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2013 Annual Report

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Museum of Southwestern Biology
2013 Annual Report



Joseph A. Cook, Director

15 April 2014

The University of New Mexico's Museum of Southwestern Biology

The Museum of Southwestern Biology (MSB) provides critical infrastructure for the University of New Mexico in the areas of teaching, research and public service. Through its world-class natural history collections, associated databases, and staff expertise, MSB provides unparalleled research infrastructure and graduate training, authentic undergraduate experiences, and substantial public-service and outreach to local, national, and international constituents. MSB promotes quality productivity at UNM, including high research activity and heavy engagement of undergraduate and graduate students in the Department of Biology and in other departments on campus.

Table 1. Metrics identify the quality and productivity over the last five years in the Museum of Southwestern Biology. Numbers are compiled from Divisional reports (annual reports are available at <http://msb.unm.edu>).

	2009	2010	2011	2012	2013	5-YEAR AVERAGE
1. Collection growth (Specimens Cataloged)	136248	301268	64598	25446	34772	112,467
2. Loans Out	128	167	185	99	145	145
3. Professional Visitors to the Collections	953	692	504	307	344	560
4. Collection Database Web Site Hits	319745	298360	160880	396362	**	
5. RFIs Answered in Person	1355	1214	1354	522	1626	1215
6. Outside Publications Citing MSB Specimens	68	61	134	76	167	102
7. Peer-Reviewed Publications by Staff	79	72	52	77	54	68
8. Technical Reports	24	29	29	23	35	28
9. UNM Courses using the Collection	25	23	58	79	50	47
10. UNM Courses taught	24	22	68	109	69	59
11. Graduate Students	51	39	42	42	42	44
12. Graduate Theses/Dissertations Completed	4	5	3*	9	7	6
13. Undergraduate Students	91	102	75	76	66	82
14. Grants/Contracts in Force	94	98	78	76	61	82
15. Grants In Force Total Costs	\$11,239,035	\$10,471,063	\$10,132,206	\$8,850,955	\$8,502,590	\$9,839,170
16. Estimated F&A return	NR	NR	\$398,059	\$528,950	\$430,124	\$ 452,378

* 1 UNM, 2 outside, NR – not reported

MSB collections are an informatics treasure trove for rigorous assessments of spatial and temporal change on our planet. Specimens span the last 120 years and represent biodiversity change across the globe (primarily western North America, Central and South America, but with significant holdings from Asia, Africa, Australia and Europe). MSB consists of 7 divisions (Amphibians and Reptiles, Arthropods, Birds, Fishes, Genomic Resources, Herbarium, Mammals, and Parasites) and the Natural Heritage New Mexico program. Annually, our collections support a significant number of peer-reviewed publications (> 70 in 2013) and attract considerable grant dollars (\$410K in IDC in 2013), metrics that attest to the fact that MSB is among the most productive research units on campus. Web-accessible archives and databases constitute an unparalleled informatics resource contributing to applied efforts in conservation as well as theoretical advancements related to unraveling the complexity of planetary life and related ecosystem function on local, regional, and global scales. MSB curators have active research and graduate programs that build the collections and then exploit the wealth of specimens and data. They also commit considerable effort to build a shared resource for the greater scientific community. Curators, collection managers, and an army of students then strive to make these valuable collections and data accessible to UNM, to the broader scientific community, and to the general public. Such facilities and activities are hallmarks of top-notch research-intensive universities.

A primary strength of the Museum of Southwestern Biology is the focus on hands-on training and education of students at all levels from undergraduate students to post-doctoral associates. Each division immerses students in sub-disciplines within biology that fall under the broad umbrella of natural history, including systematics, molecular biology, morphology, species identification, museum specimen preparation and curation, field studies, and web-based informatics. Over the past 6 decades, MSB held a leading role in graduate education on campus by ensuring that museum-based doctoral students obtain competitive professional positions and eventually assume leadership roles in their respective fields. A large percentage of undergraduate projects or graduate dissertations in Biology, Anthropology and elsewhere used MSB specimens as a basis for their studies. MSB has been the locus of large student-training efforts for many years and now sponsors two museum-centered programs (funded by the National Science Foundation) that focus on student success: Undergraduate Opportunities (UnO) and AIM – UP! MSB is vital to educational initiatives in UNM Biology and has become a leader in training international students, especially those from Latin America.

MSB is a leader at UNM in public service, especially activities related to thoughtful (science-based) management of dwindling natural resources. We are heavily involved with municipal, state and federal agencies through funded projects, many related to developing effective management plans for their respective regions. International organizations also rely on our specimens, data and expertise to help them design and implement public health initiatives. MSB has built a strong tradition in the public health arena in efforts related to identifying zoonotic pathogens and understanding the ecology of zoonotic diseases and wildlife diseases in the western US, but also in a number of international settings.

MONTH	AWARD OR EVENT	MSB PROGRAM
July 2013	Nathan Lord, a graduate assistant in the Arthropod Division, successfully defended his Ph.D. Dissertation "Systematics within the Zoopheridae Complex (Coleoptera: Tenebrionides)"	Arthropods
	Special Publication #10: Birds in Corrales , a large monograph by James Findley, was published. Jim is a former Director of MSB and Curator of Mammals. This paper covers more than 50 years of bird observations in the central Rio Grande Valley, providing a key view of biotic change.	MSB

	Robert Dickerman and Andrew Johnson (Collection Manager Division of Birds, Museum of Southwestern Biology) published: "Notes on the Elf Owls of Trans-Pecos Texas and Adjacent Coahuila and New Mexico". Published by the Bulletin of the Texas Ornithological Society, 45(1-2): 2012	Birds
	Andrew Hope (PhD 2011), Joe Cook (Curator of Mammals, Museum of Southwestern Biology) and collaborators published a paper in <i>Nature Climate Change</i> that explores how tundra and boreal forest species of mammals might respond under future projections of climate change. http://www.nature.com/nclimate/index.html	Mammals
	"North Pacific Temperate Rainforests", a new book edited by Gordon Orians and John Schoen includes a chapter by Joseph Cook (Curator of Mammals, Museum of Southwestern Biology) and Stephen MacDonald entitled: <i>Island Life: Coming to Grips with the Insular Nature of Southeast Alaska and Adjoining Coastal British Columbia</i> (University of Washington Press).	Mammals
	J. Tomas Giermakowski (Collection Manager, Division of Amphibians and Reptiles, Museum of Southwestern Biology) presented a talk entitled <i>Local amphibians and reptiles</i> to the Bosque Academy Summer Camp Program, Albuquerque, New Mexico.	Amphibians & Reptiles
	Beckman E.J. (Graduate Student) & Witt C.C. (Curator, Division of Birds, Museum of Southwestern Biology) presented the paper "Diversification in the Andean Avifauna: the South American siskins." at the American Genetics Association Annual Symposium, Ithaca, NY	Birds
	Bob Sivinski organized a Sedge Identification Workshop for the Native Plant Society of New Mexico that was held at the Valles Caldera Science and Education Center in Jemez Springs.	Herbarium
	Dr. Becky Bixby, MSB Research Associate, is featured in "Algae to Biofuels: Squeezing Power from Pond Scum" exhibit at the Bradbury Science Museum, Los Alamos.	Herbarium
	Jon Dunnum, MSB Mammal Collection Manager, and Kayce Bell, Mammal Graduate Assistant, taught a 3 day short course "Biodiversidad, ecología, y conservación de los roedores neotropicales" at Museo de Historia Natural, Universidad Nacional de San Agustín, Arequipa, Peru.	Mammals
	Jason Malaney (MSB Mammals Doctoral graduate 2013) and co-authors published "Gene tweaking for conservation" in <i>Nature</i> .	Mammals
September	Heidi Hopkins, Graduate Assistant in Arthropods, delivered a talk "The phylogeny of Arenivaga (Rehn) (Blattellidae, Corydiidae)" at the 6th Dresden Meeting on Insect Phylogeny, Dresden, Germany	Arthropods
October	Sandra Brantley, Arthropods Collection Manager, participated in the NM Museum of Natural History and Science's "Ask the Experts Day."	Arthropods
	Jon Dunnum, Mammals Collection Manager, gave an invited talk "Expanding the reach of NH Research Collections and biodiversity data" at the Annual Meeting of the Association of Science and Technology Centers held in Albuquerque, NM.	Mammals
November	Bethany Abrahamson, Graduate Assistant in Arthropods and the Herbarium, presented a paper entitled "Evaluating natural history collections use in one university museum" at the Entomological Collections Network Annual	Arthropods

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	Meeting, in Austin, TX	
December 2013	MSB Curator of Birds, Christopher Witt , partnered with evolutionary geneticist Jay Storz (Univ. Nebraska) and collaborators from three other institutions to compare the hemoglobin proteins in hummingbird species that live at different elevations in the paper entitled "Repeated elevational transitions in hemoglobin function during the evolution of Andean hummingbirds. Proceedings of the National Academy of Sciences, USA. Online 2013.	Birds
	Lightfoot, D.C., Collection Manager Arthropods Division, presented "Geographic patterns of grasshoppers, crickets and katydids (Orthoptera) of the American Southwest. SysEB Section Symposium: What Arthropods Reveal about the Biogeography of the American Southwest and Mexico"; with a Report on Work from Joshua Tree National Park. Annual Meeting of the Entomological Society of America, Austin, TX.	Arthropods
	Lord, N.P., (Ph.D 2013 Division of Arthropods, Museum of Southwestern Biology), R.A.B. Leschen, and T.R. Buckley. NZ ZopherID presented: "A comprehensive electronic tool to a taxonomically difficult group of New Zealand beetles". SysEB Section Symposium: Interactive Keys Transforming Identification: Melding Traditional Methods with New Technologies. Annual Meeting of the Entomological Society of America, Austin, TX.	Arthropods
January 2014	Jon Dunnum, MSB Mammal Division Collection Manager, was nominated for the Sarah Bell Brown Community Service Award at UNM.	
	Graduate student Natalie Wright and Assoc Prof Chris Witt have published a "Metabolic 'engines' of flight drive genome size reduction in birds". Proc. R. Soc. B 2014 281, 29 Jan 2014.	Mammals
	A crew was here filming for an upcoming episode of "Mysteries at the Museum" on hantavirus that will air on the Travel Channel.	Birds
	A new MSB Occasional Paper has been published. Hubbard and Dove's "A Proposed Emendation of the Gray Flycatcher's Type Locality and Formal Designation of its Lectotype. The paper is dedicated to Bob Dickerman.	MSB
	Jon Dunnum (MSB Coll Mgr Mammal Division), Tom Giermakowski (MSB Coll Mgr Amphibians and Reptiles), Tom Turner (MSB Curator of Fishes), and Bill Gannon (MSB Research Associate Mammal Division) judged science exhibits at Jefferson Middle School	MSB
	The Southwest Carex Working Group visited the MSB Herbarium and reviewed the 1739 specimens of <i>Carex</i> , the sedge genus	Mammals
February	"Combing Chipmunks" . Jefferson Middle School's Suzy Dunnum and her 7th grade gifted science class and MSB's Kayce Bell (Ph.D. candidate MSB Mammal Division) have teamed up to help Kayce with her Ph.D. Dissertation research on chipmunks and their parasites.	Herbarium
	Heidi Hopkins, a Ph.D. candidate of Assoc. Professor Kelly Miller has recently had a monograph published in partial fulfillment of her dissertation for a Ph.D. in biology. "A revision of the genus Arenivaga (Rehn) (Blattodea, Corydiidae), with descriptions of new species and key to the males of the genus". ZooKeys 384 (2014) Special Issue.	Mammals
	Rachel Mallis, Matt Leister and Kelly Miller (Assoc Professor and Curator of Arthropods) have published a "The male of <i>Tengella perfuga</i> Dahl, 1901 with re-description of the female and comparisons with <i>T. radiata</i> (Kulczynski, 1909) (Araneae: Tenggellidae)". <i>Zootaxa</i> , 3709: 185-199, a Nicaraguan spider. Rachel is a graduate student and Matt is an undergraduate student, both working in Assoc. Professor Miller's lab. Rachel has a successful live colony	Arthropods
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of over in Castetter!.

March	The Mammal Division has a Facebook page https://www.facebook.com/MSBDivisionofMammals	Mammals
	Here is the Miller Lab website detailing their research http://www.kellymillerlab.com/default.asp?action=show_personnel&id=kelly .	Arthropods
	Our Bird Division also has a website detailing their research http://biology.unm.edu/witt/index.html .	Birds
	The digital archives of William Jacob Koster, Ph.D. (UNM Professor of Biology 1938-1975) will be available through the University of New Mexico Institutional Repository ("LoboVault") in 2014. These archives include PDF files of Dr. Koster's original field notes linked to the cataloged records of New Mexico fishes he collected during his tenure at the University of New Mexico.	Fishes
	Christopher W. Hoagstrom, Ph.D. Associate Professor of Zoology at Weber State University, Ogden UT arrived in October 2013 to spend a year sabbatical at the University of New Mexico, collaborating with Thomas F. Turner, Ph.D. UNM Biology Professor and MSB Curator of Fishes in the ecology of pelagic-broadcast spawning freshwater fishes. http://faculty.weber.edu/choagstrom/index.htm	Fishes
	Heidi Hopkins successfully defended her Ph.D. dissertation.	Arthropods
	Tom Giermakowski (Coll Mgr of Amphibians and Reptiles) gave a talk March 22, 2014 on Frogs and Toads of the Rio Grande Valley in conjunction with the Bernalillo County Open Space program.	Amphibians & Reptiles
	AIM-UP! (Advancing the Integration of Museums into Undergraduate Programs) is a National Science Foundation sponsored network that focuses on how to integrate museum specimens and data into undergraduate teaching held its annual meeting in Asilomar, CA from 27 February to 2 March 2014.	MSB
	The staff from the UNM Office of Sponsored Projects (Pre-Award) toured the MSB on March 7, 2014 to learn what the MSB is all about.	MSB
	Natalie Blea, a native burquena and former UnO Undergraduate Scholar in Steve Poe's laboratory has been accepted into the graduate program in Marine Biodiversity and Conservation at Scripps Oceanography at the University of California, San Diego.	Amphibians and Reptiles
	Students from New Mexico State University in Dr. Jennifer Frey's class "The Natural History Museum in Modern Society" traveled to the MSB and met with a series of collections managers. The goal of the class is to expose the students to all of the purposes and functions of modern natural history museums, especially their role in research, public education, the biodiversity crisis, and service to society.	MSB
	The Division of Amphibians and Reptiles has recently cataloged its 95,000 th specimen and is continuing cataloging of newly deposited specimens from New Mexico's state and federal agency biologists.	Amphibians and Reptiles
	Tom Giermakowski (Coll Mgr Amphibians and Reptiles) and Howard Snell (Curator of Amphibians and Reptiles) have recently been awarded a contract from New Mexico Department of Game and Fish to evaluate the status of the Arizona Toad (<i>Anaxyrus microscaphus</i>) in New Mexico.	Amphibians and Reptiles
	Tom Giermakowski (Coll Mgr Amphibians and Reptiles) was part of an inter-institutional team that recently published a report on the climate effects on several bird and reptile species in the west. van Riper, C., III., Hatten, J.R.,	Amphibians and Reptiles

April	Giermakowski, J.T., Mattson, D., Holmes, J.A., Johnson, M.J., Nowak, E.M., Ironside, K., Peters, M., Heinrich, P., Cole, K.L., Truettner, C., and Schwalbe, C.R., <i>In press</i> , Projecting climate effects on birds and reptiles of the Southwestern United States: U.S. Geological Survey Open-File Report 2014– http://pubs.usgs.gov/ofr/2014/XXX/ .	
	The MSB now has a Facebook page! www.facebook.com/msb.unm.edu	MSB
	On April 1, 2014 the MSB's Divisions of Alcohol Arthropods and Parasites received the go ahead to start using the collection space	Arthropods and Parasites
	April 4, 2014, the MSB held a mini open house for Research Day	MSB

DIVISION REPORTS FOR 2013

DIVISION OF AMPHIBIANS AND REPTILES

1. DIVISION HIGHLIGHTS

The collection increased by 508 specimens in 2013 to a total of 95,058 specimens. Although many of the specimens were collected by division staff and students as well as other museum associated academics, most of the specimens were deposited by New Mexico Department of Game and Fish personnel and collaborators. Additions from the 17 accessions catalogued during 2013 include a collection of amphibians from the Gila National Forest, various species of snakes from Arizona, records of amphibians from Alaska and muscle tissue from the three specimens of Mexican Garter snakes, a recent rediscovery of the species in New Mexico (see news item at <http://www.cabq.gov/culturalservices/biopark/zoo/news/northern-mexican-gartersnake-back-from-extinction>).

The website of the division continues to receive thousands of hits and the collection receives numerous queries via aggregator sites. For 2013, the collection was queried 8,231 times and served 6,182,520 records via HerpNET, while GBIF has reported that for the same period, there were 6,336 searches and downloads of 832,239 records from our collection. In addition to internet queries, data associated with specimens from the division have been used in at least 16 publications in 2013. Many scientists and members of the general public continue to request information on specimens or general aspects of herpetology from our division via telephone, email and directly in person. In addition to responding to over 100 of these requests, we hosted 8 visitors and individually compiled data on 17 occasions.

Aside from specimen processing and cataloguing, we continue to focus on research and outreach activities that involve students. We continued our work with the USGS Colorado Plateau Research Station at Northern Arizona University on projects that examine distributions of amphibians and reptiles. Through this collaboration we were able to provide training to three undergraduate students to work in biological research. Other activities included lending of specimens for teaching purposes to University of New Mexico classes and other educational entities, such as the Bosque Ecological Monitoring Program, and advising students on class projects. We hosted many tours and gave several public presentations and invited lectures, all led by the division's collection manager. We continued to work with the New Mexico Department of Game and Fish through participation on boards dedicated to species recovery as well as field outings. Regionally, we are involved with the Southwestern chapter of Partners in Amphibian and Reptile Conservation and we

organized and hosted a meeting of nearly 70 professionals on campus of the University of New Mexico in July. Staff from our division also participated as the local host committee for a large professional meeting (over 1,200 attendees) during July of the Joint Meeting of Ichthyologists and Herpetologists held at the Albuquerque Convention Center. In addition, the collection manager has participated in a digitization workshop at University of Kansas, advised several graduate students, and collaborated with the New Mexico Museum of Natural History and Science.

2. TABLE OF COLLECTION USE

Collection Growth	508
Loans (outgoing/incoming)	9 (7/2)
Research Visitors ¹	8
Outreach Visitors ¹	140+
Information Requests Answered	116
Direct Website Access ² (“Hits”)	2,827
Indirect: Specimen Data Queries ³ (“Hits”)	34,545
Indirect: Specimen Records Downloaded ³	7,014,759
Downloads of Division Documents	985
Publications Citing/Using MSB Herp Specimens	16

¹ Research Visitors are those visiting the collection as part of research activities, Outreach visitors are those visiting as part of tours.

²Direct Website access represents access to our Division's webpages.

³Indirect Collection Access represents access to data associated with our specimens via data aggregator websites: HerpNet and GBIF

3. COURSES USING THE COLLECTIONS

BIOL 204, Animal Form and Function, spring and fall semesters, 177+ students

BIOL 386, General Vertebrate Zoology, spring and fall semesters, 67 students

BIOL 488, Herpetology, 13 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Giermakowski, J.T.

Fall BIOL 402 – Topics in Collections Research, 2 students

BIOL 502 – Topics in Collections Research, 2 students

Poe, S.

Spring BIOL 488 – Herpetology, 13 students

BIOL 551 – Graduate Research Problems, 2 students

BIOL 599 – Master's Thesis, 2 students

BIOL 699 – Dissertation, 2 students

Fall BIOL 203 – Ecology and Evolution, 212 students

BIOL 386 – General Vertebrate Zoology, 29 students

BIOL 551 – Graduate Research Problems, 1 student

BIOL 599 – Master's thesis, 2 students

BIOL 699 – Dissertation, 2 students

Snell, H.L.

Spring BIOL 386 – General Vertebrate Zoology, 36 students
 BIOL 402 – Conservation Biology, 11 students
 BIOL 402 – Topics in Collections Research, 2 students
 BIOL 499 – Undergraduate Problems, 2 students
 BIOL 551 – Graduate Research Problems, 1 student
Fall BIOL 379 – Conservation Biology, 39 students
 BIOL 402 – Topics in Collections Research, 2 students
 BIOL 402 – Conservation Biology Seminar, 5 students
 BIOL 502 – Topics in Collections Research, 2 students

B. Graduate Students

Gray, L.N

BIOL 112 – Biology Lab non-majors, 61 students

Latella, I.M.

BIOL 386 – General Vertebrate Zoology, spring, 36 students

Truett, B.

BIOL 247 – Anatomy & Physiology Lab, 70 students

5. COLLECTION MANAGEMENT

The collection increased by 508 specimens in 2013 to a total of 95,058 specimens. The website of the division was queried 8,231 times and served 6,182,520 records via HerpNET, while GBIF has reported that for the same period, there were 6,336 searches and downloads of 832,239 records from our collection. In addition to internet queries, data associated with specimens from the division have been used in at least 16 publications in 2013. Many scientists and members of the general public continue to request information on specimens or general aspects of herpetology from our division via telephone, email and directly in person. In addition to responding to over 100 of these requests, we hosted 8 visitors and individually compiled data on 17 occasions.

6. AWARDS, GRANTS, AND CONTRACTS

\$26,886. Predicting effects of climate change on riparian obligate species in the Southwestern US. J.T. Giermakowski. Northern Arizona University/Bureau of Reclamation. Nov 2012– Dec 2013.

\$153,163. Information Development for Species of Greatest Conservation Need. Charles McCollough and J.T. Giermakowski. New Mexico Department of Game and Fish. Sep 2013-Jun 2016.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Jiménez-Uzcátegui, G., Snell, H. L. (2013). CDF Checklist of Galapagos Mammals - FCD Lista de especies de Mamíferos Galápagos. In: Bungartz, F., Herrera, H., Jaramillo, P., Tirado, N., Jiménez-Uzcátegui, G., Ruiz, D., Guézou, A. & Ziemmeck, F. (eds.). Charles Darwin Foundation Galapagos Species Checklist - Lista de Especies de Galápagos de la Fundación Charles Darwin. Charles Darwin Foundation /Fundación Charles Darwin, Puerto Ayora, Galapagos:
<http://checklists.datazone.darwinfoundation.org/vertebrates/mammalia/>

Jiménez-Uzcátegui, G., Márquez, C., Snell, H. L. (2013). CDF Checklist of Galapagos Amphibians - FCD Lista de especies de Anfibios de Galápagos. In: Bungartz, F., Herrera, H., Jaramillo, P., Tirado, N., Jiménez-Uzcátegui, G., Ruiz, D., Guézou, A. & Ziemmeck, F. (eds.). Charles Darwin Foundation Galapagos Species Checklist - Lista de Especies de Galápagos de la Fundación Charles Darwin. Charles Darwin Foundation / Fundación Charles Darwin, Puerto Ayora, Galapagos:
<http://www.darwinfoundation.org/datazone/checklists/vertebrates/amphibia/>

Jiménez-Uzcátegui, G., Márquez, C., Snell, H. L. (2013). CDF Checklist of Galapagos Reptiles - FCD Lista de especies de Reptiles Galápagos. In: Bungartz, F., Herrera, H., Jaramillo, P., Tirado, N., Jiménez-Uzcátegui, G., Ruiz, D., Guézou, A. & Ziemmeck, F. (eds.). Charles Darwin Foundation Galapagos Species Checklist - Lista de Especies de Galápagos de la Fundación Charles Darwin. Charles Darwin Foundation / Fundación Charles Darwin, Puerto Ayora, Galapagos:
<http://checklists.datazone.darwinfoundation.org/vertebrates/reptilia/>

B. Journal Articles

Nieto Montes de Oca, A, S. Poe, S Scarpetta, LN Gray, CS Lieb. 2013. Synonyms for some species of Mexican anoles (Squamata: Dactyloidae). *Zootaxa* 3637 (4): 484–492.

Poe, S. 2013. 1986 redux: New genera of anoles (Squamata: Dactyloidae) are unwarranted. *Zootaxa* 3626 (2):295–299.

Ryan, M.J., S Poe, EW Schaad & AJ Aquilar-Kirigin. 2013. *Ameerga hahneli* (NCN). Range Extension. *Herpetological Review* 44: 471.

Ryan, M.J., S Poe, IM Latella & J Davis. 2013. *Craugastor laevisissimus*. (NCN). New population. *Herpetological Review* 44: 471.

C. Web-Based

M.J. Ryan:

AmphibiaWeb Species Accounts for *Craugastor crassidigitus*, *C. evanescens*, *C. fitzingeri*, *C. punctariolus*, *Oophaga granulifera*, *Pristimantis educatoris*

UNM Bioblog: Jackie Robinson, Pee Wee Reese and the pursuit of science (<http://unm-bioblog.blogspot.com/2013/11/jackie-robinson-pee-wee-reese-and.html>)

UNM Bioblog: Glass Frogs (<http://unm-bioblog.blogspot.com/2013/02/glass-frogs.html>)

D. Technical Reports

Latella, I.M. Conservation of Endangered, Threatened and Sensitive Amphibians and Reptiles. Draft of E-61-7 USFWS Grant Progress Report (NMDGF)

Latella, I.M. 2013 Investigator's Annual Report to U.S. National Park Service. Distributional Assessment for the Gray-banded Kingsnake, *Lampropeltis alterna*, in New Mexico. Ryan, M.J. and I.M. Latella.

Current status of the Arizona Toad (*Anaxyrus microscaphus*) in New Mexico: Identification and evaluation of potential threats to its persistence. New Mexico Game and Fish, Final Report, Dec 27 2013. 29 pp.
Ryan, M.J. and I.M. Latella

Current status of the Arizona Toad (*Anaxyrus microscaphus*) in New Mexico: Identification and evaluation of potential threats to its persistence. New Mexico Game and Fish, Interim Report, Apr 20, 2013. 12 pp.

E. Theses/Dissertations Completed

T.L.McInness. Habitat Preference of Western Diamond-backed Rattlesnakes (*Crotalus atrox*) at Bosque del Apache National Wildlife Refuge, New Mexico: An Analysis at Multiple Scales. Spring 2013.

F. Work In Progress

Chaves, G., A. Garcia-Rodriguez, H. Zumbado-Ulate, E. Gomez & M.J. Ryan. Rediscovery of the endemic streamside frog *Craugastor taurus* (Craugastoridae), in Costa Rica. Herpetological Conservation & Biology (*Rejected with major revisions, in revision*).

Geist, D.J., H.L. Snell, H.M. Snell, C. Goddard, and M. D. Kurz. In press. A Paleogeographic Model of the Galápagos Islands and Biogeographical and Evolutionary Implications. In: The Galápagos: A National Laboratory for the Earth Sciences, Geophysical Monograph 204. First Edition. Edited by Karen S. Harpp, Eric Mittelstaedt, Noémi d'Ozouville, and David W. Graham.

Kohler, J.J., S Poe, M.J. Ryan & G. Kohler. *Anolis marsupialis* Taylor 1956, a valid species from southern Pacific Costa Rica (Reptilia, Squamata, Dactyloidae). Target: Zootaxa

Ryan, M.J., MM Fuller, NJ Scott, JA Cook, S Poe, B Willink, G Chaves & F Bolaños. Individualistic Population Responses of Five Frog Species Over 42-years in Two Changing Tropical Environments. PLOS One (*resubmitted & in review*).

Ryan, M.J., MM Fuller, NJ Scott, JA Cook, S Poe, B Willink, G Chaves & F Bolaños. Individualistic Population Responses of Five Frog Species Over 42-years in Two Changing Tropical Environments. PLOS Biology (*in revision*).

Ryan, M.J., LM Ladwig, R Pangle & NJ Scott. Observations of the changes in understory climber and sapling incidence between 42-year sampling periods at two tropical forest environments in southwestern Costa Rica. Biotropica (*Submitted*).

Ryan, M.J., LM Ladwig, R Pangle & NJ Scott. Observations of the changes in understory climber and sapling incidence between 42-year sampling periods at two tropical forest environments in southwestern Costa Rica. PLOS One (*REJECTED*).

Ryan, M.J., NJ Scott, JA Cook, S Poe, G Chaves, & F Bolaños. Impacts of the 2010-2011 La Niña on a premontane leaf litter frog community. Target: *Ecology Letters*.

Ryan, M.J., J.T. Giermakowski, IM Latella, W Pockman, & S Poe. Drought impacts on a lizard community in a Piñon-Juniper woodland, New Mexico.

Ryan, M.J., IM Latella, J.T. Giermakowski, RE Lovich. Threats and status of *Anaxyrus microscaphus* in New Mexico. Target: *Herpetological Conservation and Biology*.

Ryan, M.J., G Chaves, F Bolaños, A Garcia-Rodriguez, V Acosta, H Zumbado, J Abarca, B Willink, I Latella, B Kubicki, & J.R. Mendelson. Recovered versus Rediscovered amphibian populations: case studies from Costa Rica relating to amphibian chytridiomycosis.

Ryan, M.J., J.T. Giermakowski. Range extension: *Leptodactylus melanonotus*. Target: Herpetological Review.

van Riper, C., III., Hatten, J.R., Giermakowski, J.T., Mattson, D., Holmes, J.A., Johnson, M.J., Nowak, E.M., Ironside, K., Peters, M., Heinrich, P., Cole, K.L., Truettner, C., and Schwalbe, C.R., *In press*, Projecting climate effects on birds and reptiles of the Southwestern United States: U.S. Geological Survey Open-File Report 2014–XXXX, XX p., <http://pubs.usgs.gov/ofr/2014/XXX/>.

G. Publications/Reports Based on MSB Specimens/Data

Barlow, A., K. Baker, C. R. Hendry, L. Peppin, T. Phelps, K. A. Tolley, C. E. Wuster, and W. Wuster. 2013. Phylogeography of the widespread African puff adder (*Bitis arietans*) reveals multiple Pleistocene refugia in southern Africa. *Molecular Ecology* 22:1134-1157.

