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Tucson, Arizona

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SOCIETY OF ETHNOBIOLOGY

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Bienvenido a Tucson

The annual conference of the Society of Ethnobiology is an opportunity to disseminate research, learn about field methodologies, and connect with fellow scholars. Ethnobiology is a diverse field that is inclusive of anthropology, archaeology, botany, ecology, linguistics, natural history, nutrition, pharmacology, zoology, to name just a few. Across the range of disciplines, the Society of Ethnobiology embraces non-Western, native, and indigenous scholars as vibrant members of our research community.

This year's conference is hosted in Tucson, Arizona, and is sponsored by four units of the University of Arizona: School of Anthropology, Arizona State Museum, Southwest Center, University of Arizona Press, as well as the Arizona-Sonora Desert Museum, and Native Seeds/SEARCH.

Have questions or comments about the meeting? Organizing Committee members have blue ribbons on their name tags.

Conference Coordinator: Elizabeth Olson

Organizing Committee: Michael Diehl
Suzanne Fish
Jesús García
Sharlot Hart
Melissa Kruse-Peebles
Lela Scott MacNeil
Letitia McCune
Paul Minnis

Volunteers: Jay Allen, Elizabeth Eklund, Paul Fish, Patricia Gilman, Sharlot Hart, Anna Jansson, Sarah Lee-Allen, Nicole Mathwich, Laurie Monti, Rebecca Renteria, and Meredith Wismer-Lanoe

About The Society of Ethnobiology

The Society of Ethnobiology is a nonprofit professional organization dedicated to the interdisciplinary study of the relationships of plants and animals with human cultures worldwide, including past and present relationships between peoples and the environment. Our interests encompass ethnobotany, ethnozoology, linguistics, paleoethnobotany, zooarchaeology, ethnoecology, and other related areas in anthropology and biology. We are committed to scholarly research and to inclusive relationships with communities with whom we work and with colleagues around the world. The Society of Ethnobiology hosts an annual conference with field trips, and offers three peer-reviewed publications: the *Journal of Ethnobiology*, a professional journal with two issues per year, *Contributions in Ethnobiology*, a digital monograph series, and *Ethnobiology Letters*, a digital publication for short contributions. We award excellence in ethnobiological research through our Distinguished Ethnobiologist Award, and Best Poster Award, and also recognize student research excellence through the Barbara Lawrence Award and the Undergraduate Ethnobiologist Award.

Want to know more about the Society? Officers have white ribbons on their name tags.

Society Officers

President	Scott M. Herron
President-Elect	Cynthia T. Fowler
Treasurer	Denise Glover
Secretary	Karen Park
Board Members	Chelsey Armstrong
	James R. Welch
	Daniela Shebitz
	Janelle Marie Baker
	Ray Perotti
	Elizabeth A. Olson
	Steve Wolverton

2016 Distinguished Ethnobiologist Award



We are honored to announce Dr. Gary Paul Nabhan as the 2016 Distinguished Ethnobiologist. Here are some of the things that the nomination letters said about him: "Gary is one of the most distinguished and widely recognized ethnobiologists in the world. He is regarded as the 'father of the local food movement' (*Utne Reader*) and has had his work featured in the *New York Times*, *Time Magazine*, *Mother Earth News* and many other popular outlets... Gary's contributions to SOE have been numerous and long-standing. He was lead author on an important article in the first issue of *the Journal of Ethnobiology*, was an original member of the editorial board...Gary has attended nearly every SOE conference, was an organizer of both the 3rd and 13th annual conferences in Arizona, and delivered the keynote address at the 2013 conference."

Gary has worked for almost five decades in applied ethnobiology to help facilitate socially-just environmental movements. As noted on Gary's blog, he was among the earliest researchers to promote native foods in preventing diabetes, especially in his role as a co-founder and researcher with the nonprofit Native Seeds/SEARCH. Gary is Director of the new Center for Regional Food Studies at the University of Arizona. His newly edited anthology, *The Future of Ethnobiology*, will be released the week of the annual conference and includes collaborations with individuals from many different cultures and disciplines. As Brother Coyote, he is a professed brother in the Order of Ecumenical Franciscans. He keeps an orchard of heritage fruit trees in Patagonia Arizona.

2016 Student Fellowship Awards



Ecological Knowledge Research Fellow Alex McAlvay is a Botany Ph.D. student in Dr. Eve Emshwiller's lab at the University of Wisconsin-Madison. He became passionate about traditional plant management while studying Biology and Anthropology at Western Washington University. Since his undergraduate years, he has worked to promote the continuity of traditional ecological knowledge with the Huichol Center for Cultural Survival and Traditional Arts, Herbal Anthropology Project, Common River, and other non-profit organizations. The Ecological Knowledge Research Fellowship will support Alex's transportation, interviews, and herbarium collections in the Mexican states of Oaxaca and Puebla. His dissertation focuses on the formation of new ecological knowledge around introduced plants and the evolutionary implications of these new relationships for the plants. Specifically, he studies the interactions between seven highland Mexican cultures and (delicious) introduced feral field mustard (*Brassica rapa*).



Indigenous Ethnobiologist Fellow Jessica Orozco is a Ph.D. student at the Rancho Santa Ana Botanic Garden through Claremont Graduate University. As an Indigenous graduate student in Botany, her research interests lie in the floristics of the California flora; she is currently completing a floristic study in the southern Sierra Nevada. Other research interests include studying the relationships between people, culture and plants and how anthropogenic forces have influenced plant selection and distribution of species. For her Ph.D. project, Jessica is interested in investigating how Indigenous peoples' use and trade of *Salvia columbariae* has effected its distribution. The trading and selection of *S. columbariae* seeds among tribes in North America could have expanded its current distribution into regions not previously occupied. Jessica is investigating genetic signatures of plants throughout this species' geographic distribution, in a range of habitats, and in relation to known trajectories of human transport in order to try to reconstruct patterns of anthropogenic long-distance dispersal.



Urban Ethnobiology Fellow Diana Chen is a Ph.D. student in the Environmental Dynamics program at the University of Arkansas in Fayetteville. Diana's research interests include Urban Ethno-biology, Native American Ethnobiology, Deep Ecology, and Food Studies. Her research proposal is for an ethnographic study of foodways in the burgeoning Marshallese community in the relatively small mid-South city of Springdale, Arkansas. Studies of food and culture have become immensely popular among both academics and the general public. However there is not yet a work of this sort for the Republic of the Marshall Islands (RMI) or its related communities even though global change threatens to submerge the RMI within this generation. Diana's research seeks to explore how knowledge of traditional Marshallese foodways is conserved or transformed by immigration to Springdale, and to preserve this knowledge for future generations of Marshallese people.



The 2016 Undergraduate Ethnobiologist Award goes to Lindsie Linaburg, a senior in the ethnobotany program at Frostburg State University. She is committed to course-related applied ethnobiology projects in Cherokee, NC, Maryland, and New Zealand. Lindsie's enthusiasm impressed the committee along with her expressed interest in being a long-term Society member. Lindsie will sit on our Board as an appointed "Student Advisor." We look forward to working with Lindsie!

Meeting Summary

WEDNESDAY

- 9:00-3:00 **Board Meeting**, Haury Building, Room 215
- 9:00-3:30 **Workshop 1: Introduction to Community Seed Banking and Seed Libraries.** Native Seeds/SEARCH Conservation Center, 3584 E. River Rd. Transportation from Aloft to the Conservation Center will be provided at 8:45.
- 1:00-4:00 **Workshop 2: Innovative Teaching in Ethnobiology.** Haury Building Room 212.
- 5:00-9:00 **Reception for *New Members and First Time Registrants/Native Seeds/SEARCH Open House.*** The Society is holding a special reception for new members and people who have registered from our annual meeting for the first time. This is a chance to meet other new members and the Society's officers. It is being held at Native Seeds/SEARCH's conservation facility, 3584 E. River Road. A bus will shuttle people from Aloft to the venue starting at 4:45 and ending at 9:00.
- 6:00-9:00 **General Reception and Native Seed/SEARCH Open House.** The traditional opening reception is a chance to register or pick up registration packets, meet friends, and view Native Seed/SEARCH's conservation facility, 3584 E. River Road. A bus will shuttle people from Aloft to the venue starting at 4:45 for the new member/first-time registrants reception and 5:45 for the regular reception and ending at 9:00.

THURSDAY

- 8:15-8:45 **Welcoming Session.** Harvill Hall Room 150
Welcome by Provost Andrew Comrie
Comments by Organizing Committee
- 9:00-12:00 **Presentation Sessions,** Harvill Hall
- | | |
|---------|--|
| Rm. 102 | First Farmers, First Farms: Landscape Ecology of the Early Neolithic |
| Rm. 115 | The Historical Ecology of Cultural Keystone Places of the Northwest |
| Rm. 210 | Multiscales of Human Interaction with Aquatic Environments; Pedagogy |
| Rm. 204 | Ethnobotany 1 |

- 12:00-1:00 **Arizona State Museum Collection Tours.** Small groups of up to 10 will be shown two collections: basketry and zooarchaeology. There will be two tours each day, one for each collection. Sign up is on a first registered-first served basis. An individual can do only one tour until there are openings. Meet in the Museum lobby. Visits to the ASM's Conservation Lab are also available; see the registration desk for details.
- 12:00-1:00 **Student/Mentor Lunch.** University of Arizona Student Union, Ventana Room. Pre-registration required.
- 1:30-5:00 **Presentation Sessions,** Harvill Hall
- | | |
|---------|---|
| Rm. 102 | Foraging Theory, Zooarchaeology, and Archaeobotany |
| Rm. 210 | Landscapes Management and Agriculture |
| Rm. 101 | Ethnobiology Ethics Lab; Ethnobiology in the National Parks |
| Rm. 204 | Ethnobotany 2 |
- 5:00-6:30 **Student Get Together.** University of Arizona Student Union, Ventana Room. The University of Arizona Anthropology Graduate Students and SoE Student Caucus invite all students for an informal get together before the public talk. Light food and beverages will be provided.
- 7:00-8:30 **Public Event: "Indigenous Lessons for the Future."** Social Sciences Room 100. This conversation features Gary Nabhan, Jesús García, Nancy Turner, and Verna Pepeyl Miller. After the event, Gary Nabhan will have a book signing for his latest volume, *Ethnobiology for the Future*.

FRIDAY

- 9:00-12:00 **Presentation Sessions.** Harvill Hall.
- | | |
|---------|--|
| Rm. 210 | Zooarchaeology of the American Southwest and Northwest Mexico: New Pathways and Future Directions 1 |
| Rm. 115 | Birds as Relationships: An Ethno-Ornithology of Reciprocity 1 |
| Rm. 204 | Archaeobotany |
| Rm. 101 | Conceiving Venomousness; Talking Past One Another: The Place of Ethnobiology in "Multi-Species Turn" |
- 12:00-1:00 **Arizona State Museum Collection Tours.** Small groups of up to 10 will be shown two collections: basketry and zooarchaeology. There will be two tours each day, one for each collection. Sign up is on a first registered-first served basis. An individual can do only one tour until there are openings. Meet in the Museum lobby. Visits to the ASM's Conservation Lab are also available; see the registration desk for details.

- 1:30-3:45 **Presentation Sessions**
- | | |
|---------|---|
| Rm. 210 | Zooarchaeology of the American Southwest and Northwest Mexico: New Pathways and Future Directions 2 |
| Rm. 115 | Birds as Relationships: An Ethno-Ornithology of Reciprocity 2 |
| Rm. 102 | Ethnozoology |
| Rm. 204 | Medicine |
- 3:30-4:15 **Poster Session.** Harvill Hall Room 150. Poster will be displayed during the entire meeting with authors present to discuss their posters at this time.
- 4:15-5:30 **General Meeting.** Harvill Hall Room 150. General business meeting and award presentations.
- 7:00-9:00 **Banquet.** Janos Wilder, the premier chef in Tucson and a James Beard awardee, has adapted local and indigenous ingredients in an innovative cuisine. This promises to be a memorable meal, and Janos has agreed to discuss his cooking with the diners. To be held in Carriage House, 146 Broadway. The bus will leave Aloft starting at 6:15. The restaurant is located along Tucson's new streetcar route which links Aloft, UA campus, and downtown.

SATURDAY

General Note: There are two ½ day fieldtrips on Saturday timed so participants can do one or both.

- 8:15-1:00 **Morning Fieldtrip: Arizona-Sonora Desert Museum.** Bus boards from Aloft hotel at 8:15. The bus will return to Aloft, leaving the museum at 12:30. Pre-registration required.
- 1:30-6:00 **Afternoon Fieldtrip: Tohono O'odham and Hispanic Landscapes of Tucson.** The bus boards from Aloft hotel at 1:30 and return to Aloft around 6:00. Pre-registration required.

Presentation Schedule

(Note that presenters with an asterisk are being considered for the Barbara Lawrence Award)

THURSDAY MORNING

First Farmers, First Farms: Landscape Ecology of the Early Neolithic

Room 102 Organized by Gillreath-Brown and Bocinsky; moderated by Gillreath-Brown

9:00 *Bellorado, Benjamin

What We're Missing in the Models: How Experimental Methods Can Change the Way We View Early Neolithic Farmscapes in the Ancient Southwest

9:15 Schroeder, Sissel, Samuel Munoz

Farmland, Forest, and Floods in the Cahokia Area, Illinois

9:30 Collins, Shawn

Changing Socioecologies on the Prehispanic Pacific Slope of Guatemala

9:45 Mink, Philip, Alan Sullivan

"Food Fires:" Initial Estimates of the Yield and Sustainability of Ruderal Production by Anthropogenic Burning

10:00 Marston, John

Woodland Ecology and Wood Fuel Use in the Epipaleolithic and Early Neolithic Fayum, Egypt

10:15 break

10:30 Sandor, Jonathan, Jeffrey Homburg

Anthropogenic Soil Change in Ancient and Traditional Agriculture

10:45 Dominguez, Steven

Let Them Plant Their Own: Implications of Interactive Crop-Loss Processes during Drought in Hopi Maize Fields

11:00 Hanselka, Kevin, Brian King

Water and Prehistoric Agriculture near the Ocampo Caves, Tamaulipas: Integrating Archaeological and Geospatial Applications

11:15 *Gillreath-Brown, Andrew

An Applied Geospatial Soil Moisture Model: Investigating Agricultural Field Locations and Proximity to Puebloan Villages in the Central Mesa Verde Region, Southwestern Colorado

11:30 Varien, Mark

The Pueblo Farming Project: Investigating the Agrarian Ecology of the Mesa Verde Region

11:45 d'Alpoim Guedes, Jade, Kyle Bocinsky

Constructing Agricultural Frames of Reference: An Example from Highland Southwest China

The Historical Ecology of Cultural Keystone Places of the Northwest

Room 115 Organized by Lepofsky, Armstrong, and Savo; moderated by Lepofsky

- 9:00 Mathews, Darcy
Gardens for the Living and the Dead: Coast Salish Funerals and the Production of Blue Camas
- 9:15 Armstrong, Chelsey Geralda, Dana Lepofsky, Leslie Main Johnson, Nancy Turner
Village Life at Dalth Gyilakyaw: A Cultural Keystone Place for the Gitsm'geelm, Tsimshian
- 9:30 Main Johnson, Leslie
Relationships to Land over Time in the Traditional Knowledge of Gitksan and Witsuwit'en, Northwestern British Columbia
- 9:45 *Toniello, Ginevra, Dana Lepofsky, Kirsten Rowell
Ancient Clam Gardens and Ecological Enhancement on Northern Quadra Island, BC
- 10:00 Savo, Valentina, Dana Lepofsky, Jennifer Carpenter, Nick Hedley, Community of Bell Bella
Impacts of Climate Change on the Cultural Keystone Places of the Heiltsuk of Central British Columbia, Canada
- 10:15 break
- 10:30 *Jackley, Julia, Dana Lepofsky, Nancy Turner, Jane Carpenter
Mountain Top to Ocean Floor: The Eco-Cultural History of Hauyat
- 10:45 Spalding, Pamela
Cultural Keystone Places and Landscapes as Pathways to Reconciliation on Southern Vancouver Island, BC, Canada
- 11:00 Turner, Nancy
"Just Like a Paradise": Salmon River Estuary, Shuswap Lake, as a Cultural Keystone Place
- 11:15 Discussion

Multiscales of Human Interaction with Aquatic Environments

Room 210 Organized and moderated by Quintana Morales

- 9:00 Oberndorfer, Erica, Todd Broomfield, Carol Gear, Jeremy Lundholm, Gita Ljubicic
The Big but Not Empty Land: Ecological Footprints of Fishing Practices Near the Inuit Community of Makkovik (Nunatsiavut, Canada)
- 9:15 Davis, Brittany
Diving for Knowledge: Scuba Divers, Fishers, and Coral Reefs
- 9:30 Johnson, Jennifer Lee
Between Wet and Dry/Between Life and Death: Fishwork, Colonial Control and Transformations in the Littoral Ecology of Disease
- 9:45 Quintana-Morales, Eréndira
Fishing on the Eastern African Coast in the Space-Time Continuum
- 10:00 Klokler, Daniela
Fish Otoliths from Brazilian Shell Mound Sites: More than a By-Product of Fishing
- 10:15 Discussion

Pedagogy

- Room 210** Moderated by Glover
- 10:45 Glover, Denise
Dog and Cats and Things that Grow: Ethnobiological Pedagogy with College Freshman
- 11:00 Gendron, Fidji
How to Bring Traditional Knowledge in Science Courses
- 11:15 Newberry, Teresa
TOCC Plant Atlas: A Tool for Preserving Biocultural Diversity
- 11:30 Veteto, James R.
Permaculture as Ethnoecological Design Science at the Appalachian Institute for Mountain Studies
- 11:45 Discussion

Ethnobotany 1

- Room 204** Moderated by Stepp
- 9:00 Herron, Scott, Roger LaBine
Retracing the Canoe Trail of Nanabozho: Wild Rice Reemergence in Michigan after a Decade of Ecocultural Restoration
- 9:15 Pool, Marilen, Christina Bisuka, Nancy Odegaard
The Use of Plant and Insect Exudates in the American Southwest
- 9:30 Hamersley Chambers, Fiona
The 'Lost' Berry Gardens: First Nations' Plant Cultivation on British Columbia's Northwest Coast
- 9:45 Lloyd, T. Abe
Wild Rice: The Curious Case of Aboriginal Grain Use in the West
- 10:00 *Anderson-Fung, Puanani
Holistic Reconstruction of the Polynesian Ake/a`e Scented Hardwood, Mostly Plant Name Group with Help from Horatio Hale
- 10:15 break
- 10:30 Castle, Lisa
Prairie Turnips at 15: A Good Model Goes Bad
- 10:45 Roskruge, Nick, Rodrigo Estrada de la Cerda
The Relationship of Maori to Kūmara or Sweetpotato
- 11:00 Bye, Robert, Edelmira Linares
Arí of Mexico - "...It Is No More Strange than Bird's-Nests Soup..."
- 11:15 Discussion

THURSDAY AFTERNOON

Foraging Theory: Zooarchaeology and Archaeobotany

- Room 102** Organized and moderated by Weitzel and Wolverton
- 1:30 Weitzel, Elic
Faunal and Botanical Evidence of Changes in Patch Use from the Terminal Pleistocene through Middle Holocene at Dust Cave, AL
- 1:45 Fisher, Jacob

