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# “Bacanora for Bats”: a Multispecies Ethnography in the Sonora-Arizona Borderlands

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# "BACANORA FOR BATS": A MULTISPECIES ETHNOGRAPHY IN THE SONORA-ARIZONA BORDERLANDS

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Dissertation Advisors: Dr. Lisa Neuman and Dr. Darren Ranco

An Abstract of the Dissertation Presented
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This dissertation presents a multispecies ethnography that explores the relationships among agaves, bats and humans in the border region shared by Sonora, Mexico and Arizona, USA. The work follows the lesser long-nosed bat (*Leptonycteris yerbabuenae)*; *Agave angustifolia,* which is the species of agave used to make bacanora; and the human stakeholders who have become increasingly entangled in these bat-agave relationships. This ethnography de-centers the human actor bringing bats and agaves into the center of the story to provide alternative ways to understand human relationships with other species. In doing so, the ethnography challenges dominant assumptions about the human-nature divide. The first part of the dissertation explores these bat-agave-human relationships more generally. Part two takes a closer look at how the bacanora industry, along with binational conservation efforts, are shaping these human-nonhuman entanglements in the Sonora-Arizona borderlands.

Nectar-feeding bats and agaves have co-evolved for millions of years. Lesser long-nosed bats forage for agave nectar, passing pollen from plant to plant, during their migration from southern

Mexico to southern Arizona. This mutualistic relationship is threatened by habitat loss and climate change. Additionally, the growing bacanora industry in the state of Sonora is now one of the primary threats to the agave-bat relationship. Bacanora is a type of mezcal originating from the mountains in eastern Sonora. It is a culturally significant beverage that supports local livelihoods in the most marginalized region of the state. As demand for the agave distillate grows, wild agave stocks are disappearing at an unsustainable rate due to overharvesting.

This multispecies ethnography follows the entanglements of the lesser long-nosed bat, *Agave angustifolia* and several human stakeholder groups—bacanora producers, the bacanora regulatory council and binational conservation organizations—at this time of rapid change. Qualitative data gathered from the Sonora-Arizona borderlands provides a depth and richness to these interspecies interlinkages at the local level. Participant observation and semi-structured interviews yield a diversity of stories that illustrate the complexity of changing interspecies connections within a transboundary region. This ethnographic illustration of bat-agave-human entanglements intentionally avoids oversimplified, reductionist interpretations, offering instead a valuable, nuanced understanding of these multispecies relationships that may help local stakeholders and policy makers on both sides of the border consider equitable and sustainable policy relating to the bacanora industry and conservation efforts.

## DEDICATION

I dedicate this dissertation to the borderlands that raised me.

## ACKNOWLEDGEMENTS

I want to begin by acknowledging my advisory committee for your support and guidance in the field, and during the process of analysis and writing. It has been a pleasure learning from and working with you over these last few years. Thank you.

To the Sonora-Arizona borderlands. My time traversing the state of Sonora, while it had its challenges, was incredibly rewarding and humbling. I showed up clueless. When I left, I was family. To all of you who fed me, housed me and put up with my endless stream of questions—*¡Muchas gracias!* I learned so much about the rich culture, the depth of local tradition and the growing industry of bacanora across the state. Moreover, everyone I met south of the international line, taught me to bow my head to my heart. Don't get too caught up in that intellect, *muchacha*! To the Borderlands Restoration Network family in southern Arizona, thank you for taking in this stray kitty. I am so impressed with the work you are doing on both sides of the border.

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When I returned to Maine from the southern borderlands, there was no way of knowing a pandemic was about to shut everything down. I landed in Winterport with two incredible women, their two incredible dogs and one emo cat. Two and a half years later, I feel the weight of saying goodbye. The Girl House rocks! Lulu, I love you. Susan, can I take you with me, please? You are both so special to me. When I was down, you picked me up with comedy and cookies, which worked every time.

Mom and Dad, thank you for continuing to put up with my "unconventional" lifestyle and for your unconditional love. I think I'm finally starting to adult. Sammy Pants, a special shout out to you, my incredible little sister. Thank you for everything you've done and continue to do. How did I win the most amazing sister lottery? You are a remarkable human being. Chris, I cannot imagine a better brother-in-law. Thank you for being my bacanora tasting buddy. And thank you for letting me live in your house intermittently during fieldwork.

It may seem odd to acknowledge an inanimate object, though for me, Gloria is so much more than my little old green truck. Gloria was my trusty field assistant. We drove everywhere

together. She took me safely from one side of the border to the other, from one side of la sierra to the other, from one side of the country and back again. Thank you for keeping me safe.

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## LAND ACKNOWLEDGEMENT

The University of Maine recognizes that it is located on Marsh Island in the homeland of Penobscot people, where issues of water and territorial rights, and encroachment upon sacred sites, are ongoing. Penobscot homeland is connected to the other Wabanaki Tribal Nations— the Passamaquoddy, Maliseet, and Micmac—through kinship, alliances, and diplomacy. The University also recognizes that the Penobscot Nation and the other Wabanaki Tribal Nations are distinct, sovereign, legal and political entities with their own powers of self-governance and self-determination.

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# CHAPTER 1

## INTRODUCTION: BORDERS AND BRIDGES

***"To Live in the Borderlands"***

***To live in the Borderlands means to***
***put chile in the borscht,***
***eat whole wheat tortillas,***
***speak Tex-Mex with a Brooklyn accent;***
***be stopped by la migra at the border checkpoints…***
***you are at home, a stranger…***
***To survive the Borderlands***
***you must live sin fronteras***
***be a crossroads.***

*(Gloria Anzaldúa, Borderlands/La Frontera: The New Mestiza)*

### ROADMAP THROUGH THE BORDERLANDS

Agaves act as an anchor throughout this ethnography, grounding multispecies entanglements while bats enter the story more recursively. **Chapter One** introduces bat-agave-human entanglements in the Sonora-Arizona borderlands. The concepts of borders and human-nature dichotomies are briefly presented, followed by a short discussion about multispecies political ecology and multispecies ethnography to frame and discuss bat-agave-human relationships. **Chapter Two** takes a bird's eye view to peer at the long arc of agave-human relationships throughout time. The chapter begins in the Tucson Basin and explores human's close ties with the plant in this locale and further south. **Chapter Three** does the same with human-bat relationships with an emphasis on pollinator bats and their intimacy with agaves. **Chapter Four** takes a deeper look at the bacanora industry in Sonora. I use a multispecies political ecology framework to show how agaves shape and are shaped by political, cultural and economic forces throughout bacanora's denomination of origin. **Chapter Five** moves north of the border to

Tucson and Patagonia, Arizona. This chapter examines conservation non-governmental organizations (NGOs) operating across scales in a transboundary context. It begins with people and projects affiliated with Borderlands Restoration Network (BRN), then looks more briefly at Bats Conservation International (BCI) and Colectivo Sonora Silvestre (CSS).

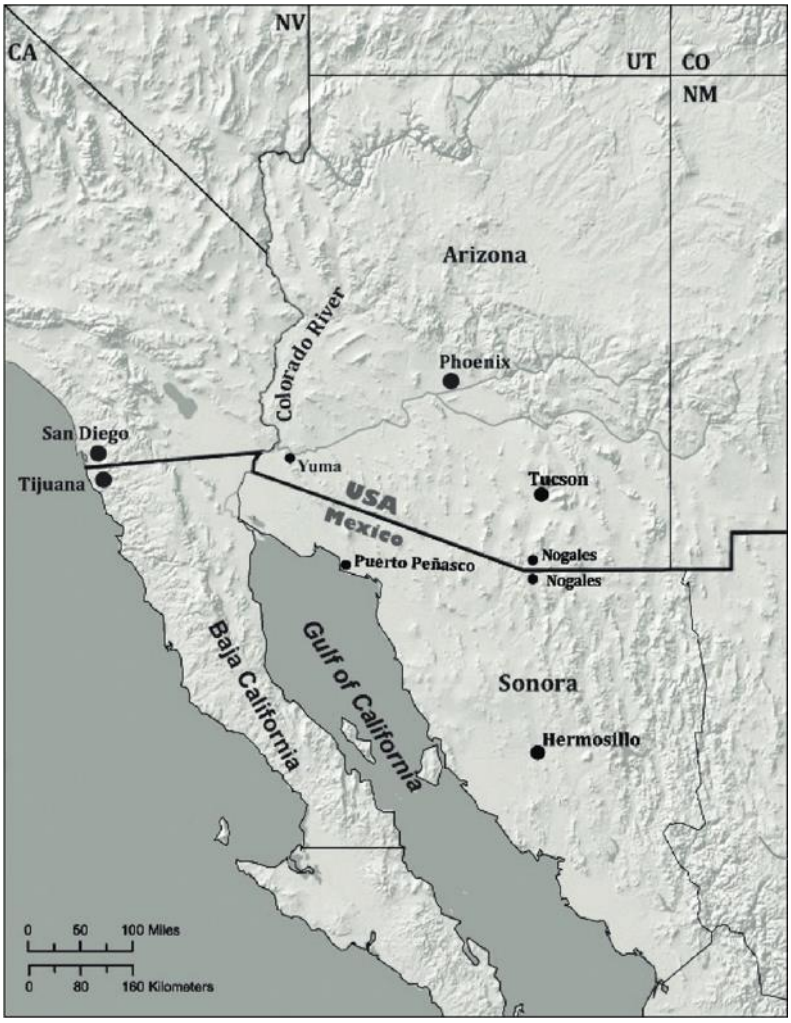


Figure 1: Sonora-Arizona borderlands. Source: CLIMAS Project, University of Arizona

**Openings and Opportunities**

This desert borderlands landscape shared by what is now Sonora, Mexico and Arizona, USA, has many boundaries–physical, geographic, economic, political, social, linguistic. It has porous

boundaries, including conceptual relationships among species. We may consider border and transboundary relationships among agaves, bats and humans spaces of opportunity, spaces of exchange rather than separation despite the formidable challenges of this transboundary zone. In this way, multispecies borderlands thinking is a way to acknowledge agency across species despite the powerful systems that reinforce both human-nature dichotomies and oppressive border policy. The international and imperial influence of European settler colonialism across the Americas continues to reconfigure landscapes by dismantling and reassembling human-nonhuman relationships within dominant Eurocentric and anthropocentric matrices (Zahara and Hird 2015). Neoliberal policies like The United States-Mexico-Canada Agreement (USMCA) and Draconian border policies tear at the social and ecological fabric of these borderlands. Communities (permanent and migrant) that exist in this space, experience the weight of this colonial landscape. How a particular community's experience differs from another relates to many variables. The neoliberal control of the global market and the US immigration policies that support it affect people differently depending upon the  intersection of identities (e.g. race, ethnicity, class, nationality, gender). Agaves and bats (permanent and migrant, respectively) are likewise impacted. One focus of this dissertation is to take a closer look at the assemblages of agave-bat-human worlds across various sites on both sides of the international border, to explore more intimately the capitalist processes that shift and change the diverse entanglements of these three beings.

Agaves, bats and humans have deep roots throughout the region—roots that reach back in time (thousands of years for human-agave entanglements; millions of years for the agave and bat). These roots interweave and shape the role that agaves, bats and humans have played in the past

and continue to play today. Within the last few years, agave-bat-human worlds have emerged in new ways with the potential to bring communities together across borders. Perhaps, there exists a possibility of the "blending and colliding of ontologies," opening opportunities to learn from the relationships with agaves and bats. Perhaps, this blending and colliding of ontologies will help expose the opportunities and limitations of capitalist, cultural and conservation motivations in these borderlands (Todd 2014: 217).

The Sonoran Desert is  a binational ecosystem cut by *la línea.* The desert we inhabit today is the result of the transformative work of societies who developed relationships with nonhuman beings a millennia ago. The nonhuman beings of the Sonoran Desert have their own logic and rules of engagement that exist outside and within these articulations of human worlds (Ogden 2011: 27). Nature, however it may be defined, is not a passive recipient of human influence. Rather, non-human beings are agents that constrain and influence individuals and societies. What is the potential for seeing beyond the human-nature divide to shift how humans interact with the rest of the biotic environment (Marshman 2019: 102)? What do these interspecies interactions look like in a transboundary context?

**Defining the Borderlands**

There is an abundance of literature describing borders. The "borderlands" as a concept takes on various meanings for different people across space and time. In the early 1900s, scholars began referring to borders as sites of territorial separation, fixed lines, and physical boundaries (Bolton 1907). In the 1960s, there was a surge of Mexican American and Chicanx scholars who described the US-Mexico border as more than the two-thousand-mile geographical boundary.

Scholars emphasized the dynamics of the U.S. Mexico border on Latino identities who are caught in between worlds, straddling a physical and cultural border (Acuña 1972; Berrera 1979; Gómez-Quiñones 1978). Many of these scholars argued that the 1848 Treaty of Guadalupe Hidalgo, when Mexico ceded over half of its territory to the US, established colonial institutions that created the conditions for Anglo-American domination and the marginalization of Mexicans (Vélez-Ibáñez 1996). In the 1980s and 1990s, the literature described borders as sites of contradictions, boundaries that separated two nation-states, as well as locations where people, cultures, languages and ideas flowed across these transnational spaces (Anderson 1983; Carens 1987). The US-Mexico border, in particular, represented a transnational zone of military, linguistic and cultural conflict, as well as a space of cultural hybridity where peoples, cultures, and ideas move in complex ways (Gutiérrez 2001:3). While the idea of the US-Mexico borderlands carries multiple meanings, for the purposes here, I use the Johnson et al. (2011) description of a liminal space where processes, practices, discourses, symbols, institutions and networks through which power moves (2011:62).

Borders are woven into the fabric of society. In this sense, borders reveal connectivity as well as questions of identity, belonging, political conflict, and societal transformation (Johnson et al. 2011: 68). The United States-Mexico borderlands is a place of such entanglements and interlinkages of human, as well as non-human communities. They are sites of multiple assemblages, biocultural landscapes that connect and divide, that build bridges while also severing them. They are the hard-to-define edges that exist between the human-nature dichotomy that persists. Where do these boundaries begin, and where do they end? To place non-human entities in the center of the discussion opens spaces for more nuanced ideas of nature that can

broaden and challenge preconceptions of what making place and making boundaries implies (Sheridan 2016).

**Interrogating the Human-Nature Dichotomy**

Dismantling the human-nature dichotomy reveals the co-production of humans and non-humans within diverse environments. The practice of unraveling the construct of this duality exposes a mutualism shared by multiple species in shaping landscapes together (Zimmer, 2010; Marshman 2019: 93). Human-nature borders thus become blurred. The concept of connectivity challenges notions of nature as separate from human worlds, instead defining these relationships as mutually constitutive. Embracing connectivity allows us to relate to landscapes as places of continuous transformation by the species with whom people share this space. I shall refer to this as "biocultural landscapes," a term I first heard from agave expert, Leah Bailey, in an interview at the Desert Botanical Gardens. Biocultural landscapes put the idea of "nature" into question. It is a concept that helps break down the borders of the human-nature binary. Leah urges us to look at landscapes from a cultural perspective and evaluate "wild" species more critically within their cultural and "natural" landscape (Hodgon 2013: 101). The concept of biocultural landscapes is a thread throughout this work with particular attention to human world-making constituted through changing relations with other animals and plants. The central characters tying the story together are agaves and nectar-feeding bats. The biocultural landscape visited is the transboundary region that connects or cuts across (perhaps both at once) northern Sonora, Mexico and southern Arizona, USA.

Decentering human exceptionalism and imagining the alternatives within these biocultural landscapes requires a resituating of the human in ecological terms and the nonhuman in ethical terms (Plumwood 2002). This nudge to resituate humans and non-humans, to move beyond a view of humans as autonomous individuals who exist outside of ecological consequences, requires an acceptance of a "co-emergent world based on intimate human-more-than-human relationships of responsibility and care" (Country et al., 2015: 16). When we understand ourselves to be integral members of biocultural landscapes and multispecies communities, we are tasked with the responsibility to care for the more-than-human others with whom we inhabit these spaces, merely one species among many (Houston and Hillier 2018).

Humans, animals and plants exist as active agents participating together in the environment (Todd 2014: 217). Expanding Donna Haraway's concept of companion species (Haraway 2003), Anna Tsing argues that human nature is an interspecies relationship, part of a rich ecological tapestry of relationships of interspecies interdependence (2012). It is not possible for human beings to exist without relationships with other-than-human beings, which entails interlinkages across time and place that alter the trajectory of human worlds (Schoenbrun and Johnson 2018: 314). Tsing's discussion of assemblages is helpful to think about how species influence each other, to understand that it is never settled. She describes assemblages as open-ended gatherings. History written on the landscape that records the myriad trajectories of world-making among human and non-human. These ever-changing assemblages show us potential futures in the making. Decentering humans within the story of these landscapes contributes to our understanding of the agency of multiple participants in creating historical, current and future assemblages (Tsing 2015: 22).

The relationship between humans, agaves and bats is an old affiliation. Bats have always existed more on the periphery of human communities. Agaves and humans are long-time companions. So, too, are bats and agaves. These beings have co-evolved for millions of years, forming a dependency upon one another. If one flourishes, so will the other. When we bring to the surface the entanglements of agaves, bats and humans, we can build a bridge that connects communities across divisions. We can build a bridge that connects the past to the present. We can build a bridge that opens spaces for alternative ways of knowing. This dissertation attempts to bridge the multiplicity of assemblages of humans, agaves and bats in this transboundary landscape to discern where these spaces may already be unfolding (Houston and Hillier 2018: 201).

**Multispecies Political Ecology**

To examine the socioeconomic, political and environmental contexts of agave-bat-human assemblages, I engage with multispecies political ecology. A multispecies perspective brings attention to human-nonhuman interconnections and the tension that exists with these social, cultural and ecological relationships. This focus on relationality highlights how human life is produced with nonhuman life, the way these conditions co-constitute each other (Besky 2014: 65). Multispecies political ecology addresses and challenges the power imbalances that create and maintain harmful social and environmental behaviors (Marshman 2019: 92). These dynamic relationships exist not as naturally-occurring landscapes. Instead, they reveal a systematic transformation of the land necessary for capitalist gain and the human-nonhuman relationships that continue to develop and change together in this altered landscape.

**Engaging More-than-human Methods**

More-than-human participants are dynamic in these desert borderlands. Their symbolism, significance, and value change depending upon their location. In a region as complex as the Mexico-U.S. border, where the arid landscape exposes historical processes of uneven development, stories capture diverse identities well and provide access to the complexities of cultural landscapes. These cultural landscapes are places formed by social activities, economics, values and environmental conditions (Holm 2016). Centering agaves and bats in the social construction of these borderlands landscapes allows alternatives to dominant human-nature imaginaries to emerge. Opening space for alternative knowledges contributes to an analysis of larger structural inequalities that shape human-nature articulations (Friedman 1974). As a collector and conveyer of these stories, I had to think carefully and critically about who speaks for the non-human during the act of place-making, especially considering that stories are often sites of discursive contestation (Houston and Hillier 2018).

To elicit the multiplicity of borderlands imaginaries, I conducted a multi-sited, multispecies ethnography (MSE) that focused on the interconnections of locales, a mapping of the complex trans local linkages, the frictions and the opportunities between sites (Hannerz 2003; Smith 2017). Multispecies ethnography offers a way to interrogate human-nature dichotomies. It is a research strategy that involves following plants and animals across time, space, landscapes and ontologies. Nonhuman entities can link people and places where stakeholders are unknowingly connected and entangled (Cook 2004).

A multi-sited approach provides a more nuanced account of humans and nonhumans as agents across national, cultural, linguistic, economic, ecological, and ontological boundaries (Hannerz 2003). To better understand these cultural processes, nonlocal ethnography moves beyond a geographic locale to collect data from a range of source. I attempt to situate myself as a storyteller, a reflexive qualitative investigator with the aim of illustrating the messiness of doing fieldwork within a region of ever-shifting overt and covert power relations. I share these stories recognizing that there is no master narrative. Instead, I offer stories from these biocultural landscapes that are replete with the contradictions and partial truths that make up transboundary assemblages (Gay-Antaki 2020).

From August 2018 to January 2020, I traveled throughout northern Sonora and the bordering state of Arizona to investigate diverse knowledges and social processes that shape multispecies engagements related to binational bat-agave conservation efforts and the connection to the production and consumption of mezcal bacanora, a regional mezcal produced from one species of agave in the mountains of Sonora, Mexico. While in the field, I met with participants across diverse sites on both sides of the border to learn the cultural, political, economic, and environmental drivers that influence human-bat-agave relationships. Stakeholders included conservation organizations, mezcal producers, the Bacanora Regulatory Council of Sonora, academics, consumers, distributors and representatives of Sonora's mining sector. I spent many hours collecting seeds and planting agave pups in restoration sites. I spent countless hours with bacanora producers learning about the process of making mezcal bacanora, taking a machete to an agave ripe with sugar and assisting in the process of extracting the sweet *agua miel,* honey water. During the process of conducting fieldwork, stakeholders on both sides of the border were

generous with their time. While I had far less interaction with the illusive nectar-feeding bats, over time, with patience and attention, I began to notice their presence and their influence within and across research sites.

I held reflexivity at the forefront of data collection, questioning the effects that my scholarly training and personal background may have on research decision-making processes, knowledge creation and representation of voice. My identity as a *gringa*, a white female researcher from *al norte* (north of the border) reflected a certain sense of status gained from academic institutions in the United States. This certainly has an impact on access to community knowledge and outcomes. At times, it opened doors. Other times, it may have limited the information I received. I was often met with curiosity and kindness, but also hesitation and reservation.

I approached this research with sincere curiosity and without a hypothesis to prove. I wanted to learn as much as I could, and folks were very open to sharing their experiences. In addition to participant observation over a year and a half, I conducted more than 60 interviews. In Sonora, many of these were with men, who still hold most of the positions of power in the mezcal industry. I believe in some cases, being female was an advantage. Many of the men I interviewed did not perceive me, a woman and a graduate student, as a threat or even as someone with a lot of knowledge of the industry. This meant they were often willing to share politically controversial perspectives or details about their business that they may not have shared with someone they saw as more of a contemporary.

While there were challenges traveling alone in an old green pick-up truck throughout both urban and rural areas in Sonora, there was always an underlying privilege that gave me access to various stakeholder groups. As I navigated the realities of being in the field, I learned how to negotiate and leverage power to gather knowledge while also recognizing my naivete and ignorance in many situations. I asked myself how my allegiance to small scale bacanora producers, for example, and my commitment to environmental and social justice, framed my research from the questions I asked to the analysis I produced. The privilege and responsibility of this interpretation must not be taken lightly. In order to embrace other ways of knowing, I began by interrogating my own positionality, including my ontological and epistemological underpinnings. My situated experience in these borderlands became a method with which to interpret the stories of humans, bats, and agaves—researcher-as-instrument (Hammersley and Atkinson 1995). I approached my research with the understanding that there is no objective truth to be known but multiple truths (Gaus 2017). It is impossible to disentangle my own relational and subjective understanding that influences how I interpret these diverse “truths" of multispecies relationships (Panelli 2010). Acknowledging researcher subjectivity while analyzing bat-agave-human relationships is an important step toward avoiding oppressive essentializations (Gay-Antaki 2020).

My position within this transborder landscape was one that shapeshifted as I moved across linguistic, gendered, national, cultural, and class boundaries. This boundary crossing required an emphasis on observation and listening, on being present to allow multiple interpretations of multispecies encounters to emerge. It took time to build trust with participants, time digging in the dirt and repotting plants, talking in the kitchen, picking chiltepín in the garden, milking cows

and making cheese, or sipping bacanora fresh from the still. Taking this time to build relationships opened the door to additional local knowledge about agaves and bats. I learned which ranchers have caves where nectar-feeding bats stopover as they move through the migratory corridor and which men collect guano as a source of income when times are tough. As with any research, the more time one has in the field, the more complexities emerge. Taking time makes for a richer multispecies ethnography. I embraced the complexity with attention to the subjectivity of the "data" participants provided, as well as the subjectivity with which I documented and interpreted this "data." Centering bats and agaves provided a launching point to dive deeper into environmental narratives and power relations across diverse sites. This multi-local, multispecies ethnography is a collection of the stories I was told by the many interlocutors in the many places I visited while in the field. These stories reveal the depth and complexity of agave-bat-human entanglements as they shift and change across multiple physical and semiotic borders in southern Arizona and northern Sonora. These stories also serve to outline forms of power and how they interact with different spaces and places of participation.

**References**

Acuña, Rodolfo. 1972. *Occupied America.* Canfield Press. Virginia.

Anderson, B. 1983. *Imagined Communities: Reflections on the Origin and Spread of Nationalism*, Verso: London.

Berrera, Mario. 1979. *Race and Class in the Southwest.* University of Notre Dame Press. Indiana.

Besky, Sarah. 2014. *The Darjeeling distinction: Labor and justice on fair-trade tea plantations in India*.. Univ of California Press.

Bolton, Herbert Eugene. 1907. "Spanish Records at San Antonio." *Texas State Historical Association Quarterly* 10: 297-307.

Carens, J. H. 1987. “Aliens and Citizens: The Case for Open Borders. *The Review of Politics*, 49(2), 251-273.

Cook, Ian. 2004. Follow the thing: Papaya. *Antipode*, *36*(4), 642-664.

Fish, S.K. and P.R. Fish. 2014. Agave (*Agave* spp.): A crop lost and found in the US-Mexico Borderlands (pp 102-138). In *New Lives for Ancient and Extinct Crop,* ed. P.E. Minnis. Tucson: University of Arizona Press.

Gay-Antaki, Miriam. 2020. Grounding climate governance through women’s stories in Oaxaca, Mexico. *Gender, Place & Culture*, DOI: 10.1080/0966369X.2020.1789563.

Gentry, H.S. 1982. *Agaves of Continental North America.* Tucson: University of Arizona Press.

Gibson, B., Anderson, J.E., Krause, D.R., Tucker, W.C. and Tuddenham, K.A. 2015. *Manifesto for Living in the Anthropocene.* Punctum Books: Brooklyn, NY.

Gómez-Quiñones,Juan and Luis Arroyo. 1978. *Orígens del Movimiento Obrero Chicano.*

Guas, Nurdiana. 2017. Selecting research approaches and research designs: a reflective essay. *Qualitative Research Journal*, 17 (2): 99-112.

Gutiérrez, Ramón. 2001. “Borderlands.” *Encyclopedia of American Cultural and intellectual History,* edited by Mary Kupiec Cayton and Peter W. Williams, Charles Schriber’s Sons. Student Resources in Context.

Hammersley, M., & Atkinson, P. 1995. Access. *Ethnography: principles in practice. 2nd ed. London, New York: Routledge*, 54-79.

Hannerz, Ulf. 2003. “Being There... and There... and There! Reflections on Multi-Site Ethnography.” *Ethnography* 4 (2): 201–16.

Haraway, Donna. 2003. *The Companion Species Manifesto: Dogs, People, and Significant Otherness.* University Presses Marketing, Chicago, Illinois.

Havlick, David. 2010. “Hybrid Geographies.” In *The Encyclopedia of Geographies.* Ed. Barney Warf. SAGE Publications, Inc.

Henrich, J. et al. 2001. In search of homo economicus: Behavioral experiments in 15 small- scale societies. The American Economic Review 91 (2) (May): 73–78.

Heynen, N., Kaika, M., and Swyngedouw, E. 2006. “Urban Political Ecology: Politicizing the Production of Urban Natures. In N. Heynen, M. Kaika, & E. Swyngedouw (Eds.), *In the Nature of Cities: Urban Political Ecology and the Politics of Urban Metabolism.* London: Routledge.

Hodgson, Wendy. 2013. “Pre-Columbian Agaves: Living Plants Linking an Ancient Past in Arizona.” In: *Explorations in Ethnobiology: the legacy of Amadeo Rea*. Marsha Quinlan and Dana Lepofsky, eds. *Society of Ethnobiology*: 101-131.

Holm Hernández, Andrea. 2016. Floating Borderlands: Chicanas and Mexicanas Moving Knowledge in the Borderlands. University of Arizona, PhD dissertation.

Houston, Donna and Jean Hillier. 2018. “Make Kin, Not Cities! Multispecies Entanglements and ‘Becoming-world’ in Planning Theory.” *Planning Theory,* 17(2): 190-212.

Johnson, Corey and Reece Jones, Anssi Paasi, Louise Amoore, Alison Mountz, Mark Salter, Chris Rumfod. 2011. “Interventions on Rethinking ‘the Border’ in Border Studies. Political Geography 20:61-69.

Marshman, Jennifer. 2019. “Communing with Bees: A Whole-of-community Approach to Address Crisis in the Anthropocene.” *Journal of Agriculture, Food Systems, and Community Development*, 9(1): 87-110.

Ogden, L. A. 2011. *Swamplife: People, gators, and mangroves entangled in the Everglades*. University of Minnesota Press.

Panelli, Ruth. 2010. More-than-human social geographies: Posthuman and other possibilities. *Progress in Human Geography,* 34(1): 79-87.

Plumwood, V. 2002. Decolonization relationships with nature. *PAN: Philosophy Activism Nature*, (2), 7-30.

Schoenbrun, David and Jennifer Johnson. 2018. “Introduction: Ethnic Formation with Other-Than-Human Beings.” *History in Africa,* (45): 307-345.

Sheridan, Michael. 2016. “Boundary Plants, the Social Production of Space and Vegetative Agency in Agrarian Societies.” *Environment and Society: Advances in Research,* 7(1): 29-49.

Smith, Michael Peter. 2017. “Power in Place/Places of Power: Contextualizing Transnational Research.” In *Explorations in Urban Theory,* Routledge: Oxford, England.

Todd, Zoe. 2014. “Fish Pluralities: Human-animal Relations and Sites of Engagement in Paulatuuq, Arctic Canada.” *Études/Inuit/Studies.* 38(1-2): 217-238.

Trejo-Salazar, Roberto-Emiliano and Luis E. Eguiarte, David Suro-Piñera, and Rodrigo A. Medellin. 2016. Save our bats, save our Tequila: Industry and Science Join Forces to Help Bats and Agaves. Natural Areas Journal, 36(4): 523-530.

Tsing, Anna. 2012. “Unruly Edges: Mushrooms as Companion Species.” *Environmental Humanities,* (1): 141-154.

Tsing, A.L. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press.

Vélez-Ibáñez, Carlos G. 1996. *Border Visions: Mexican Cultures of the Southwest United States.* University of Arizona Press: Tucson.

Zahara, Alexander and Myra Hird. 2015. "Rave, Dog, Human: Inhuman Colonialism and Unsettling Cosmologies." *Environmental Humanities,* 7: 169-190.

Zimmer, A. 2010. "Urban Political Ecology: Theoretical Concepts, Challenge, and Suggested Future Directions," *Erdkunde,* 64(4): 343-354.

# CHAPTER 2

# GRANDMOTHER MAGUEY

***"The uses of agaves are as many as the arts of man [sic] have found it convenient to devise."***
(Howard Scott Gentry, Agaves of Continental North America, 1982)

## ROADMAP

This chapter follows agave-human relationships throughout the region from the Annual Agave Heritage Festival in Tucson to Pre-Columbian sites surrounding the city and further south in Mexico. It provides a brief history of agave-human interdependence. Where does the past end and the present begin? When does a cultivar left alone for centuries finally become wild? The chapter celebrates the deep history humans share with agaves and acts as a reminder to challenge the dominant narrative that separates humans from the environment.

## Tucson's Agave Love

Downtown Tucson, after years of abandoned buildings sitting dormant, is now bustling with chic eateries, microbreweries, condominiums, and trendy shops. The Historic Fox Theater, built in 1930 as a dual vaudeville/movie house, closed its doors in 1974 due to competition from new theaters and the decline of downtown Tucson. Twenty-five years later, the theater, after a long process of restoration, reopened on New Year's Eve 2006. The "Southwestern Art Deco" architecture and interior design draws large audiences as a performance venue (Fox Theater Foundation 2022). This particular evening, the theater was hosting one of the principal events of the 2019 Agave Heritage Festival. People were sprinkled across the theater, most of them in the first few rows. Ignite Agave!—a panel discussion featuring presentations from celebrity chefs,

botanists, mezcal producers and business owners—highlighted their love of agave, how it influences their work, and the importance for the sustainable use of the plant. Over the course of two weeks in the spring, the annual Agave Heritage Festival celebrates all things agave, including agave spirits, agave farm and garden tours, tours of archaeological sites revealing the cultivation of agave fields, as well as numerous seminars and lectures exploring all things agave.