Camp, C. D., J. Wooten, J.B. Jensen, and D. F. Bartek. 2013. Role of temperature in determining occupancy of cave twilight zones by two species of lungless salamander (family Plethodontidae). *Canadian Journal of Zoology*.

Fenolio, D. B., M. L. Niemiller, M. G. Levy, and B. Martinez. 2013. Conservation Status of the Georgia Blind Salamander (*Eurycea wallacei*) from the Floridan Aquifer of Florida and Georgia. *IRCF Reptiles & Amphibians* 20:97-111.

Leavitt, D. J. and L. A. Fitzgerald. 2013. Disassembly of a dune-dwelling lizard community due to landscape fragmentation. *Ecosphere* 4:art97.

Lindeman, P. V. 2013. *The Map Turtle and Sawback Atlas: Ecology, Evolution, Distribution, and Conservation*. University of Oklahoma Press.

Lobos, G., P. Cattán, C. Estades, and F. M. Jaksic. 2013. Invasive African clawed frog *Xenopus laevis* in southern South America: key factors and predictions. *Studies on Neotropical Fauna and Environment* 48:1-12.

Maciel Mata, C. 2013. Análisis de la diversidad taxonómica de la familia Anguillidae (Squamata: Sauria) en México, con base en modelos de distribución espacial. ICBI-BD-UAEH.

McInnes, T. L. 2013. Habitat Preference of Western Diamond-backed Rattlesnakes (*Crotalus atrox*) at Bosque del Apache National Wildlife Refuge, New Mexico: An Analysis at Multiple Scales. Master's Thesis. University of New Mexico.

Myers, E., J. Rodríguez-Robles, D. DeNardo, R. Staub, A. Stropoli, S. Ruane, and F. Burbrink. 2013. Multilocus phylogeographic assessment of the California Mountain Kingsnake (*Lampropeltis zonata*) suggests alternative patterns of diversification for the California Floristic Province. *Molecular Ecology* 22:5418-5429.

Quintero, I. and J. J. Wiens. 2013. Rates of projected climate change dramatically exceed past rates of climatic niche evolution among vertebrate species. *Ecology letters* 16:1095-1103.

Roedder, D., U. Schulte, and L. F. Toledo. 2013. High environmental niche overlap between the fungus *Batrachochytrium dendrobatidis* and invasive bullfrogs (*Lithobates catesbeianus*) enhance the potential of disease transmission in the Americas. *North-Western Journal of Zoology* 9.

Rovito, S. M., G. Parra-Olea, J. Hanken, R. M. Bonett, and D. B. Wake. 2013. Adaptive radiation in miniature: the minute salamanders of the Mexican highlands (Amphibia: Plethodontidae: *Thorius*). *Biological Journal of the Linnean Society* 109:622-643.

Ryan, M.J. and I.M. Latella. Current status of the Arizona Toad (*Anaxyrus microscaphus*) in New Mexico: Identification and evaluation of potential threats to its persistence. New Mexico Game and Fish, Final Report, Dec 27 2013. 29 pp.

Vandergast, A. G., R. D. Inman, K. R. Barr, K. E. Nussear, T. C. Esque, S. A. Hathaway, D. A. Wood, P. A. Medica, J. W. Breinholt, and C. L. Stephen. 2013. Evolutionary Hotspots in the Mojave Desert. *Diversity* 5:293-319.

Wiens, J. J., K. H. Kozak, and N. Silva. 2013. Diversity and niche evolution along aridity gradients in North American lizards (Phrynosomatidae). *Evolution* 67:1715-1728.

Wooten, J. A., C. D. Camp, J. R. Combs, E. Dulka, A. Reist, and D. M. Walker. 2013. Re-evaluating niche conservatism versus divergence in the Woodland Salamander genus *Plethodon*: a case study of the parapatric members of the *Plethodon glutinosus* species complex. *Canadian Journal of Zoology* 91:883-892.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

J.T. Giermakowski

Guest Lecturer: Conservation Biology (BIOL 379) Class. September.

M.J. Ryan

On the trail of missing frogs: searching for lost species in an age of extinction. University of New Mexico Biology Department Brown Bag Series.

NM Tech & Sevilleta: Research Opportunities at the Sevilleta LTER

Guest Lecturer:

Spring-UNM Herpetology-Tropical amphibian declines

Fall-UNM General Vertebrate Zoology-Amphibian biology and declines

Fall-UNM Conservation Biology-Amphibian biology and declines

Fall-UNM Conservation Biology-Climate change and ectotherms

B. Contributed Talks/Posters (*presenter)

Aguirre, C.M., and J.T. Giermakowski*. The effect of imprecise localities on modelling species distribution: a case study of the Plateau Striped Whiptail (*Aspidoscelis velox*). Poster presentation. 12th Biennial Conference of Science and Management on the Colorado Plateau. Flagstaff, Arizona. September.

Giermakowski, J.T.* and E.M. Nowak. Consequences of Climate Change for the Arizona Black Rattlesnake (*Crotalus cerberus*), a Southwestern Endemic. Oral presentation. Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

Giermakowski, J.T.*, E.M. Nowak, J.R. Hatten, M.J. Johnson, J.A. Holmes. M. Peters. The future suitability of landscape for two species of gartersnakes from Arizona and New Mexico. Oral presentation. 12th Biennial Conference of Science and Management on the Colorado Plateau. Flagstaff, Arizona. September.

Latella, IM* 2013. Longitudinal study of perch height in an introduced community of *Anolis* lizards. Poster presentation. Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

Marti, H* & M.J. Ryan. 2013. The effect of shrub encroachment on harvest & lizards of the Sevilleta National Wildlife Refuge. Oral presentation. St. Olaf Undergraduate Science Symposium.

Pierce, L.J.S.* V. Seamster, K. Menke, and J.T. Giermakowski. Study and conservation of wildlife under a changing climate: can't do it without GIT! Oral presentation. New Mexico Geographic Information Council Annual Meeting. Albuquerque, New Mexico. October.

Ryan, M.J.* Individualistic responses of five litter frog in time & space in Costa Rica. Oral presentation. Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

Poe, S.* Phylogeny of Anoles. Oral presentation. Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

Poe, S.* Identification Key for *Anolis* lizards. Poster presentation. Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

C. Attendance at Professional Meetings

J.T. Giermakowski

Southwestern Partners in Amphibian and Reptile Conservation, Albuquerque, New Mexico. July.

Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

12th Biennial Conference of Science and Management on the Colorado Plateau. Flagstaff, Arizona. September.

I.M. Latella

Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

S. Poe

Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

M.J. Ryan

Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico. July.

D. Service as Editor or on Editorial Board of a Journal

S. Poe. Associate Editor. *Phyllomedusa*.

H.L. Snell, Editor of the Publication Series of the Museum of Southwestern. Major activity in 2013 was the production of Jim S. Findley's Birds of Corrales the 118 page MSB special publication #10 distilling 50 years of systematic monitoring of bird population in the central Rio Grande Valley.

E. Service as Officer of Professional Society/Organization

JT Giermakowski. Senior Co-chair of the Southwestern Partners in Amphibian and Reptile Conservation Steering Committee.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

J.T. Giermakowski

Local amphibians and reptiles. Presentation to the Bosque Academy Summer Camp Program, Albuquerque, New Mexico. July.

B. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.

None

C. Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

H.L. Snell.

Member of IUCN SSC Iguana Specialist Group 2013-2016.

Member of New Mexico Department of Game and Fish Species Recovery Team for Boreal Toads. New Mexico Department of Game & Fish.

Elected Board Member, Tierra Grande Improvement Association (organization that administers 15,000 acres of protected areas in southern Manzano Mountains, Valencia County).

J.T. Giermakowski.

Senior Co-chair of the Southwestern Partners in Amphibian and Reptile Conservation Steering Committee.

Member of Collections Committee for the American Society of Ichthyologists and Herpetologists.

Member of New Mexico Department of Game & Fish Species Recovery Board.

Appointed to University of New Mexico Institutional Animal Care and Use Committee. 2012-2014.

D. Journal Referee

J.T. Giermakowski. Herpetological Conservation and Biology

I.M. Latella. Biological Invasions.

S. Poe. Zoological Journal of the Linnaean Society, Proceedings of the Royal Society

M.J. Ryan. Herpetological Review, Journal of Herpetology, PLOS One, Phyllomedusa

E. Hosting Professional Colloquia and Groups

None.

10. SERVICE

A. Symposia, Workshops, Conferences etc. Sponsored, Organized, Held, etc.

J.T. Giermakowski. Organized and hosted the annual meeting of the Southwestern chapter of Partners in Amphibian and Reptile Conservation. July. The University of New Mexico.

B. Public Service

H.L. Snell

Work with Whitfield Wildlife Conservation Area, Belen, NM

Member NM Department of Game & Fish Species Recovery Board, Santa Fe & Albuquerque, NM

Elected Board Member, Tierra Grande Improvement Association, Valencia County, NM. Organization oversees 15,000+ acres of protected natural habitat in the southern Manzano Mountains.

Work with the New Mexico Mountain Club to promote wilderness activities throughout New Mexico.

Chairman of the New Mexico Mountain Club's Technical Rock Climbing Section for 2013 – primary responsibility is the NMMC Technical Rock Climbing School to teach and promote safe mountaineering.

M.J. Ryan

Reviews:

Prioritizing Captive Amphibians for Conservation in Panama, Amphibian Ark: Review and provide information for setting captive breeding programs in Panama.

Review and comments to Jemez Mountain Salamander Recovery Plan

Outreach:

APS High School Museum Program. April and November.

Mentoring:

Elizabeth Gallagher: Independent Undergraduate Research Project NM Tech

Vivien Enriquez (REU): Sevilleta National Wildlife Refuge LTER Research Experience for Undergraduates

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

I.M. Latella

New Mexico Share with Wildlife: Current status of the Arizona Toad (*Anaxyrus microscaphus*) in New Mexico: Identification and evaluation of potential threats to its persistence. \$10,800

New Mexico Department of Game and Fish: Conservation of Endangered, Threatened, and Sensitive Amphibians and Reptiles. \$12,000 (Field Work, Report Writing)

M.J. Ryan

New Mexico Share With Wildlife: Effects of *Batrachochytrium dendrobatidis* on amphibian communities in New Mexico, \$10,000 (Co-PI with Dr. Jamie Voyles)

Lewis and Clark Exploration Fellowship: In search of missing frog species in Costa Rica: rediscovering critically endangered species in a time of extinction, \$5,000 (PI)

LTER Graduate Student Fellowship for Summer Research: Lizard Community Response to Short-Term Rainfall Manipulation, \$4,500 (PI)

New Mexico Share With Wildlife: Current status of the Arizona Toad (*Anaxyrus microscaphus*) in New Mexico: Identification and evaluation of potential threats to its persistence, \$10,800 (PI)

Crowd-funding: Search for Missing Frogs, \$1,500

12. DONATIONS AND GIFTS RECEIVED

Donation of 2013 issues of the Southwestern Naturalist and Texas Journal of Science.

13. CURRENT STAFF

A. Faculty/Staff

Snell, H.L. Professor and Curator

Degenhardt, W.D., Curator and Professor Emeritus
Poe, S., Associate Professor and Associate Curator

Giermakowski, J.T. Sr. Collection Manager

Gray, L. N. Graduate Assistant (Spring)
Ryan, M.J. Graduate Assistant (Fall)

B. Graduate students

Davis, J./Poe
Gray, L.N., M.S. /Poe
Latella, I.M., Ph.D./Poe
McInnes, T.L., M.S./Snell
Ryan, M.J., Ph.D./Poe
Schaad, E./Poe
Truett, B./Poe

C. Undergraduate Student Workers and Volunteers

Aguirre (Wilson), Cassandra. Student employee.
Hostak, Emily. Student employee.
Leyva, Sinjin. Student employee.

14. MUSEUM ASSOCIATES

A. Curatorial Associates

Painter, C.W., New Mexico Dept. of Game & Fish
Stuart, J.N., New Mexico Dept. of Game & Fish

B. Research Associates

Fitzgerald, L., Texas A&M University
Fritts, T.H., retired

DIVISION OF ARTHROPODS

1. DIVISION HIGHLIGHTS

Arthropods loaned over 20 specimens to Castetter Hall for a display focusing on the Museum of Southwestern Biology and how research collections are used in various forms of study. The display was completed in summer 2013. The specimens loaned included both dry and alcohol-preserved specimens collected from White Sands National Monument and from Quatrociénegas, Mexico, and illustrated the importance of monitoring projects and surveys in studies of biodiversity studies. Two undescribed White Sands specimens were also loaned to the New Mexico Museum of Natural History and Science for a six-month exhibition educating visitors on conservation research in New Mexico that is made possible through museum research collections. The exhibit opened in January 2014 and was produced by Bethany Abrahamson, a graduate student of the Division curator.

Arthropods loaned 41 of our best butterfly specimens to the New Mexico Museum of Natural History and Science for a special public display on butterflies of New Mexico. The Division contributed specimens to a UNM Biology Department public display on the role of museums in conservation biology. Research Associate Julie McIntyre presented many of the Division's pollinator specimens at two separate public pollinator events in New Mexico.

Regretfully, the renovation of space for alcohol collections of Arthropods and Parasitology remained unfinished through 2013, delayed for over a year.

2. COLLECTION USE SUMMARY

Collection growth (specimens acquired)	(4264 dry collection + 200 alcohol, also databased)
Loans – outgoing	(5 dry)
Loans – incoming	(3 dry + 3 alcohol)
Research Visitors	(24 dry collection)
Information Requests Answered	(46 dry collection)
Publications Citing/Using MSB	11
Arthropod Specimens	

3. COURSES USING THE COLLECTION

Course	Title	Students
BIOL 485/585	Entomology	16
BIOL 371L	Invertebrate Zoology	25
BIOL 203L	Evolution/Ecology Lab (TA)	44

4. COURSES TAUGHT BY MSB PERSONNEL

Instructor	Course	Title	Students
Miller, K.B.	BIOL 485/585	Entomology	16
	BIOL 419	Sexual Selection in Animals	37

5. AWARDS, GRANTS, AND CONTRACTS

Abrahamson, B. UNM Graduate and Professional Student Association Student Research Grant (\$500)

Abrahamson, B. UNM Biology Department Graduate Student Allocations Committee Grant (\$400)

Lord, N.P. and K.B. Miller. National Science Foundation Doctoral Dissertation Improvement Grant (DDIG) (\$19,570).

Mallis, R.E. UNM Biology Scholarship Award for excellence in research and academic record. University of New Mexico Biology Department. (\$1000) March 2013.

Miller, K.B. and E.H. Nearn. USDA/APHIS Postdoc funding for Gino Nearn, "Longicorn ID: Tool for Diagnosing Cerambycoid Beetles" (\$77,825).

Phylogenetic Revisions of South American Water Beetles (Coleoptera: Adepaga: Hydradepaga): A Model for Teaching Systematic Biology, K.B. Miller, NSF CAREER #DEB-0845984, \$675,000, 2009-2015, 51%.

NSF Emerging Frontiers Grant #EF-1207371, (N. Cobb, PI: K.B. Miller, Co-PI). Digitization TCN: Collaborative Research: Southwest Collections of Arthropods Network (SCAN): A Model for Collections Digitization to Promote Taxonomic and Ecological Research (\$366,333), 2012-2015

6. PUBLICATIONS

A. Journal Articles

Miller, K.B. 2013. Scientific Note: Notes on Flight and Respiration at the Water Surcae by *Hygrotus salinarius* (Wallis) (Coleoptera: Dytiscidae). *The Coleopterists Bulletin*, 67(4): 444-446.

Miller, K.B. 2013. Review of the Genus *Cybister* Curtis, 1827 (Coleoptera: Dytiscidae: Dytiscinae: Cybistrini) in North America. *The Coleopterists Bulletin*, 67(4): 401-410.

Miller, K.B., A. Jean, Y. Alarie, N. Hardy, & R. Gibson. 2013. Phylogenetic placement of North American subterranean diving beetles (Coleoptera: Dytiscidae). *Arthropod Systematics and Phylogeny*, 71(2): 75-90.

Gustafson, G.T & K.B. Miller. 2013. On the family- and genus-series nomina in Gyrinidae Latreille, 1810 (Coleoptera, Adepaga). *Zootaxa*, 3731(1): 077-105.

Hodson, A.M., Cook, S.E., Edgerly, J.S., & Kelly B. Miller. 2013. Parthenogenetic and sexual species within the *Haploembia solieri* species complex (Embioptera: Oligotomidae) found in California. *Insect Systematics & Evolution*, 45(2014): 93-113.

Leister, M., Mallis, R., & K.B. Miller. 2013. The male of *Tengella perfuga* Dahl, 1901 with re-description of the female and comparisons with *T. radiata* (Kulczynski, 1909) (Araneae: Tengellidae). *Zootaxa*, 3709: 185-199.

Alarie, Y., Gibson, J.R., & K.B. Miller. 2013. Descriptions of larvae of the North American endemic stygobiontic *Ereboporus naturaconservatus* Miller, Gibson & Alarie and *Haideoporus texanus* Young & Longley (Coleoptera: Dytiscidae). *Tijdschrift voor Entomologie*, 156(2013): 1-10.

Grzymala, T.L. & K.B. Miller. 2013. Taxonomic Revision and Phylogenetic Analysis of the Genus *Elytroleptus* Dugés (Coleoptera: Cerambycidae: Cerambycinae: Trachyderini). *Zootaxa*, 3659: 1-62.

Gomez, R.A. & K.B. Miller. 2013. *Prionohydus*, a New Genus of Noterini Thomson (Coleoptera: Noteridae) from South America with Three New Species and Its Phylogenetic Considerations. *Annals of the Entomological Society of America*, 106(1): 1-12.

K.B. Miller. 2013. *Notomicrus josiahi*, a new species of Noteridae (Coleoptera) from Venezuela. *Zootaxa*, 3609(2): 243-247.

B. Web-Based

Brantley, S.L., editor, Spiders of the Arid Southwest, authors are Richman, D.B., D.A. Dean, S.L. Brantley, and B. Cutler

C. Technical Reports

D. Theses and Dissertations Completed

Lord, N.P. 2013. Systematics within the Zopheridae Complex (Coleoptera: Tenebrionoidea). Doctoral dissertation approved Aug. 2013.

E. Publications and Reports Based on MSB Specimens/Data by Outside Researchers

7. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and Seminars

B. Contributed Talks and Posters

Abrahamson, B. Evaluating natural history collections use in one university museum. Entomological Collections Network Annual Meeting, Austin, TX, 9 Nov. 2013

Brantley, S.L. Emergence of SCAN (Southwest Collections of Arthropods Network). NSF Integrated Digitized Biocollections (iDigBio), Lawrence, KS, 3/2013

Brantley, S.L. Reflections on imaging invertebrate specimens in alcohol. NSF Integrated Digitized Biocollections (iDigBio), Ann Arbor, MI, 9/2013

Dunnum, J.L., S.L. Brantley, and K. Bell. Using online tools to make accessible museum collections. Association of Science-Technology Centers, Albuquerque, NM, 10/2013.

Lightfoot, D.C. 2013. Geographic patterns of grasshoppers, crickets and katydids (Orthoptera) of the American Southwest. SysEB Section Symposium: What Arthropods Reveal about the Biogeography of the American Southwest and Mexico; with a Report on Work from Joshua Tree National Park. Annual Meeting of the Entomological Society of America, Austin, TX. November 10–13.

Lord, N.P., R.A.B. Leschen, and T.R. Buckley. 2013. NZ ZopherID: a comprehensive electronic tool to a taxonomically difficult group of New Zealand beetles. SysEB Section Symposium: Interactive Keys Transforming Identification: Melding Traditional Methods with New Technologies. Annual Meeting of the Entomological Society of America, Austin, TX. November 10–13.

Lord, N.P. and K.B. Miller. 2013. An Ironclad family? The first phylogeny of Zopheridae (Coleoptera: Tenebrionoidea) based on molecular data. SysEB Member Symposium: Taxonomy and Systematics within the Tenebrionoidea (Coleoptera). Annual Meeting of the Entomological Society of America, Austin, TX. November 10–13.

Ivie, M.A., I.A. Foley, and N.P. Lord. 2013. *Phreatus* - What is it? SysEB Member Symposium: Taxonomy and Systematics within the Tenebrionoidea (Coleoptera). Annual Meeting of the Entomological Society of America, Austin, TX. November 10–13.

Miller, K.B. 2013. Diversity and Evolution of Sexual Systems in Diving Beetles. Annual Meeting of the Entomological Society of America, Austin, TX. November 10–13.

Chapman, C. and S.L. Brantley. Spider community dynamics along the C. Hart Merriam elevation gradient. 12th Biennial Conference of Science and Management on the Colorado Plateau 9/2013

Gustafson, G. T. & K.B. Miller. On the tribe formerly known as Enhydrini (Coleoptera: Gyrinidae: Gyrininae). Toward a revision of the tribe and a review of its history. Water beetle symposium Annual Entomological Society of America Meeting 2013.

Lord, N.P., J.V. McHugh, J.P. Shields, and K.B. Miller. 2013. Heavy metals in beetle mandibles: the first comprehensive analysis of incorporation, with evolutionary origins and implications. 10-minute Student Paper Competition at the Annual Meeting of the Entomological Society of America, Austin, TX. November 10–13.

Mallis, R.E. 2013. Life history, web ontology and cribellum use in *Tengella perfuga* Dahl, 1901. American Arachnological Society, Johnson City, TN; July 2013; presentation.

Mallis, R.E. 2013. Kinky action from 8-Legged Freaks. UNM Brown Bag lecture series, October 2013; presentation.

Hopkins, H. The phylogeny of *Arenivaga* (Rehn) (Blattodea, Corydiidae, Corydiinae). 6th Dresden Meeting on Insect Phylogeny, Dresden, Germany, September 26-29, 2013; poster.

Hopkins, H. The phylogeny of *Arenivaga* (Rehn) (Blattodea, Corydiidae, Corydiinae) and some early results of niche assessment of some species in the genus. UNM Brown Bag lecture series, November, 2013; presentation.

Hopkins, H. The phylogeny of *Arenivaga* (Rehn) (Blattodea, Corydiidae, Corydiinae). Entomological Society of America Annual Meeting, November 2013; competitive presentation.

Hopkins H. The biotic and abiotic factors contributing to species boundaries in *Arenivaga* (Rehn) (Blattodea, Corydiidae, Corydiinae). Entomological Society of America Annual Meeting, November 2013; symposium presentation.

C. Attendance at Professional Meetings

Brantley, S.L. NSF Integrated Digitized Biocollections (iDigBio), Lawrence, KS, 3/2013

Brantley, S.L. NSF Integrated Digitized Biocollections (iDigBio), Ann Arbor, MI, 9/2013

Brantley, S.L. Association of Science-Technology Centers, Albuquerque, NM 10/2013

Brantley, S.L. NSF Integrated Digitized Biocollections (iDigBio), Summit Meeting, Tallahassee, FL, 11/2013

Gustafson, G. T. Entomological Society of America, Austin, TX, 11/2013.

Hopkins, H. Entomological Society of America, Austin, TX, 11/2013.

Hopkins, H. 6th Dresden Meeting on Insect Phylogeny, Dresden, Germany, September 26-29, 2013.

Lightfoot, D.C. Entomological Society of America, Austin, TX, 11/2013.

Lord, N.P. Entomological Society of America, Austin, TX, 11/2013.

Mallis, R. Arachnological Society of America National Meeting, Johnson City, TN, 07/2013.

Miller, K.B. Entomological Society of America, Austin, TX, 11/2013.

D. Service as Editor or on Editorial Board of a Journal

Gustafson, G.T. English language editor, ACTA Entomologica Musei Nationalis Pragae
Lightfoot, D.C. Associate Editor (entomology and ecology), Western North American Naturalist
Lord, N.P. Review editor, Frontiers in Phylogenetics, Phylogenomics, and Systematics.
Lord, N.P. Subject editor (Coleoptera: Cucujiformia), Zootaxa.
Miller, K.B. Subject editor (Embioptera), ZooKeys

E. Service as Officer of Professional Society/Organization

Homziak, N. President, UNM Chapter of the New Mexico Wilderness Alliance, 2012-2013.

Miller, K.B. Past President, Systematics, Evolution and Biodiversity Section, Entomological Society of America, 2013.

8. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

B. Journal Referee

Hopkins, H. Reviews for: Life, the Excitement of Biology, Systematic Entomology.

Lord, N.P. Reviews for: Systematic Entomology, Proceedings of the Entomological Society of Washington, Deutsche Entomologische Zeitschrift, Acta Entomologica Musei Nationalis Pragae, Japanese Journal of Systematic Entomology, ZooKeys, Banisteria.

Mallis, R.E. Reviews for Insect Conservation and Diversity, specifically Arachnids

Miller, K.B. Reviews for Coleopterists Bulletin, Molecular Phylogenetics and Evolution, Cladistics, Aquatic Insects, Zootaxa

9. SERVICE

A. Symposia, Workshops, Conferences etc. Sponsored, Organized, Held, etc.

Abrahamson, B. Organizer: "Conserving New Mexico" Exhibit Docent and Volunteer Training, New Mexico Museum of Natural History and Science, 31 January & 1 February 2014.

Brantley, S.L. Co-Organizer: NSF Integrated Digitized Biocollections (iDigBio) Invert Imaging workshop, Ann Arbor, MI, 9/2013

Hopkins, H. Organizer: Section Symposium, Entomological Society of America Annual Meeting, 2013, Austin, TX. Title: What Arthropods Reveal About the Biogeography of the American Southwest and Mexico.

Lord, N.P. Co-Organizer: Member Symposium during the Entomological Society of America Annual Meeting, 2013 in Austin, TX. Title: Taxonomy and Systematics within the Tenebrionoidea (Coleoptera).

B. Public Service

Brantley, S.L. Presentation to Chuck Buxbaum's Comparative Anatomy class (~50 students) at Sandia Prep. Part of larger presentation by collection managers from Fishes, Reptiles and Amphibians, Birds, and Mammals. All brought specimens from teaching collections to illustrate animal anatomy and evolution.

Brantley, S.L. Museum of Natural History and Science BioBlitz, Sandia Mountains Natural History Center, 6/2013.

Brantley, S.L. Presentation and training for Master Naturalists Program, 6/2013

Brantley, S.L. Museum of Natural History and Science, "Ask the Experts Day," 10/2013.

Mallis, R.E. Judge for UNM Biology Department Research Day, 4/ 2013.

Mallis, R.E. Graduate student representative, Research Day 2014 Planning Committee, Fall 2013.

Hopkins, H. Scheduling and publicity for UNM Biology Weekly Brown Bag Speaker Series, May 2011-December 2013.

Hopkins, H. Consultant to BugGuide.net on cockroach identification and public inquiries on cockroaches, 2010-present.

Hopkins, H. Judge for UNM Biology Department Research Day, April 2013.

Hopkins, H. Mentor to an undergraduate biology student Nicholas Homziak in the UnO (Undergraduate Opportunities) program, through May 2013.

10. DONATIONS AND GIFTS RECEIVED

Metzler, E. 25 moth specimens, White Sands National Monument, NM, including paratypes.

Miller, K.B. 2,423 pinned insect specimens, databased, world-wide. Several books for library.

11. CURRENT STAFF

A. Faculty/Staff

Kelly Miller, Associate Professor, Assistant Director of Museum, Curator

Manuel Molles, Professor Emeritus, Curator Emeritus

Sandra Brantley, Research Assoc. Professor, Senior Collection Manager

David Lightfoot, Research Assoc. Professor, Senior Collection Manager

B. Graduate Students

Nathan Lord, Ph.D. candidate

Michael Medrano, Ph.D. candidate

Heidi Hopkins, Ph.D. candidate

Karen W. Wright, Ph.D. candidate

Grey Gustafson, Ph.D. candidate

Rachael Mallis, Ph.D. student

Bethany Abrahamson, Masters student

Rafael Braga, Ph.D. student visiting from Universidade Federal do Rio de Janeiro (UFRJ)

C. Undergraduate Student Workers and Volunteers

Sharyn Davidson, volunteer

Martha Lara

Nicholas Homziak, (UNM UNO program, honors)

Stephen Baca

Sarah Jogi
Matthew Leister
Aaron Prairie
Emily Schmeltzer

12. MUSEUM ASSOCIATES

A. Research Associates

Ana Davidson, postdoctoral fellow, UNM and UNAM
Eric Metzler, Ohio State University, retired
Robert Parmenter, Valles Caldera National Preserve
Ernest Valdez, USGS
Mark Rowland, retired

DIVISION OF BIRDS

1. DIVISION HIGHLIGHTS

Over 500 specimens actively collected: Trinidad, Alaska, Arizona, New Mexico (including Navajo Nation).

945 specimens cataloged:

69 from Peru

45 from South Africa

717 from New Mexico

Traded with ANSP the type of *Bubo virginianus pinorum* for an Eskimo Curlew specimen. MSB now has all of the 'common' extinct species from North America, lacking only a Labrador Duck and Great Auk.

The Division of Birds also added more than 100 salvaged specimens from New Mexico, Alaska and Maine. The major accomplishments of the Division of Birds this year include (1) a major expedition to Trinidad and Tobago, (2) a major expedition to Alaska, (3) the first receipt of salvaged bird specimens from Maine, (4) a collecting campaign in nine New Mexico and Arizona mountain ranges to study Yellow-rumped Warblers and their malaria, and (5) a collaborative, interdisciplinary research & collecting expedition to the Rio Grande Valley of Valencia County, NM.

Our Peru field program was on hold during 2013 because of a delay with processing of our Genetic Resources Access Permit. We received that permit in August 2013 after a tremendous amount of negotiation and lobbying, and we are now ready to ramp up Peru fieldwork again in 2014. Our current Peru collections represent over 750 species, of which over 95% are new species or subspecies for the MSB collection. Our avian tissue collection is now gaining international recognition for these outstanding holdings (9400 Peru tissues collected to date), and this is reflected in the growing research importance of our collection.