- Optimal Foraging Theory, Epidemics, and Demographic Collapse in Alta California*
- 2:00 Bayham, Jude, Frank Bayham
Territoriality, Social Boundaries and Conflict: A Dynamic Model for the Formation of Intertribal Buffer Zones
- 2:15 Jones, Emily Lena
Beyond Depression? Human-Environmental Impacts and Foraging Theory in Zooarchaeology
- 2:30 Neme, Gustavo, Clara Otaola, Miguel Glandina, Adolfo Gil
The Use of the Faunal Resources among the High Altitude Hunter Gatherers of Southern Mendoza
- 2:45 Munro, Natalie
Intensive Hunting and Early Animal Management in the Southern Levant
- 3:00 break
- 3:15 Nagaoka, Lisa
Difficult Choices: HBE and the Legacy of the New Archaeology
- 3:30 Mohlenhoff, Kathryn, Brian Coddling
The Potential Integration of Niche Construction Theory within the Framework of Human Behavioral Ecology
- 3:45 Wolfe, Allison L., Jack M. Broughton, William C. Roth
A Foraging Theory Perspective on the Paleoindian Exploitation of North American Megafauna
- 4:00 Weiland, Andrews
Synthesizing Human Behavioral Ecology and Niche Construction Theory: an Ohio Hopewell Case Study
- 4:15 Louderback, Lisbeth A.
Diet Breadth and Resource Intensification in Relation to Environmental Change
- 4:30 Broughton, Jack
Discussant

Landscape Management and Agriculture

- Room 210** Moderated by McAlvay
- 1:30 *Lam, Wai Lun, Chris Coggins
Ethnobotany of Castanopsis in Fengshui Forests of Southeast China
- 1:45 Zahn, Marie, Matthew Palmer
"Everything We Do, It's Cedar": First Nation Ecosystem-Based Foresters' Relationship and Practice with Western Redcedar
- 2:00 Blazina, Ashley
Garry Oak (Quercus garryana) Woodlands on the Nisqually Reservation: Assessing Potential Harvest and Education Possibilities
- 2:15 Oberndorfer, Erica
Relationships in Practice: Makkovimiut Plant Knowledge and Practices
- 2:30 Currey, Robin
Agricultural Biodiversity Loss over a Ten-Year Period from Home Garden Agroecosystems, Kyrgyz Republic, Central Asia

- 2:45 Berg, Kevan
Multiple-Factor Classification of a Human-Modified Forest Landscape in the Hsuehshan Mountain Range, Taiwan
- 3:00 break
- 3:15 Cannon, Carrie
Plants Bringing Power and Life to the People: Reflections on Hualapai Ethnobotany of the Grand Canyon
- 3:30 Kachko, Liza
Strategies for Revitalizing Traditional Botanical Knowledge in Two Tribal Communities in Coastal Louisiana
- 3:45 Roberts, Michelle
Asking the Spirit's for Permission: Khmu Perspectives on Land Ownership in Northern Lao
- 4:00 McAlvay, Alex, Ilhulpanchatkl Neubauer, Chelsey Geralda Armstrong, Jessica Miller, Eve Emshwiller
Beyond the Foraging-Farming Continuum: Modeling the Diversity of Human Subsistence in Multiple Dimensions
- 4:15 *Johnson, Michael Kotutwa
Hopi Dryland Farming: Sustainability through Environmental Knowledge and Adaptive Management

Ethnobiological Ethics lab 1:30-3:30

Room 101 Organized by Fowler

- Duncan, Sophie
Re-Curating Herbarium Specimens and Rethinking Botanical Etymologies
- Fowler, Cynthia
Considering the State of SoE's Code of Ethics
- Herron, Scott
What is an Ethnobiological Ethic? A President's Perspective
- LaBine, Roger
Ethics from an Anishinaabe Male Wild Rice Chief
- McCune, Letitia
Protecting Seed Sovereignty: What is the Role of the Ethnobotanist
- Medinaceli, Armando
Code of Ethics of the Latin American Society of Ethnobiology (SOLAE)
- Bannister, Kelly
Re-imagining Research Ethics: A Relational Approach to Codes of Ethics for Ethnobiologists

Ethnobiology in National Parks

Room 101 Organized and moderated by Hooper

- 3:45 Baumflek, Michelle
The Role of Ethnobiology in Developing Plant Gathering Agreements at Acadia National Park
- 4:00 Hooper, David
Working Towards a Traditional Plant Harvesting Agreement: An Example from Mount Rainier National Park

4:15 Discussion

Ethnobotany 2

Room 204 Moderated by Stepp

- 1:30 Stepp, John Richard
Why Unimportant Plants are Important: Further Thoughts on Ethnobotanical "Canaries in the Coal Mine"
- 1:45 Tora, Mesulame
Restoration of the New Zealand Taro - Case Study
- 2:00 Roskrige, Nick
Rauwaru - Traditional Root Crops of Aotearoa
- 2:15 Aguilar-Meléndez, Araceli, Nadia del Carmen Ruiz-Nuñez, Marco Antonio Vásquez-Dávila,
Where Are the "Wild Chiles" in Modern México?
- 2:45 Anderson, Kat
Western Tribes' Potential Roles in Moving Wild Sunflowers along the Pathway to Domestication
- 3:00 break
- 3:15 Patton, Paul, Theresa Moran
A Solution to the "Quinoa Problem"? How a Prehistoric Appalachian Food May Hold an Answer to Regional Food Insecurity
- 3:30 White, John
Napo Runa Identification Characteristics of Manioc Landraces
- 3:45 Ramirez, Rose, Deborah Small
Ethnobotany Project: Contemporary Use Native Plants Social NorBaja
- 4:00 Discussion

FRIDAY MORNING

Zooarchaeology of the American Southwest and Northern Mexico: New Pathways and Future Directions 1

Room 210 Organized by Dombrosky and Jones; moderated by Dombrosky

- 9:00 *Burger, Rachel
New Perspectives on Sapawe Flutes and Whistles
- 9:15 Lipe, William, Laura Ellyson, R.G. Matson, Robin Lyle
Too Many Turkeys?
- 9:30 Shollmeyer, Karen Gust
Long Term Interactions of People and Animals in the Mimbres Region of Southwest New Mexico, A.D. 200-1450
- 9:45 Loven, Jeremy, John Speth, Myles Miller
Utilization of Faunal Resources at the Merchant Site, Southeastern New Mexico
- 10:00 *Dombrosky, Jonathan
*Zooarchaeological Data Suggest Broader Early Historic Distribution for Blue Sucker (*Cycleptus elongatus*) in New Mexico*
- 10:15 break
- 10:30 Wismer, Meredith, Francois Lanoë, Jesse Ballanger, Jonathan Mabry

Archaic Bison of the Southwest: Recent Explorations at the Cave Creek Midden Site, Southeastern Arizona, U.S.A.

- 10:45 Cordero, Robin
Puebloan Aggregation, Migratory Birds, and Garden Hunting in the Albuquerque Basin during the Rio Grande Classic
- 11:00 Chapin-Pyritz, Regina, Jennifer Water, Janet Griffiths
San Pedro Phase Subsistence Practices from Southern Arizona: Another View from Las Capas
- 11:15 Dean, Rebecca, Suzanne Fish, Paul Fish
Rodents, Rabbits, and Raptors, Oh My!
- 11:30 Discussion

Birds as Relationships: An Ethno-Ornithology of Reciprocity 1

Room 115 Organized and moderated by Sault

- 9:00 Miller, Andrew
Rarámuri Bird Knowledge and Environmental Change in the Sierra Tarahumara, Chihuahua, Mexico
- 9:15 Anderson, Gene
Birds of the Mongol Empire
- 9:30 Brownrigg, Leslie
Andeans Becoming Birds
- 9:45 Hull, Kerry
Believing Birds: Human-Avian Interaction in the Lacandon Maya Forest
- 10:00 Forth, Gregory
Bird Pairs and Contrasting Values in Central Flores (Indonesia)
- 10:15 break
- 10:30 Sault, Nicole
Birds of Rain in Latin America: Invoking the Sacred Through Sound and Image
- 10:45 Pierotti, Raymond, Nimachia ~~YfubXm~~ Howe ←
Passerine Birds in the Stories and Knowledge Traditions of American Indigenous Peoples
- 11:00 Discussion

Change requested by Raymond Pierotti, 09/27/2016

Archaeobotany

Room 204 Moderated by Hastorf

- 9:00 Fedick, Scott
Escaping the Maize Maze: Implications of Indigenous Food-Plants of the Maya Lowlands
- 9:15 Popper, Virginia
Chinese Immigrant Life in Late-19th-Century San Jose, California: Macroremains from Market Street Chinatown
- 9:30 Fish, Suzanne K., Paul R. Fish
Experimental Insights into Hohokam Agave Production Practices
- 9:45 Hodgson, Wendy, Andrew Salywon
Cultural Plants and Cultural Landscapes: Pre-Columbian Agaves in Arizona
- 10:00 White, Chantel

Early Bronze Age Viniculture at Numayra, Jordan: Archaeobotanical Evidence for Grape Processing

- 10:15 break
10:30 *Mueller, Natalie
Bet-Hedgers under Cultivation: Insights into the Domestication of Erect Knotweed from the Field and the Greenhouse
10:45 Bowyer, Vandy, Karen Adams
Seed Caches from Archaeological Contexts: What Can They Convey about the Past?
11:00 Hastorf, Christine, Stella Nair, Sonia Archila Montanez
Ephemeral Landscapes: Organic Architecture as Locus for Environmental Interaction and Cultural Continuity in the 18th Century
11:15 Adams, Karen
Ancient Yucca Quids with Wild Tobacco (Nicotiana) Contents: The Dawn of the Molecular Era in Southwest US Archaeobotany
11:30 Discussion

Conceiving Venomousness

- Room 101** Organized by Musch, Segniagbeto, and Banhoro; moderated by Musch
9:00 Musch, Tilman
Conceiving Venomousness and the Variability of Species. Cases of Echinococcus leucogaster from Western Niger
9:15 Banhoro, Yacouba
The Use of Plants in the Treatment of Snakebites in Burkina Faso: Therapeutic Itineraries
9:30 Eklund, Elizabeth
Southwest Snake Imagery in Salado Polychromes
9:45 Discussion

Talking Pasts One Another: The Place of Ethnobiology in "Multi-Species Turn"

- Room 101** Organized and moderated by Lecompte-Masterbrooke and Lewis-Jones
10:30 Fowler, Cynthia
"They Try to Change Their Worlds:" Making Worlds with Trans taxa Beings in Multispecies Communities
10:45 *Dolan, Jessica
"Turn, Turn, Turn": Re-animating Multi-species Relations to Restore Indigenous Landscapes through Tactile-Kinesthetic Learning
11:00 LeCompte-Masterbrooke, Joyce
From Cosmologies to "Worlding" and Back Again in a Very Short Period of Time
11:15 *Baker, Janelle Marie
"Shhh the Berries Will Hear You!": Ethnobiology, Posthumanism, and Cree-Berry Reciprocal Relationships
11:30 Lewis-Jones, Kay E.
The World in a Seed: Use Reimagined
11:45 Discussion

FRIDAY AFTERNOON

Zooarchaeology of the American Southwest and Northern Mexico: New Pathways and Future Directions 2

- Room 210** Organized by Dombrosky and Jones; moderated by Jones
- 1:30 Pavao-Zuckerman, Barnet
Zooarchaeology and the Development of Colonial Period Archaeology in the Pimería Alta
- 1:45 Mathwich, Nicole, Alexander Ruff, Barnet Pavao-Zuckerman
The Creation of the Southwestern Rangeland: Archaeological Markers of Landscape Management at Pimería Alta Spanish Colonial Site
- 2:00 Ramirez Thomas, Nicole A., Kendall McGovern
Beyond Collections: The Implications of Large Scale Databases for Zooarchaeological Research
- 2:15 Griffiths, Janet, Jennifer Waters, Regina Chapin-Pyritz
Bone Technology during the Early Agricultural Period: Tools, Ornaments and Everyday Life in the Tucson Basin
- 2:30 break
- 2:45 *Steele, Laura
An Examination of Artiodactyl Use through Time at Sapa'owingeh (Sapawe LA 306)
- 3:00 Driver, Jonathan
Discussant
- 3:15 Butler, Virginia
Discussant
- 3:30 Discussion

Birds and Relationships: An Ethno-Ornithology of Reciprocity 2

- Room 115** Organized and moderated by Sault
- 1:30 Gosler, Andrew
Interaction of ecological and cultural salience in English folk-naming of British birds
- 1:45 *Pam, Grace
Ethno-Ornithology of the Mushere People of Plateau State, North-Central Nigeria: Children's Bird Knowledge
- 2:00 Park, Karen
Musings from Nephelokokkygia: The Words the Birds Gave Us
- 2:15 MacDonald, Paul
Working with Nunatsiavut Government to Deliver Community-Based Harvest Monitoring of Migratory Birds in Northern Labrador
- 2:30 Discussion

Ethnozoology

Room 102 Moderated by Pierotti

- 1:30 *Medinaceli, Armando
Targeting Firearms: Effects of the Introduction of New Technologies on Traditional Tsimané Hunting in Bolivian Amazonia
- 1:45 Pierotti, Raymond
One is the Loneliest Number; How Dingoes Changed Humans
- 2:00 Mee, Allan
Reintroducing White-tailed Sea Eagles to Ireland: Resolving Human-Predator Conflicts
- 2:15 Anderson, Myrdene
Dogs in Saapmi: From Competition to Collaboration to Now
- 2:30 break
- 2:45 Libby, Kaitlin, Ruscena Wiederholt, Laura Lopez-Hoffman
Spatial Subsidies of Ecosystem Services Provided by Transboundary Migratory Northern Pintails
- 3:00 Rapinski, Michael, A. Cuerrier, M. Lemire, É. Dewailly
Inuit Perception of Marine Organisms: From Folk Classification to Food Consumption
- 3:15 Discussion

Medicine

Room 204 Moderated by Olson

- 1:30 Olson, Elizabeth
Incorporating Medicinal Plant Knowledge into Green Workshops in Autlan, Jalisco, Mexico
- 1:45 Slattery, John
Sharing the Knowledge: Highlighting the Impact on Indigenous Healers of Sonora during Cultural Exchange with Visitors
- 2:00 Shebitz, Daniela, Angela Oveido
A Pioneer Tree that Connects Ecosystem Recovery and Human Health: Pentaclethra maculoba
- 2:15 Lavoie, Kathia, Georgette Mestokosho
Innu-Natukuna: Members of the Ekuanitshit Community Gather Medicinal Plants: Description of an Experience with Hydro-Québec
- 2:30 break
- 2:45 Jernigan, Kevin, Olga Belichenko, Valeria Kolosova, Darlen Orr, Maria Pupynina
Russian Influence in Present-day Ethnobotany and Ethnomedicine of Chukotka
- 3:00 Bradley, Alex, Kelly Kindschler
Expanding Horizons: Recognizing the Ontological Limits of Materialism
- 3:15 Shebitz, Daniela, Chuck Stead
Healing the Earth and Human Spirit: The Ramapough Nation, Ford Motor Company, and Sweetgrass Gardens
- 3:30 Discussion

Poster Session 3:30-4:15

Room 150

Diehl, Michael

Measuring Diet Breadth in Paleobotanical Data Using the Shannon-Weaver and Richness Indices

Gigot, Jessica

Linkages between Soil and Food Quality in Traditional Plant Systems

Knisley, Melani

*It Squirted on Me! Introducing Students to Plant Science with Ecological of *Cyclanthera dissecta**

Myhal, Natasha, Kelly Kindscher

*Ethnobotany of Oshá (*Ligusticum porteri*) and the Role of Traditional Knowledge Systems with Plant Management*

Ruggiero, Juliet, Franchesca Brenes, Sandy Wyllie-Echeverria

Plant Identification and Use on St. Thomas, USVI: An Undergraduate Class Investigates Local Knowledge

Simons, Eric

Hybrid Epistemologies: Traditional Knowledge and Archaeology in British Columbia

Wolverton, Steve, Charles Randklev, Traci Popeyou

Late Holocene Conservation Base-lines for Freshwater Mussels from Three Rivers in Texas

Yost, Chad

Phytolith Analysis of Sediments Identify Cultivated and Encouraged Plants at the Early Agricultural Fields of Las Capas, Arizona

Zedeño, Maria Nieves, Wendi Field Murray

The Valuable-Commodity Continuum of Birds and their Feathers in the Northern Plains

Presentation Abstracts

Adams, Karen Crow Canyon Archaeological Center agave@dakotacom.net

Ancient Yucca Quids with Wild Tobacco (*Nicotiana*) Contents: The Dawn of the Molecular Era in Southwest US Archaeobotany

Unburned yucca (*Yucca*) quids with wild tobacco (*Nicotiana attenuata*) contents have preserved within Antelope Cave in northwestern Arizona. Although the cave was visited from the Archaic to the Euro-American periods, material culture remains and radiocarbon dates indicate heaviest use by the Virgin Anasazi (A.D. 1-1000). Quids are wads of fiber twisted/knotted into a ball for insertion into the mouth. Ten of the quids examined were made from the fibers of *Yucca* plants, based on molecular analysis and comparison to the DNA of *Yucca*, *Agave*, and *Nolina* plants known from the surrounding region. Twenty-eight of thirty quids examined were wrapped around a range of wild tobacco flowering stalk fragments (capsule, seed, calyx, pedicel, main stem, leaf). Quids have been interpreted as serving numerous needs (food, ceremonial/ritual, medicinal, other). The inclusion of tobacco and the scattered contexts of recovery within Antelope Cave suggest these quids provided occupants with a personal narcotic experience.

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Nadia del Carmen Ruiz-Nuñez Universidad Nacional Autónoma de México
Marco Antonio Vásquez-Dávila Instituto Tecnológico de Valle de Oaxaca

Where Are the "Wild Chiles" in Modern México?

Proposal of ethnobotanical model to study origin of domesticated chiles. Nahban describes his observation of a plant-bird-bush ecological pattern in Arizona. He labels the plant "wild," a word that suggests the specimen was found in a pristine environment unmodified by human selection or management. This chile plant population described by Nahban, growing in another geographical location further south, might have a different story. But, what if the ways people began to use, transplant and cultivate chiles are a window on a broader set of poorly-define human-plant relationships? What if we do not have the theoretical framework to understand domestication in complex tropical territories? How can this be known? This paper seeks to address these questions through the proposal of a co-evolutionary model of management practices to be used for tropical megadiverse territories to understand the domestication processes of chiles. The Zapotec ethnoecology study for the Guien guix (*C. annuum* var. *glabriusculum*) in San Juan Guelavia, Tlacolula, Oaxaca will be shown.

Anderson, Gene University of California, Riverside gene@ucr.edu

Birds of the Mongol Empire

The Mongol Empire, the largest contiguous empire the world has ever known, had, among other things, a goodly number of falconers, poultry raisers, birdcatchers, cooks, and other experts on various aspects of birding. We have records of this, largely in the Yinshan Zhengyao, the court nutrition manual of the Mongol empire in China (the Yuan Dynasty). It discusses in some detail 22 bird taxa, from swans to chickens. The Huihui Yaofang, a medical encyclopedia, lists 10 taxa used medicinally. Marco Polo also made notes on Mongol bird use. There are a few other records. This allows us to draw conclusions about Mongol ornithology, which apparently was sophisticated and detailed.