Renown ethnobotanist and agave aficionado, Charles White, reminds us, "We think about tequila as the major way we know the plant today, but up until a century ago more people ate it in this region than they drank it." Charles has been studying agave and other Sonoran Desert plants for several decades. The Charles White Papers, a collection housed at the University of Arizona Library's Special Collections, is an archive of his fieldwork studies, personal journals, scholarly books and articles (UA Special Collections 2022). Much of his work examines how agave has been essential in the Arizona-Mexico borderlands region for more than 8,000 years. "It's really like a staff of life plant that was important to the people of the desert southwest as buffalos were to the people of the great plains," Charles said. Before grocery stores, shopping malls and hospitals, agaves served as all of these things wrapped into one. People ate them, made clothes with them and practiced many medicinal uses, some of which are still used today.

Charles stood in the orchestra pit at the foot of the stage with his hair dyed bright green and molded into a mohawk with sharp spikes resembling agave leaves. He chats casually before the show begins with Dr. Francisco Solórzano, renown bat biologist from Mexico. Nearby, a mixologist chats with Bernardo Montoya, proprietor of Rancho Tepúa Bacanora. This event, among many others, celebrates the unique place-based relationship of agaves and humans over

the course of thousands of years of entanglements within the Tucson Basin and across the Sonoran Desert. The role of agave, wild and domesticated, in Sonoran ecology "cannot be disentangled from their role in Sonoran culture" (Burwell 1995: 429).

Tucson sits in the heart of the Sonoran Desert one hour drive by vehicle from the U.S.-Mexico border. Its connection to the state of Sonora, on the other side of the international boundary, is an historic relationship with overlapping music, food, drink, landscapes and livelihoods. There is a sense of pride being from "Baja Arizona," which implies an imaginary line drawn south of Phoenix denoting a detachment from the capital city and illuminating a unique borderlands culture. Part of this pride includes the desert habitat and the dozens of agave species found in the region. Murals and mosaics across the city celebrate the agave, revealing a distinct agave culture—the love for the plant runs deep. "Enchanting the nature of place," Dr. Tony Burgess refers to the place-based cultural connection to the plant that enriches the city. Agaves and humans maintain a relationship of mutualism. In his lecture, "Thinking Like an Agave: Reckoning with Global Change," Dr. Burgess reminds us that "man nurtured agave and agave nurtured man." Dr. Burgess is a white-haired professor emeritus and agave enthusiast. He discussed the importance of planting native plants in our urban and semi-wild habitats. "Not only does this help the agave, it reminds us of our desert home and the joy of *living deeply and well in a place*." The 2019 University of Arizona's Howard Scott Gentry Memorial Lecture invited Dr. Burgess to speak in honor of his lifetime contribution to agave science. Burgess covered a brief summary of agave evolution, adaptation to aridity, and a way to analyze climate from an agave's perspective. "The agaves seek us out. They are good friends." He discussed suggestions to celebrate agave and promote their continuing evolution. The threat of climate change, he

reckoned, calls for "assisted migration." He suggests that people may have to deliberately help agaves with their evolution, a plan for long-term attention to the agave. Taking an ecosystem approach, this assisted migration helps not only the agave but other species, including soil microbes, woodpeckers, and other animals that use the plant for shelter, food and other ecosystem functions. "This assisted migration is about reconnecting landscapes and relationships in the face of unprecedented environmental change." Burgess moved from one side of the lecture hall to the other, encouraging the audience to "Learn to think like an agave. Live with and love agave."

As the crowd poured out of Huary Auditorium into the fresh air and sun, I saw a familiar face. Bruce, a bacanora distributor and biologist, waved me over. He stood next to a thin woman with brown hair and tanned skin. "I'd like you to meet." He introduced me to Leah who is the Herbarium Curator Emerita and Senior Research Botanist at the Desert Botanical Gardens in Phoenix. Leah is an ethnobotanist who trained under Howard Scott Gentry (1903-1993), heralded as one of the world's leading authorities on agaves. She has identified seven "new" species of "forgotten agave domesticates" in Arizona (Nabhan 2021), including *A. yavapaiensis,* which she named for the county in which it occurs, as well as for the Yavapai tribe that may have used this plant many years ago (Hodgson and Salywon 2013).

Her book, *Food Plants of the Sonoran Desert,* provides a vast amount of information on traditional plant uses across the region. She outlines nearly 540 edible plants, to include agaves, used by more than 50 traditional cultures of the Sonoran Desert (Hodgson 2001). Leah is known for being incredibly generous with her time, thoughtful and inquisitive, authentic and down-to-

earth. Her awe and appreciation for agaves is palpable. I came to know this well during our many conversations at the botanical gardens and on the trail.

Leah rivals Charles in recognition and esteem related to the agave plant. In the world of agave enthusiasts, these two have celebrity status. Over the course of four decades, they have collaborated many times on research, studying how people manage desert food plants to support themselves and how cultures are influenced by these plants. They continue to research the impact humans have on native plants and habitats both in the past and present day. The living legacy of agave is a reminder of earlier societies who influenced and were influenced by the agave. The agave is a living part of our culture (Nabhan 2021).

Agave is one of the most recognizable plants across Tucson's wild-urban landscape. These succulents have short fibrous stems (rosettes) from which thick *pencas* (leaves) grow in a spiral. These *pencas* are oftentimes long triangular gray-green leaves with spiny edges and a needle-sharp tip that can easily cut the skin. Referred to as "century plants" across the region because of their long lifespan, these succulents take upwards of a decade or longer to flower. Most species are monocarpic, meaning that they fruit only once in their life (Quadri Barba 2020). Following the flowering and seeding, the parent rosette dies. Most species of agaves reproduce sexually (by seed) and asexually (with clonal offshoots called *hijos* or *hijuelos* in Spanish). These *hijuelos* (children) are oftentimes "the more successful reproductive strategy in many agave species" (Radding 2012: 89). During one conversation at the botanical garden, Leah mused, "Bats need agaves more than agaves need bats." While one could argue that the genetic diversity and ecological health of agave populations depend upon their bat pollinators, there is cause for pause.

If agaves disappeared today, the bats' dominant food source disappears. If nectar-feeding bats disappeared today, agaves would carry on, not necessarily in the same fashion, but their clonal *hijuelos* would survive. Of course, this grossly oversimplifies the tapestry of complex entanglements across these arid ecosystems. The adaptive strategies of agaves, to include alternative means of reproduction, merge with the needs and cultural preferences of people in the creation of desert landscapes (Radding 2012: 106). Their stories are intimately intertwined. Agaves and humans demonstrate the futility in attempts to parse out and separate nature and culture in the production of space in this biocultural landscape.

Cultural diffusion and agave diversity shifted across various topography and ecological niches throughout Mesoamerica and the Southwest US. Humans selected certain plants for particular reasons. Some plants were selected for fibers and cloth, building materials and roofing. Other variants were chosen for medicine, nutrition, food and drink. The plant plays a significant role in traditional Sonoran Desert diets. The culinary influence of Tucson is now formally recognized. Tucson holds a designation as a City of Gastronomy. The Agave Heritage Festival is an offshoot of this designation. Jonathan Rothschild, the former mayor of Tucson, officially honored the festival during the final week of April and first week of May in 2017:

> City of Tucson—Office of the Mayor
>
> Whereas, Tucson was selected by the United Nations Education, Scientific and Cultural Organization (UNESCO), the United States' first World City of Gastronomy, designed as such for our city's unique agricultural and culinary culture; and

> Whereas, Tucson sits in the heart of the Sonoran Desert, with its unique, beautiful and diverse horticulture, including the agave plant; and
>
> Whereas, Tucson has an intimate relationship with Mexico—its culture, people and history, its importance to our own story, both past and present…
>
> Therefore, I, Jonathan Rothschild, Mayor of the City of Tucson, Arizona do hereby proclaim April 28-May 7, 2017 as the Agave Heritage Festival.
>
> (Tucson City of Gastronomy 2017)

This declaration is an example of the cultural, commercial and culinary ties of agave across the US-Mexico border. We can also think of borders through the lens of interspecies relationships, where human and agave worlds are entangled within "a landscape of local mythologies, economic struggles and asymmetrical relations" (Ogden 2011: 26).

**Mission Garden and Mayahuel**

According to several different mythical streams, agaves were seen as a divine gift from Mayahuel, the goddess of agave. She carried with her rope made from agave fiber to symbolize her creative skills. She had bird-like creatures or human infants suckling at her breast, which may have alluded to the winged creatures who feed on the nectar of agave flowers. She represents fertility (Radding 2012).

One of the events occurring over the course of the two-week festival was a panel discussion, titled, "Appropriation or Appreciation?" Several members from the Tohono O'odham Nation, an anthropologist, a Latinx social activist from Mexico, and a couple of local business owners sat

on the panel. An engaging conversation unfolded surrounding ideas of the personhood of plants and our responsibility as humans to honor their agency. During the Q&A at the end of the discussion, a woman standing to the side of the panel holding a baby in her arms, shared a story:

*My name is Mari and my comment is that when it comes to cultural events, it's so important that they be accessible to the root culture. So specifically, talking about Agave Heritage Week, it's good that the Mission Gardens had this event today. Five dollars to get in. That's good. That's accessible to the community. However, as we all know, a lot of the events are very pricey. And so just something to keep in mind for the organizers is that we have things that are accessible to people of different economic means and also to me as a nursing mom. This is one of the only events that I'm going to. And I wanted to bring up that in Mexico, there's a number of pre-Hispanic images in our books and they showed the agave plant. And right in front of that plant is a woman and she's baring her breast and she's nursing a baby. So I thought to myself, I will come to this event and I dare anybody to tell me anything about nursing. And, you know, just thinking about my children and bringing them into this loop to learn about agave is so important. We recently had an experience [at the Phoenix Botanical Gardens], my family and I. We do traditional Aztec dance from central Mexico. We came all the way from Tucson. We were exhausted. We had stayed up actually the entire night before. We had not slept a wink. We presented our culture. My son, who's 11 years old, did dance after dance. He accidentally burnt himself at the Gardens. I ran around the park as quickly as I could. I found an aloe vera plant…I saw a volunteer. I said, I just need a little cut of aloe vera. She said, sure, sure. Let me find someone who has a knife. She gets on her walkie talkie, and she said, "I need someone who has a knife. There's a child that's been burned." A big burly man came up to me, and he said, "That is not what this plant is for. It is to look at." It's like, excuse you? My son just presented his*

*culture. Eleven years old, stayed up all night, got burnt presenting something, sharing his prayers with you all. And you cannot give him a little cut from the back of the plant where no one will see. I don't think so. So I don't know if we're gonna go back to the Gardens next year. If anything ever happens like that here in the Mission Garden, somebody needs a little medicinal cut of something, just give it to them. (4/23/19)*

Like Mayahuel with infants suckling her breasts, Mari held her baby close while she shared her experience at the botanical gardens. Mari's story lays bare the ontological mismatches throughout these borderlands. The function of a plant, its use and value, depends upon whether we are observers or participants. How does our relationship change when we only peer at them from a distance, removed from the essence of the plant's wisdom and medicine?


Figure 2: Agave goddess mural, Benjamin Supply Building, 100 East 6th St., Tucson, AZ

**Where the Agave Roams**

Agaves are fairly common and diverse across Mexico and the Southwest U.S. The genus ranges from Southwest Utah and Southeast Nevada, western North America through southern Mexico, where the majority of species are found, with a few in northern South America, the Caribbean Islands and Florida (Sonoran Desert Museum 2022). The majority of agave species occur in semiarid habitats including deserts, desert grasslands and oak-pine woodlands. They are also found in subtropical and subtropical coastal deserts cooled by offshore upwelling (Burgess 2019). Sixty-one percent of agaves are endemic to Mexico. Agaves are in the asparagus family (asparagaceae). If you have a chance to see the extraordinary agave stalk rise several meters from the center of the plant, you notice it indeed resembles a giant asparagus stalk. A relatively young genus, the succulents originated about 10 million years ago, have a vast distribution and range, and play an important role in their ecosystems. Some agaves have evolved to be pollinated by insects, birds or bats. Other agaves, with massive leaves and root systems, provide habitat for hundreds of reptiles and invertebrate species (Quadri Barba 2020). Traits adapted to survive arid regions include rosettes at or near soil surface to help water collection (nighttime dew or rainfall), shallow roots, low germination rates and reliance on pups (clones) from underground stems called rhizomes (Hodgson 2021). Particular species of agaves have adapted to grow within and withstand the harsh weather conditions of the Sonoran Desert. Many seem to prefer growing in rocks and poor soil conditions with little water. Climatic limitations include vulnerability to extreme heat, extreme cold and extended droughts, as well as heavy and frequent rainfall. As the climate changes and ecosystem regimes shift, the capacity to adapt may dwindle as hotter temperatures and longer droughts puts more stress on these plants (Burgess 2019).

The Tucson valley, surrounded by the sky islands—Santa Ritas, Santa Catalinas, the Rincons and the Tucson Mountains—is blanketed with various species of agaves adapted to living in this desert. This hot, semi-tropical desert covers approximately 100,000 square miles to include Arizona, southeastern California, the Baja California Peninsula, the southern portion of Arizona and most of Sonora, Mexico. The sky islands are isolated mountains of biodiversity dispersed throughout the Sonoran Desert like oases that connect the Sierra Madres to the south and the Rocky Mountains to the north. These small mountain ranges provide much-needed resources for thousands of migrating birds among other endemic and migrating species. Some of these mountains reach upwards of 10,000 feet and are home to several biomes from the desert floor to the ponderosa pines of higher elevations. This is one of the most biodiverse regions in the United States. Driving from the desert floor to the summit of a sky island is akin to traveling from Mexico to Canada in an hour. The drive up the winding roads of these mountains brings relief, an escape from three digit temperatures during the height of summer. Though the Sonoran Desert region is one of the hottest and driest areas in North America, it houses over 2,500 plant species and at least 500 food plant species (Magrane and Cokinos 2016). Plants provide a critical role in human lives from our food supply to the air we breathe. Vegetation patterns reveal deep pathways etched over time that blur the lines of human-nature separation.

Leah describes pre-contact landscape modification as “biocultural landscapes” (Hodgson 2019). According to Leah, biocultural landscapes refer to the importance of place; what it once was and what it is now. Ben Wilder, director of the University of Arizona Desert Laboratory, believes the idea of reclaiming traditional cultural knowledge is critical to nurture “arid-land biocultural adaptation practices” (Wilder 2019). The Desert Laboratory resides atop Tumamoc Hill,

*Cemamagi Du'ag* (O'odham), or Horned Lizard Mountain, which is a volcanic hill of prominent cultural and sacred significance to the Tohono O'odham Nation and other Native nations (Wilder 2019). Tumamoc Hill today serves as a popular meeting point for Tucsonans, a place to enjoy a walk with friends or an early morning jog. Long before a paved road led from the base of the hill to the top where the Desert Laboratory sits, this site was an ancient agave field where Hohokam people cultivated the landscape, irrigated and collected water in rock piles within which the plants thrived. While these rock piles are barren today and the agaves have disappeared along with the former residents, the remains of these agrarian communities represent a repository of adaptive practices developed over centuries. Walking up Tumamoc, one moves through layers of past, present, and future—over 4,000 years of human use (Desert Laboratory 2022). Along with countless other projects, Wilder manages the Agave-Human Symbiosis Project. This is a collaborative group that aims to establish a "biocultural sanctuary of agaves" with particular focus on domesticates on Tumamoc Hill. The biocultural landscape concept, adopted by the Agave-Human Symbiosis Project, recognizes the constant interplay between people and their natural surroundings, and more specifically the manner in which human societies shape the land and are in turn, shaped by it (Hong 2014).

A few miles south of Tumamoc Hill lies Mission Garden, nestled at the base of Sentinel Peak, commonly referred to as "A" Mountain, west of Interstate-10 near downtown Tucson. Mission Garden is located at the site of the Tohono O'odham village of *S-cuk Son* and serves as a living agricultural museum of Sonoran Desert-adapted crops and edible plants. The area surrounding Sentinel Peak is one of the longest known areas of continuous cultivation in the United States with the oldest known canal-irrigated agriculture beginning at least 3,500 years ago and

stewarded by the Tohono O'odham people (Mission Garden 2022). Humans and other species have carved and shaped this biocultural landscape for thousands of years. Mission Garden maintains a series of agave terraces known as *trincheras* that welcome visitors to the garden. These *trincheras* resemble those of the ancient Hohokam farmers used to plant agaves in drainages on rocky slopes to capture rainwater runoff (Fish and Fish 1992). Since 2016, the Mission Garden staff and volunteers have been planting agaves here, learning ancient agricultural practices, erosion control, and water-harvesting methods that may come in handy with climate change upon us. The co-evolution of humans alongside myriad species in these borderlands has generated local ecological knowledge and practices that represent vital reservoirs of experience. Revitalizing and maintaining this connection with nonhuman beings in this rich biocultural landscape ensures the continuation of methods and skills necessary to live sustainably.

**Climate Change**

As intensifying heat and drought due to climate change become greater threats across northern Mexico and the Southwest US, maintaining multispecies connections are important for both humans and nonhumans. Agaves have adapted to particular climate niches that depend upon certain temperatures and precipitation. The megadrought impacting the Sonoran Desert over the last twenty years is expected to persist (Magrane and Cokinos 2016). According to Dr. Burgess in his UA lecture, helping agaves adapt to climate change, as well as globalization, requires us to "Really think like an agave…the agave's perspective of the climate" (2019). He encourages us to find appropriate climate niches to migrate agave if in danger from climate change. Hybridization may provide viable offspring in a changing climate, he argues. More mountainous agave are in a

better position to move to higher or lower elevations as the climate changes. Helping agaves cope with climate change also helps a number of other species—silverfish, lizards, carpenter bees and woodpeckers who make homes in dead agave stalks, to name a few (Burgess 2019). Reforestation of agaves is also an opportunity to capture carbon. Agaves are efficient in their water use. When planted in significant densities, they can draw down and store tons of carbon per acre per year. These plants, along with nitrogen-fixing "companion trees," such as mesquite, ironwood and palo verde that often grow near agaves, require little to no irrigation (Stromback 2019). Many are looking toward the future and the importance of nurturing this symbiotic relationship among agaves, humans and other beings that inhabit this desert.

Charles White  in his recent article, "The Role of Agaves in Presilience at the Food/Water/Energy Nexus" (2022) writes about the plight of desert cities as climate change advances. Arid cities, particularly those near geopolitical boundaries, have become "laboratories for the future." These borderlands, he argues, need equitable public access to water, energy and food security to address a rapidly changing climate. He suggests creating community-based solutions and cultivated plantations of agaves and other desert-adapted crops. The proposed Center for Desert Agriculture and Climate Resilience would engage all sectors in desert border communities to develop adaptions to climate change (Nabhan 2022). The Center for Climate Adapted Heritage Cuisine is already learning how to adapt and live with extremes by embracing climatically appropriate foods through the sciences and the arts (Desert Laboratory 2022). Sharing meals and sharing cultural knowledge can connect diverse communities and disparate peoples brought together by climate change. Interpersonal relationships built through such networks may also provide important linkages between humans and nonhumans. These

relationships connect us to peoples of the past who sculpted the landscape with the help of their agave relations.

**Pre-Columbian Cultures and Agave**

Just north of Tucson rests Marana, Arizona, once a quiet agricultural and ranching community, now a community of sprawling subdivisions and shopping plazas. Part of this town is nestled at the feet of the Tortolitas, a small, low-elevation (5,000 feet) mountain range to the west of the looming Santa Catalina range that climbs from the desert floor to reach over 9,000 feet. Driving to the Tortolita Preserve trailhead, one passes several affluent housing communities before arriving at the parking lot adjacent to the Ritz Carlton hotel and golf course. What once was sprawling desert is now a suburban landscape with curly-cue streets lined with cookie-cutter homes, bright blue pools and green lawns. I graduated high school ten miles down the road without ever taking notice of the multilayered, multifaceted biocultural landscape within which I was raised. Despite the tightly-woven relationship between agaves, humans and other desert dwellers without learning how to read the living biocultural landscape, these relationships remain obscured.

The Hohokam (500-1450 AD) lived in this same region and shaped the ecosystem in ways that are still written upon the landscape. These pre-Columbian peoples helped carve the borderlands environment we interact with today, though without adequate knowledge, it is easy to assume the landscape is “natural” and “untouched.” Suzanne and Paul Fish, Curators Emerita at the Arizona State Museum and Professors of Anthropology at the University of Arizona, are well-known for their contributions to understanding Hohokam lifeways, particularly relating to their traditional

food systems. They have done extensive work at the base of the Tortolitas in Marana. The Marana Community of the Classic Period was home to a concentrated population with advanced agricultural development (Fish and Fish 1992). Hohokam agricultural technology is documented well before 1,000 AD. Their agricultural footprint in what is now Marana included "riverine irrigation networks, floodwater diversions from ephemeral drainages, and complexes of rock piles, terraces and other devices capturing overland runoff" (Fish and Fish 1992: 280). The Hohokam used the Rillito and Santa Cruz rivers as sites for intensive agriculture including hundreds of miles of irrigation canals. The agrarian system fostered an exchange and market system extending within and beyond this region (Hodgson 2001).

The Hohokam thrived in what we now call Arizona for thousands of years prior to Spanish colonization. The 40,000 square mile region they inhabited encompassed a range of topographic and climate variability that provided opportunities for the development of farming technologies (Fish and Fish 1992: 269). Over the course of several thousand years, Hohokam farmers developed an agricultural system that included corn, beans, squash, amaranth, cotton, as well as domesticate agaves cultivated from wild ancestors. Archaeological sites across the Tucson valley reveal a number of agave domesticates cultivated by the Hohokam. They were among the first agave cultivators to use the plant for food, fuel, fiber, ritual, medicine and fermented beverages (Hodgson et al. 2018). The Hohokam cultivated agaves for food for over 10,000 years. The plant was a main food source. It provided calcium, fiber, iron, potassium and much-needed calories (Denham 2007). Pre-Hispanic communities cooked agave hearts in oven pits built into the ground and baked the agave leaves to extract long pieces of fiber that were used to weave clothes and make rope (Sonoran Desert Museum 2022).

Agave had a leading role in shaping the American Southwest's largest pre-Columbian populations (Hodgson et al. 2018). Hohokam farmers transported agaves with rhizomatous offshoots, underground stems that produce numerous clonal plants for asexual reproduction. Farmers could select and perpetuate agave genetic variants. This drought resistant succulent matured with less moisture than other crops. The Hohokam may have expanded the geographic ranges and ecological tolerances via mutation, recombination, and additional hybridization. This domestication is as much a rearrangement of genes as it is a social and cultural process (Denham 2007).

Agave domesticates began to decline over many centuries following a significant reduction in the population of the region post-1450. In the absence of care and trade, genetic variation of cultivated agaves began to erode, causing near extinction of agave domesticates (Hodgson 2021). The arrival of the Spanish in the 16$^{th}$ century and ensuing social reorganization further threatened cultivated agave variants (Fish and Fish 1992). This decline is written on the land. Today's "wild" landscapes are remnants of once thriving agave cultivation sites. The relationship between agaves and humans has never been static. These entanglements blur and muddy the divide between wild and domestic, natural and cultivated.

Researchers have documented similar processes of agave domestication in Mesoamerica. There were many forms of cultural diffusion between Mesoamerican cultures and the Hohokam during the pre-Hispanic era. Archaeological sites suggest that the Hohokam planting pattern resembles patterns still followed in Mexico today with plants lining terrace walls and annual crops planted in these terraces (Fish and Fish 1992). The Aztecs and other early Mexican cultures cultivated

maguey through vegetative offsets (clones). Clonal reproduction and self-propagation in rock piles resemble Hohokam sites and signify long-term investment (Mazarella 2021). These societies selected genes for high production value, which they could pass on to the next generation. For millennia, the agave has been one of the most important plants for pre-Columbian civilizations throughout Mesoamerica.

Spanish colonization restricted, oftentimes violently, traditional farming practices, yet these agrarian activities remain part of the cultural traditions across Mexico today. Due to the near disappearance of widespread agave cultivation by the Aztecs, many people today harvest "wild" plants. Varieties of wild-domesticates remain. Relic agave domesticates are difficult to speciate due to their hybrid nature over time. While talking with Leah at the Desert Botanical Gardens, she explained, "Their hybridity makes defining the lines of speciation challenging. It's difficult to know whether a species domesticated by humans centuries ago is now growing on its own as 'wild'" (Leah 2019). These relationships are hard to define. The edges are blurred. The separation of nature and human, wild and cultivated, is often reflected in colonial histories of landscapes. When we begin to follow the agave, to look more closely, simplistic Western dichotomies begin to crack. Plant histories provide frames of seeing that question colonial ontologies supporting human-nature dualities. These plant histories reveal relationships that are far more complex, multifaceted, place-based, and relational (Marshman 2019).

…

"Agaves migrated with people!" Sue hollered on the trail. The one time I had the pleasure of riding a horse in Patagonia, Sue led myself and my stubborn horse, Paul, along with another friend and her own stubborn horse, to the wildlife preserve a few miles outside of town. It was a

typical early spring morning. There was a slight chill in the air that would burn off in a couple of hours. Sue chose one of the numerous single track dirt trails that run across the hills dotted with dry desert grasses, mesquite trees, cacti and other assorted desert flora. I knew she planned to take us to an historic "agave grow-out," a patch of once-cultivated agave. I looked in all directions, sat up high on my horse and peered as best as I could over the hills. The landscape looked fairly homogenous from my untrained eye. I saw hills with dry grasses dotted with trees and cacti. Solitary agaves perched on ledges and rocky inclines. I did not notice anything out of the ordinary. We plodded along, enjoying a breeze and the sun warming our skin. As we rounded a bend, I spied a mesquite tree atop a low hill. Surrounding the tree was a swath of pale green. Sue led us to the grow-out. As we got closer, I could see many dozens of healthy Agave murphyi of all sizes cloistered together in what appeared to be an "unnatural" collection of plants. Nowhere else in the vicinity could we spot another location with a dense collection of agaves, or any plant for that matter. The landscape was sparse aside from this stand of succulents. When was this agave patch from the past actively cultivated and harvested? Does this grouping of agaves represent what Tsing describes as the "unruly edges and seams…where we cannot ignore interspecies interdependencies" (2012: 141)? Where is the boundary between wild and domesticated? Who determines that edge?

Charles White  casually mentioned during one of our conversations, "We have to listen to what the agave is telling us" (Nabhan 2019). He encouraged stepping outside of the familiar realm of human senses to build a bridge to other worlds, to hear what our companions have been telling us. I never received a clear answer to what he meant by listening to the agave. How many languages does the plant speak? Would I be able to interpret her message? Who gets to be the

translator? Other-than-human stories complicate the dominant narrative of the current borderlands, revealing a landscape shaped by mobility and migration, belonging and boundaries (Head and Atchison 2008). Human migration and agave distribution are deeply intertwined across ecological, cultural, and political borders. These ever-evolving entanglements include the co-evolution between humans and agaves (as well as the primary pollinator of many agave species, the nectar-feeding lesser long-nosed bat, who makes an appearance momentarily). Wild and cultivated, past and present—the closer we look, the more the lines continue to blur.

Figure 3: Agave grow-out near Patagonia, Arizona

**Indigenous Relationships with Agave**

Despite severe population decline and subsequent colonization across Mesoamerica and what is now the southwestern United States, there exists evidence of occupation and agricultural land use of more recent arrivals (Loendorf and Lewis 2017). Contemporary Indigenous peoples of the Sonoran Desert are recognizable in the archaeological record (e.g., O'odham, Seri, Apache, Maricopa, Yavapai, Cocopah). Though their diets varied for cultural and ecological reasons, all used desert plants, both wild harvested and domesticated, for food and other purposes (Bohrer 1991). The agave plants across the Southwest represent the knowledge of how to survive in a hostile desert. Adaptations to aridity represented by both agave and people hold critical insight into how to live well in the desert. Many native nations of the region are relearning their ancestral diets and ways of preparing local plants. Though this reciprocal relationship between desert plant and desert people began to unravel over centuries wrought with environmental and social conflict, many Indigenous communities are actively recovering and reclaiming their traditional knowledge and abandoned ancestral agave fields. These efforts reflect an interconnectedness of human-agave worlds that is hard to break.

"The agave is so much more than a plant." Lewis is a Tohono O'odham tribal member, a young man who works at the Tohono O'odham Cultural Center and Museum in Topawa on the Tohono O'odham Nation an hour west of Tucson. The cultural center sits beneath the sacred mountain, Baboquivari Peak, or *waw kwiulk* in O'odham, which means "constricted rock." The Nation is the second largest reservation in Arizona with a land base of nearly 3 million acres, roughly the size of Connecticut. Lewis stands at a podium just below the stage on what is usually Hotel Congress's dance floor. Most nights, the dance floor is packed with young bodies gathered for

live shows or DJs. Today, the crowd has gathered to listen to Lewis share his peoples' traditional knowledge of agave. His long black hair is tied loosely into a ponytail at the base of his neck. He is casually dressed in a black short-sleeved t-shirt and jeans. "Our tribe, our people, and other Indigenous people in the area, use this plant in many ways…to connect to the land, to the plant, to all plants. It's helped sustain us in our communities." He shares with the small audience the tribe's efforts to recover their traditional knowledge and uses of agave. He mentions revitalization projects across the Tohono O'odham Nation, as well efforts of the Akimel O'odham and White Mountain Apache. Lewis shares photos and stories of traditional methods of preparing agave for food, medicine, and ceremonial uses. "Our elders remind us that we are connected to the land, to this plant, to all plants."

Lewis told the story of a "song dreamer" who accompanied a group on an agave harvesting trip to create a song about the area. "It took two nights for him to finally catch the words that were coming through in his dream. Two days later we did a roasting…[enough] time for the song dreamer to have visions in his sleep. He had the song, and he recited the song to us as if he was sleeping. We heard mumbling in the beginning. It was in rhythm, a sound. At the roasting he offered this song. That was something very moving." Lewis told the audience about the importance of offering prayers to thank the agaves for their help. They made a creosote blessing before several elders demonstrated the process of roasting in a traditional cone-shaped pit. Lewis explained that there are different ways of harvesting and roasting agaves in different Tohono O'odham communities, just like the language changes slightly depending upon where you are in the T.O. Nation. "Our elders tell us to place some [of the plant] on yourself to help with what ails you, and to thank them for their help. They told us to bury what can't be used of the plant in case

another being needs it. If it is buried back into the soil, our elders told us, hopefully it will provide life somewhere, to some other animal for food, maybe." Lewis showed pictures of agave roasting pits where they held celebrations in several communities to show tribal members the roasting process and to give them a taste of this traditional food. There were not as many people as Lewis expected to participate. "A lot of people are really skeptical, like, oh, we don't do that. And we're trying to educate the community. It's still in the people. Elders still have memory of it. So, most of the people that came out were elders. We offered it to our elders, and they were really thankful for that. It was a good opportunity because we were able to capture some of their oral histories." Lewis closed his presentation saying, "Our leaders taught us these things to keep us going and to show everybody. So, I hope you are all able to try it, too" (Lewis 2019).

A couple of years following Lewis's presentation, the Desert Lab on Tumamoc Hill invited Glenn and Barb to share their traditions of agave use. Glenn is Akimel O'odham and a member of the Salt River Pima Maricopa Indian Community (SRPMIC). He is the community garden coordinator for SRPMIC. Barb is a member of the White Mountain Apache Tribe. They described how multiple cultures and multiple lifeways evolved with the agave, and how the use of agave takes a variety of forms that change from region to region, reflecting distinct place-based culture and ingenuity. Agaves are companion species that reach across borders and continue to co-produce rich biocultural landscapes. Tsing writes, "Delight makes an impression: an impression of place…Conscious decision can also take [us] to a spot of past encounters" (2012: 142). Tsing urges us to search for a world of mutually-flourishing companions. Jacob and Barb shared their delight in the resurgence of this beloved companionship.

Glenn described relearning ancient techniques used by Akimel O'odham ancestors. Today, Glenn takes children on hikes to show them the value of the land as more than a resource. He tells the story of rediscovering what their ancestors cultivated. Years ago, they found identical clones of 700-year-old agaves under a palo verde tree. Jacob describes the agave clones as beings who "walked across the land" following resources. Over time, these plants formed a relationship with the palo verde. They were "nestled" underneath the tree in a microclimate that formed a habitat for the agave. The human community began to bring blessings and offerings to the plants. They brought water to the agave stands. The goal was to foster an intentional relationship with the agave. Jacob and his children took five of the plants home and planted them in various places. According to Jacob, the ones that did the best were under palo verde. "It's cool that they formed this relationship with those plants over the time they've been there. So, for us to hold them—we were freaking out—when we actually found the stand and we took the babies. Not only to be in their presence but to actually touch these little babies. It was special because we were literally touching something that our ancestors planted in the ground over 600 years ago because the pups are identical clones of the plants, so it was a true living connection with our ancestors, to those that came before us. It's something that's hard for me to express verbally, but it was a very special moment. Today we have about 50 of these plants in the garden" (Glenn 2021). In the same site where these agave clones were found, they noticed stone tools scattered across the area, along with pits for roasting agave. While many children visited these places to enjoy the riparian area, they weren't necessarily taught the history of the space, the connection to the land. "Being able to take our kids out there is a blessing for me and something that I really take seriously. So, all the kids got to see this site. They know that it should be respected when they're out there." Children now participate in all steps of harvesting and processing agaves. It is

an intergenerational process of revitalizing traditions. “Kids are open to these new experiences. My kids ask when they’ll get to taste the sweet agave again…We work with children and elders at the garden and everyone in between. We see people starting their own agave gardens” (Glenn 2021).