Collecting expeditions in 2013:

2013: central Alaska, Alaska range and Seward Peninsula, 126 specimens

2013: Trinidad & Tobago: 160 specimens

2013: New Mexico & Arizona: Nine-mountain-range comparison of breeding Yellow-rumped Warbler populations: 150 specimens.

2013: New Mexico: Valencia County: La Joya WMA wintering bird physiology expedition: 15 specimens.

All catalogued specimens are fully digitized and web accessible, via the Arctos database (arctos.database.museum; note: recently collected research specimens are not made public right away in order to allow MSB researchers to capitalize on proprietary data). These online specimen records are **directly linked** from five of the peer-reviewed publications listed in this report, as well as ten additional publications that are already submitted for anticipated publication in 2014.

In 2013 we created the first direct host-parasite links between specimens in the Bird and Parasite collections, respectively.

2. COLLECTION USE SUMMARY (SEE TABLE ABOVE)

METRIC DESCRIPTIONS

- 1. Collection growth 945 specimens**
- 2. Number of specimen loans made to outside researchers and institutions. 21 loans**
- 3. Professional Visitors to the Collections. 73**
- 4. Collection web activity. 77,569 Arctos searches that returned at least one MSB Bird record.**
- 5. Requests for information (RFIs) answered in person. 67**
- 6. Publications by museum staff. 7**
- 7. Publications by scientists outside of the MSB. 6**
- 8. Technical reports by museum staff 1**
- 9. UNM courses using specimens, data, electronic archives and other resources provided by the MSB. 22**
- 10. UNM courses provided by museum staff 22**
- 11. Number of graduate students mentored by MSB staff per year 6**
- 12. Number of graduate theses/dissertations 0**
- 13. Number of undergraduate students trained in the MSB 11**
- 14. Number of grants and contracts in force 3**
- 15. Total dollar amount of all grants and contracts in force 114,121**
- 16. Total amount of Facilities and Administration (F&A) 19,253.04**

COURSES USING THE COLLECTIONS

Semester	Course	Title	
Fall 2013	BIOL 699	Dissertation	2
Fall 2013	BIOL 599	Masters Thesis	3
Fall 2013	BIOL 402	T: Ecology Seminar	16
Fall 2013	BIOL 402	T: Molecular Seminar	6
Fall 2013	BIOL 502	T: Molecular Systematics Disc	2
Spring 2013	BIOL 699	Dissertation	2
Spring 2013	BIOL 300	Evolution	40
Spring 2013	BIOL 599	Masters Thesis	2
Spring 2013	BIOL 551	Research Problems	1
Spring 2013	BIOL 400	Senior Honors Thesis	2
Spring 2013	BIOL 402	T: Avian Sci Specimen Prep	9
Spring 2013	BIOL 402	T: Ecology Seminar	17
Spring 2013	BIOL 402	T: Molecular Seminar	9
Spring 2013	BIOL 402	T: Molecular Systematic Discus	8
Spring 2013	BIOL 499	Undergraduate Problems	1
Spring 2013	BIOL 386	General Vertebrate Zoology	40
Fall 2013	BIOL 386	General Vertebrate Zoology	30
Spring 2013	BIOL 204L	Plant & Animal Frm & Fnction	180
Fall 2013	BIOL 204L	Plant & Animal Frm & Fnction	180
Fall 2013	BIOL 203L	Ecology and Evolution	240
Spring 2013	BIOL 203L	Ecology and Evolution	240
Fall 2013	BIOL 486L	Ornithology	13

WITT (COURSES WITH AN ASTERISK DENOTE CO-TAUGHT WITH JOHNSON):

Semester	Course	Title	
Fall 2013	BIOL 699	Dissertation	2
Fall 2013	BIOL 599	Masters Thesis	3
Fall 2013	BIOL 402	T: Ecology Seminar	16
Fall 2013	BIOL 402	T: Molecular Seminar	6
Fall 2013	BIOL 502	T: Molecular Systematics Disc	2
Spring 2013	BIOL 699	Dissertation	2
Spring 2013	BIOL 300	Evolution	40
Spring 2013	BIOL 599	Masters Thesis	2
Spring 2013	BIOL 551	Research Problems	1
Spring 2013	BIOL 400	Senior Honors Thesis	2
Spring 2013	BIOL 402	T: Avian Sci Specimen Prep *	9
Spring 2013	BIOL 402	T: Ecology Seminar	17
Spring 2013	BIOL 402	T: Molecular Seminar	9
Spring 2013	BIOL 402	T: Molecular Systematic Discus	8
Spring 2013	BIOL 499	Undergraduate Problems	1

COLLECTION MANAGEMENT ACTIVITIES

AWARDS, GRANTS, AND CONTRACTS

WOLF, B.O.

The direct effects of global warming on desert bird communities: the physiology ecology of die-offs during heat waves, Julie Hutt Co-PI, NSF IOS-Organism-Environment Interactions (2011-2014), \$654,985

WITT, C.C.

2011-2015: Montane Biogeography Revealed by Quirks of the Evolutionary Process: Integrative Respiratory Phenotypes for Andean Birds; P.I.: C. C. Witt; co-P.I. Blair Wolf; co-P.I. Joann Mudge; National Science Foundation (Evolutionary Processes Cluster); \$650,000; DEB-1146491.

WRIGHT, N.A.

NSF Doctoral Dissertation Improvement Grant: The effects of ecology and evolution on avian flight morphology. \$14,742.

PEER REVIEWED PUBLICATIONS BY MSB BIRD DIVISION PERSONNEL**Journal Articles**

Noakes M.J., B. Smit, **B.O. Wolf**, A.E. McKechnie. 2013. Thermoregulation in African Green Pigeons (*Treron calvus*) and a re-analysis of insular effects on basal metabolic rate and heterothermy in columbid birds. *Journal of Comparative Physiology B* 183: 969-982.

Baumann, M. J., S. M. McNew, & C. C. Witt. 2013. Morphological and molecular evidence confirm the first definitive eastern White-breasted Nuthatch (*Sitta carolinensis*) for New Mexico. *Western Birds* 44:90-97.

Projecto-Garcia, J., C. Natarajan, H. Moriyama, A. Fago, R. Weber, Z. A. Cheviron, R. Dudley, J. A. McGuire, **C. C. Witt**, and J. F. Storz. 2013. Repeated elevational transitions in hemoglobin function during the evolution of Andean hummingbirds. *Proceedings of the National Academy of Sciences, USA*, published ahead of print December 2, 2013, [doi:10.1073/pnas.1315456110](https://doi.org/10.1073/pnas.1315456110).

Dickerman, R. W., S. M. McNew*, & C. C. Witt. 2013. Long-distance movement in the "Dusky" Great Horned Owl and current limits to phylogeography for establishing provenance. *Western North American Naturalist* 73(4):401-408.

Yuri, T., R. T. Kimball, J. Harshman, R. C. K. Bowie, M. J. Braun, J. L. Chojnowski, K.-L. Han, S. J. Hackett, C. J. Huddleston, W. S. Moore, S. Reddy, F. H. Sheldon, D. W. Steadman, **C. C. Witt**, E. L. Braun. 2013. Parsimony and model-based analyses of indels in avian nuclear genes reveal congruent and incongruent phylogenetic signals. *Biology* 2:419-444.

Schmitt, C. J.*, T. Valqui, and C. C. Witt. 2013. The expanding known range of Stygian Owl (*Asio stygius*) in the Andes. *Boletín de la Unión de Ornitólogos del Perú (UNOP)*, 8:37-45.

Schmitt, C. J., D. C. Schmitt, J. Tiravanti C., F. Angulo P., I. Franke, L. Pollack, & C. C. Witt. 2013. Avifauna of a relict *Podocarpus* forest in the Cachil Valley, Northwest Peru. *Cotinga*, 35:15-23.

Steadman, D. W., Morris, J. R., and **Wright, N. A.** (2013). A new species of Late Pleistocene rail (Aves: Rallidae) from Abaco, the Bahamas. *Paleontological Journal*, 47: 1355-1364.

Publications Based on MSB Specimens/Data By Other (non-MSB) Authors

Berns, C.M., D.C. Adams 2013. Becoming different but staying alike: patterns of sexual size and shape dimorphism in bills of hummingbirds. *Evolutionary Biology* 40: 246-260.

Cannell, B.L, K.V. Krasnec, K. Campbell, H. I. Jones, R.D. Miller, N. Stephens. 2013. The pathology and pathogenicity of a novel *Haemoproteus* spp. infection in wild Little Penguins (*Eudyptula minor*). *Veterinary Parasitology* 197: 74-84.

Dohms KM, Burg TM (2013) Molecular Markers Reveal Limited Population Genetic Structure in a North American Corvid, Clark's Nutcracker (*Nucifraga columbiana*). *PLoS ONE* 8(11): e79621. doi:10.1371/journal.pone.0079621

Findley, J.S. 2013. Birds in Corrales. Special Publication of the Museum of Southwestern Biology 10: 118 pages. <http://msb.unm.edu/publications/documents/BIRDSINCORRALES.pdf>

Parmeter, J.E. 2013. Additions to the list of bird species recorded at the Melrose Migrant trap, Roosevelt County, New Mexico: 2007-2011. *New Mexico Ornithological Society Bulletin* 41: 2-7.

van Donegan, W.F.D., I. Lazzoni, H. Winkler, R.A. Vásquez, C.F. Estados. 2013. Behavioural and genetic interactions between an endangered and a recently-arrived hummingbird. *Biological Investigations* 15: 1155-1168.

Dissertations/Theses Based on MSB Specimens/Data

Carmi, Ore. 2013. PHYLOGEOGRAPHY OF THE VERMILION FLYCATCHER, PYROCEPHALUS RUBINUS. M.S. Thesis. Submitted to the faculty of San Francisco State University (CA, USA) in partial fulfillment of the Requirements for the Degree Master of Science in Biology: Ecology and Systematic Biology, May 2013.

Cuervo, A. M. 2013. "Evolutionary Assembly of the Neotropical Montane Avifauna". Ph.D. Dissertation. Department of Biological Sciences (Division of Systematics, Ecology, and Evolution), and Museum of Natural Science. Louisiana State University, USA.

Steinberg, R. K. 2013. Spectrophotometric, molecular, and geographic characterization of two plumage variants in the Cassin's Finch, *Haemorhous cassinii*. Undergraduate Thesis. Dept. of Biology, University of New Mexico, Albuquerque, NM, USA.

Reports Based on MSB Specimens/Data

Benham, P. M., E. Bautista O., **E. J. Beckman, J. A. Clark, L. M. Flores, S. C. Galen, A. B. Johnson, M. Combe, J. Huaroto, K. S. Verde G., and C. C. Witt.** 2013. Survey of the Birds of

Cloud Forest and Páramo Habitats above Agua Azul, Northwest Peru. Technical Report to Dirección General Forestal y de Fauna Silvestre (DGFFS), Lima, Peru. 13 pp.

ACTIVITIES IN LEARNED SOCIETIES

Invited/Plenary Talks and Seminars

Witt, C.C.

Hemoglobin adaptation and the biogeography of hummingbirds. [Invited talk]. Symposium on Neotropical Avian Biogeography, 4th Colombian Ornithological Congress, November 5-8, Cali, Colombia.

Repeated elevational transitions in hemoglobin function in Andean hummingbirds. Hosts: Bill Milsom & Doug Altshuler University of British Columbia, Dept. of Zoology, Physiology, November 22.

Witt, C. C. 2013. INVITED SEMINAR: Ministerio de Agricultura del Perú, Lima, Peru, November 12, 2013. Fisiología y adaptación a las grandes alturas en colibríes peruanos. [In Spanish].

Contributed Talks and Posters

Beckman E.J. & Witt C.C. Diversification in the Andean Avifauna: the South American siskins. American Genetics Association Annual Symposium, Ithaca, NY. July 21, 2013.

Smiley, A., G. Williams, N.A. Wright, and C.C. Witt. 2013. *Assessing hypoxic stress in high-Andean birds using right ventricular morphology.* 131st Meeting of the American Ornithologists' Union & 83rd Meeting of the Cooper Ornithological Society, 14 - 17 August, Chicago, IL, USA.

Smiley, A., G. Williams, N.A. Wright, and C.C. Witt. 2013. *Assessing hypoxic stress in high-Andean birds using right ventricular morphology.* 22nd Annual Research Day, University of New Mexico Department of Biology. 5 April, 2013. Albuquerque, NM, USA.

Smiley, A. M. Badger, and R. Dudley. 2013. Electrostatic charge in Anna's hummingbirds (*Calypte anna*) and its possible roles in pollination biology. Biology Scholars Program.

Smiley, A., G. Williams, N.A. Wright, and C.C. Witt. 2013. *Assessing hypoxic stress in high-Andean birds using right ventricular morphology.* SACNAS Conference, San Antonio, TX.

Toomey, M.B., J.M. Enright, K.M. Riedl, S.J. Schwartz, **C. C. Witt**, E. H. Harrison, O. Lind, A. Kelber, K.J. McGraw, & J.C. Corbo. 2013. *Complementary shifts in carotenoid metabolism and opsin tuning facilitate avian color discrimination.* 131st Meeting of the American Ornithologists' Union & 83rd Meeting of the Cooper Ornithological Society, 14 - 17 August, Chicago, IL, USA.

Chavez, A.N., S.C. Galen, J. Projecto-Garcia, J.F. Storz, & C.C. Witt. 2013. *Evidence for high altitude adaptation in Andean House Wrens.* 131st Meeting of the American

Ornithologists' Union & 83rd Meeting of the Cooper Ornithological Society, 14 - 17 August, Chicago, IL, USA.

Chavez, A. N., S. C. Galen, J. Projecto-Garcia, J. F. Storz, & C. C. Witt. 2013. Increased Hb-O₂ affinity in high altitude Andean house wrens. 22nd Annual Research Day, University of New Mexico Department of Biology. 5 April, 2013. Albuquerque, NM, USA.

Schmitt, C.J., E.L. Montaña, W. Vargas Campos, S.M. McNew, T. Valqui, & C.C. Witt. 2013. *Color polymorphism and adaptation in the Vermilion Flycatcher*. 131st Meeting of the American Ornithologists' Union & 83rd Meeting of the Cooper Ornithological Society, 14 - 17 August, Chicago, IL, USA.

Witt, C.C., and S.C. Galen. 2013. *Avian malaria diversity across hosts and environments in the Peruvian Andes*. 131st Meeting of the American Ornithologists' Union & 83rd Meeting of the Cooper Ornithological Society, 14 - 17 August, Chicago, IL, USA.

Galen, S.C., & C. C. Witt. *Diverse avian malaria in Andean House Wrens: evidence for co-diversification despite lability in host breadth and climatic niche*. 131st Meeting of the American Ornithologists' Union & 83rd Meeting of the Cooper Ornithological Society, 14 - 17 August, Chicago, IL, USA.

Galen, S.C. and Witt, C.C. *Avian malaria in Andean house wrens*. University of New Mexico Research Seminar, Albuquerque, NM. September 2013.

Galen, S.C. and Witt, C.C. *Diverse avian malaria in Andean House Wrens: evidence for co-diversification despite lability in host breadth and climatic niche*. International Conference on Malaria and Related Haemosporidian Parasites of Wildlife, Vilnius, Lithuania. August 2013.

Wright, N.A., T.R. Gregory, & C.C. Witt. 2013. *Flight ability drives genome size reduction in birds*. 131st Meeting of the American Ornithologists' Union & 83rd Meeting of the Cooper Ornithological Society, 14 - 17 August, Chicago, IL, USA.

Carmi, O., **C.C. Witt**, A. Jaramillo, & J.P. Dumbacher. 2013. *Phylogeography of the Vermilion Flycatcher, Pyrocephalus rubinus (Passeriformes: Tyrannidae)*. 131st Meeting of the American Ornithologists' Union & 83rd Meeting of the Cooper Ornithological Society, 14 - 17 August, Chicago, IL, USA.

Perdigón Ferreira, J., J. Miranda, A.M. Cuervo, **C.C. Witt**, & J. Pérez-Emán. 2013. *Relaciones filogenéticas de Aglaiocercus berlepschi (Trochilidae), un colibrí endémico de la región nor-oriental de Venezuela*. 10th Venezuelan Congress of Ecology, 18-22 November, Mérida, Venezuela.

Castro, M., J. Miranda, **C.C. Witt**, & J. Pérez-Emán. 2013. *Relaciones filogenéticas del género Sternoclyta (Gould, 1858; Aves: Trochilidae): ¿un género monotípico o una especie más de Heliodoxa?* 10th Venezuelan Congress of Ecology, 18-22 November, Mérida, Venezuela.

Galen, S.C., & C.C. Witt. *Diverse avian malaria in Andean House Wrens: evidence for co-diversification despite lability in host breadth and climatic niche.* International Conference on Malaria and Related Haemosporidian Parasites of Wildlife, 7-11 August, Vilnius, Lithuania.

Olivas, I. & C.C. Witt. Tanagers and Avian Malaria: Are Females Differentially Susceptible in Dimorphic Species? SACNAS (*Society for Advancement of Chicanos and Native Americans in Science*) National Conference; San Antonio, TX. October 4, 2013.

Olivas, I. & C.C. Witt. Tanagers and Avian Malaria: Are Females Differentially Susceptible in Dimorphic Species? (poster) Biology Department Annual Research Day 2013, University of New Mexico; Albuquerque, NM. April 5, 2013.

Olivas, I. Genetic Investigation of Factors Influencing *ospC* Gene Expression in *Borrelia burgdorferi*. Summer Student Symposium, Rocky Mountain Laboratories, NIAID, NIH; Hamilton, MT. August 2013.

Smiley, A., & C.C. Witt. 2013. *Cardiac morphology in Andean house wrens reflects hypoxia stress.* SACNAS Conference, October.

Williams, S. O. III. 2013. History and status of Worthen's Sparrow in New Mexico. 51st Annual Meeting of New Mexico Ornithological Society, Silver City, NM.

Wright, N.A., T.R. Gregory, and C.C. Witt. 2013. Genome size evolution and flight ability in birds. 22nd UNM Biology Department Research Day. Albuquerque, NM.

Attendance at Professional Meetings

Chavez, A.N.

American Ornithologists' Union Meeting, Chicago, IL, August 2013.
UNM Biology Department Research Day April 2013.

Galen, S.C.

International Conference on Malaria and Related Haemosporidian Parasites of Wildlife, Vilnius, Lithuania, August 2013.

American Ornithologists' Union Meeting, Chicago, IL, August 2013.
UNM Biology Department Research Day April 2013.

Johnson, A.B.

American Ornithologists' Union Meeting, Chicago, IL, August 2013.
UNM Biology Department Research Day April 2013.

Olivas, I.

Intramural NIAID Research Opportunities (INRO) Participant. Office of Training and Diversity, National Institute of Allergy and Infectious Diseases, NIH, Bethesda, Maryland, February 2013.

Americas Next Top Infectious Disease Model: HIV & Influenza.
Harvard School of Public Health and the Center for Communicable Disease Dynamics,
Chicago, IL, April 2013.

Witt, C.C

Colombian Ornithological Congress, Cali, Colombia, November 2013.
American Ornithologists' Union Meeting, Chicago, IL, August 2013.

Wolf C.J.

American Ornithologists' Union Meeting, Chicago, IL, August 2013.
UNM Biology Department Research Day April 2013.

Wolf B.O.

American Ornithologists' Union Meeting, Chicago, IL, August 2013.

Wright, N.A.

UNM Biology Department Research Day April 2013.

Service as Editor or on Editorial Board of a Journal

Williams, S. O. III. New Mexico Editor, North American Birds.

Williams, S. O. III. Editor, New Mexico Ornithological Society Field Notes.

Service as Officer of Professional Society/Organization

Witt, C.C.

American Ornithologists Student Travel and Awards Committee (2009-2013; Reviewer for student and postdoc proposals).

Reviewer for American Philosophical Society Lewis & Clark Research Grants, 2013.

OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity

Witt, C.C.

Curator's Coffee, New Mexico Museum of Natural History and Science, September 12, 2013. A two-hour colloquium entitled "How hummingbirds thrive in the high Andes."

Borderwatch Films (a Christian filmmaking organization) produced a documentary about hummingbirds, *Refracted Glory*, that was filmed in the MSB Bird Range during 2013, including an extended interview session with Witt. This was an outreach effort to the religious community regarding the theory of evolution.

Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.

None

Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

Williams, S. O. III. Secretary, New Mexico Bird Records Committee.

Witt, C.C. NSF Panelist for review of grant proposals, April 3-6, 2013; Division of Environmental Biology, Evolutionary Processes Cluster, Evolutionary Ecology Panel, National Science Foundation, Arlington, VA. (Reviewed 22 proposals).

UNM Biology Wednesday Brown Bag Seminar Chair

Journal Referee

Witt, C.C.

American Naturalist (1), Zootaxa (1), Wilson Journal of Ornithology (1), Occasional Papers of the Museum of Southwestern Biology (2), The Auk (1), Genome Biology and Evolution (1), International Journal of Biodiversity (1), Conservation Genetics Resources (1).

Museum Visits:

Wright, N.A. University of Kansas Natural History Museum: 1 week measuring skeletons

Schmitt, C. J. Field Museum of Natural History: 2 days examining skins

PUBLIC SERVICE

Beckman, E.J. Judge for undergraduate posters at UNM Biology Research Day, April 3, 2013.

Johnson, A.B. Judge for undergraduate posters at UNM Biology Research Day, April 3, 2013.

Williams, S. O. III. New Mexico Coordinator for the North American Breeding Bird Survey (BBS).

Wright, N.A. Hosted UNM PIBBs Seminar Speaker Richard Prum, Yale University.

ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

Beckman, E.J.

UNM Biology department scholarship - \$1000

Chavez, A.N.

UNM Latina/o Graduate and Professional Student Fellowship for 2013-2014 - \$1000

GPSA Student Research Grant (SRG) - \$500

UNM Biology Department Scholarship (Molly Hayes Scholarship) Spring 2013 - \$1000

AOU/COS Student Travel Award (2013) - \$437.87

Galen, S.C.

UNM Lynn Hertel Award (\$2000)

UNM Biology Department Award (\$500)

UNM Student Research Grant (\$500)

AOU Travel Award (\$475)

Smiley, A.

AOU Student Travel Award (\$428)

SACNAS Student Travel Award (\$421)

MARC Summer internship (\$969/month + \$3,000 stipend)

Olivas, I.

MARC (Minority Access to Research Careers) Scholar, June 2011- July 2013

Schmitt, C.J.

Won 1st place prize for poster presentation by a graduate student at UNM Biology Research Day.

University of New Mexico Biology Department Scholarship (\$1000)

Wolf, C.J.

New Mexico Ornithological Society Research Grant (\$1000).

UNM Biology Scholarship (\$1000)

Wright, N.A.

Department of Biology Scholarship Award, UNM: Linking geographic variation with function: flight biomechanics in island birds. \$1500.

Graduate Student Poster Presentation, Honorable Mention, Department of Biology Research Day, UNM.

DONATIONS AND GIFTS RECEIVED

Donation of bird-related books in personal library of John M. Campbell.

\$3K from Robert Dickerman, PLUS Alaska Field work funding ~\$8K

CURRENT STAFF**Faculty and Staff**

Christopher Witt

Andrew Johnson

Adrienne Raniszewski

Graduate students

Matthew Baumann

Elizabeth Beckman

Andrea Chavez

Spencer Galen

Jonathan Schmitt

Natalie Wright

Undergraduate Student Workers and Volunteers

Jessica Allen

Kobie Boslough

Catherine Bradt

Madeline Cauthen

Jason Kitting

Iris Olivas

Erika Pohl

Trevor Romero

Ashley Smiley

Nick Wilson

Cole Wolf

MUSEUM ASSOCIATES

Curatorial Associates

Robert Dickerman

John Hubbard

Research Associates

Donna Schmitt

Gregory Schmitt

Sartor O. Williams III

DIVISION OF FISHES

1. DIVISION HIGHLIGHTS

Currently, the MSB Division of Fishes has **94,717** catalogued lots of fishes (4,108,518 specimens). During the year, 6,910 lots of fishes (285,791 specimens) were cataloged and integrated into the main collections. To date, there are 69,073 digital files of field notes and 650 jpg files of habitat photographs and specimens (for color). There are 39,383 specimen locality records of which two-thirds are georeferenced for mapping.

The Joint Meetings of Ichthyologists and Herpetologists were held 10 to 15 July 2013 in the Albuquerque Convention Center. The MSB Divisions of Fishes and Herpetology staff and associates served on the Local Organizing Committee, chaired by Thomas F Turner, Curator of Fishes. There were 14 UNM and NM Institute of Mining and Technology graduate and undergraduate student volunteers who received free registration for their service to the meeting. The Local Committee raised almost \$12,000 to fund the celebration of the 100th anniversary of Copeia, the journal of the American Society of Ichthyologists and Herpetologists, founded by John Treadwell Nichols. These funds also covered travel expenses for four students from Mexico, guest speaker registrations, and special events including a workshop entitled, “Communicating Science: Adapting your work for policy boards, publics, and peers,” led by D.G. Ross, Ph.D, Auburn University. Plenary and special event speakers included: William deBuys, John Nichols (author and grandson of Copeia founder), and Ray Powell, New Mexico Land Commissioner.

Under a NSF funded collaborative research program, Lorraine McInnes, M.S. joined the MSB Division of Fishes for an 18 month appointment as a georeferencing professional. Her duties include completing the georeferencing of MSB Division of Fishes collection data as well as the western US fish collections data received from the other collaborating institutions. These data will be available to researchers through a cache-based system, Fishnet2 by 2014.

Christopher W. Hoagstrom, Ph.D., Weber State University, Utah spent his 2013 sabbatical with the MSB Division of Fishes and UNM Biology (sponsored by T.F. Turner) working on manuscripts regarding fish biogeography in North American highlands and the ecology of pelagic-broadcasting (spawning) minnows of the Pecos River. His fieldwork centered on the Pecos Pupfish, *Cyprinodon pecosensis* inhabiting the overflow wetlands of Bitter Lake National Wildlife Refuge, Roswell NM.

Outreach Summary: Sandia Preparatory School, January 2013 (3 hours), Wingate High School, April 2013 (1 hour), Montessori Rio Grande Charter School, March 2013 (1 hour), UNM Museum Studies MS Student, May and Sept 2013 (5 hours), UNM BIOL 487 Ichthyology MSB Projects, March & April 2013 (20 hours), USFWS Program for Albuquerque Middle Schools-Native Fishes in the Classroom, Nov 2013 (5 hours), UNM Latin American and Iberian Institute Guest Tour, Feb. 2013.

2. TABLE OF COLLECTION USE

Collection Growth	Loans Out	Professional Visitors	Collection Web Activity	Requests for Information	Publications by MSB Staff
285,791	16	43		121	15
Publications using MSB specimens/data	Technical Reports by MSB Staff	UNM Courses using MSB resources	UNM Courses taught by MSB staff	Graduate Students MSB mentored	MSB Graduate Students' Theses/Dissertation
0	14	2	2	5	2
Undergraduate Students MSB employed	Grants and contract in force	Dollar amount Grants/ contracts	UNM F&A generated from Division grants/contracts		
3	13	\$531,462	\$75,553		

3. UNM COURSES USING THE COLLECTIONS

TERM	COURSE	TITLE	STUDENTS
Spring	BIOL. 487	Ichthyology	20
Spring & Fall	BIOL. 204L	Plant and Animal Form and Function	60

4. UNM COURSES TAUGHT BY MSB STAFF

INSTRUCTOR	TERM	COURSE	TITLE	STUDENTS
T.F. Turner	Spring	BIOL. 487	Ichthyology	20
T.F. Turner	Spring & Fall	BIOL. 402/502	Ecology and Evolution of Fishes	15
T.J. Pilger	Spring	BIOL. 487L	Ichthyology	20

5. COLLECTION MANAGEMENT

New Mexico Dept. of Game and Fish collections of San Juan River fishes, collected from 1987 to 2010 have been completely cataloged and filed. These 6,522 lots of 367,098 specimens are an important resource (data and specimens) for Federal and State biologists.

The complete MSB Division of Fishes electronic archives (data, field notes, photographs, and WJ Koster Archives) are now stored off site using the UNM Zimmerman Library electronic storage resources, dSpace and ftp site and LoboVault for WH Koster Archives.

Three undergraduate Curatorial Assistants and two staff Curatorial Assistants processed specimens, genetic samples, and digitized field notes received from several ongoing projects: Wyoming Dept. Game and Fish, USFWS NM/TX Fish and Wildlife Conservation Office, US Bureau of Reclamation, US Bureau of Land Management, Aquatic Conservation Facility of Albuquerque BioPark, American Southwest Ichthyological Researchers, New Mexico Dept. Game and Fish, and supported Turner Lab research, Megan J. Osborn, Ph.D. and postdoctoral research, Evan W. Carson, Ph.D.