Anderson, Kat

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Western Tribes' Potential Roles in Moving Wild Sunflowers along the Pathway to Domestication

A diversity of wild sunflower species in the genera *Balsamorhiza*, *Helianthella*, *Helianthus*, and *Wyethia* were culturally significant to tribes in the West. Because tribes in California and the Great Basin valued these plants for foods, medicines, ceremonies and technologies, they applied various harvesting and management practices aimed at reducing consumption of seeds by insects, reducing competition from other species, and generally optimizing the resource. These practices were based on empirically derived knowledge of species' reproductive biology and habitat needs. Tillage, pruning, and particularly burning increased the level of disturbance to which these species were subjected; removal of seedheads before they were fully ripe may have selected for seed retention; and deliberate sowing and judicious harvesting modified the parameters of reproduction. These practices altered the selective pressures on these species in systematic ways; used over centuries and possibly millennia, they may have been sufficient to move these species some distance toward domestication.

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Dogs in Saapmi: From Competition to Collaboration to Now

The Saami of Lapland hunted in competition against wolves, and in collaboration with dogs, since 8,000 BCE, even before dogs cooperated with the Saami in the herding of semi-domestic reindeer during the recent half-millennium. The Saami reindeer-herding dog, until recently an essential partner in herding and husbandry chores but never a pet, is not trained, but rather, like the Saami child, matures with unique constellations of habits. In recent decades, various vehicles have replaced the dog in many tasks, and dog-as-household-pet has emerged. However, these pets in Saapmi are not from the traditional dog stock, but are purchased exotic breeds that are kept indoors as sheltered pets. Yet, herding families may take their pets out to reindeer roundups, letting the short-legged and -haired canines try their hands and feet at herding chores. Some of these dogs have earned recognition by both male and female herders.

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Holistic Reconstruction of the Polynesian Ake/a`e Scented Hardwood, Mostly Plant Name Group with Help from Horatio Hale

How does a Western Polynesian name for a tree end up meaning 'wooden bat' and 'type of odor' at Polynesia's eastern edge? The answer lies in the phylogeny of the Polynesian word ake which, together with its linguistic cognate a`e, forms a pan-Pacific plant taxon and a lexemic protoform. Its meanings include: *Zanthoxylum*, *Dodonaea*, *Sapindus*, *Xylosma*, *Olearia*, and *Microsorium*, as well as products made from other species and words unrelated to plants. This investigation gathered ake/a`e words from Polynesian dictionaries, combined them with indigenous names for the named genera, and found additional ake/a`e words using comparative linguistic practices. It then elucidated how and why the word and its meanings changed by integrating data regarding the morphology, characteristic properties, distribution and use of the included species, the pathways of Polynesian migration, and the effects of colonization and cultural hegemony. Finally, it identifies seven factors that together make this one related group.

Armstrong, Chelsey Geralda Simon Fraser University cdageralda@gmail.com

Dana Lepofsky

Simon Fraser University

Leslie Main Johnson Athabasca University

Nancy Turner

University of Victoria

Village Life at Dałth Gyilakyaw: A Cultural Keystone Place for the Gitsm'geelm, Tsimshian

Robin Town (Dałth Gyilakyaw) is a long-lived village of the Gitsm'geelm (Tsimshian) First Nations of Northwestern British Columbia. The legacy of generations lived on the landscape are visible today in impressive archaeological features, modified ecosystems, and remnant orchard gardens. Many Gitsm'geelm have strong cultural ties to Robin Town as it was only recently abandoned in the late 19th century. The village continues to support important memories, lessons, and experiences for community members. However, due to settler colonialism and new lifeways, much of the deep time history of this place including how people interacted with this cultural landscape, are hidden in its material remains. We use a variety of approaches, including archaeological and paleoecological methods, botanical inventories, historic maps and community member interviews to reconstruct how Gitsm'geelm people lived their lives at Robin Town. This research focuses on traditional orcharding and archaeological features as one aspect of the historical ecology of this Cultural Keystone Place.

Baker, Janelle Marie McGill University/Athabasca University janelle.baker@mail.mcgill.ca

"Shhh the Berries Will Hear You!": Ethnobiology, Posthumanism, and Cree-Berry Reciprocal Relationships

Crees in northern Alberta, Canada, tend to their relationships with the sentient landscape and its entirety of living beings through respectful speech, behaviour, and harvesting practices. Living beings who gift themselves have agency in deciding whether or not humans can encounter, harvest, and share their substance. As an ethnobiologist, Cree teachers work with me to record traditional environmental knowledge, including observations and indicators of change and contamination that result from large-scale industrial development of oil sands deposits in their traditional territories, so that we can co-produce ethnobiological results. From a post-humanist perspective, one might ask how 'more-than humans' experience the disturbance in cycles of respect, reciprocity, and reincarnation due to oil sands extraction. In this paper I will discuss how being a student of Cree ontology and ethnobiology has revealed some possibilities for how berries listen and respond to living in and on the edge of human-induced ruins.

Banhoro, Yacouba

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The Use of Plants in the Treatment of Snakebites in Burkina Faso: Therapeutic Itineraries

The ophidian envenomation still constitutes a major public health problem in Africa. The present contribution studies cases from Burkina Faso. Here, cooperation between modern medical services and the so-called "traditional practitioners" is going on. As a result of their parallel intervening, one can observe intertwined perspectives concerning the care of snakebite. This offers a tableau of medical pluralism, which, due to the interdependency of actors and practices, is worth to be analyzed. My presentation will center on the role of plants in curing snakebite and of their perception by the different actors. In order to do so, I will proceed by a cross analysis of patients, "modern" doctors and "traditional practitioners" with regard to their varying conceptions of the pharmacopoeia.

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Re-imagining Research Ethics: A Relational Approach to Codes of Ethics for Ethnobiologists

Ethics is about how we treat one another and other sentient beings. Ethical guidance for research involving Indigenous and traditional communities, cultural knowledge and associated biological 'resources' has evolved significantly over recent decades. Formal guidance for ethnobiological research has been thoughtfully articulated and codified in many helpful ways - including but by no means limited to the Code of Ethics of the International Society of Ethnobiology. We have witnessed a successful and necessary era

of “research ethics codification” with ethical awareness raised, fora established for debate and policy development, and new tools under development to assist us in treating one another as we agree we ought within the research endeavour. Yet most of us - especially those situated within the university - still struggle with ethical dilemmas, conflicts, and differences that arise as part of the inevitable uncertainties and lived realities of our cross-cultural work. Is it time to ask what more - or what else - might we do, to lift the words on a page that describe how we ought to conduct ourselves, to connecting with the relational intention of those ethical principles and practices in concrete, meaningful ways? How might we discover ethics as relationship while we necessarily aspire to follow agreed ethical codes as prescription?

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The Role of Ethnobiology in Developing Plant Gathering Agreements at Acadia National Park

Proposed changes to the National Park Service Code of Federal Regulations (36 CFR 2) would provide federally recognized tribes with expanded plant gathering rights on parklands. But, what will this look like in practice, how will we get there, and how can ethnobiology contribute to the process? This paper will introduce initial steps towards developing plant gathering agreements at Acadia National Park in coastal Maine. In advance of proposed regulation changes, Acadia has begun working with Wabanaki tribes using an ethnobiological approach with the goal of creating a model practice for other parks. Based on tribal consultations, ethnobotanical research and meetings with Park staff, we will discuss a suite of key issues including gatherer privacy, permitting and identification, and respectful incorporation of traditional knowledge into park management, monitoring and interpretation.

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Frank Bayham California State University, Chico

Territoriality, Social Boundaries and Conflict: A Dynamic Model for the Formation of Intertribal Buffer Zones

Human territoriality and the evolution of social boundaries are important and long-standing issues of concern to anthropologists and social scientists. One notable phenomenon often spatially situated between groups is the intertribal buffer zone, an area that is generally devoid of occupation where certain resources can flourish without being overhunted. We here examine through the development of a bioeconomic model the relative importance of resource depression and conflict on the formation of the buffer zone. We first develop a dynamic spatial model of a group harvesting resources at varying distances from a base locale. We then simulate the effects of two amicable groups taking resources and compare this to two groups in conflict. Ultimately, we show how the potential for conflict reduces the incentive to harvest high-ranking resources, and prevents the overexploitation of the resources.

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What We're Missing in the Models: How Experimental Methods Can Change the Way We View Early Neolithic Farmscapes in the Ancient Southwest

In recent decades, scientists have developed a number of quantitative methods for reconstructing ancient agricultural systems, allowing them to create models of the ways farmers responded to fluctuating climatic and environmental conditions in the past. However, advancements in modeling capabilities have led some researchers away from nuanced analyses of specific agricultural technologies and the societies that used them, towards more generalized conclusions about the nature of farming in different areas of the world. In the northern Southwestern US, many archaeologists modeling the origins and development of maize agriculture continue to use outdated measures of productivity based on modern industrialized agricultural systems. Recent experimental farming and cold-air drainage studies in the Northern Southwest have shown

that many of these models of maize productivity grossly underestimate the potential contribution of agriculture to early Neolithic societies. This presentation presents some of the key findings of this research and proposes strategies for future studies.

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Multiple-Factor Classification of a Human-Modified Forest Landscape in the Hsuehshan Mountain Range, Taiwan

Human actions drive landscape heterogeneity, yet most ecosystem classifications omit the role of human influence. This study explores landscape history to inform a classification of the local forestland of the Tayal Mrqwang indigenous people of Taiwan. Our objectives were to determine the extent to which human action accounts for patterns of forest heterogeneity. We used multivariate tools to relate vegetation to environmental gradients and human modification across 76 sites. We identified eleven forest types, ranging from mixed coniferous forests at high elevations, to pine, bamboo, alder, and laurel stands at low elevations. The impact of human action was particularly evident at lower elevations, where patterns of forest and soil variation were resonant of the small-scale practices of indigenous residents (e.g., shifting cultivation). The findings show that forest-dwelling people play a key role in shaping the forest, which counters widely held perceptions that mountain forests are predominantly natural in Taiwan.

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Garry Oak (*Quercus garryana*) Woodlands on the Nisqually Reservation: Assessing Potential Harvest and Education Possibilities

The Garry oak woodlands found in the northeast corner of the Nisqually Reservation are remarkably beautiful and intact. The woodlands are located on a 131-acre site bought by the tribe in 1992. The site has been slated by the Nisqually as a potential restoration site that could be used for harvesting traditional plants, as well as an outdoor educational area for tribal youth to learn more about traditional practices. However, a previous restoration of the site had limited success. Using geospatial data, historic photos, understory field surveys, and interviews with Nisqually tribe members, this research examines the site's capacity for supporting a variety of traditional plants, and what steps should be taken to maintain these plant populations.

Bowyer, Vandy

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Karen Adams Crow Canyon Archaeological Center

Seed Caches from Archaeological Contexts: What Can They Convey about the Past?

Humans have been caching and storing plant seeds and fruit for thousands of years, providing important insights into ancient plant use invisible in the general archaeological record. Plant storage and caching illuminate human behaviors regarding ancient plant selection, domestication, harvesting and spiritual practices. Concentrations of ancient plant parts can be difficult to distinguish from the natural collection of plants by rodents and insects. As a result, identifying cultural vs natural concentrations of plant remains in archaeological deposits is not always straightforward. This paper: 1) outlines key characteristics that can assist archaeobotanists in distinguishing between natural (e.g. nesting and caching by rodents) and cultural (e.g. storage and caching by humans) plant concentrations; 2) discusses some key archaeological sites in the American Southwest with excellent examples of human caching and plant storage; and 3) highlights the interpretive potential of these unique archaeobotanical assemblages for understanding ancient plant use in the region.

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Expanding Horizons: Recognizing the Ontological Limits of Materialism

A reductionist lens often fails to capture that pivotal moment of a medicinal plant's efficacy in situ, in vivo, because of a narrow fixation upon the lock-and-key model of receptor and active compound or the focus upon the pharmacokinetic activity of an individual molecule or solvent extract rather than on whole plant material (for example, as traditionally administered in those settings in which it is reported to be effective). Those same technologies which are uninspiringly recruited to rule out candidates as line items on a checklist could instead be used to bridge the apparently irreconcilable differences separating a materialist scientific outlook from those of the world's rich ethnobiological traditions. Our presentation will be a dynamic student/teacher dialogue with the student's insightful questions and comments keeping both the student and teacher dancing, while exposing fallacies of dominant paradigmatic thought.

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Discussant

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Andeans Becoming Birds

In traditional Andean ritual contexts, rural kin-bound humans dance as particular birds and dance bird roles in myths; dancers experience becoming these birds: the "choique" lineage of Mapuche dance the "choique" bird's lifecycle; herding communities around the cordillera La Viuda dance as "kiuyos" do. In Pasco's "Mama Rayhuana" saga, dancers enact comic birds helping humans invent horticulture. In inverted versions of a widespread danced myth, a bird flock hatches an egg from which a human hero emerges OR bereft humans create an egg to resurrect a savior bird. Ritual bird dances once confined to micro-regions have been progressively appropriated for public performance by troupes uniformly costumed to reference one bird. Public bird dance performances commonly extirpate communications with the forces of nature, redirecting religiosity to saints' statues. Modern school children adopting local bird dances are rapidly diffusing contributions to the on-going re-vindication of Andean culture.

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New Perspectives on Sapawe Flutes and Whistles

Bone flutes and whistles recovered from archaeological sites of the Chama Valley are recognized widely as markers of the ceremonial elaboration that accompanied aggregation into ancestral Pueblo settlements and set the Pueblo IV period (AD 1275-1600) apart from earlier occupations. Yet we know little about how these instruments were played and even less about their socio-cultural contexts and relationships to sound generation for performance or perhaps avian husbandry. Using perspectives derived from Music Archaeology, faunal analysis, and acoustic modeling, this paper challenges existing conventions that flutes were produced strictly from turkey bone and reconsiders the functional differences in the utilization of flutes with multiple tone holes versus whistles assumed to be bird calls. It will also consider Sapawe as a potential production center and the performance aspects of playing instruments that in turn may have influenced not just the dynamics of sound production but also those of supply and demand.

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Discussant

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Edelmira Linares Universidad Nacional Autónoma de México

Arí of Mexico - "...It Is No More Strange than Bird's-Nests Soup..."

Gums played an important role in the indigenous societies during colonial Mexico. Despite its recent decline in importance, remote Mexican communities continue using them as source of material (adhesives, sealants), medicine and food. However, current changes in land use, harvesting practices and climate threatened local extinction. As part of a participatory conservation program with the Rarámuri people in the Sierra Tarahumara, we analyze the ethnobotany of "arí". Even though the leguminous host tree (*Coursetia glandulosa*) grows in the dry tropical forest along the Mexican Pacific slope and extends into the lower Sonoran Desert, gum production [based upon the mutualism between scale insects (*Tachardiella fulgens* and ants) is limited to the northern range. "Goma de Sonora" was a major colonial poisoning remedy. Today the Rarámuri continue to place high value on the gum as a specialty food and trade item. "Arí" with its peculiar flavor has become incorporated into the regional gastronomy as salsas and aguachile.

Cannon, Carrie Hualapai Tribe calisay17@hotmail.com

Plants Bringing Power and Life to the People: Reflections on Hualapai Ethnobotany of the Grand Canyon

The ethnobotanical story of the Hualapai Tribe begins with the plant knowledge that the people have inherited from their great grandparents who lived entirely off the land. Hualpai grandchildren live in a completely different modern world now. A world filled with cell phones, text messages, and ipods. The Hualapai Ethnobotany Youth Project is now in its tenth year. It is an intergenerational program designed to provide elders with an opportunity to share their plant and land based knowledge with Hualapai youth. For a few hours a week, the cell phones, TV's, and text messaging are dialed down, and the focus is brought back to the ancient knowledge, to a tribal technology that served the Hualapai for hundreds of generations and brought power and life to the people. Information presented will share about the project and examine the crucial role plant resource acquisition has played in Hualapai Culture.

Castle, Lisa Southwestern Oklahoma State University lisa.castle@swosu.edu

Prairie Turnips at 15: A Good Model Goes Bad

The prairie turnip (*Pediomelum esculentum*), an edible legume native to the North American Great Plains, makes a poor model organism for investigating population dynamics. Individual plants are long lived, slow growing, and only visible for a few weeks each year. These "challengeing" traits, however, make the prairie turnip a good choice as a conservation model, as the traits are shared with many other wild harvested plants. Fates of individual plants in three populations were tracked from 2001 to 2004 and used in 2006 to project population size and model level of sustainable harvest under many different harvest regimes. Plots in the largest and most robust population were re-visited in 2013-2015, at which time the population had crashed, with 80% fewer plants in the plots in 2014 than 2004. Reasons for and implications of this dramatic decline will be discussed.

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Jennifer Water Desert Archaeology, Inc.

Janet Griffitts Statistical Research, Inc.

San Pedro Phase Subsistence Practices from Southern Arizona: Another View from Las Capas

Excavations conducted at Las Capas, a large, multi-component site located on the ancient floodplain of the Santa Cruz River in northwestern Tucson, have provided a wealth of significant new information. Using the combined zooarchaeological data collected by Desert Archaeology, Inc (DAI) and SWCA Environmental Consultants, we explore the transition from an Archaic hunting-gathering lifestyle to maize cultivation during the San Pedro phase (1200-800 BC). Using a number of faunal attributes, similarities and differences in the hunting practices and processing activities between contexts and over time are explored along with the effects of recurrent sedentism and other anthropogenic changes in the landscape. With this information, the Las Capas faunal record will be compared to data collected from other sites in southern Arizona that contained zooarchaeological remains dating to the same period. Through this study, a redefined picture of Early Agricultural animal procurement and subsistence emerges.

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Changing Socioecologies on the Prehispanic Pacific Slope of Guatemala

Many scholars have proposed a causal relationship between climatic change and significant sociopolitical change among the prehispanic Maya of the Yucatan and Peten regions of Mesoamerica. In contrast, Collins' (2009) work in watersheds across the piedmont and coast of southern Guatemala shows that sociopolitical change did not correlate with climatic and environmental change. If overt anthropogenic ecological degradation was not the cause of the prehispanic depopulation of the Pacific slope of Guatemala, decreased socioecological diversity may have contributed. Phytolith, pollen, and charcoal evidence from the paleo-ecological record suggest that as agriculture intensified on the Pacific slope, much of the landscape came under cultivation that increasingly centered on fewer economically useful species, thereby leading to a socioecology that was less resilient to stressors such as social or environmental change.

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Puebloan Aggregation, Migratory Birds, and Garden Hunting in the Albuquerque Basin during the Rio Grande Classic

Towards the end of the 13th Century, the Albuquerque Basin of New Mexico saw a significant increase in population aggregation from Puebloan peoples migrating into the valley. By the time of the Coronado expedition in 1541-42, this area contained 12 large pueblos along the roughly 55 km long by 5 km wide Rio Grande floodplain, resulting in one of the densest concentrations of pueblos and agricultural fields in the Eastern Pueblo region. This substantial increase in the area under cultivation resulted in a significant shift in the wintering grounds of granivorous migratory birds, such as cranes, geese, and ducks, along the Rio Grande Flyway. This paper will present evidence for this shift in the Rio Grande Flyway and demonstrate that Puebloan groups in the Albuquerque Basin were likely using the post-harvest fields for garden hunting of these birds. Furthermore, evidence will show that Puebloan groups were exploiting these birds for subsistence in addition to possible ritual/ceremonial purposes.