Barb discussed over 9,000 years of use and the importance of agave in trade. The Tohono O’odham traded with the Akimel. The Northeastern Yavapai occasionally visited Navajo country where they traded agave among other items. Agave is not found in Hopi country and was obtained by trading, often with the Havasupai. Western Yavapai traded with the Mohave and Tohono O’odham nations (Hodgson 2001). Barb notes the importance of mezcal agave among all of the Hualapai bands, even those territories where the species grew on the periphery. “Normally, [the Hualapai] were a desert people, but for agave and game they climbed onto the first western step of the great Colorado Plateau. Their camps on the plateau were temporary and seasonal, but their mezcal roasting ventures were just as much a part of their seasonal annual food-getting cycle as their irrigation agriculture along the Big Sand River” (Pailzote 2021).

Like Jacob, Barb noted the importance of involving the youth. She mentioned the Hualapai Ethnobotany Youth Project, which teaches children traditional agave harvesting. The nutritional value of the desert food plants is emphasized in this project, as well as the many traditional uses of culturally significant plants. Barb listed the many original uses of agave in her community and other regional native nations. “Some of these include: tattooing with the spines, nets and ropes, fiber burden baskets, tumplines for carrying baskets, hair brushes, hats, paint brushes, agave stalk drying racks, fiber used to preserve tanning material, adornments, and agaves as a musical

instrument." The relationship with this plant calls into question our relationship with nature, interrogating dominant ideas of "natural ecosystems." The idea of symbiosis—mutually beneficial interspecies living—is illustrated by the entanglements of humans and agaves, entanglements written across the landscape. Marta, a self-proclaimed Chicana herbalist, honors the sacred relationship between plants, people and the environment, "Our lives are grounded in social relationships, including the relationships with native plants and the ecosystem in which they thrive" (Vargas-Frank 2019). She argues that plants have agency, a distinct "personhood."

**Gender**

Marta operates her own company, Yerba Nomadica, helping women to remember their intimate relationship with plants. "The smell of the plant is its way to communicate. What are the plants telling us about their uses?" Marta asked a small group of workshop participants. We gathered in the early morning at the Borderlands Restoration Network's Native Plant Nursery in Patagonia, Arizona to learn about local traditional herbalism and to make our own herbal remedy to take with us. There were 15 budding herbalists, 14 women and one brave male. The morning was brisk but sunny. Spring was in the air. Borderlands Restoration Network invited Marta to lead a workshop she titled, "Medicine of Place for Spring in the Sky Islands." As she discussed native medicinal plants for home gardens, she encouraged us to study the relationship between plants, people and the environment. She noted that folk traditions of herbalism do not recognize a dichotomy between humans and nature. Relationships with nature tend to be place-based and rooted firmly in local knowledge. Over the course of the morning, Marta taught us to listen to our bodies. What are our bodies telling us? Listen to the plants. What are they telling us about their uses? She encouraged us to engage with our environment, to seek out its medicine. Use

taste as a teacher, she said, to learn the plant's therapeutic potential. “The old herbal adage goes that the medicine you need is growing around you” (Vargas-Frank 2019). Marta positions her work with medicinal desert plants within complex spheres of human-nature relationships, “I view my work with the herbs as an extension of my activism towards environmental, social, and health justice” (Vargas-Frank 2019). Her work celebrates the perseverance of healing traditions across generations and migrations. During a break, the group strolled in and out of greenhouses growing numerous native plants, to include hundreds of agave pups, *hijuelos* growing slowly and preparing for their own migration to surrounding sites within this biocultural landscape. Most of these pups grew from seed collected by Borderland Restoration Network employees and volunteers. I had the pleasure of participating in one of the seed gathering adventures on the eastern flanks of the Chiricahua range. This is where I met Isabela.

…

A few miles down the road from the nursery, Isabela’s house sits in the center of town with a yard full of native flowers and herbs. She is very conscious and active in her effort to reclaim the traditional knowledge of her *abuelitas* (grandmothers). With her three children running around the shaded yard, we drank iced water and laughed together as bees and butterflies enjoyed the nectar from her abundant flowers. Isabela’s long dark hair fell across her shoulders as she lifted her youngest daughter into her arms. She loves being a mother. “I find great purpose in raising my children to love themselves and know their roots,” she said. I first met Isabela on a bumpy dirt road on our way to collect agave seeds. We chatted easily about our connection to the desert, what draws us to this place despite the harsh realities of loss—loss of the healthy desert landscape, loss of cultural knowledge, loss of water, life, spirit. She told me about her mother’s experience of living in a space in-between cultures. She never learned Spanish because she was

forbidden to speak the language growing up. As a young woman, she did not want to date someone who "looked Mexican" though her parents emigrated to Tucson from Mexico. Alicia believes that her mother wanted to assimilate to the dominant culture for safety reasons and "because she didn't love herself, where she came from. She was ashamed." Alicia told me of this generation, her generation of women, "We are claiming our Chicana, Mexican-American heritage with pride. I have a lot to learn, but I am remembering the plants in this area, how to use them and how to care for them." Grandmother Agave is calling her children back home.

*"As a mestiza I have no country, my homeland cast me out…as a feminist, I challenge the collective cultural/religious male-derived beliefs of Indo-Hispanics and Anglos…I am participating in the creation of yet another culture, a new story to explain the world…a new value system…that connects us to each other and to the planet" (Gloria Anzaldúa 1987:103)*

Traditionally, Indigenous *curanderas*, or community healers, throughout Mesoamerica regarded the agave as *Abuela Maguey*, grandmother agave. These women used the sacred plant to treat infertility, muscular ailments, the kidneys and the immune system. The Indigenous science of midwives involved ritual and prayer, a deep connection to and reverence for the agave and its medicine (Gonzales 2012: 35). The arrival of the Spanish in the 16th century dramatically changed the relationship between humans and nature. Shifts in relations to land, conception of reality, identity, social, ecological, and cosmological processes were impacts of forced assimilation. The Roman Catholic Church suppressed many Indigenous traditions, which were subsequently lost or went underground following Spanish occupation. "Christianity became the most powerful instrument in the transformative mission…the erasure of community, of

ecological practices, knowledges of planting" (Lugones 2012: 74). The domination over nature coincided with the imposition of the modern colonial gender system. Indigenous knowledge, particularly women's relations with nature were condemned as "idolatrous practices…against systems of patriarchy, gender hierarchy and civilization" (Walsh 2015: 111).

Marcela Gonzales is a traditional healer, midwife and associate professor of Mexican American Studies and American Indian Studies at the University of Arizona. She is the author of *Red Medicine: Traditional Indigenous Rites of Birthing and Healing* (2012). Her work shows how Indigenous peoples, Mexican Americans, and Chicanas are reclaiming the knowledge of Nahua peoples in Mexico. I had the opportunity to speak with Dr. Marcela Gonzales in 2019 at an Indigenous Peoples' Day event at Global Justice Center in south Tucson. She mentioned *La Abuela Maguey,* Grandmother Agave, who carries with her Mexican Indigenous teachings. Along with the female deity, Mayahuel, *Abuela Maguey* shares her knowledge of Indigenous science, midwifery and sacred rituals. There is a deep thread of knowledge connecting the past with the present. Descendants of pre-Hispanic societies are searching for these threads, slowly weaving them together after the devastation wrought by the Spanish. Today, despite centuries of repression, healers are receiving traditional Indigenous medicine through dreaming, which is a form of diagnosis, according to Gonzales. In her book, Gonzales writes about a dream she had in April of 2002. "The divine midwives from the spirit world sent a message: Maguey Grandmother in a New Moon Dream presented sacred formulas that constitute a distinct expression of Indigenous science, and ceremonies and rituals are included as part of the process…midwives perform a sacred charge in the heavens, burning copal incense in the celestial realms and guiding as divine beings, following moon cycles" (Gonzales 2012: 33). Gonazles praises traditional

*curanderas*, community healers, who gather these messages. They take these teachings and prepare the maguey to use as medicine to treat ailments relating to infertility, the immune system, kidneys, diabetes and muscular ailments (Gonzales 2012: 33). Across Mexico and the southwest US, women descended from the Nahual people are reconnecting with their ancestral knowledge. Grandmother Agave offers her medicine. She acts as a conduit from pre-Columbian thought to modern day healing practices. This more-than-human perspective provides another lens to witness various forms of knowledge construction, meaning, and maneuvering (Todd 2014). Making space for gendered knowledges and other alternative knowledges provides a window to view and interrogate larger structural inequalities that shape human-nature articulations (Friedman 1974).

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We began our hike in the soft sand of the *arroyo* before beginning a gentle climb in the Tortolita preserve. I had the great pleasure of walking with Leah and her friends, two other ethnobotanists, Lettie and Muff. I call them B³—Badass Botanist Babes. We paused every few steps to identify and assess a plant. A three mile hike can easily take hours with these expert plant lovers. Along the trail, we discussed some of the structural inequalities that threaten these fragile biocultural landscapes. The women believe that tackling structural inequalities requires collaboration among myriad stakeholders, to include Indigenous communities, traditional farmers, academia, archaeologists, federal agencies, and citizens. Leah said there needs to be more funding and support for linguistic and ethnobotany programs. “We need more investments to promote ancestral traditions in native communities. We need to provide alternative relationships with nature counter to the dominant Western tradition that separates humans from nature.” Lettie interjected, “How do we define these biocultural landscapes, anyway?” She wants to see a policy

that protects historically domesticated agaves still existing on the landscape despite the end of cultivation several centuries prior. “These plants are not covered under the Endangered Species Act, the Archaeological Resources Protection Act, or the International Union for the Conservation of Nature (IUCN).” Muff piped in, “Shouldn’t these and other rare cultural species be protected? Where do we draw the line at the edge of nature and culture when Indigenous peoples have been in contact with the plants surrounding them for hundreds or thousands of years?” According to B³, policy needs to change to allow cultural management practices on an ecosystem level and to acknowledge the need to safeguard living artifacts. While we stood over a small parched barrel cactus, observing her struggle during this prolonged drought, we agreed that the new appreciation for agave, particularly as an agave distillate, is a double-edged sword. Perhaps, it will open the possibility to nurture more-than-human relationships. Perhaps, it will lead to further exploitation of these desert plants as demand rises and commodification of the agave increases. During my visit to the Desert Botanical Gardens, Leah’s colleague, Andrew, a geneticist who works with agaves, said “Finally, agave is popular with mainstream audiences” (5/2019). What will the next chapter of our entanglements with agaves look like? Will we co-write the story with them consciously, or will we continue to place ourselves at the center of the narrative?

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Thomas, who works with Oaxacan *mezcaleros* in southern Mexico, argues that agave is a model that illustrates how humans and nature can coexist. “These are remarkable arid-adapted plants that [have] worked in concert with humans…for millennia. Carefully selected, they diversify in step with the uses people ascribe to them and thrive when cared for” (Mazarella 2021). Economies, foodways and bio-culturally diverse habitats and communities are all embedded in

this relationship between people and plants. “This is a story that has been written on the landscape by those who inhabited these lands before us. Now it is ours to continue and make our future” (Mazarella 2021).

…

At the end of her presentation for the Agave Renaissance series, Leah shared one of her favorite Howard Gentry quotes. Alongside the quote was a photo of Gentry seated within a behemoth of an agave, her thorny arms rising far above his head: “This is the last slide and it is time for the last truth. You see me held in the arms of this giant maguey. Actually, I am a son of Mayahuel, the goddess of maguey. What I have told you today is what she told me to tell you” (Bicentennial Convention of the CSSA in San Diego, 1975).

Biocultural heritage is a part of complex bodies of knowledge, most of them constructed empirically and transmitted in multiple verbal and nonverbal ways (Hodgson 2013). These bodies of knowledge and traditions are passed down across generations and are embedded in the quotidian experience of local people. A focus on processes of change reveals different ways of knowing and emphasizes the importance of listening to and for different voices and multiple truths. Consider community as a network of relationships and processes of co-becoming. Community encompasses more than humans alone. It is a multi-species network that includes all of those with whom our livelihoods are intertwined—interspecies interdependence (Marshman 2019: 98). The children of Mayahuel are the gatherers and cultivators, those who nurture and are nurtured by the agave. She remains a powerful symbol of fertility and creativity across Mexico. Part goddess, part plant. She urges us to listen for those different voices, the non-human truths

surrounding us. Mayahuel tugs on the threads of mythology and truth, nature and culture. She weaves a story with layers of symbolism and invites us to be a part of its telling.

**References**


Addams, Eli. 2022. "Camazotz: The Mayan Bat God." *HistoricalMX*. *https://historicalmx.org/items/show/90* . 4/2122.

Altringham, JD. 2011. *Bats: From Evolution to Conservation* (*2nd ed.).* Oxford University Press: Oxford.

Arizona Game and Fish. 2022. "Bat Conservation and Management." https://www.azgfd.com/wildlife/speciesofgreatestconservneed/bats/. Accessed 4/22/22.

Bats Conservation International. 2022. "About Bats." https://www.batcon.org/. Accessed 4/21/22.

Bats Conservation International. 2018. "Bats Love to Pollinate." https://www.batcon.org/pollinator-week/. June 18.

Bohrer, V. L. 1991. Recently recognized cultivated and encouraged plants among the Hohokam. *Kiva*, *56*(3), 227-235.

Burgess, Tony. 2019. "Thinking Like an Agave: Reckoning with Global Change." Presentation for the University of Arizona Howard Scott Gentry Memorial Lecture. May.

Burwell, T. 1995. Bootlegging on a Desert Mountain: The Political Ecology of Agave (*Agave* spp.) Demographic Change in the Sonora River Valley, Sonora, Mexico. *Human Ecology* 23(3): 407-32.

Glenn, Jacob and Barb Pailzote. 2021. "Indigenous Agave Practice." Presentation for the Desert Laboratory Agave Renaissance Spring 2021 Lecture Series. March.

Cajas, Jose. 2009. "Bats in Maya Art." Asociación FLAAR Mesoamerica. Guatemala.

Denham, T., & White, P. (Eds.). 2007. *The Emergence of Agriculture: A Global View* (Vol. 1). Routledge.

Desert Laboratory. 2022. "Tumamoc Hill." The University of Arizona Research, Innovation & Impact.

Desert Laboratory. 2022. "Center for Climate Adapted Heritage Cuisine." The University of Arizona Research, Innovation & Impact.

Fish, Suzanne and Paul Fish. 1992. “Prehistoric Landscapes of the Sonoran Desert Hohokam.” *Population and Environment,* 13(4): 269-283.

Fish, Suzanne and Paul Fish. 2021. “Tumamoc Agave.” Presentation for the Desert Laboratory Agave Renaissance Spring 2021 Lecture Series. February.

Fox Theater Foundation. 2022. “The Crown Jewel of Downtown.” https://foxtucson.com/history/. Accessed 5/25/22.

Gentry, H. S. 2004. *Agaves of Continental North America*. University of Arizona Press.

Gonzales, P. 2012. *Red Medicine: Traditional Indigenous Rites of Birthing and Healing*. University of Arizona Press.

Hodgson, Wendy. 2001. *Food Plants of the Sonoran Desert.* The University of Arizona Press. Tucson, Arizona.

Hodgson, Wendy and Andrew M. Salywon. 2013. “Two new *Agave* species (Agavaceae) from central Arizona and their putative pre-Columbian domesticated origins.” *Brittonia,* 65(1): 5-15.

Hodgson, Wendy (ethnobotanist) in discussion with the author, May 2019.

Hodgson, Wendy. 2021. “Agave Human Symbiosis: An Overview.” Presentation for the Desert Laboratory Agave Renaissance Spring 2021 Lecture Series. January.

Hong, Sun-Kee. 2014. *Biocultural Landscapes.* Springer Science + Business Media. Dordrecht.

Ibarra, Lea and Valeria Cañedo. 2021. “A Symbiosis Imperiled?” Presentation for the Desert Laboratory Agave Renaissance Spring 2021 Lecture Series. April.

Jepson, Katie. 2018. Of the land: Agaves and bats of the borderlands. *Bats Conservation International,* (3):12-15.

Lewis, Lewis (museum specialist) in discussion with the author, March 2019.

Lindenmayer, D.B., Westgate, M.J. 2020. “Are Flagship, Umbrella and Keystone Species Useful Surrogates to Understand the Consequences of Landscape Change?” *Curr Landscape Ecol Rep* 5: 76–84.

Loendorf, C., & Lewis, B. V. 2017. Ancestral O'odham: Akimel O'odham cultural traditions and the archaeological record. *American Antiquity*, *82*(1): 123-139.

Magrane, Eric and Christopher Cokinos, editors. 2016. *The Sonoran Desert: A Literary Field Guide.* The University of Arizona Press. Tucson, Arizona.

Marshman, J., Blay-Palmer, A., & Landman, K. 2019. Anthropocene crisis: climate change, pollinators, and food security. *Environments, 6*(2): 22.

Mazarella, Thomas. 2021. "Agave is the Future." Presentation for the Desert Laboratory Agave Renaissance Spring 2021 Lecture Series. May.

Medellin, Francisco; Wiederholt, Ruscena; Lopez-Hoffman, Laura. 2017. "Conservation of Relevance of Bat Caves for Biodiversity and Ecosystem Services." *Biological Conservation,* 211: 45-50.

Mission Garden. 2022. "Site History: Growing Tucson's Agricultural Heritage." Friends of Tucson Birthplace 501(c)(3).

Nabhan, Gary (ethnobotanist) in discussion with the author, December 2019.

Nabhan, Gary.. 2021. "Wendy Hodgson: When she gets to her study sites, there ain't nothing she can't see." https://www.Charlesnabhan.com/news/2021/08/wendy-Hodgson-when-she-gets-to-her-study-sites-there-aint-nothing-she-cant-see/. Accessed 8/28/21.

Nabhan, Charles. 2022. "The Role of Agaves in Presilience at the Food/Water/Energy Nexus." Foodtank. https://foodtank.com/news/2022/03/the-role-of-agaves-in-presilience-at-the-food-water-energy-nexus/. Accessed 3/25/22.

Nossaman. 2018. "US Fish and Wildlife Delists Lesser Long-nosed Bat." Endangered Species Law & Policy. https://www.endangeredspecieslawandpolicy.com. Accessed 3/25/22.

National Geographic. 2021. "Francisco Solorzano: Becoming the 'Bat Man' of Mexico." https://www.nationalgeographic.com/impact/article/Francisco-medelln-the-bat-man-of-mexico. Accessed 3/25/22.

Ogden, Laura. 2011. *Swamplife: People, gators, and mangroves entangled in the Everglades*. University of Minnesota Press.

Purvis, Dana. 1983. *The Bat, the Blossom, and the Biologist.* BBC Worldwide, 43 minutes. London, England.

Quadri Barba, Paulo. 2020. "Friday Flora Feature: Agave." Sky Island Alliance. August. https://skyislandalliance.org. Accessed 5/23/22.

Radding, Cynthia. 2012. "The Children of Mayahuel: Agaves, Human Cultures, and Desert Landscapes in Northern Mexico." *Environmental History,* 17(1): 84-115.

Sonoran Desert Museum. 2022. "Flowering Plants of the Sonoran Desert: Genus Agave." https://www.desertmuseum.org/books/nhsd_agave.php. Accessed 5/23/22.

Stromback, Ben. 2019. “Agave Power: How a Revolutionary Agroforestry and Grazing System in Mexico Can Help Reverse Global Warming.” Ecosystem Restoration Foundation. Netherlands.

Tucson City of Gastronomy. 2017. “Tucson: Designated UNESCO Creative City in 2015.” https://tucson.cityofgastronomy.org/.

Tsing, Anna. 2012. “Unruly Edges: Mushrooms as Companion Species.” *Environmental Humanities,* 1: 141-154.

University of Arizona Special Collections. 2022. “Gary Nabhan Papers.” https://speccoll.library.arizona.edu/.

Vargas-Frank, Marta (herbalist) in discussion with the author, April 2019.

Walsh, Catherine. 2015. “Life, Nature and Gender Otherwise: Feminist Reflections and Provacations from the Andes.” In *Practicing Feminist Political Ecology: Moving Beyond the Green Economy,* eds. Wendy Harcourt and Ingrid L. Nelson. Zed Books, London, 101-130.

Wilder, Ben. 2021. Introductions to presentations, Desert Laboratory Agave Renaissance Spring 2021 Lecture Series.

# CHAPTER 3

# POLLINATOR BATS AND PEOPLE

***"The people had a relationship with the plants like the bats did. Relationships that are mutually beneficial, an intentional relationship."***

(Glenn Butler, Akimel O'odham)

***"While the bats are the most important pollinator of mezcal agaves, and agaves are probably the most important nectar source for the bats, the extent of the mutualism is unknown. Mezcal agaves have other pollinators and bats have other food sources."***

(Howard Gentry 1982: 7)

## ROADMAP

This chapter follows bat-human entanglements more generally, then narrows to focus on entanglements between bats-humans-agaves in the Sonora-Arizona borderlands region. The lesser long-nosed bat plays an important role as one of agave's primary pollinators. What is the intersection between these bats, the agave from which they forage food, conservation organizations and mezcal bacanora? How are bat-agave-human entanglements changing in this region?

### Silent Wings

There is a valuable yet vulnerable being that flies largely under the radar along a well-worn migration path. These are the unsung heroes, little known and rarely mentioned, who help define human-agave interactions. Agaves are one of the most recognized, heralded and beloved arid plants on both sides of the border. Their nocturnal nectar-feeding friends are often forgotten in the background, seldom considered nor understood. An Aztec legend suggests that humans

learned about the beneficial properties of the agave from the animal world (Jepson 2018). The story does not reveal what specific animal, but considering the co-evolution of agaves with nectar-feeding nocturnal mammals, we might imagine that nectar-feeding bats played this role. Without the mutual relationship between pollinator bats and agaves, the culturally significant plant may not have spread as far and wide across Mesoamerica and the American Southwest. Bats are less celebrated than the agave, but they are gaining popularity among human groups. These multispecies relationships are shifting quickly under social, economic, and ecological pressures.

***"El Año del Murciélago Magueyero"* (The year of the agave bat)**

Alamos rests along the southern foothills of the Sierra Madres Occidental where the Sonoran Desert meets tropical deciduous forest. It is a *Pueblo Mágico* (Magical Town), a designation given to towns that have preserved their original architecture and colonial heritage. Alamos is one of 132 *Pueblo Mágicos* across Mexico. Once a thriving silver mining town in the 1600s, it has experienced boom and bust cycles over the centuries—Independence from Spain, the Mexican Revolution and the closure of the mines have all impacted the town in various ways. A resurgence of investment and renovation in the 1940s transformed Alamos into the tourist destination it remains today (Explore Sonora 2022).

*Día del Jaguar*, Day of the Jaguar, is an annual festival in Alamos that celebrates and educates the general public on wildlife conservation. Over the course of a weekend in early October, the festival typically features art, photography, conferences and workshops. This year the festival honored pollinator bats, particularly the lesser long-nosed bat. Several venues hosted events for children, including workshops to construct bat boxes and another to make bat face masks.

Sponsored by *Naturaleza y Cultural Internacional* (Nature and Culture International ) and the *Comisión Nacional de Áreas Naturales Protegidas* (National Commission of Protected Natural Areas), the conference highlights academic research and on-the-ground conservation projects. Dr. Veronica Zamora Gutiérrez shared her knowledge about the ecosystem services of bats during her talk titled, *"Murciélagos, invaluables aliados de la agricultura"* (Bats, invaluable allies of agriculture). She referred to bats as an *umbrella species* that have an indirect influence on other species that make up an ecological community. While a keystone species often defines an entire ecosystem (e.g. wolves in Yellowstone), an umbrella species requires a large habitat range. They are often migratory and may include many diverse habitats. These species are a critical aspect of conservation decision-making (Lindenmayer and Westgate 2020). In an effort to help these nocturnal umbrella species, Borderlands Restoration Network (BRN) and students with *Colectivo Sonora Silvestre* (Wild Sonora Collective, CSS), planted several hundred agave pups in a small nature reserve located within the town of Alamos. The hope is that these plants will eventually flower to provide food for bats. Throughout the weekend, across the bustling tourist town, young people were giddy with excitement and happy to be together in solidarity to express their love and desire to care for the plants and animals that make this landscape special.

**Nectarivores**

***"As the bats feed, they pollinate the flowers, so the bat and the plant exchange food for sex."***
(Donna Howell, bat biologist, 1983)

Bats have been on Earth for more than 50 million years. With over 1,400 species found on six continents, they are the second largest order of mammals. Bats are unique in the animal kingdom for their longevity relative to their body size. Scientists have documented over two dozen species

that live more than 20 years (Simmon et al. 2008). There are over 150 known pollinator bats worldwide who serve as critical agents connecting species across ecosystems. Their health influences the overall health and biodiversity of myriad environments. The health of these ecosystems likewise influences the fate of the bat. Whereas insectivorous bats depend upon food that is more or less evenly distributed across habitats, migrant nectarivores rely on a food supply that "wants to be found" (Sonoran Desert Museum 2022). Migratory foraging requires habitats occupied by their food plant. Nectarivores must time their migration to coincide with their food plant's flowering cycle. Most migrants follow broad paths of blooming plants, known as nectar corridors (Fleming and Nassar 2002). Hundreds of species of flowering plants rely on these bats either as major or exclusive pollinators. Agaves are one genus of plants that rely heavily on these nectar-feeding bats.

The lesser long-nosed bat (*Leptonycteris yerbabuenae)* is one of three North American species that feed exclusively on the fruit and nectar of night-blooming cacti, including saguaro and organ pipe, as well as many species of agave. These bats are mild-mannered with a tongue that extends ¾ the length of its body. Their extensible tongue ends in a brush-like tip that increases the quantity of nectar and pollen that can be carried on it (Altringham 2011). They have good eyesight and sense of smell but poor sonar abilities. Communal roosting helps these small mammals maintain body temperature and conserve moisture. The lesser long-nosed is found in southern Arizona and southwestern New Mexico, and throughout Mexico and Baja California. The small warm-blooded mammal forages for food, which requires a tremendous energy intake. Every summer, pregnant females take to the sky together to make the long journey north where they will birth their pups in maternity roosts in the Sonoran Desert. These females migrate north

to feed on fresh blooms as the flowering season wanes in southern Mexico. Lactating females can fly up to 100 kilometers one way from their roost to their foraging grounds, feed while flying, then return to the roost to suckle their babies (Purvis 1983). Once weaned in late summer or early fall, the young bats and their mothers migrate south. Safe roost sites are critical. Mothers often select caves and mine shafts for protection from predators and human disturbances. There is extensive research about the mating caves in Jalisco and the maternity roosts in the Sonoran Desert. Many of these caves are located in protected areas. However, the transient roosts that lesser long-nosed bats occupy during their migration remain a mystery. These areas are challenging areas to research because of their remoteness and proximity to organized crime corridors. In an odd twist of fate, the bats likely benefit from the *narcotraficantes,* drug traffickers, because there are less people moving through these regions (Sonoran Desert Museum 2022; Fleming 2004).

Rodrigo Medellín, known as the "Bat Man of Mexico," is a professor of ecology and conservation at the Institute of Ecology at the National Autonomous University of Mexico. He's been instrumental in educating farmers about the importance of bats' role in agave pollination, convincing many to set aside part of their land for plants to flower and await pollination. "We are learning about [bat] migration…We need to follow them in detail to understand the paths, the stepping stones, and the foraging grounds they use" (Nat Geo 2021). Current research involves equipping a few bats with a satellite-capable GPS device. This will ideally provide a better understanding of the timing, the scale, the geography, and the physiological needs along with their migration (Nat Geo 2021).

What does the agave need from its night time companion? The plant requires a dependable pollinator as do most plants in the desert. There is an abundance of competition for services from bees and hummingbirds, so “agaves work the night shift” (Purvis 1983). There is virtually no pollen available during the day. They open to expose pollen at dusk. The shape and biochemistry of agave flowers have evolved to attract bats. The biology of the bat and the agave are so interwoven that a decline in one means a decline in the other. If there are fewer plants, there is less food. If there is less food, there are fewer bats, which means less pollination and fewer plants. “In any disturbed ecological system, the partnerships are the first to go. The effects can spread” (Purvis 1983).

This symbiotic relationship between pollinator bats and agaves reaches far back in time, well before humans migrated into their natural range throughout Mesoamerica and the southwest United States. These two species have been co-evolving for several million years (Trejo-Salazar et al. 2016). At the end of the agave's life, after storing sugar for upwards of a decade or longer, she prepares to grow an enormous stalk reaching several meters toward the sky, offering thousands of flowers like little candy handouts to these nighttime pollinators before she dies.

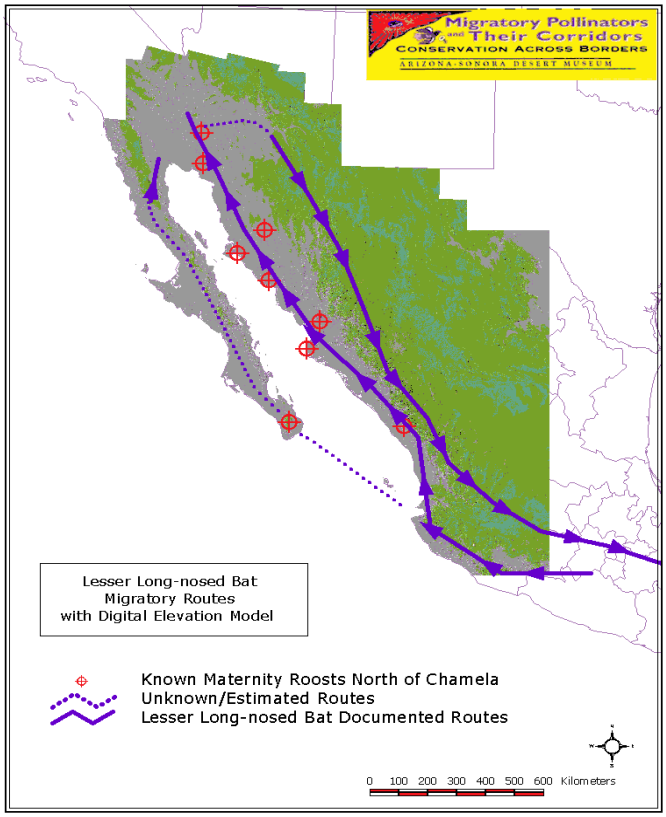


Figure 4: Lesser long-nosed bat migratory routes (Source: Arizona-Sonora Desert Museum)

Figure 5: Lesser long-nosed bat covered in agave pollen (Source: Bats Conservation International)

**Ecosystem Services**

***"Every day of our lives is touched by one or more ecosystem services that bats provide. From your cotton shirt to your coffee to your tacos to your rice to your tequila, and much, much more. Your life has been touched by bats."***

(Rodrigo Medellín)

I had far less interactions with the illusive pollinator bats, though with patience and attention, I began to notice their presence and their influence within and across my research sites. It was often standing in someone's backyard listening to *corridos* at sunset, or taking a walk through the steep hills of a producer's *rancho,* or bouncing in the back of a pick-up truck on the way to cut mesquite when I learned the most valuable insights about multispecies entanglements. When I first entered the field, agave was center stage and still is, but as I spent more time in *la sierra*, speaking with producers and getting to know members of the communities, I learned that everyone has a bat story. A long string of rural towns run north and south along the bats' migratory route from southern Mexico to southern Arizona. Many local ranchers and bacanora producers know the ecological significance of pollinators. Those with large cattle ranches can afford to invest in plantations and allow a handful of agaves to flower in order to collect seed for stronger, more viable agaves for mezcal. Relationships with bats in this region are complicated. Bats are feared and also revered, sometimes both at once by the same person. Taking time to gather stories gives voice to more marginalized communities, their local knowledge and the complexities of their relationships with other species (Shoenbrum and Johnson 2018). Sharing these stories is a method that underscores how bats contribute important social, political, and ecological roles in different regions, communities, and countries. These stories connect bats through such disparate regions.