6. AWARDS, GRANTS, AND CONTRACTS:

Effects of Sediment-Laden Stream Flows on Gila River Drainage on Dynamics of Fish Populations, Basal Resources and Habitat Following Whitewater-Baldy Complex Fire, 2012. K.B. Gido, D.L. Propst, T.F. Turner, J.E. Whitney, and T. Pilger. Total Award (UNM): \$97,027. 2013. Annual Budget \$38,926 (\$3,892.00 F&A)

Grant Agreement for Curatorial Services between Bureau of Reclamation upper Colorado Region and the Museum of Southwestern Biology at the University of New Mexico and San Juan River Data Analysis. R13AP40007. A.M. Snyder PI and T.F. Turner CoPI. U.S. Bureau of Reclamation. Total Award (UNM): \$521,862. 24 June 2013 to 30 Sept 2017. Annual Budget \$ 115,276 (\$17,169 F&A)

Accession and Integration of NMDGF Fish Collections in Museum of Southwestern Biology, Division of Fishes No. T-39-1 A.M. Snyder PI and T.F. Turner CoPI. New Mexico Department of Game and Fish. Total Award (UNM): \$140,000. 1 July 2012 to 30 Jun 2015. Annual Budget \$20,000. (\$1,818 F&A)

Collaborative Research: CSBR: Natural History Collections: Georeferencing U.S. Fish Collections: a community-based model for georeferencing natural history collections. T.F. Turner PI and A. M. Snyder CoPI. Total Award (UNM): \$140,350. 1 August 2012 to 31 July 2015. Annual Budget \$70,000. (\$35,700 F&A)

Genetic and demographic studies to guide conservation management of Bonytail Chub and Razorback Sucker in off-channel habitats. T. Dowling PI Arizona State University and T.F. Turner CoPI subaward. US Bureau of Reclamation. Total Award (UNM): \$44,760. 1 October 2010 to 30 September 2015. Annual Budget \$8,000. (\$350 F&A)

Metacommunity dynamics of Gila River fishes. K. Gido PI, T. F. Turner CoPI, D. L. Propst CoPI and J. Falke CoPI. US Bureau of Reclamation. Desert LCC. 1 October 2011 to 30 September 2014. Total Award (UNM): \$78,000. Annual Budget \$37,500. (\$1,641 F&A)

Comparative transcriptomics of immune-related genes in cyprinid fishes. T. F. Turner PI. Center for Evolutionary and Theoretical Immunology (CETI) Seed Grant. Total Award (UNM): \$79,500. 1 October 2011 to 1 May 2013. Annual Budget \$39,000. No F&A returned

Razorback Sucker genetic diversity assessment. T. Dowling PI Arizona State University and T.F. Turner CoPI. US Bureau of Reclamation. Total Award (UNM): \$32,891. 1 October 2011 to 30 September 2015. Annual Budget \$7,500. (\$328 F&A)

Relationships of fish passage to genetic variation and self-sustainability in the Middle Rio Grande. T.F. Turner PI, M.J. Osborne and E.W. Carson CoPIs. US Fish and Wildlife Service. Total award (UNM): \$113,373. 1 April 2012 to 30 September 2013. Annual Budget \$73,000. (\$4,960.00 F&A)

Genetic monitoring in support of Gila Trout recovery from a catastrophic fire. T.F. Turner PI. New Mexico Department of Game & Fish. Total Award (UNM): \$415,800. 1 October 2012 to 30 June 2018. Annual Budget \$68,000. (\$1,700 F&A)

Development and characterizing microsatellite DNA markers for assessing relatedness of Bonytail Chub produced in off-channel habitats. M. J. Osborne (PI), Total Award (UNM): \$34,265. U.S. Bureau of Reclamation: Lower Colorado River Multi-Species Conservation Program. Annual Budget \$34,265 (\$5,996 F&A)

Genetic status of the Rio Grande Shiner and Speckled Chub in the Pecos River, New Mexico. M.J. Osborne (PI). Total Award (UNM): \$10,395. New Mexico Department of Game And Fish, Share with Wildlife Program. Annual Budget \$10,395 (\$1,039 F&A)

Genetic Studies of Rio Grande Sucker with emphasis on the Gila River Basin. T. F. Turner PI. New Mexico Department of Game and Fish, Share-With Wildlife Program. Total Award (UNM): \$9,600. 1 July 2012 to 31 December 2013. Annual Budget \$9,600. (\$960 F&A)

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Ross, S. T. 2013. Ecology of North American Freshwater Fishes. University of California Press, Berkeley. 486 pp. ISBN 978-0-520-24945-5

B. Journal Articles

Carson, E. W., H. Espinosa-Pérez, and V. Souza. 2013. Low mitochondrial DNA sequence variation in the microendemic Cuatro Ciénegas Platyfish *Xiphophorus gordonii*. Western North American Naturalist 73:224-229.

Carson, E. W., R. R. Beasley, K. L. Jones, S. L. Lance, M. de L. Lozano-Vilano, L. Vela-Valladares, I. Banda-Villanueva, T. F. Turner, and M. De la Maza-Benignos. 2013. Development of polymorphic microsatellite markers for the microendemic pupfishes *Cyprinodon julimes* and *C. pachycephalus*. Conservation Genetics Resources. 5:853-856.

Carson, E. W., M. De la Maza-Benignos, Ma. de L. Lozano-Vilano, L. Vela-Valladares, I. Banda-Villanueva, and T. F. Turner. *Early View*. Conservation genetic assessment of the critically endangered Julimes Pupfish, *Cyprinodon julimes*. Conservation Genetics. DOI:10.1007/s10592-013-0548-x.

Dowling, T. E., T. F. Turner, E. W. Carson, M. J. Saltzgeber, D. Adams, B. Kesner, and P. C. Marsh. *Early View*. Time-series analysis reveals genetic responses to intensive management of Razorback Sucker (*Xyrauchen texanus*). Evolutionary Applications. DOI:10.1111/eva.12125

Franssen, N.R., L.K. Stewart, and J.F. Schaefer. 2013. Morphological divergence and flow-induced phenotypic plasticity in a native fish from anthropogenically altered stream habitats. Ecology and Evolution. DOI: 10.1002/ece3.842.

Franssen, N.R. and S.L. Durst. 2013. Prey and nonnative fish predict the distribution of Colorado Pikeminnow (*Ptychocheilus lucius*) in a south-western river in North America. Ecology of Freshwater Fish. DOI: 10.1111/eff.12093.

Franssen, N.R. and M. Tobler. 2013. Upstream effects of a reservoir on fish assemblages 45 years following impoundment. Journal of Fish Biology 82:1659–1670.

Franssen, N.R., J. Harris, S.R. Clark, J.F. Schaefer, and L.K. Stewart. 2013. Shared and unique morphological responses of stream fishes to anthropogenic habitat alteration. Proceedings of the Royal Society B. 280: 20122715.

Gido, K.B., D.L. Propst, J.D. Olden, and K.R. Bestgen. 2013. Multidecadal responses of native and introduced fishes to natural and altered flow regimes in the American Southwest. Canadian Journal of Fisheries and Aquatic Sciences. 70: 554-564. dx.doi.org/10.1139/cjfas-2012-0441.

Hanna, A. H., K. W. Conway, E. W. Carson, G. P. Garrett, and J. R. Gold. 2013. Conservation genetics of an undescribed species of *Dionda* (Teleostei: Cyprinidae) in the Rio Grande drainage in western Texas. *Southwestern Naturalist*. 58:35-40.

Hoagstrom, C. W. and T. F. Turner. 2013. Recruitment ecology of pelagic-broadcast spawning minnows: paradigms from the ocean advance science and conservation of an imperiled freshwater fauna. *Fish and Fisheries*. Online Early. DOI: 10.1111/faf.12054

Marsh-Matthews, E., J. Thompson, W.J. Matthews, A. Geheber, N.R. Franssen, and J. Barkstedt. 2013. Differential survival of two minnow species under experimental sunfish predation: implications for re-invasion of a species back into its native range. *Freshwater Biology*. 58:1745–1754.

Osborne, M.J., Perez, T., Altenbach, C.S. and T.F. Turner (2013) Genetic analysis of captive spawning strategies for the endangered Rio Grande Silvery Minnow. *Journal of Heredity*. 104 (3): 437-446.

Osborne, M.J., Diver, T.A., and T.F. Turner (2013) Introduced populations as genetic reservoirs for imperiled species: a case study of the Arkansas River Shiner (*Notropis girardi*). *Conservation Genetics*. 14(3): 637-647.

C. Technical Reports

Brandenburg W. H., M. A. Farrington, S. P. Platania. 2013. Delaware River Ichthyofaunal Survey, New Mexico, 2012. Bureau of Land Management, Pecos Las Cruces District. 56pp.

Carson, E. W. January 2013. Genetic diversity, inbreeding effective population size, and long-term genetic monitoring recommendations for the critically endangered Julimes Pupfish, *Cyprinodon julimes*. Contracted by Pronatura Noreste, A.C., Monterrey, Nuevo León, Mexico.

Carson, E. W. January 2013. Genetic diversity, inbreeding effective population size, and long-term genetic monitoring recommendations for the endangered Bighead Pupfish, *Cyprinodon pachycephalus*. Contracted by Pronatura Noreste, A.C., Monterrey, Nuevo León, Mexico.

Dudley, R.K. and S.P. Platania. 2013. Summary of the Rio Grande Silvery Minnow population monitoring program results (May 2013 to December 2013). Seven reports to the Middle Rio Grande Endangered Species Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 203 pp.

Dudley, R.K. and S.P. Platania. 2013. Rio Grande Silvery Minnow population monitoring program results from December 2011 to October 2012. Report to the Middle Rio Grande Endangered Species Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 158 pp.

Dudley, R.K. and S.P. Platania. 2013. Spatial spawning periodicity of Rio Grande Silvery Minnow during 2013. Report to the Middle Rio Grande Endangered Species Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 40 pp.

Farrington M. A., W. H. Brandenburg and S. P. Platania. 2013. San Juan River 2012 Colorado Pikeminnow and Razorback Sucker larval fish survey. Research report submitted to San Juan River Implementation Recovery Program. 54pp.

Gido, K.B, J.E. Whitney, T.J. Pilger, T.F. Turner, D.L. Propst. 2013. Metacommunity Dynamics of Gila River Fishes (R11AC81531). US Bureau of Reclamation Report. 12 pp.

Osborne, M. J. 2013. Genetic status of *Notropis jemezianus* and *Macrhybopsis aestivalis* in the Pecos River, New Mexico. Final Report submitted New Mexico Department of Game and Fish, Share with Wildlife Program. 24 pp.

Osborne, M. J. 2013. Development and characterization of microsatellite PCR primers for Bonytail Chub for use in assessing relatedness of fishes produced in off-channel habitats. Final Report submitted to U.S. Bureau of Reclamation, LC-MSCP, Boulder City, NV. 11 pp.

Snyder, A.M. and T.F. Turner. 2013. Curation of the 2012 San Juan River collections of fishes, University of New Mexico, Museum of Southwestern Biology. Award R13AP40007. Annual Report to San Juan River Basin Recovery Implementation Program, US Bureau of Reclamation, UT. 22 pp.

Snyder, A.M. and T.F. Turner. 2013. Accession and integration of New Mexico Dept. Game and Fish State Reference Collections of fishes by the University of New Mexico, Museum of Southwestern Biology. Contract T-39-1. Annual Report to Conservation Services, NMDGF, Santa Fe. 5 pp. plus 421 appendix pages.

Turner, T.F., M. J. Osborne, T. J. Pilger, and D. L. Propst. 2013. Genetic Studies of Rio Grande Sucker with emphasis on the Gila River Basin. Final Report to the Share-With-Wildlife Program, NMDGF, Santa Fe, NM. 20 pp.

Turner, T. F., M. J. Osborne, W.D. Wilson, and D. L. Propst. 2013. Genetic monitoring of Gila trout lineages restored to the upper West Fork Gila River and implications for future conservation strategies. Project Work Order CSD 120731-B. Annual Report to Conservation Services, NMDGF, Santa Fe. 8 pp.

D. Theses/Dissertations Completed

Diver, T. A. 2013. The evolution and maintenance of deeply divergent lineages of red shiner, *Cyprinella lutrensis* in the Rio Grande watershed. Master of Science Biology, The University of New Mexico Albuquerque, New Mexico, November, 2013. Advisor T.F. Turner, Committee Members, M.J. Osborne and A. Kodric-Brown.

Hopkins, A. 2013. Life history and morphometric variation of *Gambusia nobilis* at Bitter Lake National Wildlife Refuge. Master of Science Biology, The University of New Mexico Albuquerque, New Mexico, May, 2013. Advisor A Kodric-Brown, Committee Members, T. F. Turner, B. O. Wolf.

E. Work In Progress

Carson, E. W., A. H. Hanna, G. P. Garrett, and J. R. Gold. *In Press*. Conservation genetics of cyprinid fishes in the upper Nueces River basin in Central Texas. *Southwestern Naturalist*.

De la Maza-Benignos, M., L. Vela-Valladares, Ma. de L. Lozano-Vilano, M. E. García-Ramírez, and E. W. Carson. *In Revision*. A holistic approach to conservation of desert springs: a case study of the model system of Julimes, Chihuahua, and its microendemic pupfish *Cyprinodon julimes* of El Pandeño Spring. Universidad y Cien Dixon, D. S., and T. F. Turner. *In Revision*. Toward an economic model of a genetically sustainable fishery. *Marine Economics and Management*.

Durst, S.L. and N.R. Franssen. *In Press*. Movement and growth of Colorado Pikeminnow (*Ptychocheilus lucius*) in the San Juan River, NM and UT. *Transactions of the American Fisheries Society*.

Franssen, N.R., J.E. Davis, K.B. Gido, and D. Ryden. *In Review*. Fish community responses to nonnative fish removal in a southwestern river. *Fisheries*.

Franssen, N.R., C.G. Goodchild, and D.B. Shepard. *In Review*. Morphology predicting ecology: incorporating new methodological and analytical approaches. *Environmental Biology of Fishes*.

Gido, K. B., J. S. Perkin, J. S. Whitney, and T. F. Turner. *In Press*. Fragmentation, connectivity and species persistence. In: Closs, G., M. Krkosek, and J. Olden, Eds. *Conservation of Freshwater Fishes*, Cambridge University Press.

Krabbenhoft, T. J. and T. F. Turner. *In Press*. Clock gene variation: seasonal timing, phylogenetic signal, or functional constraint? *Journal of Heredity*.

Krabbenhoft, T. J., S. P. Platania, and T. F. Turner. *Accepted*. Interannual variation in reproductive phenology in a riverine fish community: implications for predicting effects of climate change and alteration of flow regimes. *Freshwater Biology*.

Hanna, A H., E. W. Carson, G. P. G. and J. R. Gold. *In Revision*. Conservation Genetics of six species of genus *Dionda* (Cyprinidae) in the southwestern United States. *Western North American Naturalist*.

Hershler, R., J. Landye, H-P. Liu, M. De la Maza-Benignos, P. Ornelas, and E. W. Carson. *In Press*. New species and records of Chihuahuan Desert springsnails, with a new combination for *Tryonia brunei*. *Western North American Naturalist*.

Perkin, J.S., Gido, K.B., Cooper, A.R., Turner, T.F., Osborne, M.J., Johnson, E.R. and K.B. Mayes. *submitted*. Fragmentation and dewatering transform Great Plains stream fish communities. *Ecological Monographs*.

Propst, D.L., K.B. Gido, J.E. Whitney, E.I. Gilbert, T.J. Pilger, A.M. Monie, Y.M. Paroz, J.M. Wick, J.A. Monzingo, and D.M. Myers. *In Press*. Efficacy of mechanically removing nonnative predators from a desert stream. *River Research and Applications*.

Ross, S. T. and W. J. Matthews. *In Press*. Chapter 1. Evolution and ecology of North American freshwater fish assemblages, Volume 1. In: *North American Freshwater Fishes: Ecology, Evolution, and Behavior*. M. L. Warren and B.M. Burr (eds.). Johns Hopkins University Press. (to be published spring 2014)

Whitney, J.E., K.B. Gido, and D.L. Propst. *In Review*. Native success in the presence of nonnatives in an arid-land riverscape: Influence of environmental factors and community composition. *Canadian Journal of Fisheries and Aquatic Sciences*.

Wilson, W. D., M. J. Osborne, and T. F. Turner. *In Revision*. Evolution of the MHC class II DAB locus in the family Salmonidae. *Immunogenetics*.

Zamor, R.M., N.R. Franssen, C. Porter, T.M. Patton, and K.D. Hambright. *In Press*. Rapid recovery of a fish assemblage following an ecosystem disruptive algal bloom in a Southern Great Plains reservoir. *Freshwater Science*.

F. Publications/Reports Based on MSB Specimens/Data by Outside Researchers
NONE TO REPORT

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars (Presenters' name in bold)

Dowling, T., T. F. Turner, and P. Marsh. Molecular markers and management of endemic fishes from the mainstream Colorado River: razorback sucker (*Xyrauchen texanus*) as a case study. Invited presentation, ASIH "Fish out of Water" Symposium, Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico, 10-15 July 2013.

Franssen, N.R. Reservoirs as a model system to investigate contemporary evolution. American Society of Ichthyologists and Herpetologists 93rd Annual Meeting, Albuquerque, NM. July 2013.

Gido K., J. Perkin, J. Whitney, T. F. Turner. Ecological and evolutionary consequences of fragmentation of river networks. Invited presentation, ASIH "Fish out of Water" Symposium, Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico, 10-15 July 2013.

Ross, S. T. Eco-Evolutionary change and the conundrum of Darwinian debt. American Society of Ichthyologists and Herpetologists, 93rd annual meeting, Albuquerque, New Mexico. 10-15 July 2013.

Ross, S. T. Ecology of North American Freshwater Fishes- Issues in Conservation. Departmental Seminar, University of Oklahoma, Norman. 25 September 2013.

Ross, S. T. Ecology of North American Freshwater Fishes- An overview. Fish Biology Discussion Group, Department of Biology, University of Oklahoma, Norman. 25 September 2013.

Turner, T. F. Retrospective stable isotope analysis reveals ecosystem-wide effects of river regulation over the last century. Departmental Seminar, University of Oklahoma, Norman. 4 December 2013.

Turner, T. F. Comparative Genomics of Fishes in a Drying River: Are Stress and Immune Responses Similar Across Species? Fish Biology Discussion Group, Department of Biology, University of Oklahoma, Norman. 4 December 2013.

Turner, T. F. Retrospective stable isotope analysis reveals ecosystem-wide effects of river regulation over the last century. Departmental Seminar, Department of Biological Sciences, Ohio University, Athens. 5 November 2013.

Turner, T. F. From the 'River of Grass' to the Rio Grande: Biology and Conservation in Regulated Rivers. Keynote Speaker: 15th Annual Biology Symposium, Florida International University, Miami, Florida, 2 February 2013.

Turner, T. F. Retrospective stable isotope analysis reveals ecosystem-wide effects of river regulation over the last century. Departmental Seminar, Department of Biological Sciences, Florida International University, Miami, Florida, 1 February 2013.

Turner, T.F., and T. J. Krabbenhoft. Comparative Genomics of Fishes in a Drying River: Are Stress and Immune Responses Similar Across Species? Invited presentation, ASIH "Fish out of Water" Symposium, Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, New Mexico, 10-15 July 2013.

B. Contributed Talks/Posters (Presenters' name in bold)

Brandenburg, W.H. and M.A. Farrington. Early Life History of Catostomids, and Inference of Spawning Periodicity, in the San Juan River, NM, CO, and UT (2003-2011). Colorado River Upper Basin Meetings. Moab, UT. January 2013.

Brandenburg, W.H. and M.A. Farrington. Early Life History of Catostomids, and Inference of Spawning Periodicity, in the San Juan River, NM, CO, and UT (2003-2011). 93rd Annual Meeting American Society of Ichthyologists and Herpetologists. Albuquerque, NM. July 2013.

Carson, E. W., M. De la Maza-Benignos, Ma. de L. Lozano-Vilano, L. Vela-Valladares, I. Banda-Villanueva, and T. F. Turner. 2013. Conservation genetic assessment of the critically endangered Julimes Pupfish, *Cyprinodon julimes*. 45th annual meeting of the Desert Fishes Council, Flagstaff, Arizona.

Carson, E. W., Ma. L. Lozano-Vilano, L. Vela-Vallardes, and I. Banda-Villanueva, T. F. Turner, and M. De la Maza Benignos. 2013. Genetic diversity and effective population size of the critically endangered Julimes Pupfish, *Cyprinodon julimes*. 93rd Annual Meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. July 2013.

De la Maza-Benignos, M., Ma. L. Lozano-Vilano, L. Vela-Vallardes, and I. Banda-Villanueva, and E. W. Carson. 2013. Race against time: establishing a refuge population for the Carbonera Pupfish, *Cyprinodon fontinalis* (Poster). 45th annual meeting of the Desert Fishes Council, Flagstaff, Arizona.

De la Maza Benignos, M., **E. W. Carson**, Ma. L. Lozano-Vilano, L. Vela-Vallardes, and I. Banda-Villanueva. 2013. The *Cyprinodon julimes* experiment: a case study for development of a broadly effective conservation model in Mexico (Poster). 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. July 2013.

Diver, T.A., M. J. Osborne, T. J. Krabbenhoft, T. F. Turner. The evolution and maintenance of deeply divergent lineages of Red Shiner, *Cyprinella lutrensis*, in the Rio Grande watershed. Joint Meeting of Ichthyologists and Herpetologists, Albuquerque New Mexico, 10 – 15 July, 2013.

Dudley, R.K. and S.P. Platania. Spawning periodicity of Rio Grande Silvery Minnow from 2002–2013. Desert Fishes Council, Flagstaff, AZ. November 20–24, 2013.

Dugas, M.B., M.O. Bastille, and N.R. Franssen. The relationship between river velocity and sexually and naturally selected traits in the Steelcolor Shiner *Cyprinella whipplei*. Southwestern Association of Naturalists, Lake Charles, LA. April 2013.

Farrington M.A., W.H. Brandenburg and S.P. Platania. Results of the 2012 larval ichthyofaunal survey in the San Juan River, NM, CO, and UT. San Juan River Recovery Implementation Program, Biology Committee. Fort Lewis College, Durango, CO. February 2013.

Farrington M.A., W.H. Brandenburg, and S.P. Platania. Results of the 2012 larval ichthyofaunal survey in the San Juan River, NM, CO, and UT. San Juan River Recovery Implementation Program, Coordination Committee. Fort Lewis College, Durango, CO. May 2013.

Farrington M.A., W.H. Brandenburg, and S.P. Platania. Results of the Dirty Devil River ichthyofaunal survey. Colorado River Upper Basin Meetings. Moab, UT. January 2013.

Franssen, N.R., K.B. Gido, D.L. Propst, D.W. Ryden, and E.I. Gilbert. Prey availability and the prevalence of piscivory by Colorado Pikeminnow in the San Juan River, NM and UT, USA. 34th Annual Researchers

meeting of the Upper Colorado River Endangered Fish Recovery Program and the San Juan River Basin Recovery Program, Moab, UT. January 2013.

Gido, K.B. and **D.L. Propst**. Long-term dynamics of a non-coevolved fish assemblage under a managed flow regime. Upper Basin Researchers Annual Meeting, Moab, UT. 14-15 January 2013.

Osborne, M.J., Sharp, A., Monzingo, J., Propst, D.L., and T.F. Turner. Genetic analysis suggests high conservation value of peripheral populations of Chihuahua Chub (*Gila nigrescens*). Western Division American Fisheries Society- Arizona-New Mexico Chapter Meeting, Albuquerque, New Mexico.

Osborne, M.J., Diver, T.A. and T.F. Turner. Introduced populations as genetic reservoirs for imperiled species: a case study of the Arkansas River Shiner. 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. July 2013

Osborne, M.J., Diver, T.A. and T.F. Turner. Introduced populations as genetic reservoirs for imperiled species: a case study of the Arkansas River Shiner. Desert Fishes Council 45th Annual Meeting, Flagstaff, AZ. November 2013

Pilger, T.J., and T.F. Turner. Comparative Population Genetics of Gila River Fishes: Life History Influences on Genetic Diversity and Gene Flow. Southwestern Association of Naturalists Annual Meeting, Lake Charles, LA. April 2013.

Pilger, T.J., **T.A. Diver**, N.R. Franssen. Landscape-scale effects on genetic and phenotypic variation in a native stream fish. University of New Mexico Annual Department of Biological Sciences Research Day, Albuquerque, NM. April 2013

Pilger, T.J., and T.F. Turner. Intrinsic and Extrinsic Factors Affecting Genetic Diversity and Gene Flow: Comparative Landscape Genetics of Gila River Fishes. Joint Meeting of Ichthyologists and Herpetologists Annual Meeting. Albuquerque, NM. July 2013

Pilger, T.J., T.A. Diver, N.R. Franssen. Landscape-scale effects on genetic and phenotypic variation of Longfin Dace, *Agosia chrysogaster*, in the upper Gila River drainage. Desert Fishes Council 45th Annual Meeting, Flagstaff, AZ. November 2013.

Reale, J.K., R. Candelaria-Ley, R.K. Dudley, C.S. Reale, D.J. Van Horn, C.N. Dahm. Synergistic Effects of Climate Change, Wildfire, and Severe Water Quality degradation on the Aquatic Ecosystems and Ichthyofauna of the Middle Rio Grande. Arizona – New Mexico Chapter of the American Fisheries Society & Arizona – New Mexico Chapters of the Wildlife Society, Albuquerque, NM. February 2013.

Stewart, L.K., N.R. Franssen, and J.F. Schaefer. Morphological diversification and flow-induced plasticity in *Cyprinella venusta*. Southwestern Association of Naturalists, Lake Charles, LA. April 2013.

Turner, T. F., Osborne, M.J., Pilger, T. J., Propst, D.L. Origin and diversification of Rio Grande Sucker, *Pantosteus plebeius*, in the Gila River Basin. 45th annual meeting of the Desert Fishes Council, Flagstaff, Arizona. 20 – 23 November 2013

Turner, T.F., Osborne, M.J., Propst, D.L. and Wilson, W.D. The genetic status of Gila Trout after the Whitewater-Baldy Fire: implications for recovery. Arizona-New Mexico Chapter of the American Fisheries Society Meeting, Albuquerque, New Mexico. February 2013

C. Attendance at Professional Meetings

W.H. Brandenburg

- San Juan River Recovery Implementation Program, Biology Committee. U.S. Forrest Service Office, Durango, CO. 21-23 February 2013.
- Colorado River Upper Basin Meetings. Moab, UT. 14-15 January 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013

E.W. Carson

- Desert Fishes Council 45th Annual Meeting, Flagstaff, AZ. 20–24 November 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013

R.K. Dudley

- Desert Fishes Council 45th Annual Meeting, Flagstaff, AZ. 20–24 November 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013

M.A. Farrington

- San Juan River Recovery Implementation Program, Biology Committee. U.S. Forrest Service Office, Durango, CO. 21-23 Feb 2013.
- San Juan River Recovery Implementation Program, Coordination Committee. U.S. Forrest Service Office, Durango, CO. 21-23 May 2013.
- Colorado River Upper Basin Meetings. Moab, UT. 14-15 Jan 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013

N.R. Franssen

- San Juan River Recovery Implementation Program, Biology Committee. Fort Lewis College, Durango, CO. 20-21 February 2013.
- San Juan River Recovery Implementation Program, Biology Committee. Fort Lewis College, Durango, CO. 7-8 May 2013.
- Annual Meeting for Southwestern Association of Naturalists, Lake Charles, LA. 4-7 April 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013

M.J. Osborne

- Desert Fishes Council 45th Annual Meeting, Flagstaff, AZ. November 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013
- Arizona-New Mexico Chapter of the American Fisheries Society Meeting, Albuquerque, New Mexico. February 2013

T.J. Pilger

- Southwestern Association of Naturalists Annual Meeting, Lake Charles, LA. 3-6 April 2013.
- Desert Fishes Council 45th Annual Meeting, Flagstaff, AZ. 20-23 Nov 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013

D.L. Propst

- Upper Basin Researchers Meeting. Moab, UT. 14-15 Jan 2013.

- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013
- Desert Fishes Council Meeting, Flagstaff, AZ. 20-23 Nov 2013. R.K. Dudley

S.T. Ross

- San Juan River Recovery Implementation Program, Biology Committee. U.S. Forest Service Office, Durango, CO. 20-21 February 2013.
- San Juan River Recovery Implementation Program, Biology, Public, and Coordination Committee meetings. U.S. Forest Service Office, Durango, CO. 7-9 May 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013
- San Juan River Recovery Implementation Program, Biology Committee. U.S. Forest Service Office, Durango, CO. 19-20 November 2013.

A.M. Snyder

- Desert Fishes Council Meeting, Flagstaff, AZ. 20-23 Nov 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013
- Colorado River Upper Basin Meetings. Moab, UT. 14-15 Jan 2013.

T. F. Turner

- Desert Fishes Council Meeting, Flagstaff, AZ. 20-23 Nov 2013.
- 93rd annual meeting of the American Society of Ichthyologists and Herpetologists, Albuquerque, NM. 10-15 July 2013
- Arizona – New Mexico Chapter of the American Fisheries Society & Arizona – New Mexico Chapters of the Wildlife Society, Albuquerque, NM. February 7–9, 2013.
- Colorado River Aquatic Biologists (CRAB) Meeting, Laughlin, NV. 9 – 10 January 2013.

D. Service as Editor or on Editorial Board of a Journal

N.R. Franssen

- Contributing Editor - Southeastern Naturalist, since 2012.

E. Service as Officer of Professional Society/Organization

T.J. Pilger

- Co-President of University of New Mexico Biology Graduate Student Association.
- Treasurer of University of New Mexico Biology Graduate Student Association
-

S.T. Ross

- Member, Long Range Planning and Policy Committee, American Society of Ichthyologists and Herpetologists, 2007-2013.
- Member, Local Host Committee for the 2013 Joint Meeting of Ichthyologists and Herpetologists, Albuquerque NM.
- Co-organizer, “Fish out of Water: evolutionary and ecological issues in the conservation of fishes in water-altered environments” symposium for the 2013 Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, NM.
- Board of Governors, American Society of Ichthyologists and Herpetologists, 2012-2017
-

A.M. Snyder

- Board of Governors, American Society of Ichthyologists and Herpetologists, 2011-2016.
- Local Committee for the 2013 Joint Meeting of Ichthyologists and Herpetologists, Albuquerque NM.