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Agricultural Biodiversity Loss over a Ten-Year Period from Home Garden Agroecosystems, Kyrgyz Republic, Central Asia

The results of a ten-year longitudinal study of agricultural diversity in home gardens of the Kyrgyz Republic (Kyrgyzstan) are reported. The temperate home gardens of Kyrgyzstan are species diverse (24 edible plant species per home garden at baseline) and offer unique opportunities for *in situ* conservation due to an abundance of crop wild relatives in the fruit and nut forests, the Tian Shan Mountains and the Ferghana Valley. Understanding the rate at which biodiversity is lost or conserved from actively managed home gardens is important for *in situ* conservation efforts. Edible plant diversity and factors that might influence

management practices in home garden agricultural systems were surveyed by using interviews, structured survey instruments and full agroecosystem mapping. On average, cultivated fruit tree species diversity and also variety diversity declined over the last decade in home garden agroecosystems.

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Kyle Bocinsky Crown Canyon Archaeological Center

Constructing Agricultural Frames of Reference: An Example from Highland Southwest China

The need to construct locally and historically contingent models of food resources was a central concern of "New Archaeology". However, data and computational limitations meant that archaeologists were unable to go beyond describing coarse patterns of effective temperature, rainfall and net primary production on a global scale. Advances in ecology and computational modeling mean that archaeologists have at their disposition new computational tools and big data that allow us to build frames of reference with a higher level of spatial and temporal precision. This paper describes the creation of ecological niche models for predicting the constraints placed on ancient agriculturalists as they moved crops outside of their homelands of domestication. Using the highland southwest China as a test case, describe how the use of these models has elucidated the reasons underlying a major transition in subsistence regimes during the second millennium cal. B.C.

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Diving for Knowledge: Scuba Divers, Fishers, and Coral Reefs

As tourism replaces fishing as the dominant economic activity in coastal destinations, researchers will need to consider how this changes human interaction with the marine environment. The snorkelers, divers, sport fishers, and sunbathers arriving as tourists access and use the marine environment in different ways, with varying consequences for environmental management. Focusing on how scuba divers use, understand, and come to know the coral reefs on which they regularly dive--and how this differs from fishers--illuminates the value of understanding human activities across scales. The special access diving equipment grants scuba divers to coral reefs, which can also result in their harm. This paper addresses the need to consider scuba diving and other tourism-related activities alongside fishing and traditional livelihood activities to develop a more complete understanding of human interactions with the marine environment. Ultimately, this understanding can foster better environmental management.

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Suzanne Fish University of Arizona
Paul Fish University of Arizona

Rodents, Rabbits, and Raptors, Oh My!

The Marana Platform Mound, near Tucson, Arizona, provides an ideal database for understanding the roles of non-human animals in Hohokam Classic period communities. Due to the extensive nature of the Marana excavations, combined with the short period of site occupation, the faunal remains are a snapshot not only of Hohokam diet, but also of feasting and other ritual uses of fauna; the impact of agricultural methods on local animal communities; and family/individual differences in access to resources. This paper explores the spatial differences in faunal remains across compounds (assumed to be associated with particular lineages) and between rooms (assumed to be associated with individual households) to assess the causes of faunal variability. Ultimately, faunal resources and use show greater variability between rooms than between compounds, suggesting greater differences in resource access between households within the same lineage than between lineages.

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Measuring Diet Breadth in Paleobotanical Data Using the Shannon-Weaver and Richness Indices

In subsistence studies, diet breadth models commonly rely on two indices, diversity and richness. Diversity is often measured using the Shannon-Weaver information diversity index. Richness is expressed by the number of different taxa represented in an assemblage. In the Tucson Basin after the introduction of maize, two thousand years of stable, low intensity use of maize were followed by 1400 years of comparatively rapid changes in the organization of food production and procurement. Which measure of diet breadth does a better job of capturing the differences between Early Agricultural Period forager farmers and Sedentary Period Hohokam sedentary, intensive-farmers? I evaluate the utility of the Shannon Weaver and Richness indices by comparing diet breadths in paleobotanical data from components at the Las Capas and Julian Wash sites.

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"Turn, Turn, Turn": Re-Animating Multi-Species Relations to Restore Indigenous Landscapes through Tactile-Kinesthetic Learning

How do humans "know" other biological organisms, abiotic, and geologic components of ecosystems? What are our reasons for trying to know them? Here, I join a call for scientists, anthropologists, Indigenous knowledge holders, and community members to come together to transform human chauvinism, through sharing environmental epistemologies and practices of stewardship. Ethnobiologists are ideally positioned to facilitate these conversations among communities of practice. I will provide examples of traditional knowledge regeneration projects I participated in with Haudenosaunee colleagues. They are: composting; heirloom seed exchange and education; re-animating the living Indigenous heritage of riverine ecosystems through canoeing them and mapping toponyms; and wild plant and fungi harvest and stewardship. These are some processes through which the Haudenosaunee teach and recreate Indigenous relationships with landscapes across generations; they are also ways people everywhere can participate in restoring peace and ecological health.

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Zooarchaeological Data Suggest Broader Early Historic Distribution for Blue Sucker (*Cycleptus elongatus*) in New Mexico

The blue sucker (*Cycleptus elongatus*) is an endangered fish currently experiencing range reduction in the State of New Mexico, but poor documentation of the historic range of this species means the extent of its habitat loss is unclear. In the early sixties, two blue sucker skeletal elements were reported from a late prehistoric/early historic archaeological site, suggesting the range of blue sucker once extended into northern New Mexico. Since that publication, however, little consideration has been given to the past presence of this species in the Upper Rio Grande. New zooarchaeological data from Ponsipa (LA 297), a site in northern New Mexico, reveal the presence of multiple blue sucker skeletal elements. This information suggests a broader pre-impoundment distribution for blue sucker than previously recognized and can help establish a new baseline for their conservation and/or restoration in New Mexico.

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Let Them Plant Their Own: Implications of Interactive Crop-Loss Processes during Drought in Hopi Maize Fields

The role of drought in the 13th century abandonment of the North American Southwest remains poorly understood. Computer simulations of prehistoric crop production suggest that production in the Mesa Verde region never dropped sufficiently low to force abandonment. However, data from the Hopi Reservation indicate that grain-loss processes are highly complex, and that during severe and extreme droughts the declines in vegetative and grain production also involve declines in plant health and ability to survive shocks, and increased plant mortality. These are exacerbated by increased frequency and magnitude of animal damage. Data from Hopi indicate that losses impose a severe penalty on those who cannot provide sufficient personnel for crop protection, and loss during extreme drought can be nearly complete. Results also suggest that farmers' options to cope with those processes are shaped by hydrologic and geomorphic factors as well as social relationships.

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Discussant

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Re-Curating Herbarium Specimens and Rethinking Botanical Etymologies

My project reimagines more inclusive botanical practices and naming systems by re-curating herbarium specimens from my own collections in Western Massachusetts to reflect their indigenous histories through an alternative labeling system. Reimagining herbarium specimens provides an example for scientists of how to reintegrate marginalized histories into their biological research. The questions guiding my work include: How does our system of classification work to exclude and erase already marginalized groups? How does the use of Latin in binomial nomenclature foreground the legacy of certain botanical cultures at the expense of others? How does the assignment of "authors" to every plant species contribute to an almost exclusively Western narrative of species "discovery?" How do we decolonize a botanical naming and organizational system that was produced by colonial regimes?

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Southwest Snake Imagery in Salado Polychromes

Is it possible to identify the imagery of snakes in the stylized iconography found on the Salado polychrome (Roosevelt Red Ware) vessels dating from 1250-1450 AD in the US Southwest? Building on previous work on the iconography of Salado vessels by Patricia Crown and efforts to identify fish species found on photoreal Mimbres vessels by Jett and Moyle, this project looks at geospatial data on the distribution of Salado polychromes as well as data on local snake species for insights on what local species may have inspired these designs. In addition, this project looks at diagnostic traits from fifteen species to see if those traits might be reflected in the imagery of these pre-Hispanic ceramics. The Salado "phenomena" may reflect movement across the Mogollon Rim, a key biological transition zone, indicating that the appearance of these motifs may reflect regional migrations in the Southwest during this significant period of change.

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Escaping the Maize Maze: Implications of Indigenous Food-Plants of the Maya Lowlands

While maize certainly played a central role in ancient Maya subsistence, the Maya Lowlands are endowed with over 500 indigenous food-plants, many of which probably figured prominently in the subsistence economy. The recognition of plant foods other than maize provides the basis for the critical re-examination of food-commodity exchange, agricultural resilience, drought resistance, pollen evidence for deforestation, and the interpretation of carbon isotope signatures as evidence for maize cultivation and consumption.

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Paul R. Fish University of Arizona

Experimental Insights into Hohokam Agave Production Practices

The scale of prehispanic agave cultivation in southern Arizona is now well established. The extensive fields where Hohokam farmers grew this crop are frequently preserved on valley slopes. They are marked by arrays of stone features in "rockpile fields" with interspersed roasting pits. Because indigenous groups in the area no longer used this agricultural technology after Spanish contact, little is known about production and processing practices. Observations from 30 years of experimental plantings and analysis of associated chipped stone tools have begun to shed light on the social and economic implications of agave as an essential component of Hohokam agriculture.

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Optimal Foraging Theory, Epidemics, and Demographic Collapse in Alta California

In western North America, prehistoric increases in human population densities frequently corresponds with resource depression of large game and a greater dependency on high cost resources, as predicted by optimal foraging models. These models similarly predict that when human population densities decline significantly, there should be a rebound in large game populations due to the relaxation of hunting pressures. This pattern of resource intensification and subsequent rebound of large game has been identified at Kathy's Rockshelter in northern California. The timing of the rebound at circa AD 1478-1642 corresponds with the initial European exploration of the coast, suggesting that the pattern may represent a protohistoric demographic collapse of Native California populations due to the spread of epidemics into the interior.

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Bird Pairs and Contrasting Values in Central Flores (Indonesia)

In several classificatory and symbolic contexts the Nage ('Na-gay') people of Flores Island combine named bird folk taxa to create standard pairs. Examples encountered in traditional narrative include: Friarbird and Imperial pigeon, Quail and Paradise flycatcher, and Stubtail and Coucal. Several other pairs occur in general folk nomenclature, where they are associated either with special-purpose utilitarian categories or otherwise unnamed folk-intermediate taxa, and also in the parallelistic speech of ritual language and song. Focusing on values Nage attach to the Russet-capped stubtail (*Tesia everetti*), a bird endemic to Flores and the neighbouring island of Sumbawa, the paper describes cultural contexts in which pairings occur and considers their motivation with reference to bird morphology and behaviour.

Fowler, Cynthia Wofford College fowlerct@wofford.edu

"They Try to Change Their Worlds:" Making Worlds with Transtaxa Beings in Multispecies Communities

Seaworms are magnificent tools for linking not only items in single taxonomic categories (items with 'seaworm' in the names, for example, or cognates for 'seaworms' in Austronesian and Papuan languages) but also disparate categories (for example, the link between Polycheata and Liliopsida, or between apical clan [human] ancestors and the moon). By deeply contextualizing nale, the Kodi word for 'seaworms', in the space-time culture of Kodi, we find that the term refers to a category of beings who periodically switch taxonomic status and are thus transtaxa. Describing an ethnotaxonomy populated by taxa-crossing beings provides a platform for exploring the contributions of ethnobiology to posthuman studies. Through documenting relationships between human and nonhumans, ethnobiologists deepen and expand knowledge about habitats, ecosystems health, and the world making activities of both humans and

nonhumans. Seaworms is an amazingly poetic topic to use as the means for ethnobiologically demonstrating that all humans on Earth live in multispecies worlds.

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Considering the State of SoE's Code of Ethics

The Code of Ethics for the Society of Ethnobiology (SoE) is the International Society of Ethnobiology's (ISE) Code of Ethics. SoE members can feel confident in the quality of our Code of Ethics because ISE has made tremendous efforts towards developing their Code of Ethics and an Ethics Toolkit. While the ISE continues investing in their ethics program by, among other things, developing an Ethics Toolkit, SoE continues relying on ISE to provide standards for us. The SoE has an Ethics Committee with the President and Vice President as members. We have organized an ethics session for the 2016 conference to find out whether you, the members, are satisfied with the state of SoE's ethics, or would like to make changes. The Ethics Committee will seek guidance from the members during this session by asking questions about the ethics issues you deal with in your work as ethnobiologists and facilitating discussions around your responses.

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How to Bring Traditional Knowledge in Science Courses

Aboriginal peoples in Canada are under-represented in science, technology, engineering, and mathematics (STEM). A significant factor explaining the low retention of Aboriginal students in STEM majors is the apparent conflict between Western science and Indigenous science. Aboriginal students feel that STEM is incompatible with their culture. At the First Nations University of Canada (Regina, Saskatchewan, Canada), we are committed to deliver culturally-relevant scientific activities to Aboriginal students. In this presentation, I will discuss how we bring Indigenous knowledge and Elders in our face-to-face and online science courses. I will highlight our Science workshops (e.g., hide tanning activity) where students perform hands-on activities under the guidance of Elders and biology and chemistry professors. I will also present our new Indigenous Environmental Science degree program. It is hoped that the braiding of Indigenous knowledge and Western science in our science courses will improve retention of Aboriginal students in STEM.

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Linkages between Soil and Food Quality in Traditional Plant Systems

Increased access to traditional plants in Washington State and place-based, nutritional information on these plants will enhance food sovereignty resources in the region. This study aims to determine if i) organic soil management techniques affect soil quality parameters (i.e. organic matter, soil biodiversity) in delta restoration habitat and ii) if these soil quality parameters enhance food quality (i.e. antioxidants, phytonutrients) in cultivated, traditional plants. Organic soil management techniques include fish emulsion nitrogen applications (high, low) and compost applications. Plants selected for cultivation include camas (*Camassia quamash*), nodding onion (*Allium cernuum*), serviceberry (*Amelanchier alnifolia*), golden current (*Ribes aureum*), indian plum (*Oemleria cerasifromis*) and blue elderberry (*Sambucus caerulea*). A field site is established on tribally owned farmland (La Conner, WA) and soil and plant samples will be collected for analysis over multiple growing seasons. This presentation will review the project background, objectives and experimental design and report on initial data collection.

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An Applied Geospatial Soil Moisture Model: Investigating Agricultural Field Locations and Proximity to Puebloan Villages in the Central Mesa Verde Region, Southwestern Colorado

Puebloan communities of the Central Mesa Verde Region were heavily reliant upon agriculture for their subsistence needs by AD 900. While Neolithic farmers were able to harness nature, they were dependent upon receiving sufficient precipitation for successful plant growth. A variable climate can have major impacts on soil moisture, which is the amount of water present within a three-dimensional soil column. Although soil moisture can be modeled at multiple spatial scales, most studies rely on data that are at resolutions of 1-km or greater. However, crop growth can vary considerably across small distances. A static geospatial soil moisture model was developed to predict potential agricultural field locations. This model is evaluated by using collected soil moisture data from Crow Canyon Archaeological Center's experimental gardens. This data is used to understand the changes in the Puebloan's risk by determining the distance between Puebloan villages and potential agricultural field locations.

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Dog and Cats and Things that Grow: Ethnobiological Pedagogy with College Freshman

How do we inspire first-year students in college to care about the world beyond their own social lives and the next paper due date? Partly through engaging them in careful, contemplative and meaningful engagement with the natural world around them. In this presentation, I discuss my experience teaching a freshman seminar class in the past two years (titled People, Plants, and Animals) in terms of integrating an ethnobiological pedagogy that connects the heart and mind of a student to the natural world around her/him. By giving students opportunities to connect with places and non-human beings in their own lives, to read works by scholars in various disciplines (humanities and sciences) about human-nature relationships, and to write from their own experiences in conversation with those of others, we can help promote an awareness and consciousness of the natural world as a core aspect of a college education.

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Interaction of ecological and cultural salience in English folk-naming of British birds.

At the heart of the interplay between names and knowledge is the relative salience of different taxa. Hunn (1999) described four, semi-overlapping, kinds of salience: phenotypic, perceptual, cultural and ecological. Whilst the first three are well documented, Ecological Salience remains largely hypothetical in the literature. In this paper I test Hunn's concept of *Ecological Salience* by reference to recorded English folk-names of British birds. Using original bird census data, I demonstrate an overall correlation between the number of names, and/or the number of monolexic names, of a species with up to three measures of specific ubiquity, but that this relationship is significantly weaker for those taxa with documented significance to C19th English Folk culture, which tend to carry more names than predicted by ecological ubiquity alone. The study suggests that Ecological Salience has been significant in bird naming, but that its effect was masked for culturally salient taxa.

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Jennifer Waters Desert Archaeology, Inc.

Regina Chapin-Pyritz SWCA Inc.

Bone Technology during the Early Agricultural Period: Tools, Ornaments and Everyday Life in the Tucson Basin.

Las Capas and Los Pozos are large, multicomponent sites located on the Santa Cruz River floodplain in the Tucson basin of Southern Arizona. Substantial and well-preserved bone and antler artifact assemblages recovered at these sites provide an unusual opportunity to examine bone technology during the San Pedro (1200-800 B.C.) and Cienega (ca. 800 B.C. - A.D. 50). Some of the bone artifacts likely had symbolic functions, while others had more technical functions. Usewear analysis using high power optical microscopy and a comparative collection of replicated usewear was employed to identify potential tool uses. Because

bone tools are often used to produce other tools made from such perishable materials as plant fibers or leather, usewear analyses can provide information on other, less visible technologies needed for day-to-day life on the floodplain.

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The 'Lost' Berry Gardens: First Nations' Plant Cultivation on British Columbia's Northwest Coast

Recent research has highlighted how First Peoples on British Columbia's Northwest coast managed their territories to enhance productivity of key resources such as estuary root crops and crabapple orchards. Today, however, few of these management practices are followed, and First Peoples are undergoing a nutrition transition as they move away from nutrient dense traditional foods to a modern diet high in processed foods, saturated fats and sugars. Associated concerns include a lack of community food security/sovereignty, epidemic rates of chronic preventable diseases, and the loss of biological and cultural diversity as traditional management practices decline. Working with the Heiltsuk First Nation, this PhD research seeks to discover to what extent and in what ways berries were managed in the past. Results will be applied collaboratively to address the concerns listed above. This research will contribute to the evolving understanding of how Northwest Coast First Nations enhanced plant productivity through cultivation.

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Brian King

Freese and Nichols

Water and Prehistoric Agriculture near the Ocampo Caves, Tamaulipas: Integrating Archaeological and Geospatial Applications

The Ocampo region of Tamaulipas, Mexico is well known for archaeological evidence of early domesticated plants and the development of prehistoric food production, documented in the 1950s in three cave sites. Because these early investigations emphasized only one facet of the local settlement system (cave use), the wider spectrum of land use remained ambiguous. Our research addresses the broader context of the Ocampo caves through archaeological survey and geospatial analysis of the surrounding landscape. Field survey revealed additional caves sites as well as open-air settlements in a wide range of topographic settings. A suitability raster produced using a geographic information system weighted overlay analysis identified suitable farming locations, as well as least cost distance zones and travel pathways between sites and from sites to water sources. This predictive tool can facilitate detection of additional early agricultural sites in Ocampo by concentrating future fieldwork on high probability settings.

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Stella Nair

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Sonia Archila Montanez

Universidad de los Andes

Ephemeral Landscapes: Organic Architecture as Locus for Environmental Interaction and Cultural Continuity in the 18th Century

Traditional architecture reflects use of local resources. The Inca and then the Spanish left evidence throughout the countryside of their two conquests architecturally as well as their physical and psychological impact on the inhabitants in the Andes. Both conquests moved across a landscape that was densely inhabited with long traditions, thus creating a layered history of impact that is unveiled through detailed study. Long-term work at Chinchero by Nair has encountered traditionally built structures in the town. Studying this house in 2011 Nair and Hastorf gathered organic and architectural data. We learned about the style of construction, the building date and the resource use zones visited to build the structure. The house construction style and its components display how the Colonial residents continued their building

tradition from the pre-Colombian Inka era, as well as their knowledge and use of the resources within their landscape, based on wood identification by Archila.