…

The restaurant adjacent to the hotel in Bacanora was closed to customers. Rogelio had a key. Chairs, tables and other odds and ends were stacked against the wall. I sat on a stool at the bar. Rogelio stood behind the bar preparing hot water for our morning coffee. This became a ritual we enjoyed when I passed through town. I traveled with a French press and fresh ground coffee. He thought the coffee was ok, though a bit too strong for his taste. He preferred his mug of Nescafe. Rogelio worked at the hotel, one of the only employees, just as I was often one of the only guests. An older man with a graying mustache and kind eyes, he sat on a stool beside me and graciously answered my endless questions. I learned much from Rogelio. We became good friends. When I asked about bats, he said, "*Mucha gente no sabe nada de estos animales. Lastima, porque son animales importantes*." (Many people don't know anything about these animals. It's a shame because these animals are very important.) Like many mezcal producers with whom I spoke, he told me about the migratory corridor that passes through *la sierra* on the eastern side of the state of Sonora near the border with Chihuahua. Cattle ranchers in the mountains of Sonora are also very familiar with the network of caves where nectar-feeding bats stopover as they migrate. He said that many people believe they are dangerous, though he knows they are not. In addition to pollinating agaves, Rogelio told me that the bats provide an important source of income. "*Cuando no hay trabajo, hombres van a las cuevas a recoger guano, pero es peligroso*." (When there is no work, some men will go into the caves to collect guano, but it's dangerous.) For generations, men have collected guano as a source of income when times are tough.

…

Pollinators are critical for functioning ecosystems and economies around the world. Anthropogenic pressures combined with the uncertainties of climate change are pushing many pollinator species to the brink of extinction. Pollinators provide an estimated 35% of global crop volume and pollinate an estimated 90 percent of flowering plants on earth (Potts 2016). Flowering plants require pollinators to travel from one plant to another to introduce the pollen from the stamen to the pistil. This cross-pollination increases the genetic diversity of the plant. Across the globe, nectar-feeding bats unroll their tongue like a red carpet to drink the sweet sugar water inside night-blooming flowers. They pick up a dusting of pollen and share it with other plants as they continue to eat. These nectarivores play a critical role in the reproduction of many plants. The ecological niche of nectar-feeding bats helps maintain the health of natural ecosystems and human economies. Over 530 species of plants are pollinated by bats worldwide. In Mexico and the southern US borderlands there are three bats that pollinate plants—the greater long-nosed bat (*leptonycteris nivalis),* lesser long-nosed bat (*leptonycteris yerbabuena),* and the Mexican long-tongued bat (*choeronycteris mexicana)* (Fleming 2004).

Across the globe, human communities rely on bats for vital ecosystem services in the form of insect pest consumption, commercial crop pollination and seed dispersal. Some bat species consume important disease vectors, such as malaria-bearing mosquitos. Other species are significant suppressors of agricultural pests and protect vulnerable cash crops, including bananas, guavas, cashews, dates, figs, sugar, corn, cotton and agave (Potts 2016). Guano is a natural fertilizer sought after by ranchers and agriculturalists. Despite the vital role they play in the health of diverse ecosystems, bats are often left in the dark. Their nighttime habits and funny faces have had a wide-ranging impact on human communities across space and time.

**Threats**

Nearly 200 bat species in over 60 countries around the world are considered threatened, endangered or vulnerable by the International Union for the Conservation of Nature (BCI 2022). While some of the challenges they face are endemic to their order, such as their slow gestation periods, the primary cause of their decline is human activity including: habitat destruction, hunting, accelerated climate change, invasive species, and other stresses. Bats are important seed dispersers and pollinators for many native plants, as well as key insect predators globally. The loss of these services has significant consequences for diverse ecosystems (Potts 2016). As human numbers increase and people encroach deeper into remaining natural habitats, human-bat interactions are becoming more frequent, with often undesirable consequences to both humans and bats. Problems related to infectious diseases are an example. The white-nose syndrome, a severe condition caused by a pathogenetic fungus introduced to North America by human travel, has devastated several hibernating North American bat species, inducing steep population declines (Frick et al. 2016). Several zoonotic diseases, the most notorious being COVID-19, have been associated with bats and have caused enormous impact on global human health and national economies (Rocha et al. 2021: 8).

Climate change compounds these threats. The negative forces of climate change are often most severe on species already impacted by habitat loss and other stressors. Climate change in concert with the continued loss of natural habitats poses a significant threat to global bat populations. Forest habitat, which many bats use for roosting and foraging, are disappearing as a result of timber harvests, clearings to make room for farm crops, mining operations, cattle pastures and growing urban areas. Caves and abandoned mines serve as roosts for many species. Bats are frequently driven out due to instances, such as mine closures, inappropriate guano mining,

recreational caving and tourism. Risk increases during the winter months when large numbers of bats hibernate in caves and mines. If roused from hibernation by human or other disturbances, bats can burn through the stores of fat they need to survive the winter (Frick et al. 2016).

**Bat-Human Entanglements**

While our understanding of bat evolution is still inchoate, the oldest bat fossils found to date (*Onychonycteris finneyi*) are estimated to be from the Eocene more than 50 million years ago (Simmons et al. 2008). Arguably, when our hominid ancestors sheltered in caves, they likely shared these dark dwellings with cave-roosting bats. These secretive mammals were probably as enigmatic for our human ancestors as they are for most of us today. Although elusive due to their mostly nocturnal behavior, bats have fascinated humans for millennia. People and bats came to share landscapes throughout the world. Like humans and agaves, it is an age-old coexistence. There are numerous examples of historic and contemporary cultural representations of bats in local folklore (Rocha et al. 2021). Studies on the cultural and symbolic value (aesthetic, spiritual, educational, and recreational) reveal diverse imaginaries around bats.

There are myriad ways in which bats and humans have interacted over time. Some cultures associate bats with death, witchcraft, vampires, malevolent spirits and evil. In other societies, particularly across the Asia-Pacific region, they have been used as spiritual totems, linked to luck and good fortune. Multiple cultural groups, particularly across the tropics, have traditionally hunted bats for human consumption and traditional medicine (Rocha et al. 2021). Across much of Europe, disdain and fear of bats is largely embroiled in religious doctrine, where bats

symbolize the devil (Eklöf and Rydell 2021). Among several Indigenous groups in Mexico (e.g., Mizteco, Zapoteco), bats were considered to be messengers from the underworld and important symbols of fertility. This cultural and spiritual relevance is evident in the various bat symbols found in Pre-Hispanic Mayan mythology and iconography. The bat deity, *Camazotz,* is present in several Mayan languages, as well as Nahuatl. *Camazotz* translates to "death bat" in Maya and remains a prominent figure in Maya religion (Retana-Guiascón and Navarijo-Ornelas 2012). The Zapotec in Oaxaca believed bats represented night, death and sacrifice. Aztecs also associated the bat with death and human sacrifice. Aztec iconography commonly depicted bats holding a sacrificial knife and a human heart or sacrificial victim. Pre-Hispanic worldviews and cultural values considered bats to be beings of darkness and death. These beliefs about bats are etched in effigies, stone sculptures, ceramics, figurines, murals and codices. Caves are considered an entrance to the underworld, guided by spirits and deities of death, disease, water and fertility (Cajas 2009: 3).

Today, in many communities across the world, we are witnessing both a growing disdain for bats, as well as a warm welcoming of these flying mammals. Sentiments toward bats swing like a pendulum from maleficent mythology and fear of disease to more romanticized and celebrated imaginaries of these creatures. A richer understanding of bat-human entanglements shows how the lives of humans and bats have been closely intertwined over time. Bat diversity supports the biocultural richness of our planet and plays an important role in biocultural landscapes (Rocha et al. 2021). This is certainly true in the Arizona-Sonora borderlands.

**Cultural Value**

***"They are really just amazing little animals. They're really good parents. If a parent dies, the rest of the colony will adopt the babies and raise them."***

(Camille, bat biologist)

*"¡Hay una nube de murciélagos!"* (There's a cloud of bats!) A woman approached me excitedly to tell me about an enormous cave near her hometown in Sinaloa, the state to the south of Sonora. The meeting at the community gathering hall in Banámichi had just wrapped-up. The Bacanora Regulatory Council invited bacanora producers to learn about opportunities in the mezcal industry and to voice any concerns. I was invited to speak to the group and share my research relating to the entanglements between humans, agaves, and bats. I praised the lesser long-nosed bat and the important role she plays in increasing the genetic diversity of the agave plant used to make bacanora. The woman who approached me after the meeting enthusiastically told me about the tens of thousands of bats that leave a cave near her home as night falls, "*Un nube de murciélagos*." Such stories often lie beneath the surface. Over time, the process of "deep hanging out," (what David Siebert, watershed restoration expert with Borderlands Restoration Network, refers to as participant observation) provided spontaneous "data points" relating to human-bat relationships.

The first meeting I attended that was organized by the Bacanora Regulatory Council was in Arivechi, a small village nestled in the hills outside of Sahuaripa—one of the largest communities in the *la sierra*. To reach Arivechi, one must drive up a steep incline that turns sharply to the left where a brightly-lit EXXO convenience store greets visitors. Directly ahead

lies a park in the center of town with a replica of the Moorish kiosk of Santa María la Ribera in Mexico City. The kiosk seems out of place in this rural town. Intricate arches, painted variations of red and blue hues, resemble traditional Moorish designs. Aside from the elegant kiosk, there is little else surrounding the center square aside from the modest cathedral, the community meeting hall and a few small restaurants. Sahuaripa, a larger town just down the road, is often where members of rural communities must travel for gas, a mechanic, a trip to the hardware store, a doctor and other hard-to-find necessities in these rural enclaves. Despite being the largest pueblo in this part of la sierra, there is no bank or ATM in Sahuaripa. Many folks pay bills at the counter of the local EXXO. Every time I traveled the three hours from Hermosillo across two mountain passes to reach these villages, I had to make sure to travel with enough cash. More than once, I had to head back to Hermosillo ahead of schedule because my funds ran dry.

Arivechi marked my first outing with the Bacanora Regulatory Council. Over time, I would spend many hours with the members of *el consejo* (the council) in various small towns and their government office in Hermosillo. Rosalía, a doctoral student at the Instituto Tecnológico de Sonora (ITSON) in Ciudad Obregón, invited me to join. During the meeting, she spoke about the importance of protecting bacanora's denomination of origin (DO) to help small-scale producers and to preserve the tradition of bacanora in the mountains. As I did in the meeting in Banámichi, I briefly introduced myself and shared the focus of my research. Following the meeting, two young men approached me and told me about several caves in the nearby area. Similar to the woman from Sinaloa, they also mentioned a "dark cloud" of bats leaving these caves in the early evenings. Echoing what Rogelio told me over coffee, the gentlemen said some of these caves are exploited for the guano in times of economic need. *"Es un trabajo muy peligroso y es tóxico*."

(It’s very dangerous work and it's toxic.) Weeks later, Jaime, a bacanora producer in el pueblo Bacanora, told me that men collect the guano while bats sleep. “*Es muy caro, muy vendido*.” (It’s expensive, hard to find.) He looked in the direction of several caves located on his ranch and shook his head. “*Hay miles y miles en una cueva.*” “There are thousands in one cave…Harvesting guano,” he said, “interrupts the bats. It’s dangerous for them.”

…

One night at dusk while walking on a quiet street in Bacanora, I saw bats flying all around me. I looked up and spotted them dropping by the dozens from a palm tree in someone's yard. I sat on a concrete dividing wall and watched tiny black bodies fall from the tight canopy of leaves. There were so many falling so fast that I could not keep count. I watched in amazement until it became too dark to see. I asked Rogelio about the bats the next morning. He said sometimes bats will sleep in dry palm leaves that form an enclosure to protect them. Then he told me, “*La gente aquí tiene miedo. No les gustan los murciélagos y queman las hojas secas*.” (People here are afraid. They don't like the bats and burn the dry leaves.) He added, “*La gente no conoce ni se preocupa por el medio ambiente*.” (People don't know about or care for the environment.)

…

There are bat fanatics on both sides of the border. Bat enthusiasts with a particular penchant for binational bats, celebrate the arrival of their nectar-feeding friends, *Leptonycteris yerbabuenae*. In late May 2019, I met Camille in the second floor conference room at Maynard’s French Bistro across the street from Congress Hotel in downtown Tucson. The Agave University was in session. The evening was sponsored by the University of Arizona College of Social and Behavioral Sciences Community Classroom. Three lecturers, Charles, an ethnobotanist, Robert,

a cultural anthropologist, and Lyle, a bacanora aficionado, discussed the botany, diversity, conservation and traditional knowledge associated with wild agaves. The presenters then apprised the class about the relationship between bats and mezcal production and led a tasting of various mezcals. Following the talk, I perused several tables showcasing mezcal products from select producers, distributors and restaurateurs. Camille and I introduced ourselves at one of these tables. She told me about her research in northeastern Mexico studying bats in the area. Over the course of her fieldwork, she came to understand that without local buy-in, conservation projects will not succeed. I laughed and nodded when Camille mentioned that we were at yet another event led by men, in this case three white men. We spoke about the male dominated mezcal and conservation industries, about the impacts of large scale commercialization of agave on the plant and on pollinators. Camille has since completed her doctorate and works as the Agave Restoration Program Manager for Bats Conservation International.

Several weeks later, I attended a presentation featuring Camille at the Congress Hotel. The talk celebrated fruit bats. “This is where we really start to see their value to human economies and ecosystems,” she said. They have “pretty large colonies…One the biggest is not far from here as the bat flies and may have 100,000 to 200,000 females.” She spoke about the lesser-long nosed bat and their incredible migration to maternity and post-maternity roosts in the borderlands. “Bats are moving pollen. They can fly 100 miles from a roost each night. So why worry about these bats?” The primary threats, similar to the plight of many bat species around the world, are roost disturbance and habitat destruction. “As you can imagine, one burning tire, one, you know, set of kids with dynamite. It is this kind of serious disturbance traditionally that has been the biggest thing, in addition to the loss of habitat for foraging.” Camille discussed Bat Conservation

International's Bats and Agave Initiative that aims to provide support to governments, universities, citizens, and conservation partners. The project hopes to increase education and outreach on these agave-bat inter-relationships, and to prioritize landscapes for restoration within 50 kilometers from major roosts. One goal is to plant 1,000,000 agaves, a feat that cannot be done alone. "One of the best partners [we have] is Borderlands Restoration Network (BRN)." These two NGOs are partnering with biology students from *la Universidad de Sonora* (UNISON) in the capital of Hermosillo. This group of ambitious undergraduates formed their own conservation alliance, *Colectivo Sonora Silvestre* (Wild Sonora Collective, CSS), to monitor wildlife and assess the ecological health of natural spring ecosystems. Bat lovers in the borderlands are banding together in an attempt to save these important pollinators from threats that may lead to significant population decline.

The goings-on at the 2019 Agave Heritage Festival shone a spotlight on the opportunities and contradictions of the ever-shifting bat-agave-human entanglements. Wrapped up in these multispecies entanglements are the complexities of mutualism and co-evolution, the commodification of nature and global commodity chains, transnational power relations and shared biocultural landscapes. Centering the multiplicity of meanings and relationships among the three species creates fertile ground to explore and (re)interpret our interspecies interdependence.

**References**


Altringham, J. D. 2011. *Bats: from evolution to conservation*. Oxford University Press: London.

Badyaev, Alexander. 2016. “Bat Whisperers.” BioGraphic. https://www.biographic.com/agave-whisperers/. Accessed 6/30/22.

BCI. 2022. “Endangered Species Intervention.” Bats Conservation International.https://www.batcon.org/our-work/endangered-species-interventions/. Accessed 6/4/22.

Cajas, Antonieta. 2009. "Bats in Maya Art." *Asociación FLAAR Mesoamerica*.

Eklöf, Johan, and Jens Rydell. 2021. "Attitudes towards bats in Swedish history." *Journal of Ethnobiology* (41)1: 35-52.

Explore Sonora. 2022. “El Encantador Pueblo Colonial.” https://explore-sonora.com/alamos-sonora/. Accessed 7/7/22.

Fleming, 2004. “Nectar Corridors: Migration and the Annual Cycle of Lesser Long-nosed Bats.” IN *Conserving Migratory Pollinators,* ed Gary Nabhan. The University of Arizona Press, Tucson.

Fleming, T. H., Nassar, J. M., Fleming, H., & Valiente-Banuet, A. 2002. “Population biology of the lesser long-nosed bat, Leptonycteris curasoae.” *Mexico and northern South America*, 283-305.

Frick, W. F., Puechmaille, S. J., & Willis, C. K. 2016. “White-nose syndrome in bats.” In *Bats in the Anthropocene: Conservation of bats in a changing world.”* pp. 245-262. Springer, Cham.

Gentry, H. S. 2004. *Agaves of Continental North America*. University of Arizona Press, Tucson.

Jepson, Katie. 2018. “Of the Land: Agaves and the Bats of the Borderlands.” *Bats Magazine, Bats Conservation International,* 37(3): 12-15.

Lindenmayer, David B., and Martin J. Westgate. 2020. "Are flagship, umbrella and keystone species useful surrogates to understand the consequences of landscape change?." *Current Landscape Ecology Reports* 5(3): 76-84.

National Geographic. 2021. “Rodrigo Medellín: Becoming the 'Bat Man' of Mexico.” Nat Geo: Impact. https://www.nationalgeographic.com/impact/article/rodrigo-medelln-the-bat-man-of-mexico. Accessed 6/29/22.

Potts, Simon G.; Ngo, Hien T.; Biesmeijer, Jacobus C.; Breeze, Thomas D.; Dicks, Lynn V.; Garibaldi, Lucas A.; Hill, Rosemary; Settele, Josef; VanBergen, Adam. 2016. *The assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production.* Bonn, Germany, Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 556.

Purvis, Dana. 1983. “The Bat, the Blossom and the Biologist.” BBC TV.

Retana-Guiascón, Oscar G., and María L. Navarijo-Ornelas. 2012. "Los valores culturales de los murciélagos." *Revista Mexicana de Mastozoología (Nueva Época)* 2(1): 18-26.

Rocha, R., López-Baucells, A., & Fernández-Llamazares, Á. 2021. “Ethnobiology of bats: Exploring human-bat inter-relationships in a rapidly changing world.” *Journal of Ethnobiology*, *41*(1), 3-17.

Simmons, Nancy B., et al. 2008. "Primitive Early Eocene bat from Wyoming and the evolution of flight and echolocation." *Nature,* (451) 7180: 818-821.

Sonoran Desert Museum. last updated 2022. “Migratory Pollinators and Their Corridors.” 1:100km. Migratory Pollinators Program. https://www.desertmuseum.org/pollination/bat_results.php. Accessed 7/1/22.

Sonoran Desert Museum. 2022. “Migratory Pollinators Program: Lesser Long-nosed Bat.” http://www.desertmuseum.org/pollination/bats.php. Accessed 7/2/22.

Trejo-Salazar, Roberto-Emiliano, et al. 2016. "Save our bats, save our tequila: industry and science join forces to help bats and agaves." *Natural Areas Journal* 36.4: 523-530.

Zamora-Gutiérrez, Veronica. 2020. “The Lesser Long-nosed Bat.” Bats Conservation International. https://www.batcon.org/meet-the-lesser-long-nosed-bat/. Accessed 6/30/22.

# CHAPTER 4

# MORE-THAN-HUMAN POLITICAL ECOLOGY OF BACANORA

***El bacanora es un espíritu de la sierra, que brota de la tierra, desafiante, impone respeto, se asoció con Tao, el sol y Metza, la luna, para recibir su energía lentamente con paciencia, sin prisa, este espíritu viaja por las noches en las alas del murciélago.***

***El bacanora es un espíritu silencioso como el venado, que vive y aprendió a esconderse en la sierra, ahí nació, es su terreno natural, no pretenden otra cosa, él no lo va a permitir.***

**Bacanora is a spirit of the mountains, which springs from the earth, defiant, imposes respect, it was associated with Tao, the sun and Metza, the moon, to receive its energy slowly with patience, without haste, this spirit travels at night on the wings of the bat.**

**Bacanora is a silent spirit like the deer, who lives and learns to hide in the mountains. He was born there, it is his natural terrain, do not pretend anything else, he will not allow it.**

(Manuel Rafael Chacon Gil, "Espíritu de la Sierra")

**"*Primero somos los Sonorenses. Segundo somos los Mexicanos. Somos bacanora. No tendría porqué importarle solamente a Sonora. Es bacanora lo que presenta México en el mundo*."**

**First we are Sonoran. Second, we are Mexican. We are bacanora. It should not only matter to Sonora. It is bacanora that Mexico presents to the world.**

**(**Jose, bacanora producer)

## ROADMAP

This chapter takes a tour along *la ruta bacanora*. I provide a short history of the agave distillate and introduce some of the key participants with whom I worked in the field. Themes explored include history and tradition, local and global articulations, the conflict regarding the denomination of origin, along with barriers of access to resources. This section of the dissertation looks at how relationships among humans and agaves are changing with the commercialization of mezcal bacanora in Sonora. A multispecies political ecology approach helps frame the larger

issues influencing the  bacanora industry, including security, gender and mining impacts on local communities. Bats are mostly absent from this chapter as they did not come up often when discussing the history and development of the industry. We return to our nocturnal friends in the following chapter. (Note: throughout the chapter, I interchange *agave* with the common name for agave in Mexico, *maguey.*)

**La Vinata Batuq**

I first met Luis and Abram in the small town of San Pedro de la Cueva, which sits along Lake Novillo, or *Presa El Novillo.* This is a large reservoir located on the Yaqui River that provides water for irrigation and generates electricity, most of which ends up in Hermosillo, the capital city of Sonora. Luis and Abram work seasonally for Pascual Trujillo, the owner of the bacanora brand, Batuq. When they are not working for Trujillo, they fish part time and work as ranch hands for the cattle industry. I met Pascual in Tucson during the Agave Heritage Festival following a presentation he and his son gave about their brand of bacanora and their method of production. In front of a (mezcal tasting) room full of people eager to learn about artisanal processes of making bacanora, the Sonoran borderlands mezcal, he shared his experience as a producer with consumers eager to taste the mezcal and imbibe the narrative of history, tradition and a distinct identity rooted in the Sierra Madres Occidental.

Pascual was not at the ranch when I visited. He sent Luis and Abram, two young men in their early twenties, to fetch me in town. The ranch is remote and difficult to find. The unmaintained dirt road offered a challenge even with four-wheel-drive. This was the first time I used 4x4 in my old green truck. I was pleased that we navigated the road without a problem. Abram, sitting in

the passenger seat—I kindly refused his offer to drive—even complimented my driving, *para una mujer,* he said. As we left the reservoir and the town, we wound our way further into the desert, up and down rolling hills thick with pitaya stands (*Stenocereus thurberi,* better known in the U.S. as organ pipe cactus). The emblematic cacti (a columnar cacti like the saguaro, both of which, in addition to maguey, provide food for the lesser long-nosed bat) can reach upwards of twenty feet or more. At this time of year, they were covered in furry cactus fruit the size of a tennis ball. The fruit is harvested in late spring-early summer, providing a food source for local families, as well as seasonal source of income. (Several bacanora producers told me they are currently making or plan to distill bacanora with pitaya fruit.)

The ranch is sprawling and isolated. That night, we slept outside on cots on the covered porch of the humble ranch house, which is not set up for comfort but a space for seasonal workers to cook and clean in between shifts. There is a small television in the living room that remained on a music station playing videos of popular *corridos* and *musica norteña*. Various bands, typically groups of men in cowboy hats and matching outfits with cowboy boots, sing love songs, traditionally accompanied by guitars and an accordion. *Musica norteña* is known for *la grita,* a sort of crying out with heartache, love and sadness. People across the state of Sonora, across this entire borderlands region, often sing-along and express the lament, *la grita*, in tune with the singer. Once the sun set, the heat of the day dissipated. The cool evening air was refreshing, far preferable to sleeping inside the stuffy concrete house. Four cots for the four of us–Luis, Abram, myself and Rafael, who was in charge of operations–made a row down the length of the patio between the house and the *vinata,* distillery. The vinata had a large steel autoclave, the only one I saw throughout my time in the field. An autoclave is essentially a large pressure cooker. They

are commonly used in the tequila industry and are sometimes preferred as they cook the agave faster and offer more control than the traditional *horno,* or *tatema,* which is the oven used to bake agave *piñas*. *Piña,* pineapple in Spanish, refers to the bulbous center of the agave that is cooked and eventually mashed to release juice for fermentation and distillation. The *tatema* was traditionally made of earthen clay. Today, many bacanora producers build an underground pit and line it with bricks. They cook the *piñas* for two to three days with mesquite wood and allow a couple of days for the fire to cool before opening the sealed *tatema.* At this stage in the process, the agave is well-cooked, slightly resembles a squash in color and texture and tastes very sweet.

While May is far from the hottest month of the year in the Sonoran desert, not much work is done under the heat of the summer sun. Rafael, the *maestro vinatero* (mezcal producer, also called *mezcalero* or *bacanorero),* along with Luis and Abram, the *jimadores,* or agave harvesters, rise at dawn, set the water to boil for coffee and throw on their work clothes. I rise with them, mix a spoonful of Nescafe and hot water in my tin mug and rinse my face with cool water. Bottles of water in tow, we hop in the back of the truck where the tools await. Rafael behind the wheel and the three of us in the bed of the truck, we head up the hill. When we arrive at the agave field, the sun is already beginning to heat up the surface of the earth. Despite the hot temperatures, everyone wears long-sleeved shirts, jean pants and heavy boots. This is for sun protection, as well as protection from the formidable maguey and other desert hazards, to include rattlesnakes and the myriad other plants with threatening thorns. Rafael gathers his water bottle, which sits snugly inside of a homemade leather water bottle carrier, grabs an ax with a long handle and another ax with a short handle. He does not waste time chatting or sipping coffee. He

scouts the first viable agave and goes to work. The other young men follow suit, grabbing their harvesting tools. One of the men carries a *coa,* which is a sharp circular blade attached to a long stick that *jimadores* use to trim the *pencas,* which are the strong, fibrous, sharp agave leaves that can grow several feet long on a mature plant.

For every one agave uprooted by the two young men, the *ayudantes*, Rafael harvests several. His speed and precision is impressive to watch. While the young men wear gloves to protect their hands from the barbed thorns, Rafael is content to work with bare hands. Since childhood he has helped his grandfather, father and uncles craft bacanora in the traditional method used for centuries. While the process is the same, each family has a unique recipe for bacanora production. With a lifetime of experience producing bacanora, Rafael is a talented *vinatero* and knows what he is looking for this morning.

The agave takes all the complex carbohydrates stored for many years in *la piña* and rapidly converts those to sugars to fuel the growth of *quiote*, the stem of the flower stalk that can grow about a foot per day and easily reach upwards of 15-20 feet (mezcal  Reviews 2022). In this desert landscape, when the maguey sends its stalk upward, it is often the tallest thing on the landscape, rising above even the mesquite trees and pitayas. Flowers then bloom and await hungry pollinators--hummingbirds, moths, bats--to feast and carry pollen from plant to plant. Before that happens, however, *jimadores* look for telltale signs that the *quiote* is getting ready to sprout. The plant begins to flush. The leaves change. *La piña* is fat and full. The time is ripe to harvest. A few hours later with the truck full of freshly cut and trimmed *piñas*, we head back down the hill to unload the agaves near the autoclave and return to the house to make

breakfast—tortillas, beans, queso fresco and chorizo. We rest until the late afternoon when we return to the agave grow out to harvest more plants.

Pascual Trujillo has been planting maguey on his ranch for over twenty years with sustainability in mind. He propagates with both *hijuelos* (pups or clones) and *bulbos* (small offshoots of the agave). He also allows some maguey to flower and collects the seeds to plant in his greenhouses. Batuq is one of a handful of bacanora labels you can find for purchase in the U.S.

Figure 6: Agave field (Photo by author)

Figures 7 and 8: Jimador harvesting agave (Photos by author)

**El Boom**

The "Mezcal Boom" (*El Boom*) refers to the increased global demand for mezcal over the last twenty years, particularly in the United States and Europe. *El Boom* has provided livelihood opportunities for many mezcal producers, but there exist many barriers to entry for small scale producers. Inequitable allocation of resources, poor infrastructure, administrative costs, marketing, *la materia prima* (the raw material, the agave before it is harvested) and certification costs pose challenges for small batch producers to get their distillate to the market. The industry also faces grave problems relating to the sustainable harvesting of agave. The growing popularity of mezcal encourages increased production that threatens wild agave stocks throughout Mexico and in particular the mountains within bacanora's denomination of origin.

Rural communities in *la sierra*, the mountains located in eastern Sonora near the Chihuahuan border, cling to the precarious edges of the global market. Among the poorest in the state, these *pueblos*, small towns, are impacted by larger neoliberal processes. The communities in la sierra sit just south of the international border. It is common for young people to migrate north. Many towns are "lleno de viejitos" (full of older people), as one woman described it. Many of these older folk depend upon remittances to pay for their costs of living. Illegal trafficking and organized crime also occur within and across the region. Cartels move goods through la sierra, and with them follows violence and uncertainty. The bacanora industry provides a glimmer of hope, an opportunity for economic development in a region where there are few options for work. Looking more closely at the relationship between humans and agaves in la sierra exposes this economic precarity. This relationship also illustrates the interdependence between humans and agaves. This interspecies interdependence challenges common notions of "natural"

environments. Over the course of several centuries, the mining sector and cattle ranching have been the primary economic drivers across the eastern mountains of Sonora. The impacts of these economic pursuits are written on the landscape. I attempt to center the agave in this chapter in order to illustrate how state, market and community-driven interactions influence the construction of marginality and how power mediates environmental outcomes that perpetuate this marginality (Tsing 2015).

Ethnographic attention across communities and across borders reveals the depths of meaning this beverage has for people. Much more than an alcoholic beverage or a marketable product, bacanora is a valuable cultural construct in the region. *Agave angustifolia* is a plant that contributes to this sacred sense of place. It is a plant that connects human communities with nonhuman communities to provide a significant sense of belonging. Attention to the complexities of this plant-human interconnectedness also illuminates social divisions and unequal access to resources. I draw from the local discourse I encountered about bacanora—the beverage, the industry—in an attempt to capture *un trago,* a shot that offers the essence and character of the symbolic and material meanings it imbues. This ethnography is particularly timely at a moment when a formal bacanora industry is still quite new. We are witnessing the great transformative power of agave-human relationships at this current juncture (Gross 2014: 21).

**Agave Angustifolia**

There are dozens of diverse types of agave spirits made across Mexico with regional names and their own histories of interspecies relationships in situ. The umbrella term for these agave

distillates is “mezcal.” Several of these drinks are now recognized under a denomination of origin (DO), which serves to protect place-based production. (Zizumbo-Villarreal and Colunga-GarcíaMarín 2008). Bacanora received a denomination of origin in 2000. This distinction allows one species of agave in the production of mezcal bacanora—*Agave angustifolia.* Historical data suggests that *A. angustifolia* was the first species used in the historic production of mezcal in Mexico (Zizumbo-Villarreal and Colunga-GarcíaMarín 2008). Angustifolia has the widest distribution of any agave because people moved them around, from place to place over millennia. This type of maguey is well suited for arid climates as it is particularly drought resistant and enjoys rocky terrain.

**La Sierra**

The state of Sonora is known for cowboys, carne asada and música norteña. It is also known for its mezcal  bacanora. Deep into the northernmost reaches of the Sierra Madres Occidental lies the pueblo Bacanora, founded by the Spanish in 1627. Located three hours from Hermosillo, the state capital of Sonora in northwestern Mexico. The village is nestled among mountains. The road from the capital is curvy, steep and narrow. Altars of *La Virgin de Guadalupe,* Mexico’s patron saint, appear every few kilometers along the winding mountain roads that connect numerous mountain towns similar to Bacanora. Each altar has candles, flowers and offerings for the Virgin. These offerings pay homage to the La Virgen, asking for protection on their journey. These arid mountains are dry most of the year. Browns and muted greens blanket the terrain until the summer monsoons brighten the landscape, turning them flush with ephemeral greens. This region where water is scarce and precipitation fickle is currently experiencing the worst drought in over a thousand years. The closer you get to the town of Bacanora and as you move deeper

into the mountains, people drive more slowly, smile and wave from their vehicles as you pass them on the opposite side of the highway. Throughout the chapter, I will refer to the mountain communitie within the bacanora denomination of origin as *la sierra*

Figure 9: Town of Bacanora, Sonora (Photo by author)

**Iván y Eva**

Iván is easily the tallest man in town. He tends to bend down a bit when having a conversation with someone to get a little closer in order to hear what they are saying. He is gregarious, kind, well-respected and well-liked in the community. His bacanora, labeled 1627 for the year the town of Bacanora was founded, is also well-liked in this community and throughout the region. Iván is a small producer who makes bacanora in his *vinata,* distillery, behind the house. He works alone and produces in small batches.