T. F. Turner

- Chair, Local Committee, 2013 Joint Meeting of Ichthyologists and Herpetologists, Albuquerque NM, 10 – 15 July 2013.
- Co-organizer, “Fish out of Water: evolutionary and ecological issues in the conservation of fishes in water-altered environments” symposium for the 2013 Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, NM.
- Board of Governors, American Society of Ichthyologists and Herpetologists, 2013-2018

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

Brandenburg, W.H.

- Fishes of the Rio Grande, NM. New Mexico Natural History Museum Albuquerque, NM. June 2013.

R.K. Dudley

- Native fishes of New Mexico. BIOL 487 Ichthyology. University of New Mexico, Albuquerque, NM. March 19, 2013.

D.L. Propst

- Native Fish Conservation in New Mexico. BIOL. 487 Ichthyology. University of New Mexico, Albuquerque, NM. 30 Apr 2013.
- Rotenone and Antimycin Use in Fisheries Management. USFWS National Conservation Training Center. 4-8 Mar 2013.
- The Endangered Species Act and Conservation of Native Fishes in New Mexico. Gila River Festival, 19-20 Sep 2013.

B. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees

NONE TO REPORT

C. Scholarly Service as a Member of a Local/State/Regional/Nat'l Committee, Panel

E.W. Carson

- Technical advisor, Pronatura Noreste, A. C., Monterrey, NL México. 2013

R.K. Dudley

- Technical Advisor, Recovery Team for Rio Grande Silvery Minnow (*Hybognathus amarus*), US Fish and Wildlife Service.

M. J. Osborne

- Member Rio Grande, silvery minnow controlled propagation and genetics working group.
- Member Rio Grande, silvery minnow Big Bend Reintroduction Technical team (U.S. Fish and Wildlife Service).
- Technical advisor, Chihuahua Chub Recovery Team
- Poster Judge, Annual Research Day, Department of Biology, University of New Mexico 2013

S.T. Ross

- Member, Peer Review Panel, San Juan River Basin Recovery Implementation Program. 2013

- Review of promotion dossier to advanced grade for Dr. Peter Moyle, University of California Davis, August 2013.
- Review of book proposal on The Siberian Sturgeon (*Acipenser baerii*, Brandt, 1869): Biology and Farming. Springer, Life Sciences / Biomedicine Europe II. September 2013.
- Review of candidate for promotion to professor at the University of Minnesota. September 2013.

A.M. Snyder

- Vice Chair and Scientific Member, UNM Institutional Animal Care and Use Committee. 2010-2016.

T.F. Turner

- Graduate Student-Professional Speed-Networking Workshop, 45th Annual Meeting, Desert Fishes Council, Flagstaff, Arizona, 22 November 2013.
- Facilitator and Lead Panelist, Greenback Cutthroat Trout Scientific Review Workshop, US Fish & Wildlife Service, Denver, Colorado, 29 July to 1 August 2013.
- Member, Gila Trout and Chihuahua Chub Recovery Team
- Member, Rio Grande silvery minnow Propagation and Genetics Workgroup

D. Journal Referee

E.W. Carson

Environmental Biology of Fishes (1), Evolutionary Ecology (2), Genetica (1),
Journal of Fish Biology (1), Molecular Phylogenetics and Evolution (2), PlosOne (1)

N.R. Franssen

Hydrobiologia (1), Biodiversity and Conservation (1), Southwestern Naturalist (1), Ecology of
Freshwater Fish (2), Evolutionary Ecology (1), Copeia (1), Journal of Fish Biology (1),
Proceedings of the Royal Society B: Biological Sciences (1).

M.J. Osborne

BMC Evolutionary Biology (2), Conservation Genetics (1), Ecology and Evolution (1), Molecular
Ecology (1)

T.J. Pilger

Journal of Heredity (1), Western North American Naturalist (3).

D.L. Propst

Freshwater Science (1)

T. F. Turner

Transactions of the American Fisheries Society (1), Evolutionary Ecology (1), Ecological
Applications (3), Molecular Phylogenetics and Evolution (1), Journal of Heredity (1), Aquatic
Biology (4), Proceeding of the National Academy of Sciences (1)

E. Hosting Professional Colloquia and Groups
NONE TO REPORT

10. SERVICE

A. Symposia, Workshops, Conferences etc. Sponsored, Organized, Held, etc.

T. F. Turner

- Population Genetics for Fishery Managers – an interactive short course co-organized with Thomas Dowling, Professor, Arizona State University. US Bureau of Reclamation, Boulder City, Nevada, 13 – 15 January, 2013.
- Organizer and Presenter, Workshop on the status of genetic diversity in Gila Trout after Whitewater-Baldy. New Mexico Fishery and Wildlife Conservation Office, USFWS, 1 March 2013.
- Co-organizer, “Fish out of Water: evolutionary and ecological issues in the conservation of fishes in water-altered environments” symposium for the 2013 Joint Meeting of Ichthyologists and Herpetologists, Albuquerque, NM.
- Co-organizer, Facilitator, and Panelist, Greenback Cutthroat Trout Scientific Review Workshop, US Fish & Wildlife Service, Denver, Colorado, 29 July to 1 August 2013.
- Panelist and Presenter, Workshop on Biological Impacts of Proposed Diversion under the Arizona Water Settlement Act (AWSA). Organized by The Nature Conservancy and hosted by the University of New Mexico.

B. Public Service

D.L. Propst

- Leader, Gila Trout and Chihuahua Chub Recovery Team. January to December 2013.

T. F. Turner

- Member, Gila Trout and Chihuahua Chub Recovery Team. January to December 2013.

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

S.P. Platania

- 2013 Researcher of the Year, San Juan River Recovery Implementation Program Annual Meetings, Moab UT

T.F. Turner

- USFWS Recovery Champions Award 2013 – Gila Trout Recovery Team, D. L. Propst (Team Leader), T. F. Turner (Team Member).
- Outstanding Biology Alumnus, Department of Biology Sciences, Florida International University, Miami FL, 2013.

12. DONATIONS AND GIFTS RECEIVED (non-specimen) NONE TO REPORT

13. CURRENT STAFF

A. Faculty/Staff

Evan W. Carson, Research Assistant Professor

Nathan R. Franssen, Postdoctoral Researcher

Kylie R. Naegle, Staff Curatorial Assistant

Megan J. Osborne, Research Assistant Professor

Steven P. Platania, Associate Curator of Fishes

David L. Propst, Curatorial Associate and UNM Adjunct Professor of Biology

Stephen T. Ross, Curator Emeritus and UNM Adjunct Professor of Biology

Alexandra M. Snyder, Collections Manager

Maribel Solis, Staff Curatorial Assistant
Thomas F. Turner, Curator of Fishes and MSB Director

Graduate students

Museum Research Assistants-Graduate Student TA

Alyssa H Hopkins, Fall and Spring 2013

Tracy A Diver, Summer 2013

MSB Fishes Graduate Students, UNM Biology

Mary A. Brandenburg, M.Sci. student

Tracy A. Diver, M.Sci. student

Michael A. Farrington, M.Sci. student

Alyssa Hopkins, M. Sci. student

Tyler J. Pilger, Ph.D. student

Undergraduate Students

Curatorial Assistants

Kendra Brunet Lecomte, A&S Biology

Devin Sims, UNM School of Engineering

Larissa E. Garcia, UNM School of Business

14. MUSEUM ASSOCIATES

Curatorial Associates

David L. Propst, Ph.D. UNM Adjunct Professor of Biology

Research Associates

W. Howard Brandenburg, American SW Ichthyological Research, Albuquerque

Kirk A. Patten, M.S. and J.D. New Mexico Dept. Game and Fish, Santa Fe

John M. Caldwell, M.S. New Mexico Dept. Game and Fish, Santa Fe

James E. Brooks, US Fish and Wildlife Service, Albuquerque

Eliza I. Gilbert, M.S. New Mexico Dept. Game and Fish, Santa Fe

Astrid Kodric-Brown, Ph.D. Emeritus, University of New Mexico, Albuquerque

Brooks M. Burr, Ph.D. Southern Illinois University, Carbondale

Michael Collyer, Ph.D. Western Kentucky University, Bowling Green

Thomas E. Dowling, Ph.D. Wayne State University, Detroit

Robert K. Dudley, Ph. D. American SW Ichthyological Researchers, Albuquerque

Michael A. Farrington, American SW Ichthyological Researchers, Albuquerque

Keith B. Gido, Ph.D. Kansas State University, Manhattan KS

Richard L. Mayden, Ph.D. St. Louis University, St. Louis MO

Norman Mercado Silva, Ph.D. Ecology and Natural Resources, Universidad de Guadalajara.

DIVISION OF GENOMIC RESOURCES

1. DIVISION HIGHLIGHTS.

The Division of Genomic Resources (DGR) of the Museum of Southwestern Biology (MSB) is a centralized repository for cryogenic material from all MSB divisions at the University of New Mexico and other individuals and institutions worldwide for which archival agreements are extant. The DGR frozen tissue collection is taxonomically broad and contains multiple tissue samples from over 235,000 specimens, including Mammals, Birds, Reptiles and Fishes. The collection is ranked as one of the largest collections of its kind worldwide.

Collection Growth.

1. 6,182 new specimens from the division of mammals.
2. 945 new specimens from the division of birds.
3. 6,056 specimens from the New Mexico Museum of Natural History.
4. Approximately 45,056 tissue vials added to the DGR frozen collection.

Training in specimen based research and curation.

Training remains one of the integral goals of all of the MSB divisions. Students gain experience in bioinformatics, natural history collection preparation and curation, and field and laboratory based research. DGR supports one graduate student per semester.

Publications citing MSB DGR specimens.

The DGR tissue resource has become a foundation for considerable research worldwide. DGR attempts to track all publications utilizing our tissue specimens and incorporate the manuscripts into the ARCTOS database with linkages to specimen records, loans, and GenBank information. During 2013 DGR specimens were cited in at least 62 studies published in 43 journals or books. Tracking publications has become easier with the advent of electronic information sharing, but some publications using our specimens or their derivatives (e.g., sequences) are likely still unreported.

Theses/Dissertations.

MSB Arctos database and collection accessibility.

The Arctos database is a freely assessible, multi-institutional relational database that provides an inestimable resource for scientists, public health officials, natural resource managers, and educators worldwide.

2. COLLECTION USE

Collection Growth (specimens catalogued)	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests Personally Responded to	Publications Citing MSB DGR Specimens
6,686 M* 945 B* 6,056 NMNH** 13,687 Total ~45,056 Vials	39(965)*** 14(361)**** Total 53(1,326)	0	>200	>500*****	61

* Newly cataloged from the mammal and bird divisions.

** Newly acquired from New Mexico Natural History Museum.

*** Mammal tissue loans processed in DGR.

**** Bird tissue loans processed in DGR.

***** Estimate of email or phone requests to Cheryl Parmenter and Joe Cook.

Collection Usage. In total, 12,000 new NK numbers were issued from DGR to the MSB mammal and MSB bird divisions for use in their projects in Panama, Mongolia, Alaska, Peru, Canada, the Pacific Northwest and New Mexico. In 2013 the DGR processed 39 tissue loans for the MSB mammal division containing 965 specimens, and 14 loans for the MSB bird division, containing 361 bird specimens to 16 states, and 3 foreign countries, including 9 tissue loans for UNM students.

3. COURSES USING THE COLLECTION

UNM courses or programs using collection through visits or staff presentations.

BIOL 486L - Mammalogy, Fall	(19 students, 2 instructors)
UNM Mus Studies (Szabo)	(12 students, 1 instructor)
UNM Biology student interest group	(10 students, 1 instructor)
UNM prospective grad students' tour	(24 students, 1 instructor)

Visiting researchers: Institutions or Departments:

New Mexico Museum of Natural History&Science	(3)
Texas Tech University	(2)
UNM Biology	(5)
US Geological Survey	(1)
USFWS Mexican Wolf Program	(3)
Valles Caldera National Preserve	(1)

4. COURSES TAUGHT BY MSB PERSONNEL

Faculty/Collection Managers

5. COLLECTION MANAGEMENT

The DGR added ~13,608 new specimens and approximately 45,056 new frozen vials during 2013.

Current projects generating specimens for DGR

Collaborative Integrative Investigations of Arctic Biomes - NSF
Mexican wolf reintroduction – USFWS
Panama Hantavirus – ICIDR NIH
Bighorn Sheep Reintroduction Program – NMGF
ISLES---USDA Forest Service
Jackson Whitman Idaho collection
Black bear /elk predation project – NMDGF
Robert Rausch parasite host collection
Mammalogy and Tropical Biology classes
Ladder ranch and Greater Gila Ecosystem Mammal Survey
Troy Best collections
Valles Caldera- Elk
New Mexico Museum of Natural History

The majority of staff time was spent:

1. Developing the ARCTOS database.
2. Processing MSB mammal and MSB bird tissue loans.
3. Preparation, cataloging, and installation of new specimens.
4. Data entry for new accessions.
5. Filling information requests.
6. Equipment maintenance including: 16 ultra-cold freezers, multiple alarm systems, computers, and a bio-safety cabinet.
7. Equipment monitoring 24 hours a day, 7 days a week.
8. Supervising and training personnel in the DGR Bio-safety Level II Laboratory.
9. USDA, UNM Bio-safety inspections and compliance.

6. AWARDS, GRANTS, AND CONTRACTS

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Parmenter, C.A

1. Parmenter, R. R., C. M. Crisafulli, T. E. Blackman, C. A. Parmenter, and J. A. MacMahon. 2014. Primary succession on the Mount St. Helens volcano: Ground beetle (Coleoptera: Carabidae) recolonization and species turnover on the Pumice Plain of Spirit Lake, 1980-2010. *In*: V. H. Dale and C. M. Crisafulli. Ecological responses revisited 35 years after the 1980 eruptions of Mount St. Helens. Springer Verlag, New York, NY, USA. (In press).

B. Journal Articles

See Bird and Mammal Division reports

C. Web-Based

All publications in the MSB series are available via free-download from our website.

D. Technical Reports

E. Theses/Dissertations Completed

F. Work In Progress (Only in press and already submitted)

G. Publications/Reports Based on MSB Specimens/Data by Outside Researchers
See Bird and Mammals Division Reports

H. Theses/Dissertations

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/ Plenary talks

B. Attendance at Professional Meetings

McLean, B.

1. American Society of Mammalogists 93rd Annual Meeting, Philadelphia, PA, June 2013.
2. UNM Department of Biology Research Day, April 2013.
3. Paleoclimate workshop, University of Wisconsin, June 2013.

C. Service as Editor or on Editorial Board of a Journal

D. Service as Officer or Professional Society/Organization

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentations to General Audience in a Scholarly Capacity

B. Seminars

C. Workshops

D. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.

E. Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

F. Journal Referee

G. Hosting Professional Colleagues and Groups

9. SERVICE

A. Symposia, Workshops, Conferences, etc. Sponsored, Organized, Held, etc.

B. Public Service

General

A significant portion of DGR staff time is spent providing information or assistance to the public either during visits to the collection, through phone calls, emails or through research tissue loans. This is an important and ongoing activity of all DGR personnel.

Parmenter, C.A.

Divisional tours and presentations – provided educational tours and information for visitors and school groups.

C. University and Departmental Committees

10. DONATIONS AND GIFTS RECEIVED

Robert and Virginia Rausch mammal specimens (200) + \$5000
Troy Best mammal specimens (1000)

11. CURRENT STAFF

Faculty/Staff

J.A. Cook, Curator
C.A. Parmenter, Collection Manager

Graduate students

Cook, J.A.

(Reported in Mammal Division report)

Grad Student Research Assistant DGR

1. Bryan McLean.

Undergraduate Student Workers and Volunteers

12. MUSEUM ASSOCIATES

Curatorial Associates

Research Associates

See Bird and Mammal Division Reports

HERBARIUM

1. DIVISION HIGHLIGHTS

The UNM Herbarium contained more than 129,900 accessioned specimens of vascular and non-vascular plants at the end of 2013. Each specimen represents the field efforts of the collector and is mounted individually by student employees, databased, stored, and available for web-based, in-house, or outgoing-loan access by the public. Interpretive activities or collections-related outreach includes tours for the public, including K-12 and UNM students. The Herbarium works closely with Native Plant Society of New Mexico (NPSNM) and the New Mexico Rare Plant Technical Council. This year Bob Sivinski, Herbarium Associate, organized a NPSNM workshop for amateur botanists on identification of sedges.

The Herbarium continues to provide the leadership for the statewide collection database, New Mexico Biodiversity Consortium (NMBCC), which serves natural history specimen data via the World Wide Web, and contributes to regional web-served data on The Southwest Environmental Information Network or SEINet (144,815 individuals visited the site in 2013; 258,457 total visits to <http://swbiodiversity.org/seinet/>).

2. TABLE OF COLLECTION USE

Collection Growth (specimens catalogued & entered in collection)	Loans/# specimens (outgoing)	Visitors (not including tour groups)	Information Requests Personally Responded to	Publications Citing MSB Specimens
2209	10/441	168	121	3

3. COURSES USING THE COLLECTIONS

Spring 2013: Biol. 406-Plants and People- 12 students
Fall 2013: Biol. 463-Flora of New Mexico-14 students
Spring 2013: Biol 496- Limnology Laboratory-10 students

4. COURSES TAUGHT BY MSB PERSONNEL

Faculty

Lowrey, T.K..

Spring 2013: Biol. 406-Plants and People- 12 students
Fall 2013: Biol. 463-Flora of New Mexico-14 students

Graduate Students/ Research Associates

Bixby, R.J.

BIOL 551- Research Problems (2 student)
WR 598- Professional Project (1 student)

Guest lectures:

BIOL 495 (Limnology): “Geomorphology”, “Benthic algae”, “phytoplankton” undergraduate and graduate, Spring 2012

BIOL 496 (Limnology lab): Algae lab, Spring 2013

Water Resources 573: Biomonitoring and fire impacts, Summer 2013

5. COLLECTION MANAGEMENT

We processed and added 2209 new acquisitions to the collection. The UNM Herbarium received 29 gifts from various collectors and institutions, resulting in an increase of two thousand accessioned specimens. All records were databased and made available for public access via SEINet.

The herbarium logged more than 160 visits from the botanical community as well as group visits by schools and organizations. We average 2-3 information requests per week by e-mail and/or phone, and the Biodiversity and SEINet websites receive many hits per month to access specimen data for herbaria in the state.

6. AWARDS, GRANTS, AND CONTRACTS

R.J. Bixby

New Mexico NSF EPSCoR, 2013-2013, “Energize New Mexico,” team member for Bioalgal Fuel component.

Innovative Working Group, New Mexico EPSCoR, 2013, \$7613, P.I. with co-P.I.s J. Gomez (New Mexico Tech) and E. Martinez (New Mexico Highlands University), “Connections linking hydrology, biogeochemistry, and biological responses in headwater montane streams.”

Interstate Stream Commission, 2011-2013, \$153,180, P.I., “Resource utilization by Rio Grande silvery minnow at the Los Lunas Silvery Minnow Refugium.”

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Lowrey, T. K. 2013. *Townsendia*, pp. 308-310. In: K.D. Heil, S.L. O’Kane and L.M. Reeves (eds.). *Flora of the Four Corners Region*. Missouri Botanical Garden Press, St. Louis.

Mygatt, J. 2013. *Urticaceae*, pp. 962-963. In: K.D. Heil, S.L. O’Kane and L.M. Reeves (eds.). *Flora of the Four Corners Region*. Missouri Botanical Garden Press, St. Louis.

Sivinski, R.C. 2013. *Boraginaceae*, pp. 321-337. In: K.D. Heil, S.L. O’Kane and L.M. Reeves (eds.). *Flora of the Four Corners Region*. Missouri Botanical Garden Press, St. Louis.

B. Journal Articles

C. Web-Based / Curriculum Development

D. Technical Reports

Bixby, R.J. and A.S. Burdett. 2013. Resource utilization by the Rio Grande silvery minnow at the Los Lunas Silvery Minnow Refugium, Annual Report (2011-2012). Interstate Stream Commission, 43 pp.

E. Theses/Dissertations Completed

Constance Jones, Master of Water Resources (with distinction), "Evaluating the potential for establishment for two aquatic invasive plant species in New Mexico, graduated in August 2013.

F. Work In Progress

G. Ph.D. Advisement:

University of New Mexico

Jack Triepke, 2011. Tim Lowrey, Co-supervised with Dr. Esteban Muldavin. In Progress.

Becky Bixby:

Shannon Rupert, 2008-2012, present, Bixby, co-advised with Cliff Dahm

Committee Member for completed degrees:

Anna Hamilton, Ph.D., Department of Biology, University of New Mexico, 2009-2013

Becky Bixby:

Advisor:

Constance Jones, Master in Water Resources, 2010-2013.

Undergraduate Advisement:

Laura Richardson. Graduated Spring 2013. Mentored by Tim Lowrey. Breeding systems and conservation strategies for rare plants.

Alex Clark, Junior, Mentored by Becky Bixby. Epiphytic diatom response to fire impacts, Valles Caldera National Preserve.

Ryan Kelly, Graduated Spring 2013. Mentored by Becky Bixby. Community changes in invertebrates during winter dry-down.

Brennan Davis, Sevilleta REU program, 2013, Effects of drought on algal communities in springs.

H. Publications/Reports Based on MSB Specimens (including outside researchers)

2013. K.D. Heil, S.L. O’Kane and L.M. Reeves (eds.). Flora of the Four Corners Region. Missouri Botanical Garden Press, St. Louis.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

B. Contributed Talks/Posters

Bixby, R.J., A. Clark, B.M. Shafer, and C.N. Dahm. 2013. Resistance and resilience of diatom taxa to impacts of forest fire. New Mexico Academy of Sciences, Albuquerque, New Mexico.

Bixby, R.J., A. Clark, B.M. Shafer, and C.N. Dahm. 2013. Resistance and resilience of diatom taxa to impacts of forest fire. North American Diatom Symposium, Bar Harbor, Maine.

Bixby, R.J., A. Clark, B. M. Shafer, and C.N. Dahm. 2013. Impacts of fire on the diatom component of biofilms in a mountain stream. Society for Freshwater Sciences, Jacksonville, Florida.

Clark, A.L., **R.J. Bixby**, V.F. Thompson, and C.N. Dahm. 2013. Seasonal changes in epiphytic diatoms in the Valles Caldera. Society for Freshwater Sciences, Jacksonville, Florida.

Hamilton, A.T., C.N. Dahm, **R.J. Bixby**, G.Z. Jacobi, B.M. Shafer, V.F. Thompson and S.M. Stringer. 2013. Short-term effects of the Las Conchas fire on stream benthos. Society for Freshwater Sciences, Jacksonville, Florida.

Shafer, B.M., D.J. Van Horn, **R.J. Bixby**, S. Compton, R.R. Parmenter, M.R. Grace, and C.N. Dahm. 2013. Long-term measurement of whole-stream metabolism in a snowmelt dominated montane ecosystem. Society for Freshwater Sciences, Jacksonville, Florida.

Sullivan, J.C., E.P. Gardiner, P.V. Bolstad, D.S. Leigh, M.C. Scott, E.F. Benfield, **R.J. Bixby**, T.L. Gragson, and C.M. Pringle. 2013. The Coweeta Hazard Site Project: A long-term study of stream ecosystems and their responses to different land use trajectories in the southern Appalachians. Society for Freshwater Sciences, Jacksonville, Florida.

Thompson, V.F., B.M. Shafer, **R.J. Bixby** and C.N. Dahm. 2013. The effects of forest fire on submerged aquatic macrophyte biomass and production in a mountain stream. 2013. Society for Freshwater Sciences, Jacksonville, Florida.

C. Attendance at Professional Meetings

Lowrey, T.K. Council of Graduate Schools Annual Meeting, San Diego, CA. Dec. 2013.

Bixby, R.J. Society for Freshwater Science, Jacksonville, FL, May 2013; North American Diatom Symposium, Bar Harbor, ME, August 2013

D. Service as Officer of Professional Society/Organization

Lowrey, T.K.

Member, Board of Directors, Flora North America, Elected.

Flora North America Editorial Board

Research Associate, Missouri Botanical Garden, St. Louis, MO. 1985-present.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity (*presenter)

B. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.

Native Plant Society of New Mexico Workshop – organized by Bob Sivinski:

SEDGE IDENTIFICATION WORKSHOP. Native Plant Society of New Mexico. Jemez Springs, July 24-26, 2013; Valles Caldera Science and Education Center.

C. Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

Bixby, R.J.

Participant in LTER Synthesis Working Group, “Synthesis of stream ecosystem responses to nutrient enrichment at multiple trophic levels,” NEON, Boulder Colorado, April 2013

Co-chair Public Information and Publicity Committee, Society for Freshwater Science

Member, Literature Review Committee, Society for Freshwater Science

Editor/Writer, Benthos News on society website, Society for Freshwater Science

Appointed Research Associate, New Mexico Museum of Natural History and Science

Member of Cyberinfrastructure/Science coordination team, NM EPSCoR

Member, American Society of Limnology and Oceanography

Member, Ecological Society of America

Member, International Society for Diatom Research

Member, New Mexico Academy of Science

Member, Organization for Tropical Studies

Member, Phycological Society of America Member, Society for Freshwater Science

Lowrey, T.K.

Member, New Mexico Rare Plant Technical Council

Member, Native Plant Society of New Mexico

California Botanical Society, 2008-present.

American Society of Plant Taxonomists, 1975-present.

Sivinski, R.

Member, New Mexico Rare Plant Technical Council

Member, Native Plant Society of New Mexico.

Regional Reviewer for the Flora of North America Project.

Tonne, P.C.

Member, New Mexico Rare Plant Technical Council.

Member, Native Plant Society of New Mexico

D. Journal Referee

Bixby, R.J.

Diatom Research-2

Polar Research -1

Lowrey, T.K.

Molecular Phylogenetics and Evolution- 1

American Journal of Botany-1

Texas Tech University Press-1

E. Hosting Professional Colloquia and Groups

Connections linking hydrology, biogeochemistry, and biological responses in headwater montane streams, Innovative Working Group, New Mexico EPSCoR program, hosted by Bixby, June 2013

F. Field Research

10. SERVICE

A. Symposia, Workshops, Conferences etc. Sponsored, Organized, Held, etc.

Coordination of Bosque Environmental Monitoring Program – University of Georgia Interdisciplinary Field Program, June 19-20, 2013 (Bixby)

B. Public Service

Lowrey, T.K., Phil Tonne, and Bob Sivinski:

Plant Identification for the general public in the UNM Herbarium.

Tonne, P., Joy Avritt, and Bob Sivinski. Rare plant conservation and restoration efforts in New Mexico. Current focus is on the conservation botany of the Todsens's Pennyroyal (*Hedeoma todsenii*)

Bixby featured in “Algae to Biofuels: Squeezing Power from Pond Scum” exhibit at the Bradbury Science Museum, Los Alamos, July 2013-present

C. University and Departmental Committees

Lowrey, T.K.

Policy Committee, UNM Faculty Senate, Vice-chair.

Committee on Governance, Vice-chair.

Tim Lowrey. Interim Co-Director, Museum Studies Program

Associate Deans of Research Committee

UNM Economic Development Committee

UNM Academic Program Review Committee

Promotion and Tenure Committee

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

Alex Clark, Society for Freshwater Science Undergraduate Travel Award (Bixby)

12. DONATIONS AND GIFTS RECEIVED

\$500 annually. Native Plant Society donation for New Mexico Herbaria.

13. CURRENT STAFF (List Faculty/Staff, Students and Volunteers)

Faculty/Staff

Lowrey, T.K., Curator

Tonne, P., Collection Manager

Graduate students

Wetherill, Karen (Spring 2013)
Lynn, Joshua (Fall 2013)

Undergraduate Student Workers and Volunteers

Robinson, Kyle. Work-study Employee. Sophomore.
Alex Clark, Employee for Bixby, Junior (Fall and Spring 2013)
Ryan Kelly, Employee for Bixby, Senior (Spring 2013)
Summer Woods-Tunney, Employee for Bixby (Spring 2013)
Brennan Davis, REU student (Summer 2013)

14. MUSEUM ASSOCIATES

Curatorial Associates

Sivinski, R., New Mexico State Botanist

Research Associates

Bixby, R.J. UNM Research Assistant Professor, Diatoms
Bleakly, D., Botanical Consultant
Carter, J.L., Emeritus Professor, Colorado College and Botanist
Dunmire, W., Retired U.S. National Park Service and Author
Keller, C., Retired, Los Alamos National Laboratory
Knight, P., Botanical Consultant

DIVISION OF MAMMALS

1. DIVISION HIGHLIGHTS.

- A. **Collection Growth.** The DOM added 6,182 new specimens to its catalogue and converted 504 DGR records to MSB mammal records during 2013 and now contains 256,687 cataloged specimens. The collection is currently the 3rd largest collection in the Western Hemisphere and in the top 5 worldwide. New accessions of mammalian material amounted to ~5000 specimens.

The continued exceptional growth is the result of several facets of our operation:

a. **Specimen growth through fieldwork**

- i. Directed specimen-based studies within Joseph Cook's research program.
- ii. Highly successful fieldwork in a wide variety of projects spanning the Western Hemisphere, eastern Asia, and collaborations with state and federal resource agencies in the western US and Canada. Work primarily sponsored by the National Science Foundation, National Institutes of Health, USDA Forest Service and US Fish and Wildlife Service.
- iii. New initiatives focused on building the collection in key geographic regions and for critical taxa.

b. **Specimen growth through donation**

- i. A well-developed network of researchers and agencies worldwide are now heavily invested in the DOM, by continuing to deposit their material here and later track and retrieve information via the Arctos database.
- ii. Donations of personal collections from individual researchers.

Continued growth and use, in addition to recognition by several agencies that DOM is a primary repository for research material, points to the strength and good standing of this infrastructure in the greater scientific community.

- B. **Training in specimen based research and curation.** Training remains one of the integral goals of the DOM. Students gain experience in bioinformatics, natural history collection preparation and curation, and field and laboratory based research. Students were involved in all activities of the division during 2013.