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What is an Ethnobiological Ethic? A President's Perspective

As the short term leaders of a professional society, SOE Presidents bring their past personal, teaching, research, and religious-spiritual philosophies with them into their leadership role. We lean upon these foundations as we navigate ethical issues with our members, our publications, society bestowed awards, investment of society funds, and other professional societies. Open honest conversations, admitting when we do not fully understand a situation, and asking for help from those more experienced with the situations at hand are key features of the president's role in ethics.

Herron, Scott Ferris State University herrons@ferris.edu

Roger LeBine Lac Vieux Band of Lake Superior Chippewa

Retracing the Canoe Trail of Nanabozho: Wild Rice Reemergence in Michigan after a Decade of Ecocultural Restoration

Wild rice, *Zizania palustris* and *Z. aquatica*, is an emergent, annual grain once widely distributed across the entire Great Lakes, but the genocide and removal of Native Americans also led to destruction of wild rice habitats. As tribal communities became cut off from the rivers and lakes providing this food, their tool and canoe making knowledge and processing techniques virtually vanished from Michigan. The vision of Roger LeBine's uncle Naganash, who mentored Roger before he passed in 1999, led to his restoration efforts in 2002 on Lake Lac Vieux Desert on the Michigan-Wisconsin border. Over the past decade, the authors helped wild rice reemerge. They hosted a conference in 2006, wild rice camps 2007-2012, and have trained hundreds of citizens from Michigan and beyond in the hand-harvesting techniques of wild rice from canoes, as well as processing techniques to turn this grain into an Anishinaabek staple foods again.

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Andrew Salywon Desert Botanical Garden

Cultural Plants and Cultural Landscapes: Pre-Columbian Agaves in Arizona

The importance of agaves to Mesoamerica and its cultures has long been recognized for providing food, fiber and beverage. However, their significance to these cultures has overshadowed and distorted the plants' role for indigenous peoples north of the U.S. - Mexico border. Pre-Columbian farmers cultivated more than ten species of agave in Arizona from at least A.D. 600, including several putative domesticated species. Because of their longevity and primarily asexual reproduction, relict agave clones have persisted in the landscape to the present, providing an opportunity to study pre-Columbian nutrition, trade, migration and agricultural practices. Additionally, these remnant clones present a rare opportunity to examine cultivars virtually unchanged since they were last cultivated within a prehistoric cultural context. These discoveries underscore the necessity of viewing landscapes and some plant species from a cultural, rather than "natural," perspective that may help discern potential cryptic species veiled by more traditional taxonomic treatments. Understanding these plants and their ecological/cultural roles requires interdisciplinary collaboration between botanists and archaeologists.

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Working Towards a Traditional Plant Harvesting Agreement: An Example from Mount Rainier National Park.

Last year, the United States' National Park Service purposed a rule change, that if accepted, would establish procedures to develop policies which would allow traditional plant collecting, by federally recognized tribes, within park lands. If these rule changes go through, the establishment of collecting agreements require both an understanding of cultural and biological factors that influence traditional harvesting practices. Since 2006, I, with cooperation of the Nisqually Native American Tribe, and Mount Rainier National Park, have studied the ecology of traditional plant harvesting. The mechanisms for the sustainable harvest of beargrass (*Xerophyllum tenax*), pipsissewa (*Chimaphila umbellata*), and peeling bark of western redcedar (*Thuja plicata*) are cultural practices, which works within the plants tolerance to damage, or maintains its ability to reproduce. The approach used in conducting this research is one possible set of methods for collecting data needed in establishing collecting agreements.

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Rob Fergus Independent Researcher

Believing Birds: Human-Avian Interaction in the Lacandon Maya Forest

The Lacandon Maya of Chiapas, Mexico are acutely attuned to messages brought by various birds. For prognostications relating to climate, time, health and healing, sorcery, danger, and hunting the Lacandon look principally to birds, to a remarkable extent. In this presentation we draw upon our fieldwork data with the Lacandon to decipher the intimate knowledge-sharing relationship that exists between birds and the Lacandon people. With many of these relationships we show a mythological precedent that informs current beliefs. We also examine the idiosyncratic Lacandon taxonomy through naming practices and contrast these taxa with neighboring Maya groups and sister languages.

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Dana Lepofsky Simon Fraser University

Nancy Turner University of Victoria

Jane Carpenter Heiltsuk Integrated Resources Management Department

Mountain Top to Ocean Floor: The Eco-Cultural History of Hauyat

The Mountain Top to Ocean Floor Project is a collaborative undertaking by the Heiltsuk First Nation, Simon Fraser University, and University of Victoria that seeks to document and explore the unique cultural and ecological history of Hauyat, a landscape in Heiltsuk traditional territory on the Central Coast of British Columbia. Over millennia, Hauyat has been transformed by a complex web of relationships between people, plants, animals and ecosystems. The rich and deep history of this place is known through Heiltsuk oral history and is also reflected in the number and diversity of archaeological sites and eco-cultural features. Ranging from the lower intertidal to the subalpine, the landscape has been modified to include clam gardens, fish traps, root gardens, berry patches, orchards, settlements, rock art, and defensive sites. These features are suggestive of long-term resource management systems that likely worked together to provide food, materials, and medicines for past communities.

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Olga Belichenko European University of St. Peterburg
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Russian Influence in Present-Day Ethnobotany and Ethnomedicine of Chukotka

The authors worked from 2014-2015 with 95 Naukan and Chukchi participants in six villages in the Russian Far Eastern region of Chukotka to document local plants used for food, medicine and spiritual purposes as well as illness explanatory models. Voucher specimens of 41 useful species were collected from the local Arctic tundra. The study region underwent significant acculturation in the Soviet period due to collectivization of herding brigades, establishment of schools and termination of village sites deemed unsuitable for collectivist living, changes in spiritual worldview, subsistence, social structure and language proficiency, a reduction in the number of wild species gathered for food as diets shifted to include store-bought food. On the other hand, the number of local species considered to be medicinal has actually increased, as people came to view treatment of illness in more physical and less spiritual terms.

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Between Wet and Dry/Between Life and Death: Fishwork, Colonial Control, and Transformations in the Littoral Ecology of Disease

In the decade that followed the 1900 signing of the Uganda Agreement, an estimated 200,000-300,000 individuals in this newly forming nation died. Colonial administrators and contemporary scholars alike have attributed their deaths to an outbreak of sleeping sickness, a disease transmitted through the bite of blood-sucking tsetse flies. Hardest hit were former residents of the over one-hundred and fifty strategically important islands that fringe Uganda's southern shores. Ten years after formal colonial indirect rule began, almost all islanders were, to quote colonial administrators at the time, "exterminated." In the vernacular languages in use along Uganda's southern littoral, the term for island was and still is ekizinga. Although ekizinga is a noun, it references an object (eki) that comes into being through the actions of rolling, coiling, twisting, and folding (zinga). Ekizinga are places materially and metaphorically manipulated into existence. Combining insights from previous scholarship in historical linguistics and ethnobiology with unpublished vernacular language texts and ethnographic interviews with littoral elders and contemporary healers, this paper considers islands as ekizinga to reexamine Uganda's sleeping sickness epidemic. Rather than consider the containment of this epidemic as a triumph of colonial medicine – as most contemporary Ugandans and Euro-American scholars continue to do – this paper demonstrates that historical littoral residents actively manipulated littoral vegetation that would otherwise have created ideal habitat for tsetse flies into the conditions of their own abundance, simultaneously limiting the spatial extent of the disease. Early colonially imposed efforts to contain sleeping sickness by forcibly limiting movements between littorals, rendering all fishing illegal, and removing islanders from Uganda's littorals, only made the situation worse.

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Hopi Dryland Farming: Sustainability through Environmental Knowledge and Adaptive Management

Since time immemorial the Hopi people of the southwest have been producing crops (corn, beans, squash) for sustenance and ceremonial use despite the arid region they reside in. This presentation will look at some of the time tested Hopi agricultural techniques that have been utilized and have contributed to their survival in the environment they are a part of. Although some of the process have changed over time such as the use of a modified planter the principles of why they plant have remained unchanged. These Hopi

dryland farming techniques will be given in a power point presentation further validating Hopi dryland farming as being one of the best uses of traditional ecological knowledge still being utilized in the United States despite outside pressure from a number of western influences.

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Beyond Depression? Human-Environmental Impacts and Foraging Theory in Zooarchaeology

The use of optimal foraging theory in zooarchaeology has been criticized for focusing heavily on negative human-environmental interactions – particularly, anthropogenic resource depression, or cases in which prey populations are reduced by foragers' own foraging activities. In this presentation, I assess this critique. I first review the foraging theory/zooarchaeology literature, and then use examples from Pleistocene-Holocene transition Southwestern Europe to explore how foraging theory can address questions beyond "was there resource depression?"

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Strategies for Revitalizing Traditional Botanical Knowledge in Two Tribal Communities in Coastal Louisiana

Native American communities of Isle de Jean Charles and Pointe-au-Chien, located along Louisiana's Gulf Coast, are experiencing adverse effects from coastal erosion, subsidence, and sea level rise affecting their ability to remain in a place they have lived for generations. The extensive land loss, and salt water inundation is also a major contributing factor to the loss of many traditional medicinal and wild edible plants. This paper brings together research from the 1930's, 1960's, and present-day to examine how traditional botanical knowledge and use has changed, and how various sociocultural and environmental factors have contributed to its decline. Currently, both communities are actively pursuing strategies to revitalize traditional botanical knowledge with the aims of increasing self-sufficiency, improving health outcomes, and fostering pride in their cultural heritage. This paper will discuss different strategies the communities are employing to maintain and revitalize traditional medicinal and wild edible plant knowledge and use.

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Fish Otoliths from Brazilian Shell Mound Sites: More than a By-Product of Fishing

Otoliths are elements commonly recovered from Brazilian shell mound and midden deposits, and their presence has usually been explained as a simple by-product of fish processing and consumption by hunter-gatherer groups. However, many groups used and still utilize otoliths as charms, oracles, medicinal ingredients, and raw material for jewelry. Realization that the relationship between humans and animals encompasses more than just a subsistence-based connection encouraged a review of the fish assemblage recovered from a cemetery site. Research at the Jabuticabeira II site in southern Brazil unveils new hypotheses for the use and deposition of otoliths by prehistoric coastal hunter-gatherer populations.

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It Squirted on Me! Introducing Students to Plant Science with Ecological Studies of *Cyclanthera dissecta*

For six years, students at Southwestern Oklahoma State University have been given the chance to engage in fieldwork and data manipulation while working with *Cyclanthera dissecta* (*C. naudiniana*: Cucurbitaceae), a weedy annual vine that is native to Oklahoma. Despite being related to known medicinal and edible plants (e.g., *Cyclanthera pedata*), little is known about this plant with exploding seed pods. The interesting physical characteristics and lack of extensive previous research have made this plant a good fit for student

research. Data collection has focused primarily on population size (ranging from 14 to 326 plants in one population) and location of all individuals. Students have analyzed the correlation between drought and population decline and are investigating influences of other factors including timing of first freeze, disease transmission, and seed germination on population size.

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Ethics from an Anishinaabe Male Wild Rice Chief

The spirit of the plants, animals, and places we tend and procure food and other resources from guide our ethics. As a protector of natural resources including wild rice, walleye, and wolves, we return to the lakes, rivers, forests, and swamps throughout the year, not just when they provide their bountiful harvest. We offer gifts, songs, smoke, and thank the spirits that protect these resources and offer us what we harvest. Working with elders, youth, and adults from many backgrounds and cultures presents challenges when regarding harvesting. We always come back to the origin stories (sacred oral stories), and discuss them in the context of treaty rights, modern laws, and what it means to be an honest, good human being walking gently on the earth with our actions and choices.

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Ethnobotany of *Castanopsis* in Fengshui Forests of southeast China

Surrounding and within the villages of southeast China are old forests of variable sizes called fengshui forests (fengshuilin or 风水林). Often protected and strictly regulated by village customs, many fengshui forests survived the major deforestation and conversion to plantations that occurred in the past century. These forests are crucial to village health and prosperity, not only in an ecological sense but also in association with numerous village activities, rites, and beliefs that reflect the "fengshui" cosmology of the Han people. Our interviews and field research of fengshuilin in Guangdong, Fujian, and Jiangxi Provinces have confirmed certain ecological benefits of these forests in addition to the high biodiversity of subtropical broadleaf trees, which can potentially provide valuable refugia for the unique and biodiverse subtropical flora of East Asia. Here, we present ethnobotanical uses for and associated ethnographic knowledge and beliefs about one important and widespread genus, *Castanopsis*.

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Innu-Natukuna: Members of the Ekvanitshit Community Gather Medicinal Plants – Description of an Experience with Hydro-Québec

The Innu community of Ekvanitshit has a community pharmacy called Innu-Natukuna. The women who work there carry out activities related to both preparing and distributing medicinal remedies. As part of the Romaine hydroelectric project (1,550 MW – 8.0 TWh), they helped implement an enhancement measure related to gathering medicinal plants in the impoundment areas of future reservoirs. From 2011 to 2014, a team of Innu gatherers, along with a Hydro-Québec Environment Advisor, gathered medicinal plants on the site of the future reservoirs. In total, they collected 16 species of medicinal plants that were then processed and added to the community pharmacy. The presentation describes the gathering experience organized by both an Innu community and a government-owned corporation as part of the construction of a hydropower complex. The gatherers and the Environment Advisor will describe the challenges faced during the experience as well as their accomplishments.

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From Cosmologies to “Worlding” and Back Again in a Very Short Period of Time

Focusing on processes of nourishing and being nourished, this paper gives a material-semiotic reading of people-plant-place relations situated in the montane Coast Salish territories of Washington State. Drawing on examples from archival research and fieldwork with Puget Sound Coast Salish communities, I consider the potential of such an approach for enlivening the field of ethnobiology. As a form of process-relational thought, material-semiotics offers a heuristic for understanding matter and mind not as conjoined as in two sides of the same coin, but as an emergent property of animate, dwelt-in worlds. Such a perspective does not require abandonment of either ecology or history; rather, material-semiotics is a form of “radical empiricism” that has the potential to literally enliven our understandings of the relations between them. In particular, material-semiotics as ontology and as praxis resonates with Puget Sound Coast Salish understandings of history, temporality, and people-place-plant relations.

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The World in a Seed: Use Reimagined

The act of seed conservation at the Millennium Seed Bank demands attention to the interactions and entanglements that plants rely on, foster and contribute to in the world around them. This paper argues that as seed scientists endeavour to unpack the worlds of the seed, in order to sustain the wild communities from which they come, they draw upon a capacity for empathy and an appreciation of other living agencies akin, perhaps, to animism. Yet, in attempting to communicate the relationships that the seeds exist within, those involved in the conservation often fall back on utilitarian rhetoric. Holding in mind the concern of multispecies scholars, this paper aims to explore what ethnobiology can contribute to the comprehension and communication of such relations within the environment and how we might help reimagine relationships of use in human-plant interactions.

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Spatial Subsidies of Ecosystem Services Provided by Transboundary Migratory Northern Pintails

In complex coupled natural-human systems, drivers of change in one location can have profound effects on human well-being in distant locations, often across international borders. Here, we use a new approach—spatial subsidies—to measure the degree to which a migratory species’ ability to provide services in one location depends on habitat in another location. We calculated spatial subsidies for a migratory species: Northern Pintails (*Anas acuta*) that migrates between the U.S. and Canada. We modeled habitat dependence, and assessed the economic value of pintail ecosystem services (viewing, and hunting). We found that pintails provide \$48 million/year, predominantly in the U.S. The Prairie Potholes breeding region (in Canada and the northern U.S.) was the most important for population viability. Finally, we found that U.S. habitat areas in Alaska and the west coast derive a subsidy from breeding areas in predominantly in Canada and overwintering habitat on the Gulf Coast.

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Too Many Turkeys?

In the Northern San Juan area of the Southwest, turkey bones increase markedly relative to those of artiodactyls in Ancestral Pueblo sites of the A.D. 1200s, apparently in response to game depletion. We use excavated faunal assemblages to model the proportional contribution of turkeys, artiodactyls, lagomorphs, and other small animals to the A.D. 1200s diet. We estimate that in some large villages, domestic turkeys contributed over half the minimum need for animal protein. Both the birds and their keepers were heavily dependent on maize; three adult turkeys would have required as much maize as a single adult human. Keeping turkeys would have required larger harvests, more storage capacity, and increased time and effort, thus adding substantial costs (and risks) to a subsistence economy dependent on dry farming.

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Wild Rice: The Curious Case of Aboriginal Grain Use in the West

First Peoples on the Northwest Coast of North America have an extraordinarily rich traditional diet including nearly 300 species, many of which have been "tended." Some European foods, such as root vegetables, were readily adopted subsequent to contact with early explorers, while others, such as grains, were avoided despite pressure from colonial governments. This talk explores the provenance of Wild Rice (*Zizania palustris*) in the west, a grain that is neither traditionally eaten, nor native to this region, yet was adopted by some Coast Salish families in the 20th century. While it is commonly thought to have been planted in the west by duck hunters, I use historical, linguistic, and genetic modes of inquiry to test my hypothesis that Wild Rice, and associated TEK, was traded westward where it germinated in novel soil among otherwise grain-averse people, because rice culture was an indigenous technology that was compatible with existing foodscapes.

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Diet Breadth and Resource Intensification in Relation to Environmental Change

This project examines the ecology of human diet using archeological evidence from North Creek Shelter (NCS), a site near Escalante, Utah. I combine evidence from dietary plant macro- and microfossil remains with dietary faunal remains, examining this comprehensive dataset in the context of ground stone tool abundance and environmental change. Two periods of increased dietary species richness occurred at 9400 and 8000 14C BP, when people were focusing their subsistence on deer and *Chenopodium* seeds, respectively. The shift in emphasis between deer and *Chenopodium* was accompanied by a shift in stone tool technology. The assemblage of chipped stone tools at 9400 14C BP was dominated by hunting and bone-processing implements. Ground stone tools became dominant at 8000 14C BP, simultaneous with a peak in *Chenopodium* abundance. Increasing aridity began by 9000 14C BP and had progressed significantly by 8000 14C BP, indicated by a shift in vegetation from a mixed conifer forest of cool-adapted species to a semi-arid woodland and shrub mosaic. This coincided with a broadening of the diet dependent upon an intensified use of small seeds and ground stone technology.

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Utilization of Faunal Resources at the Merchant Site, Southeastern New Mexico

Archaeological investigations at the Merchant Site recovered a large faunal assemblage. Results from the faunal analysis indicate that the prehistoric inhabitants of this 14th century pueblo relied heavily on large mammal resources, specifically bison and deer/pronghorn, for dietary purposes. Although remains of small mammals are present, they represent an extremely small proportion of the assemblage. The low quantity of small mammal remains appears to be a reflection of their limited importance as a food source, and not the result of excavation or screening bias. The high quantities of artiodactyl remains recovered from the Merchant site raises interesting questions concerning the relative abundance of large mammals in the local area during this time period, as well as the amount of time and energy potentially invested in long distance hunting by the inhabitants of the site, and the possible use of bison meat and hides as a trade good.