At the close of the community meeting organized by el consejo in Sahuaripa, I planned to remain in *la sierra* while el consejo and Rosalía returned to the capital. Alejandro recommended I speak with a man named Iván about the bacanora industry. "He is the Bacanora Association president currently," Alejandro said. He briefly introduced us. Iván, with his characteristic warm grin and easy laugh, said, "Come over to my house when you're in Bacanora. Ask someone, they can tell you where I live."

When I arrived in the small town of about 500 people, I checked into the only hotel in town, *El Jimador,* and asked the gentlemen who worked there if he knew Iván. "Of course," he said. He introduced himself as Rogelio and told me to wait a moment, he would walk me to his house. We walked several blocks of the quiet cobble stoned streets, up a short hill and turned onto a dirt road that led us to the back of Iván's property. At the top of a hill was his vinata. Over the years, Iván had hobbled together small pieces of surrounding property—a 1/8 hectare here, another there, *poco a poco*. Down the hill from the vinata were several small fields with organic oregano.

There was a pen with several goats. On the hillside behind the oregano, a dozen chiltepín bushes grew. Rogelio came back to the gate, "*Su mujer dijo que no estaba en casa*." Iván was not home.

We walked to the center of town where we met a man named Gaby, whom I recognized from the meeting in Sahuaripa. Both men wore jeans and cowboy boots with a lightweight plaid shirt and a white undershirt. The town seemed deserted. A few people were strolling across the plaza where the historic church resides. The Bacanora museum is located next to the church. When our search for Iván turned out to be unfruitful, Gaby went into, what I assumed, was a government office, and retrieved the key to the museum. He unlocked the door, and the three of us stepped inside. There were several rooms filled with artifacts telling the history of mezcal bacanora.

**La Historia**

**"Para todo mal, mezcal, y para todo bien, también."**
**For every ill, mezcal, and for every good, as well.**

(popular Mexican saying)

**Mayahuel**

The Nahuatl words, '*metl*' and '*mex calli*' translate roughly to cooked agave. This is where the word mezcal originates . Deeply entwined with Mexican culture, the importance of maguey for pre-Hispanic cultures extends far beyond a fermented drink. It was one of the major sources of calories, among other religious and utilitarian uses. The historical memory across Mexico carries the significance of this plant through time and across generations. The Aztecs, as they migrated across Mesoamerica, discovered the value of the agave. Historical records document the "invention" of *pulque* sometime between 1172 and 1291 (Salazar Solano 2007: 108). The

beverage was considered sacred and was used in ceremonies and religious practices, to include human sacrifices. Mayahuel arose in Aztec cosmology as the goddess of maguey. In ancient art, she is adorned with a headdress of agave leaves and the foam of pulque in her hair. There are multiple Aztec legends that tell the story of a goddess who came to represent passion and transformation (Ramirez Rodriguez 2020). We may never know precisely how the Aztecs thought of the goddess due to Spanish occupation and the burning and looting of texts and codices. Patricia Gonzales, in an interview with me, described the loss of cultural knowledge. "We are trying to piece together our knowledge and wisdom with scraps and fragments of what was once a rich catalog of literature across Mesoamerica" (2019). Throughout my time in the field, many people mentioned Mayahuel. Across Sonora and across Mexico, she represents pulque and mezcal.

**Los Ópata y Los Españoles**

Throughout my time in the field, many people mentioned the Ópata, a pre-Hispanic culture from the mountainous region of Sonora. The Ópata lived along river valleys. There is evidence of permanent villages and irrigated agriculture. Once the most populous culture in what is now the state of Sonora, there is only a small population of people who identify as Ópata, and much of their language and traditions are extinct (Yetman 2010). People proudly told me about the fermented agave beverage the Ópata made, the mother of bacanora. The drink is similar to *pulque*, a culturally significant fermented beverage made across Mexico for millennia. While some folks believe the Ópata distilled agave prior to Spanish contact, there appears no evidence of distillation before European contact. We do know, however, that the Ópata produced a fermented agave beverage in small batches across the mountains of eastern Sonora. The

archaeological and ethnobotanical records do indicate the distillation of *Agave angustifolia* in Mexico in the 16th century (Zizumbo-Villarreal and Colunga-GarcíaMarín 2008). The Spanish took this fermentation one step further and distilled the agave into mezcal. While the drink was celebrated, it was also a cause for concern for many as alcoholism negatively impacted communities, particularly Indigenous communities, such as the Apache and the Yaqui in northwestern Sonora. Seen as a threat to orderly society, the Spanish government enacted the first prohibition of mezcal from Sonora to Oaxaca in 1785 (Salazar Solano 2007).

**19th Century Industry**

Throughout the 19th century, the bacanora industry in Sonora was one of the leading economic sectors in the state. The industry grew, in part, due to increased demand following a burgeoning mining sector. During this period of expansion and industrialization, there was much movement from Sonora into Arizona through the Nogales port of entry, which is located three hours north of Hermosillo. There were abundant distilleries operating in 1890, most of them located in *la sierra* (Salazar Solano 2007). There were also a smattering of distilleries across the border. Tucson had a handful of distilleries that produced bacanora. Bacanora moved across the border freely from patrons to friends and families. When a second prohibition began, the formal production and sale of bacanora came to an end, though the cross-border connections between friends and family continued to move bacanora illegally across the border. Clandestine informal transboundary bacanora exchanges between *compadres y familiares.*

In 1915, during the Mexican Revolution, General Plutarco Elías Calles prohibited the manufacture of alcoholic beverages across the state of Sonora. Prohibition after the Mexican Revolution (1910-1917) occurred throughout the country for reasons of "moral obligation" to

fight immorality and alcohol abuse (Gutiérrez-Coronado 2007). During the decades-long prohibition, called the *"Ley Calles"* or *"Ley Seca' '* (the Dry Law), the criminalization of bacanora forced producers deeper into the mountains, ravines, caves and other clandestine locations. They used small, Philippine-type stills that were easy to hide and could accommodate a wide range of different agave species (Zizumbo-Villarreal and Colunga-GarcíaMarín 2008). Attempts to keep the tradition of bacanora alive brought great risks to producers. Rural police, known as *La Acordada,* were known for their abuse and profound cruelty. They destroyed vinatas. Many *vinateros* were brutally reprimanded, incarcerated and assassinated during the period of prohibition (Salazar 2007). The maltreatment of *La Acordada* remains present in the historical memory of the communities in la sierra today. Many gratefully acknowledge the gift of these producers, who are the forebears of many families still living in the Sonoran mountains. Without their sacrifice, communities today would lack the rich knowledge of artisanal production. Not only is this knowledge culturally important to the identity of these communities, bacanora production provides a means to survive economically in a region where alternative employment and development is sparse. Prohibition lasted 77 years until 1992. The production and commercialization of bacanora is no longer clandestine, yet it remains largely informal. As consumption steadily increases and demand spreads globally, many are at odds with how the industry should develop.

**En la Vinata**

Over the course of my time in *la sierra,* Iván and I became good friends. When I visited the town of Bacanora, I would stay with Iván and his family in their spare bedroom, eat with them, run errands to Sahuaripa with them and help in la vinata. During my first visit, following the tour of

the museum, I found my way back to Iván's house. He gave me a tour of the small vinata. As the sun set, he tended the fire that was heating up the *saite,* fermented agave. When the fire heats the fermentation, it separates the alcohol from the water. The alcohol turns to vapor, which rises and moves through the *serpentina*. *La serpentina* is a long copper hose. Iván's *serpentina* is submerged in a blue plastic barrel filled with cold water. The vapor moves through this pipe and returns to liquid. There is a small metal bucket positioned to catch the liquid pouring out of the pipe. This is the first distillation. The *resaque* is the second distillation, the most delicate part of the process, which is divided into the *cabeza, corazón y cola* (head, heart and tail), each with different alcohol strengths. Every master *bacanorero* produces their unique formula by selecting the percentage of the head, heart and tail to use. They observe *las perlas,* the small bubbles that form when they shake the liquid. This anecdotal observation tells the vinatero when the distillation is ready. While the mezcal slowly began to fill the metal bucket, Iván shared the process of making the distillate.

Once the cooked agaves are tossed out of the *tatema,* warm and sweet, they cool down and are ready to be chopped into smaller pieces. Iván uses a short ax to cut the *piñas,* then runs them through his electric mill. The *moliendo*—ground cooked agaves—was traditionally pounded into fine fibers in a long, narrow hollowed out piece of wood called a *cuba,* which slightly resembles a small dugout canoe. This process is laborious and time consuming. Today most producers use a mill to shred the cooked agave. This shredded agave, the *moliendo,* is also called *saite.* The *saite* is submerged in water, and wild yeast from the atmosphere converts the sugar into alcohol and carbon dioxide. This process takes longer than adding yeasts and chemicals to accelerate fermentation (This is allowed under the law for tequila). Depending upon the weather, this

process may take about a week—less time if it is warmer; more time if the weather remains cool. Once the producer decides the fermentation is ready, the distillation begins. The *piñas* roast in the *tatema* with mesquite wood, generally, which gives the mezcal  herbaceous, mineral and smoky aromas.

Not much has changed over the last several hundred years. The majority of bacanora produced in the denomination of origin is still made in the traditional manner. The artisanal technology remains largely the same, though some steps are mechanized, such as the mills to grind the cooked agave. Maintaining traditional production remains a source of pride for producers who continue the legacy of their ancestors that labored to keep the tradition alive. Iván was born in *la sierra,* though he lived much of his life outside of the mountains. He always wanted to return to Bacanora to produce the agave distillate, the pueblo's namesake. He told me, one day he packed his car with everything that would fit and left Hermosillo. He showed up in town with very little. Over the years, he has cobbled together a humble home and a small *terreno,* piece of land behind the house. The chiltapín bushes grow well on the hillside. His oregano fields rest in the low-lying area near the *arroyo,* dry stream. During my time in la sierra, he acquired a burro to carry the heavy burden of freshly cut agave in the steep, rocky terrain. Jimadores must travel further into the mountains to find stocks of Agave angustifolia due to overharvesting closer to the pueblos. The disappearance of *la materia prima* weighs on everyone's mind. To my surprise, Iván said, one night in the vinata with *música norteña* playing on a small radio and mesquite wood burning, there was still plenty of *materia prima* to be found.

Figures 10, 11 and 12: Process of production from roasted agave to agave distillate (Photos by author)

**TRADITION**
***"Lo enterraban [una botella de bacanora] y lo sacan 20 años después para la boda de la hija."***

**They buried [a bottle of bacanora] and took it out 20 years later for his daughter 's wedding.**

(Don Gerado, master vinatero)

The denomination of origin that regulates bacanora production allows only one species of agave in the production of the mezcal–*Agave angustifolia*. Traditionally, producers used other species of agave, primarily lechuguilla, along with angustifolia. Bacanora was shared at festivals, weddings, births, and holidays. Many producers made bacanora in small batches to share with family and friends. Some made *bacanora puro* seasonally to sell to nearby towns. It remains a

supplemental form of income for many small scale producers. Some might add additional ingredients, such as anise, uvalama and damiana (the latter two are plants native to Mexico and grow en la sierra). Today, producers are experimenting with newer flavors, pitaya fruit, for example, and *tuna,* the fruit of the *nopal* (prickly pear). *Cremas,* which tend to be popular among women, resemble Irish cream and come in various flavors, such as strawberry and coconut. Jose, a producer who lives in Navojoa and his wife, Xochitl, whom after time I referred to as *mi madre Sonorense* (my Sonoran mother), invited me to a friend's house, an amateur chef and coffee importer, to taste several bacanora blends he made. We tried bacanora with mesquite flour, agave syrup, and mango from the tree in his yard.

**Medicine**

**Patient:** This is truly a very good remedy.

**Doctor:** That's why I prescribe it for vomiting, evil eye, bile, kidneys, indigestion, angina, and pimples. And it's also quite good for typhus fever, hoarseness, headache, toothache, stomachache. For Huntington's disease, pneumonia, fainting spells, diarrhea, whiteheads, and even for dandruff…It never fails because even if my patients don't get cured, they end up quite happy.

**Patient:** And what do you call this prodigious elixir?

**Doctor:** Well, it's a professional secret, but since we are friends I'm going to tell you. Of course, I know it by its scientific name, which is "miracle water," but they also call it bacanora.

(scene from "Por Mis Pistolas," a 1968 film starring the famous Mexican comedian, Cantiflas) (Enicinas 2020)

Many people with whom I spoke shared bacanora remedies for various ailments. Sitting around the kitchen table in Rosario, I enjoyed *comida tradicional* with a family and a group of *compadres,* good friends, from the pueblo. We ate fresh *machaca* the family dried on the roof that week, fresh tortillas and *requéson,* fermented whey leftover from making cheese that morning, sprinkled with crushed dried chiltepin. Natalia, the municipal president at the time, uses bacanora with garlic to help with stomach aches. Ruben, *el comandante* of Rosario, told me he uses bacanora with *damiana, ajo, miel, sábila* (damiana, garlic, honey, aloe) as an anti-inflammatory and cancer preventive. Don Gerardo, Natalia's *tío,* a well-respected master vinatero, recalled stories about prohibition, hidden vinatas and producing at night to avoid detection. He drinks *un trago* of bacanora every afternoon with ajo, like one might take a daily vitamin, to help his overall health. People said a shot of bacanora can help lower cholesterol and blood pressure, and can help with diabetes. Traditional knowledge of bacanora and its many functions is found across la sierra. It is celebrated for its many uses–connecting communities and playing an important cultural role that extends beyond an alcoholic beverage to imbibe. There is a spiritual connection, a sacred interrelationship between the agave and humans. These traditions are living, negotiated practices that continuously adapt to shifting ecological and social conditions. Across generations, gratitude for the gifts of maguey connect communities to this place, this desert, this plant.

**Denomination of Origin**

The Paris Convention in 1883 produced the first treaty to legally protect patents, inventions, trademarks, and industrial designs. Several other treaties to protect intellectual property, notably the 1958 Lisbon Agreement for the Protection of Appellations of Origin, recognize qualifying

products as unique. The Lisbon Agreement prohibits products with an appellation of origin, also referred to as denomination of origin (DO), from being copied or counterfeited. The Lisbon Agreement established special status for traditional products associated with a specific geographical area (OMPI 2022). The first denomination of origin established in Mexico in 1974 was tequila. There are currently 18 products with the distinction of DO. In addition to tequila and bacanora, there is Yucatan chile, Morelos rice, Chiapas mango and Talavera pottery, to name a few. Among the most recognized globally are cocoa and Chiapas coffee. Many of these products have roots reaching back to pre-Hispanic cultures (Martineau 2015). The idea of the DO is to protect the natural and cultural heritage of the country. According to the Mexican Institute of Industrial Property (IMPI), this distinction of origin recognizes a product's characteristics as unique to a particular region. The IMPI operates at the federal level and has the authority to protect and authorize the use and geographic region of DOs (IMPI 2022).

The denomination of origin for bacanora was established in November 2000. It includes 35 municipalities in the mountains of eastern Sonora. Many producers in these municipalities kept the tradition of bacanora production alive during the 77 years of prohibition at the risk of imprisonment or death. These municipalities are also the most impoverished in the state. According to the DO, bacanora can only be labeled as such if it is produced within the 35 municipalities. Anything produced outside of the DO that uses *A. Angustifolia* may be commercialized as an agave distillate but cannot use the name bacanora. The commercialization of bacanora offers an additional economic opportunity in la sierra where the few jobs available are predominantly in the cattle and mining sectors. Many of the pueblos in this region are void of young people as they migrate to larger cities or travel north to the United States to look for work.

Some folks are pushing to expand the DO to include the entire state of Sonora. Many others vehemently oppose this and see the protection of the DO as a means to preserve the culture of the agave distillate and to protect vulnerable populations who are struggling financially.

During a press conference in March 2020, the director of the regulatory council at that time, Manuel Moreno (Poncho), introduced the Second Bacanora Fest in Tesopaco, a pueblo in Rosario, one of the municipalities in the denomination of origin. As he is known to do, he promoted the level of development and the strides made in growing the industry on a global scale. He noted the increase in plantations, doubling the amount of hectares planted with *Agave angustifolia* and assuring the audience that soon there will be about 2,500 more hectares ready for planting. *"Estamos sentando las bases para que el producto del bacanora se posicione a nivel internacional."* ("We are laying the foundation to position the product of bacanora at an international level.") At the same press conference, the former president of Rosario municipality, Valenzuela, praised traditional producers, many of whom feel left behind by the regulatory council. *"Retomamos las festividades de nuestra comunidad, con una causa que nos empodera, que nos da oportunidades de crecimiento, de desarrollo y sobre todo, que nuestros productores sientan ese espacio suyo, que se les reconozca la labor que han venido haciendo durante tantos años"* ("We resume the festivities of our community, with a cause that empowers us, that gives us opportunities for growth, development and above all, that our producers…be recognized for the work they have been doing for so many years" (Secretaría de Economía 2020). In this press conference, two ideas of development were expressed. While there are nuances, some fall on the side of growth at the global scale, which involves large scale industrialization similar to tequila.

Others want to maintain the denomination of origin on a smaller scale, producing a bacanora that remains true to most of the local producers in la sierra.

Wherever one falls in the debate surrounding the DO, the bacanora designation, like any appellation of origin, creates an image of the culture behind the beverage. The narrative paints the picture of traditional producers and the rugged but bucolic mountains in northwestern Mexico. One may argue that the DO is a project of re-imagining local identities to fit a romanticized version of producers and their traditions within a geographical imaginary. The global capitalist economy promotes a discourse that reinforces such imaginaries to attract consumers. The artisanal appeal frames mezcal as a luxury item that supports local families and protects tradition. Consumers on a global level, however, are far removed from the realities of the communities in the DO. Consumers know little about how producers are compensated, for instance, and how power differentials impact producers across scales from local to global (Massey 2004: 10; Bowen 2015). There is pressure within the global market for socially responsible, environmentally friendly commodities. The market puts pressure on producers to distinguish their product and create a unique value for their mezcal. To compete, producers within the DO must present a kind of performance, a cultural expression of value that caters to consumer desires to keep people and products tied to a particular place (Besky 2014: 91). The idea of value, in this case, is tied to commodity exchange and ideas of social justice and sustainability. Value becomes a strategy to appeal to consumers and to promote the idea that the DO, among other agricultural schemes (e.g. fair trade, organic), creates a sense of social solidarity and environmental responsibility (Besky 2014). However, the value of bacanora extends far beyond the current commodification of the beverage. The value of bacanora is rooted

in social relationships, human and nonhuman (Tsing 2015: 122). This value is not tied to economic exchange relations or economic actors and the things they consume. The value of bacanora is tied to the well-being of *A. Angustifolia.* It is wrapped up in the culture of la sierra– the entire ecosystem and biocultural landscape.

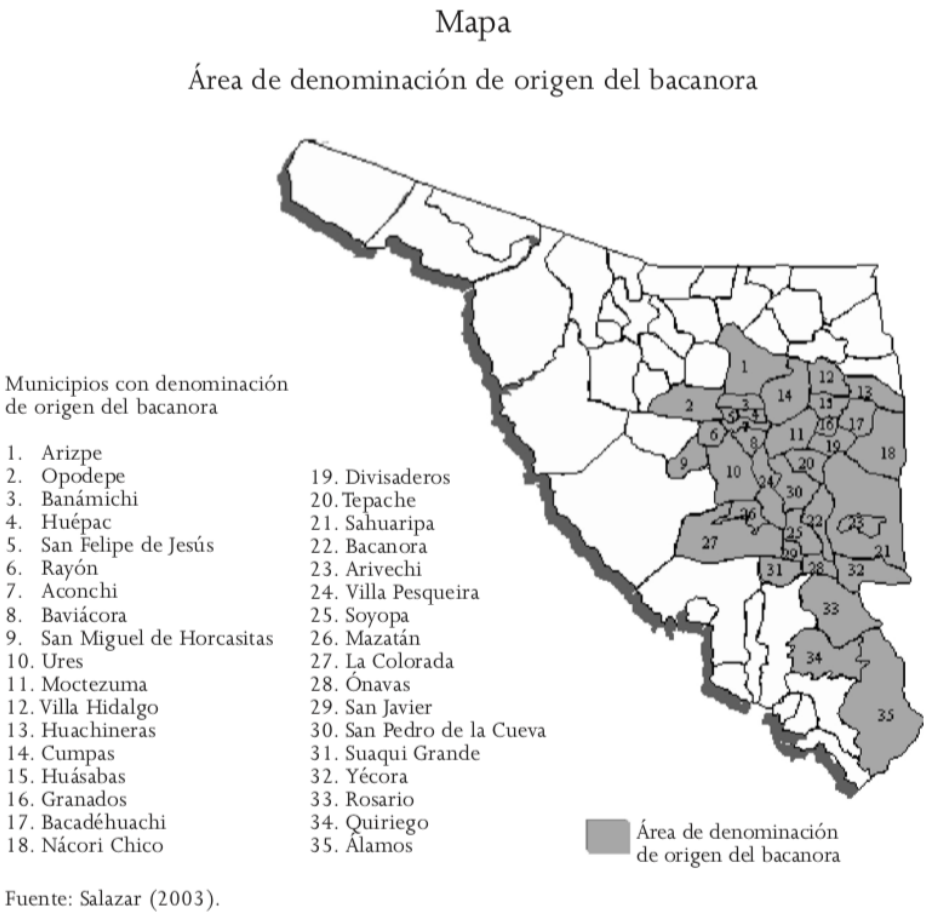


Figure 13: Map of bacanora denomination of origin (Source: Salazar 2003)

## Terroir

***"To drink mezcal is to imbibe in the highest expression of Mexican terroir. Indeed, our distinctly Sonoran bacanora and lechuguilla may be considered a love letter to the land where north and south embrace."***

(Robert Villa, self-proclaimed "mezcal disciple")

Woven within the concept of geographic indicators is the idea of *terroir,* an idea that assures a product is tied to a particular place and is bounded by unique traditions and culture. It is the flavor of the product found only in a specific region. Terroir is the soil of the region, the particular climate of the region, the elevation, along with other characteristics that root the product in place. It is the values, culture and knowledge of a place. There are many critiques of terroir, including the argument that the "taste of place" played a role in the formation of nation-states and the identity of its citizens to reinforce an allegiance to a location while promoting it worldwide (Feinberg 2020: 554). Others note that the idea of terroir was aspirational, not absolute, to allow room for needed developments (Guy 2003). At this time of unprecedented environmental change in la sierra, many believe opening the DO is necessary to grow enough agave (*materia prima*) to supply the demand. Others argue that terroir is what gives bacanora its essence. It exists only in la sierra.

*El sabor depende en la tierra,* the flavor depends on the land. I heard this again and again. The agave is more than a plant. It is imbued with the rocky soil and monsoon rains. To grow Agave angustifolia in plantations outside of the DO would rob it from its essential characteristics that define bacanora. Bacanora contains the aromas of la sierra. Everyone is aware of the situation with swiftly dwindling Agave angustifolia stocks. Where to construct greenhouses and plantations remains a point of contention. Most producers told me there is sufficient land in la sierra to grow enough agaves to supply increasing demand. What is most needed are resources from the government to help with infrastructure and training in the various municipalities.

…

Darío, an agronomist who works in reforestation near Moctezuma, sees promise in maintaining the DO and planting agaves in harmony with the ecosystem. He and his two brothers, who have just begun producing bacanora, view the DO and terroir as a way to enter a niche market, "*una edición limitada."* They want to focus on Asia. "There is much more wealth and appeal for rare commodities." His vision involves a landscape-scale initiative that honors human and non-human relationships. We visited his *terreno* one afternoon as the sun began to hang low in the sky, cooling the air. He is growing about 48,000 plants. He mentioned the impacts of cattle ranching and the need for a different relationship with the land. "Ranchers complain they don't have enough water," Dario told me, "but the cattle eat and trample the plants causing evapotranspiration and soil erosion." He proudly boasted the constructed canals and gullies to capture water. Mesquite and other trees and desert plants are also growing in these canals, which will provide nitrogen to the soil. Their roots will help with water conservation, will keep the soil intact, and will provide shade. Maguey grows better with friends–companion planting. If handled appropriately, investing in sustainable agave grow-outs on a landscape scale in la sierra may offer a way to restore the environment while protecting local livelihoods in an industry that is increasingly under the influence of outside interests.

**Value-based Labels**

One argument against values-based labels, like the DO and the idea of terroir, is that it benefits producers with more capacity to increase their income-earning potential relative to other, less organized producers or groups (Mutersbaugh 2005). Others argue that values-based labels represent an alternative to the "unsustainable trends within presently existing capitalism" driven partly by neoliberal reforms (Barham 2002: 349; Barham 2003; Raynolds 2000; Renting et al.

2003). Many with whom I spoke believe that value-based labels like DOs can counter the negative effects of globalization (e.g. pressure to weaken environmental standards, the homogenization of local cultures) by linking production to particular places, while interacting with broader markets (Gaytán and Bowen 2015: 269). However, some scholars argue that values-based labels may not be true alternatives, that the system of qualifications must conform to the trends of consumption, which may lead to shifting production practices, local environments, and communities in order to meet DO demands (DeSoucy 2010; Rangnekar 2012). Gaytán and Bowen warn that, "in a neoliberal context where influence and power are linked to financial capital, it is likely that the voices of the marginalized within the industry—the agave farmer, workers, and small tequila companies---will continue to go unheard" (Gaytán and Bowen 2015: 280).

**Sonorense Regulador del Bacanora**

In 2006, one year after the Mexican government published the standard guidelines for bacanora production, the government of Sonora established the *Consejo Sonorense Regulador del Bacanora* (Bacanora Regulatory Council of Sonora, which I will refer to as *el consejo* ). This body is housed with the *Secretaría de Economía* (Ministry of Economy). Their purpose is to promote the industrialization of bacanora production, as well as to ensure quality in the process of production. In accordance with *La Norma Oficial, el consejo* is pushing certification of all vinatas within the DO. The government body is also tasked with providing training to assist with investments in agriculture and the bacanora production chain, in addition to promoting the culture and commercialization of this drink.

Their mission states:

*Impulsar la organización, regulación y consolidación de la industria del bacanora, mediante la implementación de esquemas de promoción, financiamiento, comercialización, control de calidad y modernización tecnológica, accesible y oportuna.*

Promote the organization, regulation and consolidation of the bacanora industry, through the implementation of schemes for promotion, financing, marketing, quality control and technological modernization, accessible and timely.
(Consejo Sonorense Regulador del Bacanora 2018)

**La Norma Oficial and Certification**

*La Norma Oficial Mexicana,* aka Norma or NOM, are regulated government standards covering a number of industries including tequila and mezcal production. In December 2005, one year prior to the formation of the *Consejo Sonorense Regulador del Bacanora* (CSRB), *La Norma Oficial* (NOM-168-SCFI-2004) was published, creating an official standard of guidelines for the production, packaging and labeling of bacanora. The federal mandate requires bacanora producers to prepare the distillate with 100% *Agave angustifolia* made with the sugars extracted from grinding cooked agaves and fermented with yeasts. It allows bacanora to be *blanco, reposado* or *añejo* within a range of 38 to 55 degrees of alcoholic volume (NOM-168-SCFI-2004 2004: 6). La Norma prompted the Sonoran government to require certification of bacanora vinatas. The certification requires that samples of a producer's mezcal is sent to a lab for inspection. el consejo promotes it as a *sello de calidad: marca CSRB,* a guarantee of quality endorsed by the CSRB. Producers need to obtain a compliance report, which includes a copy of their alcohol license issued by the general directorate of alcoholic beverages from the state, a

copy of operations notice for protection against sanitary risks in the vinata, verification of actions relating to sustainability (planting of agave or purchasing agave from a registered plantation with the CSRB, and a copy of proof of address that the vinata is located within the DO. Requirements for the issuance of product quality certificate include regulations, such as using glass bottles to package the mezcal with a trademarked label and the alcohol content clearly labeled. Producers must present a copy of the federal taxpayer registration. Finally, producers must pay the following service fees: $1,500 pesos for registration of certification services, $3,000 pesos plus VAT (Value Added Tax) for laboratory service (per sample), and certain installments due to the CSRB (Consejo Sonorense Regulador del Bacanora 2018). The purpose of this certification is to standardize the industry in a similar manner to the tequila industry. In fact, the NOM, as it is written, closely resembles the NOM of tequila.

Many mezcaleros across Mexico support the idea of an appellation of origin and NOM rule, while others do not. There is fear of the high costs and bureaucratic hurdles under the appellation's strict regulations. Some producers simply worry about no longer being able to doctor their spirit with the cheaper distillates and flavorings, which occurs in part because of the rising costs of production (Martineau 2015 :91). La Norma Oficial Mexicana del Bacanora—NOM-168-SCFI-2005—is intended to provide to the consumer a guarantee that it is pure and safe to drink. However, there are barriers to certifying one's product. The cost of sending a sample to the lab alone is $3,000 pesos, roughly $150US. The price to participate, particularly with little government assistance, is prohibitive and presents imposing barriers to compete in the larger market. As the overall cost of compliance increases, many producers find little economic advantage to seeking certification. At the time of my fieldwork, there were only two certified

producers–Don Hecho from La Colorada and Dalumoro from Alamos. Dalumoro is the largest *fabrica* in the DO. The distillery is owned by RubénBours, a middle-aged man from one of the wealthiest families in Sonora.

…

In the air conditioned government office in Rosario's town center where Sarahí works, I sat in a chair across from Sarahí as Ruben, *el comandante,* stood near her desk with his cowboy hat held in his hands. The previous evening, I spent the night at Sarahí's house. Her mother picked greens from the garden and laughed as I tried to make corn tortillas for the family dinner. Sarahí's three-year-old sat on my lap as Sarahí told me about her master's thesis in international business. Her business plan provides details of how to expand the industry in a way that provides opportunities for rural communities. "There is a need for more opportunities," she said. "Ranching is not a reliable option anymore, not for the ranchers and not for the laborers. There is no water." I recall passing a decaying cow carcass on the side of a dirt road earlier that week. "We don't want to become the tequila industry. We need loans, financing, and marketing. I called el consejo but received no response."

In her office, Sarahí leaned in and urgently discussed the need for support from el consejo in order to certify their bacanora. Ruben nodded in agreement. "There are many artisanal producers in a similar predicament. To certify costs money," they told me. "*El dinero que casi nadie tiene aquî*" (Money that almost nobody here has.) "How can we regulate our vinatas? We need bathrooms, stainless steel tanks. *Es muy caro.* Smaller producers need access to resources. Producers need help with training, seeds, registered brands, certification, *un poco de todo."* (6/15/21)

…

One brutally hot afternoon in August, Iván, Eva and I took a break from working outside. I sat in a chair next to the bed where they lounged. It was the only room in the house with an AC unit. We watched television and drank *jugo de mango.* Chatting casually, Iván said, "*Mira muchacha,* we need help. E consejo shows up for 10 or 20 minutes, takes a quick look around, then leaves with nothing to come of it. We need a director who understands the industry and wants to help small producers. el consejo  serves the rich, not the smaller producers in la sierra" I heard this sentiment everywhere I went–throughout la sierra, in Hermosillo, across the border in Arizona. There was little faith that el consejo  would do anything to benefit traditional bacanora production. (8/16/21)

…

Charles agreed that el consejo  does not have the best interest of artisanal producers in mind. He mentioned this in a brief conversation. "Trouble is there's lots of patronage if not corruption in el consejo  *regulador* of every agave spirit [across Mexico], forcing the bacanora consejo to follow the tequila trajectory"(1/22).

**Tequila Train**

**"It takes approximately 14 kilos of agave to make a liter of mezcal , while it takes about half that to make a liter of tequila."**

(Bruce, bacanora distributor)

While neoliberal processes are not uniform, in general these processes create space for a new transnational elite, both foreign and domestic, to accumulate capital (Gaytán and Bowen 2015). This process is evident in the power multinational corporations hold over the tequila industry.

The rise of the transnational state and industrialization of the tequila industry over the last century illustrates neoliberal processes that concentrate the industry in the hands of a few powerful players. The rules that define tequila have evolved in one direction. Decisions favor large companies, often international, over small producers and workers. The result is tequila production that is essentially detached from the traditions and communities that made it unique (Gaytán and Bowen 2015: 280). Agave weber, from which tequila must be produced, is likewise detached from the land, existing as a commodity to fit consumer demands rather than an integral piece of the biocultural landscape. Tequila's appellation dilutes the value of its terroir and product. It also poses significant challenges for the smallest producers to mobilize (Bowen 2015: 69) Bacanora's NOM closely resembles tequila's NOM. el consejo  is pursuing the goal of industrialization. Many worry that this is unsustainable and will hurt small producers. Sarita said to me one morning over coffee, "Bacanora survived prohibition. Can it survive commercialization?

…

In a workshop for women looking to enter the bacanora industry hosted by el consejo  in Hermosillo, Poncho, the director, told the women, "The most important goal is to raise bacanora to a global scale. We have to think big," he said. "We have to make the entire state part of the DO."

After the workshop, el consejo  invited me to join them for lunch. Poncho treated us to a big spread of meat–tripa, carne asada, costillas, quesadillas, guacamole, ensalada, tortillas. (Sonora is known across Mexico for its beef, and the state consumes a lot of it!) Fernando, one of the members of el consejo , a large and gregarious man who spent a couple of year working at a dairy farm in New Hampshire, said, "If the DO is opened to the entire state, more producers will

reach a larger market, which will bring more people looking to import and this will benefit everyone, including smaller producers because people will find them and want to work with them." This echoed what several larger producers mentioned, "There is enough for everyone. Twenty years after Mexico established the DO, it has not grown. It will not grow unless the DO opens." (7/2/19)

…

Ruben Lopez, the proprietor of the brand Sunora, grew up in Obregon and lives in US. Over the phone, he spoke to me about the "Mexican Mentality." He said, "People are given plants, but do not water them and they all die. People do not follow through with projects. There have been loans and assistance, but…that's the 'Mexican Mentality.' [The DO] was supposed to be an economic opportunity for poor municipalities. In 17 years, it hasn't done squat. It looks good on paper but does not work in real life. Water and land is not sufficient in the current DO…Jalisco—They are doing it right…If you want to play in the major league, you have to open it up."

…

Tsing challenges us to think about precarity as a way to understand how scalability has transformed the landscape and society. Precarity exists where non-scalable ecological and economic relations erupt. Precarity persists where the continuing hegemony of scalability deepens ecological and economic insecurity (Tsing 2015). Scalability and the push of larger neoliberal processes have already severed the relationship of tequila with the biocultural landscape from which it arose. Will the same come to pass as powerful interests attempt to scale-up the bacanora industry?

**Access to Markets**

***"Behind every drink of bacanora are woven stories of courage and sacrifice, of an intense struggle to survive in a region lacking alternative employment and development."***

(Vidal Salazar 2007)

The influence of the state and the commodification of a tradition creates barriers for small producers to access resources and scale up production. With the expansion of the market and the increasing cost of *la materia prima*, it is becoming more difficult for small scale producers to sell their bacanora at a competitive price even regionally as they once had. For many producers en la sierra, the sale of bacanora traditionally provided a seasonal source of income. This scaling up to connect with the global capitalist market impacts the economic security of small producers. Across communities, producers expressed concern of losing access to the traditional, often regional, sale of their mezcal within the growing commercial market (Burwell 1995: 427).

Some suggest forming cooperatives or collectives to allow greater yield of mezcal. There are numerous examples across Mexico of producers banding together to overcome barriers to access larger mezcal markets. Working cooperatively allows mezcaleros the ability to produce enough mezcal for global export. Collectives can pool resources, which helps cover numerous costs and may even allow the group to hire representatives to market their product on *ambos lados,* both sides of the border. Accessing markets north of Mexico is preferred as US tariffs on alcohol are far lower than domestic taxes. (Martineau 2015: 90). I spoke with people who support the promotion of collectives, to include representatives in el consejo  and small producers throughout various pueblos en la sierra. Pueblos can form their own group and combine batches to make a local brand for that community. Others argue that collectives will not work with the bacanora

industry. It is not part of the culture, they told me. It is not realistic to think that one producer will share his recipe with another. We are very independent here.

…

In a personal email, Charles White expressed his thoughts about the importance of collectives in the bacanora industry. "The Consejo has teamed up with Grupo Mexico mining company to produce tens of thousands of uniform vegetatively propagated plants in greenhouses rather than diversifying their genetic stock with open pollination as Oaxacans, southern Jaliscans and Michoacan producers have done for years…Sorry to be so cynical but Sonorans need to go south and learn from other innovators rather than staying isolated. They have a purely capitalistic model, not a community-based co-op model in Sonora" (White 1/22).

…

Oscar picked me up from Hotel California, an economy hotel on the main drag in Navojoa where I stayed often. He told me that Rubén is very protective of his place and was wondering who I am and what I want. We met Rubén at the *terreno,* several hectares of land located in the valley near the Tecate plant. Rubén is tall with broad shoulders and a round belly. He has red hair with a fair complexion. His voice is commanding and confident as he tells me about the upcoming opening game of *Los Yaquis,* Ciudad Obregon's baseball team, of which he is part owner. Tens of thousands of Agave angustifolia grow on his land at various stages of life, from pups under the cover of shade to two-year-old plants basking in the sun ready for transplanting. According to DO regulations, agaves must reach at least two years of age before producers can transplant them from the valley into the DO for harvesting. Oscar and Rubén gave me a tour of the agave grow-out before we climbed into Rodrigo's white Ford Super Duty truck. We pulled up to the gate of

his distillery. The most famous brand of bacanora he produces is *42 Grados,* 42 Degrees. It is a big operation compared to the majority of vinatas in Sonora. Located in between Navojoa and Alamos, the distillery sits just inside the border of the DO. There are about fifty *trabajadores,* laborers working in la vinata and in the fields. Oscar and Rubén proudly showed me the facility– four large tatemas to cook the agave, a spacious room with numerous steel tanks for fermentation, a bottling facility where we tasted the three different brands of bacanora. We then drove to the agave fields. Agaves taller than me lined up in row after row, nestled at the foot of rocky hills turned bright green from fresh monsoon rains. There were many men brandishing machetes, cutting off *las pencas* and uprooting *las piñas.* He has plans to open it to tourists one day. They are working on constructing the cantina for tastings. The distillery, despite its size compared to other vinatas in the state, is still quite small in comparison to larger, more industrialized distilleries further south. The methods of production, while scaled-up, remain largely the same as traditional production. (8/30/19)

Several days later, I accompanied Rubén to his family's ranch. They were branding cattle when we arrived. I watched as *los vaqueros* guided calves into a narrow chute. Men pressed a red hot-iron with the mark of the ranch to be easily identified on the open range. He showed me around the property in an all-terrain-vehicle. While we were admiring the beautiful desert vistas, I asked him about accessing resources. "Is el consejo  responsible for helping producers receive assistance and loans to help them build their business? He shared similar sentiments I heard from el consejo  and other larger producers. Rubén told me that, essentially, poor rural uneducated producers cannot be trusted with loans. They will squander them, he assured me.

…

Maria gets frustrated when we touch upon the topic of loans. One day, I brought it up on our way home after running errands and eating together in downtown Navojoa. She spoke slowly to make sure I understood. "*Escuchame, Sarita*, there are no loans for the majority. Jose completed all the paperwork and nothing came of it. Rubén received help, but he doesn't need the money. Lupe [*una comercializador,* marketer] received government assistance. She said she has a vinata [to qualify for certain loans], but it's just for show." Maria said it is clear the consejo favors some over others and provides no training for small producers. If the DO opens, she believes, "Everyone will want in." By that, she means those with money and power from the cities in the valley and the *comercializadores* who want to open it to make the process of production easier and more convenient for their purposes. (7/3/21)

…

My first visit to la sierra resulted in a flat tire. Thankfully, not mine. The day before our departure, I had an interview with Rosalía , a researcher at Instituto Tecnológico de Sonora (ITSON), who is researching the aromatic flavor profile of bacanora. She invited me to join her and el consejo  to a meeting in Arivechi and another in Sahuaripa. I followed Rosalía  and the government officials in my little green truck. This was my first introduction to el consejo . The roads leading into the mountains are notoriously bad. The government vehicle, a white truck much newer than mine, got a flat tire after our lunch in Mazatán. While the men changed the tire, Rosalía  and I spoke quietly on the side of the road. She shared her thoughts about the industry. She wants to help organize collectives of small producers in various pueblos. "There are barriers to taking your batch to get tested to see if it's good or bad. A lot of the smaller producers can't afford that. So, they need to organize." She spent over a year traveling through the municipalities in the DO, learning about producers' traditions and what help they need to market their bacanora.

“The real bacanora is in the mountains. They’re poor, but they’re making it in the traditional way. Wisdom learned and passed down for generations.”

She also mentioned how political the business has become. “We'll see. We don't know if [the industry] is going to be a good thing because it really depends on who is leading it and how they decide to operate, especially here in Mexico. You know, power corrupts.” Rosalía mentioned Rubén and 42 Grados. “They are doing a good job. I don’t know if they’re helping producers, but they’re not exploiting them or trying to keep them out.” On the other hand, she was not impressed with Lupe Torres. Her brand, Pascola, is well-known, “but she exploits the smaller producers, and she adds sugar to her mixes. People know her name because she's been in the Bacanora industry from the start, pretty early on.” Lupe is not the only comercializador that exploits small scale producers by purchasing their product at a very low price. Comercializadores offer such a low price because they know producers will pay. They have no other way to get their product to market. (6/26/19)

**Materia Prima**

***“Un amigo que produce bacanora me preguntó cuál es lo más importante para hacer primero esa industria. Me dijo que tiene que registrar la marca. Eso es lo más importante…Y la segunda cosa es sembrar, sembrar, sembrar, sembrar la materia prima, la materia prima, porque si no hay, no hay bacanora.”***

**A friend who produces bacanora asked me what is the most important thing to do first in the industry. He told me that it is to register the trademark. That is the most important thing… And the second thing is to sow, sow, sow, sow the raw material, the raw material, because if there is no [agave], there is no bacanora.**

(Meri, producer in Rosario)

*9/15/19—La Fabrica Mazot (excerpt from fieldnotes)*

*In the afternoon, I passed by the Mazot distillery hoping to see a truck full of maguey. There was no truck, but the gates were open. A few men were working. I popped in, asked some questions—as I always do—and awkwardly hung around. After about ten minutes, the Doctor [of the town of Bacanora and owner of Mazot Bacanora] approached from behind—a very pleasant surprise. His wife, her sons and Iván were on their way back after being delayed for several days. The truck carrying twelve tons of wild harvested agave (nine tons for Mazot and three tons for Iván) was pulling an additional trailer filled with livestock. The truck had to reroute to avoid cartel activity south of Bacanora. On the way from Hermosillo, the truck got a flat tire. The truck would not arrive anytime soon, so the Doctor invited me to sit. We chatted easily for several hours. He mentioned a piece he was writing relating to bacanora and Daoism, a piece about agave needing ten years or more to mature versus a few months for the grain that produces whiskey. This aging promotes different characteristics that have benefits for our health, he said. The truck finally arrived as midnight approached. I eagerly clambered up the ladder of the truck, jumped into the bed full of piñas and began to help toss the agaves out of the truck with Iván and three Mazot employees. "Cuidado, muchacha, pica mucho," Iván said. Once the truck was empty it was past midnight. We said goodnight. I was leaving early for Alamos in the morning, so I gave the doctor the money for the five nights I spent at Jimador, the one hotel in town. He would give it to the owner, El Chayo, the current municipal president. In this small town, you can pay your bills in such a manner. There is trust and a sense of camaraderie. As I walked back to the hotel, I wondered aloud, "Where did all that maguey come from?"*

Figure 14: Twelve tons of wild-harvested *Agave angustifolia* (photo by author)

I said something to Iván once about not having sufficient materia prima. He seemed relatively unconcerned, “We'll keep finding them. We'll keep getting more.” Despite his optimism, the reality of overharvesting wild agave without reforesting places smaller producers, in particular, in grave danger as they do not have the resources to establish their own *viveros*, nurseries, or sufficient land to plant agaves.

The overharvesting of *la materia prima*, the raw material of mezcal bacanora, is the biggest threat to the sustainability of the industry. Seedlings and juvenile agaves are extremely sensitive to land use regimes, including livestock overgrazing and regular burning for agricultural purposes (Gentry 1972). The ecology of mezcal agaves face the consequences of these fire and grazing regimes that remove vegetation cover and result in soil conditions that negatively impact

agave populations. Climate change poses an increasing threat to wild agave stands, as well. While Agave angustifolia is well adapted to arid climates and drought, detrimental freezes are a growing threat to the survival of these plants. To understand the reach of these impacts and the condition of current agave populations, some of the most reliable sources of historical and current data on agave populations are the mezcal eros themselves (Burwell 1995).

The most immediate concern to producers is the diminishing supply of agave angustifolia. The current situation with la materia prima could be viewed as a case of the "tragedy of the commons" (Hardin 1968) as wild agaves are a common resource across la sierra. A neo-Malthusian approach, however, oversimplifies the process of overharvesting wild agaves. The connection to larger capitalist social relations (human and nonhuman) cannot be overstated. Mezcaleros recognize the long-term costs of overharvesting, yet they must respond to short-term economic opportunities. This recognition illustrates the precarity of both Agave angustifolia and the mezcaleros who exist in the margins of these greater capitalist influences (Burwell 1995: 426). The harvesting practices of Agave angustifolia have become a political act relating to the complexity of controlling and managing agave stocks (PerJosed 2005: 59).

…

Robert owns a mezcal bar in downtown Tucson and has been actively involved in the bacanora industry for many years. We sat upstairs in the loft to chat. The din of a passing train and the chatter below made it hard to hear. I asked Robert about the situation with la materia prima.

**Robert:** It would be interesting to get a cursory look at what's actually out there. I think that's really important to get a baseline right now. What's available? Where's it growing?

**Me:** Or if you're going to change the denomination of origin, let in another species. Don't make it explicitly Angustifolia.

**Robert:** I know. Historically, it was never like that. They used whatever they had…I buy so much [informal] bacanora en tiendas, convenience stores, and it's obviously lechuguilla. That's just historic. It's always been. (12/20/2020)

…

Berta is originally from Bacanora, lived many years in the US, and returned to la sierra several years ago. She is the president of *Mujeres del Bacanora y Maguey de México Sonora* (Women of Bacanora and Mexican Maguey in Sonora). She invited me for lunch at her home, located in the center plaza near the church, to share her knowledge of the industry. Over a couple of hours, we spoke about many things, including la materia prima. "You don't see them," she said emphatically. "We don't have resources. Agaves *silvestres*, wild agaves, they're gone…[Jimadores] have to travel far into the mountains because there are no mature plants here anymore. *Es un tema muy urgente*…We need to work on the certification process and sell the product as a limited edition." (7/13/19)

Everyone connected to bacanora knows there are simply not enough plants to support a sufficient level of production to meet the current and future demand. In addition to the depletion of wild stocks, nearly everyone mentions changing weather patterns, notably the changing patterns of *la lluvia*, the summer monsoon. It is becoming more difficult to predict these summer storms that typically drench the thirsty desert. A shifting climate poses serious problems for la materia prima. Many people told me about *la helada,* the frosts that occurred over a decade ago en la sierra. Two catastrophic frosts killed over 60% of all wild agaves that were mature enough for

mezcal production. The future for the region remains uncertain. What people do know is that life in la sierra will not be the same. People will need to adapt.

Berta understands the need to adapt and adjust to new realities. She believes the bacanora industry can be sustainable. She also believes the industry can provide opportunities for young people in la sierra where jobs are scarce. Growing the industry is a way to keep young people in los pueblos. It offers the potential to keep some young men from venturing into organized crime.

**Security**

**"Indigna massacre de 9 en Bavispe: Señalan que con este hecho se remarca el desafío de combatir la delincuencia organizada"**

**Indignant massacre of 9 in Bavispe: They point out that this fact highlights the challenge of combating organized crime**

(Yamileth Hernández, El Imparcial de Sonora 11/42019)

The day I crossed the border to continue fieldwork in la sierra, headlines reported the massacre, which occurred about 70 miles south of the Mexico-US border. Gunmen killed six minors and three women driving three Suburbans on a remote dirt road near the border of Sonora and Chihuahua. The *sicarios,* assassins, injured six more children. The family was returning home to the isolated Rancho La Mora and Colonia LeBarón, a small fundamentalist Mormon community of bilingual families with dual-citizenship. The route is a known Narco smuggling route. Two warring cartels are vying for control of the route. The LeBarón family believes the vehicles were mistaken for a cartel convoy. The tragic incident made international news. The horrific murders of the fair-skinned women and children even garnered attention from then president, Donald Trump, who Tweeted, "If Mexico needs help against these monsters, the US is ready." One of

the men from the LeBarón family, tweeted a response to Trump that dismissed his display of chivalrous concern, stating that if the US wants to help, it should reform drug, economic and immigration policy that has created the violent situation along the border and across Mexico.

This is the backdrop within which the bacanora industry is attempting to grow. Many see tourism as an opportunity in la sierra. La Ruta Bacanora—a tour of bacanora producers and various sites in the historic colonial pueblos nestled in the Sierra Madres Occidental—is a vision that resembles the tourism market in Jalisco. A market that revolves around mezcal culture. Aside from a lack of infrastructure and meaningful government support, the ever-present reality of narco violence looms large in this region and is a likely deterrent to potential visitors. I never personally encountered *los sicarios,* yet evidence of their oppressive control was all around me. I heard countless stories, rumors and warnings. Rogelio, over morning coffee, mentioned the situation with Narcos south of Bacanora. "There is a war here between cartels. *No tienen corazón. No tienen alma.*" (They don't have hearts. They don't have souls.)

During the annual International Bacanora Festival (2019), a car full of producers from Rosario departed for home after selling their small batch bacanora and participating in the festivities. Natalia, *la presidenta* of Rosario, her husband and several others piled into the vehicle. On their way south, *sicarios* stopped the car outside of Sahuaripa. The men wore bullet proof vests, carried radios and brandished military-style arms. Ruben, *el comandante*, along with the other men and women, stepped out of the car while the armed guards checked the vehicle. The gunman eventually told the group that he would contact the other *sicarios* to let them know their vehicle was just passing through. During my interview with Natalia several months before this incident,

she described Rosario as once a quiet place to live. “People would sleep outside on cots on the porch of their ranch house during cool monsoon evenings. Nobody does that anymore. We don’t feel safe.” Rosario, like many communities along this Narco route, is caught in the crossfire. *El comandante* would tell me later, that a few years ago, Natalia’s parents were murdered on their ranch by cartels. *Balaceras*, shootouts, are now a fairly regular occurrence. This extreme physical and psychological violence, the collective trauma these communities endure, remains always under the surface despite the acceptance and normalization of this reality. This current era of hyper-violence affects every region of US/Mexico border society. Trafficking of drugs, weapons, women and labor continues to proliferate in the northern border region of Mexico. The international growth of the black market industry is caused, in part, by weak police and judicial systems, and widespread corruption throughout Mexico (Biron 2012; Mexica 2018).

…

I sat with Eva while she trimmed her freshly cut oregano, which she sells dried to a vendor in Sahuaripa for $30 pesos per bag. She grows the oregano in the terreno down the hill from la vinata. She loves having many flowers and an assortment of plants, taking her morning coffee in the shaded garden. Old rusting tea kettles and watering cans are used as flower pots. We spoke well into the evening, one of the rare opportunities to spend time together without Iván. She is enjoying Iván’s absence for a few days. She does not have to cook. “*El le gusta frijoles con todo*.” Eva warned that traveling alone with my truck makes me an easy target for theft. My rule of thumb, I told her, was never to drive after sunset. Everybody knows the nighttime belongs to the narcos. In Arivechi, for example, a couple of women were maimed, not killed, but badly hurt *antes la madrugada*, before dawn. “The narcos are in control here.” She mentioned the military checkpoint between Bacanora and Sahuaripa. “Did they stop you? No! They are doing nothing,

letting everybody pass. The cartels inform the police and military in this region on how things are going to go down…It's getting worse, and women are most at risk."

The following evening, still waiting for the truck with the maguey and Iván, Eva and I sat on the damp earth to cut fresh oregano as the sun set and the cool night air surrounded us. As we chatted, we drank ice-cold Coca-Cola out of glass bottles until we filled our buckets with the herb. Back in the house, we sat around the kitchen table, navigating around Iván's fermentation barrels that he needed to get out of the sun, and cut leaves from the stem before making dinner ("weenies" on a bun with jalapeños, avocado, lettuce, tomato, and queso). She told me about her sister who lives *sin papeles,* undocumented, in Phoenix with her two children who were born in the US. Her sister lives in fear of deportation. She said, very honestly, that she feels resentment toward "*los gringos*" because they pass easily into Mexico and back into the US when it is so difficult for Mexican citizens to cross.

…

The US-Mexico border for people without a US passport remains a barrier and a dividing line for the poor, the non-white, and the non-privileged (Mexica 2018: 333). Social, economic, and political displacement has created a unique biocultural landscape, relationships that move across a shared ecosystem, to become one of the most notoriously dangerous places on the planet. The advanced stages of neoliberalism in these contentious borderlands allows the development of narco culture to thrive. Narco culture is glorified with a narrative that champions the hyper-masculine (Mexico 2018: 337, 341). How does the material flow of illicit goods moving north and south–the demand for drugs *al norte* and arms flowing south–impact relationships with the environment? How does the militarization of the border and the structural violence that

accompanies this phenomena, impact relationships with the environment? What, if any, role does the maguey play? As Berta mentioned, many young men migrate out of la sierra in search of employment. Joining a cartel is a growing influence on young men as it provides an income where there are few economic opportunities. Can the maguey play a part in dismantling some of the stranglehold of violence by offering the youth in la sierra the chance to reconnect with the tradition of bacanora production?

## Gender

**"Eso es un trabajo de hombres."**
**This is men's work.**

(Doctor Hernández)

Shifts in women's obligations and socioeconomic transformations throughout Mexico continue to influence social change with respect to gender identities and relations. Women across the country are increasingly more independent (Gutmann 2001: 149). Mexican agave distillate industries were historically dominated by men. Though this is still true, in recent years women's roles have become more prominent.

…

I arrived in Rosario on e*l Día de la Virgen de Rosario*, the town's namesake. The central plaza was full of locals celebrating. Bands played, children walked in a procession, people on horses showed off their animal's fancy footwork. The evening ended with a loud fireworks display. The following morning, I walked to the government offices in search of Natalia, la presidenta and a producer. This was my first meeting with her. Following our interview, she invited me to stay for

another meeting with several women involved in bacanora production. She said that some of their husbands and fathers left, or were disappeared or killed, so they took over the process. Four women producers and Sarahí joined the meeting. The conversation centered on how to organize in the community to better support smaller producers. They agreed that the need to certify vinatas and to produce high quality mezcal  with 100% angustifolia would be easier with a collective, an alliance of producers. They discussed how to become more politically involved? What needs to happen to support other women in the community? Mari, one of the producers, mentioned a collective forming in the town. Sarahí asked, "What do you think of that collective?

Mari responded, "This group is something new in Rosario. It is something to help, to have more power, because it is to help the family…We need investments. We still extract from the mountains. [The group] is going to put some large nurseries on the land and to sow the land. We have a team here to get a certified vinata…We want to prepare [our product] for other currencies, for other countries."  (10/8/19)

…

Women in the industry are engaging with shifting structural constraints and opportunities. Social distinctions of gender in Sonora intersect with other social variables, such as class and level of formal education. Women of varying levels of education and access to resources are banding together to make their voice louder and to open doors that were traditionally opened only for men. The women I met in Rosario have fewer resources and less formal education than some of the other women I interviewed. However, these women have a close connection to production. There are women in Rosario who grew up around la vinata on family ranches. "All the resources you need," Berta said. "*Mujeres del Bacanora y Maguey de México Sonora* want to help women

in this region connect to other women who can help them market their product." Berta likes to remind people that bacanora is very close to women. Traditionally, production was a family affair. Women were involved nearly every step of the way.

…

Jose and Maria asked me if I wanted to try some traditional tacos. We drove across town to the only remaining stand that serves *tacos de seso, nariz y ojo* (brain, nose and eye). Their son, Eduardo, was disgusted and refused to join us. While eating—I found the eye the most challenging to swallow—we discussed some of the influences and impacts of *comercializadores*, marketers. Jose offered to contact one of the most successful comercializadores, Lupe Torres, a leader in the industry and the owner of six bacanora brands, the most famous being Pascola.

Jose drove my little green truck from Navojoa to Ciudad Obregón. An hour drive, the highway is lined with factories and agricultural land. We met Lupe at the property she shares with her brother. They are growing thousands of agaves with the help of a handful of *trabajadores,* workers. Confident and intelligent, she shared her story about becoming one of the first women involved in the bacanora industry. It began with three women and a goal to sell bacanora. With a background in business, after several years she successfully marketed her product at the global level. The most popular of her six brands, Pascola, has won medals in international competitions (e.g. San Diego, Bulgaria, China, San Francisco, London). During our conversation, she stated her desire to help developing communities. "We need to unite to access global markets." It is challenging, she said, for pueblos in the DO to receive government assistance to build their business. I did not mention my conversations with Rosalía or Maria about her role in exploiting small producers by low-balling the price of bacanora. Nor did I ask why she received

government assistance meant for producers when she is not a producer herself. Lupe spoke about women getting involved in the business. “Women always made the food, served the meals. Now we are leaving the home. We are pursuing what is important to us. This is something I want to see more of.” (6/12/19)

…

Women are increasingly forming communities of practice to support each other in the bacanora industry. Women from different social positions are attempting to co-learn from each other and support each other through associations and collectives that will strengthen their voices and give them more political power in an industry dominated by men. Power relations between men and women are often more overt than the power differentials that can exist among women. Women operating from different structural positions and situated identities must negotiate the challenges of collaborating together. How will women working together in the industry navigate these power relations between them?

**Mining**

***“Grupo México tiene un compromiso, una responsabilidad social por el daño ecológico que ha hecho y ellos siembran con semilla.”***

**Grupo México has a commitment, a social responsibility for the ecological damage it has done, and they sow with seed.**

(Rosalía)

I met Baldemar at the courthouse early one morning in downtown Tucson. In a moment of desperation having no one else to ask, the Tucson Samaritans, a humanitarian aid organization, inquired if I might translate for undocumented migrants facing detention. I was relieved to see Baldemar arrive a few minutes later than I. Upon introductions, I happily took a backseat given

that Baldemar is from Sonora and Spanish is his first language. We became friends that morning, and a couple weeks later I accompanied him on a trip to Cananea, the pueblo where he is from. I had traveled there once before during preliminary fieldwork, taking a bus from Agua Prieta, a border town located about an hour northeast from the town. One could call Cananea a company town, a town that exists because of copper deposits. The mine has been in operation since 1899, and is one of the largest open-pit copper mines in the world. It is so massive that it can be seen from the International Space Station (Stefanov 2008). The history of Cananea reaches back to the Mexican Revolution (1910-1917). In 1906, a miner's strike demanded better working conditions. The motto for the strike was, "*Cinco pesos, ocho horas*" (Five pesos, eight hours), a meager request considering the life threatening circumstances of working in the mine (Turner 2007). Baldemar told me that miners here have a short life expectancy. His father worked in the mines since he was a young man. He died from health complications at the age of forty-five.

The mine has changed many hands over the last century. Grupo Mexico currently operates the mine. Baldemar took me on a tour of the town, visiting several of his sisters who live scattered across the steep hills of the pueblo. Chatting over coffee and postres in each of the three homes, we discussed the situation in Cananea. Baldemar's niece is studying for a degree in large scale mining. She is conflicted as it is a lucrative career opportunity, but the mine has devastating consequences for public health and the environment. His eldest sister, Rosalva (La Chava), told us when there is running water in the tap (there was no running water when we were there), it is not potable. People try to avoid it as they believe it is linked to the many cases of cancer, skin lesions and other illnesses.

**Contamination**

In August 2014, 40,000 cubic meters of acidulated copper sulfate poured into the Bacanuchi and Sonora rivers from the Tinajas dam at the Cananea mine. Representatives of the mine assured community members, "Fortunately, we can confirm that the impact was more media than environmental related" (López Andere 2019: 7). Their experts made clear that these rivers are living systems with the ability to auto-regulate and recuperate from "adverse situations," and the concentrations of cadmium, mercury, aluminum, copper, nickel, and zinc are not related to the spill (López Andere 2019: 12, 14). Aside from those representing the mining sector, I did not meet anyone who trusts the mining corporations nor their claims that their operations do no harm.

Sonora has a long history of mining. Many of the small towns located in the mountainous region of the state, in the east toward the Chihuahua border, were founded by the Spanish several centuries ago. The state has one of the most productive mining industries in Mexico with diverse, rich deposits of minerals (e.g. gold, copper, silver, molybdenum). *La Asociación de Mineros de Sonora A.C.* (The Miners Association of Sonora A.C., AMSAC) represents the mining sector in Sonora. Their aim is to strengthen and develop this sector across the state. Part of AMSAC's mission is to entice outside development, both national and international corporations, to invest. There are over 4,000 mineral concessions and 56 mines currently in operation, along with hundreds of exploratory projects (Carlos interview 10/19/19).

I sat with Carlos in his windowless, air-conditioned office early one morning in Hermosillo. Carlos smiled and said, "This is a new era of mining…We have new technology and we're

getting better with ecological restoration. We want to work with local communities. We want to talk to them and hear what they're saying. We want to make things better and we want to improve our reputation. It's important to us." Grupo Mexico is funding a project in partnership with el consejo . The corporation has donated tens of thousands of *hijuelos,* agave pups, to producers that have land. Grupo Mexico has three large greenhouses growing clonal agave angustifolia. They promote the project as an opportunity for economic diversification. Who receives the plants depends upon who has access to land and the resources to grow agave.

…

The light hung low in the loft of the mezcal bar when I brought up the subject of mining. Robert had a lot to say:

Grupo Mexico is going to destroy Rio Sonora. There is going to be a catastrophe ten times the [spill in 2014] in a matter of years. It's going to destroy the [watershed]. They don't have holding tanks. The tailing ponds are going to breach. One giant monsoon rain, and it's gone. After the 2014 spill, they proposed this thing, some sort of containment fencing you put on the pond, double its capacity, but it didn't work. The state just looked the other way. [The government said,] 'We'll look the other way as long as you're doing this basic concession [e.g. planting agave grow outs]'. It's a bit distasteful that producers are getting these plants for free, but it's hard not to accept them. Where else are they going to get them?

I think about the miners themselves. I remember being in Arivispe at the mine and going through town and it being time to eat, so we stopped at this woman's house…she serves food to miners. It's almost like a mess hall. She ladles pozole out of a big pot. So, we sat and ate and talked with the miners…It's a good job. And, you know, we'd all be hypocrites if we said screw the mines.

We don't want to have anything to do with them…but we rely on it. It's an important livelihood, so all that complexity has to be part of the conversation.

…

How are humans and nonhumans alike subjected to the discourse of globalization and the narratives it imposes upon us (Massey 2004:10)? Multinational mining corporations shape landscapes in processes that often rob locals from any agency. Structural power dynamics embedded in institutions like the global mining industry often undermine the resiliency of communities in order to promote dominant interests at the expense of local culture, community cohesion and environmental health (Adger 2013: 115). Grupo Mexico and other mining companies with similar pursuits to donate agave pups to producers, work with the government to promote short-sighted policy that ignores the larger structural power dynamics driving environmental degradation and the loss of social cohesion in la sierra (Shore and Wright 2011). Agaves and humans, interwoven into the complex biocultural heritage in la sierra, hang on the precipice of survival. Tsing reminds us that precarity is always with us, everywhere. Precarity is the "condition of our time…the condition of being vulnerable to others…to shifting assemblages, which will remake us, as well as others" (Tsing 2015: 132). She encourages us to observe assemblages as they shift and change. Human and nonhuman participants guide these world-making projects, even capitalism carries the characteristics of an assemblage. Mining corporations and organized crime syndicates are part of this assemblage that turns the landscape and its inhabitants into assets. In the same way, the maguey is a commodity being increasingly extracted from its ecological and social assemblage.

### *Échale Ganas*

The current governor of Sonora, Durazno, in a December 2021 meeting with stakeholders related to the bacanora industry, praised the potential of the mezcal for the state, referring to it as an economic icon of Sonora. “The main income, the main economic source of these municipalities should not be livestock or agriculture. It has to be bacanora. There is much to do in those municipalities. We have to aspire to reach and surpass the mezcal brands from Oaxaca, Guerrero, Jalisco…Why not? This is how tequila began” (Gobierno de Sonora 2021). There is a new director of el consejo, Adela Domínguez Reyes, appointed by Durazno. Deemed a producer herself, some are confident that she will steer the industry in a socially and ecologically sustainable manner. Others remain cautious, wary of the corruption within the government and the influences of people inside and outside the DO who carry more political weight than small producers.

In early April of this year (4/4/22), Alejandro, one of the four previous members of el consejo, told me that the new director is a producer. He believes this poses a conflict of interest as the director should be impartial. Of course, the former director, Poncho, was far from impartial, urging the industry to expand and follow the tequila train. Many producers with whom I spoke argued that el consejo should not be part of the government at all. Rather, it should be a board of producers that does not change every four years with an election. Alejandro also said most things remain the same since I was last in the field. He believes producers still need help with certification, the DO should allow more than angustifolia in the production of bacanora, sustainability and la materia prima remain the greatest threat as plantations expand though not fast enough to keep up with demand.