- a. 27 students worked in the division in 2013
 - i. 3 graduate students
 - ii. 11 paid undergraduates
 - iii. 3 high school interns/volunteers
 - iv. 10 volunteers.
- b. Of these 27:
 - i. 19 were females
 - ii. 8 males
 - iii. 10 were from under-represented groups

Publications citing MSB DOM specimens. The DOM collection continues to be utilized heavily in a wide range of disciplines and is the basis for a large number of peer-reviewed publications and agency reports. Tracking all publications that utilize our specimens is difficult, as not all authors are careful to acknowledge use of DOM specimens. Thus the number of publications that are based on our material should be viewed as an underestimate.

During 2013 DOM specimens were cited in at least **58** studies published in **39** journals or books including: Acta Parasitologica; Animals; Bat Evolution, Ecology, and Conservation; Biological Invasions;

Biological Journal of the Linnean Society; Conservation Genetics Resources; Emerging infectious diseases; Epidemiology and Infection; Evolution; Free-Ranging Dogs and Wildlife Conservation (book); Genetics and Molecular Research; Infection, Genetics and Evolution; Journal of Biogeography; Journal of Mammalian Evolution; Journal of Mammalogy; Journal of Morphology; Journal of Parasitology; Mammalia; Molecular Ecology; Molecular Phylogenetics and Evolution; Monographs of the Western North American Naturalist; Nature Climate Change; Northwestern Naturalist; Occasional Papers (Museum of Texas Tech University); Palaeogeography, Palaeoclimatology, Palaeoecology; PLoS ONE; PLoS Pathogens; Revista Biologia Tropical; Southwestern Naturalist; Systematic Biology; The Balance of Nature and Human Impact (Book); Virology Journal; Virus Research; Western North American Naturalist; Zoologica Scripta; Zoological Journal of the Linnean Society; Zoological Studies; Zootaxa.

C. Theses/Dissertations.

- a. In 2013, at least 6 theses or dissertations from 5 institutions (UNM, University of Minnesota, Utah State University, University of Nebraska-Lincoln, and Universidade Federal De Minas Gerais (Brazil), were completed that utilized MSB mammal specimens.

D. Arctos database and collection accessibility. The Arctos database is a cutting-edge relational database that continues to provide an invaluable resource for researchers, educators, public health workers, and natural resource managers worldwide. Arctos is web-accessible and greatly enhances the visibility of the MSB.

- a. Web visits to the Arctos database tracked via Google analytics = 123,664 visits
- b. From 200 countries
- c. 4,462 visitors referred to our site were from GenBank.
- d. Queries specific to DOM, DGR Mammals, DOM observations:

Collection	Queries	Specimen Records
DGR Mammals	7,633	163,854
MSB Mamm Obs	255	559
DOM	103,630	32,024,880
TOTAL	111,518	32,189,293

- E. Educational Modules.** We continued to expand our collaboration with the UNM Art and Ecology program (College of Fine Arts). Presentations on the collections are regularly delivered to A&E classes by members of the Mammal Division. In Spring 2013, Joe Cook co-taught a class with Scott Edwards-Harvard University (8 students) That course included a number of speakers covering topics related to genomes and museums and also developed web-based educational modules using museum specimens to illustrate various evolutionary concepts that can be viewed online and used by K-12 and UNM classes.

2. COLLECTION USE

Collection Growth (specimens catalogued)	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests Personally Responded to	Publications Citing MSB DOM Specimens
6,686 (6,182/504)*	31(772) / 39(945)**	6	658***	>500****	58

* Total growth (Newly cataloged/converted from DGR catalog)

- ** Loans originating in DOM / loans of mammal tissue originating in DGR Combined total of 70 loans of 1,717 specimens of traditional voucher specimens, skin clips and tissue samples.
- *** 26 visiting researchers from 12 institutions, 261 students and 27 teachers from 8 K-12 schools, 20 UNM classes (246 students and 18 instructors), 80 other visitors.
- **** Estimate of email or phone requests to Jon Dunnum and Joe Cook.

3. COURSES USING THE COLLECTIONS

UNM Classes receiving loans of material for educational purposes (12 classes serving 1,022 students)

BIOL 204L - Plant and Animal Form and Function. Spring	(180 students)
BIOL 204L - Plant and Animal Form and Function. Fall	(180 students)
BIOL 203L – Ecology and Evolution. Spring	(240 students)
BIOL 203L – Ecology and Evolution. Fall	(240 students)
BIOL 486L – Mammalogy. Fall	(15 students)
BIOL 386L General Vertebrate Zoology. Fall	(30 students)
BIOL 386L General Vertebrate Zoology. Spring	(40 students)
BIOL 599 - Masters Thesis. Fall	(1 student, 1 loan)
BIOL 699 – Dissertation. Spring	(2 students, 3 loans)
BIOL 699 – Dissertation. Fall	(2 students, 2 loans)
NTSC 262L - Spring	(46 students)
NTSC 262L - Fall	(46 students)

UNM courses or programs using collection through visits or staff presentations (246 students, 18 instructors from 20 classes/programs).

ANTHO 486 Practicum-Museum Methods	(1 student)
ANTHO 373/573 – Zooarchaeology, Fall	(17 student, 2 instructors)
ART Studio, Spring	(1 student)
ART 208 Painting 1, Spring	(18 students, 1 instructor)
ART Studio 141 (Intro art/ecol), 2 sections, Spring	(34 students, 2 instructors)
ART Studio 141 (Intro art/ecol). 2 sections, Fall	(27 students, 2 instructor)
ART /ART HIST – Drawing 1. Spring	(19 students, 1 instructor)
ART /ART HIST 106– Drawing 1, Spring	(1 student)
ART HIST – Land Arts of American Southwest	(8 students, 2 instructors)
BIOL 486L - Mammalogy, Fall	(19 students, 2 instructors)
COM/JOUR 518	(16 students, 1 instructor)
UNM Mus Studies (Szabo)	(12 students, 1 instructor)
UNM Biology graduate student orientation	(20 students, 1 instructor)
UNM Biology student interest group	(10 students, 1 instructor)
UNM prospective grad students' tour	(24 students, 1 instructor)
UNM Center English Language/American Culture	(5 students, 1 instructor)
UNM Fine Art	(1 student)
UNM Spanish Dept – Conexiones program	(13 students, 2 instructors)

K-12 schools and educational groups: 261 students, 27 teachers from 8 schools.

Albuquerque Academy AP Biology	(13 students, 1 teacher)
Cien Aguas International School (2 visits)	(65 students, 4 teachers)
Wingate High school	(14 students, 1 teacher)
Jefferson Middle school	(90 students, 8 teachers)
Montessori on the Rio Grande	(9 students, 4 teachers)
Monte Vista Elementary School	(26 students, 3 teachers)
Sandia Prep High School	(25 students, 1 teacher)

St. Pius High School

(19 students, 5 teachers)

1. Presentations on natural history of Alaska mammals and island biogeography at
 - a. WhaleFest, and to 4 science classes at
 - b. Mt Edgecumbe High School,
 - c. UA Southeast and
 - d. Sitka High School
 - i. (hosted by Kitty LaBounty, Kent Bovee and Scott Harris). October 2013

Visiting researchers: 26 from 12 institutions or departments

Jefferson Middle School	(1)
New Mexico Museum of Natural History / Science	(1)
San Diego Natural History Museum	(1)
Smithsonian Institution	(1)
State Museum of Pennsylvania	(1)
Statistical Research Inc.	(2)
Texas Tech University	(1)
Univ Nebraska-Kearney	(1)
Univ Nebraska-Omaha	(5)
UNM Anthropology	(5)
UNM Biology	(5)
US Geological Survey	(2)

Other visitors: 80

University of Guadalajara	(2)
Mongolian Dept Ministry and Nat Univ Mongolia	(13)
Bernalillo Co. Master Naturalists Program	(31)
Mountain West Conference Foundation	(20)
US Geological Survey	(1)
Whole Woman Inc.	(2)
Other	(11)

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Cook, J. A.

Spring:

Research Problems 551-007	3 students
Masters Thesis 599-007	2 student
Dissertation 699-007	4 students
Genomes and Museums 402/502	3 students
Virus Evolution 402/502	

Fall:

Sabbatical Leave	
Research Problems 551-007	3 students
Masters Thesis 599-007	1 student
Dissertation 699-007	3 students

Schmidly, D.
Mammalogy 489L

15 students

Student Mentoring
Undergraduates

B. Graduate Students (labs, etc.)

BIOL 486L – Mammalogy
BIOL 402/502 - AIM-UP
BIOL 402 - UnO

5. COLLECTION MANAGEMENT

The DOM received 82 new accessions of material (~5000 specimens) and added approximately 6,600 specimens to its catalogue during 2013 including new material and records converted from DGR.

Current projects generating specimens for DOM

Beringian Coevolution Project - NSF
Mexican wolf reintroduction – USFWS
Mongolian Vertebrate Parasite Project – NSF
Panama Hantavirus – ICIDR NIH
Bighorn Sheep Reintroduction Program – NMGF
ISLES---USDA Forest Service
Jackson Whitman Idaho collection
Black bear /elk predation project – NMDGF
Robert Rausch parasite host collection
Mammalogy and Tropical Biology classes
Troy Best collections

The majority of staff time was spent:

10. Development of the Arctos database.
11. Reorganizing and relabeling of dry collections.
12. Training student technicians and UnO students in museum work.
13. Preparation, cataloging and installation of museum specimens.
14. Data entry for the incoming accessions.
15. Filling information requests.
16. Processing loan material.
17. Assisting with UNM courses utilizing MSB specimens and facilities.
18. Outreach to K-12 schools.

6. AWARDS, GRANTS, AND CONTRACTS

Bell, K.C.

1. NSF Doctoral Dissertation Improvement Grant: Elucidating Evolutionary Histories of Multiple Chipmunk Parasites Using Next Generation Sequencing, \$13,000

Cook, J.A.

1. NSF-DEB 1258010 (3/13/13-2/28/16)--Awarded
Collaborative & Integrative Inventories of Biomes of the Arctic
(with K Galbreath, Northern Michigan University & E. DeChaine,
Western Washington University) (\$450K to UNM) \$945,000

1. USGS Cooperative Agreement-II, Tundra Preserves (6/11-12/13) \$65,000
2. USGS Cooperative Agreement, Completion of Museum Integration \$84,000
3. USGS Cooperative Agreement, Student Research (9/15/13-9/15/15) \$89,838
4. Finalized Bruce Hayward Endowment/photograph collection (ca. \$250,000)
5. USGS Cooperative Agreement, Tundra Preserves (6/11-12/14) now \$123,000
6. RCN-UBE: Advancing Integration of Museums into Undergraduate Programs (AIM-UP!) (w/ co-PIs E. Lacey (UC Berkeley), S. Edwards (Harvard), S. Ickert-Bond (U Alaska)). NSF-DEB 0956129 \$485,648 5/01/2010-4/30/2015 (\$98K annually).
7. ISLES—Island Survey to Locate Endemics USDA Forest Service \$280,000 (9/08-10/13) (\$65K annually)
8. URM: Undergraduate Nurturing Opportunities (UNO) NSF-DEB 0731350 \$1,014,659 08/01/07 - 08/01/13 (\$200k annually—completed 2013)
9. Mongolia Vertebrate Parasite Project ((Co-PI) to University of Nebraska) NSF-DEB 0717214 \$829,999 09/11/07 -9/01/13 (no \$\$ to UNM, but we now have the largest collection of Mongolian mammals outside Russia and largest collection of tissues from mammals period). NSF-DEB 1057383 1/1/11-12/32/14
10. Integration and Curation of the Robert and Virginia Rausch Helminthological Collection- A Resource for Science and Society in the MSB Division of Parasitology NSF \$489,490

Scientist in Residence Fellowship, Sitka Sound Science Center (Alaska 2013)

Patronyms

Arostrilepis cooki Makarikov, Galbreath, & Hoberg 2013
Cook's hymenolepidid cestode (tapeworm of *Myodes gapperi* in BC & MT)

Dunnum, J. L.

1. Improved housing of Mexican wolf (*Canis lupus baileyi*) specimens and its conservation in New Mexico. U. S. Fish and Wildlife Service. Total \$10,000 (No F&A).
2. Sarah Belle Brown Community Service Award – Nominee. University of New Mexico.

Kohli, B.A.

American Society of Mammalogists Annie M. Alexander Award for Outstanding Masters Thesis Project. (included \$1000 travel grant to present during plenary session at 2013 ASM meeting)

Hartley H. T. Jackson Award, American Society of Mammalogists, June 2013

Malaney, J.

A Brazier Howell Award, American Society of Mammalogists (included \$1000 travel grant), June 2013

McLean, B.

The Joseph Gaudin Scholarship, UNM Department of Biology - \$2250
Travel Grant, UNM Graduate Research Allocations Committee - \$150

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Cook, J.A.

1. Cook, J. A., C. Brochmann, S. L. Talbot, V. Fedorov, E. B. Taylor, R. Väinölä, E.P. Hoberg, M. Kholodova, K. P. Magnusson. 2013. Genetic Perspectives on Arctic Biodiversity. Pp. 459-483 *In* Arctic Biodiversity Assessment. Conservation of Arctic Fauna and Flora Committee, Copenhagen.
2. Hoberg, E. P., S. J. Kutz, J. A. Cook. K. Galaktionov, V. Haukialmi, H. Henttonen, and S. Laaksonen. 2013. Parasites in Terrestrial, Freshwater, and Marine Environments. Pp. 420-449 *In* Arctic Biodiversity Assessment. Conservation of Arctic Fauna and Flora Committee, Copenhagen.
3. Meltofte, H., T. Barry, D. Berteaux, H. Bültmann, J. S. Christiansen, J. A. Cook, A. Dahlberg, F. J.A. Daniëls, D. Ehrich, J. Fjeldså, F. Fridriksson, B. Ganter, A. J. Gaston, L. J. Gillespie, L. Grenoble, E. P. Hoberg, I. D. Hodgkinson, H. P. Huntington, R. A. Ims, A. B. Josefson, S. J. Kutz, S. L. Kuzmin, K. L. Laidre, D. R. Lassuy, P. N. Lewis, C. Lovejoy, C. Michel, V. Mokievsky, T. Mustonen, D. C. Payer, M. Poulin, D. G. Reid, James D. Reist, D. F. Tessler and F. J. Wrona. 2013. Synthesis: implications for conservation. Pp. 22-65 *In* Arctic Biodiversity Assessment. Conservation of Arctic Fauna and Flora Committee, Copenhagen.
4. Cook, J. A. and S. O. MacDonald. 2013. Island life: Coming to grips with the insular nature of North Pacific Coastal Forests. Pp. 19-42, *In* Conservation of North Pacific Coastal Forests, Orians, G. H., and J. W. Schoen, eds. University of Washington Press, Seattle.

B. Journal Articles

Cook, J. A.

1. Malaney, J. L. and J. A. Cook. 2013. Using biogeographic history to inform conservation: The case of Preble's jumping mouse. *Molecular Ecology* 22:6000-6017.
2. Greiman, S. E., V. V. Tkach, and J. A. Cook. 2013. Description and molecular differentiation of a new *Staphylocystoides* (Cyclophyllidae: Hymenolepididae) from the dusky shrew *Sorex monticolus* in Southeast Alaska. *Journal of Parasitology* 99: 1045-1049.
3. Ho, S-H. and J. A. Cook. 2013. Co-Evolving Pedagogies. *ARID: A Journal of Desert Art, Design and Ecology*. Vol. 2 published online (<http://aridjournal.com/co-evolving-pedagogies-szu-han-ho-and-joseph-a-cook/>)
4. Deardorff, E.R., R. A. Nofchissey, J. A. Cook, A. G. Hope, A. Tsvetkova, S. L. Talbot, G. D. Ebel. 2013. Serological Evidence of Powassan Virus in Mammals from Russia, Alaska and New Mexico, 2004-2007. *Emerging and Infectious Diseases*. 19:2012-2016.
5. Hope, A. G., E. C. Waltari, D. C. Payer, J. A. Cook, and S. L. Talbot. 2013. Future distribution of tundra refugia in Alaska. *Nature Climate Change* 3:931-938.
6. Malaney, J. L., C. J. Conroy, L. A. Moffitt, H. D. Spoonhunter, J. L. Patton, and J. A. Cook. 2013. Phylogeography of the western jumping mouse (*Zapus princeps*) detects deep structure in the southwestern United States. *Journal of Mammalogy*, 94:1016-1029.
7. Hope, A. G., N. Takebayashi, K. E. Galbreath, S. L. Talbot, and J. A. Cook. 2013. Temporal dynamics of speciation among amphi-Beringian small mammals. *Journal of Biogeography* 40: 415-429.

McLean, B.

C. Web-Based

All publications in the MSB series are available via free-download from our website.

D. Technical Reports

Four ISLES Quarterly Reports for USDA Forest Service.

E. Theses/Dissertations Completed

Kohli, B. A.

Red-backed vole (*Myodes*) phylogeography and systematics. M. S. 2013-spring

Malaney, J.

Historical biogeography of jumping mice. Ph. D. 2013-spring

F. Work In Progress (Only *in press* and already submitted)

Bell, K.C.

Sullivan, J., J.R. Demboski, K.C. Bell, S. Hird, B. Sarver, N. Reid, J.M. Good. Divergence-with-gene-flow within the recent chipmunk radiation (*Tamias*). *Heredity*, *accepted pending minor revisions*.

Cook, J.A.

1. Kohli, B. A., K. A. Speer, C. W. Kilpatrick, N. Batsaikhan, D. Damdinbaza, J. A. Cook. In Press. Evolution in the subarctic: Multilocus systematics of a recent radiation of boreal rodents (Arvicolinae: Myodini). *Molecular Phylogenetics and Evolution*.
2. Hope, A.G., N. Panter, J. A. Cook, S. L. Talbot, and D. Nagorsen. 2014. Multi-locus phylogeography and systematic revision of North American water shrews (genus: *Sorex*). *Journal of Mammalogy*.
3. Gu, S.H., B. K. Lim, B. Kadjo, S. Arai, J.-W. Song, J.-A. Kim, V. Nicolas, C. Denys, J. A. Cook, S. R. Dominguez, K. V. Holmes, and R. Yanagihara. Submitted. Molecular phylogeny of hantaviruses harbored by insectivorous bats in Côte d'Ivoire and Vietnam. *Viruses*.
4. Cook, J.A., S. V. Edwards, E. Lacey, R. P. Guralnick, P. S. Soltis, D. E. Soltis, C. Welch, K. C. Bell, K. E. Galbreath, C. Himes, J. M. Allen, T. A. Heath, A. C. Carnaval, K. L. Cooper, M. Liu, J. Hanken. Submitted. Aiming Up: Natural History Collections as Emerging Resources for Innovative Undergraduate Education in Biology. *Bioscience*.
5. Powers, K. E., L. A. Prather, J. A. Cook, J. Woolley, H. L. Bart, Jr., A. K. Monfils, M. Blackwell, and P. Sierwald. Submitted. Revolutionizing the Use of Natural History Collections in Education. *American Biology Teacher*.
6. Gardner, S. L., J. Salazar-Bravo, and J. A. Cook. In revision. New species of *Ctenomys* (Rodentia: Ctenomyidae) from Bolivia. *Texas Tech Museum, Occasional Papers*.
7. Talbot, S.L., S. A. Sonsthagen, G. K. Sage, S. D. Farley, N. G. Dawson, and J.A. Cook. Island bears: insularity and gene flow among coastal brown bear populations of southeast Alaska. In revision, *Journal of Mammalogy*

8. Hart, T., J. Mackenzie-Dodds, R. Huxley, K. Ciborowski, J.A Cook, O. Hogg; J. Banks, A. Emery, A. Jungblut, C. Lyal, and J. Jackson. Submitted. SNOWBANK: Designing a repository of polar samples to facilitate large-scale ecological studies. *Polar Biology*.
9. Kohli, B. A., V. B. Fedorov, E. C. Waltari, and J. A. Cook. Submitted. Phylogeography of a Holarctic rodent (*Clethrionomys rutilus*): Testing high-latitude biogeographic hypotheses and the dynamics of range shifts. *Journal of Biogeography*.
10. Ryan, M. J., M. Fuller, N. J. Scott, J. A. Cook, S. Poe, B. Willink, G. Chaves, and F. Bolaños. Submitted. Individualistic population responses of five frog species over 42-years in two changing tropical environments. *PLoS One*
11. Hope, A. G., S. Y. W. Ho, J. L. Malaney, J. A. Cook, S. L. Talbot. Submitted. Calibrating molecular evolutionary rates for comparative demographic inference of multiple species. *Evolution*.
12. Dawson, N. G., A. G. Hope, S. L. Talbot, and J. A. Cook. 2014. A multi-locus evaluation of ermine (*Mustela erminea*) across the Holarctic, testing hypotheses of Pleistocene diversification in response to climate change. *Journal of Biogeography*

Dunnum, J.

1. Dunnum, J. L. 2014. Family Caviidae, *In* Mammals of South America. Volume 2, Rodents, edited by J. L. Patton, U. F. J. Pardiñas, and G. D'Elia, pp. xxx-xxx. The University of Chicago Press, Chicago, IL. in press.

G. Publications/Reports Based on MSB Specimens/Data by Outside Researchers

1. Alvarado-Serrano, Diego F., and Guillermo D'Elia. 2013. A new genus for the Andean mice *Akodon latebricola* and *A. bogotensis* (Rodentia: Sigmodontinae). *Journal of Mammalogy* 94(5): 995-1015.
2. Arai, S., Nguyen, S. T., Boldgiv, B., Fukui, D., Araki, K., Dang, C. N., ... and Oishi, K. 2013. Novel Bat-borne Hantavirus, Vietnam. *Emerging infectious diseases* 19(7), 1159.
3. Carrasco, M. A. 2013. The impact of taxonomic bias when comparing past and present species diversity. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 372, 130-137.
4. Conroy, Chris J., Kevin C. Rowe, Karen M. C. Rowe, Pauline L. Kamath, Ken P. Aplin, Lucia Hui, David K. James, Craig Moritz, James L. Patton. 2013. Cryptic genetic diversity in *Rattus* of the San Francisco Bay region, California. *Biol Invasions* 15:741–758. DOI 10.1007/s10530-012-0323-9
5. Coyner, Brandi S., Janet K. Braun, Michael A. Mares, and Ronald A. Van Den Bussche. 2013. Taxonomic validity of species groups in the genus *Akodon* (Rodentia, Cricetidae). *Zoologica Scripta* 42(4):335–350.
6. Esselstyn, J. A., Maharadatunkamsi, Achmadi, A. S., Siler, C. D. and Evans, B. J. (2013), Carving out turf in a biodiversity hotspot: multiple, previously unrecognized shrew species co-occur on Java Island, Indonesia. *Molecular Ecology*, 22: 4972–4987. doi: 10.1111/mec.12450
7. Frey, Jennifer K. and Michael T. Calkins. 2013. Snow cover and riparian habitat determine the distribution of the short-tailed weasel (*Mustela erminea*) at its southern range limits in arid western North America. *Mammalia* 0(0):1-12.
8. Frey, Jennifer K., Jeremy C. Lewis, Rachel K. Guy, and James N. Stuart. 2013. Use of Anecdotal Occurrence Data in Species Distribution Models: An Example Based on the White-Nosed Coati (*Nasua narica*) in the American Southwest. *Animals* 3:327-348; doi:10.3390/ani3020327
9. Galbreath, K. E., Ragaliauskaite, K., Kontrimavichus, L., Makarikov, A. A., and Hoberg, E. P. 2013. A widespread distribution for *Arostrilepis tenuicirrosa* (Eucestoda: Hymenolepididae) in *Myodes*

- voles (Cricetidae: Arvicolinae) from the Palearctic based on molecular and morphological evidence: historical and biogeographic implications. *Acta Parasitologica* 58(4):441-452.
10. Gardner, Scott L., F. Agustín Jiménez, and Marie L. Campbell. 2013. *Pritchardia boliviensis* n. gen., n. sp. (Anoplocephalidae: Linstowinae), A tapeworm from opossums (Didelphidae) in the yungas and lowlands of Bolivia and atlantic forest of Paraguay. *Occasional Papers, Museum of Texas Tech University* 319:1-8.
 11. Gardner, Scott Lyell, Altangerel T. Dursahinhan, Gábor R. Rácz, Nyamsuren Batsaikhan, Sumiya Ganzorig, David S. Tinnin, Darmaa Damdinbazar, Charles Wood, A. Townsend Peterson, Erika Alandia, José Luís Mollericona, and Jorge Salazar-Bravo. 2013. Sylvatic Species of *Echinococcus* from Rodent Intermediate Hosts in Asia and South America. *Occasional Papers, Museum of Texas Tech University* 318:1-12.
 12. Geluso, Keith, Jeffrey J. Huebschman, Kenneth N. Geluso. 2013. Bats of the Wildcat Hills and Surrounding Areas in Western Nebraska. *Monographs of the Western North American Naturalist* 6(1):20-42. Gompper, Matthew E., ed. *Free-Ranging Dogs and Wildlife Conservation*. Oxford University Press, 2013.
 13. Gu, S. H., Dormion, J., Hugot, J. P., and Yanagihara, R. 2013. High prevalence of Nova hantavirus infection in the European mole (*Talpa europaea*) in France. *Epidemiology and infection*, 1-5.
 14. Gu, S. H., Markowski, J., Kang, H. J., Hejduk, J., Sikorska, B., & Yanagihara, R. (2013). Boginia virus, a newfound hantavirus harbored by the Eurasian water shrew (*Neomys fodiens*) in Poland. *Virology journal*, 10(1):160.
 15. Gu, S. H., Nicolas, V., Lalis, A., Sathirapongsasuti, N., & Yanagihara, R. (2013). Complete genome sequence and molecular phylogeny of a newfound hantavirus harbored by the Doucet's musk shrew (*Crocidura douceti*) in Guinea. *Infection, Genetics and Evolution*, 20:118-123.
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 17. Guterres, Alexandro, Renata Carvalho de Oliveira, Jorlan Fernandes, Paulo Sérgio D'Andrea, Cibele R. Bonvicino, Camila Bragagnolo, Gustavo Ducoff Guimarães et al. 2013. Phylogenetic analysis of the S segment from Juquitiba hantavirus: Identification of two distinct lineages in *Oligoryzomys nigripes*. *Infection, Genetics and Evolution* 18:262–268.
 18. Hardy, Daniel K. , Francisco X. González-Cózatl, Elizabeth Arellano, Duke S. Rogers. 2013. Molecular phylogenetics and phylogeographic structure of *Sumichrasti's* harvest mouse (*Reithrodontomys sumichrasti*: Cricetidae) based on mitochondrial and nuclear DNA sequences. *Molecular Phylogenetics and Evolution* 68(2):282-292.
 19. Hoberg, E. P., & Brooks, D. R. 2013. 14 Episodic processes, invasion and faunal mosaics in evolutionary and ecological time. *The Balance of Nature and Human Impact*, 199.
 20. Holmes, Brian E. and Daniel J Neubaum. 2013. First Record of the Northern Flying Squirrel (*Glaucomys sabrinus*) in Colorado. *Northwestern Naturalist* 94(1):84-87.
 21. Hornsby, Angela D. and Marjorie D. Matocq. 2013. Patterns of Evolutionary Divergence and Convergence in the Bushy-Tailed Woodrat (*Neotoma cinerea*) Across Western North America. *Journal of Mammalian Evolution*. DOI 10.1007/s10914-013-9232-7
 22. Indorf, Jane L., and Michael S. Gaines. 2013. Genetic divergence of insular marsh rice rats in subtropical Florida. *Journal of Mammalogy* 94(4):897-910.
 23. Jansa, Sharon A., F. Keith Barker, Robert S. Voss. 2013. The early diversification history of didelphid marsupials: a window into South America's "Splendid Isolation". *Evolution*. doi:10.1111/evo.12290.
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32. Oyler-McCance, Sara J., Ernest W. Valdez, Thomas J. O'Shea, and Jennifer A. Fike. 2013. Genetic characterization of the Pacific sheath-tailed bat (*Emballonura semicaudata rotensis*) using mitochondrial DNA sequence data. *Journal of Mammalogy* 94(5):1030-1036.
33. Parada, Andrés, Ulyses F.J. Pardiñas, Jorge Salazar-Bravo, Guillermo D'Elía, R. Eduardo Palma. 2013. Dating an impressive Neotropical radiation: Molecular time estimates for the Sigmodontinae (Rodentia) provide insights into its historical biogeography. *Molecular Phylogenetics and Evolution* 66(3):960-968.
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35. Reese, Aspen T., Hayley C. Lanier, and Eric J. Sargis. 2013. Skeletal Indicators of Ecological Specialization in Pika (Mammalia, Ochotonidae). *Journal of Morphology* 274:585–602.
36. Resman, Katarina, Miša Korva, Luka Fajs, Tanja Zidarič, Tomi Trilar, and Tatjana Avšič Županc. 2013. Molecular evidence and high genetic diversity of shrew-borne Seewis virus in Slovenia. *Virus research* 177(1):113-117.
37. Riedle, Tamera D. H., and Raymond S. Matlack. 2013. Bats of Palo Duro Canyon State Park, Texas: community composition, abundance, and seasonal activity. *Western North American Naturalist* 73(1):pp. 89–97.
38. Roy-Dufresne, Emilie, Travis Logan, Julie A. Simon, Gail L. Chmura, Virginie Millien, Brian Stevenson. 2013. Poleward Expansion of the White-Footed Mouse (*Peromyscus leucopus*) under Climate Change: Implications for the Spread of Lyme Disease. *PLoS ONE* 8(11):e80724.
39. Salazar-Bravo, Jorge, Ulyses F. J. Pardiñas, Guillermo D'Elía. 2013. A phylogenetic appraisal of Sigmodontinae (Rodentia, Cricetidae) with emphasis on phyllotine genera: systematics and biogeography. *Zoologica Scripta* 42(3):250-261.
40. Schenk, J.J., K. C. Rowe, S. J. Stepan. 2013. Ecological Opportunity and Incumbency in the Diversification of Repeated Continental Colonizations by Muroid Rodents. *Systematic Biology* 62(6):837-864.
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44. Spotorno, Angel E., Carlos Zuleta R., Laura I. Walker, German Manriquez S., Pablo Valladares F., And Juan C. Marin. 2013. A small, new gerbil-mouse *Eligmodontia* (Rodentia: Cricetidae) from dunes at the coasts and deserts of north-central Chile: molecular, chromosomic, and morphological analyses. *Zootaxa* 3683 (4): 377–394. <http://dx.doi.org/10.11646/zootaxa.3683.4.3>
45. Stolz, J. F. B., G. L. Gonçalves, L. Leipnitz, and T. R. O. Freitas. 2013. DNA-based and geometric morphometric analysis to validate species designation: a case study of the subterranean rodent *Ctenomys bicolor*. *Genetics and Molecular Research* 12(4):5023-5037.
46. Ubelaker, John E., Bretton S. Griffin, Donald W. Duszynski, Robert L. Harrison. 2013. Distribution Records for Helminths of the Red Fox *Vulpes vulpes* from New Mexico. *The Southwestern Naturalist* 58(1):111-112.
47. Valdez, Ernest W. and Paul M. Cryan. 2013. Insect prey eaten by hoary bats (*Lasiurus cinereus*) prior to fatal collisions with wind turbines. *Western North American Naturalist* 73(4):516–524.
48. Velazco, Paul M. and Bruce D. Patterson. 2013. Diversification of the Yellow-shouldered bats, Genus *Sturnira* (Chiroptera, Phyllostomidae), in the New World tropics. *Molecular Phylogenetics and Evolution* 68(3):683-698.
49. Ventura, K., Silva, M. J. J., Geise, L., Leite, Y. L., Pardiñas, U. F., Yonenaga-Yassuda, Y., & D'Elia, G. 2013. The phylogenetic position of the enigmatic Atlantic forest-endemic spiny mouse *Abrawayomys* (Rodentia: Sigmodontinae). *Zoological Studies* 52(1):1-10.
50. Vilela, Júlio F., Beatriz Mello, Carolina M. Voloch, and Carlos G. Schrago. 2013. Sigmodontine rodents diversified in South America prior to the complete rise of the Panamanian Isthmus. *Journal of Zoological Systematics and Evolutionary Research*.
51. Walters, C. L., Collen, A., Lucas, T., Mroz, K., Sayer, C. A., & Jones, K. E. 2013. Challenges of Using Bioacoustics to Globally Monitor Bats. In *Bat Evolution, Ecology, and Conservation* (pp. 479-499). Springer New York.