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Working with Nunatsiavut Government to Deliver Community-Based Harvest Monitoring of Migratory Birds in Northern Labrador

Because migratory birds move across the continent or over oceans, it is essential that governments coordinate and cooperate in research and management. Environment and Climate Change Canada's Canadian Wildlife Service (CWS) is Canada's national wildlife agency, with a core area of responsibility being the protection and management of migratory birds and their nationally important habitats. However, this responsibility is ultimately a shared responsibility with provincial/territorial and Aboriginal governments. As an example, CWS has been working cooperatively with Nunatsiavut Government (representing Labrador Inuit) to develop a community-based program to monitor Inuit harvest of migratory birds in Northern Labrador. Information on species, sex and age composition is collected by assessing characteristics of wings and tails of birds donated to community freezers. This will provide ongoing local-level information to guide Nunatsiavut Government's harvest recommendations and also promotes a better understanding of the populations of harvested birds in a remote region.

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Relationships to Land over Time in the Traditional Knowledge of Gitksan and Witsuwit'en, Northwestern British Columbia

Historical ecology and ethnoecology overlap in the traditional knowledge and narratives of contemporary indigenous peoples. For this symposium, I reflect on kinds of information about past ecological conditions, and past relationships with plants and animals. Gitksan narratives reveal significant past relationships with animals, located in particular places on the landscape. Other narratives reveal changes in environmental conditions, such as the shrinking of glaciers and snowfields, and embed these in more general contexts. Looking after the territory is another aspect of historical relationship to the land revealed in the traditional knowledge of Elders I have worked with. Finally, certain highly significant places on the landscape, appear to be Cultural Keystone Places, foci of ancient occupation and oral traditions. Memory of environmental change or significant events and morally charged messages about proper relationships of people to other species are located in these places.

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Woodland Ecology and Wood Fuel Use in the Epipaleolithic and Early Neolithic Fayum, Egypt

The Western Desert of Egypt appeared radically different in the Early Holocene, prior to the aridification of the Sahara. In this savanna-like environment, we find evidence for the earliest agricultural populations in Africa in the Fayum Basin alongside the paleolake Birket Qarun. Recent archaeological investigation of Epipaleolithic and Early Neolithic features in this landscape has yielded considerable wood charcoal, which provides evidence for woodland ecology in this region and for selective wood use by early farmers and herders. This paper presents results of charcoal analysis from three sites in the Fayum region that indicate that sustained, low-effort exploitation of the riparian wood community was the most prevalent wood collection strategy in this region; evidence for collection of desert shrubs is limited. Low wood charcoal diversity indicates a lack of resource depression during the Early Holocene. The early agricultural impact on woodland communities in this region appears to have been minimal.

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Gardens for the Living and the Dead: Coast Salish Funerals and the Production of Blue Camas

Between ca. AD 1400–500, Coast Salish peoples of southern Vancouver Island were actively engaged in the making of landscapes that were a mosaic of blue camas (*Camassia leichtlinii* and *C. quamash*; Liliaceae) punctuated with burial cairns—arrangements of stones and soil built over the dead. Blue camas was an economically vital root food that was managed, owned, and inherited through time. Recent research at two Cultural Keystone Places: Rocky Point and Cadboro Bay, suggests a relationship between the production of camas and the production of the ancestral dead. Tacking between archaeological, ethnographic, and ethnobotanical evidence, I conclude that beginning ca. AD 1400, the Coast Salish dead became increasingly implicated in the affairs of the living, such that the moving of stones in the context of both gardening and funerals recursively defined and legitimated claims to ancestral places and histories.

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The Creation of the Southwestern Rangeland: Archaeological Markers of Landscape Management at Pimería Alta Spanish Colonial Site

European livestock accompanied the foundation of Spanish missions and presidios in the arid Pimeria Alta, altering the local landscape and native society. Livestock connected desert farmers to distant colonial markets and provided a new source of protein and grease. These animals also required new economic, social, and spatial arrangements--putting new pressures on water plant resources near Spanish colonial sites. This paper explores domesticated animals' access to water and grazing using stable isotopes from ungulate bioapatite from several colonial sites, and wild animal importance through zooarchaeological data. Historical and archaeological evidence point to a regional pattern of differential access to resources among caprine and cattle and an absence of wild fauna from assemblages. Regional and synthetic approaches provide a new way to investigate the colonial demands on O'odham labor and pressures on the range and water resources that had previously been used for agricultural irrigation.

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Beyond the Foraging-Farming Continuum: Modeling the Diversity of Human Subsistence in Multiple Dimensions

Human subsistence strategies have frequently been portrayed on a continuum from foraging to farming. However, studies of traditional resource management have produced numerous examples of activities (e.g. transplanting, pruning, controlled burning) that do not fit neatly on this axis. To account for this complexity, we present multidimensional models of subsistence strategies based on the presence or absence of specific practices. To assess the models, we coded data from an initial sample of eleven cultures in the Western Hemisphere and employed clustering analyses to assess similarities and differences between them. Using these models, we investigated correlations between subsistence strategies, language families, and environments. Recognizing the limitations of coding bias, an incomplete record of practices, and cultural change, we see multidimensional models as an opportunity to explore the diversity of human subsistence practices without *a priori* placement of farming at the endpoint of a scale.

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Protecting Seed Sovereignty: What is the Role of the Ethnobotanist

As ethnobotanical researchers we're often identifying plants, and therefore seeds, with uses unique to a culture or that have been developed over generations to fit a particular environment and use. International treaties have recognized the rights of Indigenous Peoples to their seeds and to agreements upon collection. Many countries also require deposits in government herbaria. Whether one agrees with patenting or not, commercial enterprises could acquire these seeds in the name of research or biodiversity and subsequently create patentable products or plants. As material is transferred from seedbanks or herbaria are the agreements on use considered? Are standardized collection forms a good idea for the Society of Ethnobiology? Do we need a toolkit listing methods to ensure seed sovereignty so the seeds are not compromised after the collection of material? Can we create a database listing our members' agreements with Indigenous Peoples (if not the agreements themselves) upon collection?

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Targeting Firearms: Effects of the Introduction of New Technologies on Traditional Tsimané Hunting in Bolivian Amazonia

For decades, firearms have been replacing the traditional implements used in Amazonian hunting. Studies highlight the widespread preference for firearms due to their superior efficacy over traditional tools. For the Tsimané people, hunting is one of the main subsistence activities. Most hunters use firearms, but Tsimané from the villages of San Luis Chico and Cuchisama continue to use bows and arrows while hunting. Through a process of reflection and discussion, villagers identified the widespread use of firearms as a negative cultural change. Results reveal the overall preference for traditional implements over firearms in criteria such as monetary cost, quietness and cultural identity. Despite this preference, younger generations are not hunting with bows and arrows, nor fabricating them. This study aims to analyze the preference for traditional implements in two villages and evaluate the effect that firearms are having on the Tsimané culture as seen from the local (emic) perspective.

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Code of Ethics of the Latin American Society of Ethnobiology (SOLAE)

The Latin American Society of Ethnobiology Code of Ethics (SOLAE-CoE), since its approval during the IV SOLAE conference in October 2015, offers ethical guidelines for all SOLAE members, researchers, indigenous peoples, local communities and organizations to carry out ethnobiological research in Latin America. This CoE represents over three years of work by the Ethics Committee in several countries. Encouraging the participation and collaboration of ethnobiologists, indigenous peoples, local communities, and the private and governmental sectors, the SOLAE-CoE addresses the necessities and realities of the Latin American region. Currently, the Ethics committee is implementing and disseminating the SOLAE-CoE to communities, regional and national organizations, universities and academic societies aiming to reach those interested in ethnobiological research in Latin America. For this session, I invite discussion of the SOLAE-CoE and the possibility of starting a collaboration between SOLAE and SoE.

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Reintroducing White-Tailed Sea Eagles to Ireland: Resolving Human-Predator Conflicts

Today we are in the midst of a global extinction crisis. About 12% of the world's bird species are threatened with extinction. Historically large terrestrial and avian carnivores have been driven to near extinction because of conflicts with human interests. Reintroduction, restoration and rewilding are tools for species, population and ecosystem recovery. White-tailed Sea Eagles (*Haliaeetus albicilla*) were one of two eagle species indigenous to Ireland that disappeared as a result of human persecution in the early 20th century. A reintroduction program, using young eagles from Norway, has been ongoing since 2007 with birds now breeding in the wild. However human-eagle conflict still persists. Regarded with reverence in ancient Irish folklore, the connection between man and eagle broke down, perhaps paralleled by the disintegration of Gaelic culture. Restoring this disconnect is critical to the success of reintroduction projects. Lessons from Norway show that such conflicts can be resolved.

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Rarámuri Bird Knowledge and Environmental Change in the Sierra Tarahumara, Chihuahua, Mexico

Greater than 99% of the original extent of the Sierra Madre Occidental's pine-oak ecosystem has been subject to logging, thus leaving few opportunities to measure changes in bird communities. This study examines knowledge of pine-oak (*Pinus-Quercus*) bird species held by residents of two indigenous Rarámuri communities in southwestern Chihuahua, Mexico: Cabóráchi, a community logged extensively for close to 50 years, and Pino Gordo, which retains unharvested pine-oak forests. Research participants were asked to identify and name 105 color bird pictures and offer their opinions on whether their abundance had changed over their lifetimes. Residents of Pino Gordo provided an average of 42 Rarámuri bird names, nine to 13 more than Cabóráchi residents. On average Cabóráchi respondents failed to recognize old-growth associated species nearly 20% more frequently than generalist species, a difference that did not exist for residents of Pino Gordo. While culture change is likely occurring in Cabóráchi, the greater loss in bird knowledge of old growth species suggests environmental change is having an impact on biocultural diversity. Older interviewees perceived 59 changes in abundance for 15 bird species and species groups, with 78% of these changes reported from Cabóráchi. Many of these changes correspond to ecological changes recognized by western scientists. This research demonstrates connections between environmental conditions and the maintenance of traditional knowledge. The salience of many bird species makes ethno-

ornithology a potentially productive means for documenting ecological change in regions where prolonged ecological investigations are difficult to conduct.

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"Food Fires:" Initial Estimates of the Yield and Sustainability of Ruderal Production by Anthropogenic Burning

Archaeological investigations of the effects of anthropogenic fire on the livelihoods of small-scale societies, particularly those of the prehispanic northern Southwest, are embryonic in scope and disciplinary impact. In this contribution, we present the first results of our efforts to estimate the yields of ruderals -- economically important plants that thrive in disturbed areas -- that accompany anthropogenic burning. With data from the Upper Basin (northern Arizona), we show that, in an area that is environmentally hostile to corn production, significant populations could be supported with "food fires" -- low-intensity understory burns that promoted ruderal production in pinyon-juniper ecosystems (the remains of these plants dominate the area's archaeobotanical and pollen assemblages). This first approximation is intended to illustrate that fire-reliant ruderal agriculture, in contrast to maize agriculture, was a sustainable and ecologically-sound practice that not only increased food-supply security but insulated populations from long-term climatic variability and short-term environmental uncertainty.

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Brian Coddington University of Utah

The Potential Integration of Niche Construction Theory within the Framework of Human Behavioral Ecology

Throughout the history of hominid evolution, our ancestors developed the ability to adapt to extremely different environments and eventually colonize the entire world. The capacity to adapt to environments as different as the Amazon Rainforest and the Arctic tundra is complex, and has led some anthropologists to question the utility of Neo-Darwinian evolutionary frameworks. The debate over the utility of these frameworks has become more heated recently, with some proposing the use of Niche Construction Theory (NCT) as an alternative to Human Behavioral Ecology (HBE). Here, we propose that, instead of viewing NCT as an alternative to HBE, niche constructing behavior can (and has been) integrated within HBE models. We discuss three examples to show how these two theoretical frameworks articulate with one another, including a discussion of animal domestication in the Near East, human fire use in California, and clam garden construction on the Northwest Coast.

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Bet-Hedgers under Cultivation: Insights into the Domestication of Erect Knotweed from the Field and the Greenhouse

Evolutionary bet-hedging refers to situations in which organisms sacrifice mean fitness for a reduction in fitness variance over time. Germination heteromorphism is the quintessential and most well understood bet-hedging strategy. It has evolved in many different plants, including the wild progenitors of some crops. Erect knotweed (*Polygonum erectum* L.), an annual seed crop, was cultivated in Eastern North America between c. 1500-800 BP. By 800 BP, cultivation had produced a domesticated subspecies with greatly reduced germination heteromorphism. Field observations and greenhouse experiments explore how domestication could have occurred in this case, with reference to the theory of evolutionary bet-hedging. Dormancy provides plants a means of escaping adverse conditions in time, while dispersal provides an escape in space. Farmers relaxed selective pressures for dormancy in erect knotweed by acting

as seed dispersers and by creating more homogenous conditions for cultivated plants over many generations.

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Intensive Hunting and Early Animal Management in the Southern Levant

This paper adopts a deep-time behavioral ecological framework to investigate changes in animal economy across the forager to farmer transition in the southern Levant. A sequence of Epipaleolithic and early Neolithic archaeozoological assemblages are used to reconstruct the ecological background from which animal management emerged. This paper focuses on the trade-off between wild game and domestic progenitor species. Increased frequencies of goat, pig and cattle from the Early Pre-Pottery Neolithic B (PPNB) to the Late PPNB phases coincide with a reduction in wild taxa and an increase in foraging efficiency indicated by multiple independent comparisons of high and low-ranked wild taxa. The wild diet narrows as domestic progenitors play an increasingly important role. These changes suggest that by the PPNB it was more efficient for humans to modify prey populations with the lowest management costs (domestic progenitors), than to pay increasingly high search and handling costs for gazelle and small game.

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Conceiving Venomousness and the Variability of Species. Cases of *Echis leucogaster* from Western Niger

The contribution discusses cases of *Echis leucogaster* envenomation in Western Niger and tries to give an example of how venomousness could be perceived in a local context; at the same, it outlines an ethnobiological approach to the topic of variability on a species- and subspecies level (*Echis* sp.). *E. leucogaster*, which only in the 1970s was classified as a species of its own, is of particular interest: Clinical descriptions of envenomations caused by its bite seem almost inexistent, and many authors refer to other *Echis* sp. when discussing the topic. This is however problematic, given the high variability of snake venom. Furthermore, clinical descriptions of envenomations in the African context are generally not very numerous compared to other continents. The present contribution discusses thus the study of local clinical observations made by healers as the anthropological input to a (future) interdisciplinary research of venom variability.

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Ethnobotany of Oshá (*Ligusticum porteri*) and the Role of Traditional Knowledge Systems with Plant Management

Oshá (*Ligusticum porteri*), found growing at high elevation sites in the southwestern United States and northwestern Mexico, is a medicinal plant whose roots are being sold by herbal product companies to treat influenza, bronchitis, coughs, colds, and sore throat. Historically, tribes including the Chiricahua, Mescalero, and White Mountain bands of the Apache, Navajo, Zuni and other Pueblos, Southern Ute, Lakota, and the Tarahumara in Mexico used oshá to treat ailments listed above and others that we will highlight in our poster. We will present the details of the tribal ethnobotany of oshá, including uses for food, medicine, and other cultural uses. Our collaborative work, including fieldwork in New Mexico and Colorado is focused on sustainability of harvest of oshá. We will use ethnobotanical information to demonstrate that these efforts can be aided by incorporating Native American traditional knowledge.

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Difficult Choices: HBE and the Legacy of the New Archaeology

Archaeological research using human behavioral ecology (HBE) models to understand subsistence change has significantly increased over the past decade both in number and scope. However, it faces challenges from outside and within. The former stems from a long-standing criticism that HBE models are too environmentally deterministic and do not accommodate humans as unique, active participants in their destiny. The latter is from HBE practitioners who look to expand its application beyond food acquisition and production. In this paper, I examine why reaching common ground between traditional HBE approaches and these critical perspectives is often difficult. The dilemma is linked to the New Archaeology's dual goals of being anthropological and scientific. Meeting both goals is often not possible. As a result, researchers often must prioritize one goal over the other, resulting in the development of debates with two "camps" in both HBE research and the broader archaeological literature.

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The Use of the Faunal Resources among the High Altitude Hunter Gatherers of Southern Mendoza

During the last 20 years research has been carried out to understand human use of environments located above 3000 masl in the Andean cordillera from southern Mendoza (Argentina). The archaeological record at this elevation is characterized by the presence of habitation structures, high frequency of pottery, non-local goods, late radiocarbon chronology, as well as dependence on big game. In this presentation we use Optimal Foraging concepts to evaluate alternative hypothesis about the use of faunal resources in such high elevation ecosystems. The archaeofaunal record from Los Pequeños, El Indígena, Laguna del Diamante and Risco de los Indios sites, are used to discuss the alternative hypothesis. All these sites are located in the high Andes of South America, near the headwaters of Diamante and Atuel rivers, a ca. 34° SL. The results suggests that high elevation camps were used as base camps and probably with larger stays than was initially expected.

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TOCC Plant Atlas: A Tool for Preserving Biocultural Diversity

Over the past decades, biocultural studies have shown that diversity in language and culture are strongly linked to biological diversity and have established that a loss of diversity in one domain negatively impacts diversity in the other. Thus, a thriving linguistic and cultural diversity sustains the vitality and resilience of our planet. The tribal college system in the U.S plays a pivotal role in the biocultural preservation and resilience for indigenous communities. For example, the Tohono O'odham Community College has developed a "TOCC Plant Atlas" which is a medium for cultural and language preservation. The TOCC Plant Atlas is a web-based teaching tool that provides a visually rich and culturally-relevant medium to relate native knowledge to scientific knowledge. It merges Tohono O'odham traditional knowledge with scientific knowledge. The Plant Atlas includes audio of the Tohono O'odham names which strengthens its role in Tohono O'odham language preservation.

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The Big but Not Empty Land: Ecological Footprints of Fishing Practices near the Inuit Community of Makkovik (Nunatsiavut, Canada)

Historically, life in Labrador—affectionately known as “The Big Land”—had strong ties to maritime areas. The coastline has been home and thoroughfare for Indigenous peoples, and later for other nationalities seeking whales and codfish. Today, all five communities in Nunatsiavut, the Inuit Land Claims Area in Labrador, are located on the Labrador Sea, where communal and commercial fisheries remain locally vital. We looked at present-day plant communities and soils of historical fishing places to see if fishing practices of Makkovimiut (residents of Makkovik) and visiting fishing crews left different ecological footprints. Although we found site-level distinctions, particularly in soil metals, a clearer narrative emerged through plants and soils of individual built environments. This historical urban ecology of the north speaks not only to different footprints of local and visiting fishing crews; with the insight of Makkovimiut, it also tells the often hidden local stories of a peopled northern landscape.

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Relationships in Practice: Makkovimiut Plant Knowledge and Practices

In the natural sciences, plants are understood to live in complex networks of ecological relationships. Plants also live in complex networks of cultural and personal relationships. In the Inuit Community of Makkovik (Nunatsiavut, Labrador), the plant knowledge and practices of Makkovimiut (residents of Makkovik) speak to these integrated networks of ecological, cultural and personal relationships. Plants and plant knowledge support cultural practices such as fishing, which in turn support plants and plant knowledge. Personal ethics of reciprocity and respect help guide relationships with plants, and these values also shape the ways Makkovimiut manage—care for—plants, landscapes and relationships with neighbours. Practicing respectful relationships with plants not only encourages healthy plant communities, but actively strengthens the personal relationships that support caring human communities. In learning about plants in the context of these complex relationships, we have come to better appreciate how central plants are to northern peoples.

