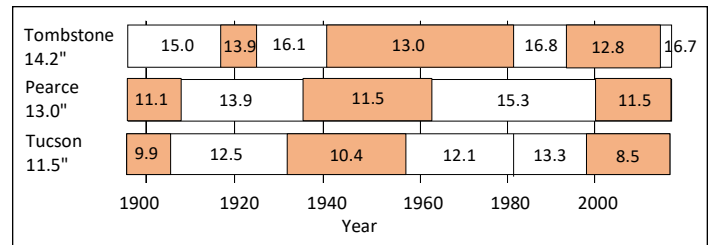


Figure 4. Drought status at three stations in southeastern Arizona, from 1896 to present. Annual average precipitation from 1896 to the present is given beneath each station name. Shading indicates drought conditions, and white, non-drought conditions, as indicated by annual average precipitation over the time interval indicated by each box. Data are from Westwide Drought Tracker, <https://wrcc.dri.edu/wwdt/time/>

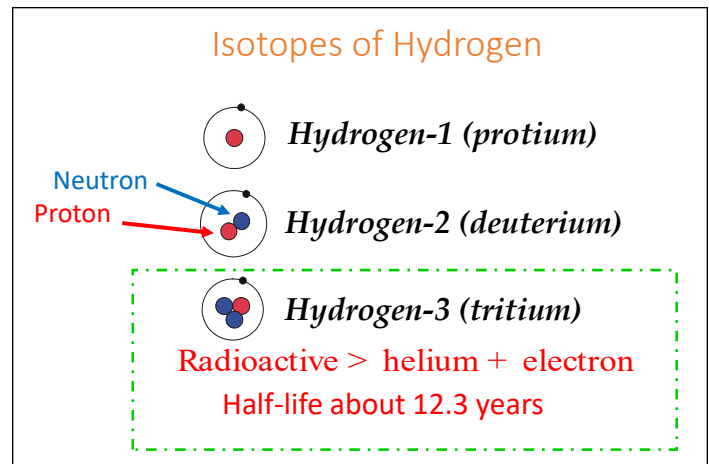


Figure 5. The isotopes of hydrogen, shown as simple models of atoms.

close to the tritium concentration in rain at that time. Since 2001, the river has had no perennial water in area 5. The water is thought to come from canyons draining the Santa Catalina Mountains, and to reach the river by rapid flow through a limestone aquifer. In this case, the tritium measurement indicates that the perennial water originated as rainwater a few years old. The river and nearby Bingham Cienega became dry because of the post-1990s drought, but can be expected to recover when this cycle of drought comes to an end.

In area 3, at the Three Links Pastures, perennial water appears to come from a storage associated with Red Rock Canyon. Samples taken between 2007 and 2014 contained 1-2 units of tritium, which can be explained as a mixture of pre-1953 rainwater (containing no tritium by 2007) with younger water (still containing measurable tritium). The surface water is older in this area, so that the decline in surface water is not simply a response to recent drought conditions. It may be a response to the 1940s–1950s drought, or to drying since the Little Ice Age, or both.

Much more information can be derived from isotope studies. For instance, it is possible to tell the difference between average monsoon floodwater stored in the banks of the river, water flowing out of area 1, and groundwater that comes from the nearby mountainous flanks of the valley. The groundwater from the mountainous flanks contributes to perennial water in area 2 near St. David (Figure 1). The Vigneto development would remove much of that water before it could reach the river. Exactly how the isotope measurements can be used in these ways is a story for another time, or for those who wish to read the paper in detail.

Conclusion: What are implications for Cascabel residents?

Groundwater in Cascabel comes from rain and runoff in our section of the San Pedro Valley, not from upstream of the Benson Narrows. The amount of groundwater is dwindling, as reflected in the contraction of our perennial reaches. Nat-

ural drought may be the main cause, but human use exacerbates the problem. An end to our present decade-scale drought may reverse the trend in certain places, but not necessarily in all situations. We need to use groundwater wisely.

Further reading

Castiglia, P.J. and Fawcett, P.F., 2006. Large Holocene lakes and climate change in the Chihuahuan desert. *Geology* 34, 113-116.

Cordova, J.T., Dickinson, J.E., Beisner, K.R., Hopkins, C.B., Kennedy, J.R., Pool, D.R., Glenn, E.P., Nagler, P.L., and Thomas, B.E., 2015. Hydrology of the middle San Pedro Watershed, southeastern Arizona. *U.S. Geological Survey Scientific Investigations Report* 2013–5040, 77 p., <http://dx.doi.org/10.3133/sir20135040>

Eastoe, C.J., 2020. Sources of perennial water supporting critical ecosystems, San Pedro Valley, Arizona. *Environmental and Engineering Geoscience* 26: 463-479.



Barbara Clark and David Blocker

Caravan Hermitage



New rainwater catchment system at the Corbett Center doubles as a shade ramada



David Omick

Tiny wood stove

Hermitage Program continued from page one.

new mini wood stove at the cottage hermitage for warmer winter sojourns.

- We are designing and building a small “caravan” hermitage for a more remote site which should be completed by February 2022.
- The retired Gonzalez-Leitner strawbale hermitage will become a legacy site and when completed will be open to the whole community as a pilgrimage destination, to honor the first hermitage and gift of land by Francis and Mary Lou.

We have much to be grateful for. We feel the support and partnership of all who have sojourned here and inspired us with their deep reflections and insights, and all who have shared financially so that we can continue to serve all sojourners. We also appreciate our partnership as land stewards with our sister organization, Saguaro-Juniper. And the growing synergy of our committee is a powerful reminder that we can do together what we cannot do alone.

We invite you to join us in this endeavor in any way that is life-giving and feeds your soul.

Schedule a group retreat or individual sojourn:
Susan (smtollefson51@gmail.com)

Volunteer or donate to support our work:
Katie (kt.talbott@gmail.com)

—Susan Tollefson and Katie Talbott,
Hermitage Program Co-chairs

com-mu-ni-ty gar-den / verb

- 1) parcel of land, soil, compost, people, livestock and ideas working together to grow crops to sustain parcel of land, soil, compost, people, livestock and ideas.
- 2) place to gather, six feet apart

GARDEN IS AN ACTION WORD. Nouns are fixed and static, but the movement in a garden is infinite in its character and variety. From two-handed people with shovels to fungi and microbes in soil, change is the only constant. Ideas bring change, as does bird shit, alpaca shit (thanks, Sue), mousy shit, and occasional snake shit. All the elements of *garden* are cooperative and each is essential to the success of the whole.

That said, people do a lot of work when they *garden*. There are meetings to discuss how things went last season. Did we plant enough onions? Did we remember to plant chiles? How about beets, could we use a few more? Could we have done with a few (dozen) less cabbages? And then we talk about next season, about what worked well and what we might want to try for the very first time. And then we talk about what could make our garden more productive and self-sustaining in the future, like our big idea three years ago to build a greenhouse. Should we buy a kit? Wait, could we get a better bang for our buck by designing and building our own? How do we want to feel when we step into our garden greenhouse? Happy, content, hopeful... Does it help us generate more ideas for another section of 'future' down the line? Should the purpose of our greenhouse be primarily utilitarian, or should we be bold with our ideas? Well, both, of course!

Then there is the physical work of *garden*. Weeding, first. Included with that is greeting old frenemies every spring: like vetch, for example. Once a cover crop, but now a greedy guest who has overstayed her welcome. She gets uprooted along with the others only to reappear next year. Yet the job is not mere drudgery for the gardeners, because you cannot imagine the funny and interesting conversations that ensue as all those weeders crouch along the rows of...whatever... pulling the weeds and talking as they pass each other in their slow journey to the other end. And the compost-making, and the trench-digging, and the seed-sowing, and the watering and the fretting over the watering and the instruments of watering, especially in the summer when many of the gardeners and our fix-it guy are away. It can suck.

And isn't that really the point? To garden is to work hard, sometimes fail, learn something and move on. We garden because it makes us happy. We're not 'gardeners.' We're gardening: a verb.

—Deb Longley



"We garden because it makes us happy."

Transitions

We say goodbye to two long-time Board members.

DANIEL BAKER was an initiator, along with Jim Corbett, of the idea to create a space for contemplation in desert wildlands. He was a founding member of the Cascabel Hermitage Association, and has had an outsized role in CCA's 25-year history. His first love was the Hermitage Program, which he led until 2017, and he also helped shape the Conservation Program. Thank you, Daniel, for your extraordinary contributions to CCA, in philosophical underpinnings, labor, and resources.



Daniel Baker

KAREN MCKELVEY has served on the board, primarily as Vice President, for 17 years. She has been an active gardener and will continue on as a steadfast member of the Hermitage Committee. She has been our behind-the-scenes editor, and the face of CCA at the Community Fair for the past decade. Thank you, Karen, for your words of wisdom, poetic voice, and for frequently helping us get the wording just right.



Karen McKelvey

We are grateful for the enduring contributions of Karen and Daniel, and look forward to their continued counsel and support as emeritus board members.

We welcome two new Board members.

VERA MORITZ says of her connection to CCA: "In the 1980's I first learned about Jim Corbett through Sanctuary, and then later the Cascabel Hermitage Association, which brought together spiritual practice and protection of the land. I have been spending time in Cascabel and supporting CCA for the past 15 years. I am also a member of the Hermitage Committee, deeply interested in continuing the work of providing a home for spiritual contemplation in harmony with nature in a healing manner."



Vera Moritz

TOM TALBOTT explains his interest in serving on the Board: "My wife, Katie, and I have been in and out of Cascabel since 2015, each time staying longer and eventually purchasing land in the valley. CCA's basic tenet, that the land and its inhabitants have rights that are equal to the rights we attribute to ourselves, originally attracted us here. Fostering these values on our land and the lands of the association, as well as supporting the community as a whole, is a priority for me."



Tom Talbott

We remember two important women in the development of CCA.

MEREDITH LITTLE, founding board member, was pivotal in the inception of the original Cascabel Hermitage Association. She donated her skills as an attorney to make sure that our founding documents were done in a professional way, and that our financial practices and reporting would be without reproach and would stand up to IRS scrutiny. It would be difficult to overemphasize her importance in getting CHA started on the right foot. She was also an important strand in the Quaker influence on CHA, being an active member of the Pima Meeting. Meredith died last May.



Meredith Little

LINDA MCLEAN had a more focused influence in CCA. She arrived here from Hawaii in the mid-2000's, having nurtured orchards in that setting, and she was immediately drawn to the Community Garden. Her business acumen and generous spirit largely made possible the Community Garden in its current form. Many will remember her for her careful tending of the asparagus bed, and delivery of asparagus to folks up and down the river. Linda died this April.



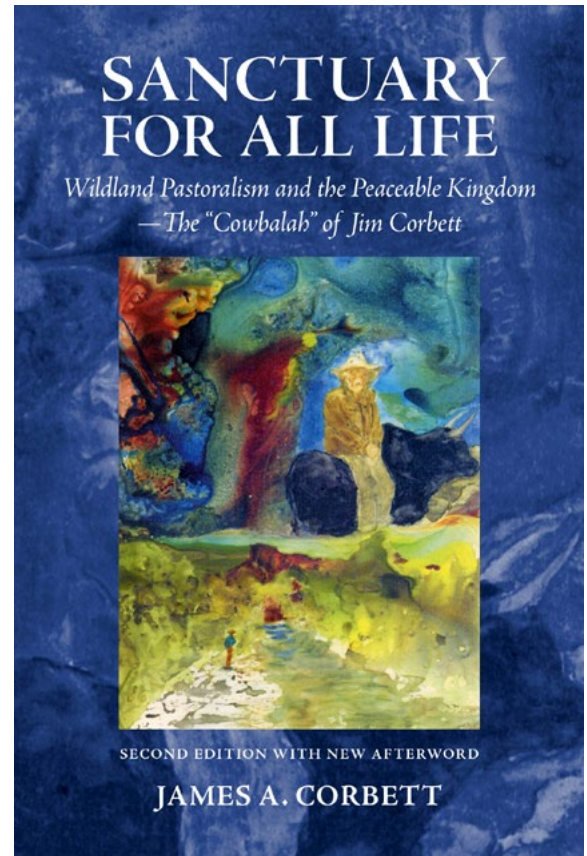
Linda Mclean

Sanctuary for All Life Second Edition Now Available

JIM CORBETT'S FINAL BOOK, *Sanctuary for All Life: Wildland Pastoralism and the Peaceable Kingdom—The "Cowbalah" of Jim Corbett*, was republished in May by Cascabel Books. Sue Newman has been the tireless champion of this effort over the past year, with the help of Roby Wallace and Michael Puttonen, plus contributing Cascabel residents. While this book focuses on Jim's complex and iconoclastic writings, drawing on his extensive theological studies as well as his knowledge of ancient pastoral civilizations and their relationship to the land, the culmination is the Covenant, crafted in consensus with fellow founders of Saguaro-Juniper and later adopted by CCA. (See Covenant Preamble below.) This redemptive land ethic built on Aldo Leopold's earlier work in his *Sand County Almanac*, poses the question: how do we honor the earth and its creatures with humans as equal partners?

This second edition is an unusual book in that the Afterword considers the collective efforts of Saguaro-Juniper and CCA to honor the Covenant over the last 30 years. Thirteen members of this community who have been continuing the work of protecting this valley, whether by ranching or community gardening or offering solitary retreats, wrote of their memories. It is one thing to put on paper an idealized but achievable land ethic, but making it work in reality is the test.

To purchase copies, either contact Pat Corbett for a signed copy (\$20) or order on [Amazon](https://www.amazon.com) for \$21.95.



The Saguaro-Juniper Covenant Preamble

IN ACQUIRING PRIVATE GOVERNANCE of land, we agree to cherish its earth, waters, plants, and animals in a way that promotes the health, stability, and diversity of the whole community. This entails attentive stillness to meet and know the land as an active presence. It entails study, observation, shared reflection, and cumulative corporate experience to increase and bequeath our understanding of ecosystem health, stability, and diversity. It entails symbiotic naturalization into the land community—a communion of actual nurture and shelter. As elaborated by these entailments, fully accountable governance—stewardship—is the distinctively human way of bonding into one society with all who share in the land's life, which is the foundation for instituting a biocentric ethic among humankind.

Podcast Explores Jim Corbett's Goatwalking

FUTURE ECOLOGIES HAS PRODUCED an engaging four-part podcast on Jim Corbett. The first episode, "FE3.7 Goatwalker: On Errantry," is now available, featuring interviews with Ann Russell, Pat Corbett, John Fife, Miriam Davidson, and recordings of Jim Corbett.

From www.futureecologies.net: "Jim Corbett was not your typical rancher. Over the course of decades roaming the borderlands of the desert southwest, he developed a practice that he referred to as 'goatwalking'—a form of prophetic wandering and desert survival based on goat-human symbiosis. For Jim, 'goatwalking' provided both physical and spiritual sustenance, and allowed him to become at home, for a time, in wildlands."



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Web Support: Dave Shreevie Graphic Design: Michael Puttonen

JOIN THE CCA TODAY!

MISSION

The Cascabel Conservation Association is dedicated to the collaborative stewardship of the Middle San Pedro River watershed in a way that promotes the health, stability and diversity of the whole community, including its earth, waters, plants, and animals. We strive to integrate the needs of the land with the needs of a sustainable human community through educational, economic, agricultural, contemplative and other conservation related endeavors.

COMMUNITY

CCA opens itself to the community. It has a friendly and supportive relation with the Saguaro-Juniper Corporation, sharing a common Covenant, adjacent land and similar purposes. It also partners with the Lower San Pedro Watershed Alliance, Cascabel Community Center, the Cascabel Working Group, and is a member organization of the Lower San Pedro Collaborative, the Land Trust Alliance, and the Coalition for Sonoran

Desert Protection. Furthermore, it is open to you. CCA operates in a consensual manner and your voice and participation are welcome.

FINANCES

In keeping with its integrative approach to the human and natural community, CCA seeks simplicity, equality and justice in financial matters, offering all services at no fee or minimal cost. CCA is run primarily by volunteers, and staff members work for minimal or no compensation. Nonetheless, financial support is required for expenses (such as office, infrastructure, insurance, vehicles, etc.) and the sustainability of our programs.

We would like to invite your participation in CCA by becoming a member (no fee required), or by donation (no membership required), or both. Donations are tax deductible.



Cut here and return the form below.

CCA MEMBERSHIP APPLICATION

I, _____ [PRINT], wish to become a member of the Cascabel Conservation Association: **Supporting Conservation, Community and Contemplation in the Middle San Pedro River Valley**. I understand that I will receive announcements of CCA meetings, minutes, mailings and invitations to participate in events and decision making. (If you were a CHA member, you are already a CCA member)

MEMBERSHIP AGREEMENT: I support the mission of the Cascabel Conservation Association (see above), am in accord with its efforts to function in a consensual manner, and agree to abide by applicable covenants and/or conservation easements when on CCA lands.

SIGNED _____ DATE _____

ADDRESS _____

PHONE _____ EMAIL _____

CCA DONATIONS

- I would like to make a monetary donation to CCA. *(Please specify if you want your donation to go to the General, Hermitage, Conservation, Garden, or Education Programs, or to the Mick Meader Conservation Endowment).*
- I would like to help at CCA work parties. Please contact me when they are scheduled.

Please make checks payable to CCA and return to: CCA, 6146 North Canyon Road, Cascabel AZ 85602