Theses/Dissertations

1. Giarla, Thomas Christopher. 2013. Systematics, biogeography, and phylogeography of *Thylamys* mouse opossums, a recent radiation of neotropical marsupials. PhD Dissertation, University of Minnesota. pp. 1-156.
2. Gifford, S. J. 2013. Ecology of Coyotes on the Valles Caldera National Preserve, New Mexico: Implications for Elk Calf Recruitment. PhD dissertation, Utah State University. Pp. 1-103.
3. Jensen, E. T. (2013). Coccidia of Gerbils from Mongolia. MS Thesis, University of Nebraska-Lincoln. Pp. 1-104.
4. Kohli, B. 2013. A Holarctic perspective on mammalian evolution: The evolutionary and biogeographic history of red-backed voles and their close relatives (Rodentia: Arvicolinae). MS Thesis, University of New Mexico. Pp. 1-125.
5. Malaney, Jason L. 2013. Exploring signals of historical demography in boreal mammals through integration of statistical conservation phylogenetics, taxonomy, and comparative phylogeography. PhD Dissertation, Biology, University of New Mexico. Pp. 1-223.
6. Teixeira De Rezende, Daniella. 2013. Modelos aplicados ao estudo de mamíferos deficientes em dados no Brasil: identificação de áreas para amostragem e estimativa de custos para obtenção de informações. MS Thesis, Universidade Federal De Minas Gerais. Pp. 1-85.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/ Plenary talks

Cook, J.A.

1. "Mammalian Phylogeography of Northwestern North America." Biogeography Symposium, 11th International Mammal Congress, Belfast, UK Aug 2013.
2. AIM-UP! Advancing the Integration of Museum Collections into Undergraduate Education. CollectionsWeb Symposium, Smithsonian Institution, May 2013.

Dunnum, J.L.

Expanding the reach of NH Research Collections and biodiversity data. Invited talk- Symposium, Using Online Tools to Make Accessible Museum Collections. Association of Science and Technology Centers annual meeting, Albuquerque, NM Oct 2013.

B. Contributed Talks/Posters

Bell, K.C.

1. Bell, K., E. Hoberg, J. Demboski, J. Cook. 22 June 2013. Deep Divergence Belies Shifting Alliances in a Widespread Pinworm. Evolution, Snowbird, UT.
2. Bell, K., E. Hoberg, J. Demboski, J. Cook. 10 January 2013. Worms Out West: Revealing Faunal Assembly for Pinworms (Nematoda: Oxyurida) and Chipmunks (Mammalia: Rodentia) in the American West. International Biogeography Society Meeting, Miami, FL
3. Museum Collections on the Internet and in the Classroom. Association of Science-Technology Centers Conference, Albuquerque, NM. 19 October 2013.
4. Bell, K.C., J.L. Dunnum, F. Salazar-Mirallas, J.A. Cook. Colecciones de Los Museos in el Internet y en La Sala de Clases. Curso de Biodiversidad, Ecología y Conservación de Los Roedores Neotropicales. Universidad Nacional de San Agustín, Arequipa, Peru. 26 July 2013.
5. Bell, K.C., J.A. Cook, E.A. Lacey. Incorporating Natural History Collections into Undergraduate Education. American Society of Mammalogists Annual Meeting, Philadelphia, PA. June 2013.

Cook, J.A.

1. Kohli, B., V. B. Fedorov, E. Waltari, and J. A. Cook. 2013. Phylogeography of a Holarctic rodent (*Clethrionomys rutilus*). American Society of Mammalogists, annual meeting, Philadelphia, June.
2. Arbogast, B., K. Schumacher, A. Bidlack, J.A. Cook, and G. J. Kenagy. 2013. Analysis of nuclear and mitochondrial DNA reveals cryptic speciation in North American flying squirrels. American Society of Mammalogists, annual meeting, Philadelphia, June.
3. Gu, S. H., B. K. Lim, B. Kadjo, S. Arai, J-W Song, V. Nicolas, C. Denys, J. A. Cook, S. R. Dominguez, K. V. Holmes, R. Yanagihara. 2013. Phylogenetically Divergent Hantaviruses Harbored by Insectivorous Bats in Côte d'Ivoire and Vietnam. IX International Conference on HFRS, HPS and Hantaviruses, June 5-7, Beijing, China.
4. Salazar-Mirallas, F., S. L. Talbot, E. R. Deardorff, and J. A. Cook. 2013. Alaskan hantavirus: Insights into viral evolution. Research Day, Biology Department, University of New Mexico 7 March.
5. Malaney, J.L. and J.A. Cook (2013) Laying a solid foundation for effective conservation action: historical biogeography informs conservation of the controversial jumping mice of western North America – (Invited Seminar) Western Section of the Wildlife Society, Davis CA
6. Gu, S. H., B. K. Lim, B. Kadjo, S. Arai, J-W Song, V. Nicolas, C. Denys, J. A. Cook, S. R. Dominguez, K. V. Holmes, R. Yanagihara. 2013. Phylogenetically Divergent Hantaviruses Harbored by Insectivorous Bats in Côte d'Ivoire and Vietnam. IX International Conference on HFRS, HPS and Hantaviruses, June 5-7, Beijing, China.

7. Bell, K., E. Hoberg, J. R. Demboski, and J.A. Cook. 2013. Worms Out West: Revealing Faunal Assembly for Pinworms (Nematoda: Oxyurida) and Chipmunks (Mammalia: Rodentia) in the American West. International Biogeography Society, January 10, Miami, Florida.
8. Malaney, J., A. Hope, Y. Sawyer, S. MacDonald & J. A. Cook. 2013. Exploring signals of historical demography in North American boreal mammals through statistical comparative phylogeography. International Biogeography Society, January 10, Miami, Florida.

Kohli, B.A.

Phylogeography of a Holarctic rodent (*Myodes rutilus*): Testing high-latitude biogeographic hypotheses and the dynamics of range shifts. 15 June 2013. Plenary Session I of American Society of Mammalogists Annual Meeting, Philadelphia, PA (Oral presentation).

McLean, B.

1. An isotopic role for fossil small mammals in paleoecology and paleoclimatology. Wisc-SIMS High Resolution Proxies of Paleoclimate workshop, University of Wisconsin, oral pres. (June 2013).
2. McLean, B.S. and Cook, J.A. New geometric morphometric methods for taxonomic identification of fossil ground squirrels (Rodentia:Marmotini). American Society of Mammalogists 93rd Annual Meeting, oral pres. (June 2013).
3. Jackson, D.J., McLean, B.S. and Cook, J.A. Phylogeny of the Holarctic ground squirrel genus *Urocitellus*. American Society of Mammalogists 93rd Annual Meeting, poster pres. (June 2013).
4. Jackson, D.J., McLean, B.S. and Cook, J.A. Phylogeny of the Holarctic ground squirrel genus *Urocitellus*. UNM Department of Biology Research Day, poster pres. (April 2013).

C. Attendance at Professional Meetings

Bell, K.C.

American Society of Mammalogists 93rd Annual Meeting, Philadelphia, PA, June 2013
 Evolution Society America annual meeting, Snowbird, UT, June 2013.

Association of Science-Technology Centers Conference, Albuquerque, NM. 19 October 2013.

Cook, J.A.

American Society of Mammalogists 93rd Annual Meeting, Philadelphia, PA, June 2013

Dunnum, J.L.

Association of Science-Technology Centers Conference, Albuquerque, NM. 19 October 2013.

Kohli, B.

American Society of Mammalogists 93rd Annual Meeting, Philadelphia, PA, June 2013

Malaney, J.L.

Evolution Society America annual meeting, Snowbird, UT, June 2013.

D. Service as Editor or on Editorial Board of a Journal

Cook, J.A.

2013-2014 Corresponding Editor, *Frontiers in Phylogenetics, Phylogenomics, and Systematics*

International Advisory Board Member, Editorial Board, *Zoologia*, *Brazilian Journal of Zoology*

E. Service as Officer or Professional Society/Organization

Bell, K

Student Member of American Society of Mammalogists Board of Directors. 6/2011- present.
Public Education Committee, American Society of Mammalogists. 6/2011- present.
Advancing the Integration of Museums into Undergraduate Education (AIM-UP!) NSF-funded RCN-UBE. 1/2011 - present.

Cook, J.A.

Board of Directors, American Society of Mammalogists, Member, 2011-2014 (elected)

Board of Directors, National Systematics Collection Alliance 2011-2014 (elected)

UNM Representative to the federal Colorado Plateau Cooperative Extension Studies Unit. 2011-2015 (appointed)

9. OTHER PROFESSIONAL ACTIVITIES**A. Presentations to General Audience in a Scholarly Capacity****Cook, J.A.**

1. "Island Life: A mammalogist's perspective on what's cool about living in isolation at the western edge of North America." Sitka Sound Science Center, Scientist in Residence Public Lecture, Sitka, Alaska. October 2013.

Seminars**Cook, J.A.**

1. "The role of climate in structuring mammals and their associated parasites in northwestern North America." University of Alaska Southeast and Alaska Coastal Rainforest Center, Juneau, October 2013.
2. "Beringia: it's role as a crossroads and refugium in the assembly of North American mammal diversity." Seccion de Evolucion, Universidad de la Republica, Montevideo, Uruguay. December 2013

Workshops

1. Co-Organizer, CollectionsWeb Workshop, The Stakeholders. 2-4 May 2013, Smithsonian Institution, Washington DC.
2. Organizer, AIM-UP! Genomes and Museums Workshop, 10-13 April 2013. Harvard University, Cambridge, MA.

B. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.

Presentation to the national Ministry of Education, Uruguay on Natural History Museum Collections as critical scientific infrastructure, Dec 2013

C. Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.**Cook, J.A.**

2011-2013 Member Steering Committee, VertNet

2011-2013 Member Steering Committee, CollectionsWeb Research Coordinating Network

2010-2014	Chair, Steering Committee, AIM-UP! Research Coordinating Network in Undergraduate Biology Education
2008-2013	Convener and Lead, Genetic Resources, Arctic Biodiversity Assessment, Conservation of Arctic Fauna and Flora (CAFF)
2011-2015	Chair, MSB Executive Committee
2003-2013	Editorial Board, MSB Publications Series
2008-2013	Member, Latin American Scholarship Committee, American Society of Mammalogists
2012-2013	Chair, Conservation Awards Committee, American Society of Mammalogists
2009-present	Steering Committee, ARCTOS on-line museum database
2011-present	Board of Directors, National Systematics Collection Alliance
2007-2013	Director, Undergraduate Opportunities for Minorities (NSF-URM)
2011-2015	UNM Representative to the federal Colorado Plateau Cooperative Extension Studies Unit.

Developed and Established Amendment One to Memorandum of Understanding with New Mexico Museum of Natural History to curate their frozen tissue collection (Addition of >5000 mammals including world's largest pika collection and pika genome voucher. This species is central to climate change and conservation efforts in western North America).

External Review for Promotion of of Smithsonian Institution Scientist (5 year comprehensive).

External Tenure and Promotion review for faculty member at University of Miami

Dunnum, J.L.

Systematic Collections Committee, American Society of Mammalogists
Arctos database advisory committee

McLean, B.

UNM Biology dept. representative to the UNM Graduate + Professional Student Assn.
UNM biology dept. research day presentation judge

D. Journal Referee

Bell, K

PLOS One (1)

Cook, J.A.

Journal of Biogeography, Proceeding Royal Society London

Dunnum, J.L.

Journal of Wildlife Disease (1)

Journal of Biogeography (1)

E. Hosting Professional Colleagues and Groups

We hosted 26 visiting academics and professionals from 12 outside institutions or departments and they primarily visited the collections for research purposes.

Drs. Eduardo Santana, Jocelyn Gacel, and Ricardo Avila from University of Guadalajara, Jalisco, Mexico tour of MSB and design discussion for new museums in Mexico 15 February

Cook hosted the following individuals:

Dr. Scott Edwards, Harvard University, April 2013

Drs. Kurt Galbreath (Northern Michigan U) and Eric Hoberg (USDA), 12-16 December 2013

10. SERVICE**A. Symposia, Workshops, Conferences, etc. Sponsored, Organized, Held, etc.****B. Public Service****General**

A significant portion of DOM staff time is spent providing information or assistance to the public either during visits to the collection, through phone calls, emails or through outreach endeavors. This is an important and ongoing activity of all DOM personnel.

Bell, K.C.

1. Collaboration with Suzy Dunnum's gifted 7th grade science classes at Jefferson Middle School. Natural history collections and chipmunk lice research. Resulted in Albuquerque journal article.
2. Jefferson Middle School science fair judge
3. Public presentation at NMMNHS "Meet the Experts Day" on research and MSB collections.
- 4.

Cook, J. A.

1. Divisional tours and presentations – provided educational tours and information for over many visitors and several school groups (e.g., Directors of Development for 9 western universities, June 2013)
- 2.

Dunnum, J. L.

1. Divisional tours and presentations – provided educational tours and information for 658 visitors and school groups.
2. Tour and presentation on NM mammals and mammalian adaptations for Bernalillo County Master Naturalists program.
3. Jefferson Middle School science fair judge
4. Presentation at Sandia Prep High School on MSB and the use and value of natural history research collections.
5. Volunteer coach for Duke City Soccer Organization. U14 girls and U12 girls.

C. University and Departmental Committees

Cook, J.A.

College of Arts and Sciences, Deans and Directors Council
Director, Museum of Southwestern Biology and Chair, MSB Executive Committee
Interim Curator, Division of Genomic Resources, Museum of Southwestern Biology
Curator, Division of Mammals, Museum of Southwestern Biology
Director, Undergraduate Opportunities Program, (46 students to date)
Biology Department, Tenure and Promotion Committee
UNM Museum Council—Vice Chair
Faculty Sponsor, Student Chapter of the New Mexico Wilderness Alliance
UNM College of Arts and Sciences, Deans and Directors Council

12. DONATIONS AND GIFTS RECEIVED

Robert and Virginia Rausch mammal specimens (200) + \$5000 donation
Troy Best mammal specimens (1000)
Bruce Hayward endowment/photograph collection (\$250,000)
Jack Whitman specimens

13. CURRENT STAFF

A. Faculty/Staff

J.A. Cook, Curator
J.L. Dunnum, Collection Manager
C.A. Ramotnik, USGS Collection Manager
M.A. Bogan, Emeritus Curator
J.S. Findley, Emeritus Curator
Stephen O. MacDonald, Curator II (retired)
Gordon Jarrell, Cyber Coordinator
Adrienne Raniszewski, Curatorial Assistant

B. Graduate students

Bell, Kayce. 3rd year Ph.D. student. Systematics and phylogeography of chipmunk lice.

Escobedo, Yadeeh. 7th year Ph.D. Linkage corridors along the North Pacific Coast.

Malaney, J. Defended PhD dissertation and graduated.

Kohli, Brooks. MS graduate.

Rearick, Jolene. 7th year Ph.D. Phylogeography and molecular evolution of freeze tolerance in *Lithobates sylvaticus*.

Jessica Weber. 3rd year Ph.D student. Hypoxia tolerance and adaptive responses in Caviomorph rodents.

Grad Student workers

2. Kayce Bell
3. Marie Westover
4. Jocie Colella

C. Undergraduate Student Workers and Volunteers

Undergraduate Workers

1. Amber McArdle
2. Amber Trujillo
3. Ellie Johnson
4. Lindsey Frederick
5. Schuyler Liphardt
6. Stephanie Mladinich
7. Adrienne Vigil
8. Christine Meadows
9. Donovan Jackson
10. Francis Anaya
11. Emily Schmeltzer

Undergraduate Volunteers

1. Adrienne Vigil (undergrad)
2. Alex Hendrickson (undergrad)
3. Amber West (undergrad)
4. Ben Gonzales (undergrad)
5. Brittany Quintana (undergrad)
6. Heather Toman (undergrad/grad)
7. Lindsey Frederick (undergrad)
8. Mike Smith (undergrad)
9. Sara Alves (undergrad at Kansas State University)
10. Sinjin Leyva (undergrad)
11. Yousuf Qaseem (undergrad)

High School Volunteers

1. Richard Apodaca (high school)
2. Nanda Ramos (high school)
3. Shelby Vigil (high school)

Other Volunteers

1. Steven Allen (Master Naturalist intern)
2. Omega Delgado (Master Naturalist intern)

Total volunteer hours: 490

14. MUSEUM ASSOCIATES

A. Curatorial Associates

James H. Brown, UNM Department of Biology
Jerry W. Dragoo, UNM Department of Biology
William Gannon, UNM Research Ethics
David J. Schmidly, UNM Department of Biology

B. Research Associates

J. Scott Altenbach, UNM Department of Biology (retired), NM
Sydney Anderson, American Museum of Natural History (retired), NY
Robert J. Baker, The Museum, Texas Tech University, Lubbock, TX

Troy L. Best, Department of Biology, Auburn University (retired), AL
Fernando Cervantes, UNAM, Mexico City, Mexico
Paul J. Cryan, Ft. Collins, CO
Natalie Dawson, University of Montana, Missoula, MT
John Demboski, Denver Museum of Science and Nature, Denver, CO
Guillermo D'Elia, Universidad de Valdivia, Chile
Eugene Fleharty, Ft. Hayes University (retired), KS
Melissa Fleming, Poulsbo, WA
Jennifer K. Frey, Las Cruces, NM
Kurt Galbeath, Northern Michigan University, Marquette, MI
Scott L. Gardner, Dept. Nematology, Curator, University Nebraska, NE
Keith Geluso, Lincoln, NE
Ken Geluso, Albuquerque, NM
David J. Hafner, New Mexico Museum Nat. History (retired)
Art Harris, University of Texas (retired), El Paso, Texas
Heikki Henttonen, Finnish Forest Research Institute, Finland
Edward J. Heske, Illinois Biological Survey, IL
Eric Hoberg, Beltsville, MD
Andrew Hope, Kansas State University, Manhattan, KS
Clyde Jones, The Museum Texas Tech University (retired), Lubbock, TX
Tom Jung, Whitehorse, Yukon
Sue Kutz, University of Calgary, Alberta
Enrique Lessa, Universidad de la Republica, Montevideo, Uruguay
Stephen MacDonald, Gila, NM
Jason Malaney, University of Nevada, Reno, NV
Michael Mares, Oklahoma University, Norman, OK
Pablo Marquet, Universidad Catolica, Santiago, Chile
Rodrigo Medillín, UNAM, Mexico City, Mexico
Tony R. Mollhagen, Lubbock, TX
Gary Morgan, New Mexico Museum Natural History, NM
Thomas J. O'Shea, Ft. Collins, CO
Eduardo Palma, Universidad Catolica, Santiago, Chile
Robert Parmenter, Valles Caldera, Jemez, NM
James L. Patton, Museum of Vertebrate Zoology (retired), Berkeley, California
Reggie Rausch, Burke Museum, University of Washington, Seattle, WA
Brett R. Riddle, University of Nevada, Las Vegas, NV
Jorge Salazar Bravo, Texas Tech University, Lubbock, TX
C. Greg Schmitt, Farmington, NM
Fred Szalay, Los Ranchos de la Rio Grande, NM
Sandy Talbot, Molecular Ecology Lab- USGS Anchorage, AK
Fernando Torres Perez, Vina del Mar, Chile
Ernie Valdez, USGS-UNM, Tijeras, NM
Alasdair Veitch, Department of Renewable Resources, Norman Wells, NWT, Canada
Jack Whitman, Ketchum, ID
Don E. Wilson, Smithsonian (retired), Washington, DC
Nyamsuren Batsaikhan, National University of Mongolia, Ulaan Baatar

Natural Heritage New Mexico

1. DIVISION HIGHLIGHTS

In 2013, the Natural Heritage New Mexico Division continued to work with agencies and private partners to conduct a suite of conservation science projects and build its conservation information data systems. Within the division, there are four working groups: Conservation Data Center, Ecology, Zoology, and Botany.

The Conservation Data Center Group (Rayo McCollough, Lead; Teri Neville, GIS manager) worked on projects to make conservation data more readily available via the web and to support effective conservation management. We completed a collaborative project with the NM Department of Game and Fish (NMDGF) to build a Crucial Habitat Assessment Tool (CHAT) for the state which was integrated to a west-wide Western Governors Association (WGA) decision support system to help guide energy development and avoid conservation conflicts. We delivered the final version to WGA on December 13, 2013, and we are continuing to work updates for 2014. In addition, we continued a joint U.S. Fish and Wildlife Service (USFWS) and NMDGF project to database the biological information content found in annual Threatened and Endangered Species science permits required under the Endangered Species Act. In cooperation with NMDGF, NM Energy, Minerals and Natural Resources Department, U.S. Forest Service (USFS), and the Bureau of Land Management, we also continued to gather additional data and provide quality control on target sensitive species to build tools for dissemination of that information via the web. Lastly, we engaged the New Mexico Rare Plant Technical Council in updating their website, which we host, and developing a protocol evaluating the conservation status of rare plants.

The Ecology Group (Esteban Muldavin, Lead; Elizabeth Milford, Riparian Ecologist; Yvonne Chauvin, Senior Botany Tech; Hannah Varani, Senior Ecology Tech, and Paul Arbetan, Ecologist) continued the development of the “New Mexico Rapid Assessment Method” (NMRAM) for New Mexico’s wetlands and riparian areas in collaboration with New Mexico Environment Department (NMED) by adding a new module on playas. We also continued our work on a big-river version of the NMRAM and conducted workshops and field sampling on the Gila River and Mimbres River watersheds. The goal of the NMRAM was to develop a tool of easily applied landscape, biotic, and abiotic metrics to evaluate and rank the ecological condition and function of wetlands for conservation, restoration, and management. We have initiated a project with the Middle Rio Grande Conservancy District to develop a Conservation Action Plan for the district (in collaboration with the Colorado Natural Heritage Program). We continued work on the Guadalupe Mountains National Park vegetation map and implemented a similar project on White Sands National Monument. Data collected on national parks will provide a valuable reference dataset for comparing the potential conservation value of other sites around the state. We continued providing biological monitoring and assessment for New Mexico Army National Guard lands.

The Zoology Group conducts field research and modeling of the habitats of animal species of conservation concern in New Mexico. We provide habitat management advice and create management plans for animals of conservation concern and their habitats. In 2013, we completed the last year of a five-year, multi-scale habitat modeling study of pinyon-juniper birds on three Department of Defense installations. We completed year one of a follow-up study on BLM lands, for which we are investigating the applicability of our pinyon-juniper habitat models to BLM lands in another part of the state. In collaboration with experts at the NMDGF, USFWS, and Texas A&M University, we continued work on a habitat map and model for the dunes sagebrush lizard, a sensitive lizard of southeastern New Mexico.

For the Botany Group (Temporary Lead Esteban Muldavin). Working with the Bureau of Land Management (BLM), we concluded a research project on the endangered Kuenzler’s hedgehog cactus where we conducted a range-wide survey of in the Sacramento and Guadalupe Mountains to assess population trends among the

major population centers. We also completed year one of a project jointly with the BLM and botanist Robert Sivinski to model the distribution of the rare Tharps's bluestar (*Amsonia tharpii*) to guide surveys in 2013. Lastly, we are working with the State Botanist, Daniela Roth, at the NM Energy, Minerals, and Natural Resources Department to integrate rare-plant species databases between the department and the division and to develop a protocol for ranking the conservation status of rare plants.

2. TABLE OF COLLECTION USE

Collection Growth (specimens catalogued)	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests Personally Responded to	Publications Citing MSB Specimens
7,798 new records, 55,375 updated records	NA	NA	12,713 visitors to web site	140 Custom 163,481 Downloads	UNKNOWN (all downloads carry a citation)

3. COURSES USING THE COLLECTIONS

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

B. Staff

5. COLLECTION MANAGEMENT

As part of our service role in the museum to provide conservation data to the public and researchers, in 2013 the Conservation Data Management Group worked on several initiatives to add to our conservation information. Under the supervision of our assistant data manager, three student employees added 4,655 observations to the database and updated another 55,375.

Through our one-of-a-kind program to database Section 10 and section 6 reports from USFWS, we were able to add over 1,000 new observations to our database on federally listed species. We continued our collaborative work with NMDGF to host their BISON-M database and work with them on data exchange and creating decision-support systems. We also worked on several initiatives to build our conservation database (see Section 1). As an outcome of our database activities, we completed 140 formal information requests, and 163,481 publications and data downloads were obtained from our website.

6. AWARDS, GRANTS, AND CONTRACTS

NHNM AWARDS:

\$139,414. NM Military Affairs Dept. Banner #0480B6. Endangered and threatened species surveys. **Paul Arbetan**, PI. 10/12-09/13. \$87,430 (F&A \$14,572).

\$16,065. NM Military Affairs Dept. Banner #0480B7. Gunnison's prairie dog survey for Camel Tracks Training Site. **Paul Arbetan**, PI. 10/12-09/13. \$16,064 (F&A \$2,677).

\$25,000. NM Military Affairs Dept. Banner #0480CF. Las Cruces Training Lands Conservation Species Surveys **Paul Arbetan**, PI. 05/13-04/14. \$8,019 (F&A \$1,336).

\$15,000. NM Military Affairs Dept. Banner #0480CG. Camel Tracks Grey Vireo Surveys **Paul Arbetan**, PI. 05/13-09/14. \$10,586 (F&A \$1,764).

\$45,000. NM Military Affairs Dept. Banner #0480CH. Roswell WETS Bat Surveys **Paul Arbetan**, PI. 04/13-04/14. \$18,823 (F&A \$3,137).

\$48,000. NM Military Affairs Dept. Banner #0480CI. Carlsbad Happy Valley Bat Surveys **Paul Arbetan**, PI. 04/13-04/14. \$12,472 (F&A \$2,079).

\$75,000. BLM. Banner #0480C4. Habitat use by pinyon-juniper birds. **Kristine Johnson**, PI. 10/12-04/14. \$67,803 (F&A \$10,098).

\$296,080. Center for Excellence for Hazardous Materials Management. Banner #0480AJ. Dunes Sagebrush Lizard habitat map and model. **Kristine Johnson**, PI. 07/12-12/14. \$81,360 (F&A \$7,396).

\$43,852. Ecosphere Environmental Services. Banner #04808B. Pinyon Jay surveys at Kirtland AFB. **Kristine Johnson**, PI. 12/11-03/13. \$2,214 (F&A \$457).

\$85,000. Dept. of Defense. Banner #04808Z. Grassland bird surveys at Holloman AFB. **Kristine Johnson**, PI. 03/12-12/13. \$72,334 (F&A \$16,261).

\$40,000. Dept. of Defense. Banner #04809A. Raptor surveys at Holloman AFB. **Kristine Johnson**, PI. 03/12-03/13. \$17,016 (F&A \$3,825).

\$110,000. Dept. of Defense. Banner #04809B. Management, wetlands/floodplain. **Kristine Johnson**, PI. 03/12-09/13. \$90,693 (F&A \$20,388).

\$99,554. Dept. of Defense. Banner #0480AS. Habitat use at multiple scales by pinyon-juniper birds. **Kristine Johnson**, PI. 08/12-03/14. \$34,818 (F&A \$5,186).

\$6,827. NM Dept. of Game and Fish. Banner #0480B8. BISON-M document management web page. **Rayo McCollough**, PI. 10/12-01/13. \$6,826 (F&A \$621).

\$275,000. NM Dept. of Game and Fish. Banner #0480A1. BISON-M database management. **Rayo McCollough**, PI. 06/12-05/17. \$65,353 (F&A \$5,941).

\$120,000. NM Dept. of Game and Fish. Banner #0480A2 (0480D7 as of 7/13). NM crucial habitat tool (CHAT). **Rayo McCollough**, PI. 05/12-09/14. \$72,608 (F&A \$6,601).

\$7,000. NM Dept. of Game and Fish. Banner #0480A3. NMGDF permits and documents database. **Rayo McCollough**, PI. 06/12-06/13. \$6,999 (F&A \$636).

\$124,000. NM Dept. of Game and Fish. Banner #0480A5. Organizing federally listed species information. **Rayo McCollough**, PI. 06/12-10/15. \$43,367 (F&A \$3,942).

\$46,800. NM Dept. of Game and Fish. Banner #0480DA. Information development for species of greatest conservation need. **Rayo McCollough**, PI. 09/13-06/16. \$6,150 (F&A \$559).

\$75,000. BLM. Banner #0480B0. Tharp's bluestar inventory. **Esteban Muldavin**, PI. 10/12-09/17. \$20,059 (F&A \$2,987).

\$30,000. BLM. Banner #0480BR. Santa Fe River vegetation and channel morphology monitoring. **Esteban Muldavin**, PI. 10/12-09/17. \$13,861 (F&A \$2,064).

\$39,822. BOR. Banner #0480C3. Albuquerque overbank project (AOP). **Esteban Muldavin**, PI. 04/13-10/14. \$26,288 (F&A \$3,915).

\$14,080. INTERA Inc. Banner #0480DC. Intera Cliff-Gila reconnaissance vegetation survey. **Esteban Muldavin**, PI. 10/13-06/14. \$11,970 (F&A \$3,846).

\$20,000. Middle Rio Grande Conservancy District. Banner #0480DL. Middle Rio Grande Conservancy action plan. **Esteban Muldavin**, PI. 10/13-3/14. \$387 (F&A \$64).

\$35,000. NPS. Banner #04808X. Assess impacts of Las Conchas fire and suppression activities on park vegetation. **Esteban Muldavin**, PI. 03/12-12/14. \$16,238 (F&A \$2,418).

\$22,600. NPS. Banner #0480AH. Carlsbad Caverns post-fire monitoring. **Esteban Muldavin**, PI. 07/12-06/13. \$14,373 (F&A \$2,141).

\$29,200. NPS. Banner #0480CN. Monitoring sensitive vegetation after the Loop Fire. **Esteban Muldavin**, PI. 08/13-04/14. \$12,950 (F&A \$1,929).

\$3,402. NatureServe. Banner #0480BQ. Madrean Archipelago REA. **Esteban Muldavin**, PI. 02/13-09/14. \$688 (F&A \$232).

\$10,000. NM Dept. of Game and Fish. Banner #0480DN. Southern Great Plains CHAT data support. **Esteban Muldavin**, PI. 07/13-12/14. \$0 (F&A \$0).

\$50,000. NM Dept. of Game and Fish. Banner #0480D5. Support for Madrean Archipelago rapid ecological assessment. **Esteban Muldavin**, PI. 06/13-06/14. \$5,142 (F&A \$467).

\$185,000. NM Environment Dept. Banner #04809Z. Rapid assessment of wetlands in the Gila watershed. **Esteban Muldavin**, PI. 06/12-10/14. \$85,087 (F&A \$7,735).

\$12,000. NM Environment Dept. Banner #0480BH. NMRAM training workshop. **Esteban Muldavin**, PI. 01/13-07/14. \$10,482 (F&A \$2,163).

\$202,000. NM Environment Dept. Banner #0480CK. Rapid assessment for NM playa region, southern high plains. **Esteban Muldavin**, PI. 06/13-10/16. \$27,664 (F&A \$2,515).

\$44,000. NMSU. Banner #0480CZ. Modeling the effects of environmental change on crucial wildlife habitat. **Esteban Muldavin**, PI. 07/13-09/14. \$1,657 (F&A \$216).

\$119,933. U.S. Forest Service. Banner #04803U. Nonforest ecological modeling for Arizona and New Mexico. **Esteban Muldavin**, PI. 04/10-09/13. \$14,718 (F&A \$2,192).

\$25,800. U.S. Forest Service. Banner #048972. Development of native plant materials program. **Esteban Muldavin**, PI. 09/08-09/13. \$19,540 (F&A \$1,776).

\$25,200. University of Arizona. Banner #04809M. Research and tools to assess risk from climate change and fire. **Esteban Muldavin**, PI. 01/12-06/13. \$11,456 (F&A \$0).

PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

B. Journal Articles

Johnson, K., G. Sadoti, and J. Smith. Pinyon Jay behavioral response to declining pinyon tree condition. In review, *Western North American Naturalist*.

Munson, S., E. H. Muldavin, J. Belnap, D.C. Peters, D.C. J. Anderson, M. H. Reiser, K. Gallo, A. Melgoza-Castillo, J. E. Herrick, and T. A. Christiansen. 2013. Regional signatures of plant response to drought and elevated temperature across a desert ecosystem. *Ecology* 94: 2030-2041

C. Web-Based

D. Technical Reports

Johnson, K., J. Smith, and N. Petersen. 2013. Avian protection plan for Holloman Air Force Base. Natural Heritage New Mexico Publication No. 13-GTR-377, University of New Mexico Biology Department, Albuquerque, NM.

Johnson, K., J. Smith, N. Petersen, Lynn Wickersham, and John Wickersham. 2013. Habitat use by pinyon-juniper birds in Farmington BLM Resource Area 2013 final report. Natural Heritage New Mexico Publication No. 13-GTR-380 University of New Mexico Biology Department, Albuquerque, NM.

McCollough and M. East 2013. New Mexico Bat Roost Database. Final report to the Bureau of Land Management, Santa Fe, NM.

McCollough and M. East 2013. Distribution of the bullfrog in New Mexico and comparison to a native threatened species. Final Report to the New Mexico Department of Game and Fish, Santa Fe, NM.

Milford, E., Y. Chauvin, and E. Muldavin. 2013. Cliff-Gila Reconnaissance Vegetation Survey: Vegetation Community and Stand Health Dataset. Final Report to INTERA Inc. from Natural Heritage New Mexico.

Muldavin, E., Y. Chauvin, T. Neville, P. Neville, A. Kennedy, H. Hulse, P. Arbetan, K. Schultz, M. Hall, and M. Reid. 2013. Vegetation Classification and Map: El Malpais National Monument. Natural Resource Technical Report NPS/SPCN/NRTR-2013/803. National Park Service, Fort Collins, CO.

Sadoti, G., K. Johnson, J. Smith, and N. Petersen. 2013. Seasonal habitat use by grassland and shrubland birds at Holloman Air Force Base 2011-2012. Natural Heritage New Mexico Publication No. 13-GTR-376 University of New Mexico Biology Department, Albuquerque, NM.

Sivinski, R., T.B. Neville, E. Muldavin, and H. Hulse. 2013. Sharp's bluestar in the Carlsbad, New Mexico area. Interim progress report for the Bureau of Land Management.

Smith, J. and K. Johnson. 2013. Grassland and shrubland bird surveys at Holloman Air Force Base, NM 2009-2013. Natural Heritage New Mexico Publication No. 13-GTR-378 University of New Mexico Biology Department, Albuquerque, NM.

Smith, J. W., M. D. Freehling, K. Johnson, and N. Petersen. 2013. Lake Holloman Wetland Complex Area invertebrate and bird monitoring 2012 final report. Natural Heritage New Mexico Publication No. 13-GTR-375, University of New Mexico Biology Department, Albuquerque, NM.

E. Theses/Dissertations Completed

F. Work In Progress

Muldavin, E.H., D. Moore, and S. Collins. In prep. Extreme environmental conditions and post-fire vegetation response in a Chihuahuan Desert grassland. In-prep for Ecological Applications.

Muldavin, E., Y. Chauvin, T. Neville, and P. Neville. 201x. Vegetation Classification and Map Report, Guadalupe Mountains National Park. Natural Resource Technical Report NPS/CHDN/NRTR-200X/00X, National Park Service, Fort Collins, CO.

Muldavin, E. E. Milford, N. Umbreit, and Yvonne Chauvin. 201x. Applying a natural-processes approach to big-river riparian restoration in the Southwest: the Albuquerque Overbank Project after 16 years. In-prep for Wetlands.

G. Publications/Reports Based on MSB Specimens/Data by Outside Researchers

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

B. Contributed Talks/Posters

Muldavin, E., P. Arbetan, and R. Pendleton. 2013. Forb variability over two decades in a Chihuahuan Desert grassland assemblage: local dynamics in a regional context. Poster. Ecological Society of America, 2013 Annual Meeting, Minneapolis, MN.

C. Attendance at Professional Meetings (List division personnel alphabetically then list meetings attended under each)

E. Muldavin: Biodiversity without Boundaries, NatureServe Network annual meeting. Baltimore, MD.

E. Muldavin: Ecological Society of America Panel on Vegetation Classification meeting at the Ecological Society of America, 2013 Annual Meeting, Minneapolis MN.

Lisa Arnold: Two biannual meetings of the New Mexico Geographic Information Council (NMGIC)

D. Service as Editor or on Editorial Board of a Journal

E. Service as Officer of Professional Society/Organization

E. Muldavin: Executive Committee, Ecological Society of America Panel on Vegetation Classification.

Lisa Arnold: completed first term serving on the Board of Directors for NMGIC New Mexico Geographic Information Council (NMGIC) and was re-elected to a second term. Currently serving as President and CEO of the Board.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

B. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.

E. Milford. New Mexico Rapid Assessment Methodology. EPA tribal workshop, Isleta Pueblo, Nov. 5, 2013.

R. McCollough and M. East. Ranking rare plant species. Rare Plant Technical Council.

E. Milford and E. Muldavin: NM RAM applications, New Mexico Wetlands Roundtable 2013.

C. Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

E. Muldavin: Ecological Society of America Panel on Vegetation Classification meeting at the Ecological Society of America, 2012 Annual Meeting, Portland, OR

K. Johnson: NM Prairie Dog Working Group, New Mexico Burrowing Owl Working Group.

E. Muldavin, R. McCollough, New Mexico Rare Plant Technical Council.

R. McCollough: Jemez Mountains salamander recovery team; Dune Sagebrush Lizard GIS Group.

D. Journal Referee

K. Johnson: Southwestern Naturalist

E. Muldavin: Oegologia

E. Hosting Professional Colloquia and Groups

Playa Science Workshop, MSB, University of New Mexico, July 22, 2013.

10. SERVICE

A. Symposia, Workshops, Conferences etc. Sponsored, Organized, Held, etc.

New Mexico Rapid Assessment Training Workshop, Santa Fe, NM, June 12, 2013.

E. Milford. New Mexico Rapid Assessment Methodology—field training. EPA tribal workshop, Isleta Pueblo, Nov. 5, 2013.

B. Public Service

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

NatureServe 2013 Conservation Impact Award presented at the Biodiversity Without Boundaries conference in Baltimore, April 2013.

12. DONATIONS AND GIFTS RECEIVED

13. CURRENT STAFF

A. Faculty/Staff

Paul Arbetan, Research Assistant Professor
Lisa Arnold, GIS Analyst
Yvonne Chauvin, Sr. Research Tech/Life Sciences
Kristine Johnson, Research Associate Professor
Rebecca Keeshen, Unit Administrator I
Rayo McCollough, Database Administrator
Elizabeth Milford, Research Scientist III
Esteban Muldavin, Research Associate Professor
Teri Neville, GIS Analyst
Nathan Petersen, Field Research Tech/Life Sciences
Jacqueline Smith, Sr. Research Tech/Life Sciences
Hannah Varani, Sr. Field Research Tech

B. Graduate students

Ramakrishna Amula, M.A.
Wuzhenni Hu, M.A.

C. Undergraduate Student Workers and Volunteers

Amy Adams
Djente Jo Fawcett
Maren Geisler
Victoria Montoya
Casey Myers
Brett Reynolds
Jared Shepherd
Adam Summers
Matthew Wilder
Savannah Woodward

14. MUSEUM ASSOCIATES

None

DIVISION OF PARASITES

1. DIVISION HIGHLIGHTS

Our division is now up to 15,930 catalogued specimens: Plathyhelminthes 8,211, Nematoda 7,377, Acanthocephala 275 and Nematomorpha 67

Continuation of NSF and NIH grant work

Two expeditions to Kenya (Loker)

Snail collections for digenetic trematodes (Gendron)

CETI contribution of \$7500 to complete the shelving for Alcohol collection

Developed a Division of Parasites display case in Biology department

Of the Rausch Helminth Collection (RHC): 90% of the whole worm slides have been barcoded and entered into a searchable object tracking format and about 50% of the RHC wet collection has been barcoded and entered into object tracking. We are getting close to having the collection somewhat searchable prior to cataloging.

2. METRIC DESCRIPTIONS

Specimens Accessioned	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests	Publications Citing MSB Specimens
Parasites 220 Hosts 151	2	6	2	15	9

3. COURSES USING THE COLLECTIONS

TERM	COURSE	TITLE	STUDENTS
November 2013		Bosque Club, Coronado Elementary After School Program	15

4. COURSES TAUGHT BY MSB PERSONNEL

ERIC S. LOKER

Graduate

Biology 502- Parasites and Hosts – Spring and Fall – 3 students Spring; 7 students Fall

Biology 519 – Evolutionary Immunology (split with Rob Miller) – Fall – 7 students

Biology 519 - Biology of Disease Vectors – Spring – 3 students

Biology 551 – Research Problems – 1 student Spring; 2 students Fall

Biology 699 – Dissertation - 1 student Spring; 2 students Fall

Undergraduate

Biology 402 – Parasites and Hosts – Spring and Fall – 1 student

Biology 419 – Evolutionary Immunology (split with Rob Miller) – Fall – 22 students

Biology 419 - Biology of Disease Vectors – Spring – 41 students

Sara V. Brant

Undergraduate

Biology 400 - Senior Honors Thesis - 1 student Spring

Graduate

Biology 551 - Research Problems - 1 student Spring

Graduate Student laboratory teaching:

Gendron, E.T. - BIOL 450 Virology - Spring

Laitemitt, M. - BIOL 204 Plant and Animal Form and Function - Spring
BIOL 124 Biology for Health related majors - Fall

Devkota, R. - BIOL 201 Cell and Molecular Function - Spring/Fall

5. COLLECTION MANAGEMENT ACTIVITIES

Developed workflow for incoming frozen hosts, curation of alcohol specimens, processing of field collections.

Developed barcode labels appropriate for slides, alcohol, frozen tubes, and general use

Created templates for alcohol catalog and locality labels.

10,000 slides from RHC slide collection barcoded and searchable through object tracking in Arctos.

Continued development of the Arctos Database for hosts and parasites

Two volunteer working on curation of LTER Parasite collection.

Two student workers exclusive to RHC data capture

We have completed scanning of approximately 5,000 pages (45,000 records) of the original Rausch data ledger in our possession and have archived the digital images in TIFF format at the University of Texas Advanced Computing Center - The first for the division.

Prepping alcohol specimens to move to RM 125 Alcohol collection for Arthropods and Parasites

Integrating schistosomes from Schistosome Diversity Project, about 60% catalogued

We conducted 3 tours through the division

Other than specimens from paper submissions, local people and projects that generate specimens for the Division include the Schistosome Diversity Project - NSF; Nematomorph Diversity Project - NSF; Beringia Coevolution Project - NSF; the ongoing RHC.

6. AWARDS, GRANTS, AND CONTRACTS

Submitted

S. Brant (PI), E. S. Loker, D. Jouet, H. Ferte NSF Evolutionary Process: Preliminary Proposal: Host switching: using avian blood flukes to understand the initial steps of a major mode of parasite diversification

F. S. Loker (PI) Development of a common, untapped resource (amphistome flukes) to control schistosomiasis in snails in Africa OPP1098449 Bill & Melinda Gates Foundation 11/1/2013 -

4/30/2015 \$100,000

E.S. Loker (PI) P20 RR 018754 9/30/2014 – 6/30/2019
NIH/NCRR COBRE: Center for Evolutionary and Theoretical Immunology, Phase III

E.S. Loker, Schistosomiasis Consortium for Operational Research and Evaluation (SCORE)
Subaward with the University of Georgia RR374-092/492186
12/01/2013 - 11/30/2014 \$26,462

Awarded:

S. Brant (PI) NSF REU Supplemental for NSF DEB-1021427 Phylogenetic and Revisionary Systematics of a Diverse Clade of Avian Schistosomes (Platyhelminthes: Schistosomatidae) \$6,240

E. S. Loker (PI) Development of a common, untapped resource (amphistome flukes) to control schistosomiasis in snails in Africa OPP1098449 Bill & Melinda Gates Foundation 11/1/2013 - 4/30/2015 \$100,000

E.S. Loker, Schistosomiasis Consortium for Operational Research and Evaluation (SCORE)
Subaward with the University of Georgia RR374-092/492186
12/01/2013 - 11/30/2014 \$26,4

Ongoing:

S. Brant (PI) NSF DEB-1021427 REVSYS: Phylogenetic and Revisionary Systematics of a Diverse Clade of Avian Schistosomes. 09/01/2010 – 08/31/2014
\$60,000 (annual direct cost).

E. S. Loker (PI) NIH/NCR COBRE: *Center for Evolutionary and Theoretical Immunology*. 9/30/2003 – 5/31/2014 \$1.4M (annual direct cost)

E. S. Loker (PI) NIH/NIAID 1R01AI101438-01 Snail-Related Studies of Transmission and Control of Schistosomiasis in Kenya 04/01/2012 – 05/30/2017 \$250,000 (annual direct cost)

Cook JA (PI) NSF-DEB 1057383 1/1/11-12/32/14 Integration and Curation of the Robert and Virginia Rausch Helminthological Collection- A Resource for Science and Society in the MSB Division of Parasitology, \$489,490

7. PEER REVIEWED PUBLICATIONS BY MSB PERSONNEL (bolded)

Journal Articles

Brant S.V., Loker E.S. 2013. Discovery-based studies of schistosome diversity stimulate new hypotheses about parasite biology. *Trends in Parasitology* 29: 449-459.

Brant S.V., Jouet D., Ferte H., Loker E.S. 2013. *Anserobilharzia* gen. n. (Digenea, Schistosomatidae) and redescription of *A. brantae* (Farr & Blankemeyer, 1956) comb. n. (syn. *Trichobilharzia brantae*), a parasite of geese (Anseriformes). *Zootaxa* 3670: 193-206.

Brant S.V., Pomajbikova K., Modry D., Petrzalkova K.J., Loker E.S. 2013. Molecular phylogenetics of the elephant schistosome, *Bivitellobilharzia loxodontae* (Trematoda: Schistosomatidae) from Central African Republic. *Journal of Helminthology* 87: 102-107.

M. L. Steinauer, M. R. Christie, M. S. Blouin, L. E. Agola, I. N. Mwangi, G. M. Maina, M. W. Mutuku, J. M. Kinuthia, G. M. Mkoji, **E. S. Loker**. 2013. Non-Invasive Sampling of Schistosomes from Humans Requires Correcting for Family Structure PLoS Neglected Tropical Diseases 7(9): e2456. doi:10.1371/journal.pntd.0002456

Publications Based on MSB Specimens/Data By Other (non-MSB) Authors

BOLEK M.G., C. SZMYGIEL, A. KUBAT, A. SCHMIDT-RHAESA, & B. HANELT. 2013. Novel techniques for biodiversity studies of gordiids and description of a new species of Chordodes (Gordiida, Nematomorpha) from Kenya, Africa. Zootaxa 3717 (1): 023–038.

Bolek M.G., Rogers E., Szmygiel C., Shannon R.P., Doerfert-Schrader W.E., Schmidt-Rhaesa A., Hanelt B. 2013. Survival of larval and cyst stages of gordiids (Nematomorpha) after exposure to freezing. Journal of Parasitology 99(3):397-402 doi: 10.1645/12-62.1.

McAllister C.T., M. G. Bolek and B. Hanelt. 2013. Horsehair worm, *Paragordius varius* (Nematomorpha: Gordiida): New to the Fauna of Oklahoma. The Southwestern Naturalist 58(2):249-250. doi: 10.1894/0038-4909-58.2.249

Ubelaker JE, Griffin BS, Duszynski DW, Harrison RL. 2013. Distribution records for helminths of the red fox *Vulpes vulpes* from New Mexico. Southwestern Naturalist 58: 111-112.

MAKARIKOV, A. A., K. E. GALBREATH & E. P. HOBERG. 2013. Parasite diversity at the Holarctic nexus: species of *Arostrilepis* (Eucestoda: Hymenolepididae) in voles and lemmings (Cricetidae: Arvicolinae) from greater Beringia. Zootaxa 3608 (6): 401–439.

Kolářová L, Skírnisson K, Ferté H, Jouet D. 2013. *Trichobilharzia mergi* sp. nov. (Trematoda: Digenea: Schistosomatidae), a visceral schistosome of *Mergus serrator* (L.) (Aves: Anatidae). Parasitology International 62: 300-308..

Dissertations/Theses Based on MSB Specimens/Data

Reports Based on MSB Specimens/Data

8. ACTIVITIES IN LEARNED SOCIETIES

Invited/Plenary Talks and Seminars

E. S. Loker (2013) This De-Wormed World?. Journal of Parasitology: December 2013, Vol. 99, No. 6, pp. 933-942. doi: <http://dx.doi.org/10.1645/13-390.1> PRESIDENTIAL ADDRESS

E.S. Loker. Snail control in Brazil and Egypt. Schistosomiasis Consortium for Operational Research and Evaluation (SCORE) meeting on snail control , funded by Bill and Melinda Gates Foundation, meeting, June, 2013, Athens, GEORGIA.

E. S. Loker. 2013. Defense Responses of *Biomphalaria* to Schistosomes. Japanese society of parasitology, Tokyo, Japan, March, 2013

E.S. Loker 2013. Celebrating 100 Years of Snails and Schistosomes - Defense Responses of *Biomphalaria* to Schistosomes. Southeastern Society of Parasitologist Meeting, Western Kentucky University, 10 april 2013.

E. S. Loker. Schistosome evolution: an ongoing exploration of environment, host and habitat. The evolution of parasite genomes and origins of parasitism, Wellcome Trust Advanced Courses and Scientific Conferences, Sanger Center, Cambridge, UK, 28-30 April, 2013.

Contributed Talks and Posters (bolded MSB personnel and “*” the presenter, “^” a student)

Brant, SV*, Loker ES. 2013. Are schistosomes a special case or a typical story of parasite diversification? American Society of Parasitologists, Quebec City, Canada, 26-29 June 2013. Oral.

Mischler JA*^, **Brant SV, Loker ES,** Townsend A. 2013. Changes in a high elevation molluscan-trematode community over the last 50 years in Crested Butte, CO. American Society of Parasitologists, Quebec City, Canada, 26-29 June 2013. Poster.

Tkach VV, Rios S*^, **Brant SV.** 2013. First report on avian schistosomatides from birds and mollusks in North Dakota. American Society of Parasitologists, Quebec City, Canada, 26-29 June 2013. Poster.

Gendron, ET*^, Loker ES, Tkach VV, **Brant SV.** 2013. Variation in host ecology can lead to discordant population demographics among parasites within a *Trichobilharzia* species complex. American Society of Parasitologists, Quebec City, Canada, 26-29 June 2013. Oral.

Devkota, R^, Brant, SV*, Loker ES. 2013. Schistosomiasis in Nepal. American Society of Parasitologists, Quebec City, Canada, 26-29 June 2013. Oral.

Laidemitt, M.R*^., Brant, S.V., Zawadzki, E.T^., Mkoji, G.M., Mutuku, M.W. and **Loker, E.S.** 2013. Patterns of Host Use of Paramphistomoid Flukes from Kenya, with Implications for *Schistosoma mansoni* Transmission. American Society of Parasitologists, Quebec City, Canada, 26-29 June 2013. Oral.

Buddenborg, S.K*^., Misra, M., Gordy, M.A., Lindquist, E.L., Agola, E.L., Mkoji, G.M. and **Loker, E.S.** Sequence studies of field-derived uninfected and *Schistosoma mansoni* infected *Biomphalaria pfeifferi* from Kenya. American society of parasitologists meeting, 2013, Quebec, Canada, 26-29 June, 2013. Oral

Hudgell, M.A*^., Gordy, M.A., and **Loker, E.S.** exposure of *Biomphalaria havanensis* to *Schistosoma mansoni*: exploration of the basis of incompatibility in this host-parasite system. American Society of Parasitologists Meeting, 2013, Quebec, Canada, 26-29 June, 2013. Oral.

Gordy MA*^, **Brant SV, Gendron ET^,** Hanington PC. 2013. Determinants of snail and trematode distribution and compatibility. Canadian Society of Zoology, Guelph, Ontario 13-17 May 2013. Poster.

Brant SV, Loker ES*. 2013. Schistosome evolution: an ongoing exploration of environment, host and habitat. The Evolution of Parasite Genomes and Origins of Parasitism Symposium, Cambridge, England April 2013. Oral.

Gendron, ET*^, Loker ES, Brant SV. 2013. Variation in host ecology can lead to discordant population demographics among parasites within a *Trichobilharzia* species complex. Southwestern Association of Parasitologists, Lake Texoma, OK, 18-20 April 2013. Oral.

Gendron, ET*^, Loker ES, Brant SV. 2013. Variation in host ecology can lead to discordant population demographics among parasites within a *Trichobilharzia* species complex. UNM Department of Biology Research Day, April 2013. Poster.

Devkota, R[^], Brant, SV*, Loker ES. 2013. Schistosomiasis in Nepal. UNM Department of Biology Research Day, April 2013. Poster.

Attendance at Professional Meetings

Loker, E.S.

- Japanese Society of Parasitology, Tokyo, Japan, March, 2013
- Southeastern Society of Parasitologist meeting, Western Kentucky University, 10 April 2013.
- The Evolution of Parasite Genomes and Origins of Parasitism, Wellcome Trust advanced courses and scientific conferences, Sanger Center, Cambridge, UK, 28-30 April, 2013.
- American Society of Parasitologists meeting, 2013, Quebec, Canada, 26-29 June, 2013
- Schistosomiasis Consortium for Operational Research and Evaluation (SCORE) meeting on snail control, funded by Bill and Melinda Gates Foundation, meeting, June, 2013, ATEHNS GEORGIA.
- Third Biennial Western Regional IDEA Conference, Wakiki Beach Marriott Resort and Spa, 6-8 October, 2013

Brant, S.V.

Southwestern Association of Parasitologists, Lake Texoma, Oklahoma, April.
American Society of Parasitologists, Quebec City, Quebec, Canada, June.

Gendron, E.T.

Southwestern Association of Parasitologists, Lake Texoma, Oklahoma, April.
American Society of Parasitologists, Quebec City, Quebec, Canada, June.

Laidemitt, M.R.

American Society of Parasitologists, Quebec City, Quebec, Canada, June.

Campbell, M.L. iDigBio Fluid Preserved Invertebrate Imaging Workshop. Michigan September 2013.

Service as Editor or on Editorial Board of a Journal

Loker, E.S. Journal of Helminthology

Service as Officer of Professional Society/Organization

Loker, E.S.

President, American Society of Parasitologists 2012-2013

Brant, S.V.

President elect for the Southwestern Association of Parasitologists
Member of the Membership Committee for American Society of Parasitologists

9. OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity

Brant, S.V.; Gendron, E.T.

Parasites in New Mexico Presentation to the Bosque Club afterschool program for Coronado Elementary School, Albuquerque, New Mexico. November.

Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.

Loker, E.S. CETI EAC Meeting, April, 2013

Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.

Loker, E.S.

Member, Schistosomiasis Consortium for Operational Research and Evaluation (SCORE), funded by Bill and Melinda Gates Foundation, meeting, MAY, 2012, ATHENS GEORGIA.

UNM PIBBS ADVISORY BOARD

UNM Internal advisory committee, north campus brain COBRE program

UNM Associate provost search committees, July-august 2013

UNM Local representative, Earth and planetary science academic program review, November, 2013

Brant, S.V.

2011 - present: Scientific voting member of UNM IACUC committee

UNM Dept. of Biology: Research Day Undergraduate Poster Judge

Journal Referee

Loker, E.S.

Journal of Parasitology

Brant, S.V.

Journal of Parasitology, Parasite International, ZooTaxa

10. PUBLIC SERVICE

-Jefferson Middle School Honors Science Classes, November

-Bosque Club, Coronado Elementary After School Program, November

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

Gendron, E. T. UNM Student Conference Award Program \$500

12. DONATIONS AND GIFTS RECEIVED

-Obtained the original field records of Dr. Robert Rausch for the RauschHelminth Collection

-Leica microscope and assorted parasitology books from the late Dr. Jack Frenkel

-Field ledger of Francis (Bud) Fay, who collaborated with Dr. Rausch

-CETI donation of ~\$7500 to complete shelving for the alcohol collection of the Divisions of Arthropods and Parasites

13. CURRENT STAFF

Faculty and Staff

Dr. Eric S. Loker, Curator of Division of Parasites, Director of CETI

Dr. Sara V. Brant, Senior Collections Manager Division of Parasites

Ms. Mariel Campbell, Data Technician, Curatorial Assistant (Rausch Grant)

Dr. Gordon Jarrell, Data Curation, Arctos database Programmer (Rausch Grant)

Graduate students

Ms. Erika T. Gendron

Mr. Ramesh Devkota

Ms. Martina Laidemitt

Ms. Sarah Buddenborg

Undergraduate Student Workers and Volunteers

Ms. Kelly Chavez, student worker

Mr. Ryan Barber, student worker

Mr. Keith Keller, student worker

Mr. Michael Lott, volunteer
Ms. Meghan Bentz, volunteer

14. MUSEUM ASSOCIATES

Curatorial Associates

Research Associates