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Incorporating Medicinal Plant Knowledge into Green Workshops in Autlán, Jalisco, Mexico

Indigenous knowledge of medicinal plants is highly valued in the region of Autlán, Jalisco. Due to the high prevalence of indigenous communities in the region, and a substantial emphasis on biodiversity conservation in the region, the indigenous knowledge of medicinal plants is very desirable. Participant observation and community surveys are from fieldwork conducted across four trips (from 2013-2015) are used to demonstrate the ways in which indigenous and traditional knowledge are currently being used to: (1) address needs of marginalized communities, (2) bolster a segment of the local economy based in sustainable principles, and (3) promote human well-being at a community and family level. The findings suggest that the incorporation of indigenous medicinal plant knowledge in the broader region of Autlan reflects broader global movements toward health sovereignty.

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Ethno-Ornithology of the Mushere People of Plateau State, North-Central Nigeria: Children's Bird Knowledge.

Ethno-ornithological knowledge of Mushere children was surveyed between October-November 2015. The aim of the study was to determine if bird knowledge held by adults was being transmitted to the younger generation, and if children viewed or perceived birds differently from the adults. We used picture elicitation exercises and free-listing in data collection. Our results show that bird knowledge is being transmitted to children in Mushere, but transmission is mainly horizontal, not vertical, with most children learning from peers. Children view birds mainly as food, and consider them important for that reason. We conclude that more pro-active engagement of Mushere children in bird conservation activities can encourage a better appreciation of birds beyond the present perception and could help sustain the present cultural knowledge of birds.

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Musings from Nephelokokkygia: The Words the Birds Gave Us

"The linguistic sign is arbitrary," (Saussure: 1915). The logical assertion that there is an arbitrary relationship between words and meaning gave Linguistics a definitive answer to the age-old debate between "conventionality" and "naturalness" in language, and laid the foundation for current research inquiry in the field. And yet, iconicity – delightful corners where arbitrariness is all but invisible – persists in the creative system that is human communication. Linguists are cautioned about these 'naturalness' corners: onomatopoeia has no place in Historical Linguistics methods, the Bow-wow Theory of language origin is for the dogs, and language is more of the mind than of culture. This presentation, therefore, dances on the edge of respectability in Linguistics, exploring questions of onomatopoeia, metaphor, and language origin within the context of words the birds have given us. These cross-species borrowings demonstrate a very human relationship with birds that informs etymological transitions from mimicry to meaning.

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A Solution to the "Quinoa Problem"? How a Prehistoric Appalachian Food May Hold an Answer to Regional Food Insecurity

Despite growing international demand for quinoa, American farmers in the Midwest U.S. have had little success in generating a variety of the crop that will grow productively in the region. Still, the National Institute for Food and Agriculture committed \$1.6 million in 2014 to the development of a US-grown quinoa variety. This paper reports on current research aimed at converting a native eastern North American sister species of quinoa, *Chenopodium berlandieri*, into a crop that would fill the demand for a US grown quinoa. We describe the preliminary results of on-going experimental research on the economic potential of *C. berlandieri* as a modern food source in the Appalachian region of Ohio. Additionally, this paper describes recent archaeological data from southeastern Ohio that indicates *C. berlandieri* was domesticated much earlier than previously thought.

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Zoarchaeology and the Development of Colonial Period Archaeology in the Pimería Alta

Archaeological research on the colonial period in what the Spanish referred to as the Pimería Alta, encompassing present-day southern Arizona and northern Sonora, was somewhat slow to develop compared to other regions. Archaeological and historical research tended to be either biographical or

architectural in nature, or was focused primarily on description and particularism. The current blossoming of research that places these colonial sites in broader economic and environmental context is due in no small measure to the growth of archaeofaunal analysis in the region. Zooarchaeological information from Spanish colonial missions and presidios permits examination of regional economic interactions, and connectivities between what used to be characterized as frontier isolates. Zooarchaeological research demonstrates that, through the co-option of O'odham labor, the economies of Spanish colonial missions, mines, and presidios were intimately connected through the production of animal products, including hide and tallow.

Change requested by Raymond Pierotti, 09/27/2016

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~~Nimachia Hernandez-Howe~~ Blackfoot Nation ←

Passerine Birds in the Stories and Knowledge Traditions of American Indigenous Peoples

Birds discussed as important in cultural traditions of Indigenous American peoples, include Eagles, Ravens, Owls, and mythic Thunder Birds. Many passerine birds were important companions and components of the ecology of the places where these peoples lived. We discuss how various Corvids, (Ravens, Crows, Jays, Magpies), and other passerines are identified as having special roles as trickster figures and important teachers. Such stories include how grassland sparrows are one of the few species able to trick the trickster, Coyote, to Canada (or Gray) Jays serving as trickster/Creator of the Woodland Cree people, Wisakyjak. Magpies won the Great Race around the Black Hills to determine whether humans would eat bison or vice versa, and Mockingbirds teaching humans to speak. Although not considered charismatic megafauna, Passerines are known for their attraction to human activities and are open in their communication styles, so that humans felt they could directly communicate with these birds.

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One is the Loneliest Number; How Dingoes Changed Humans

In many areas, humans moved into lands occupied by wolves and developed relationships with these four-legged social hunters. In one place the situation was reversed; humans were present well before social canids arrived, creating a relationship unlike any other (Dingo makes us human). Aboriginal people of Australia and dingoes were the only large placental mammals on an entire continent. Aboriginal people do not regard themselves as owners of dingoes. Aboriginal peoples had no other placental companions until dingoes arrived around 5000 BP. Aboriginal people love dingoes deeply because their presence offered new ways of thinking about identity. Before dingoes Australia was a lonely place. Humans were so pleased to have another placental companion who shared their social proclivities and hunting traditions, that they felt no need to change their new companions into a domestic form, although they raised and socialized puppies, increasing overall dingo breeding success.

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The Use of Plant and Insect Exudates in the American Southwest

The peoples of the Southwest have long used various plant and insect exudates as an adhesive, putty, coating and paint binder. These materials include pinyon pine resin, mesquite gum, and insect lac (shellac). The conservation laboratory at the Arizona State Museum completed a survey of these materials in collections using Fourier transform infrared spectroscopy (FTIR). In this comprehensive study, over 150 artifacts were analyzed in ASM collections which span from the archaic to historic periods. Results document the earliest known uses of these materials and their continued use and trade through time. Results also

demonstrate selective use based on their chemical and materials properties (solubility, hardness, melting point, etc.). This study discusses these new findings in the context of the materials reported in the early anthropological and ethnobotanical literature.

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Chinese Immigrant Life in late-19th-century San Jose, California: Macroremains from Market Street Chinatown

Plant remains recovered from the late-19th century Chinatown in San Jose, California, present a picture of the complexity of Chinatown life. They represent a variety of activities such as purchasing food from local farms and Chinese grocery stores to prepare for daily meals and festivities and purchasing, collecting, or growing medicinal plants to promote good health. They attest to the strong ties between the Overseas Chinese and traditional Chinese foodways as well as the active role the Overseas Chinese took in molding 19th century farming in California.

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Fishing on the Eastern African Coast in the Space-Time Continuum

For over a millennium, people living along the eastern African coast have been fishing on a daily basis. As an archaeologist, my research reconstructs past fishing and fish consumption in this region from the cumulative material traces of these activities. However, it remains a challenge to identify daily actions from archaeological remains. The aim of this paper is to explore the role of daily activities in the formation of long-term patterns recognizable in archaeological data sets. I look at archaeological evidence of fishing from within houses, throughout towns, and across the region that demonstrate how these spaces are interlinked. This multi-scale approach provides a more dynamic understanding of the long-standing fishing practice in this region.

Ramirez, Rose

Ethnobotany Project

Deborah Small

Ethnobotany Project

Ethnobotany Project: Contemporary Use Native Plants Social NorBaja

The collaborative Ethnobotany Project has been documenting southern California and northern Baja California's Native people's contemporary uses of native plants. The primary goal is to create a resource for Native people in this region to share and learn traditional knowledge about native plant uses and gathering practices. The project began in 2007. Two publications have resulted so far: a 2010 large-scale calendar and book in 2015. A series of workshops are planned for the Native community through the project. The recent book will be translated into Spanish and Kumiai later this year. The second goal of this project is to educate the general population about Native people's continued dependence on native plants and habitats, and how they are effected by development, climate change, and other contemporary issues

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Beyond Collections: The Implications of Large Scale Databases for Zoo-archaeological Research

Traditional zooarchaeological research uses collections data from specific sites or regions to draw conclusions about the use of animal resources in prehistory. This paper explores the utility of large scale archaeological databases in addressing research questions in zooarchaeology. Many states now maintain digital databases of their cultural resources; however as this practice is relatively new the research potential

of these databases has yet to be fully realized. We will examine how zooarchaeological research questions can be addressed using the largest statewide cultural resources database, the New Mexico Cultural Resource Information System (NMCRIS), which contains roughly 190,000 sites, 5,000 of which report faunal remains from survey, testing, and excavation activities. We will demonstrate how the NMCRIS system can be used to generate archaeofaunal datasets and ways in which data can be used to test current assumptions about archaeological sites with reported archaeofaunal remains.

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Inuit Perception of Marine Organisms: From Folk Classification to Food Consumption

Although the nutritional benefits of many large marine animals from Inuit food systems are well known, other marine organisms, such as invertebrates from the intertidal region, are poorly studied. In order to highlight these components of the food system in Nunavik, northern Québec, and elucidate their importance to health and wellbeing, interviews with Elders were held, in May 2014, in two Inuit communities, Ivujivik and Kangiqsujuaq. Altogether, 78 marine organisms were mentioned as part of the traditional or current food system, ranging from algae and small marine invertebrates to fish, birds and large mammals. Folk taxonomy of marine organisms combines elements of morphological similarities with access to the sea. Furthermore, activities related to the harvest and consumption of crustaceans, molluscs, echinoderms and algae are often associated with health and wellbeing. Finally, their abundance, proximity to the land, and year-round accessibility still make them an important food source. In light of growing concerns related to food security and climate change in the north, it is important to understand the importance of these organisms play in the Inuit food system.

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Asking the Spirit's for Permission: Khmu Perspectives on Land Ownership in Northern Lao PDR

Through the use of participatory photography, this research looks at Khmu traditional beliefs about the land. The Khmu indigenous group resides in the mid-altitude regions of the Lao PDR. Research was conducted in six subsistence based villages in Northern Lao PDR to gain an understanding of local practices concerning culture, agriculture and land use. Participatory photography is an effective methodology to help outside researchers gain an emic perspective on a variety of local topics. My research questions included topics concerning agriculture, traditional religious beliefs about the land and village development. Eighty-nine villagers were taught how to use digital cameras and answer questions with photos. This session will present a photo essay utilizing local photographer's images to highlight some aspects of Khmu beliefs about the land including a detailed description of the ritualized three step process of asking the spirits for permission to conduct agriculture on specific plots of land.

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The Relationship of Maori to Kūmara or Sweetpotato

Kūmara (*Ipomoea batatas*) and taewa, (*Solanum tuberosum*), are arguably the most important Māori traditional crops. Over centuries, Māori have developed an intimate relationship with them to ensure their survival. This project looked at the diverse knowledge systems that exist relative to the relationship of Māori to these food crops. Information was gained from sources including Andean, Pacific and Māori traditional knowledge, scientific publications, and literature in Spanish and English. Key factors which

clearly define the Māori relationship to these foods include: the conduit provided in determining and continuing a relationship between South Pacific cultures and the South American continent; the perceived importance of these crops as witnessed at the time of European contact, including Spanish and Portuguese in the wider Pacific region, and subsequently the British, French, and other peoples, and; the extended value of these crops to the endurance of Māori culture (physically, socially and spiritually). Both crops retain a contemporary importance to Māori society.

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Rauwaru - Traditional Root Crops of Aotearoa

Anthropologists refer to the development of agriculture as the Neolithic Revolution acknowledging its contribution to the acceleration of man and the development of large and complex societies. Maori as a Pacific people who migrated to Aotearoa/New Zealand acknowledge agriculture through their celestial origins and the role of Papatuanuku their Earth Mother to sustain her offspring. Prior to the 18th century arrival of Europeans, Māori were subsistence horticulturists' dependent on the success of crops and forage plants for matters of survival, hospitality and health. Critical to this was the availability of a range of root crops, sustained and held within the soil. Rauwaru is the Maori term for these crops and the suite of available rauwaru in a relatively cold and temperate climate was broad but is now almost forgotten. This project sought to gather traditional knowledge aligned to root crops, their management, utility and relationship to society generally.

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Plant Identification and Use on St. Thomas, USVI: An Undergraduate Class Investigates Local Knowledge

During Fall term 2015, an undergraduate class at the University of the Virgin Islands, St. Thomas Campus was introduced to theory and methods related to the science of Ethnobotany. With this background, students carried out an Ethnobotanical Practicum to learn basic field techniques and explore the value of five local plant species to local elders, selected by the students. The five species investigated were chosen through a random process undertaken by the entire class. Following this, the class worked in teams to review literature, preserve voucher specimens, generate interview questions, select and interview elders, and analyze the data. At the end of the fall term, the students presented to an audience of invited academics and press. We will explain how this hands-on teaching method could become a model for introducing the science of Ethnobotany to undergraduate students.

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Anthropogenic Soil Change in Ancient and Traditional Agriculture

Soils form the foundation resource of agriculture, and are changed by farming deliberately through management, and unintentionally. Soil change from agriculture ranges from wholesale transformation to ephemeral and subtle modification. The archaeological record of early agricultural systems holds information about soil change on century to millennial scales, with important implications for long-term soil condition and land use sustainability. Knowledge of early agricultural management can also be inferred from soils, including farming strategies in challenging, uncertain environments. This paper discusses soil change processes and outcomes mainly using studies of ancient and traditional agriculture in arid regions of the Americas. The potential and limitations of soil change research methods in ancient agriculture are

also considered. Soil anthropogenic change involves complex, interactive physical, chemical, and biological processes across a wide range of spatial and time scales. Soil change outcomes in early agriculture relating to soil health and productivity vary from degradation to improvement.

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Birds of Rain in Latin America: Invoking the Sacred Through Sound and Image

Around the World certain birds are associated with water and rain due to their behavior, appearance, or role in myths, ceremonies and key events. In Latin America “rain birds” are particularly important for their connection to life-giving water, mountain streams, fertility and renewal. In Costa Rica the clay-colored robin is said to “call the rains” at the end of the dry season. In Peru the condor and the kestrel are depicted in textiles, ceramics, and gold for their associations with not only death and hunting but also with storm clouds and rain. In the pampas of Bolivia and Argentina, the rhea appears in ancient paintings on cave walls and still figures centrally in contemporary dances. What makes these birds so exemplary? The answer can be found by examining the cultural context for these portrayals in the archeological record and contemporary rituals, even when rain associations are not obviously invoked.

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Community of Bell Bella

Impacts of Climate Change on the Cultural Keystone Places of the Heiltsuk of Central British Columbia, Canada

The Heiltsuk people of the Central Coast of British Columbia have lived on the land and waters of their territories for over 12,000 years. Over this time, this region has experienced relatively stable sea levels. As a result, this cultural landscape retains a palimpsest of Heiltsuk interactions with and knowledge of their surroundings. These interactions are reflected in place names, countless archaeological sites, and the recent settlement of Bella Bella. Our semi-structured interviews (~30) with Heiltsuk members indicate that with changing climate, sea level is rising, ecological indicators are changing, and temperatures are increasing. These ecological and physical changes, coupled with other social changes, threaten a variety of places and landscapes that have cultural, spiritual, and economic importance to the Heiltsuk. We are working with the Heiltsuk to understand and plan for future changes to their cultural keystone places, using ethnographic methods and modelling.

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Farmland, Forest, and Floods in the Cahokia Area, Illinois

Paleoethnobotanical information, high resolution pollen and carbon isotope data, and paleo-flood records spanning from A.D. 200-2000 document the entwined nature of climate, ecology, and culture in the Cahokia area, a Mississippian city that emerged around A.D. 1050 in the Mississippi River valley near modern-day St. Louis, MO. We review the evidence for changing land use practices associated with the emergence, florescence, and senescence of Native American occupation between about A.D. 450 and 1350. We discuss the implications of a large flood that occurred between A.D. 1100 and 1260, and explore how the ecological, demographic, and sociopolitical consequences of this event might have varied depending on the seasonal timing of the flood.

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A Pioneer Tree that Connects Ecosystem Recovery and Human Health: *Pentaclethra macroloba*

The lowland tropical wet forests of the Northern Zone of Costa Rica have undergone decades of deforestation. *Pentaclethra macroloba* is a dominant tree species that accelerates ecosystem recovery by fixing nitrogen in otherwise nutrient-poor soils. Local people apply the bark topically as an antifungal medicine. This study links *P. macroloba's* ecological effects on soil chemistry and plant diversity to effects on human health. We interviewed local people about their use and preparation of the plant and harvested samples for analysis. Disc diffusion assays showed strong inhibition of the fungus *Candida albicans*, and not as strong results for the bacteria that we used in assays. G-C Headspace Chromatography identified compounds within *P. macroloba* that may be responsible for its use as an antifungal medicine and for wound regeneration. In addition, these analyses provide insight to potential causes for its ability to alter soil chemistry and facilitate nutrient recovery following disturbance.

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Chuck Stead Town of Ramapo

Healing the Earth and Human Spirit: The Ramapough Nation, Ford Motor Company, and Sweetgrass Gardens

During the 1960s, the Ford Motor Company dumped millions of gallons of paint in the woods surrounding Mahwah, New Jersey and the Torne Valley of New York. The Ramapough Nation was hardest hit by lead contamination. Approximately, 3,500 tribal members have cancer, birth defects and other health problems from contaminated water and soil. Today, paint sludge is being excavated. Remediation of a well field started in 2013, when 42,000 tons of waste were removed. Reconstruction included excavating hazardous waste, adding topsoil, reforesting the site, and creating a .2 ha medicinal garden in respect of local traditional ecological knowledge. We are conducting a field study within the garden to determine an efficient ways to maintain sweetgrass (*Hierchloe ordata*) within the site. In 2015, we established four treatments: planting sweetgrass into clover patches (burned and unburned) and weeding sweetgrass-only plots (burned and unburned) to determine if burning will provide an advantage over labor-intensive weeding. The garden will be open to members of the Ramapough Nation as a source of healing and hope.

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Long Term Interactions of People and Animals in the Mimbres Region of Southwest New Mexico, AD 200-1450

Understanding how people maintain long-term access to animals for food and other uses is important in the context of archaeology and may also have implications for contemporary societies' access to animal resources. This study examines the long-term record of human population and settlement patterns, land use, and animal remains in archaeological sites in the Mimbres area. This region has a well-documented sequence of alternately dispersed and aggregated human settlements. Over time, increasing population aggregation and sedentism contributed to altered environments around some villages, and access to some resources became more difficult. Other sites show markedly greater access to certain desirable taxa due to such factors as location and population history. This study brings together a large dataset of published and unpublished analyses to examine long-term trends in human use of animals, including the resilience of different taxa to human hunting and anthropogenic landscape change.