Wage labor, mining and mezcal production remain on the margins of capitalism. Most small scale bacanora producers continue to subsist along these economic and ecological margins. Household incomes are increasingly more vulnerable to security and economic uncertainties, along with impacts of climate change. People must seek alternative sources of income as cattle ranching becomes more tenuous in la sierra. This often requires out-migration from the rural mountain pueblos. Historically and today, mezcal producers sell their bacanora as an addition to the household's income strategy (Burwell 1995: 420). As the industry attempts to scale up, many artisanal mezcaleros believe that legal mezcal is an entirely different cultural product, with fundamentally different relations of production. Bacanora is a drink of tradition in the local mountains, whereas commercial bacanora carries little of the tradition in la sierra. Producing for commercial consumption becomes a depersonalized business transaction (Burwell 1995: 426). Increased commodification of this distillate threatens to decontextualize the production and the cultural significance of the beverage. To appreciate these assemblages, we must recognize that humans and nature are not distinct and bounded entities. They are inextricably tied by social and ecological processes that shape global flows and networks (Marshman 2019: 89).

Iván has expanded the vinata since I first met him in 2019. He is partnering with Christian from Nogales, a comercializador who has resources to invest in the vinata and land to grow agaves. The name of their brand is 1915 to symbolize the beginning of the 77 year prohibition. In a few short months, with Christian's investment, Iván built a bathroom, separate rooms for *el molino* and fermentation, which are no longer in plastic but stainless steel barrels. His methods remain artisanal, small batches. One night after a monsoon storm, we sat outside with the smell of wet

earth all around us. He warned me of my ignorance of the complexities of the bacanora industry and told me to remain aware as I seek to understand these intricacies. "*Muchacha*, you will never get the full truth from anyone." Iván remains confident that "things will change in ten years. A lot of money will come here…*Échale ganas*," he said, "We must keep going forward."

Iván believes that maintaining the current denomination of origin is a form of social justice. It is a way to defend artisanal producers who live on the edges of global capitalism, who cling to a precarious relationship alongside agave angustifolia. This entanglement is threatened by power relations across scales, both historic and contemporary, that shape this unique, dynamic and altered landscape. Sipping bacanora in the cool evening, the smell of agaves roasting in *la tatema*, Iván says to me emphatically, "We have to honor our ancestors. They struggled and gave up their lives to keep this tradition alive. We can't lose our connection to them." I imagine Agave angustifolia a living ancestor, as well. A delicate relationship between human and plant. A relationship in peril in the mountains of eastern Sonora, just south of *la linea*, a border that both connects and severs these sacred relationships.

**References**

Adger, N. et al. 2013. Cultural Dimensions of Climate Change Impacts and Adaptation. Nature Climate Change 3(5):112-117.

Barham E. 2002. "Towards a theory of values-based labeling" *Agriculture and Human Values* 19 349–360.

Barham E. 2003. "Translating terroir: the global challenge of French AOC labeling" *Journal of Rural Studies* 19 127–138.

Besky, Sarah. 2014 *The Darjeeling distinction: Labor and justice on fair-trade tea plantations in India*.. Univ of California Press.

Biron, Rebecca. 2012. “It’s a Living: Hit Men in the Mexican Narco War.” *PMLA*, 127 (4): 820-834.

Burwell, Trevor. 1995. “Bootlegging on a Desert Mountain: The Political Ecology of Agave: Demographic Change in the Sonora River Valley, Sonora, Mexico.” *Human Ecology,* 23(3): 407-432.

Consejo Sonorense Regulador del Bacanora. 2018. “Certificación.” Gobierno del Estado de Sonora.

DeSoucey M. 2010. “Gastronationalism: food traditions and authenticity politics in the European Union” *American Sociological Review* 75: 432–455.

Encinas, Rafeal. 2020. “Cantiflas Bacanora.” YouTube. https://www.youtube.com/watch?v=rvdHCwJtKEA. Accessed 8/2/22.

Espinosa, María Del Socorro Alejandra Gámez, and Rosalba Ramírez Rodríguez. 2020. "Borrachera espiritual. La muerte y la agricultura en la ritualidad y la cosmovisión en San Pedro Cholula, Puebla, México." *Revista Tefros* 18(1): 141-170.

Feinberg, Rebecca. 2020. “Uprooting Wine, Food, Culture & Society.” *Food, Culture & Society,* 23(5): 551-569.

Gaytán, Marie Sarita and Sarah Bowen. 2015. *Naturalizing Neoliberalism and the De-Mexicanization of the Tequila Industry.* Environment and Planning, 47: 267-283.

Gentry, H.S. 1982. *Agaves of Continental North America.* Tucson: University of Arizona Press.

Gutiérrez-Coronado, M.L., E. Acedo-Félix, A.I. Valenzuela-Quintanar. 2007. “Industria del Bacanora y Su Proceso de Elaboración.” *Journal of Food,* 5(5): 394-404.

Gross, Toomas. 2014. Mezcal and Mexicanness: The Symbolic and Social Connotations of Drinking in Oaxaca. *Folklore,* 59: 7-28.

Gutmann, Matthew. 2001. “*Mamitis* and the Traumas of Development in a *Colonia Popular* of Mexico City.” *Gendered Modernities: Ethnographic Perspectives*. Hodgson, Dorothy, ed. Palgrave: New York.

Guy, K. M. 2003. *When Champagne Became French: Wine and the Making of a National Identity*. Baltimore: Johns Hopkins University Press.

Hardin, G. The Tragedy of the Commons. *Science* 162: 1243-1248.

Hernández, Yamileth. 2019. “Indigna massacre de 9 en Bavispe: Señalan que con este hecho se remarca el desafío de combatir la delincuencia organizada” El Imparcial, edición Sonora. 4 de noviembre. Accessed 6/12/22.

Instituto Mexicano de la Propiedad Industrial. 2018. “México ya tiene 18 Denominaciones de Origen.” IMPI. https://www.gob.mx/impi/articulos/mexico-ya-tiene-16-denominaciones-de-origen?idiom=es. Accessed 8/1/22.

López Andere, Alberto. 2019. “En Defensa del Desarrollo de la Cuenca.” *Mundo Minero,* julio-agosto.

Marshman, Jennifer. 2019. “Communing with Bees: A Whole-of-Community Approach to Address Crisis in the Anthropocene.” *Journal of Agriculture, Food Systems, and Community Development*, 9(suppl 1): 87-110.

Martineau, Chantal. 2015. *How The Gringos Stole Tequila: The Modern Age of Mexico’s Most Traditional Spirits.* Chicago Review Press: Chicago.

Massey, Doreen. 2004. “Geographies of Responsibility.” *Geogr. Ann.,* 86B (1): 5-18.

Mexica, C.T. 2018. “The Narcobildungsroman in Borderland Narratives.” *Chasqui,* 47(1): 331-347.

Morales, M.A. “Mike.” 2019. *From Babes to Boss Ladies: The Women Who Contribute to and Create Tequila, Mezcal, Sotol, Bacanora and other Mexican Sprits.* Published by M.A. “Mike” Morales.

Mutersbaugh T. 2005. *Fighting standards with standards: Harmonization, rents, and social accountability in certified agrofood networks.* Environment and Planning A 37: 2033-2051.

Norma Oficial Mexicana NOM-168-SCFI-2004. 14 diciembre 2004. “Bebidas Alcohólicas-Bacanora-Especificaciones de elaboración, envasado y etiquetado.” Publicado en el DOF del 14 de diciembre de 2005, primera sección.

OMPI. 2022.“Reseña del Arreglo de Lisboa relativo a la Protección de las Denominaciones de Origen y su Registro Internacional (1958).” https://www.wipo.int/treaties/es/registration/lisbon/summary_lisbon.html. Accessed 8/1/22.

Parramond, Eric. 2005. The Politics of Ecology: Local Knowledge and Wild Chili Collection in Sonora, Mexico. *Journal of Latin American Geography,* 4(1): 59-75.

Ramírez Rodríguez, Rodolfo. 2020. “Mayahuel No Es La Diosa de Maguey.” Relatos Historias en Mexico. https://relatosehistorias.mx/nuestras-historias/mayahuel-no-es-la-diosa-del-maguey. Accessed 7/722.

Rangnekar D, 2012. “Remaking place: the social construction of a geographical indication for feni” *Environment and Planning A* 43 2043–2059.

Raynolds L, 2000. “Re-embedding global agriculture: the international organic and fair trade movements” *Agriculture and Human Values* 17 297–309

Renting H, Marsden T, Banks J, 2003. “Understanding alternative food networks: exploring the role of short food supply chains in rural development” *Environment and Planning A* 35 393–411

Salazar Solano, Vidal and Alejandro Mungaray Lagarda. 2009. “La Industria Informal del Mezcal Bacanora.” *Estudios Sociales (Hermosillo, Sonora)*, 17(33): 1-16.

Secretaría de Economía. “Segundo Bacanora Fest Realizará la Secretaría de Economía.” Podio.Mx. March 11, 2020. http://podio.mx/segundo-bacanora-fest-realizara-la-secretaria-de-economia/. Accessed 7/17/22.

Stefanov, William L. 2008. “Cananea Copper Mine, Sonora Mexico.” NASA Earth Observatory. https://earthobservatory.nasa.gov/images/8680/cananea-copper-mine-sonora-mexico#:~:text=The%20mine%20workings%20at%20Cananea,beginning%20of%20Mexico's%20labor%20movement. Accessed 6/1/22.

Tsing, Anna Lowenhaupt. 2015. *The Mushroom at the End of the World*. Princeton University Press, 2015.

Turner, D.L. 2007. “Arizona’s twenty-four-hour War: The Arizona Rangers and the Cananea Copper Strike of 1906.” The Journal of Arizona History, 48(3): 257-288.

Yetman, David. 2010. *The Ópatas: In Search of a Sonoran People*. Tucson, Arizona: University of Arizona Press.

Zizumbo-Villarreal, D., & Colunga-GarcíaMarín, P. 2008. Early coconut distillation and the origins of mezcal and tequila spirits in west-central Mexico. *Genetic Resources and Crop Evolution*, *55*(4), 493-510.

# CHAPTER 5

# CONSERVATION NGOs

***"Sin Murciélagos, No Hay Bacanora."***

**Without bats, there is no bacanora.**

*(Colectivo Sonora Silvestre Presentation 2019)*

## ROADMAP

This chapter is about conservation across borders. It looks at three conservation non-governmental organizations (NGOs)—Borderlands Restoration Network, Bats Conservation International and Colectivo Sonora Sivestre—and how they are working together in Arizona and Sonora. How do we define and engage with communities in conservation efforts? How do market-based conservation programs impact communities? Who has access and who is left out of these conservation conversations?

## Borderland Realities

In the spring of 2019, the Cochise County sheriff's office in southern Arizona made a public announcement warning citizens of "significant violence occurring in the [border] towns of Agua Prieta, Naco and Nogales [Sonora…due to] fighting being waged by two cartel factions." Violence in the US-Mexico borderlands takes many forms, at times overt, other times more subtle processes of violence. These engagements highlight local struggles over power and meaning across the Arizona-Sonora border.

Two young women, co-founders of *Colectivo Sonora Silvestre* (Wild Sonora Collective, CSS), shared with me their experiences of conservation work in northern Sonora, revealing a very different reality than conservationists north of *la frontera* (the border).

**Me:** Do you feel nervous or afraid when you go into the field?

**Laura:** I totally do.

**Gabriela:** All the time.

During one of their many watershed assessments, their car broke down near the town of Moctezuma.

**Gabriela:** I called my uncle who lives on the highway between Moctezuma and Nacozari. We called him because there's always service on this road. It's the Narco's highway.

He said, "Just leave the car there and come walking right now because if it gets dark you're going to get into trouble." Laura and I didn't talk about it with the other guys that were with us because they would get scared. I said, "Laura, don't say anything, just keep them walking."

**Laura:** Yeah, there were three people killed two days before we were there, so it was so crazy. We were like, "Just keep walking. If you see any person just run into the bushes. Do not look back"…I remember talking to Gabriela, like, "Dude, if something happens, they're going to shoot [the guys], but they're not going to shoot us. They're going to take us with them. So, if something happens just run as far as you can, just don't even ask." So, that's a thing. That's always a thing. What we used to do when we went into the field was to let the police know we were there–how many [of us], what we're doing–because they're connected [to the Narcos]. You ask them the places that are safe to go. So, we work in those places and that's it. You always have to be very careful."

**Gabriela**: "Yeah, there's a lot of places you cannot go."

**Laura:** Another time we came upon a *sicario* (assassin) while doing a stream assessment in *la sierra.* He put his fingers to his lips and let us pass. We got lucky. (2/2/19)

When I asked Eric, the director of Borderlands Earth Care Youth (BECY), a Borderlands Restoration Network program, if he fears for his safety while doing restoration work throughout the Patagonia mountains, he responded easily, "Not at all." (12/718)

**Conservation across Borders**

The US-Mexico borderlands is an important area to study the political, social and cultural influences that shape dynamic environmental processes. Structural violence, uneven development and climate variability define this transboundary region, which is experiencing greater demand on resources due to population growth, the proliferation of organized crime and the increasing risk of climate change affecting watershed conditions (Shamir et al. 2007). Since the ratification of North American Free Trade Agreement (NAFTA) in 1994, the states of Arizona and Sonora continue to experience economic growth that outpaces their respective national averages. Both support significant population and economic centers despite being vulnerable to water shortages and unpredictable dry periods (Megdal and Scott 2011). There are numerous public and private actors, including a growing number of nongovernmental organizations (NGOs), working to build partnerships to preserve ecological integrity in these binational watersheds. Many stakeholders express the importance of building partnerships across the border on private, public, and Indigenous lands to address environmental concerns, such as increased drought, land-use change, intensive water use, habitat fragmentation and climate

change (Megdal and Scott 2011). Human pressures on sensitive desert ecosystems often encumber binational restoration goals.

While in the field, I heard a recurring question among conservation practitioners and other stakeholders about whether conservation goals align with the structural realities of local communities where they work. This chapter examines how several conservation nongovernmental organizations (NGOs) partner with various stakeholders across the US-Mexico border. Several NGOs, including Bats Conservation International (BCI), Borderlands Restoration Network (BRN), and Colectivo Sonora Silvestre (CSS) are collaborating with bacanora producers, academics, and policy makers to address threatened stocks of *Agave angustifolia* and the declining lesser long-nosed bat population. Agaves and bats in this region are increasingly impacted by climate change and land development, including the harvesting of *Agave angustifolia* for mezcal bacanora. These organizations are currently operating regionally throughout southern Arizona and northern Sonora. They are actively developing and promoting a bat-friendly bacanora certification. “Bacanora for Bats” is a market-based mechanism to promote conservation. The aim of the certification is to support sustainable artisanal mezcal production rooted in a conservation ethic. The certification program is promoted as a “win-win-win” for agaves, bats and bacanora producers. It is important to follow the relationship between conservation organizations and market-based approaches to sustainability as the relationship continues to grow closer across various conservation sectors (Larsen and Brockington 2018).

There are many views about using market-based instruments to address environmental issues. Some stakeholders support the relationship, others are skeptical, and others outrightly oppose

this approach. As conservation NGOs engage with capitalism, conservation efforts increasingly frame nature as a commodity ready for consumption (Larsen and Brockington 2018: 26). With this in mind, I explore how BRN, BCI and CSS address conservation, the market and broader structural inequality between the global north and the global south. Centering agaves illuminates the shifting relationships between these plants, the bats who rely upon their nectar and the many human stakeholders involved in these multispecies entanglements. Tsing's ideas of marginality and "precarity in capitalist ruins" (2015) is useful to interpret the layers of power imbalances across transnational spaces. In these borderlands, neoliberal spaces and global commodity chains are changing human relationships with bats and agaves. People have always revered the agave, and now both sides of the border are embracing the lesser long-nosed bat as a valuable being worth protecting.

Neoliberal conservation is an ideology informed by the premise that nature can be "saved" through submission to capital and a revaluation in capitalist terms (Blanchard et al. 2018: 153). Market-based mechanisms, such as fair trade, attribute a price to nature and promote social and ecological well-being using a neoliberal strategy to reduce inequities related to a particular commodity. This strategy believes in the transformative power of self-regulating free markets to solve most problems (Steven Brechin 2018: 245). Efficiency through the market offers an economic rationale for conservation, a consumer-supported method to protect biodiversity and producers. This strategy has altered relationships between conservation organizations, consumers, state and private sectors (Larson and Brockington 2018). A neoliberal approach to conservation requires the expansion of markets into other areas of society in order to make a noticeable impact on livelihoods. Are capitalist market mechanisms able to resolve

environmental problems. What are the costs and benefits of creating value based on the capitalist model that requires the commodification of nature?

## Conservation Non-governmental Organizations

### I. Borderlands Restoration Network

One Saturday morning in spring, Hailey, a botanist and the director of Borderland Restoration Network's (BRN) seed bank, led a nature walk open to the community. As we strolled through Casa Blanca Canyon, oak and sycamore trees loomed overhead, providing welcome shade as we entered the riparian area. Hailey identified edible and medicinal plants common to the Madrean Archipelago, many having served as food and medicine for humans for over a millennia. There were about fifteen of us that morning, eager to take part in and learn more about this landscape rich with human-nature entanglements. I asked Hailey her thoughts on these entanglements, "We tend to be human-centric, but I'm not sure I agree with that…We can't be separated from the environment…I base a lot of my thinking about nature around the idea of dignity…the dignity of life, and how we should respect it because it's alive and beautiful and it's something worth respecting…all parts of it, even the weeds that we walk over or pull. We're all part of what's going on."

*La frontera* (the international line) cuts across the Sonoran Desert, a rich shared landscape, and one of the most biodiverse regions in the United States. Eighteen miles north of the US-Mexico border and a thirty minute drive to Nogales, one of the busiest points of entry along the international line, sits the small town of Patagonia, with a population just shy of 1,000 people. Patagonia is recognized as a global biodiversity hotspot and the pollinator capital of the United

States. There are six diverse biomes that converge in this region: Rocky Mountains, Sierra Madres, Sonoran Desert, Chihuahuan Desert, Great Plains and the Neotropics (PARA 2019). Eric, the BECY director with BRN and my housemate during fieldwork, told me with reverence that human groups have inhabited these mountains for about 10,000 years. The Patagonia Mountains were part of Mexico until annexed by the US in 1853 with the Gadsden Purchase, five years after the Treaty of Guadalupe Hidalgo when Mexico ceded over half of its territory to the US.

In addition to high biodiversity, these mountains are rich with minerals and hold hundreds of historic mine sites. These sites, some of which began in the 1700s, continue to leak toxins into the soil and water table (PARA 2019). Exploration and extraction is still quite active in the area. There are multi-generational families with ties to mining that remain in Patagonia. In addition to these families with deep roots in the region, Patagonia has become a hotspot for newcomers, including snow birds, eco-tourists and environmental organizations, such as Deep Dirt Institute, Native Seeds/SEARCH, and Borderlands Restoration Network.

Borderlands Restoration Network operates at a grassroots and regional scale. Their work aims to build a restoration economy that provides jobs to restore degraded and threatened ecosystems. Their projects focus on connectivity among organizations and landscapes on both sides of the border, to include wild seed collection and propagation, as well as watershed and habitat restoration. BRN holds contracts with The Nature Conservancy, National Park Service, US Forest Service and US Fish and Wildlife Service among other organizations. It is unique in that it holds 501C3 nonprofit status and an L3C limited-profit that provides products and services related to the restoration economy (BRN 2022). As an L3C, BRN partners with local communities to help with marketing, sales and distribution of sustainably produced products.

The L3C certification also involves a commitment to shift consumers' purchasing power toward these sustainable goods and services. The reliance upon consumer choices, this case on a local scale, follows a larger trend referred to as "green capitalism." This strategy embraces ecological commodification, marketization and financialization that deepens the relationship with nature and capital (Smith 2009). Perhaps, the impacts of such a strategy depends upon scale. Sustainable goods procured at the local level, such as those sold by BRN, are on the margins of larger global commodity chains where nature, sustainability and conservation can be easily reduced to a value based on a transaction or monetary exchange.

**Speaking with Seeds**

***"The process of seed conservation demands knowledge of the seed's relationship, environment and its heritage. …its history, its evolutionary path, its close relatives…what it will require and how it will behave…we must learn how to see and think of the world like a seed–to attune ourselves to pay attention to the interests of the other, how they become and what they know…intercultural and interspecies collaborations are required…It is in that space…that the transformation happens."***

*(Lewis-Jones 2016: 7)*

East side of the Chiricahua Mountains, Southeastern Arizona

Southwest Research Station

We spent two nights at the Southeastern Research Station (SWRS). The SWRS is a year-round field station under the direction of the Science Department at the American Museum of Natural History in New York City. It provides dorms for biologists, geologists and anthropologists

studying the diverse environments of the Chiricahua Mountains in southeastern Arizona. At dawn, we piled into a BRN van to reach the field site. The seed collecting crew included Hailey, the seed lab director, along with six others including myself. This is where I met Ray, Bat Conservation International's (BCI) director of Habitat Conservation and Restoration. His work involves partnering with BRN and Colectivo Sonora Silvestre (CSS) on the agave restoration project, which is largely funded by BCI. He joined the BRN crew to collect seeds from *Agave palmeri*. This is the main agave propagated for BRN's multiple projects across this region of southern Arizona. Palmeri is slower growing due to its tolerance to colder temperatures. Their life cycle ranges from 15-30 years, and the distribution of the plant ranges from 3,000-8,000 feet in elevation. Similar to angustifolia, palmeri is pollinated largely by bats and produces nectar nocturnally (Gentry 1982). BRN practices low impact seed collecting. Respecting the plant's personhood and right to life, there is no cutting, uprooting, or destroying the plant. During the time of collection–wherever the location and whatever the type of seed–team leaders gather data on the details of the location, such as the elevation of the plant, so they can replant in a similar ecosystem.

Isabela and I were partners during seed collection. Armed with a long pole, a blue tarp, and a bucket, we scrambled up rocky hills in search of agave stalks. It was easy to spot them. They rose well above anything else in the area. Finding our way to them was another matter. The terrain was steep with large, loose rocks. We had to be mindful where we placed each foot, looking and listening for rattlesnakes. Once we reached an agave, we began by hooking the bucket to the end of the long pole, reaching it up to the tip of the stalk (a very long reach!) and shaking the stalk so the seeds fell into the bucket. Seeds seemed to fall everywhere except the

bucket. We soon gave up on this method and spread the blue tarp around the plant. Together we took hold of the stalk and shook it. It began to rain small, feather-light black seeds. They landed in our hair, stuck to our skin, fell inside of our clothing and boots. When we were satisfied with one plant, we folded our tarp carefully and poured the seeds into the bucket. While this was a physically demanding task, it was enjoyable and allowed time for Isabela and me to share stories of our experiences in the borderlands where we were both raised. Landscapes such as this and the attempt to protect them both shape are shaped by diverse knowledges across physical, political, cultural and economic borders. For those of us who grew up in this region, there is a shared sense of place, sense of pride, reverence and celebration to be a part of this complex transborder tapestry.

Figure 15: Conservationists collecting agave seeds (Photo by author)

**Seed Lab**

Large sacks of black seeds sit in the corner of the room. There is much discussion in the seed lab. The lab sits atop a hill in Patagonia. Part of the collection of BRN offices, the small lab is a converted elementary school cafeteria. The walk-in cooler, a former storage space, houses over 500 species of native seeds (BRN 2022). A couple weeks after the trek in the Chiricahuas, while sitting on overturned five-gallon buckets, we cleaned and processed agave seeds. The seed collection team and a couple of volunteers began a conversation about the life of a seed and what potential it holds inside, what we might gain from its knowledge. Native plants have spent centuries developing distinct adaptations to regional conditions. Agave palmeri's genomes, for example, express the ability for increased drought-tolerance, cold-tolerance, and high nectar quantities for local pollinators (Gentry 1982). Humans have played a significant role in shaping these genes.

Plants can wake us up, remind us that we are a part of a rich biocultural landscape that we influence and that influences us. During another volunteer day at the seed lab, Rachel, who moved to Patagonia five years ago, and I were processing seeds. We were cleaning native chia seeds outside. There was a nice breeze, perfect for winnowing these small seeds. We let the wind carry the chaff as the heavier seed dropped back into the container. I asked Rachel about her choice to come to Patagonia and work for BRN. "When I got here, I was doing customer service work. I realized, you know what? This is not working for me. I don't want to be inside looking at a computer, talking to cranky people on the phone. I'm exhausted. What I've been doing for the last three years is growing flowers. That really makes my heart sing. And I'm like, if I'm going to stay here in Patagonia, I need to find something that's going to be more in line with what I love.

And that's how I realized. I want to work with plants" (5/10/19). The relationship between plants and people has carried us across time and space. Plants help us connect with the place we inhabit. The seed offers us a reminder of where we came from and where we are going.

**Mining in the Patagonia Mountains**

Another Monday morning at the lab, we wandered onto the subject of mining. The landscape around Patagonia is steeped in the tradition of small and large scale extraction. There are currently several exploration projects searching for lucrative deposits of copper, silver, manganese, among other minerals. In 2018, the Hermosa Mine began operations in the Patagonia Mountains for zinc and silver (South 32 2022). The community is deeply divided on the subject of mining. Some see mining as an important economic boost, and others believe it will cause irreversible environmental damage. BRN is committed to working with state and local partners on the restoration of "legacy mining." Legacy mining refers to unsecured mining activities. They are often historic sites lacking environmental remediation. These sites may pose public safety hazards and environmental impacts, such as toxic mining drainage and poor water quality (Northern Territory Government 2022). BRN, however, has decided not to work with mining companies currently in operation. The staff was divided on this decision and ultimately determined they would focus solely on historic mine sites. Restoration conservation near abandoned mine shafts include agave grow-outs. Bats frequently inhabit these shafts for shelter. The Arizona Game and Fish Department's Bat Management Program partners with BRN and the larger bat conservation community to focus on these caves and mines in an effort to protect critical roosts (Arizona Game and Fish 2022.) While BRN has made it very clear that they will not work with mines currently in operation, BRN receives funding from Bats Conservation

International. BCI receives funding from Freeport-McMoRan, an international mining company with headquarters in Phoenix (BCI 2022). (3/4/19)

Robert, anthropologist and owner of the Xochitl mezcal bar in Tucson, is also the BRN board of directors president. During one conversation, he told me that “something to think about are these larger relationships. We might have a vision of not working with mining companies and we might hate the mining companies, but we're getting funding from them and global technology needs these minerals. So how do we work? How do we hold these mining companies accountable? We benefit from them. Everyday. That’s something that I'm currently grappling with right now. Because, I mean, mining's not going to go away.”

The 500-year-old struggle of Anglo and Spanish conquest exposes a legacy of conflict that plays out in everyday contexts. Conflict has long been a regularized part of the border and transnational relationships. This friction is often overt, like the impacts of historic and current mining operations. Other times, it is more subtle, embedded in our quotidian interactions with neighbors, co-workers, friends and family with whom we interact often.

**Community Engagement in Patagonia**

Jen spent a year in Patagonia working as a social science intern with BRN. Over the course of six months, she met with community members to ask the question: what is community engagement? She conducted interviews in an attempt to better understand community characteristics. She noticed a palpable divide within the small town. Families who have lived in Patagonia for generations commented on this divide that they believe began about 40 years ago when

newcomers arrived. Sitting in folding chairs at sunset in Jen's backyard, she told me, "There's a big rift in Patagonia at this time. You have old timers, or people who are more conservative, or people who do support the mine for economic opportunity, and they see BRN as a bunch of new hippies coming in and trying to take over. And that's a problem. How do you get people to the table? How can we say the mine is not the big evil enemy and all the people that support it are against what we are promoting? It's much more complicated and messy. You see it on a real local level (12/2/18)." BRN continues to grapple with how to be more inclusive. This came up during staff meetings, interviews and casual conversations. The staff is well-aware that community perception of their work is low in some circles. In a small town with deep roots and different ways of relating to nature, it can be challenging to find common ground.

**"Everyone's Nana Had Mint"**

Isabela, Gloria and I stood together in Isabela's backyard as their children played. A mature sycamore tree provided shade for us and for the flowers and herbs in Isabela's garden. She was growing elderberry for tinctures and tea. She showed me her mint plant. "Everybody's nana (grandmother) had mint." Gloria and Isabela have begun to harvest native edible and medicinal plants. Isabela describes her journey as a path toward reclaiming and reconnecting with her Chicana roots through motherhood. As the children continued to run around, chasing each other, barefoot and laughing, the conversation turned toward Isabela's experience working for BRN. She described it as cliquish, not a friendly place to work. I recall hearing about BRN's fallout with a conservationist in Nogales, a man named Adrián. He called out several BRN employees as being unprofessional, unreliable and unwelcoming. In a staff meeting, there was a discussion about the incident—nothing in great detail. It appeared to me that people did not want to talk

about what happened. The staff made the decision to take a step back from the work in Nogales with Adrián. There was discomfort and a sense of remorse during this conversation. “How do we navigate this well and with respect?” Joseph  the director of BRN asked. Inclusivity and diversity is a regular conversation with BRN. Equity in restoration is something that is at the heart of their mission. Still, the divide remains between the “new hippies,” the old-timers and some of the Mexican-American families. Isabela, acknowledging this divide, told me that an older friend and mentor, Anita, canceled her workshop with the BRN field school because of Isabela’s treatment. “After learning about what happened with BRN, Anita told me, ‘You represent the community, *mija*. I am with you, not them.’” (6/13/19)

Victoria , the native plant nursery director, and I were sharing tea one brisk morning discussing diversity and inclusion. She said the organization recognized the need to diversify and hire more locals, but making it happen has been challenging. “[We’re trying to] be proactive, creating ways for people to support their landscape and have a job that supports them and their watershed. Thinking about who to hire, it’s always very tricky. So, at this point—even with Joseph, who’s a wonderful director. He’s doing such a great job—would it be better to have, like, a badass, Spanish speaking, Mexican woman with a restoration ecology degree from Nogales who could be the Borderlands Restoration director? Of course. Even Joseph likes that idea, but at this point that person doesn’t exist.”

BRN acknowledges there is much to learn to engage more meaningfully with diverse stakeholders. Efforts to be better stewards to the plants, animals and human communities they serve include continued education and training. I learned, after departing Patagonia, that the staff

collectively read the book, *Me and White Supremacy: Combat Racism, Change the World and Become a Good Ancestor* (Saad 2020). They also invited Gabriela Cazares-Kelly, an educator, community organizer, co-founder of Indivisible Tohono and member of the Tohono O'odham Nation to educate the BRN staff on ways to support and grow relationships with members of the T.O. Nation and other communities of color in the borderlands. In an article she penned in 2018 for *Colorlines*, Gabriela wrote, "I am encountering more and more people of color who are bearing the burden of the demand for representation. We continuously hear things like, 'How can we get a more diverse crowd?' 'Why aren't people of color showing up?' 'People of color need to vote.' Each time I want to scream, 'Why would I want to bring my friends of color into spaces like this?'" (Cazares-Kelly 2018: 1).

How to mend deep wounds that continue to bleed across the landscape? Whether the wounds from the environmental harm of historic and contemporary extraction, community divisions relating to border policy, or the eagerness of folks ready for equity and diversity but unsure of how to get there—it takes time. The "getting there" takes time. It takes patience and a willingness to be uncomfortable. The agave, a plant that means so much to so many groups of humans, is a way to center dialogue among a diversity of people. Everyone seems to have a connection, a story related to this succulent. Perhaps, these stories, shared over time, will help chip away at these divisions. Plants bringing people together.

**BRN Native Plant Nursery**

Borderland Restoration Network's native plant nursery stretches over several acres. A number of greenhouses face the looming soil pile that stands ten feet from the shaded ramada where

volunteers work when the sun is too fierce. Tuesdays are volunteer days. A handful of us show up regularly. Many are snow birds, retirees who overwinter in Patagonia. We move mesquite. We haul soil. We re-pot agave pups when they grow too big for a container. We are available for the many chores the nursery needs on any given day. Victoria , the director of the native plant nursery, welcomes volunteers with enthusiasm as she gives directions.

Victoria was born in the borderlands. Her family are agriculturalists in Yuma, Arizona, just north of the Sonoran border near the California border. She is often wearing a wide-brimmed hat, flowing long skirt and an apron covered in soil. Her red truck with the bumper sticker, "Got Milkweed?" is usually parked at the nursery. Her dog, Chiltepin, named for the small, round, red chili that grows in Sonoran, is often curled comfortably in the cool dirt under the shade of the ramada. When Victoria was a child, her mother sent her to primary school in Mexicali, the town just across the border from Yuma. "I didn't like it that much…There's so much resentment of Americans, of course, and even though this was a little private school–everyone was able to afford to send their kids to the school–certain people didn't have Visas. It's not super easy to get a Visa. Even saying, I went to Disneyland–and some of the other kids went to Disneyland, too–there were people that were very resentful. It makes you realize right away how borders work. You know, we were just little kids trying to navigate these things…That part was a little difficult, but I learned Spanish, which was great." (1/5/19)

Conflict in the borderlands is a constant. The friction as worlds collide remains always just under the surface. Privilege in the north; marginalization in the south–the land is ripe for resentment. From an early age in these borderlands, we learn to live with this complexity, where the past is pervasive, always mingling with the present. Everyone must adapt to this beautiful but harsh biocultural landscape. From an early age, regardless of what side of the border one lands or the

community one calls home, the Sonoran Desert crosses these boundaries. Our non-human neighbors have lessons to teach us about taking time to build relationships in a hostile environment. It takes time.

One Tuesday morning, while I was carefully untangling the delicate roots of a mesquite sapling, Victoria  mentioned a partnership between BRN, Bats Conservation International, and Colectivo Sonora Silvestre (CSS). The ambition is to plant one million agave pups throughout southern Arizona and northern Sonora. Part of the vision involves collaborating with bacanora producers in Sonora to promote "Bacanora for Bats." It was the first time I heard about this particular human-agave-bat entanglement. My interest piqued.

## II. Bats Conservation International

The brick-lined patio of Hotel Congress was crowded with stands celebrating agave distillates, cultural displays, conservation projects. The historic hotel in the heart of downtown Tucson was hosting this meet-and-greet for the Agave Heritage Festival. Bats Conservation International (BCI) had an informational booth about their project, the Bats & Agave Initiative. In addition to material related to bat-agave mutualism, there was a sign reading, "Freeport-McMoRan Inc. is part of a network recognized for its commitment to restoring wild agave, which feeds bats and other pollinators and creates healthy habitats." The relationship between global mining operations and conservation organizations is not unique to BCI and Freeport-McMoRan. Over the last couple of decades, many mining companies have partnered with NGOs in an effort for each to satisfy their own goals (Smuts 2010). These relationships reveal larger processes of globalization, neoliberal spaces that allow for contradictions. Mining companies must adhere to corporate social responsibility. Conservation organizations seek much-needed funding. Freeport-

McMoRan Inc. enacts harm to the human communities and biodiversity in the sites where they operate. Their contributions to conservation NGOs allows restoration projects to continue. BRN states clearly that they will not work with mining corporations currently in operation, yet they receive funding from BCI who receives funding from extraction companies. Conservation contributions may occur far from the mining sites where harm is enacted. Ecological and social exploitation is sustained somewhere; restoration and reparation occurs elsewhere. Global capitalism and the power of multinational corporations continue to operate business as usual, perpetuating the damage that conservation groups are trying to mitigate. The contradictions relating to international mining conglomerates and conservation organizations that rely on these multinational corporations to fund their restoration efforts expose the messiness of neoliberal processes that reach across local to global scales. How do we measure the impacts of extraction versus the benefits of restoration?

Bats Conservation International has been a global advocate for bats for four decades. The NGO works worldwide to conserve caves and restore critical habitats of countless bat species. They promote climate adaptation for bats and protect habitat connectivity for migratory species. They partner with several organizations, including US Fish & Wildlife Service and the US Department of Energy's Office of Legacy Management to inventory abandoned uranium mines (Office of Legacy Management 2021). BCI boasts an adaptive management approach as outlined by the Open Standards for the Practice of Conservation (OS ). These standards are supported by the USAID Global Conservation Program. Several Big International Nongovernmental Organizations (BINGOs), including The Nature Conservancy, World Wildlife Fund, Wildlife Conservation Society, Conservation International, align their conservation efforts with the

standard framework for assessment, planning, implementing, and monitoring projects. These standards contributed to the development of the Conservation Standards for the Practice of Conservation (CMP 2020). The standardization of conservation is rooted in a dominant model of uniformity, auditing culture, colonial control, and positivist science. Often, these standards reinforce uneven power relations. How do we change this model? Does it relate to scale, to putting in the time to build relationships, to listening to the human and non-human entities that exist within these biocultural landscapes? What might the BINGOs learn from the locals, human and more-than-human?

In southern Arizona and northern Sonora, BCI's Agave Restoration Initiative is working at the regional scale. According to BCI, this is an effort to both support local livelihoods and the biodiversity of the region by working with stakeholders to identify culturally and environmentally appropriate sites and strategies for agave restoration actions. The NGOs aim is to create healthy migratory corridors for nectarivores bats while supporting local businesses. The vision is to invest in infrastructure (e.g. community greenhouses) and create business opportunities that support sustainable livelihoods (e.g. training in sustainable agricultural and ranching techniques) (BCI 2022). So, where does the local community come into the dialogue? How is BCI defining community? How do they address uneven power relations and equity? Whose voice and knowledge is valued? In a conversation with Camille, the program manager for BCI's Agave Restoration Project, she acknowledged that BCI needs to do better. In the Arizona-Sonora borderlands it is clear that across scales conservation organizations, including BCI, BRN and Colectivo Sonora Silvestre recognize the importance of listening to local communities, offering help and stepping aside to allow local leaders and local knowledges to move forward

potential restoration projects in a culturally appropriate manner. The agave reminds us that building meaningful relationships takes time.

Figure 16: “Agave Whisperers” (photo by Alexander Badyaev)

## III. Colectivo Sonora Silvestre

***“We’re not trying to change the way [bacanora] has been made. We’re trying to support it, and we’re trying to make their future better,” she said. “I’m only 25. I’m really young, and it makes me cry when I see bacanora producers passing this tradition on to the next generation. It’s really beautiful. For Sonora, this is our culture, this is in our blood.”***

(Gabriela, Colectivo Sonora Silvestre, 2021)

It was a packed room in Xochitl mezcal bar. Chairs were lined in rows, facing an area set up as a temporary stage. The bar was hosting a tasting event for the Agave Heritage Festival. Four bacanora producers were presenting their agave distillate to the audience. Jose (Real de Alamos), Doctor Hernández (Mazot), Pascual (Batuq) and Felix (Rancho Tepúa) shared their process for distillation, along with the history of the tradition and what led them to produce commercially. The evening wrapped up with a talk about the sustainability of the bacanora industry by Victoria

from BRN and Gabriela from Colectivo Silvestre Sonora (CSS). I was sitting next to Camille, who was still a PhD candidate at the time. She leaned over and asked, “How many presentations about bacanora production do we have to listen to?” Following the event, the crowd milled about the bar. I was in the back of the room when I heard a friend of Gabriela’s, a student at the University of Arizona, mention off-handedly, “It’s the killers and the conservationists,” referring to the contrast between the mezcal producers and the presence of the BRN and CSS representatives discussing the unsustainability of the industry and the impacts on wild agave and the lesser long-nosed bat.

Colectivo Sonora Silvestre was founded by a group of students, now recently graduated, from the Universidad de Sonora (UNISON) in Hermosillo. Laura and Gabriela are integral members of the grassroots NGO that is partnering with BRN and BCI to promote the “Bacanora for Bats” certification program alongside the “One Million Agaves Project.” The project is part of BCI’s plan to plant one million agaves along bat migratory corridors in the US and Mexico over the next decade. An integral part of the plan is to educate local communities on the pollinator services of bats and to partner with local groups (BCI 2022) . Kendal Blust is the senior field correspondent in Hermosillo for *Fronteras.* She is an Arizona native and one of the first contacts I met when I began my fieldwork in Sonora. She has covered bat-agave conservation for the last few years. In a 2019 article titled, “One Million Agaves: Ambitious Binational Restoration to Plant Agave, Protect Bats,” Kendal interviewed Gabriela and Laura from CSS. “We can go and plant agaves, but if we don’t tell the people how important it is–that’s why we have this second objective, which is create a commitment to bat conservation with the communities in these municipalities where the agave is naturally distributed, and of course based on that, to promote

the importance of ecological restoration with agave conservation and bacanora production in Sonora…We don't want to tell [producers] what to do, but we can suggest sustainable solutions," Gabriela said. Laura spoke about the relationship between CSS and the bacanora regulatory council. "[*The consejo*] is concerned to not make mistakes. They want to help industrialize…They're also wanting to work with conservation organizations, [but] they don't have many funds. So, we usually bring our own funds. They're very concerned with marketing in the US" (Blust 2019: 1). Laura told me that often it is difficult to become involved with a government agency. In this case, *el consejo* is open to collaborate. They have invited CSS to draft a sustainability plan.

Fondo del Bacanora para el Desarrollo Sostenible, the Bacanora Fund for Sustainable Development (FOBADES), is one of the outcomes from the collaboration with the regulatory council. The aim of the project is to work with a collective of bacanora producers "who are qualified and committed to conservation and sustainability…[to raise] their awareness of the exploitation of natural resources…." (CSS 2022). The certification program, Bacanora for Bats, is part of this program. Conservationists, *el consejo* and some producers argue the benefits for members, which include pollinator gardens and living fences, as well as a sustainable seed bank, access to specialists and conferences on agro-ecology. The certification would provide marketing and advertising, a "Bats for Bacanora" label, certified by the regulatory council, on the bottle. The appeal is to protect the genetic diversity of agaves, protect the food source of the lesser long-nosed bat and increase the value of a participating producer's bacanora in the international market thus allowing producers to earn a greater profit (BRN 2022). Though the intention of the program is to support producers while helping agave and bat populations, there appears to be an

assumption that producers have land on which to plant agaves. Some producers do have land that can support agave grow outs. Many producers, however, do not have land and struggle to get their distillate even to the regional market. What are potential consequences of over-simplifying the complexities of the bacanora industry as it currently operates? Who benefits and who is left behind? Conservation NGOs like CSS, BRN and BCI are increasingly engaging in market-based incentives that support a strategy for ecological capitalism and commodification of nature (Smith 2009: 17). How are these capitalist incentives and rewards distributed throughout the community?

**Market-based Solutions: "Feeding the Beast"**

***"It's a gold rush."***
*(Jim Strand 2/9/2019)*

George Clooney, Dwayne "the Rock" Johnson, Michael Jordan, Santana, Jimmy Buffet, Nick Jonas, P Diddy, Justin Timberlake, Toby Keith, Kendall Jenner (Leffler 2021; Lytle 2021)-- These are a handful of celebrities with their own tequila brand.

The popularity and demand for agave distillates has grown in the last twenty years among consumers in more affluent countries. Termed the "Mezcal Boom," the high demand has created an important economic activity across Mexico. While benefiting those producers with the resources to export their product, the Boom also threatens the industry. As more Mexicans and foreigners enter the industry, the need for sustainable production techniques and consistent cooperation among stakeholders (e.g. conservation NGOs, land owners, consumers) is urgent

(Trejo-Salazar 2016). The current path of the mezcal industry places the future for agaves, bats and producers in peril.

Bruce, a bacanora distributor from the US, introduced me to Jim Strand one morning at a cafe across the street from the University of Arizona. Jim is co-founder of Mezcalistas, a consulting company that promotes all things mezcal related–Brand and product launch, education materials and event planning, among other services (Mezcalistas 2022). Over coffee, we discussed the development and symbolism of agave as a luxury item and status symbol. A recent cultural phenomena in the US, bars and retail are eagerly promoting the distillate to consumers. Jim provides educational materials for bars, including material on the relationship between agave distillates and pollinator bats. "Bars are obsessed with bats," he notes. "Pollination makes a huge mental impact in the bar community–What about bats? Businesses want standards, want to check a box, want a product that fits with their narrative." Bats become a proxy that represents the value of a brand. Similar to the organic movement or fair trade, bats become a marketing lever, a way to communicate to consumers the sustainability of the product. Bat conservation in the production of mezcal paints an idyllic picture for consumers. While consumers, restaurants and retail may have the best of intentions, the focus on certifications like "Bacanora for Bats" masks larger structural problems facing producers. This neoliberal restructuring of bacanora and other mezcals throughout Mexico reduces the distillate to a commodity and perpetuates an exploitative and unsustainable relationship between humans and agaves.

**The Tequila Interchange Project**

Over twenty years ago, tequila producers in Jalisco lost entire plantations of *Agave tequilana* or Weber blue agave. Producers and agronomists estimate that 25% of agaves in plantations across

tequila's denomination of origin became infected with a fungus (*fusarium oxysporum)* and a bacteria (*erwinia carotovora*) for which the plant had no defense (Trejo-Salazar 2005). Tequileros had to replant entire fields of agaves they planted as pups, clones that are genetically identical to the mother agave. Lower genetic diversity of each generation makes the plants more prone to massive die-offs from various threats, such as frosts or disease. When one agave becomes infected and perishes with *una plaga* the other plants within the monocrop also become infected and will likely perish. Monoculture and the standardization of agaves used to make mezcal threaten not only the survival of the plants but the producers who depend on these plants for their livelihoods. After the blight devastated agave stocks, some tequila producers began to heed the warnings of bat biologist, Francisco Solorzano who alerted the industry of the dangers of propagating using only clones (Nairn 2018).

Dr. Francisco Solorzano co-founded the nonprofit, Tequila Interchange Project (TIP), with Adrián Ortiz, mezcalero and restaurateur. These men advocate sustainable practices in the agave distillate industry. The "Bat-Friendly Tequila Project" asks participating producers to allow 5% of agaves in one hectare (approximately 220 plants) to flower. These flowering agaves will feed about 90 bats per night (Arias 2017). The cost of operation requires raising funds to expand the scope and scale of the effort. Similar to "Bacanora for Bats," the project requires assistance from the global market to address the crisis facing agaves, bats and producers. TIP seeks funding from consumers, bartenders and retailers who want to help improve the future of the tequila industry. In order to do this, TIP asks for money to help hire students to visit agave monocrops to verify that producers are allowing a small percentage of agaves to flower in their fields. TIP also encourages continued education of bartenders, suggesting ideas like the promotion of a bat-

friendly cocktail where part of profits are donated to TIP or hosting a fundraising event where customers can donate money to the program (Arias 2017).

**Bacanora for Bats**

"Bacanora for Bats" follows in the footsteps of TIP, a market-based conservation approach. What are the possibilities and constraints of relying on the market? I met many stakeholders who believe that the influence of the market is here to stay, so working with consumers will provide the most benefit for local communities. While discussing the subject with Victoria  one morning at the nursery, she scoffed "What is up with TIP? I see no impact whatsoever." How would Bacanora for Bats be different?

In another article written by Kendal Blust, titled, "For Ancestral Sonoran Spirit Bacanora, Conservation Is The Future" (2021), Kendal expands on the idea of a certification for brands that adhere to the FOBADES requirements. A survey conducted by CENKO, a network of conservation NGOs in Sonora, stated the impact of a sustainability stamp on bottles that could increase their value by upwards of 15%. The regulatory council would administer the certification to provide government support and add legitimacy to the "Bacanora for Bats" branding. Kendal interviewed Victoria  for her story, "There's been a lot of work that hasn't been super successful for regulating tequila partly because the industry doesn't want to change…But with bacanora, you really have the opportunity to get this stuff off the ground early" (Blust 2021: 1). One of the few producers on board with the program has committed to leaving some agaves to flower. "The other night I was sitting on the porch, and you could see a ton of bats out there,

and it's like, wow, then this is really working already," he said. "It gives you a sense of pride, and it makes you want to keep going" (Blust 2021: 1).

The regulatory council has suggested incorporating sustainable production as part of bacanora's denomination of origin, which regulates how and where bacanora can be made. Victoria agrees that there is great potential to include bat-friendly bacanora. She argues for the need to draft a conservation plan woven into the D.O. Unfortunately, a bat-friendly label is not available to most small scale producers. It requires land and the resources to invest in growing agaves. With such barriers, the mezcal of smaller producers will be seen as less "valuable" in the wider consumer market. Bacanora for Bats reinforces the narrative of sustainability and the "win-win-win" for bats, agaves and mezcaleros. However, only producers with the resources to participate will brand their bacanora as sustainable making it more attractive to consumers. The FOBADES management plan illuminates the importance of agaves and bat conservation that also benefits the bacanora industry, yet glosses over the uneven access to land and resources and the inequalities this certification may exacerbate.

Adopting the language of environmental stewardship sells a moral economic fetish and follows the neoliberal economic emphasis on individual empowerment ( 2014). While processes of neoliberalism unfold differently across the globe, it is currently non-state actors, in this case conservation NGOs, who frequently drive policy, often promoting market-based solutions. One consequence of this market-based policy is often to provide access to more powerful players while disenfranchising smaller players (Shore 2011: 124). Neoliberal global capitalism maintains spaces of inclusion and exclusion that can be obscured by conservation policy. "Bacanora for

Bats," in its current manifestation disregards these discrete processes that exclude, perhaps unintentionally, more marginalized producers from accessing the market.

Jose and Maria, producers from Alamos believe that *gringos* (namely NGOs) think "bat-friendly" is achievable. "They are not connected to reality on the ground," Maria told me. "Producers are just trying to survive. There is not much incentive for bat friendly bacanora certification." Sarita and Wuicho, who are involved with small-scale production in Rosario, argue that "Bats for Bacanora" benefits land owners. They have little faith in government-supported certification. "Who will regulate and monitor? El consejo?" Sarita scoffed.

**Local-global Interconnections**

Contemporary NGOs cannot be understood outside the political economy. The dominant conservation paradigm is often criticized for condensing complexity through simplified systems of representation. Alternatives to the dominant social conditions that perpetuate our current socio-ecological crises are those that are regenerative, participatory, multigenerational, and grounded in social justice and equity (Marshman 2019: 92). How do we develop structures based upon the values of community empowerment? Improving relationships across the border takes time to find common ground, cultural understanding and shared goals based on equitable solutions. Who has a voice? Who has access to natural resources? Before NGOs move forward with conservation projects, it is important to determine the local values, beliefs, attitudes and knowledges in the location where the project will occur (if it should occur at all). It is important to identify dominant ideologies and environmental ethics written into policy and informing decision-making power. When we acknowledge diverse cross-border knowledges at the local level, we are in a better position to build bridges that lead to different possibilities for

conservation. Like the potential within a seed, authentic cross-border, multi-scalar partnerships have the potential for environmental stewardship that protects human and more-than-human communities.

**References**


Arias, Zulena. 2017. "Bat-Friendly Tequila and Mezcal Pilot Project." Tequila Interchange Project and Universiada Nacional Autónoma de Mexico.

Arizona Fish and Game. 2022. "Bat Conservation and Management." https://www.azgfd.com/wildlife/speciesofgreatestconservneed/bats/. Accessed 7/14/22/

Bats Conservation International. 2022. "Planting the Future." https://www.batcon.org/article/planting-the-future/. Accessed 7/14/22

Bats Conservation International. 2022. "Agave Restoration: Restoring Agave for Nectar-feeding Bats." https://www.batcon.org/our-work/protect-restore-landscapes/agave-restoration/. Accessed 7/14/22.

Besky, Sarah. 2014 *The Darjeeling distinction: Labor and justice on fair-trade tea plantations in India*.. Univ of California Press.

Blanchard, Libby, Chris Sandbrook, Janet Fisher, Bhaskar Vira. 2018. "Investigating the Consistency of a Pro-market Perspective Amongst Conservationists." IN *The Anthropology of Conservation NGOs.* Eds. Larsen and Brockington. Palgrave Studies in Anthropology and Sustainability. 2018: 151-180.

Blust, Kendal. 2019. "One Million Agave: Ambitious Binational Restoration Plan To Plant Agave, Protect Bats." *Fronteras, KJZZ.* https://fronterasdesk.org/content/1251436/1-million-agave-ambitious-binational-restoration-plan-plant-agave-protect-bats

Blust, Kendal. 2021. "For Ancestral Sonoran Spirit Bacanora, Conservation Is The Future." *Fronteras, KJZZ. https://fronterasdesk.org/content/1689558/ancestral-sonoran-spirit-bacanora-conservation-future.* Accessed 7/17/22.

Borderlands Restoration Network. 2022. "Native Plant Program." https://www.borderlandsrestoration.org/native-plant-materials-893735-937712.html. Accessed 7/14/22.

Borderlands Restoration Network. 2022. “Borderlands Restoration L3C.” https://www.borderlandsrestoration.org/borderlands-restoration-l3c.html. Accessed 7/14/22.

Brechin, Steven. 2018. “Returning Greater Integrity to the Conservation Mission in a Post-Neoliberal World.” IN *The Anthropology of Conservation NGOs.* Eds. Larsen and Brockington. Palgrave Studies in Anthropology and Sustainability, 245-250.

Cazares-Kelly, Gabriela. 2018. “Three Things to Keep Me from Rolling My Eyes at Your White Privilege.” Colorlines. April 26, 2018. https://www.colorlines.com/articles/3-things-keep-me-rolling-my-eyes-your-white-privilege. Accessed 7/17/22/

CMP. 2020. “Open Standards for the Practice of Conservation.” Conservation Measures Partnership.https://www.conservationmeasures.org/CMP-Open-Standards-for-the-Practice-of-Conservation-v4.0.pdf

Colectivo Silvestre Sonora (CSS). 2022. “Proyecto FOBADES.” CENKO. https://www.cenko.org/colectivosonorasilvestre?lang=en. Accessed 7/17/22.

Gómez-Ruiz, E.P., J. Jimenez, J. Flores-Maldonado, T.E. Lacher, J.M. Packard. 2015. “Conservación de Murciélagos Nectarívoros en Riesgo en Coahuila y Nuevo Leon. *Therya* 6(1): 89-102.

Gómez-Ruiz E.P., Lacher T.E. 2019. “Climate Change, Range Shifts, and the Disruption of a Pollinator-Plant Complex.” *Scientific Reports*. 9(1): 14048.

Hartigan, John. 2014. “Plant Publics: Multispecies Relating in Spanish Botanical Gardens.” *Anthropological Quarterly,* 88(2): 481-507.

Hodgson, Wendy. 2013. “PreColumbian Agaves: Living Plants Linking an Ancient Past in Arizona.” In *Explorations in Ethnobiology: the legacy of Amadeo Rea.* Marsha Quinlan and Raya Lepofsky, eds. Society of Ethnobiology: 101-131.

Larsen, Peter and Dan Brockington. 2018. *Anthropology of conservation NGOs*. Springer Verlag.

Leffler, Samantha. 2021. “Tequila Brands Owned by Celebrities: See Labels from Dwayn Johnson, Nick Jonas and More.” US Food. https://www.usmagazine.com/food/pictures/celebrity-owned-tequila-brands-photos/deleon-tequila/

Lewis-Jones, Kay. 2016. “People and Plants.” *Environment and Society,* 7:1-8.

Lytle, Mary. 2021. “Six Celebrity Tequilas Worth Trying.” ABC Fine Wine & Spirits. https://www.abcfws.com/celebrity-tequilas. Accessed 7/17/22.

Marshman, Jennifer. 2019. “Communing with Bees: A Whole-of-Community Approach to Address Crisis in the Anthropocene.” *Journal of Agriculture, Food Systems, and Community Development,* 9(suppl 1): 87-110.

Mezcalistas. 2022. “Consulting.” Mezcalistas. https://www.mezcalistas.com/consulting/. Accessed 7/17/22.

Megdal, Sharon B., and Christopher A. Scott. 2011. "The importance of institutional asymmetries to the development of binational aquifer assessment programs: The Arizona-Sonora experience." *Water* 3(3): 949-963.

Nairn, Carly. 2018. “Conservationists and Tequila Producers Team Up to Save Bat Species.” *Sierra,* www.sierraclub.org/sierra/tequila -boosting-bats-out-of-Danger.

Northern Territory Government. 2022. “Legacy Mines.” https://industry.nt.gov.au/industries/mining-and-energy/mine-rehabilitation-projects/legacy-mines#:~:text=Legacy%20mines%20. Accessed 7/17/22.

Patagonia Area Resource Alliance (PARA). 2019. “Patagonia Mountains in Arizona: Part of the Madrean Pine Oak Woodlands.” www.PatagoniaAlliance.org (pamphlet).

Office of Legacy Management. 2021. “LM Partners with Bat Conservation International to Safeguard Bat Habitat.” US Department of Energy. https://www.energy.gov/lm/articles/lm-partners-bat-conservation-international-safeguard-bat-habitat. Accessed 7/17/22.

Rogers, Camille. 2020. “Six Reasons Why Bats Aren’t Enemies: They Help Make Tequila, and Other Surprising Facts You May Not Know.” *CNN: Space + Science,* June 14, 2020.

Shamir, E., Tapia-Villaseñor, E. M., Cruz-Ayala, M. B., & Megdal, S. B. 2021. “A review of climate change impacts on the USA-Mexico transboundary Santa Cruz River Basin.” *Water 13*(10): 1390.

SheriRay, Michael. 2016. “Boundary Plants, the Social Production of Space, and Vegetative Agency in Agrarian Societies.” *Environment and Society: Advances in Research,* 7(1): 29-49.

Shore, Chris. 2011. Studying Governance: Policy as a Window into the Modern State. In: *Policy Worlds: Anthropology and Analysis of Contemporary Power.* Shore, Wright and Pero, eds. Berghan Books.

Smith, N. 2009. “Nature as an Accumulation Strategy.” *Socialist Register,* 46: 16–36. Retrieved from https://socialistregister.com/index.php/srv/article/view/5856

Smuts, Rowena. 2010. *Are Partnerships the Key to Conserving Africa’s Biodiversity?Four Partnership Case Studies Between Mining Companies and Conservation NGOs.*

Conservation International and USAID. https://www.cbd.int/impact/case-studies/cs-impact-USAID-africa-mining-conservation-en.pdf. Accessed 7/17/22.

South 32. 2022. "Hermosa Mine." https://www.south32.net/our-business/exploration-projects/hermosa. Accessed 7/17/22.

Southwestern Research Station. https://www.amnh.org/research/southwestern-research-station/about. Accessed 7/17/22.

Tampa Bay Times. 2005. "Agave Disease Sobers Tequila Industry." Archive, Tampa Bay Times. https://www.tampabay.com/archive/1999/06/19/agave-disease-sobers-tequila-industry/#:~:text=A%20fungus%20known%20as%20fusarium,through%20drought%20and%20intense%20heat. Accessed 7/17/22.

Trejo-Salazar, Roberto-Emiliano, Luis E. Eguiarte, David Suro-Piñera, Rodrigo A. Medellín. 2016. "Save Our Bats, Save Our Tequila: Industry and Science Join Forces to Help Bats and Agaves." *Natural Areas Journal*, 36(4): 523-530.

Tsing, Anna Lowenhaupt. 2015. *The Mushroom at the End of the World*. Princeton University Press, 2015.

Ulaby, Neda. 2017. "Bats and Tequila: Once a Boo-tiful Relationship Cursed by Growing Demands." NPR: Food for Thought. https://www.npr.org/sections/thesalt/2017/10/29/560292442/bats-and-tequila-a-once-boo-tiful-relationship-cursed-by-growing-demands. Accessed 7/17/22.

# CHAPTER 6

# CONCLUSION: BLURRED EDGES

***"The agave poses all these questions that just sort of forces us to look at plants and people differently."***
(Leah Bailey)

***"Sonora querida, tierra consentida de dicha y placer…donde el bacanora enciende pasión."***
**(Sonora dear, spoiled land of happiness and pleasure…where the bacanora ignites passion.)**
(Corrido regional, "Sonora Querida")

It was close to midnight when the procession began. The band was positioned on a small flatbed trailer pulled by an old pickup truck. The snare drum kicked off the first song. The crowd behind the band let out an elongated *grita,* the distinctive shout, a burst of emotion common in Mexican mariachi music. "Ay, Sonora!" It was the end of the first night at the International Bacanora Festival in el pueblo Bacanora. Producers had packed up their displays and the scheduled events had come to a close. The truck began to move, pulling the trailer of musicians. The crowd slowly followed behind, singing loudly and joyfully along with the band. The truck moved at a snail's pace. The crowd was thick. Many carried bottles of bacanora that they tipped toward any empty glass. The shouting, singing and laughing continued as the band rounded a corner. Bacanora producers, formal and informal, from pueblos across the denomination of origin, shared mezcal with members from *el consejo* and *las chicas* from *Colectivo Sonora Silvestre*. Creeping along the cobblestone with cool dark skies overhead, there was no hurry.

**Bat-Agave-Human Sites of Potential**

El maguey provides the fabric that weaves this interspecies story together, so we might peer more deeply into the socially-produced geographies in the Sonora-Arizona borderlands. The blending and colliding of ontologies in the desert borderlands defy simplistic dualistic thinking. What do the desert borderlands look like when we consciously challenge the binary of human-nature systems (or binary nomenclature for that matter) and instead recognize the multilayered plurality of these biocultural landscapes? Through conscious "co-world-making" we become more attuned to the contexts of multispecies entanglements that shape landscapes and interactions (Van Dooren and Rose 2012; Houston and Hillier 2018: 194). Entanglements among bats, agaves, and humans in the Sonora-Arizona borderlands illustrate the complexity of transnational linkages and the importance of bridging ways of knowing for a better understanding of these complex relationships.

In their book, *This Bridge Called My Back: Writings by Radical Women of Color*, Moraga and Anzaldúa describe *nepantleras*, a Nahuatl word meaning "those who inhabit spaces between worlds" as *seres puentes*, bridge beings that connect fluid and fragmented landscapes (2002:19). Lesser long-nosed bats, pregnant females migrating across physical and metaphorical landscapes to feed upon flowering agaves, act as *seres puentes* to provide a deeper understanding of dynamic connections across borders. These bridge beings help us examine the processual assemblages in these borderlands, assemblages of local-global articulations, assemblages of cultural and political marginality (Tsing 1993). Bats as bridges, as imaginative constructs that beckon wider cultural negotiations to the center of local affairs, help illustrate the cultural complexities and historical impacts of larger political and economic systems in Mexico and the

US. “Bacanora for Bats,” the adoption of market-based solutions to environmental issues, for example, places economic valuation on complex social-ecological systems.

The lesser long-nosed bat and her *comadre,* Abuela Maguey, remind us that sites of potential exist everywhere. Co-evolving partners over millions of years, the mammal and the succulent have adapted together, evolved for mutual benefit. The procession at the International Bacanora Festival was  a site of potential, a reminder. Everybody gathered together–producer, consumer, the state, the NGO–setting aside their discrepancies for the night to celebrate culture, tradition, history, *y la tierra,* the earth with its rocky soils well-suited for agave angustifolia. The trick is to hold on to that camaraderie when the band stops playing and the procession ends. What can we learn from bats and agaves about establishing and maintaining relationships of mutual benefit, relationships rooted in fairness and justice across boundaries?

Within dominant regimes of capitalism and conservation in these borderlands and beyond, what are the possibilities for multispecies fairness and justice? Sophia Chao argues that multispecies justice is inherently place-based and exists at the local level. “Multispecies justice,” she writes, “calls for a structural move away from top-down environmental practices and their substitution with community-led forms of restoration, management, and conservation that are anchored in traditional ecological knowledge and Indigenous science” (Chao 2021: 30). Haraway suspects that multispecies justice is inherently speculative and future-oriented (2016: 3). Bat-agave-human entanglements, like all multispecies entanglements, are continuously participating in co-world-making. When we remove humans from center stage and make room for other beings, we can explore the messy multispecies entanglements that illuminate various ways of knowing. We

can explore the challenges and opportunities for collaborative work occurring across boundaries, both physical and symbolic. There are borders and boundaries, but the closer we look the more blurred the edges become.

**References**


Chao, Sophie. 2021. "Can There Be Justice Here? Indigenous Perspectives from the West Papuan Oil Palm Frontier." *Borderlands,* 20(1): 11-48.

Haraway, Donna. 2016. *Staying with the Trouble: Making Kin in the Chthulucene.* Durham, N.C.: Duke University Press.

Houston, Donna and Jean Hillier. 2018. "Make Kin, Not Cities! Multispecies Entanglements and 'Becoming-world' in Planning Theory." *Planning Theory,* 17(2): 190-212.

Moraga, C., & Anzaldúa, G. (Eds.). 2021. *This bridge called my back: Writings by radical women of color*. Suny Press.

Rose, D.B. et al. 2012. "Thinking Through the Environment, Unsettling the humanities." *Environmental Humanities* : 1-5.

Shore, Chris and Susan Wright. 2011. Introduction: Conceptualizing Policy: Technologies of Governance and the Politics of Visibility. In *Policy Worlds: Anthropology and Analysis of Contemporary Power*. Shore, Wright and Pero, eds. Berghahn Books. 1 – 21.

Tsing, Anna. 1993. *In the realm of the diamond queen: Marginality in an out-of-the-way place.* Princeton University Press.

Van Dooren, T., & Rose, D. B. 2012. Storied-places in a multispecies city. *Humanimalia*, *3*(2), 1-27.

Wilson, Matthew W. 2009. Cyborg geographies: Towards hybrid epistemologies. *Gender, Place and Culture,* 16(5): 499-516.

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