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Hybrid Epistemologies: Traditional Knowledge and Archaeology in British Columbia

Indigenous Traditional Knowledge (TK) potentially informs all aspects archaeological research—from project planning to field methods to interpretation. Recent social and legal developments in British Columbia suggest that TK will play an increasingly significant role in the province's future, and in its archaeological practices. British Columbian archaeologists are in the habit of working with First Nations to produce their own approaches to TK, which tend to be regionally and sub-disciplinarily specific. However, aside from select researchers who elect to publish on the topic, the thoughts the province's archaeologists hold about the relationship between TK and archaeology are largely unknown. In response, I am interviewing a broad range of archaeologists working in BC. Ultimately, this work is intended to produce both a sharing of ideas and experiences amongst colleagues as well as a BC-focused contribution to the global discussion surrounding how engaging with TK affects the epistemology and practice of archaeology.

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Sharing the Knowledge: Highlighting the Impact on Indigenous Healers of Sonora during Cultural Exchange with Visitors

Located in Northwest Mexico, the state of Sonora hosts a wide array of indigenous peoples of varying linguistic groups. Amongst these many tribes there still exists a form of traditional healing, often incorporating the local flora as medicine. Due to the increased presence of pharmaceuticals, the usage of many of these remedies has been in steady decline over the past several decades. Through cultural exchange these indigenous healers can explore an outlet for sharing as well as reviving their traditional healing practices. Additionally, the economic incentive is substantial in contrast to their available earning opportunities. The author has led groups on cultural exchanges with two indigenous families of herbalists in Sonora, Mexico over the past 7 years.

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Cultural Keystone Places and Landscapes as Pathways to Reconciliation on Southern Vancouver Island, BC, Canada

What do metaphors such as "cultural keystone places" and "cultural landscapes" have to contribute to the resolution of Aboriginal rights and title? Since the earliest contact between European settlers and First Nations peoples in British Columbia (BC), there has been no common agreement on land ownership and associated resource use. With the recent recommendations of the report of the Truth and Reconciliation Commission and several Aboriginal rights legal precedents, there is a renewed urgency to resolve these longstanding disputes equitably. This paper argues that we need to find new ways to acknowledge and incorporate traditional plant knowledge meaningfully in planning and management. In collaboration with the T'Sou-ke First Nation on southern Vancouver Island, I will suggest how ethnobotanical research can be used to better articulate cultural keystone places and cultural landscapes and how this research, in turn, can make a substantial contribution to the larger discourse around Indigenous Peoples' rights and title.

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An Examination of Artiodactyl Use through Time at Sapa'owingeh (Sapawe LA 306)

Although faunal variation and subsistence patterns during the Pueblo IV period have not been widely documented, faunal assemblages in the Southwest are comprised of mainly artiodactyls, lagomorphs and turkeys. Because artiodactyls represent abundant sources of fat and protein, and are thus highly sought after, this paper explores the utilization of artiodactyls at the site of Sapa'owingeh (LA 306). Sapa'owingeh is the largest adobe ruin in the Southwest, spanning 200 years. Because of this, it was assumed

Sapa'owingeh would be a good place to elucidate changes within a faunal assemblage. Summary indices were applied to test for fluctuations through time in artiodactyl abundance at the site. These indices were then compared to other published data from contemporaneous sites in the region. This paper also focuses on the spatial dimension of elements at Sapa'owingeh. Juxtaposing room, kiva, and midden contexts from Sapa'owingeh gives insight to the importance of artiodactyls to its inhabitants.

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Why Unimportant Plants are Important: Further Thoughts on Ethnobotanical "Canaries in the Coal Mine"

Much ethnobotanical research has been concerned with documenting the plants most useful to a particular culture. Clearly, long-term survival of a community is predicated on this subset of traditional ecological knowledge. However, the relatively little attention paid to unimportant plants obscures the relevance of these flora as a gauge to measure change in traditional ecological knowledge and practices. Due to their relative unimportance, they are the first to disappear from a culture's collective knowledge and wisdom. The metaphor of the "canary in a coal mine," where British and American miners in the 19th and early 20th century relied on canaries to detect deleterious environmental change before it affected humans, is relevant here. The loss of knowledge about un-utilized plants serves this purpose in demonstrating change before more drastic effects occur. This paper relies on examples from fieldwork in Chiapas, Mexico; Yunnan, China; and Swaziland.

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Ancient Clam Gardens and Ecological Enhancement on Northern Quadra Island, BC

Clam gardens are a form of ancient mariculture and are documented along the Northwest Coast of North America from Alaska to Washington. A dense concentration of clam gardens on northern Quadra Island, British Columbia had a significant impact on past ecological and social landscapes. The construction of clam gardens not only increased the area of clam habitat but also enhanced shellfish ecology, ultimately aiding in clam growth. The bivalve productivity of clam gardens is assessed through 1) documenting overall increase in clam habitat, and 2) comparing the growth rate of clam shells from clam gardens and natural contexts. This analysis is expanding our ecological understanding of clam gardens, and enhancing our understanding of the extensive ecological knowledge of marine environments held by coastal First Nations.

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Restoration of the New Zealand Taro - Case Study

The New Zealand Taro (*Colocasia esculenta*) is an edible plant grown in sub-tropical regions and belongs to the Araceae family of plants. Having a special connection to the indigenous Maori people because of cultural tikanga, there is a great concern of restoring this variety of taro from being completely lost. To the Maori people, this crop was once only allowed to be planted on the moon phases known as Rākaunui, Rākaunui-matohi and Ōrongonui to ensure successful crops. In comparison to other different cultivars of Pacific Island taro, the New Zealand taro thrived in the cooler temperate climatic and for this reason, was only grown for the chiefs of the tribes stating its value traditionally within the society as a chiefly crop. To this date, knowledge on this crop has been slowly lost and a fear of losing out the traditional variety is high. Few Maori now grow taro except for a few regions in the country where traditional production systems survive. As part of restoration, a collection of the cultivar has been established alongside retention of traditional knowledge of the crop.

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“Just Like a Paradise”: Salmon River Estuary, Shuswap Lake, as a Cultural Keystone Place

The late Secwepemc elder Dr. Mary Thomas of Neskonlith, was born and raised along Shuswap Lake near Salmon Arm, spending much of her childhood around the Salmon River estuary. She and her siblings helped the elders harvest wapato, water parsnip, mint, berries, cattail leaves, hemp dogbane fibre, willow bark, and coot eggs, and process salmon. The place was rich in resources; many people gathered and camped together. A place where children learned lifelong lessons from stories and “by doing,” it has changed drastically over time. A railway and a highway were constructed above it. A lakeside marina altered the river course. Logging and agriculture upriver caused siltation, imperiling salmon. Livestock grazing and introduced species eliminated the wapato and other native vegetation. Despite ongoing threats, the estuary remains; through efforts the Neskonlith people, and others, restoration and revitalization of this rich environment continues; it remains today as a Cultural Keystone Place.

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The Pueblo Farming Project: Investigating the Agrarian Ecology of the Mesa Verde Region

The Crow Canyon Archaeological Center and the Hopi Cultural Resources Preservation Office designed and implemented the Pueblo Farming Project (PFP) to better understand the agrarian ecology of the Mesa Verde archaeological region of southwestern Colorado. Hopi farmers used their traditional ecological knowledge to select the location of garden plots on Crow Canyon’s campus, and between 2008 and 2015 they directed the planting and harvesting of maize (corn) in these plots. Hopi farmers provided the initial seed, and their expertise on Hopi dry-farming techniques guided the methods used in our experimental plots. Knowledge gained from the PFP is incorporated into Crow Canyon educational programs, PFP data are used to evaluate agricultural productivity estimates generated by the Village Ecodynamics Project computer model, and PFP data are being used by University of North Texas scientists to quantify the relationship between soil moisture and yields.

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Permaculture as Ethnoecological Design Science at the Appalachian Institute for Mountain Studies

Permaculture is an ecological design science and sustainability movement grounded in the recognition that economic viability and social justice are fundamentally interrelated with fully functioning and healthy ecosystems. Permaculture guides the re-design of human systems for production, consumption, and inhabitation according to an understanding of basic ecological principles. The cross-fertilization of ethnoecology with permaculture is a timely project as socio-environmental crises deepen. Both permaculture and ethnoecology have a shared interest in the applied realm and ongoing histories of working collaboratively with Indigenous and local peoples on conservation and ecological restoration projects. This paper will present a case study in which insights from ethnoecology are being used to inform permaculture design at the Appalachian Institute for Mountain Studies, Katuah Bioregion, USA.

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Synthesizing Human Behavioral Ecology and Niche Construction Theory: an Ohio Hopewell Case Study

Recent debates that compare niche construction theory (NCT) with human behavioral ecology (HBE) as theoretical frameworks for studying the origins of agriculture, have clarified elements of these approaches. This debate, rather than confounding researchers, can lead to a fruitful expansion and synthesis of both

these evolutionary theoretical frameworks in explaining the origin, diffusion, and intensification of agriculture. HBE concepts of patch residence time and the marginal value theorem can be used to explain intensification through niche construction. An Ohio Hopewell subsistence model provides a case study exploring this theoretical synthesis, in which anthropogenic riverine niche expansion of weedy pre-maize crops into earthworks in the first terrace is explained as a response to diminishing returns in alluvial patches. In this research design, earthwork size, distance between habitational sites and earthworks, nutritional value of pre-maize crops, population estimates, macro- and microbotanical data are used as variables to determine catchment areas.

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Holocene Changes in Wetland and Upland Patch Foraging Efficiency in the Central Tennessee River Valley

Changes in foraging efficiency can occur due to either environmental changes or the effects of human populations on the resource base. Given this, two alternative hypotheses are evaluated to explain the Middle Holocene increase in shellfish and white-tailed deer exploitation in southeastern North America: 1) Climate change in the Middle Holocene increased the natural abundance of both shellfish and deer, permitting these taxa to provide high return rates, and 2) Increasing human populations depressed wetland resources by the Middle Holocene, leading to increased exploitation of low-ranking shellfish in the river valley and high-ranking deer in the more distant uplands, in line with the central place foraging model. Analysis of possible return rates for these taxa, paleoclimate models for the region, and faunal data from sites in the Central Tennessee River Valley suggests resource depression occurred in the wetlands and drove increased exploitation of white-tailed deer in the more distant uplands.

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Early Bronze Age Viniculture at Numayra, Jordan: Archaeobotanical Evidence for Grape Processing

The techniques used to produce foods and beverages in prehistoric societies can provide significant information about ancient tastes, daily activities, and the organization of labor. Recent advances in experimental archaeobotany indicate that evidence for winemaking may be visible in the form of processed berries. At the Early Bronze Age settlement of Numayra along the Dead Sea, the analysis of preserved grape remains provides insight into the chaîne opératoire of winemaking activities carried out by residents. Evidence includes flattened berries indicating juice extraction, thousands of pips, and sheep/goat dung containing the remnants of discarded berry skins. Here I will discuss the archaeobotanical results from Numayra and illustrate their significance as a comparative study for other Early Bronze Age sites in the Levant.

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Napo Runa Identification Characteristics of Manioc Landraces

The effectiveness of in-situ and community based landrace conservation depend upon the capacity of indigenous cultivators and other researchers to differentiate between perceptually distinct landraces. The plant characteristics depended upon for recognition however vary both within and between cultures, and yet despite their importance for agrobiodiversity conservation remain woefully understudied. This study seeks to shrink part of this knowledge gap through the investigation of the manioc (*Manihot esculenta*) landrace identification characteristics employed by the Napo Runa of the Ecuadorian Amazon. The nature and relative frequencies of each identification characteristics employed by the participant group will be assessed before being compared to those characteristics said to be utilized by other manioc cultivators in

the literature. The findings contained herein will help underscore the variability of landrace identification characteristics and the importance of their investigation for more successful agrobiodiversity conservation initiatives.

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Archaic Bison of the Southwest: Recent Explorations at the Cave Creek Midden Site, Southeastern Arizona, U.S.A.

The occurrence of bison at Archaic sites in the U.S.-Mexico borderlands is poorly documented, though offers profound implications for understanding environmental change and human-animal interaction during the early Late Holocene. In 2015 the Arizona Archaeological and Historical Society re-investigated the Cave Creek Midden site, the type site for the Chiricahua Stage of the Cochise Culture. This excavation revealed the presence of a large concentration of bison bone directly associated with numerous ground stone tools. Initial radiocarbon dates indicate that the bone bed began to be deposited circa 3,000 C14 B.P., during the Late Archaic period. Osteometric analyses of the bison remains reveal that they are smaller in size when compared to bison originating in the plains. This paper will use the Cave Creek Midden site as a case study to explore the nature of Archaic period bison in the borderlands, their use by people, and avenues for future research.

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A Foraging Theory Perspective on the Paleoindian Exploitation of North American Megafauna

It is now known that at least 37 genera of large mammals went extinct at the end of the Pleistocene in North America. Grayson and Meltzer (2015) plot the relationship between the paleontological and archaeological occurrences of extinct and extant late Pleistocene large mammal taxa (Fig. 2, pg. 189) and observe that, relative to extant taxa, extinct forms were taken less frequently than surviving taxa by Clovis hunters—a clear negation of overkill. However, we note that the timescales they utilized are vastly different. We build on their argument, but do so within a foraging theory framework and refine the data set to include only paleontological and archaeological records of extinct and extant fauna from Clovis times. We find that the number of archaeological sites for any given taxa scale positively with the number of paleontological sites, and thus there is no apparent underrepresentation of extinct taxa in Clovis-period sites.

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Late Holocene Conservation Baselines for Freshwater Mussels from Three Rivers in Texas

Ethnobiologists contribute to conservation biology in increasingly meaningful ways. One way that paleoethnobiologists are able to provide a unique conservation dataset is through the establishment of conservation baselines for animal communities that were part of human-environment interactions during the last few millennia. Freshwater mussel remains from archaeological sites offer a rich data source for establishing this type of baseline. We establish conservation baselines for late Holocene mussel (family Unionidae) communities for the Leon, Brazos, and upper Trinity rivers of central and north Texas. These data may 1) lead to greater confidence in existing contemporary data for unionid biogeography; 2) lead to

information on whether or not community composition differs between the late Holocene and today; and/or 3) provide a justification for more intensive contemporary surveys. Such data are relatively easily acquired, are inexpensive to generate, and highly informative for environmental management as premodern baseline data.

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Phytolith Analysis of Sediments Identify Cultivated and Encouraged Plants at the Early Agricultural Fields of Las Capas, Arizona

Phytolith analysis of field sediments at the Early Agricultural site of Las Capas documents a rich microfossil record of cultivated and encouraged plants that grew in farmed irrigated soils. Maize is well-represented, but there is a strong indication of encouraged, if not cultivated, cool-season grasses, likely *Hordeum* sp. (little barley), suggesting these grasses were incorporated into the agricultural cycle, perhaps extending seasonal production of the field system. Other identified economically useful plants include sedges, common reed, composites (sunflower family), and bottle gourd. Species from the surrounding natural environment, ranging from the bajada to montane zones, include pine and hackberry. Additionally, the identification of freshwater sponge spicules and gemmoscleres demonstrates that water in the Santa Cruz River flowed consistently and cleanly for extended periods of time in the reach that irrigated Las Capas fields. The phytolith record complements and expands other "conventional" environmental studies such as pollen and macrobotanical analyses.

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"Everything We Do, It's Cedar": First Nation Ecosystem-Based Foresters' Relationship and Practice with Western Redcedar

People's values and attitudes regarding the natural world determine the level of care with which they approach the use of natural resources. We studied how human relationships with nature influence people's actions using western redcedar (*Thuja plicata*), a major forest tree of northwestern North America, as a study system. Interviews were conducted with Northwest Coast Indigenous people and ecosystem-based foresters in coastal British Columbia. Both groups expressed a personal—often spiritual—connection with nature, both value long-term management strategies, and both have similar environmental concerns. First Nation individuals have a unique spiritual relationship with western redcedar that correlates to both everyday and ceremonial practices with cedar, while ecosystem-based foresters have personal and academic relationships broadly with nature. These results are particularly useful to show that people from varied cultural backgrounds can care for the environment in similar ways and to demonstrate the nexus between relationships and practices with natural resources.

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Wendi Field Murray North Dakota State Historical Society and Heritage Center

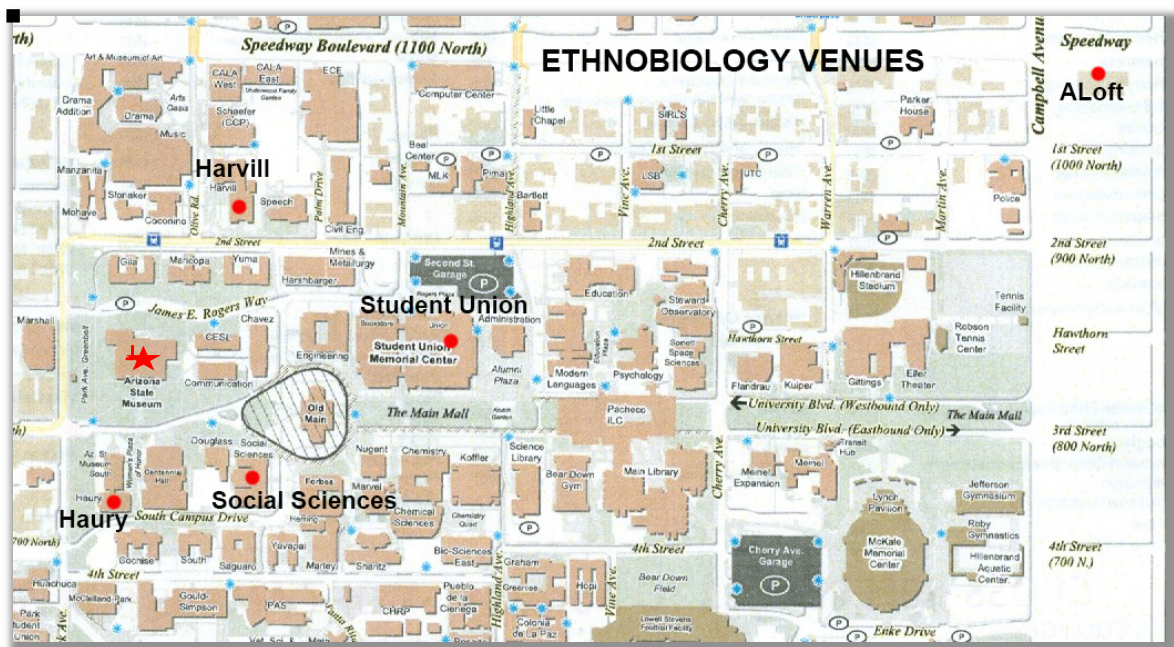
The Valuable-Commodity Continuum of Birds and their Feathers in the Northern Plains

Taking historical information about Native American long distance trade networks as a point of departure, we explore the role of birds and feathers in the establishment of intertribal relations and trade partnerships between the Blackfoot and their western and eastern neighbors. Valuables such as birds and feathers—eagles in particular—illustrate concepts of value in Native American ontologies and allow for a deeper examination of the inalienable qualities of valuable objects generally categorized as ceremonial or sacred. We argue that trade promoted the existence of a broad political and cultural context within which feathers could be venerated, commoditized, and deployed to accumulate wealth, power, and prestige

Map of Conference Venues

Venue Locations

- | | |
|-----------------------------|--|
| Aloft | Conference Hotel |
| Haury Bldg. | Board Meeting and Workshop 2 |
| Harvill Hall | General Meeting Venue |
| Social Sciences | Thursday Evening Presentation |
| Student Union | Student/Mentor Lunch and Student Reception |
| Arizona State Museum (star) | Museum Tours |



Not shown: The banquet venue is the Carriage House, 146 East Broadway.
 The Wednesday evening receptions and Workshop 1 are at the Native Seeds/SEARCH conservation facility, 3584 E. River Road.

Notes: