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9-1-2013

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MUSEUM OF SOUTHWESTERN BIOLOGY

ACADEMIC YEAR 2012-2013 ANNUAL REPORT

JOSEPH A. COOK, DIRECTOR

The Museum of Southwestern Biology (MSB) continues to be a vital contributor to educational initiatives at UNM. Numerous undergraduate projects, graduate theses & dissertations (42 graduate students, 9 completed in this period), or projects in Biology, Anthropology, Art, and elsewhere use MSB specimens as a basis for their studies. Many undergraduate students associated with MSB (76 in this period) continue on to graduate programs, professional schools or obtain jobs in conservation and management agencies in state, federal, or private sector positions. Each division immerses students in natural history, systematics, molecular biology, morphology, species identification, museum specimen preparation and curation, field studies, and web-based informatics. MSB continues to lead in training under-represented students or international students, especially those from Latin America. Indeed, MSB has been the locus of large student-training efforts for many years and sponsors two museum-centered programs (funded by the National Science Foundation) that focus on student success: Undergraduate Opportunities (UnO- \$1,010,000) and Aim-up! (\$495,000). Many of these students have obtained competitive professional positions and assumed leadership roles in their respective fields.

MSB houses collections of the natural world that document more than a century of environmental change and span broad spatial scales, representing western North America, Central and South America. We also have significant holdings from Asia, Africa, Australia and Europe. MSB consists of 8 divisions (Amphibians and Reptiles, Arthropods, Birds, Fishes, Genomic Resources, Herbarium, Mammals, and Parasites), Natural Heritage New Mexico and the USGS Arid Lands Field Station and Collections. MSB curators have active research and graduate programs that exploit the wealth of specimens and data in the collections. Unlike other faculty, they also commit considerable effort to build a shared resource for the scientific community. Curators and collection managers then strive to make these valuable collections and data accessible to other UNM faculty and students and to the broader scientific community. Such facilities are a hallmark of top-notch research-intensive universities.

MSB provides a key part of the scientific infrastructure necessary for investigators interested in understanding environmental and health issues facing society such as emerging zoonotic pathogens, climate change, invasive species, habitat conversion, and decreasing biodiversity. Annually, the large number of peer-reviewed publications (> 80) supported by our collections attests to their value. This level of research activity places MSB among the most productive research units on campus. Our web-accessible databases constitute an unparalleled informatics resource that contributes to understanding the complexity of planetary life and related ecosystem function on local, regional, and global scales.

MSB also 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 (Rio Grande Open Spaces), state (NM State Lands Office, NM Game and Fish, Rare Plant Society, regional BioBlitz's, etc.) and federal (USDA Forest Service, US Fish and Wildlife Service, Bureau of Reclamation, National Park Service, etc.) 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.

INTRODUCTION

MSB faculty, staff, and students were heavily involved in a number of academic pursuits in AY 2012-2013 (Table 1&2). There has been considerable emphasis on student training in research and informatics that includes travel to national and international meetings to present their research findings, and on developing new ways for museum data and objects to be incorporated in the classroom. The MSB develops collection resources by winning extremely competitive grants from the National Science Foundation and other federal agencies. MSB Graduate Students excel when applying for awards and recognition from the Department of Biology, and from disciplinary and interdisciplinary professional societies.

ONGOING MUSEUM-WIDE INITIATIVES THAT INTEGRATE ACROSS DISCIPLINES

Newly renovated space for Parasitology and Arthropod specimens: New dry, wet, and research space for the MSB Division of Parasitology (and wet storage for Arthropods) was renovated in Fall 2012 (beginning in June). This Division is becoming an international resource for systematics, ecology, and epidemiology of helminthes. With new UNM infrastructure, we are attracting new grant support (NSF Biological Research Collections Grant-\$495,000, NSF Collaborative Investigations of the Biomes of the Arctic--\$900,000) to obtain, curate, and electronically capture parasite specimens.

UnO: The Undergraduate Opportunities program (msb.unm.edu/UnO/education.html) led to high retention and graduation rates for underrepresented students, and successful placement of UNM undergraduate students in graduate school or professional scientific positions. As of December 2012, more than 45 undergraduate students were involved in this program.

AIM-UP! Aim-up! (aim-up.org) is centered at MSB and is a national Research Coordinating Network in Undergraduate Biology Education (RCN-UBE) supported by the national Science Foundation that explores new ways to integrate museum specimens, archives, and databases into undergraduate courses and activities. A workshop was held in February in Fairbanks 2012 that brought educators and museum specialists together to formulate new ways of using museum specimens and data in active learning modules. MSB was also the locus of an interdisciplinary course taught by Szu-Han Ho and Joe Cook entitled "Coevolution: Art and Biology" that enrolled 12 students from Art, Honors, and Biology in a spring seminar.

Museum Studies Program: The MSB, in collaboration with the Maxwell Museum of Anthropology, Meteorites, and UNM Art Museums, continued to make progress on development of a graduate (MS) Museum Studies Program. The graduate program now awaits approval from the State Board of Education. A website provides an overview of the program, a Program Director has been hired through Anthropology, and we anticipate the first Museum Studies students to begin in Fall 2013. MSB has been offering museum-related courses for several years now and Kelly Miller organized a course in Fall 2012 with 15 students that learned from Collections Managers about collections procedures across 7 MSB Divisions.

International Activities: In addition to ongoing projects throughout the Southwestern United States, MSB expeditions throughout Latin America (e.g., Panama, Peru, Venezuela), Asia (e.g., Kazakhstan, Mongolia), Australia and Africa (e.g., South Africa) brought significant new collections of arthropods, birds, mammals and parasites to UNM and provided outstanding opportunities to train a new generation of field biologists in the international research arena.

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>).

	2008	2009	2010	2011	2012	5-YEAR AVERAGE
1. Collection growth (Specimens Cataloged)	389144	136248	301268	64598	25446	183341
2. Loans Out	125	128	167	185	99	141
3. Professional Visitors to the Collections	795	953	692	504	307	650
4. Collection Database Web Site Hits	51287	319745	298360	160880	396362	245327
5. RFIs Answered in Person	1196	1355	1214	1354	522	1128
6. Outside Publications Citing MSB Specimens	60	68	61	134	76	80
7. Peer-Reviewed Publications by Staff	54	79	72	52	77	67
8. Technical Reports	30	24	29	29	23	27
9. UNM Courses using the Collection	22	25	23	58	79	41
10. UNM Courses taught	22	24	22	68	109	49
11. Graduate Students	35	51	39	42	42	42
12. Graduate Theses/Dissertations Completed	8	4	5	3*	9	5
13. Undergraduate Students	54	91	102	75	76	80
14. Grants/Contracts in Force	98	94	98	78	76	89
15. Grants In Force Total Costs	\$9,444,626	\$11,239,035	\$10,741,063	\$10,132,206	\$8,850,955	\$10,081,577
16. Estimated F&A return	NR	NR	NR	\$398,059	\$528,950	\$463,505

* 1 UNM, 2 outside, NR – not reported

METRIC DESCRIPTIONS

1. Collection growth is the number of newly cataloged specimens and is an important measure of activity. This metric also tracks the annual increase in value of the collections. In 2012, all collections at MSB exhibited growth, with some collections seeing outstanding increases in size. Cataloging of new specimens from regional and international expeditions was responsible for the majority of new specimens. Average growth of over 250,000 cataloged specimens per year places MSB among the fastest growing university-based natural history museums in the nation.

2. Number of specimen loans made to outside researchers and institutions. These are specimens, groups of specimens, or tissues loaned in support of ongoing research at other institutions. Loans help establish UNM's reputation as a significant contributor to research initiatives nationally and internationally. This metric, which is another measure of collection value, visibility and utility, continued to increase in 2012.

3. Professional Visitors to the Collections. This metric reflects the number of visiting scientists and other professionals seeking to review specimens or study morphological and/or molecular variability of organisms. It does not include members of the UNM Biology Department.

4. Collection web activity. This metric (web hits) is under-reported because of electronic dissemination of MSB specimen and locality data that extends beyond our site (e.g., Global Biodiversity Information Facility). Major internal databases supported by the MSB are ARCTOS, the New Mexico Biodiversity Collections Consortium (NMBCC), and conservation databases of the New Mexico Natural Heritage Program. The wide dispersion of web hits suggests MSB specimens have high impact in informatics initiatives globally.

5. Requests for information (RFIs) answered in person. Natural history collections staff also perform important advisory functions as indicated by the number of requests for information. Such requests come from academic and government scientists, natural resource management agency personnel, and/or the general public. MSB is one of the primary clearinghouses for knowledge and expertise on natural history of western North America and in several cases globally (e.g., Peru, Mexico, Chile, Bolivia, Panama, Mongolia).

6. Publications by scientists outside of the MSB. Curatorial management has direct impact on scholarly production through the provision of specimens and data to other researchers. In 2012, at least 76 publications or graduate theses were supported in part through materials provided by the MSB through loans and data sharing. This contribution to the global scientific infrastructure vastly increases the scholarly impact of MSB and by extension UNM's reputation as a major player in the environmental and biological sciences.

7. Publications by museum staff. This metric includes all publications in bona fide outlets such as books, journals, compendia, and other publications. Gray literature and quasi-public reports (e.g., technical reports, agency reports – see below) are not included.

8. Technical reports by museum staff include reports to agencies in fulfillment of contract deliverables. Many reports hold primary data that are the basis for critical management decisions, including endangered species status, listing decisions, and biological opinions.

9. UNM courses using specimens, data, electronic archives and other resources provided by the MSB. This number is increasing due largely to new courses and independent studies offered by new faculty curators and their staff. With the new Museum Studies degree program coming online at UNM in 2012, this high level of engagement of students will be sustained.

10. UNM courses provided by museum staff include lecture courses taught by faculty curators and associate curators of the MSB. It also includes laboratory teaching by graduate students affiliated with the MSB.

11. Number of graduate students mentored by MSB staff per year includes graduate students who are formally trained in curatorial practices and standards of field data collection, specimen preservation, field protocols that are consistent with institutional animal care guidelines, directly by faculty and staff of the MSB. It does not include graduate enrollment in formal courses. Substantial involvement of graduate students reflects the drawing power of natural history and the MSB for graduate recruitment in Biology and A&S.

12. Number of graduate theses/dissertations includes all the graduate students who graduated in 2012 that were mentored by MSB faculty as primary advisor or co-advisor.

13. Number of undergraduate students trained in the MSB includes undergraduate students that are employed through Federal Work-Study program, externally funded research grants and contracts, or education programs like Undergraduate Opportunities (UNO). This number is high as a result of MSB-centered undergraduate educational programs, and increased grant activity for curation (e.g., Fishes, Mammals, Arthropods).

14. Number of grants and contracts in force includes all active grants and contracts that are available to specimen-based research and are being conducted by MSB staff. This number varies little from year to year, but overall funding has steadily increased.

15. Total dollar amount of all grants and contracts in force is simply the sum of the total dollar amounts of all grants in force. Yearly expenditures are expected to be a fraction of the total grants in force.

16. Total amount of Facilities and Administration (F&A) funds generated for UNM annually from grants/contracts. MSB is within the top 5 units in the College of Arts and Sciences.

Table 2. Notable MSB Activities in 2012.

MONTH	AWARD OR EVENT	MSB PROGRAM
July 2012	MSB doctoral students, Bryan McLean and Kayce Bell, participated the 4th annual vertebrate/parasite expedition to Mongolia from June until August collecting at multiple localities across the Gobi Desert.	Mammals
	Masters student Shane DuBay wins Best Student Talk award at the North American Ornithological Congress in Vancouver, British Columbia, Canada.	Birds
	Mini-ARTS grant (\$3,000) from the Society of Systematic Biologists (SSB) to investigate the Diversification and Biogeography of Southern Hemisphere Zopheridae (Coleoptera: Tenebrionoidea). (Lord, N.P., doctoral student)	Arthropods
	MSB students Randle McCain, Kelly Speer, Donovan Jackson, Galen Rask, and Candice Espinosa completed mammal and parasite surveys on Heceta, Tuxekan, and White Cliff islands of Southeast Alaska.	Mammals
August	Brantley, Sandra led the arthropod identification for BioBlitz, Sandia Mountains Natural History Center Undergraduates from MSB Graduate!	Arthropods
October	Sandy Brantley was expert identifier for the Broad Canyon Audubon Area BioBlitz	Arthropods
November	New Contract: "Predicting effects of climate change on riparian obligate species in the Southwestern US." (J.T. Giermakowski). Bureau of Reclamation. Nov 2012– Dec 2013.	Amphibians & Reptiles
December	Nearns, E.H. 2012. Systematics of Longhorned Beetles (Insecta: Coleoptera: Cerambycidae). Doctoral dissertation.	Arthropods
January 2013	MSB Collections Managers conduct science outreach at Sandia Prep	MSB
April	Natural Heritage New Mexico Wins National 2013 NatureServe Network Award for Conservation Impact	Natural Heritage Program
April	AIM-UP! (Advancing the Integration of Museums into Undergraduate Programs) held it's third annual workshop at Harvard University	MSB
May	MSB Undergraduates wins top honors at Biology Graduation	MSB
May	Tom Turner and his recovery team wins national recognition from USFWS for efforts related to Gila Trout conservation.	Fishes
June	Two MSB graduate students win national awards from the 2013 American Society of Mammalogists meeting in June in Philadelphia.	Mammals

Ongoing Challenges to Growth and Development of the MSB

MSB would benefit from a rigorous external review. Challenges to the MSB relate to a lack of IT staff, low operational budgets, no recognition of curatorial duties with the faculty curator workload, and no plan for sustainability of the Natural Heritage Program.

IT Support

The National Science Foundation through NIBA and US Federal Agencies through BISON have committed significant resources to the digitization of natural history Collections. MSB has long held a leadership role in these efforts yet we still lack critical information technology support. MSB manages huge digital databases and plays a leadership role nationally in environmental informatics (e.g., VertNet, Arctos, NSCA, TCN); we need state-funded information technology support. IT Technologist/Systems Administrator position or faculty associated line would help develop, utilize, sell, and maintain this growing cyber-infrastructure.

Storage Space

Fluid collection storage space, cryogenic space and increasingly dry storage space are all limited. New space is now being developed related to the Parasitology expansion, but more remains to be done. A liquid nitrogen facility has special requirements and safety concerns that necessitate relocation to a new building.

Operating budgets

Operating budgets are low for collection care and were further reduced in 2012 by Biology Chair Richard Cripps, the first cut in over 10 years. Support has not kept pace with increased activity in several of the Divisions and now we fall further behind.

Faculty Curators

Currently, faculty curators are not compensated for curatorial work! A more permanent solution is needed to insure faculty leadership and involvement in MSB. UNM administrators have acknowledged this problem and have agreed to rectify. Furthermore, because faculty lines are not permanently tied to collections, any loss of a faculty member (i.e., retirement, resignation) jeopardizes UNM's long-term investment in this significant resource. More work is ahead of us to rectify these structural governance problems.

Natural Heritage New Mexico

Natural Heritage New Mexico (NMNH) does not have a secure financial future as direct legislative support has been reduced over the past 5 years. This year "bridge funding" from the department and Dean's office kept the program afloat, but a long-term business plan is needed. NMNH holds a leadership role in UNM's collaborations with state and federal agencies and private partners related to UNM's involvement in conservation science projects and plays a significant role in the institutions research and public service portfolios.

DIVISION OF AMPHIBIANS AND REPTILES

DIVISION HIGHLIGHTS

The collection increased by 2,385 specimens in 2012 to a total of 94,550 specimens, with many specimens deposited by New Mexico Department of Game and Fish. Notable additions include 20 accessions from the northwestern corner of New Mexico including two new county records for New Mexico.

For 2012, the collection was queried 10,238 times and served 6,248,259 records via HerpNET, while GBIF reported there were 20,006 searches and downloads of 847,050 records from our collection. Data associated with specimens from the division have been used in at least 24 publications in 2012. We hosted 13 visitors and individually compiled data for others on 28 occasions.

Our activities focus on research and outreach activities that involve students. We continue work with the USGS Colorado Plateau Research Station at Northern Arizona University on projects that examine distributions of amphibians and reptiles. Through this collaboration as well as NSF-funded "Undergraduate Opportunities" program (<http://www.msb.unm.edu/UnO/education.html>), we provided training to five 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. For example, in June we were invited to a local radio show (KUNM) to talk about 2012 as the Year of the Lizard. 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. Our division also continues to be a leader in regional involvement through a recent election of the collection manager to co-chair of the Southwestern chapter of Partners in Amphibian and Reptile Conservation.

COLLECTION USE SUMMARY

Collection Growth (specimens cataloged)	2,385
Loans - outgoing	7
Loans - incoming	2
Research Visitors ¹	13
Outreach Visitors ¹	>120
Information Requests Answered	166
Direct Website Access ² ("Hits")	4,012
Indirect Specimen Data Queries ³ ("Hits")	30,324
Indirect Specimen Records Downloaded ³	7,095,309
Downloads of Division Documents	1,179
Publications Citing/Using MSB Herpetological Specimens	24

¹Research 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 access represents access to data associated with our specimens via data aggregator websites: HerpNET and GBIF

COURSES USING THE COLLECTIONS

TERM	COURSE	TITLE	STUDENTS
Spring & Fall	BIOL 204	Animal Form and Function	363
	BIOL 386	General Vertebrate Zoology	70
	BIOL 499	Herpetology	14

COURSES TAUGHT BY MSB PERSONNEL

INSTRUCTOR	TERM	COURSE	TITLE	STUDENTS	
Snell, H.L.	Spring	BIOL 386	General Vertebrate Zoology	33	
		BIOL 402	Topics in Herpetology Collection Research	2	
		BIOL 499	Undergraduate Problems	1	
		BIOL 502	Topics in Herpetology Collection Research	2	
		BIOL 551	Graduate Research Problems	2	
		BIOL 599	Master's Thesis	1	
	Fall	BIOL 379	Conservation Biology	42	
		BIOL 402	Introduction to GPS for Conservation	3	
		BIOL 402	Conservation Biology Seminar	5	
		BIOL 502	Topics in Herpetology Collection Research	1	
		BIOL 551	Graduate Research Problems	2	
Poe, S.	Spring	BIOL 488	Herpetology	14	
		BIOL 551	Graduate Research Problems	5	
		BIOL 699	Dissertation	1	
	Fall	BIOL 386	General Vertebrate Zoology	37	
		BIOL 551	Graduate Research Problems	1	
		BIOL 599	Master's Thesis	1	
		BIOL 699	Dissertation	1	
	Giermakowski, J.T.	Spring	BIOL 402	Herpetology Collection Research	4
		Fall	BIOL 402	Introduction to GPS for conservation	3
BIOL 402			Topics in Herpetology Collection Research	1	
Davis, J	Fall	BIOL 202	Genetics	47	
Gray, L.N.	Spring	BIOL 488	Herpetology	14	
Latella, I.M.	Spring	BIOL 461	Introduction to Tropical Biology	16	
	Fall	BIOL 386	General Vertebrate Zoology	37	

COLLECTION MANAGEMENT

The collection increased by 2,385 specimens in 2012 to a total of 94,550 specimens. Many specimens were deposited by New Mexico Department of Game and Fish personnel and collaborators. The most notable additions from the 20 accessions catalogued during 2012 include a large collection of specimens from the Northwestern corner of New Mexico and voucher specimens for at least two new county records of occurrence from New Mexico.

The website of the division continues to receive thousands of hits and the collection receives a lot of queries via aggregator sites. For all of 2012, the collection was queried 10,238 times and served 6,248,259 records via HerpNet while GBIF has reported that for the same period, there were 20,006 searches and downloads of 847,050 records from our collection. In addition to internet queries, data associated with specimens from the division have been used in at least 24 publications in 2012. 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 these requests, we hosted 13 visitors and individually compiled data on 24 occasions.

AWARDS, GRANTS, AND CONTRACTS

Forecasting climate impacts on wildlife of the arid southwest at regional and local scales. H.L. Snell and J.T. Giermakowski. Northern Arizona University/U.S. Geological Survey. Sep 2010 – Mar 2012. \$24,904.

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. \$26,886.

PUBLICATIONS

Journal Articles

Giermakowski, J. T. and J. Chour. 2012. Geographic Distribution. *Cophosaurus texanus*. USA: NM: Cibola Co. Herpetological Review 43:618.

Giermakowski, J. T. and B.L. Christman. 2012. Geographic Distribution. *Sceloporus poinsettii*. USA: NM: Luna Co. Herpetological Review 43:619.

Phillips, R.B., D.A. Wiedenfeld and H. L. Snell. 2012. Current status of alien vertebrates in the Galapagos Islands: invasion history, distribution, and potential impacts. *Biological Invasions* 14:461–480.

Phillips, R.B., B.D. Cooke, V. Carrión, and H.L. Snell. 2012. Eradication of rock pigeons, *Columba livia*, from the Galápagos Islands. *Biological Conservation* 147: 264–269.

Townsend JH, LD Wilson, M Medina-Flores, E Aguilar-Urbina, BK Atkinson, CA Cerrato M., A Contreras-C., LN Gray, LA Herrera-B., IR Luque-M., M McKewy- Mejía, A Portillo-A., AL Stubbs, and JD Austin. 2012. A premontane hotspot of herpetofaunal endemism on the windward side of Refugio de Vida Silvestre Texíguat, Honduras. *Salamandra* 48(2): 92–114.

Web-Based

Gray, L., S. Poe & A. Nieto Montes de Oca 2012. *Anolis* lizards of Mexico 2012.0, available at: <http://www.oeb.harvard.edu/faculty/losos/PoeMexicanguides.html>

Ryan, M.J., UNM Bioblog: The Lazarus Effect (<http://unm-bioblog.blogspot.com/2012/04/lazarus-effect-and-amphibians.html>)

Work In Progress

M.J. Ryan, S. Poe, I.M. Latella, & J. Davis. *Craugastor Laevissimus*. (NCN). New population. Herpetological Review (*in review*).

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: another case of climatic refuges? (*Rejected, in revisions*).

M.J. Ryan & S. Poe. Seasonal shifts in forest and riparian habitat use in the lizard *Anolis polylepis* Journal of Herpetology (*Rejected, in revisions*).

Publications/Reports Based on MSB Specimens/Data

Barker, B. 2012. Historical and topographic drivers of tropical insular diversity: comparative phylogeography of *Eleutherodactylus antillensis* and *E. portoricensis*, two ecologically distinctive frogs of the Puerto Rican Bank. The University of New Mexico. Doctoral Dissertation.

Barker, B. S., J. A. Rodríguez-Robles, V. S. Aran, A. Montoya, R. B. Waide, and J. A. Cook. 2012. Sea level, topography and island diversity: phylogeography of the Puerto Rican Red-eyed Coquí, *Eleutherodactylus antillensis*. Molecular Ecology 21:6033-6052.

Bateman, H. L., D. M. Merritt, and J. B. Johnson. 2012. Riparian Forest Restoration: Conflicting Goals, Trade-Offs, and Measures of Success. Sustainability 4:2334-2347.

Bridges, A. and E. M. Nowak. 2012. Geographic Distribution. *Thamnophis cyrtopsis*. USA: AZ: Navajo Co. Herpetological Review 43:309.

Chunco, A. J., T. Jobe, and K. S. Pfennig. 2012. Why Do Species Co-Occur? A Test of Alternative Hypotheses Describing Abiotic Differences in Sympatry versus Allopatry Using Spadefoot Toads. PLoS One 7:e32748.

Gibbs, H. L. and J. E. Chiucchi. 2012. Inbreeding, body condition, and heterozygosity-fitness correlations in isolated populations of the endangered eastern massasauga rattlesnake (*Sistrurus c. catenatus*). Conservation Genetics 13:1-11.

Giermakowski, J. T. and J. Chour. 2012. Geographic Distribution. *Cophosaurus texanus*. USA: NM: Cibola Co. Herpetological Review 43:618.

Giermakowski, J. T. and B. L. Christman. 2012. Geographic Distribution. *Sceloporus poinsettii*. USA: NM: Luna Co. Herpetological Review 43:619.

Goldberg, S. R. 2012. Notes on Reproduction in Roundtail Horned Lizards, *Phrynosoma modestum* (Squamata: Phrynosomatida) from New Mexico. Bulletin of the Chicago Herpetological Society 47:34-36.

Güizado-Rodríguez, M. A., C. Ballesteros-Barrera, G. Casas-Andreu, V. L. Barradas-Miranda, O. Téllez-Valdés, and I. H. Salgado-Ugarte. 2012. The Impact of Global Warming on the Range Distribution of Different Climatic Groups of *Aspidoscelis costata costata*. Zoological Science 29:834-843.

Hamilton, B. T., R. Hart, and J. W. Sites Jr. 2012. Feeding Ecology of the Milksnake (*Lampropeltis triangulum*, Colubridae) in the Western United States. Journal of Herpetology 46:515-522.

Kern, M. M., J. C. Guzy, S. J. Price, S. D. Hunt, E. A. Eskew, and M. E. Dorcas. 2012. Riparian-Zone Amphibians and Reptiles Within the Broad River Basin of South Carolina. Journal of North Carolina Academy of Science 128:81-87.

Kolbe, J. J., P. S. VanMiddlesworth, N. Losin, N. Dappen, and J. B. Losos. 2012. Climatic niche shift predicts thermal trait response in one but not both introductions of the Puerto Rican lizard *Anolis cristatellus* to Miami, Florida, USA. *Ecology and Evolution*.

Milanovich, J. R., W. E. Peterman, K. Barrett, and M. E. Hopton. 2012. Do species distribution models predict species richness in urban and natural green spaces? A case study using amphibians. *Landscape and Urban Planning*.

Murray, I. W. and C. Newsom. 2012. Geographic Distribution. *Spea bombifrons*. USA: NM: Catron Co. *Herpetological Review* 43:614.

Ng, J., E. L. Landeen, R. M. Logsdon, and R. E. Glor. 2012. Correlation between *Anolis* lizard dewlap phenotype and environmental variation indicates adaptive divergence of a signal important to sexual selection and species recognition. *Evolution*.

Painter, C. W. and S. C.G. 2012. Natural History Notes. *Gyalopion canum*. Predation. *Herpetological Review* 43:493.

Painter, C. W., L. T. Cole, and L. D. Walker. 2012. Geographic Distribution. *Graptemys pseudogeographica*. USA: NM: Sierra Co. *Herpetological Review* 43:100.

Pineda, E. and J. M. Lobo. 2012. The performance of range maps and species distribution models representing the geographic variation of species richness at different resolutions. *Global Ecology and Biogeography* 21:935-944.

Stuart, Y. E., J. B. Losos, and A. C. Algar. 2012. The island–mainland species turnover relationship. *Proceedings of the Royal Society B: Biological Sciences* 279:4071-4077.

Swenson, J. J., B. E. Young, S. Beck, P. Comer, J. H. Cordova, J. Dyson, D. Embert, F. Encarnacion, W. Ferreira, I. Franke, D. Grossman, P. Hernandez, S. K. Herzog, C. Josse, G. Navarro, V. Pacheco, B. A. Stein, M. Timana, A. Tovar, C. Tovar, J. Vargas, and C. M. Zambrana-Torrel. 2012. Plant and animal endemism in the eastern Andean slope: challenges to conservation. *BMC Ecol* 12:1.

Urbina-Cardona, J. N., J. Nori, and F. Castro. 2012. Áreas vulnerables a la invasión actual y futura de la rana toro (*Lithobates catesbeianus*: Ranidae) en Colombia: estrategias propuestas para su manejo y control. Reporte.

Vasconcelos, T. S., M. Á. Rodríguez, and B. A. Hawkins. 2012. Species distribution modelling as a macroecological tool: a case study using New World amphibians. *Ecography* 35:539-548.

Wooten, J. A. and H. L. Gibbs. 2012. Niche divergence and lineage diversification among closely related *Sistrurus* rattlesnakes. *Journal of Evolutionary Biology* 25:317-328.

ACTIVITIES IN LEARNED SOCIETIES

Invited/Plenary Talks and Seminars

Giermakowski, J.T.

Techniques in Curation of Amphibians and Reptiles. Invited Lecture: Natural History Collections Curatorial Techniques (BIOL 419/519) Class. April.

Herpetological resources and research at the Museum of Southwestern Biology. New Mexico Conservation Confab. Bosque School, Albuquerque, New Mexico. October.

Species Distribution Modeling and Climate Change. Invited Talk: Global Change Biology (BIOL 419/519) Class. October.

Gray, L.N.

XII Reunión Nacional de Herpetología, 6-9 Noviembre 2012, Tuxtla Gutiérrez, Chiapas. Conferencia magistral: Levi N. Gray University of New Mexico, USA “Anolis of Mexico: Systematics, Biogeography, and a New Key”

Snell, H.L.

Snell, H.L. Goals of Ecological Monitoring for the Conservation of Endangered Species. Presented at the *Sceloporus arenicolus* Research Integration Workshop, College Station, Texas, January 2012.

McInnes, T.L.

McInnes, T. L., H. L. Snell, and E. C. Toolson. Western Diamond-backed Rattlesnakes (*Crotalus atrox*) at Bosque del Apache National Wildlife Refuge, New Mexico. Bosque del Apache National Wildlife Refuge, Festival of the Cranes, Socorro, New Mexico. November.

Contributed Talks and Posters

Giermakowski, J.T.

Giermakowski, J.T. and E.M. Nowak. Future ranges of focal reptiles in the Southwestern United States. Oral presentation. World Herpetology Congress, Vancouver, British Columbia, Canada. August.

Giermakowski, J.T. and H.L. Snell. Will future climates promote range expansions or extirpations of New Mexico’s lizards? Oral presentation. Southwestern Partners in Amphibian and Reptile Conservation, Las Vegas, Nevada. October.

Attendance at Professional Meetings

Giermakowski, J.T.

World Herpetology Congress. Vancouver, British Columbia, Canada. August.
Southwestern Partners in Amphibian and Reptile Conservation, Las Vegas, Nevada. October.

Service as Editor or on Editorial Board of a Journal

Snell, H.L.

Editor of the Publication Series of the Museum of Southwestern Biology

Service as Officer of Professional Society/Organization

Giermakowski, J.T.

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

OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity

Giermakowski, J.T.

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

Lizards in New Mexico. Live radio presentation on Children’s Hour (KUNM). June.

The natural history of Galápagos Islands. Presentation to Cien Aguas International School, Albuquerque, New Mexico. October.

Gray, L.N.

Anolis lizards. Susie R. Marmon Elementary, Albuquerque. November.

Ryan, M.J.

Lizards in New Mexico. Live radio presentation on Children's Hour (KUNM). June.

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

Snell, H.L.

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

Invited participant - *Sceloporus arenicolus* (Dunes Sagebrush Lizard: USFWS Candidate for Endangered Species Status) Research Integration Workshop, College Station, Texas, January 2012.

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

Snell, H.L.

New Mexico Department of Game & Fish Species Recovery Board.

Tenure & Promotion Committee (2012-13)

Museum of Southwestern Biology Publications Committee

Departmental Search Committee for Senior Ecologist (2011-2012)

Museum of Southwestern Biology Executive Committee

Member of the UNM Faculty Senate (through July 2012)

Coordinator and Advisor: Concentration for Conservation Biology within the Biology Department.

Giermakowski, J.T.

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.

Journal Referee

Ryan, M.J.

Biological Conservation; Herpetological Conservation and Biology; South American Journal of Herpetology, EcoHealth

PUBLIC SERVICE

Snell, H.L.

Invited participant - *Sceloporus arenicolus* (Dunes Sagebrush Lizard: USFWS Candidate for Endangered Species Status) Research Integration Workshop, College Station, Texas, January 2012. NOTE – This is also listed above in B. The workshop was in two parts and we provided both types of contributions to different audiences on different days.

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

Work with Whitfield Wildlife Conservation Area, Belen, NM

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 running the NMMC Technical Rock Climbing School to teach and promote safe mountaineering.

Ryan, M.J.

Sevilleta National Wildlife Refuge LTER Research Experience for Undergraduates (REU): Hannah Marti – Ant and lizard diversity across habitats on the Sevilleta NWR.

ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

Latella, I.M.

The University of New Mexico Grove Summer Research Grant. \$2500

Ryan, M.J.

Graduate Student Fellowship for Summer Research at the Sevilleta LTER
The University of New Mexico Department of Biology Travel Grant

McInnes, T.L.

The University of New Mexico Graduate and Professional Student Association Travel Grant. Summer 2012.

DONATIONS AND GIFTS RECEIVED

Donation of 2012 issues of the Southwestern Naturalist and Texas Journal of Science.

CURRENT STAFF

Faculty and Staff

Snell, H.L., Professor and Curator
Degenhardt, W.D., Curator and Professor Emeritus
Poe, S., Associate Professor and Associate Curator
Giermakowski, J.T., Collection Manager
Ryan, M.J. Graduate Assistant (Spring)
Gray, L. N., Graduate Assistant (Fall)

Graduate students

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

Undergraduate Student Workers and Volunteers

Chour, Jobette. Student employee (UnO)
Gibboney, Krista. Student employee
Hostak, Emily. Student employee
White, Amy. Student employee

Wilson, Cassandra. Student employee

MUSEUM ASSOCIATES

Curatorial Associates

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

Research Associates

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

DIVISION OF ARTHROPODS

DIVISION HIGHLIGHTS

Highlights for the Division (in conjunction with the research laboratory of KB Miller) include initiation or continuation of multiple NSF grants, a US National Park Service grant and USDA grants totaling \$2.8 million. One of these an NSF grant specifically for improvement to the Arthropod Division (\$453,444) which officially completed during 2012. Another is also specifically collections-related as part of the NSF Emerging Frontiers program to digitize many of our specimens of southwestern insect ground-dwelling arthropod species. This is a large initiative with about 10 institutions variously involved and over \$1.2million in total funding (our portion in collaboration with Northern Arizona University is about \$366,333). We shifted our databased specimens to Symbiota software to align with this initiative. Major field campaigns for insect collecting were conducted to Costa Rica and Nicaragua as well as locally in the southwest producing large numbers of new specimens for the collection. Renovation began for the alcohol collections of Arthropods and Parasitology in Spring 2012. The area is the former conference room next door to Arthropods alcohol lab. Panama trip.

COLLECTION USE SUMMARY

Collection Growth (specimens cataloged)	7700
Loans - outgoing	10
Loans - incoming	15
Research Visitors	50
Information Requests Answered	85
Publications Citing/Using MSB Arthropod Specimens	17

COURSES USING THE COLLECTION

COURSE	TITLE	STUDENTS
BIOL 485/585	Discovering Arthropods	18
BIOL 371L	Invertebrate Zoology	25
BIOL 419/519	Techniques	18
BIOL 419	Field Entomology	---

COURSES TAUGHT BY MSB PERSONNEL

INSTRUCTOR	COURSE	TITLE	STUDENTS
Miller, K.B.	BIOL 485/585	Discovering Arthropods	18
	BIOL 203	Ecology and Evolution	---
	BIOL 419	Field Entomology	---
	BIOL 419/519	Museum Techniques	18
Brantley, S.L.	BIOL 419/519	Museum Techniques	18
Lightfoot, D.C.	BIOL 419/519	Museum Techniques	18

AWARDS, GRANTS, AND CONTRACTS

Lord, N.P. Entomological Society of America (ESA) Systematics, Evolution, and Biodiversity (SysEB) travel award (\$1,000) April 2012.

Lord, N.P. Ernst Mayr Travel Grant, Museum of Comparative Zoology, Harvard University (\$1,500) April 2012.

Lord, N.P. Alvin R. and Caroline G. Grove Doctoral Scholarship (\$3,000), and the Lynn A. Hertel Graduate Research Award (\$2,000), both from UNM, April 2012.

Lord, N.P. Sigma Xi GIAR (Grants-in-Aid of Research) travel grant (\$669) as well as UNM's OGS Graduate Research Supplement Grant (\$2,000), April 2012.

Lord, N.P. Mini-ARTS grant (\$3,000) from the Society of Systematic Biologists (SSB) to investigate the Diversification and Biogeography of Southern Hemisphere Zopheridae (Coleoptera: Tenebrionioidea), July 2012.

Lord, N.P. UNM Office of Graduate Studies, Summer RPT Grant (\$620), July 2012.

Lord, N.P. UNM Biology Graduate Research Allocations Committee, Research (\$304) and Travel grant (\$150), July 2012.

Lord, N.P. American Museum of Natural History, Weevil Course Stipend (\$500), August 2012.

Miller, K.B. and E.H. Nears. USDA/APHIS (\$77,825). This grant will fund Gino's postdoctoral research at the U.S. National Museum, Smithsonian Institution, to develop phase two of "Longicorn ID: Tool for Diagnosing Cerambycid Beetles" beginning in January 2013.

Nears, E.H.. Entomological Society of America (ESA) Student and Young Professionals Committee Travel Award for travel to the International Congress of Entomology (ICE 2012), Daegu, Korea, (\$1000) in August 2012.

Hopkins, H. UNM Office of Graduate Studies, Summer RPT Grant, (\$630) July 2012.

Wright, KW. Harry Wayne Springfield Scholarship for excellence in research and academic record. University of New Mexico Biology Department. (\$2500) March 2012.

Wright, KW. Sevilleta Long-Term Ecological Research Program graduate student summer support. University of New Mexico Biology Department. (\$3500) Summer 2012.

REVSYS: Multilevel Revision within the Praying Mantises (Insecta, Dictyoptera, Mantodea), G.J. Svenson, PI; K.B. Miller, NSF Systematic Biology and Biodiversity Inventories Grant #DEB-1050569, \$603,742, 2010-2012, 51%.

Phylogenetic Revisions of South American Water Beetles (Coleoptera: Adephaga: Hydradeephaga): A Model for Teaching Systematic Biology, K.B. Miller, NSF CAREER #DEB-0845984, \$675,000, 2009-2014, 51%.

Improvements to the Division of Arthropods Collection, Museum of Southwestern Biology, K.B. Miller, Sandra Brantley and David Lightfoot, NSF Division of Biological Infrastructure Grant #DBI-0847847, \$453,444, 2009-2012, 51%.

Survey of the Aquatic Insects of Northern Venezuela with an emphasis on Coleoptera, A.E.Z. Short, K.B. Miller, NSF Systematic Biology and Biodiversity Inventories Grant #DEB-0816904, \$500,000 (~\$60,000 to UNM), 2008-2012, 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

PUBLICATIONS

Journal Articles

- Gómez, R.A, Lightfoot, D.C., & K.B. Miller. 2012. A phylogenetic review of the North American band-winged grasshopper genus, *Encoptolophus* Scudder with description of *Nebulatettix* gen. n. (Orthoptera: Acrididae: Oedipodinae). *Insect Systematics & Evolution*, 43 (2012) 117-145.
- LeBuhn, G, S Droege, EF Connor, B Gemmill-Herren, SG Potts, RL Minckley, T Griswold, R Jean, E Kula, DW Roubik, J Cane, KW Wright, G Frankie, F Parker. 2012. Detecting insect pollinator declines on regional and global scales. *Conservation Biology*. 27(1): 113-120.
- Monné, M.A., Nears, E.H., Carbonel Carril, S.C., Swift, I.P. & M.L. Monné. 2012. Preliminary checklist of the Cerambycidae, Disteniidae, and Vesperidae (Coleoptera) of Peru. *Insecta Mundi*, 0213: 1-48.
- Nears, E.H. & G.-L. Tavakilian. 2012. A new genus and five new species of Onciderini Thomson, 1860 (Coleoptera: Cerambycidae: Lamiinae) from South America, with notes on additional taxa. *Insecta Mundi*, 0266: 1-23.
- Nears, E.H. & G.-L. Tavakilian. 2012. New taxa and combinations in Onciderini Thomson, 1860 (Coleoptera: Cerambycidae: Lamiinae) from Central and South America, with notes on additional taxa. *Insecta Mundi*, 0231: 1-24.
- Monné, M.A., Nears, E.H., Carbonel Carril, S.C., Swift, I.P. & M.L. Monné. 2012. Preliminary checklist of the Cerambycidae, Disteniidae, and Vesperidae (Coleoptera) of Peru. *Insecta Mundi*, 0213: 1-48.
- K.B. Miller & P.D. Perkins. 2012. The Diving Beetle Species *Hydrotrupes palpalis* Sharp, 1882 (Coleoptera: Dytiscidae). *The Coleopterists Bulletin*, 66(4): 371-377.
- Nears, E.H. & G.-L. Tavakilian. 2012. A new genus and five new species of Onciderini Thomson, 1860 (Coleoptera: Cerambycidae: Lamiinae) from South America, with notes on additional taxa. *Insecta Mundi*, 0266: 1-23.
- Rowland, J.M. & K.B. Miller. 2012. Phylogeny and systematics of the giant rhinoceros beetles (Scarabaeidae: Dynastini). *Insecta Mundi*, 0263: 1-15.
- Gustafson, G.T. & K.B. Miller. 2012. A new species of *Desmopachria* Babington from Venezuela (Coleoptera: Dytiscidae: Hydroporinae). *Koleopterologische Rundschau*, 82: 71-76.
- Robertson, J.A., Slipinski, A., Hiatt, K., Miller, K.B., Whiting, M. F. & J.V. McHugh. 2012. Molecules, morphology and minute hooded beetles: a phylogenetic study with implications for the evolution and classification of Corylophidae (Coleoptera: Cucujoidea). *Systematic Entomology*, Early View, 3 Oct 2012.
- K.B. Miller & J. Bergsten. 2012. Phylogeny and classification of whirligig beetles (Coleoptera: Gyridae): relaxed-clock model outperforms parsimony and time-free Bayesian analyses. *Systematic Entomology*, 37: 706-746.
- Jean, A., Telles, N.D., Gibson, J.R., Foley, D. & K.B. Miller. 2012. Description of a new genus and species of stygobiontic diving beetle, *Psychopompopus felipi* Jean, Telles, and Miler (Coleoptera: Dytiscidae: Hydroporinae), from the Edwards-Trinity aquifer system of Texas, USA. *The Coleopterists Bulletin*, 66(2): 105-110.
- Miller, K.B., Hayashi, C., Whiting, M.F., Svenson, G.J., & J.S. Edgerly. 2012. The phylogeny and classification of Embioptera (Insecta). *Systematic Entomology*, 37: 550-570.
- Lightfoot, D.C., Weisman, D.B., & N. Ueshima. 2012. *Phymonotus jacintotopos*: A new genus and species of shield-backed katydid (Orthoptera: Tettigoniidae: Tettigoniinae: Nedubini) from the San Jacinto Mountains of California, USA. *Zootaxa*, 2937: 49-65.

Miller, K.B. 2012. *Petrodessus conatus* sp. n., a new genus and species of Bidessini from hygropetric habitats in tropical Australia (Coleoptera: Dytiscidae: Hydroporinae). *Zootaxa*, 3242: 62-67.

Higginson, D.M., Miller, K.B., Segraves, K.A., & S. Pitnick. 2012. Female reproductive tract form drives the evolution of complex sperm morphology. *PNAS*, 109(12): 4538-4543.

Higginson, D.M., Miller, K.B., Segraves, K.A., & S. Pitnick. 2012. Convergence, recurrence and diversification of complex sperm traits in diving beetles (Dytiscidae). *Evolution*: 1-12.

C. 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

Nearns, E.H., Lord, N.P., Lingafelter, S.W., Santos-Silva, A., & K.B. Miller. 2012. Longicorn ID: Tool for Diagnosing Cerambycoid Families, Subfamilies, and Tribes. The University of New Mexico and Center for Plant Health Science and Technology, USDA, APHIS, PPQ. Available from: <http://cerambycids.com/longicornid/>

Technical Reports

Brantley, S.L. 2012. Long-term studies of ground-dwelling arthropod biodiversity at Bandelier National Monument. Report for 2011 data.

Theses and Dissertations Completed

Nearns, E.H. 2012. Systematics of Longhorned Beetles (Insecta: Coleoptera: Cerambycidae). Doctoral dissertation approved Dec 2012.

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

Lockwood, S.A. and D.A. Pollock. 2012. Landscape and habitat attributes of species of *Glyptasida* Casey (Coleoptera: Tenebrionidae). *Coleopterists Bulletin* 66 (1): 15-22.

ACTIVITIES IN LEARNED SOCIETIES

Invited/Plenary Talks and Seminars

Lord, N.P. The trials and tribulations of hunting Bothriideridae and Zopheridae. SysEB Section Symposia: Ecology and Conservation of Saproxylic Insects. Annual Meeting of the Entomological Society of America, Knoxville, Tn. November 11-14, 2012.

Nearns, E.H. International Congress of Entomology (ICE 2012), Daegu, Korea, symposium on the systematics of Cerambycidae and Buprestidae, August 2012.

Hopkins, Heidi. *Conquering the Desert: The Radiation of an Unusual Genus of Polyphagid Roach*. ESA Member Symposium More than Pests: Cockroach Behavior, Ecology, Systematics and Taxonomy. Entomological Society of America National Meeting, November, 2012.

Contributed Talks and Posters

Brantley, S.L., M.L. Draney, D.B. Richman, and L. Wiener. New Mexico Linyphiidae: a preliminary look at species and response to precipitation patterns, American Arachnological Society, Green Bay, WI; July 2012; presentation.

Leister, M.P. and R.E. Mallis. Rediscovery of *Tengella perfuga* Dahl and description of the male, American Arachnological Society, Green Bay, WI; July 2012; presentation

Lord, N.P. and K.B. Miller. Not So Ironclad (Beetles): The First Large-Scale Phylogeny of the Family Zopheridae (Coleoptera: Tenebrionoidea). 10-minute Student Paper Competition at the Annual Meeting of the Entomological Society of America, Knoxville, Tn. November 11-14.

Leschen, R., T. Buckley, K. Marske, and N.P. Lord. Local variation, species, and biogeography of New Zealand beetles. International Congress of Entomology (ICE) Meeting, Daegu, Korea, August 19-24.

Mallis, R.E. and M.P. Leister. Natural history notes on Dahl's lost species, *Tengella perfuga* Dahl, and comparison with *T. radiata* (Kulczinski), American Arachnological Society, Green Bay, WI; July 2012; presentation.

Hopkins, H. Exquisite Genitalia: Systematics, Cockroaches, and the Radiation of *Arenivaga* (Rehn) (Blattodea, Polyphagidae, Polyphagnae), UNM Brown Box lecture series, May 2012; presentation.

Homziak, N. A revision of the genus *Heteranassa* Smith (Lepidoptera: Erebidae: Erebinae), Entomological Society of America, Knoxville, TN, November 2012; poster.

Homziak, N. A revision of the genus *Heteranassa* Smith (Lepidoptera: Erebidae: Erebinae), UNM Biology Research Day, March 2012; presentation.

Wright, KW. Evolution of diet breadth in *Melissodes*. Entomological Society of America, Knoxville, TN. Oral presentation. November 2012.

Attendance at Professional Meetings

Leister, M. Arachnological Society of America National Meeting, Green Bay, WI, 07/2012.

Lord, N.P. Entomological Society of America, Knoxville, TN, 11/2012.

Mallis, R. Arachnological Society of America National Meeting, Green Bay, WI, 07/2012.

Hopkins, H. Entomological Society of America, Knoxville, TN, 11/2012.

Homziak, N. Entomological Society of America, Knoxville, TN, 11/2012.

Wright, KW. Entomological Society of America, Knoxville, TN, 11/2012.

Miller, KB. Entomological Society of America, Knoxville, TN, 11/2012.

Brantley, S. Arachnological Society of America National Meeting, Green Bay, WI, 07/2012.

Service as Editor or on Editorial Board of a Journal

Lord, N.P. Subject editor (Coleoptera: Cucujiformia), Zootaxa.

Lightfoot, D.C. Associate editor (entomology and ecology) Western North American Naturalist

Service as Officer of Professional Society/Organization

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

Lord, N.P. Student Councilor for the Coleopterists Society, 2011-2012.

Lord, N.P. Faculty Search Committee Representative, UNM Biology Graduate Student Association, 2012-2013.

Miller, K.B. President, Systematics, Evolution and Biodiversity Section, Entomological Society of America, 2012.

OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity

Lord, N.P. Invited guest lecturer. Tropical Arthropod Biodiversity. *Tropical Biology* (Biol 461/561), Department of Biology, University of New Mexico. February, 2012.

Wright, KW. Native bees of New Mexico. Invited guest lecturer. Summer Wings Festival, Rio Grande Nature Center. August 11, 2012.

Wright, KW. Reliability of flowering times in harsh climates. Invited guest lecturer. Native Plant Society of New Mexico, Albuquerque Chapter. February, 2012.

Wright, KW. Randall Davey Audubon Center Bioblitz. Led pollinator walk to educate the public on native bees. June 2012.

Miller, KB. Invited research talks (2), University of Southern Mississippi, Sep 2012.

Journal Referee

Brantley, S.L. Reviews for *Coleopterists Bulletin* and *Great Plains Research Journal*

Lord, N.P. Reviews for *Acta Entomologica Musei Nationalis Pragae*, *Deutsche Entomologische Zeitschrift* and *Zootaxa*.

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

Nearns, E.H. Reviews for *Coleopterists Bulletin*, *Insecta Mundi*, *The Pan-Pacific Entomologist*, *Papéis Avulsos de Zoologia* (São Paulo), *Brasileira De Entomologia*, *Journal of Insect Conservation*, *ZooKeys*, *Zootaxa*

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

SERVICE

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

Lord, N.P. American Museum of Natural History Weevil Course. Southwestern Research Station, Portal, AZ. August 1-8, 2012.

Lord, N.P. Organization for Tropical Studies (OTS) Specialty Course: Diversity and Systematics of Coleoptera (Beetles). La Selva Biological Station, Costa Rica. June 6-19, 2012.

Public Service

Brantley, S.L. Training session on spider identification for Robert Delph, biologist at Dugway Proving Ground, UT. May 7-12, 2012, UNM.

Brantley, S.L. Museum of Natural History and Science BioBlitz, Sandia Mountains Natural History Center, August 2012.

Brantley, S.L. Museum of Natural History and Science, "Bone-a-Fide Museum Minds Day," October 2012.

Hopkins, H. Expert consultant to Laurel Kriesel-Bigler, Anderson High School, Austin, TX for biology project on *Gromphadorhina portentosa*, October 2012.

Hopkins, H. Provide cockroach identification for National Geographic photographer David Liittschwager, August 2012.

Hopkins, H. Provide cockroach identifications for Ecuador Entomofauna Field Guide to Kelly Swing PhD, Director Estacion Tiputini, Colegio de Ciencias Biológicas y Ambientales, Universidad San Francisco de Quito, Spring 2012.

Hopkins, H. Volunteer, Dine with a Graduate Student, UNM Biology Open House for Prospective Graduate Students, February 2012.

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

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 2012.

Hopkins, H. Mentor to an undergraduate biology student Nicholas Homziak in the UnO (Undergraduate Opportunities) program, 2012.

Hopkins, H. Judge for Rayos Elementary Science Fair, May 2012.

Wright, KW. Identification of *Melissodes* bees for Sandra Rehan (PhD Student), Brock University, St. Catharines, ON, Canada; Molly MacLeod (PhD Student), Rutgers University; Elaine Evans (PhD Student) University of Minnesota; David Drons (MS Student) South Dakota State University; David Smith (USFW); and David Lowenstein (MS Student) University of Wisconsin.

DONATIONS AND GIFTS RECEIVED

Maes, J.-M. 1800 specimens. Personal spider collection from Nicaragua.

Walker, H. and G. Harper. Several hundred vials and insect preparation materials (pins, Schmitt boxes, pinning blocks, etc.)

CURRENT STAFF

Faculty/Staff

Kelly Miller, Assistant Professor, Curator

Manuel Molles, Professor Emeritus, Curator Emeritus

Sandra Brantley, Research Assoc. Professor, Senior Collection Manager

David Lightfoot, Research Assoc. Professor, Senior Collection Manager

Graduate Students

Nathan Lord, Ph.D. candidate

Eugenio Nearn, Ph.D. candidate

Michael Medrano, Ph.D. candidate

Heidi Hopkins, Ph.D. candidate

Karen W. Wright, Ph.D. candidate

Grey Gustafson, Ph.D. student

Rachael Mallis, Ph.D. student

Bethany Abrahamson, Masters student

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

Undergraduate Student Workers and Volunteers

Sharyn Davidson, volunteer
Martha Lara
R. Antonio Gomez, (UNM MARC program, honors)
Nicholas Homziak, (UNM UNO program, honors)
Stephen Baca
Sarah Jogi
Matthew Leister
Aaron Prairie
Emily Schmeltzer

MUSEUM ASSOCIATES

Research Associates

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

DIVISION OF BIRDS

DIVISION HIGHLIGHTS

Five major expeditions to Peru that collected over 1700 new specimens along altitudinal gradients (pending export).

Field expedition to South Africa with MSB Parasite Division that added 120 bird specimens to the MSB collection.

Overall growth by 1038 cataloged specimens.

18 scientific papers published.

Four student presentations at the North American Ornithological Congress in Vancouver, British Columbia, Canada.

Masters student Shane DuBay wins BEST STUDENT TALK award at the North American Ornithological Congress in Vancouver, British Columbia, Canada.

Two Masters Degrees awarded Graduated in summer. (Phred Benham and Shane DuBay)

Undergraduates C. Jonathan Schmitt (*summa cum laude*) and Bethany Abrahamson (*cum laude*) complete honors theses in Biology

Three MSB Birds students won prestigious doctoral fellowships starting in fall 2012:

Shane DuBay (M.S. 2012), Ph.D. Fellowship at the University of Chicago

Phred M. Benham (M.S. 2012), NSF-IGERT Fellow at Univ. Illinois

Sabrina McNew (Postbac researcher, 2011-2012), NSF GRF Fellow at Univ. Utah

Curator Emeritus Robert W. Dickerman honored by Festschrift in *Western Birds*, Volume 43, number 4, including three papers by MSB Birds personnel.

COLLECTION USE SUMMARY

Collection Growth (specimens cataloged)	1038
Loans - outgoing	33
Loans - incoming	11
Research Visitors	35
Information Requests Answered	70
Publications Citing/Using MSB Bird Specimens	17

COURSES USING THE COLLECTIONS

TERM	COURSE	TITLE	STUDENTS
Fall	BIOL 502	Molecular Systematics Disc	4
	BIOL 509	Ornithology Field Expedition	
	BIOL 509	High Altitude Biology	7
	BIOL 519*	Ornithology Field Expedition	3
	BIOL 551	Research Problems	1
	BIOL 599	Masters Thesis	1
	BIOL 699	Dissertation	2
	BIOL 400	Senior Honors Thesis	2
	BIOL 402	Molecular Systematics Discussion	2
	BIOL 409	High Altitude Biology	27
	BIOL 419*	Ornithology Field Expedition	2
	BIOL 499	Undergraduate Problems	1
	BIOL 386	General Vertebrate Zoology	~36
Spring	BIOL 502*	Avian Scientific Specimen Preparation	2
	BIOL 502	Molecular Systematic Discussion	3
	BIOL 517	Basic Graduate Evolution	8
	BIOL 551	Research Problems	1
	BIOL 599	Masters Thesis	2
	BIOL 699	Dissertation	1
	BIOL 300	Evolution	48
	BIOL 400	Senior Honors Thesis	2
	BIOL 402	Molecular Systematic Discus	3
	BIOL 402	Avian Sci Specimen Prep	4
BIOL 386	General Vertebrate Zoology	~36	

COURSES TAUGHT BY MSB PERSONNEL

INSTRUCTOR	TERM	COURSE	TITLE	STUDENTS
Witt, C.C.	Fall	BIOL 502	Molecular Seminar	2
		BIOL 502	Ecology Seminar	4
		BIOL 502	Molecular Systematics Discussion	4
		BIOL 509	High Altitude Biology	7
		BIOL 519	Ornithology Field Expedition	3
		BIOL 551	Research Problems	1
		BIOL 599	Masters Thesis	1
		BIOL 699	Dissertation	2

		BIOL 400	Senior Honors Thesis	2
		BIOL 402	Molecular Systematics Discussion	2
		BIOL 402	Ecology Seminar	7
		BIOL 402	Molecular Seminar	9
		BIOL 409	High Altitude Biology	27
		BIOL 419	Ornithology Field Expedition	2
		BIOL 499	Undergraduate Problems	1
	Spring	BIOL 300	Evolution	48
		BIOL 400	Senior Honors Thesis	3
		BIOL 402	Molecular Systematic Discussion	3
		BIOL 402	Avian Scientific Specimen Prep	4
		BIOL 402	Molecular Seminar	10
		BIOL 402	Ecology Seminar	16
		BIOL 502	Avian Scientific Specimen Prep	2
		BIOL 502	Molecular Seminar	3
		BIOL 502	Molecular Systematic Discussion	3
		BIOL 502	Ecology Seminar	9
		BIOL 517	Basic Graduate Evolution	8
		BIOL 551	Research Problems	1
		BIOL 599	Masters Thesis	2
		BIOL 699	Dissertation	1
Johnson, A.B.	Fall	BIOL 519	Ornithology Field Expedition	3
		BIOL 419	Ornithology Field Expedition	2
	Spring	BIOL 502	Avian Scientific Specimen Prep	2
		BIOL 402	Avian Scientific Specimen Prep	4

COLLECTION MANAGEMENT

Synopsis of 2012 Management Activities

Our colleagues in South Africa welcomed us back in January 2012 for continued field work in Free State Province. This time Ernie Valdez and Andy Johnson went with Sara Brant and Erika Gendron of the Parasite Division. The parasitologists were interested in water birds, and we were able to put together a trip that was beneficial to both divisions. After the parasitologists left, Andy and Ernie stayed another two weeks and worked in some highland sites in eastern Free State near the Lesotho and Kwazulu-Natal Border. We found the birds to be amazing, our hosts extremely hospitable, and ended up adding 120 more specimens to our collection.

Beginning in May, we began working in Peru. Our efforts there by our team of 18 ornithologists from both New Mexico and Peru collected 1700 specimens from four different sites in northern Peru. Our efforts in this region added a tremendous amount of data to our ongoing projects on avian physiology, elevational adaptation, phylogeography, flight muscle evolution, and also contributed to the greater understanding of birds in that poorly-known region.

Closer to home, we continued to work at Boone's Draw in Roosevelt County, New Mexico, and also took trips to Elk Mountain in the Sangre de Cristo Mountains, several spots in the Gila River Drainage, the Jemez Mountains including the Valle Grande, and the Chuska Mountains.

We said our goodbyes to some very good people this summer. Two masters' students, Shane DuBay and Phred Benham, both of whom successfully defended in the spring semester, moved on to Ph.D. programs. Phred is at the University of Illinois, and Shane is at the University of Chicago. Lab Tech Sabrina McNew, who received an NSF Pre-Doctoral Fellowship, also left us to begin her graduate work at University of Utah.

Division personnel attended the fifth North American Ornithological Congress in Vancouver, BC in August. Several students presented their work, and Shane DuBay won an award for best student presentation. Spencer Galen and Sabrina McNew attended a Malaria workshop in Shepherdstown, WV.

Adrienne Raniszewski continued to excel for us as a coordinator for skeleton preparation. Through her hard work and two work-study students, Madeline Cauthen and Travis Romero, we cleaned and prepared 700 bird skeletons.

Travel for Research

Libby Beckman

LSU Museum of Natural Science (1 week)

Phred Benham

Peru expedition, May – July 2012
Gila National Forest, November 2012

Jennifer Clark

Peru expedition, May - July 2012

Robert Dickerman

Burke Museum, Univ. British Columbia, August 2012

Shane DuBay

American Museum of Natural History, Feb 2012
Field Museum of Natural History, Feb 2012
Peru expedition, May – June 2012

Spencer Galen

Peru expedition, May – July 2012
Malaria workshop, July 2012

Andrew Johnson

South Africa Expedition, January – February 2012
Peru expedition, June – July 2012

Sabrina McNew

Peru expedition, May – June 2012
Malaria workshop, July 2012

Iris Olivas

Peru expedition, May – June 2012

Jonathan Schmitt

Peru expedition, May – July 2012
Bolivia, December 2012

Greg Schmitt

Peru expedition, May – July 2012
Chuska Mts, NM, October 2012

Donna Schmitt

Chuska Mts, NM, October 2012

Ashley Smiley

Peru expedition, May – July 2012

Ernie Valdez

South Africa expedition, January – February 2012

Christopher C. Witt

Peru expedition, June – July 2012

Natalie Wright

Florida Museum of Natural History, 1 week in April 2012, 1 week in December 2012
Burke Museum of Natural History and Culture, 3 days in July 2012
Gregory Lab at University of Guelph estimating genome sizes, 2 weeks in June
Flight Lab with Bret Tobalske at University of Montana, 1 week in September

AWARDS, GRANTS, AND CONTRACTS

Christopher. C. Witt

Submitted To All Agencies In 2012

2012: NSF - DEB Proposal: CAREER: Avian malaria diversity and evolutionary dynamics in the tropical Andes. PI: C. C. Witt. (Declined “for lack of funds” despite “HIGH PRIORITY” ranking).

2012: NSF - DEB Pre-Proposal: Is molecular adaptation predictable? An integration of comparative biochemistry and protein engineering. PI (UNL): J. Storz; PI (UNM): C. C. Witt. (Invited for Full Proposal submission)

2012: NSF - DEB Invited Full Proposal: Is molecular adaptation predictable? An integration of comparative biochemistry and protein engineering. PI (UNL): J. Storz; PI (UNM): C. C. Witt. (Declined despite 6 “Excellent” reviews on previous submission.)

2012: NSF - IOS Pre-Proposal: Regulation of Naturally High Glucose Levels in Birds. PI (ASU): K. Swazea; PI (UNM): C. C. Witt. (Invited for Full Proposal submission).

2012: NSF - IOS Invited Full Proposal: Regulation of Naturally High Glucose Levels in Birds. PI (ASU): K. Swazea; PI (UNM): C. C. Witt. (Declined).

2012: NSF-DEB Proposal: DISSERTATION RESEARCH: The Effects of Ecology and Evolution on Avian Flight Morphology. PI: C. C. Witt; Co-PI: Natalie Wright. FUNDED IN 2013: \$20,000.

2012: NSF-REU Supplement: Montane Biogeography Revealed by Quirks of the Evolutionary Process: Integrative Respiratory Phenotypes for Andean Birds; P.I.: C. C. Witt; National Science Foundation (Evolutionary Processes Cluster); \$15,000. Supplement to DEB-1146491.

2012: Long-term Archive for Mammals and Birds Across Space and Time (LAMBAST): Building a Resource Integrated Across Vertebrates for the Ladder and Armendaris Ranches in New Mexico to Assess Environmental Change. Turner Enterprises, Inc. - UNM Collaboration. PI: J. A. Cook; Co-PI: C. C. Witt. \$10,000.

Awarded With 2012 Initial Start Date

2012: NSF-REU Supplement: Montane Biogeography Revealed by Quirks of the Evolutionary Process: Integrative Respiratory Phenotypes for Andean Birds; P.I.: C. C. Witt; National Science Foundation (Evolutionary Processes Cluster); \$15,000. Supplement to DEB-1146491.

2012-2013: Long-term Archive for Mammals and Birds Across Space and Time (LAMBAST): Building a Resource Integrated Across Vertebrates for the Ladder and Armendaris Ranches in New Mexico to Assess Environmental Change. Turner Enterprises, Inc. - UNM Collaboration. PI: J. A. Cook; Co-PI: C. C. Witt. \$10,000.

In Force From Previous Years

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

2010-2012: Seed Grant from Center for Evolutionary and Theoretical Immunology: Diversity and host-parasite dynamics of avian malaria along a tropical altitudinal gradient. ~1 December 2010 – 1 December 2012. PI- C. C. Witt; subaward of NIH-CETI grant to P.I.'s E. S. Loker and R. Miller; \$80,000.

2011-2012: Witt, C. C., P.I. Diversity of avian haemosporidian parasites on a tropical elevational gradient. PI – C. C. Witt; UNM-RAC Major Grants Competition. \$8000.

Elizabeth Beckman

Awarded

Chapman Grant - \$2210.00
UNM Biology - \$1500
CETI 454 voucher - ~\$10,000

Grants Applied For And Not Received

Wilson Ornithological Society Research Grant
Latin America and Iberian Institute PhD fellowship
Lewis and Clark Research Grant
Graduate Resources Allocation committee research grant

Shane DuBay

Awarded

North American Ornithological Conference Student Presentation Award (Cooper Ornithological Society Board of Directors Award) \$300

North American Ornithological Conference Student Travel Award \$500

Spencer Galen

Pending

NSF GRF

Sabrina McNew

Awarded

NSF Graduate Research Fellowship, 3-yr fellowship

Iris Olivas

Awarded

Alliance for Minority Participation Undergraduate Research Assistantship \$2000

C. Jonathan Schmitt

Applied For and Not Received

NSF GRFP

Natalie Wright

Awarded

UNM Biology Department Caughran Memorial Scholarship, awarded \$2,500 for research travel and conference attendance

UNM PiBBs fellowship, renewed for 2012-2013 school year ~\$30,000

UNM PiBBs Student Enrichment Opportunity, \$500 for research travel

Pending

NSF Doctoral Dissertation Improvement Grant November 2012, \$14,742

Applied For and Not Received

Sigma Xi March 2012, \$1,000

PUBLICATIIONS (MSB BIRDS PERSONNEL IN BOLD; STUDENTS DENOTED WITH ASTERISK*)

Peer-reviewed Journal Articles

Dickerman, R.W. and S.L. Brantley 2012. Great-horned Owls feed on vinegaroons. *NMOS Bulletin* 40: 30

Dickerman, R.W. 2012. A second incidence of electrocution of talon-locked Red-tailed Hawks. *NMOS Bulletin* 40: 45

DuBay, S. G.*, and **C. C. Witt**. 2012. An improved phylogeny of the Andean tit-tyrants (Aves, Tyrannidae): more characters trump sophisticated analyses. *Molecular Phylogenetics and Evolution* 64: 285-296

Johnson, A.B. 2012. A Vaux's Swift specimen from New Mexico with a review of *Chaetura* records from the region. *Western Birds* 43: 229-235

Jones, M. R.*, and **C. C. Witt**. 2012. Vocal formant spacing reveals subspecies composition of non-breeding Sandhill Crane populations. *Wildlife Society Bulletin*, DOI: 10.1002/wsb.110

Meyer, R. A. and **S. O. Williams III**. 2012. A Smith's Longspur on Otero Mesa: First verified New Mexico record. *New Mexico Ornithological Society Bulletin* 40:1-4
Sanchez, C., J. Saucier, **P.M. Benham***, D.F. Lane, R.E. Gibbons, T. Valqui, S. Figueroa, D. Olaechea, **C.J. Schmitt***, B. Schmidt, C. Milenski & R.T. Brumfield. 2012. New and noteworthy records from northwestern Peru, Dpto. Tumbes. *El boletín de la Unión de Ornitólogos del Perú*, **7**, 18-36

Sibly, R. M., **C. C. Witt**, **N. A. Wright***, C. Venditti, W. Jetz, and J. H. Brown. 2012. Energetics, lifestyle, and reproduction in birds. *Proceedings of the National Academy of Sciences, USA*, 109:10937-10941

Williams, S. O. III. 2012. First record of Clay-colored Thrush (*Turdus grayi*) for New Mexico. *North American Birds* 66:212-213

Witt, C. C., and **R. W. Dickerman**. 2012. Differential migration by sex in North American Short-eared Owls (*Asio flammeus*). *Western Birds* 43: 236-247

Wright, N.A.*, and D.W. Steadman. 2012. Insular avian adaptations on two Neotropical continental islands. *Journal of Biogeography* 39:1891-1899

Web-Based

Dubay, S. G.*, & **C. C. Witt**. 2012. Proposal for the resurrection of the genus *Uromyias*. Proposal to South American Checklist Committee (SACC).
<http://www.museum.lsu.edu/~Remsen/SACCprop525.html>

Witt, C. C. 2013. Lies and lying cranes who tell them. *Bosque Tracks: Newsletter of the Rio Grande Nature Center*, January-March 2013 Issue, pp. 2-7 (pdf) (published electronically in 2012).

Witt, C. C. 2012. Sandhill Cranes don't speak with one voice. *Bosque Tracks: Newsletter of the Rio Grande Nature Center*, January-March 2012 Issue, pp. 6-7. (pdf)

Technical Reports

Witt, C. C. and T. Valqui. 2012. Informe final a INRENA del proyecto con título: "Adaptación a las grandes alturas: continuación del estudio comparativo de las aves del Perú," Autorización No 377-2010-AG-DGFFS-DGEFFS. Technical Report to DGFFS/INRENA (Peru). Submitted April 2, 2012 (in Spanish). 17pp.

Theses and Dissertations Completed

Benham, P.M. 2012. The role of geological history, topography, and environmental heterogeneity in the diversification of an endemic Andean radiation : the Metallura hummingbirds. University of New Mexico Masters' Thesis

DuBay, S. 2012. Diversification in Andean tit-tyrants (Aves, Tyrannidae). University of New Mexico Masters' Thesis

Schmitt, C. J. 2012. Color polymorphism in the Vermilion Flycatcher: a possible case of industrial melanism in a bird. University of New Mexico Undergraduate Thesis. *Summa cum laude*

Abrahamson, B. L. 2012. Elevational distributions of two hummingbird species in the Sandia Mountains of New Mexico. University of New Mexico Undergraduate Thesis. *Cum laude*.

Work In Progress

- Galen, S. C., & C. C. Witt. In review. Phylogenetic biogeography of Andean house wrens and their haemosporidian parasites.
- Dickerman, R. W., S. M. McNew, & C. C. Witt. In review. Long-distance movement in the "Dusky" Great Horned Owl and current limits to phylogeography for establishing provenance.
- Dickerman, R.W., A.B. Johnson. Notes on Elf owls of Texas and adjacent Mexico and New Mexico. Texas Ornithological Society Bulletin. In Press.
- Benham, P. M., A. M. Cuervo, J. A. McGuire, & C. C. Witt. In review. Biogeography of an Andean radiation: Strong differentiation in cloud-forest and treeline clades of metal-tail hummingbirds.
- DuBay, S. G., and C. C. Witt. In review. Differential high-altitude adaptation and limited gene flow between elevational replacement species of Andean tit-tyrant flycatchers.
- Jones, M. R., & C. C. Witt. In review. Migrate small, sound big: Functional constraints on body size promote tracheal elongation in cranes.
- Hostetter, K., K. Sweazea, C. C. Witt, & E. Braun. In review. Comparative analysis of pancreatic cellular composition in wild birds.
- 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*, in press.
- Schmitt, C. J., T. Valqui, and C. C. Witt. 2013. Stygian Owl (*Asio stygius*) is widely distributed in the Peruvian Andes. *Boletín de la Unión de Ornitólogos del Perú (UNOP)*, in press.
- 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*, in press.
- 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. (published online mid-March 2013)

Publications and Reports Based on MSB Bird Division Specimens/Data

- Berns, C.M., D.C. Adams 2012. Becoming Different But Staying Alike: Patterns of Sexual Size and Shape Dimorphism in Bills of Hummingbirds. *Evolutionary Biology*. Published Online November 2012 DOI 10.1007/s11692-012-9206-3.
- Dickerman, R.W.** and S.L. Brantley 2012. Great-horned Owls feed on vinegaroons. *NMOS Bulletin* 40: 30.
- Dickerman, R.W.** 2012. A second incidence of electrocution of talon-locked Red-tailed Hawks. *NMOS Bulletin* 40: 45.
- DuBay, S. G.***, and **C. C. Witt**. 2012. An improved phylogeny of the Andean tit-tyrants (Aves, Tyrannidae): more characters trump sophisticated analyses. *Molecular Phylogenetics and Evolution* 64: 285-296.
- Grispo, M.T. 2012. Gene Duplication and the Evolution of Hemoglobin Isoform Differentiation in Birds. University of Nebraska Lincoln Masters' Thesis.
- Grispo, M.T., C. Natarajan, J. Projecto-Garcia, H. Moriyama, R.E. Weber, J. F. Storz. Gene Duplication and the evolution of hemoglobin isoform differentiation in birds. *Journal of Biological Chemistry* 287: 37647-37658.

Jackson, D.G., S.D. Emslie, M. van Tuinen 2012. Genome skimming identifies polymorphism in tern populations and species. *BMC Research* 5: doi:10.1186/1756-0500-5-94.

Johnson, A.B. 2012. A Vaux's Swift specimen from New Mexico with a review of *Chaetura* records from the region. *Western Birds* 43: 229-235.

Jones, M. R.*, and **C. C. Witt**. 2012. Vocal formant spacing reveals subspecies composition of non-breeding Sandhill Crane populations. *Wildlife Society Bulletin*, DOI: 10.1002/wsb.110

Lait, L. A., Friesen, V. L., Gaston, A. J. and Burg, T. M. 2012, The post-Pleistocene population genetic structure of a western North American passerine: the chestnut-backed chickadee *Poecile rufescens*. *Journal of Avian Biology*, 43: 541–552. doi: 10.1111/j.1600-048X.2012.05761.x

Sibly, R. M., **C. C. Witt**, **N. A. Wright***, C. Venditti, W. Jetz, and J. H. Brown. 2012. Energetics, lifestyle, and reproduction in birds. *Proceedings of the National Academy of Sciences, USA*, 109:10937-10941.

van Dongen, W.F.D, I. Lazzoni, H. Winkler, R.A. Vasquez, C.F. Estades. 2012. Behavioural and genetic interactions between an endangered and a recently-arrived Hummingbird. *Biological Invasions*, DOI 10.1007/s10530-012-0358-y

Benham, P.M. 2012. The role of geological history, topography, and environmental heterogeneity in the diversification of an endemic Andean radiation : the *Metallura* hummingbirds. University of New Mexico Masters' Thesis.

DuBay, S. 2012. Diversification in Andean tit-tyrants (Aves, Tyrannidae). University of New Mexico Masters' Thesis.

Schmitt, C. J. 2012. Color polymorphism in the Vermilion Flycatcher: a possible case of industrial melanism in a bird. University of New Mexico Undergraduate Thesis. *Summa cum laude*.

Abrahamson, B. L. 2012. Elevational distributions of two hummingbird species in the Sandia Mountain of New Mexico. University of New Mexico Undergraduate Thesis. *Cum laude*.

Witt, C. C., and **R. W. Dickerman**. 2012. Differential migration by sex in North American Short-eared Owls (*Asio flammeus*). *Western Birds* 43: 236-247.

ACTIVITIES IN LEARNED SOCIETIES

Invited/Plenary Talks and/or Seminars

Witt, C. C. 2012 (March). Distribution limits in Andean birds. Invited Seminar, Univ. Northern Colorado.

Witt, C. C. 2012. (November). Altitude, parasites, and the world's richest avifauna. Univ. New Mexico. Dept. of Biology Promotion and Tenure Seminar.

Benham, F. M. 2012. The role of geological history, topography, and environmental heterogeneity in the diversification of an endemic Andean radiation: the *Metallura* hummingbirds. Masters Thesis Defense. May 2012.

DuBay, S. G. 2012. Diversification in Andean tit-tyrants (Aves, Tyrannidae). Masters Thesis Defense. May 2012.

Contributed Talks and Posters

Beckman EJ & Witt CC. 2012. Sorting the South American Siskins: The role of ecology in a rapid continental radiation. North American Ornithological Conference, Vancouver, British Columbia.

Benham, P.M., A.M. Cuervo, R.T. Brumfield & C.C. Witt. 2012. Topographic complexity in the Andes shapes diversification patterns in the hummingbird genus *Metallura*. 5th North American Ornithological Conference, Vancouver, BC.

Calhoun M., C. C. Witt, & K. L. Sweazea. VARIATIONS IN GLUCOSE ACROSS PHYLOGENETICALLY DISTINCT AVIAN SPECIES. Arizona Physiological Society Meeting, 2012.

DuBay, S.G., and C.C. Witt. 2012. Diversification by local adaptation to altitude in Andean Tit-tyrants. North American Ornithological Conference V, Vancouver, BC, Canada. WINNER: BEST STUDENT TALK AWARD.

Wright, N.A., A.W. Kratter, D.W. Steadman, and C.C. Witt. 2012. Ecological determinants of flight muscle size across birds. 5th meeting of the North American Ornithological Conference. Vancouver, British Columbia.

Abrahamson, B. L., and C. C. Witt. 2012. Distribution limits and competitive dynamics of black-chinned and broad-tailed hummingbirds on an elevational gradient. 50th Annual Meeting of the New Mexico Ornithological Society, Albuquerque, NM.

Beckman EJ & Witt CC. 2012. Sorting the South American Siskins: the Role of Ecology in a Rapid Continental Radiation. New Mexico Ornithological Society, Albuquerque, NM.

Natarajan, C, CC Witt, ZA Cheviron, H Moriyama, RE Weber, A Fago, JF Storz. 2012. Parallel evolution of hemoglobin function in Andean hummingbirds. XVII International Conference on Oxygen Binding and Sensing Proteins.

Schmitt, C. J., W. Vargas Campos, S. M. McNew, and C. C. Witt. 2012. Genetic color polymorphism in the *mc1r* gene and local adaptation in the vermilion flycatcher (*Pyrocephalus rubinus*). 50th Annual Meeting of the New Mexico Ornithological Society, Albuquerque, NM.

Matthew B. Toomey, Jennifer M. Enright, Ken M. Riedl, Steven J. Schwartz, Christopher C. Witt, Earl H. Harrison, Kevin J. McGraw, and Joseph C. Corbo. 2012. Fine-tuning of avian color vision by selective apocarotenoid metabolism. Gordon Conference on Carotenoids.

Witt, C. C., and R. W. Dickerman. 2012. Differential migration by sex in North American Short-eared Owls (*Asio flammeus*). 50th Annual Meeting of the New Mexico Ornithological Society, Albuquerque, NM.

Olivas, I and C.C. Witt. 2012. Biogeography of Avian Malaria along an Andean Elevation Gradient SACNAS (Society for Advancement of Chicanos and Native Americans in Science) National Conference; Seattle, Washington. October 13, 2012.

Smiley, A., G. Williams, N.A. Wright, and C.C. Witt. 2012. Avian Cardiac Morphology: Right ventricular hypertrophy in high-Andean house wrens. Society for Advancement of Chicanos and Native Americans in Science. Seattle, WA. October 2012.

Williams, S. O. III, C. M. Rustay, and W. H. Howe. 2012. Rapid northward range expansion by the Cactus Wren in New Mexico. 50th Annual Meeting of New Mexico Ornithological Society, Albuquerque, NM.

Attendance at Professional Meetings

Beckman, E.J.

50th Annual NMOS, Albuquerque, NM, March 2012.
NAOC-V, Vancouver, BC. August 2012

Benham, P.M

New Mexico Ornithological Society Meeting, Albuquerque, NM. April 2012
NAOC-V, Vancouver, BC. August 2012

Dickerman, R.W.

NAOC-V, Vancouver BC August 2012
Western Field Ornithologists meeting Petalouma CA September 2012

DuBay, S.G.

NAOC-V, Vancouver, BC. August 2012

Galen, S.C.

Second Annual International Workshop on Malaria and Related Haemosporidian Parasites of Wildlife
Shepherdstown, West Virginia - National Conservation Training Center August 5 – 9

McNew, S.M

Second Annual International Workshop on Malaria and Related Haemosporidian Parasites of Wildlife
Shepherdstown, West Virginia - National Conservation Training Center August 5 – 9

Olivas, I.

Society for Advancement of Chicanos and Native Americans in Science National Conference; Seattle,
Washington. October 13, 2012

Schmitt, C. J.

50th Annual NMOS, Albuquerque, NM, March 2012.

Smiley, A.

Society for Advancement of Chicanos and Native Americans in Science National Conference; Seattle,
Washington. October 13, 2012

Williams, S. O. III

50th Annual NMOS, Albuquerque, NM, March 2012.

Witt, C. C.

50th Annual NMOS, Albuquerque, NM, March 2012.

Wright, N.A.

NAOC-V, Vancouver, BC. August 2012

Service as Editor or on Editorial Board of a Journal

Williams, S. O. III

New Mexico Editor, North American Birds
Editor, New Mexico Ornithological Society Field Notes

Service as Officer of Professional Society/Organization

Wright, N.A.

AOU Collections Committee

Witt, C. C.

AOU Student Awards Committee

OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity

Witt, C. C., 2012. How will hummingbirds be affected by global warming? NM-Connect, NM-PBS television segment, filmed September 5, 2012. (http://www.youtube.com/watch?v=B9JMAG_1q-M)

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

Williams, S.O.

Secretary of the New Mexico Bird Records Committee

Witt, C. C.

Reviewer for National Science Foundation systematics proposal
Grant reviewer 8 student proposals for Mewaldt-King Student Award, Cooper Ornithological Society
Reviewer for Explorer's Club Grant Program 2012.
Reviewer for NAOC Student Travel Awards 2012.
Reviewer for American Philosophical Society Lewis & Clark Research Grants, 2012.
Reviewer for Wilson Ornithological Society Student Awards, 2012 rounds.
Reviewer and Committee Member for AOU student travel awards 2012.
Reviewer and Committee Member for AOU postdoc travel awards 2012.

Journal Referee

Beckman, E.J

Auk (1)
Biological Journal of the Linnean Society (1)

Witt, C. C.

UNM Press (1 book)
Molecular Ecology (2 articles)
Cotinga (1 article)
Auk (1 article)
Journal of Avian Biology (1 article)
Zootaxa (1 article)

SERVICE

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

Wright, N.A. Hosted researcher Bret Tobalske, March 2012, SiBBs speaker

Public Service

Williams, S.O. III

New Mexico Coordinator of the North American Breeding Bird Survey (BBS)

Wolf, B.O.

Institutional Animal Care and Use Committee
Department of Biology Grad Policy Committee Chair
Faculty sponsor, BUGS- Biology Undergraduate Society
Coordinator for SORA

Beckman, E.L.

UNM Biology Graduate Student Association (BGSA) Secretary (2011-2012 school year)
UNM Dept. of Biology: Research Day Undergraduate Poster Judge, 2012
Biology Graduate Student Association: Grant reviewer Fall 2012

DuBay, S.G.

BGSA Co-president Jan-May 2012

Galen, S.C.

BGSA Space Allocations Committee at UNM

Johnson, A.B.

UNM Dept. of Biology: Research Day Undergraduate Poster Judge, 2012

Witt, C. C.

UNM Dept. of Biology: Research Day Undergraduate Poster Judge, 2012
2011-2012: Ecology Junior-Faculty Search Committee (270+ applications).

Wright, N.A.

Grad student rep on the Biology department graduate admissions committee
Grad student rep on the BUGS-BGSA mentoring organization

ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

Beckman, E.J.: 2nd place for Biology graduate student poster presentation, UNM Biology Research Day 2012.

Dubay S. G.; Best student talk award, North American Ornithological Conference, Vancouver.

Three MSB Birds students won prestigious doctoral fellowships starting in fall 2012:

Shane DuBay (M.S. 2012), Ph.D. Fellowship at the University of Chicago

Phred M. Benham (M.S. 2012), NSF-IGERT Fellow at Univ. Illinois

Sabrina McNew (Postbac researcher, 2011-2012), NSF GRF Fellow at Univ. Utah

DONATIONS AND GIFTS RECEIVED

Robert W. Dickerman: ~25,000

David Marchiando: \$100

Thomas and Loretta Witt: \$500

Dr. Robert Newman: \$50

CURRENT STAFF

Faculty/Staff

Christopher C. Witt, Curator of Birds

Andrew B. Johnson, Collection Manager

Blair O. Wolf, Associate Curator

Adrienne Raniszewski, Curatorial Staff

Sabrina McNew, Lab Technician

Graduate Students

Natalie Wright, Ph.D Student

Elizabeth Beckman, Ph.D Student

William Talbot, Ph.D. Student

Phred Benham, Masters' Student

Shane DuBay, Masters' Student

Spencer Galen, Masters' Student

Nick Pederson, Masters' Student

Matthew Baumann, Masters' Student

Andrea Chavez, Masters' Student

Carl Jonathan Schmitt, Masters' Student

Undergraduate Student Workers and Volunteers

Bethany Abrahamson; 2009-2012; UNM Hummingbird distribution limits in NM; Undergraduate thesis cum laude; current graduate student at UNM.

Kobie Boslough; 2009-2013; Albuquerque Academy; Bird specimen curation and Molecular lab work

Catherine Bradt; 2012; UNM; Red Blood Cell Concentration and malaria in birds.

Madeline Cauthen; 2012-2013; UNM; Bird specimen curation

Jennifer Clark; 2012; UNM; Avifauna of elevational gradients in the Marañon region

Mariela Combe; 2012; Univ. Agraria La Molina, Lima-Peru; Hispanic; Avifauna of elevational gradients in the Marañon region

Monica Flores; 2009-2012; Univ. Peruana Cayetana-Heredia; Hispanic; Endangered Polylophus forests of Apurimac

Michael Hilchey; 2009-2013; UNM; Phylogeography of the Curve-billed Thrasher in New Mexico.; Undergraduate thesis in progress

José Huaroto; 2012; Univ. Agraria La Molina, Lima-Peru; Hispanic; Avifauna of elevational gradients in the Marañon region

Jason Kitting; 2012; UNM; Red Blood Cell Concentration in Birds.

Sabrina McNew; 2010-2012; UNM; Avian malaria diversity across an elevational gradient; current NSF-GRF Fellow and doctoral student at Univ. Utah.

Matthew O'Donnell; 2010-2012; UNM; Microscopy surveys for avian malaria.

Iris Olivas; 2011-2013; UNM; Hispanic; MARC Program; Malaria prevalence across environmental gradients in Peru; Undergraduate thesis in progress

Paloma Ordoñez; 2012; Univ. Agraria La Molina, Lima-Peru; Hispanic; Avifauna of elevational gradients in the Marañon region

Erika Pohl; 2011-2013; UNM; Lab techniques in ornithology.

Travis Romero; 2012-2013; UNM; Hispanic; Bird specimen curation

Ashley Smiley; 2010-2013; UNM; Navajo; UNO and MARC Programs; Avian cardiac morphology; Undergraduate thesis in progress

Rosemary Steinberg; 2012-2013; UNM; Genetic and plumage variation in Cassin's Finches.; Undergraduate thesis in progress

Raymond VanBuskirk; 2009-2013; UNM; Rosy Finch PCR-based sex determination.; Undergraduate thesis in progress.

Karen Verde; 2012; Univ. Agraria La Molina, Lima-Peru; Hispanic; Avifauna of elevational gradients in the Marañon region.

Cole Wolf; 2011-2013; UNM; Yellow-rumped Warbler ecology and genetic variation in New Mexico.

MUSEUM ASSOCIATES

Curatorial Associates

Robert W. Dickerman
John P. Hubbard

Research Associates

Sartor O. Williams, III
C. Gregory Schmitt
Donna C. Schmitt
Mary Alice Root (deceased 31 Jan 2013)
J. David Ligon

DIVISION OF FISHES

DIVISION HIGHLIGHTS

Currently, the MSB Division of Fishes has 87,807 catalogued lots of fishes (3,822,727 specimens). During the year, 1,118 lots of fishes (16,923 specimens) were cataloged and integrated into the main collections. To date, there are 49,616 digital files of field notes, habitat photographs, specimens (for color), and data sheets available along with 38,878 specimen locality records. 2012 funding, through grants and contracts, was \$566,360 and supported ichthyological research, aquatic studies, and museum curation of fish collections.

Thomas F. Turner, Curator of Fishes took sabbatical leave January to August 2012. During this time, he collaborated with Thomas Dowling and Paul Marsh, Arizona State University on genetics and management of Razorback Sucker (*Xyrauchen texanus*) in the lower Colorado River with special emphasis on developing time-series analyses to understand the species demographic and genetic responses to management actions. He also collaborated with Keith B. Gido, Kansas State University and David L. Propst, New Mexico Dept. of Game and Fish (retired) on design and implementation of an aquatic ecosystem monitoring program in the upper Gila River to evaluate responses to the recent Whitewater-Baldy Fire.

Stephen T. Ross, Curator Emeritus was elected to the Board of Governors of the American Society of Ichthyologists and Herpetologists, Class of 2017.

Outreach Summary: Cibola High School Gifted Student Mentor, January to May 2012 (170 hours) Volcano Vista High School Gifted Student Mentor, January to May 2012 (170 hours). Bosque Club, Coronado Elementary After School Program, December 2012, (4 hours).

COLLECTION USE SUMMARY

Collection Growth (lots cataloged)	1118
Loans – outgoing ¹	11
Loans – incoming ²	1
Research Visitors ³	24
Information Requests Answered ⁴	35
Publications Citing/Using MSB Fishes Specimens ⁵	1

¹specimen loans, return of loans, gifts, exchanges, and tissue (consumptive) transfers

²loans, gifts or tissue transfers from other institutions

³research, accessing specimens, or info exchange (not tour groups)/number of visitor days

⁴emails, letters, telephone calls (not tour groups or website “hits”) averaging 1 hour to respond

⁵publications in peer review journals

COURSES USING THE COLLECTIONS

TERM	COURSE	TITLE	STUDENTS
Fall	BIOL 386L	General Vertebrate Zoology Lab	35
	BIOL 204L	Plant and Animal Form and Function	30
	BIOL 203	Ecology and Evolution	210
	BIOL 551	Research Problems	1
	BIOL 599	Master's Thesis	2
	BIOL 651	Advanced Field Biology	1
Spring	BIOL 386L	General Vertebrate Zoology Lab	35
	BIOL 204L	Plant and Animal Form and Function	30
	BIOL 551	Research Problems	2
	BIOL 599	Master's Thesis	2
	BIOL 651	Advanced Field Biology	1
	BIOL 699	Dissertation	1
Summer	BIOL 599	Master's Thesis	1
	BIOL 699	Dissertation	1
December	---	Bosque Club, Coronado Elementary After School Program	15

COURSES TAUGHT BY MSB PERSONNEL

INSTRUCTOR	TERM	COURSE	TITLE	STUDENTS
Turner, T. F.	Fall	BIOL 203	Ecology and Evolution	210
		BIOL 402/502	Ecology and Evolution of Fishes	9
		BIOL 551	Research Problems	1
		BIOL 599	Master's Thesis	2
		BIOL 651	Advanced Field Biology	1
	Spring	BIOL 551	Research Problems	2
		BIOL 599	Master's Thesis	2
		BIOL 651	Advanced Field Biology	1
		BIOL 699	Dissertation	1
	Summer	BIOL 599	Master's Thesis	1
BIOL 699		Dissertation	1	
Krabbenhoft, C.A.	Spring	BIOL 496L	Limnology	6

COLLECTION MANAGEMENT

Graduate student Curatorial Assistant, Tracy A. Diver, devised a protocol for freeze drying fish specimen tissues for long-term storage in the MSB fish collections and conservation of DNA. Using a Labconco Freeze Fryer (purchased by the Conservation Services, New Mexico Dept. of Game and Fish), Diver processed over 1,500 tissues from a Rio Grande cutthroat trout study (ACC2002-VIII:21) and *Etheostoma* spp. collections from the early 1990s (ACC1998-XI:11). This work was continued by Corey L. Krabbenhoft, Graduate Student Curatorial Assistant, summer of 2012 and Alyssa R. Hopkins, fall 2012.

Four undergraduate 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 postdoctoral research, conducted in the Turner Lab by Megan J. Osborne, Ph.D. and Evan W. Carson, Ph.D.

AWARDS, GRANTS, AND CONTRACTS

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. R11AP40025. A.M. Snyder PI and T.F. Turner CoPI. U.S. Bureau of Reclamation. Total Award (UNM): \$146,425. 1 April 2011 to 31 March 2015. **Annual budget \$ 31,066**

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.**

Collaborative Research: CSBR: Natural History Collections: Georeferencing U.S. Fish Collections: a community-based model to 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.**

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.**

Assessment and monitoring of Rio Grande silvery minnow genetics. T.F. Turner PI and M.J. Osborne CoPI. US Bureau of Reclamation, Middle Rio Grande ESA Collaborative Program. Total Award (UNM): \$772,000 (based on annual renewals) 1 October 2007 to 30 September 2012. **Annual budget \$172,794.**

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.**

Baseline Genetic Studies of Fishes Native to the Gila River Basin. T.F. Turner PI and T.J. Pilger CoPI. New Mexico Department of Game and Fish. Total Award (UNM): \$10,000 1 July 2011-30 June 2012. **Annual Budget \$10,000.**

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.**

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.**

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): \$146,414. 1 April 2012 to 30 September 2013. **Annual budget \$73,000.**

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**

Conservation priorities for Great Plains fish communities based on riverscape connectivity and genetic integrity of populations. K.B. Gido PI, J.S. Perkin, T.F. Turner, M. J. Osborne, E.R. Johnson, K.B. Mayes CoPIs. (UNM share \$50,000). U.S. Bureau of Reclamation. Total Award (UNM): \$168,000 1 October 2012 to 30 September 2014. **Annual budget (UNM) \$25,000**

Microsatellite development and analysis of genetic diversity and effective population size in the Julimes pupfish, *Cyprinodon julimes*. Pronatura Noreste, A.C., Mexico. E.W. Carson. Total Award (UNM): \$4,500. 1 January-31 December 2012. **Annual Budget \$4,500**

PUBLICATIONS

Journal Articles

Carson, E. W., M. Tobler, W. L. Minckley, R. J. Ainsworth, and T. E. Dowling. 2012. Relationships between spatio-temporal environmental and genetic variation reveal an important influence of exogenous selection in a pupfish hybrid zone. *Molecular Ecology* 21:1209-1222.

Dugas, M.D. and N.R. Franssen. 2012. Red shiners (*Cyprinella lutrensis*) have larger eyes in turbid habitats. *Canadian Journal of Zoology*. 90:1431-1436

Franssen, N.R. 2012. Genetic structure of a native cyprinid in a reservoir-altered stream network. *Freshwater Biology*. 57:155-165.

Gillette, D.P., A.M. Fortner, N.R. Franssen, S. Cartwright, C.M. Franssen, J. Wesner, P.C. Reneau, F.H. Reneau, I.B. Schlupp, E.C. Marsh-Matthews, W.J. Matthews, and C.W. Lee. 2012. Patterns of change over time in darter assemblages of northeast Oklahoma. *Ecography* 35:1-10.

Pilger, T. J. and K. B. Gido. 2012 Variation in unionid assemblages between streams and a reservoir within the Kansas River basin. *The American Midland Naturalist* 167: 356-365.

Osborne, M. J., E.W. Carson, and T.F. Turner. 2012. Genetic monitoring and complex population dynamics: insights from a 12-year study of the Rio Grande silvery minnow. *Evolutionary Applications* 5(6):553-574.

Osborne, M. J., A. Sharp, J.A. Monzingo, D. L. Propst, and T. F. Turner. 2012. Genetic analysis suggests high conservation value of peripheral populations of Chihuahua chub (*Gila nigrescens*). *Conservation Genetics* 13: 1317-1328

Trujillo, J.D., T.J. Pilger, M.R. Douglas, M.E. Douglas, and T.F. Turner. 2012. Microsatellite markers for Longfin Dace, *Agosia chrysogaster*, a sentinel fish species in imperiled arid-land rivers of the Sonoran Desert. *Conservation Genetics Resources* 4:927-929.

Turner, T.F., and M.S. Edwards. 2012. Aquatic food web structure of the Rio Grande assessed with stable carbon and nitrogen isotopes. *Freshwater Science* 31:825-834.

Vidal, R. R., E. W. Carson, and J. R. Gold. 2012. Population structure in Chilean hake (*Merluccius gayi*) along the western (Pacific) coast of South America as revealed by mitochondrial DNA sequences. *Journal of Fish Biology* 81:1763-1772.

Technical Reports

Brandenburg, W. H., and M. A. Farrington. 2012. San Juan River 2011 Colorado pikeminnow and razorback sucker larval fish survey. Research report submitted to San Juan River Implementation Recovery Program. 50pp.

De la Maza-Benignos M., J. A. Rodriguez-Pineda, A. De la Mora-Covarrubias, E. W. Carson, M. Quiñones-Martínez, P. Lavín-Murcio, L. Vela-Valladares, Ma de L. Lozano-Vilano, H. Parra-Gallo H, A. Macías-Duarte, T. Lebgue-Keleng, E. Pando-Pando, M. Pando-Pando, M. Andazola-González, A. Anchondo-Najera, G. Quintana-Martínez, J. Zapata-López, I. A. Banda-Villanueva, H. J. Ibarrola-Reyes. 2012. Planes de Manejo y Programa de Monitoreo de Signos Vitales para las Áreas de Manantiales de la UMA El Pandeño; y San Diego de Alcalá en el Desierto Chihuahuense (Management plans and monitoring program of “vital signs” of the spring areas of UMA-El Pandeño and San Diego de Alcalá in the Chihuahuan Desert). Vol 1. Pronatura Noreste, A. C. (Editor). Amigos del Pandeño, A. C. 162 pp.

Dudley, R.K. and S.P. Platania. 2012. Rio Grande silvery minnow population monitoring program results from December 2011 to October 2012. Nine reports to the Middle Rio Grande Endangered Species Act Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 252 pp.

Dudley, R.K. and S.P. Platania. 2012. Rio Grande silvery minnow population monitoring program results from December 2010 to October 2011. Report to the Middle Rio Grande Endangered Species Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 146 pp.

Dudley, R.K., A.L. Barkalow, and S.P. Platania. 2012. Spatial spawning periodicity of Rio Grande silvery minnow during 2012. Report to the Middle Rio Grande Endangered Species Act Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 42 pp.

Dudley, R.K., G.C. White, S.P. Platania, and D.A. Helfrich. 2012. Rio Grande silvery minnow population estimation program results from October 2011. Report to the Middle Rio Grande Endangered Species Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 87 pp.

Dudley, R.K., W.H. Brandenburg, M.A. Farrington, L.E. Renfro, and S.P. Platania. 2012. Distribution and conservation status of fishes in the South Canadian River Drainage, New Mexico. Report to the New Mexico Department of Game and Fish, Santa Fe, NM. 137 pp.

M.A. Farrington, W.H. Brandenburg and S.P. Platania. 2012. Dirty Devil River Ichthyofaunal Survey, 2012. Research report submitted to the U.S. Bureau of Reclamation, Activities to Avoid Jeopardy Program. 24pp.

Franssen, N.R., K.B. Gido, and E.I. Gilbert. 2012. Trophic relations of Colorado pikeminnow (*Ptychocheilus lucius*) and its prey in the San Juan River. Report to New Mexico Game and Fish. 17 pp.

Osborne, M. J. and T.F. Turner. 2012. Genetic monitoring of the Rio Grande silvery minnow: Genetic status of wild and captive stocks in 2012. Report to the Middle Rio Grande Endangered Species Act Collaborative Program, USBR Albuquerque NM. 29 pp.

Pilger, T.J. and T.F. Turner 2012. Baseline genetic studies of fishes native to the Gila River Basin, Phase II. New Mexico Department of Game and Fish, Share with Wildlife Program Report. 22 pp.

Snyder, A.M. and T.F. Turner. 2012. Accession and curation of fish collections received from the USFWS New Mexico Fish and Wildlife Conservation Office by the University of New Mexico, Museum of Southwestern Biology. Contract 201819G905. Annual Report to USFWS, Albuquerque NM. 15 pp. plus appendix 135 pp.

Snyder, A.M. and T.F. Turner. 2012. Curation of the 2011 San Juan River collections of fishes, University of New Mexico, Museum of Southwestern Biology. Award R11AP40025. Annual Report to San Juan River Basin Recovery Implementation Program, US Bureau of Reclamation, UT.

22 pp.

Snyder, A.M. and T.F. Turner. 2012. 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

Theses and Dissertations Completed

Corey A. Krabbenhoft, Master of Science. July 2012. T. F. Turner advisor, C. N. Dahm, B. O. Wolf committee members. Thesis: The contribution of young-of-year fishes to aquatic food web dynamics in an arid-land river system (Rio Grande, New Mexico).

Trevor J. Krabbenhoft, Ph.D. July 2012. T.F. Turner advisor, C. Cunningham, S. C. Collins, and K.M. O'Malley committee members. Thesis: Reproductive phenology in fishes of the Rio Grande, New Mexico: A genes-to-community approach.

Brittany S. Barker, Ph.D. July 2012. J.A. Cook advisor, R.B. Waide, **T. F. Turner**, J. A. Rodriguez-Robles committee members. Thesis: Historic and topographic drivers of tropical insular diversity: comparative phylogeography of two ecologically distinctive Puerto Rican frogs (genus *Eleutherodactylus*)

Work In Progress

Osborne, M.J., T. Perez, C.S. Altenbach, and T.F. Turner. *In Press*. Genetic analysis of captive spawning strategies for the endangered Rio Grande Silvery Minnow. *Journal of Heredity*.

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

Dowling, T. E., T. F. Turner, E. W. Carson, M. J. Saltzgeber, D. Adams, B. Kesner, and P. C. Marsh. *In Review*. Genetic and demographic responses to intensive management of razorback sucker (*Xyrauchen texanus*, Family Catostomidae) in Lake Mohave, Arizona-Nevada. *Evolutionary Applications*.

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

Krabbenhoft, T.J., S.P. Platania, and T. F. Turner. *In Review*. Reproductive timing in a riverine fish community converges due to climate-induced changes in flow regime. *Freshwater Biology*.

Dixon, D. S., and T. F. Turner. *In Review*. An economic model of a genetically sustainable fishery. *Journal of Environmental Economics and Management*.

Gido, K. B., T. J. Pilger, D. L. Propst, T. F. Turner, and J. E. Whitney. *In Review*. Connecting the dots: Integrating life history and metacommunity theories to enhance native fish conservation. *Bioscience*.

Hoagstrom, C. W. and T. F. Turner. 2012. *In Review*. Recruitment ecology and conservation of pelagic-broadcast spawning minnows. *Fish and Fisheries*.

Carson, E. W., H. Espinosa-Pérez, and V. Souza. *In Press*. Low mitochondrial DNA sequence variation in the microendemic Cuatro Ciénegas platyfish *Xiphophorus gordonii*. *Western North American Naturalist*.

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*.

Franssen, N.R. and M. Tobler. *In Press*. Upstream effects of a reservoir on fish assemblages 45 years

following impoundment. *Journal of Fish Biology*.

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

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

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

Clements, M.D., H.L. Bart, and D.L. Hurley. 2012. A different perspective on the phylogenetic relationships of the Moxostomatini (Cypriniformes: Catostomidae) based on cytochrome-b and Growth Hormone intron sequences. *Molecular Phylogenetics and evolution* 63: 159-167.

ACTIVITIES IN LEARNED SOCIETIES

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

Franssen, N.R. Reservoirs as a model system to investigate contemporary evolution. Michael Blum Laboratory Seminar. Tulane University, New Orleans, LA. April 2012.

Krabbenhoft, T.J. Reproductive phenology in fishes of the Rio Grande, New Mexico. Knouft Laboratory Seminar. St. Louis University, St. Louis, MO. October 2012.

Osborne, M. J., and Turner T. F. "Wild at Heart": maintaining genetic diversity in an endangered species using alternative breeding and rearing strategies. Evolutionary ecology of protected species - refuges and restoration. Desert Fishes Council Annual Meeting, Death Valley, CA. 17-23 November 2012.

Pilger, T. J., and T. F. Turner. Gene flow and habitat connectivity in the Gila River: which native fish species are most susceptible to negative effects of habitat fragmentation? Ecology and management of western native fishes. Western Division of the American Fisheries Society Annual Meeting, Jackson, WY. 26 - 29 March 2012.

Saltzgeber, M., T. Dowling, P. Marsh, and T. F. Turner. Reproductive success of individual razorback suckers in impounded backwaters. Invited Symposium Speakers: Evolutionary ecology of protected species - refuges and restoration. Desert Fishes Council Annual Meeting, Death Valley, CA. 17-23 November 2012.

Turner, T. F., C. A. Krabbenhoft, and A. S. Burdett. Trophic dynamics of refugial pools in an arid-land river depends on location and timing. Research advances and conservation challenges in temporary river systems. Society for Freshwater Science Meeting, Louisville, KY. 20-24 May 2012

Turner, T. F. Retrospective stable isotope analysis reveals ecosystem-level responses to river regulation over the last century. Departmental Seminar, University of Southern Mississippi, Hattiesburg, MS. 10 Feb 2012.

Turner, T. F. Retrospective stable isotope analysis reveals ecosystem-level responses to river regulation over the last century. Departmental Seminar, University of Toronto, Toronto, ON. Canada. 28 Sep 2012.

Turner, T. F. Retrospective stable isotope analysis reveals ecosystem-level responses to river regulation over the last century. Departmental Seminar, Western Kentucky University, Bowling Green, KY. October 2012.

Contributed Talks and Posters (Presenters' name in bold)

Brandenburg, W.H., M.A. Farrington. *Results of the 2011 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 2012.

Carson, E. W., M. De la Maza Benignos, L. Lozano-Vilano, L. Vela-Vallardes, and I. Banda-Villanueva. 2012. *Pupfishes of Chihuahua, how do your springs flow?* 44th Annual Meeting of the Desert Fishes Council, Death Valley, CA. November 2012.

De la Maza Benignos, M., **E. W. Carson**, L. Lozano-Vilano, L. Vela-Vallardes, and I. Banda-Villanueva. 2012 *The Cyprinodon julimes experiment: a case study for development of a broadly effective conservation model in Mexico*. 44th Annual Meeting of the Desert Fishes Council, Death Valley CA. November 2012.

Diver, T.A., Turner, T. F. and M. J. Osborne. The evolution and maintenance of deeply divergent lineages of Red Shiner, *Cyprinella lutrensis*, in the Rio Grande watershed. Desert Fishes Council 44th Annual Meeting, Death Valley, CA. November 2012.

Diver, T.A., T.F. Turner, and M.J. Osborne. The evolution and maintenance of deeply divergent lineages of Red Shiner, *Cyprinella lutrensis*, in the Pecos River, New Mexico. UNM Department of Biology 21th Annual Research Day Albuquerque, NM. April 2012.

Dixon, D. S., and T. F. Turner. An economic model of a genetically sustainable fishery. Association of Environmental and Resource Economists (AERE) Summer Conference, Asheville, NC. June 2012.

Hopkins, A. R. Life history variation of *Gambusia nobilis* (Pecos Gambusia) at Bitter Lake National Wildlife Refuge. Desert Fishes Council 44th Annual Meeting, Death Valley, CA. November 2012.

Krabbenhoft, C.A., A.S. Burdett, and T.F. Turner. The contribution of young-of-year fishes to food web dynamics in the Rio Grande. Desert Fishes Council 44th Annual Meeting, Death Valley, CA. November 2012.

Krabbenhoft TJ, Turner TF (2012) Comparative genomics of reproduction and circadian rhythms in fishes. Ecological Genomics Symposium, Kansas City, MO. October 2012.

Pilger, T.J., and T.F. Turner. Gene flow and habitat connectivity in the Gila River: which native species are most susceptible to negative effects of habitat fragmentation? Fourth Natural History of the Gila Symposium, Silver City, NM. October 2012.

Pilger, T.J., and T.F. Turner. Comparative Population Genetics of Gila River Fishes: Life History Influences on Genetic Diversity and Gene Flow. Desert Fishes Council 44th Annual Meeting, Death Valley, CA. November 2012.

Ross, S. T. Ecology of North American Freshwater Fishes- A forthcoming textbook from the University of California Press. Desert Fishes Council 44th Annual Meeting, Death Valley, CA. November 2012.

Snyder, A.M. Curating and managing project-based collections of fishes. World Congress of Herpetology and 92nd American Society of Ichthyologists and Herpetologists, Vancouver, BC, Canada. August 2012.

Stewart, L.K., N.R. Franssen, and J.F. Schaefer. Morphological diversification and flow-induced plasticity in *Cyprinella venusta*. (poster). Southeastern Fishes Council. New Orleans, LA. November 2012.

Trujillo, J., T.J. Pilger M.R. Douglas, M.E. Douglas and T.F. Turner. Development of Microsatellite Markers for Longfin Dace, *Agosia chrysogaster*. University of New Mexico Annual Department of Biological Sciences Research Day, Albuquerque, NM. April 2012

Turner, T. F., and M. J. Osborne. From pariah to panacea and back: genetic monitoring in recovery planning for the endangered Rio Grande silvery minnow. World Congress of Herpetology and 92nd American Society of Ichthyologists and Herpetologists, Vancouver, BC Canada. August 2012.

Zamor, R.M., N.R. Franssen, C. Porter, T.M. Patton, and K.D. Hambright. Temporal effects of a toxic algae (*Prymnesium parvum*) bloom on fish communities in Lake Texoma (OK-TX). American Fisheries Society Oklahoma Chapter Annual Meeting, Stillwater, OK. February 2012.

Attendance at Professional Meetings

Brandenburg, W.H.

San Juan River Recovery Implementation Program, Biology Committee. Fort Lewis College, Durango, CO. 21-23 Feb 2012.

Carson, E.W.

Desert Fishes Council 44th Annual Meeting, Death Valley, CA. 14-18 November 2012.

Diver, T.A.

Desert Fishes Council 44th Annual Meeting, Death Valley CA. 14-18 November 2012.

Farrington, M.A.

San Juan River Recovery Implementation Program, Biology Committee. Fort Lewis College, Durango, CO. 21-23 Feb 2012.

Hopkins, A.R.

Desert Fishes Council 44th Annual Meeting, Death Valley CA. 14-18 November 2012.

Krabbenhoft, C.A.

Desert Fishes Council 44th Annual Meeting, Death Valley, CA. 14-18 November 2012.

Krabbenhoft, T.J.

Ecological Genomics Symposium, Kansas City, MO. 25-28 October 2012.

Osborne, M.J.

Desert Fishes Council 44rd Annual Meeting, Death Valley, CA. 14-18 November 2012.

Pilger, T.J.

Western Division of the American Fisheries Society Annual Meeting, Jackson, WY. 26-29 March 2012.

Fourth Natural History of the Gila Symposium, Silver City, NM. 25-27 October 2012.

Desert Fishes Council 44th Annual Meeting, Death Valley CA. 14-18 November 2012.

Ross, S.T.

World Congress of Herpetology and 92nd Annual Meeting for American Society of Ichthyologists and Herpetologists, Vancouver, BC Canada. 8-14 August, 2012.

Desert Fishes Council 44th Annual Meeting, Death Valley, CA. 14-18 November 2012.

Snyder, A.M.

World Congress of Herpetology and 92nd Annual Meeting for American Society of Ichthyologists and Herpetologists, Vancouver, BC Canada, 8-14 August, 2012.

Turner, T.F.

Desert Fishes Council Annual Meeting, Death Valley, CA. 17-23 November 2012.

World Congress of Herpetology and 92nd Annual Meeting for American Society of Ichthyologists and Herpetologists, Vancouver, BC Canada. 8-14 August, 2012.

Association of Environmental and Resource Economists (AERE) Summer Conference, Asheville, NC. 3 – 5 June 2012.

Society for Freshwater Science Meeting, Louisville, KY. 20-24 May 2012.

Colorado River Aquatic Biologists Meeting, Laughlin, NV. 11-12 January 2012.

Service as Editor or on Editorial Board of a Journal

Franssen, N.R.

Contributing Editor – Southeastern Naturalist, since 2012.

Turner, T. F.

Contributing Editor – Aquatic Biology since 2009.

Service as Officer of Professional Society/Organization

Diver, T.A.

Social Chair, Biology Graduate Student Association (BGSA) Department of Biology, University of New Mexico. 2012

Pilger, T.J.

Co-President, Biology Graduate Student Association (BGSA) Department of Biology, University of New Mexico. 2012

Ross, S.T.

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.

Snyder, A.M.

Board of Governors, American Society of Ichthyologists and Herpetologists, 2011-2016.

Local Committee for the 2013 Joint Meeting of Ichthyologists and Herpetologists, Albuquerque NM.

Turner, T. F.

Chair, Local Committee, 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.

Member, Education and Human Resources Committee, American Society of Ichthyologists and Herpetologists, 2009-2012.

OTHER PROFESSIONAL ACTIVITIES

Presentation to General Audience in a Scholarly Capacity

R.K. Dudley and S.P. Platania. Rio Grande silvery minnow population monitoring (1993-2011). Middle Rio Grande Endangered Species Collaborative Program (Science Subcommittee), New Mexico Office of the State Engineer - Interstate Stream Commission (Albuquerque District Office), Albuquerque, NM. 20 March 2012.

R.K. Dudley, G.W. White, S.P. Platania, and D.A. Helfrich. Rio Grande silvery minnow population estimation / site occupancy (2005-2011). Middle Rio Grande Endangered Species Collaborative Program (Science Subcommittee), New Mexico Office of the State Engineer - Interstate Stream Commission (Albuquerque District Office), Albuquerque, NM. 20 March 2012.

R.K. Dudley and S.P. Platania. Spawning periodicity of Rio Grande silvery minnow (1999, 2001-2004, 2006-2012). Middle Rio Grande Endangered Species Collaborative Program (Science Subcommittee), New Mexico Office of the State Engineer - Interstate Stream Commission (Albuquerque District Office), Albuquerque, NM. 18 September 2012.

A. R. Hopkins. Life history variation of *Gambusia nobilis* (Pecos Gambusia) at Bitter Lake National Wildlife Refuge. Brown Bag Seminar, Department of Biology, University of New Mexico, Albuquerque, NM. April 2012.

C.A. Krabbenhoft. The contribution of young-of-year fishes to aquatic food web dynamics in an arid-land river system (Rio Grande, New Mexico). Master's Thesis Defense, Department of Biology, University of New Mexico. Albuquerque, NM. May 2012.

C.A. Krabbenhoft. Benthic Invertebrates. BIOL. 495 Limnology, C. Dahm, University of New Mexico, Albuquerque, NM. April 2012.

C.A. Krabbenhoft. Aquatic Insects. BIOL. 495 Limnology, C. Dahm, University of New Mexico, Albuquerque, NM. April 2012.

C.A. Krabbenhoft. Paleolimnology. BIOL. 495 Limnology, C. Dahm, University of New Mexico, Albuquerque, NM. April 2012.

T.J. Krabbenhoft. Reproductive phenology in fishes of the Rio Grande, New Mexico: A genes-to-community approach. Dissertation Defense. University of New Mexico, Albuquerque, NM. May 2012.

T. F. Turner. Status of Gila Trout Genetic Monitoring. Gila Trout and Chihuahua Chub Recovery Team Meeting. New Mexico Fish & Wildlife Conservation Office, 12-14 December 2012.

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

M.J. Osborne. Genetic analysis suggests high conservation value of peripheral populations of Chihuahua chub (*Gila nigrescens*). Annual Meeting of Gila Trout and Chihuahua Chub Recovery Team, USFWS Field Office, Albuquerque, NM. 13-14 December 2012

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

Carson, E. W.

Technical advisor, Conocimiento y conservación de la biodiversidad del Churince, Cuatro Ciénegas, Coahuila, Universidad Nacional Autónoma de México (UNAM) and Pronatura Noreste, A. C., Monterrey, NL México. 2012

Dudley, R.K.

Technical Advisor, Recovery Team for Rio Grande silvery minnow (*Hybognathus amarus*), US Fish and Wildlife Service.

Technical Advisor, Middle Rio Grande Endangered Species Act Collaborative Program, PVA Biology Group.

Osborne, M. J.

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, 21st Annual Research Day, Department of Biology, University of New Mexico 2012

Ross, S.T.

Judge, Storer Award Committee, Ichthyology, World Congress of Herpetology and American Society of Ichthyologists and Herpetologists, Vancouver, BC, Canada August 2012.

Member, Speed Networking Workshop for graduate students, Joint Meeting of Ichthyologists and Herpetologists, Vancouver, BC Canada. August 2012.

Member, Peer Review Panel, San Juan River Basin Recovery Implementation Program. 2012.

Snyder, A.M.

Scientific Member, UNM Institutional Animal Care and Use Committee. 2010-2013.

Turner, T.F.

UNM Biology Department Third-Floor Space Committee (Ad-hoc).

UNM Biology Department Tenure and Promotion Committee.

Judge, Stoye Award in Conservation, World Congress of Herpetology and American Society of Ichthyologists and Herpetologists, Vancouver, BC, Canada August 2012.

Journal Referee

E.W. Carson

Environmental Biology of Fishes (2)
Evolutionary Ecology (1)
Genetica (1)
Journal of Experimental Marine Biology (1)
Journal of Fish Biology (1)
Pan-American Journal of Aquatic Sciences (1)
PlosOne (1)

N.R. Franssen

Ecology of Freshwater Fish (1)
Southeastern Naturalist (2)
Hydrobiologia (2)
Journal of Fish Biology (1)
Copeia (1).

T.J. Krabbenhoft

African Journal of Agricultural Research (1)
Biological Journal of the Linnean Society (1)

Journal of Fish Biology (2)
Journal of Freshwater Ecology (1)
Marine Biotechnology (1)
Zootaxa (1)

M.J. Osborne

Molecular Ecology (2)
Molecular Phylogenetics and Evolution (1)
Journal of Heredity (1)
Heredity (1)
Immunogenetics (1)

T.J. Pilger

Copeia (1)
Ecology of Freshwater Fishes (1)
Hydrobiologia (1)
Journal of Fish Biology (1)

T.F. Turner

Aquatic Biology (2)
Journal of Heredity (2)
Genetics (1)
Molecular Ecology (2)
Hydrobiologia (2)
Evolutionary Applications (1)
Evolutionary Ecology (1)
National Science Foundation Proposals (2)

SERVICE

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

M. J. Osborne

Special Symposium: Evolutionary Ecology of Protected Species: Refuges & Restoration. Desert Fishes Council 44th Annual Meeting, Death Valley, CA. 14-18 November 2012.

Public Service

W.H. Brandenburg

Lecture, Coronado Elementary Bosque Club, After school program, December 2012, 15 students (3rd - 5th grade)

T.A. Diver

Habitat Restoration, Albuquerque Wildlife Federation, Albuquerque, NM. 2012

C.A. Krabbenhoft

Lecture, Grade School/Aquatic Science Outreach Day, Erdenebulgan, Mongolia, July 2012.

A.M. Snyder

Student Mentor, Cibola High School, Albuquerque NM. January to May 2012 (170 hours).
Student Mentor, Volcano Vista High School, Albuquerque NM. January to May 2012 (170 hours).

T.F. Turner

Member, Gila Trout and Chihuahua Chub Recovery Team. January to December 2012.
Member, Rio Grande Silvery Minnow Propagation and Genetics Workgroup. January to December 2012.

Panelist, Gila River Exhibit Development and Planning Workshop. New Mexico Museum of Natural History. 2012.

ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

Diver, T.A. 3rd Place for best Graduate Student Poster at the 21st Annual UNM Biology Department Research Day

Krabbenhof C.A. Clifford Crawford Scholarship, Department of Biology, University of New Mexico. \$1500.

Krabbenhof C.A. Alvin R. & Caroline G. Grove Summer Research Scholarship, Department of Biology, University of New Mexico. \$1000.

Krabbenhof C.A. International Research Experience for Students stipend, Rutgers, The State University of New Jersey (NSF). \$2000.

Krabbenhof T.J. and N. Mercado-Silva. US-Mongolia Field Fellowship, American Center for Mongolian Studies. \$8,000.

Krabbenhof T.J. Student participant: NSF International Research Experiences for Students. Five weeks field research in Mongolia.

Pilger T.J. Student Conference Award Program, Career Services, University of New Mexico. \$600.

CURRENT STAFF

Faculty/Staff

Evan W. Carson, Research Assistant Professor
Nathan R. Franssen, Postdoctoral Researcher
Kylie R. Naegele, Staff Curatorial Assistant
Megan J. Osborne, Research Assistant Professor
Steven P. Platania, Associate Curator of Fishes
Stephen T. Ross, Curator Emeritus and UNM Adjunct Professor of Biology
Alexandra M. Snyder, Collections Manager
Thomas F. Turner, Curator of Fishes and MSB Director

Graduate students

Museum Research Assistants-Graduate Student TA

Tracy A Diver, Spring 2012
Corey A. Krabbenhof, Summer 2012
Alyssa R. Hopkins, Fall 2012

MSB Fishes Graduate Students, UNM Biology

Mary A. Brandenburg, M.Sci. student
Tracy A. Diver, M.Sci. student
Michael A. Farrington, M.Sci. student
Corey A. Krabbenhof, M.Sci. completed 2012
Trevor J. Krabbenhof, Ph.D. completed 2012
Tyler J. Pilger, Ph.D. student

Undergraduate Students

Curatorial Assistants

Kendra Brunet Lecomte, A&S Biology
Kaitlin M. Hulsbos, A&S Earth and Planetary Sciences, Graduated December 2012
Kylie R. Naegele, A&S Biology ,Graduated May 2012
Devin Sims, UNM School of Engineering
Maribel Solis, A&S Biology, Graduated December 2012

Research Students

Samantha Sanchez
Hailey Conover
Michelle Sandoval

MUSEUM ASSOCIATES

Curatorial Associates

David L. Propst, Ph.D. Retired, New Mexico Dept. of Game and Fish, Santa Fe

Research Associates

W. Howard Brandenburg, American SW Ichthyological Research, Albuquerque
James E. Brooks, US Fish and Wildlife Service, Albuquerque
Eliza I. Gilbert, MS 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. Arizona State University, Tempe
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, Centro Universitario de la Costa Sur
(Universidad de Guadalajara).

DIVISION OF GENOMIC RESOURCES

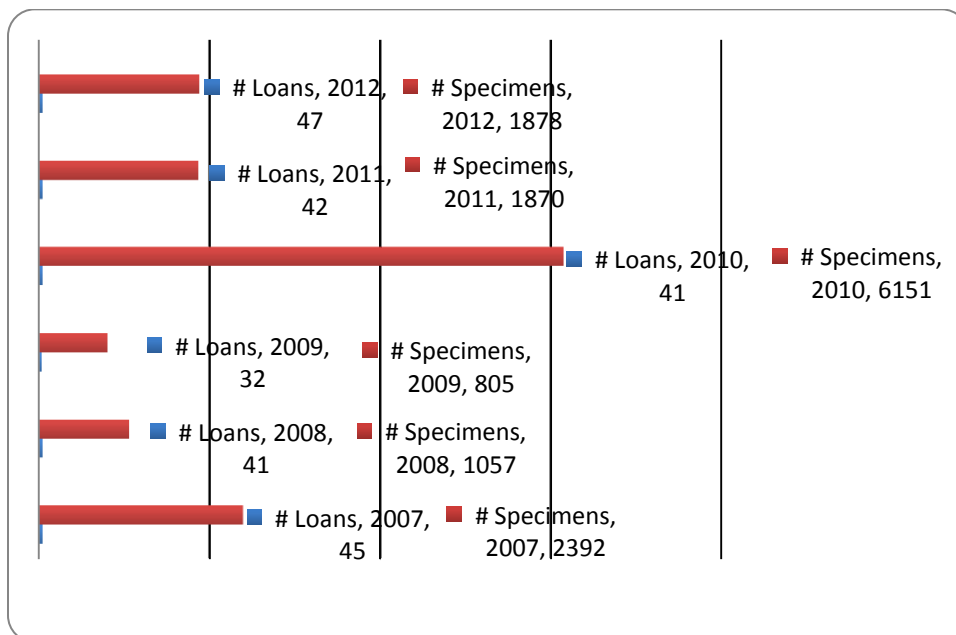
DIVISION HIGHLIGHTS

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 150,000 specimens, including Mammals, Birds, Reptiles and Fishes. The collection is ranked as one of the largest collections of its kind worldwide. In total, 9,000 new NK numbers were issued to the MSB mammal division and used in DGR for projects in Panama, Mongolia, Alaska, Peru, the Pacific Northwest and New Mexico. In 2012 the collection manager processed 41 outgoing loans for the mammal division containing 1, 878 specimens, and 6 loans for the bird division, containing 57 bird specimens to 14 states, and 4 foreign countries, including 22 tissue loans for UNM students. DGR consistently adds approximately 20,000 new tissues to the collection every year.

COLLECTION USE SUMMARY

Collection Growth	20000
Loans - outgoing	47
Loans - incoming	0
Visitors	200
Information Requests Answered	>500
Publications Citing/Using MSB DGR Specimens	41

DGR Loans 2007 - 2012



MSB mammal specimens archived 2012 = 3209 specimens, 281 species in multiple tubes.

MSB bird specimens archived 2012 = 1038 specimens, 347 species in single tubes.

COURSES USING THE COLLECTIONS

**UNM classes receiving loans of material for educational purposes
(13 classes serving 1,125 students)**

TERM	COURSE	TITLE	STUDENTS
Fall	BIOL 599	Masters Thesis	1
	BIOL 699	Dissertation	3
	NTSC 262L		36
Spring	BIOL 599	Masters Thesis	1
	BIOL 699	Dissertation	3
	NTSC 262L		53

UNM courses or programs using collection through staff presentations

TERM	COURSE	TITLE	STUDENTS
Fall	BIOL 419/519	Natural History curation/techniques	18
	---	Museum Studies	15
	---	UNM Biology graduate student orientation	25
	---	UNM prospective grad students tour	24
Summer	---	SEIS (Mammals of NM/ Value of Nat Hist Coll)	9

K-12 schools and educational groups

TERM	COURSE	TITLE	STUDENTS
---	---	Microbiology class - St. Pius High School	25

COLLECTION MANAGEMENT

Current projects generating specimens for DGR

- Beringian Coevolution Project - NSF
- Mexican wolf reintroduction – USFWS
- Mongolian Vertebrate Parasite Project – NSF
- Panama Hantavirus – ICIDR NIH
- Panama Climate Change Project - STRI/Gorgas
- Bighorn Sheep Reintroduction Program – NMGF
- ISLES---USDA Forest Service
- Jackson Whitman Idaho collection
- Black bear /elk predation project – NMDGF
- Mammalogy and Tropical Biology classes
- Valles Caldera National Preserve

Peru Birds - Witt
Mammal & Bird Prep Room

The majority of DGR staff time was spent

Preparation, cataloging and installation of museum specimens
Data entry for the incoming accessions
Filling information requests
Processing loan material
Assisting with UNM courses utilizing MSB specimens and facilities
Equipment maintenance
Alarm systems maintenance
Computer maintenance
Procuring Supplies

AWARDS, GRANTS, AND CONTRACTS

(SEE OTHER DIVISIONS)

Technical Reports

University of New Mexico, Museum of Southwestern Biology, Division of Genomic Resources: Annual Report. Joseph A. Cook and Cheryl A. Parmenter.

Theses/Dissertations Completed

Frederick S. Winslow. 2012. Effects of Translocation and Climatic Events on the Population Genetic Structure of Black Bears in New Mexico. Master's Thesis. University of New Mexico, Department of Biology.

124 Cited Specimens

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

DGR specimens: Mammals and Birds. These publications will also be listed for the individual divisions in their reports.
Abramson, Natalia I., Tatyana V. Petrova, Nikolai E. Dokuchaev, Ekaterina V. Obolenskaya & Andrey A. Lissovsky. 2012. Phylogeography of the gay red-backed vole *Cruseomys rufocanus* (Rodentia: Cricetidae) across the distribution range inferred from nonrecombining molecular markers. *Russian Journal of Theriology* 11(2): 137-156
18 Cited Specimens

John J. Andersen and Jessica E. Light. 2012. Phylogeography and subspecies revision of the hispid pocket mouse, *Chaetodipus hispidus* (Rodentia: Heteromyidae). *Journal of Mammalogy*, 93 (4):1195-1215.
15 Cited Specimens
<http://dx.doi.org/10.1644/11-MAMM-A-341.3>

John J. Andersen, Mark A. Renshaw, Jessica E. Light. 2012. Eight novel polymorphic microsatellites in the hispid pocket mouse (*Chaetodipus hispidus*) and cross-amplification in other Perognathinae species (Rodentia: Heteromyidae). *Conservation Genetics Resources*.
MSB specimens
<http://dx.doi.org/10.1007/s12686-012-9697-3>

Boric-Bargetto, Dusan, Enrique Rodríguez-Serrano, Cristián E. Hernández, Fabian M. Jaksic, R. Eduardo Palma. 2012. Temporal variation in genetic diversity during an outbreak of *Oligoryzomys longicaudatus* (Rodentia, Sigmodontinae) in a temperate forest of southern Chile. *Biochemical Systematics and Ecology* 44:383-389.

79 Cited Specimens

<http://dx.doi.org/10.1016/j.bse.2012.06.009>

Briones-Salas, Miguel, Mario C. Lavariega e Ivan Lira-Torres. 2012. Distribution actual y potencial del jaguar (*Panthera onca*) en Oaxaca, Mexico. *Revista Mexicana de Biodiversidad* 83: 246-257

MSB specimens

Calvert, Allen W., and Sean A. Neiswenter. 2012. Bats in Riparian-Restoration Sites Along the Lower Colorado River, Arizona. *The Southwestern Naturalist* 57(3):340-342.

MSB specimens

<http://dx.doi.org/10.1894/0038-4909-57.3.345>

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. 2012. Cryptic genetic diversity in *Rattus* of the San Francisco Bay region, California. *Biological Invasions*.

10 Cited Specimens

<http://dx.doi.org/10.1007/s10530-012-0323-9>

Doty, Jeffery B., Jerry W. Dragoo, William C. Black, Barry J. Beaty, Charles H. Calisher. 2012. *Peromyscus maniculatus* in eastern Colorado: a subspecies with lower prevalence of Sin Nombre virus infection. *Journal of Mammalogy* 93(1):183-197.

MSB specimens

<http://dx.doi.org/10.1644/11-mamm-a-058.1>

DuBay, Shane G., and Christopher C. Witt. 2012. An improved phylogeny of the Andean tit-tyrants (Aves, Tyrannidae): More characters trump sophisticated analyses. *Molecular Phylogenetics and Evolution* 64(2):285-296.

MSB specimens

<http://dx.doi.org/10.1016/j.ympcv.2012.04.002>

Dunnum, Jonathan L. and Joseph A. Cook. 2012. Gerrit Smith Miller: his influence on the enduring legacy of natural history collections. *Mammalia* 76(4).

<http://dx.doi.org/10.1515/mammalia-2012-0071>

Esselstyn, J. A., B. J. Evans, J. L. Sedlock, F. A. Anwarali Khan, L. R. Heaney. 2012. Single-locus species delimitation: a test of the mixed Yule-coalescent model, with an empirical application to Philippine round-leaf bats. *Proceedings of the Royal Society B: Biological Sciences* 279(1743):3678-3686.

1 Cited Specimens

<http://dx.doi.org/10.1098/rspb.2012.0705>

Fernández, Jesús A., 2012. Phylogenetics and biogeography of the microendemic rodent (Perote ground squirrel) in the Oriental Basin of Mexico. *Journal of Mammalogy* 93(6):1431-1439.

5 Cited Specimens

<http://dx.doi.org/10.1644/11-MAMM-A-409.1>

Geluso, Kenneth N., and Keith Geluso. 2012. Effects of environmental factors on capture rates of insectivorous bats, 1971–2005. *Journal of Mammalogy* 93(1):161-169.

MSB specimens

<http://dx.doi.org/10.1644/11-MAMM-A-107.1>

Gonçalves, Gislene L., Hopi E. Hoekstra, Thales R. O. Freitas. 2012. Striking coat colour variation in tuco-tucos (Rodentia: Ctenomyidae): a role for the melanocortin-1 receptor?. *Biological Journal of the Linnean Society* 105(3):665-680.

4 Cited Specimens

<http://dx.doi.org/10.1111/j.1095-8312.2011.01839.x>

Graham, Zebadiah R., Keith Geluso, Russell A. Benedict. 2012. Notes on the Distribution of Bailey's Eastern Woodrat (*Neotoma floridana baileyi*) in Nebraska . Western North American Naturalist 72(2):252-256.

[1 Cited Specimens](#)

<http://dx.doi.org/10.3398/064.072.0215>

Gunderson, A. M., H. C. Lanier, and L. E. Olson. 2012. Limited phylogeographic structure and genetic variation in Alaska's arctic and alpine endemic, the Alaska marmot. Journal of Mammalogy 93(1):66-75.

[47 Cited Specimens](#)

<http://dx.doi.org/10.1644/10-MAMM-A-380.1>

Han, G. -Z. and M. Worobey. 2012. Endogenous Lentiviral Elements in the Weasel Family (Mustelidae). Molecular Biology and Evolution.

[2 Cited Specimens](#)

<http://dx.doi.org/10.1093/molbev/mss126>

Harding, Larisa E., and Jerry W. Dragoo. 2012. Out of the tropics: a phylogeographic history of the long-tailed weasel, *Mustela frenata*. Journal of Mammalogy, 93(4):1178-1194.

[22 Cited Specimens](#)

<http://dx.doi.org/10.11644/11-MAMM-A-280.1>

Holbrook, Joseph D., Randy W. DeYoung, Jan E. Janecka, Michael E. Tewes, Rodney L. Honeycutt, John H. Young. 2012. Genetic diversity, population structure, and movements of mountain lions () in Texas . Journal of Mammalogy 93(4):989-1000.

[32 Cited Specimens](#)

<http://dx.doi.org/10.1644/11-MAMM-A-326.2>

Hope, Andrew G., Kelly A. Speer, John R. Demboski, Sandra L. Talbot, Joseph A. Cook. 2012. A climate for speciation: Rapid spatial diversification within the *Sorex cinereus* complex of shrews. Molecular Phylogenetics and Evolution 64(3):671-684.

[318 Cited Specimens](#)

<http://dx.doi.org/10.1016/j.ympev.2012.05.021>

Hope, Andrew, G., Naoki Takebayashi, Kurt E. Galbreath, Sandra L. Talbot and Joseph A. Cook. 2012. Temporal, spatial and ecological dynamics of speciation among amphi-Beringian small mammals. Journal of Biogeography,.

[56 Cited Specimens](#)

<http://dx.doi.org/10.1111/jbi.12056>

Hornsby, Angela D., and Marjorie D. Matocq. 2012. Differential regional response of the bushy-tailed woodrat (*Neotoma cinerea*) to late Quaternary climate change. Journal of Biogeography 39(2):289-305.

[24 Cited Specimens](#)

<http://dx.doi.org/10.1111/j.1365-2699.2011.02616.x>

Irwin, Nancy R., Michaela Bayerlová, Olivier Missa, Natália Martínková. 2012. Complex patterns of host switching in New World arenaviruses. Molecular Ecology 21(16):4137-4150.

MSB specimens

<http://dx.doi.org/10.1111/j.1365-294X.2012.05663.x>

Jiménez, F. Agustín, Scott L. Gardner, Graciela Navone, Guillermo Ortí. 2012. Four Events of Host Switching in Aspidoderidae (Nematoda) Involve Convergent Lineages of Mammals. Journal of Parasitology 98(6):1166-1175.

[1 Cited Specimens](#)

<http://dx.doi.org/10.1645/GE-3045.1>

Kalkvik Håkon M., I. Jack Stout, Christopher L. Parkinson. 2012. Unraveling natural versus anthropogenic effects on genetic diversity within the southeastern beach mouse (*Peromyscus polionotus niveiventris*). *Conservation Genetics* 13(6):1653-1664.

MSB specimens

<http://dx.doi.org/10.1007/s10592-012-0417-z>

Kalkvik, Håkon M. I. Jack Stout, Terry J. Doonan, Christopher L. Parkinson. 2012. Investigating niche and lineage diversification in widely distributed taxa: phylogeography and ecological niche modeling of the *Peromyscus maniculatus* species group. *Ecography* 35(1):54-64.

[123 Cited Specimens](#)

<http://dx.doi.org/10.1111/j.1600-0587.2011.06994.x>

Light, Jessica E., John C. Hafner, Nathan S. Upham, Emily Reddington. 2012. Conservation Genetics of Kangaroo Mice, Genus *Microdipodops*. *Journal of Mammalian Evolution*.

[13 Cited Specimens](#)

<http://dx.doi.org/10.1007/s10914-012-9193-2>

Longtin, Sara B. and Robert K. Rose. 2012. Unusually high body mass in Virginia meadow voles. *Journal of Mammalogy* 93(3):743-750.

MSB specimens

<http://dx.doi.org/10.1644/11-MAMM-A-335.1>

Makarikov, Arseny, Scott Gardner, and Eric Hoberg. 2012. New species of *Arostrilepis* (Eucestoda: Hymenolepidiae) in members of Cricetidae and Geomyidae (Rodentia) from the western nearctic. *Journal of Parasitology*, 98(3):617-626.2012

[1 Cited Specimens](#)

<http://dx.doi.org/10.1645/GE-2943.1>

Jason L. Malaney, Jennifer K. Frey, and Joseph A. Cook. 2012. The biogeographic legacy of an imperilled taxon provides a foundation for assessing lineage diversification, demography and conservation genetics. *Diversity and Distributions* (2012)18, 689-703.

[79 Cited Specimens](#)

<http://dx.doi.org/10.1111/j.1472-4642.2011.00866.x>

Martínez, Juan J., Luis I. Ferro, Marcos I. Mollerach, Rubén M. Barquez. 2012. The phylogenetic relationships of the Andean swamp rat genus *Neotomys* (Rodentia, Cricetidae, Sigmodontinae) based on mitochondrial and nuclear markers. *Acta Theriologica* 57(3):277-287.

[1 Cited Specimens](#)

<http://dx.doi.org/10.1007/s13364-011-0070-9>

McDonough, Thomas J., and Aaron M. Christ. 2012. Geographic variation in size, growth, and sexual dimorphism of Alaska brown bears, *Ursus arctos*. *Journal of Mammalogy*, 93(3):686-679.

MSB specimens

<http://dx.doi.org/10.11644/11-MAMM-A-010.1>

Melo-Ferreira, J., P. Boursot, M. Carneiro, P. J. Esteves, L. Farelo, P. C. Alves. 2012. Recurrent Introgression of Mitochondrial DNA Among Hares (*Lepus* spp.) Revealed by Species-Tree Inference and Coalescent Simulations. *Systematic Biology* 61(3):367-381.

[5 Cited Specimens](#)

<http://dx.doi.org/10.1093/sysbio/syr114>

Notarnicola, Juliana, F. Agustín Jiménez, Scott L. Gardner. 2012. A New Species of (Nematoda: Onchocercidae) in Bolivian Rodents and Emended Description of Bain, Petit, and Diagne, 1989. *Journal of Parasitology* 98(6):1200-1208.

[19 Cited Specimens](#)

<http://dx.doi.org/10.1645/GE-3059.1>

Palma, R. Eduardo, Dusan Boric-Bargetto, Fernando Torres-Pérez, Cristián E. Hernández, Terry L. Yates, Sergios-Orestis Kolokotronis. 2012. Glaciation Effects on the Phylogeographic Structure of *Oligoryzomys longicaudatus* (Rodentia: Sigmodontinae) in the Southern Andes. *PLoS ONE* 7(3):e32206.

[203 Cited Specimens](#)

<http://dx.doi.org/10.1371/journal.pone.0032206>

Parada, Andres, Agustina Ojeda, Solana Tabeni & Guillermo D'Elia. 2012. The population of *Ctenomys* from the Nacunan Biosphere Reserve (Mendoza, Argentina) belongs to *Ctenomys mendocinus* Philippi, 1869 (Rodentia: Ctenomyidae): molecular and karyotypic evidence. *Zootaxa* 3402: 61-68

[1 Cited Specimens](#)

Pine, Ronald H., Robert M. Timm, Marcelo Weksler. 2012. A newly recognized clade of trans-Andean *Oryzomyini* (Rodentia: Cricetidae), with description of a new genus. *Journal of Mammalogy* 93(3):851-870.

[1 Cited Specimens](#)

<http://dx.doi.org/10.1644/11-mamm-a-012.1>

Reid, Noah, John R. Demboski, Jack M. Sullivan. 2012. Phylogeny Estimation of the Radiation of Western North American Chipmunks (*Tamias*) in the Face of Introgression Using Reproductive Protein Genes. *Systematic Biology*. 61(1):44-62

[56 Cited Specimens](#)

<http://dx.doi.org/10.1093/sysbio/syr094>

Sonsthagen, Sarah A., Chadwick V. Jay, Anthony S. Fischbach, George K. Sage, Sandra L. Talbot. 2012. Spatial genetic structure and asymmetrical gene flow within the Pacific walrus. *Journal of Mammalogy* 93(6):1512-1524.

[43 Cited Specimens](#)

<http://dx.doi.org/10.1644/11-MAMM-A-344.1>

Sumibcay, Laarni, Blaise Kadjo, Se Hun Gu, Hae Ji Kang, Burton K Lim, Joseph A Cook, Jin-Won Song, Richard Yanagihara. 2012. Divergent lineage of a novel hantavirus in the banana pipistrelle (*Neoromicia nanus*) in Côte d'Ivoire. *Virology Journal* 9(1):34.

[5 Cited Specimens](#)

<http://dx.doi.org/10.1186/1743-422X-9-34>

Robert S. Voss, Ronald H. Pine, and Sergio Solari. 2012. A New Species of the Didelphid Marsupial Genus *Monodelphis* from Eastern Bolivia. *American Museum Novitates*, (3740):1-14.

[5 Cited Specimens](#)

<http://dx.doi.org/http://dx.doi.org/10.1206/3740.2>

Theses and Dissertations Using MSB Specimens

Larm, Ashley. 2012 Investigation of the Evolutionary Origin and History of a Newly Identified Transposable Element in Rodents. Masters Thesis. Eastern Michigan University.

[MSB specimens](#)

O'Neill, Mark Bryan. 2012. Cytochrome-B Variation in Shrews: Application in Systematics and Conservation. Master of Science. Texas Tech University.

[2 Cited Specimens](#)

Rinkevich, Sarah E., 2012. An assessment of abundance, diet, and cultural significance of Mexican Gray wolves in Arizona. Ph.D. Dissertation. University of Arizona.

[MSB Specimens](#)

Schwalm, Donelle L.. 2012. Understanding functional connectivity in shortgrass and mixedgrass prairies using the swift fox as a model organism. Ph.D. Dissertation. Texas Technical University.
[MSB specimens](#)

Tipps, Teresita Marie. 2012 Morphological and Molecular Variation in Townsend's Big-Eared Bat (*Corynorhinus townsendii*) in West Texas. Masters Thesis. Angelo State University.
[5 Cited Specimens](#)

Winslow, Frederick S.. 2012. Effects of Translocation and Climatic Events on the Population Genetic Structure of Black Bears in New Mexico. Masters Thesis. University of New Mexico, Department of Biology.
[124 Cited Specimens](#)

ACTIVITIES IN LEARNED SOCIETIES

Hosting Professional Colleagues and Groups

Parmenter, C.A.

Personally hosted Dr. Greg Glass, Johns Hopkins University and gave a DGR tour and assisted his students in field work planning.

CURRENT STAFF

Faculty/Staff

Joseph A. Cook: Interim-Curator.
Cheryl Parmenter: Collection manager 1.0FTE.

Students

Graduate Assistant Joelene Rearick .025FTE Summer Semester 2012.
Graduate Assistant Bryan McLean .05FTE. Winter & Fall Semesters 2012.

MUSEUM ASSOCIATES

Research Associates

Robert J. Baker, The Museum, Texas Tech University, Lubbock, TX
Troy L. Best, Department of Biology, Auburn University
James Derr, Texas A&M University
Jerry Dragoo, UNM Department of Biology
Jennifer Frey, New Mexico State University,
Scott L. Gardner, Dept. Nematology, Curator, University Nebraska.
Bruce J. Hayward, Department of Biology, Western New Mexico University
Edward J. Heske, Illinois Biological Survey
Dwight W. Moore, Emporia State University
Robert Parmenter, Valles Caldera National Preserve- Chief Scientist
James L. Patton, Museum of Vertebrate Zoology, University of California
Luis Ruedas, Portland State University, Portland, Oregon

HERBARIUM

DIVISION HIGHLIGHTS

The UNM herbarium contained more than 127,200 accessioned specimens of vascular and non-vascular plants at the end of 2012. In addition we moved the Bandelier National Monument collection to UNM; this National Park Service herbarium consists of 1996 specimens.

Interpretive activities or Collections-related Outreach includes tours for 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 and/or taught seven NPSNM workshops for amateur botanists.

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 (133,816 individuals visited the site in 2012; 232,582 total visits to <http://swbiodiversity.org/seinet/>).

COLLECTION USE SUMMARY

Collection Growth (specimens cataloged)	2814
Loans – outgoing	8
Loans – incoming	0
Research Visitors	150
Information Requests Answered	146
Publications Citing/Using MSB Herbarium Specimens	8

COURSES USING THE COLLECTIONS

TERM	COURSE	TITLE	STUDENTS
Fall	BIOL 463	Flora of New Mexico	15
Spring	BIOL 419/519	Biological Museum Curatorial Technique	19
	BIOL 406	Plants and People	12

COURSES TAUGHT BY MSB PERSONNEL

INSTRUCTOR	TERM	COURSE	TITLE	STUDENTS
Lowrey, T.K.	Fall	BIOL 463	Flora of New Mexico	15
	Spring	BIOL 406	Plants and People	12
Tonne, P.C.	Spring	BIOL 419/519	Biological Museum Curatorial Techniques	19
Bixby, R.J.	---	BIOL 400	Senior Honors Thesis	1
		BIOL 551	Research Problems	1
		WR 598	Professional Project	1

Guest Lectures

BIOL 203 (Ecology and Evolution): “Physical drivers of ecology”, January 2012

BIOL 495 (Limnology): “Phytoplankton in lakes”, “Nutrient dynamics and limitation,” and “Phosphorus cycle,” undergraduate and graduate, Winter 2012

BIOL 496 (Limnology lab): Algae lab, March 2012

COLLECTION MANAGEMENT

We processed and added 818 new acquisitions to the collection. The UNM Herbarium received gifts of 818 accessioned specimens, and 1996 National Park Service Specimens from Bandelier National Monument.

The herbarium logged more than 150 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.

AWARDS, GRANTS, AND CONTRACTS

Awarded

\$2000. BLM, Grants.gov award to begin imaging specimens in 2013.

\$20,000 Synthesis of stream ecosystem responses to nutrient enrichment at multiple trophic levels.” LTER Synthesis Working Group, 2012, Co-PI: **R Bixby**

\$153,180 Resource utilization by Rio Grande silvery minnow at the Los Lunas Silvery Minnow Refugium. Interstate Stream Commission, 2011-2013, PI: **R. Bixby**

PUBLICATIONS

Books, Book Chapters, Edited Volumes

Carter, Jack. 2012. Trees and Shrubs of New Mexico. Revised and Expanded Book. Mimbres Publishing. Silver City, New Mexico.

Lowrey, T.K. 2012. Asteraceae. In, Flora Neomexica III: An illustrated Identification Manual. K. W. Allred and R. D. Ivey. pp. 86-200. Available from Lulu.Com.

Lowrey, T. K. 2012. *Sphaeromeria* (Asteraceae). In, The Jepson Manual: Vascular Plants of California. 2nd Edition. Eds. B. Baldwin, D. Goldman, D. Keil, R. Patterson, T. Rosatti, and D. Wilkin. Pp. 423. University of California Press, Berkeley.

Pringle, C.M., E.P. Anderson, M. Ardón, **R.J. Bixby**, S. Connelly, J.H. Duff, A.P. Jackman, P. Paaby, A. Ramírez, G.E. Small, M.N. Snyder, and F.J. Triska. In press. Rivers of Costa Rica. In: M. Kappelle (ed.) Costa Rican Ecosystems. The University of Chicago Press, Chicago, Illinois.

Journal Articles

Bixby, R.J., A.S. Burdett and R.G. Verb. In review. Importance of tumbleweed (*Salsola tragus*) as an algal substrate in aridland rivers. Submitted to *Hydrobiologia*.

Fuelling, L.J., J.A. Adams, K. Badik, **R.J. Bixby**, C.L. Caprette, H.E. Caprette, W.B. Chiasson, C.L. Davies, M.M. Hall, W.L. Perry, E.R. Schultz, D.A. Taylor, M.L. Vis, and R.G. Verb. 2012. Occurrence of freshwater red algal chantransia on rusty crayfish. *Nova Hedwigia* 94: 355-366.
Spaulding, S.A., D. Jewson, **R.J. Bixby**, H. Nelson, and D.M. McKnight. 2012. Automated analysis of diatom size. *Limnology and Oceanography: Methods* 10: 882-890.

Technical Reports

Bixby, R.J. and A.S. Burdett. 2012. Resource utilization by the Rio Grande Silvery Minnow, 2011-2012, Annual Report, Interstate Stream Commission, 42 pp.

Sivinski, R.C. 2012. *Cirsium wrightii* (Wright's marsh thistle): A 2012 population Assessment. Prepared for NM EMNRD-Forestry Division, Santa Fe.

Sivinski, R.C. 2012. Botanical inventory of the Pritzlaff Ranch, San Miguel County, NM. Prepared for Biophilia Foundation, Easton, MD.

Ph.D. Advisement

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

Tim Lowrey served as a Ph.D. Committee Member for two competed dissertations in 2012

Gino Nearn- Ph.D.

Heather Simpson-Ph.D.

And is a committee member or three Ph.D. candidates:

Heidi Hopkins

Nathan Lord

Karen Wright

Masters of Water Resources Advisement

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

Virginia Thompson, 2010-present, Bixby, co-advised with Cliff Dahm

Masters of Water Resources Advisement

Constance Jones, 2010-present. Bixby, co-advised with Bruce Thomson (Civil Engineering)

Undergraduate Advisement

Shelly McNeill – research on *Erigeron acomanus*. Spring 2012.

Publications and Reports Based on MSB Specimens (including outside researchers)

UNM plays a critical role in the development of the Flora of North America (FNA), a series of publications based on specimens and records made available by the herbarium. Bob Sivinski, Herbarium Associate, reviewed 32 FNA manuscripts as a Regional Reviewer in 2012. UNM specimens are cited in the published volumes to date:

Volume 2 Pteridophytes and Gymnosperms

31 families Volume 3 Magnoliophyta: Magnoliidae and Hamamelidae

32 families Volume 4 Magnoliophyta: Caryophyllidae, Part 1

10 families Volume 5 Magnoliophyta: Caryophyllidae, part 2

3 families Volume 7 Magnoliophyta: Salicaceae to Brassicaceae

11 families Volume 8 Magnoliophyta: Paeoniaceae to Ericaceae

19 families Volume 19 Asteraceae (with volumes 20 and 21)
1 family Volume 20 Partial, Enter from Volume 19
1 family Volume 21 Partial, Enter from Volume 19
1 family Volume 22 Magnoliophyta: Alismatidae, Arceuthobium, Commelinidae (in Part), and Zingiberidae
30 families Volume 23 Magnoliophyta: Commelinidae (in part): Cyperaceae
1 family Volume 26 Magnoliophyta: Liliidae: Liliales and Orchidales
11 families

FLORA NEOMEXICANA – a three volume flora for the state of New Mexico published in 2012:

Volume I : Annotated Checklist, 2nd edition, 2012. by Kelly W. Allred. The 3783 species (and 4204 total taxa) of vascular plants occurring in the wild in New Mexico are listed, with synonymy, common names, whether native or exotic, references, and a complete accounting of all names that have been reported for New Mexico. Also included is an introduction to the climate, geologic history, soils, ecoregions, vegetation types, botanical history, and endemic, exotic, and noxious plants of the state. Available in paper- and hardbound versions; 6 x 9 inches; 603 pages.

Volume II : Glossarium Nominum, 2nd edition, 2012. by Kelly W. Allred. The etymology, definition, and usage of each of the scientific names of New Mexico vascular plants are explained. Available in paper- and hardbound versions; 6 x 9 inches; 151 pages.

Volume III : An Illustrated Identification Manual, 1st edition, 2012. by Kelly W. Allred & Robert DeWitt Ivey (Eugene Jercinovic, editor). Identification keys are provided for the 3783 species (and 4204 total taxa) of vascular plants found in New Mexico. Approximately 1600 species are illustrated. A glossary of terms, and notes on habitat, distribution, and ecology are provided for each species. Available in paper- and hardbound versions; 8.5 x 11 inches; 719 pages.

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. The Jepson manual: vascular plants of California, second edition. University of California Press, Berkeley.

Carter, Jack. 2012. Trees and Shrubs of New Mexico. Revised and Expanded Book. Mimbres Publishing. Silver City, New Mexico.

O'Kane, S.L., Jr., K.N. Smith, and K.A. Arp. 2012. *Physaria iveyana* (Brassicaceae), a new species from the Sandia Mountains, New Mexico. *Phytoneuron* 2012-53: 1–6. Published 4 June 2012. ISSN 2153 733X

Nesom, G.L. 2012. Taxonomy of *Apiastrum*, *Ammoselinum*, and *Spermolepis* (Apiaceae). *Phytoneuron* 2012-87: 1–49.

ACTIVITIES IN LEARNED SOCIETIES

Invited/Plenary Talks and/or Seminars

Lowrey, Tim. Evolution, Genetics, and Systematics of *Tetramolopium* and *Vittadinia* (Asteraceae: Astereae) in the Pacific Basin. Symposium honoring Dr. Daniel Crawford and Dr. Tod Stuessy and their research on Island Biology. Botany 2012 National Meeting, Columbus, Ohio, July 2012

Contributed Talks and Posters

Bixby, R.J., S.A. Spaulding, D. Jewson, and H. Nelson. 2012. Can digital imaging flow cytometry replace microscope measurements of diatom cell dimensions? International Diatom Symposium, Ghent, Belgium.

Shafer, B. M., L.R. Sherson, D.J. Van Horn, R.J. Bixby, M. Grace, S. Compton, B. Parmenter, L. J. Crossey, L. J. and C.N. Dahm, 2012. The response of stream metabolism to climate variability in the East Fork Jemez River, NM. Society for Freshwater Science, Louisville, KY.

Thompson, V. F.; L.R. Sherson, R.J Bixby and C.N. Dahm. 2012. The role of submerged aquatic macrophytes in a montane grassland river ecosystem. Society for Freshwater Science, Louisville, KY.

Attendance at Professional Meetings

Lowrey, T.K. Botany 2012 National Meeting, Columbus, Ohio, July 2012

Service as Editor or on Editorial Board of a Journal

Lowrey, T.K. Corresponding Editor, Madrono, Journal of the California Botanical Society, Nov. 2008 to 2012.

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.

Panel Member, National Science Foundation, Biodiversity: Discovery and Analysis,
April 2012

OTHER PROFESSIONAL ACTIVITIES

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

Tim Lowrey. Council of NM University Graduate Deans- June 2012

Tim Lowrey. Higher Education Department- December 2012

Seven Native Plant Society of New Mexico Workshops – presented and/or organized by Bob Sivinski:

INTRODUCTION TO PLANT MORPHOLOGY AND IDENTIFICATION TERMINOLOGY

April 28-29, UNM Museum of Southwestern Biology, Albuquerque

Presented by: Tim Lowrey and Bob Sivinski

CACTACEAE – CACTUS FAMILY

May 19-20, Co-sponsored by City of Albuquerque – Rio Grande Botanic Garden

Presented by: Dave Ferguson and Steve Brack

TREES AND SHRUBS OF NEW MEXICO

Albuquerque, July 7-8, UNM Museum of Southwestern Biology with Jack Carter and Bob Sivinski

Farmington, July 14-15, San Juan Community College with Bob Sivinski and Ken Heil

Silver City, July 28-29, Western New Mexico University with Jack Carter and Bill Norris

Santa Fe, July 21-22, IAIA with Jack Carter and Bob Sivinski

ASTERACEAE – ASTER FAMILY

September 14-16 (updated!), Sevilleta National Wildlife Refuge, UNM Ecological Research Station Presented by: Tim Lowrey

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

Bixby, R.J.

Member, 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

Special session at Tri-State EPSCoR meeting, "The interface of hydrology, biogeochemistry, and ecology in riverine systems," co-organized with C. Dahm, Sun Valley, ID, April 2012

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

Journal Referee

Bixby, R.J.

Biomass and Bioenergy -1

Georgia Journal of Science -1

Marine and Freshwater Research -1

PLoS ONE -1

Polar Research -1

Lowrey, T.K.

Madrono-5 papers

Journal of the Botanical Research Institute of Texas-1

Botanical Journal of the Linnean Society-1

American Journal of Botany-1

Arizona Journal of Science-1

SERVICE

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' Pennyroyal (*Hedeoma todsenii*)

University and Departmental Committees

Lowrey, T.K.

Policy Committee, UNM Faculty Senate, Vice-chair.
Committee on Governance, Vice-chair.
Interim Co-Director, Museum Studies Program

ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.

Tonne, P. Herbarium Techniques Course, Offered by Brooklyn Botanic Garden and Royal Botanic Gardens, Kew, August 20–Friday, August 31

DONATIONS AND GIFTS RECEIVED

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

CURRENT STAFF

Faculty/Staff

Lowrey, T.K., Curator
Tonne, P., Collection Manager

Graduate students

Wetherill, Karen (Spring 2012)
Robinson, Eva (Fall 2012)
Hopkins, Heidi (Summer 2012)

Undergraduate Student Workers and Volunteers

Robinson, Kyle. Work-study Employee. Freshman/Sophomore.
Alex Clark, Employee for Bixby, Sophomore
Ryan Kelly, Employee for Bixby, Senior
Summer Woods-Tunney, Employee for Bixby, Senior

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

DIVISION HIGHLIGHTS

Collection Growth

The DOM added 3,209 new specimens to its catalogue and converted 17,525 DGR records to MSB mammal records during 2012 and now contains 250,001 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 between 4000-5000 specimens.

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.

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

Specimen Growth Through Fieldwork

Directed specimen-based studies within Joseph Cook's research program.

Highly successful fieldwork in a wide variety of projects spanning the Western Hemisphere, eastern Asia (Mongolia), 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.

New initiatives focused on building the collection in certain geographic regions.

Specimen growth through donation

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.

Donations of personal collections from individual researchers.

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 2012.

36 students worked in the division in 2012

- 2 graduate students
- 13 paid undergraduates
- 6 high school interns/volunteers
- 15 volunteers

Of these 36

- 22 were females
- 14 males
- 9 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 2012 DOM specimens were cited in at least **40** studies published in **26** journals including: American Museum Novitates, Acta Theriologica, Biological Invasions, Biological Journal of the Linnean Society, Biochemical Systematics and Ecology, Conservation Genetics, Conservation Genetics Resources, Diversity and Distributions, Ecography, Journal of Biogeography, Journal of Parasitology, Journal of Mammalian Evolution, Journal of Mammalogy, Mammalia, Molecular Biology and Evolution, Molecular Ecology, Molecular Phylogenetics and Evolution, PLoS ONE, Proceedings of the Royal Society B: Biological Sciences, Revista Mexicana de Biodiversidad, Russian Journal of Theriology, Systematic Biology, The Southwestern Naturalist, Virology Journal, Western North American Naturalist, Zootaxa.

Theses/Dissertations

In 2012, at least 6 theses or dissertations from 5 institutions (UNM, Texas Tech University, University of Arizona, San Angelo State, Eastern Michigan University) were completed that utilized MSB mammal specimens.

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.

Web visits to the database tracked via Google analytics = 131,664 visits

From 199 countries

6,453 visitors referred to our site were from GenBank.

Educational Modules

The DOM has expanded our collaboration with the UNM Art and Ecology program (College of Fine Arts). Presentations on the collections are regularly delivered to A&E classes. In Spring 2012, we also co-taught a class (15 students 3 two-day workshops) with Dr. Szu-Han Ho of the Art and Ecology Program that was entitled "Coevolution: Art and Biology". This course developed web-based educational or "dispersion" modules using museum specimens to illustrate various evolutionary concepts that can be viewed online and used by K-12 and UNM classes.

COLLECTION USE SUMMARY

Collection Growth (specimens cataloged)	20,734 (3,209/ 17,525)*
Loans – outgoing	30(753) / 41(1878)**
Loans – incoming	7
Research Visitors	489***
Information Requests Answered	>500****
Publications Citing/Using MSB Mammal Specimens	40

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

** Loans originating in DOM / loans of mammal tissue originating in DGR Combined total of 71 loans of 2631 specimens of traditional voucher specimens, mammalian parasites, and tissue samples.

*** 32 visiting researchers from 19 institutions, 104 students and 26 teachers from 17 K-12 schools, 16 UNM classes (230 students and 18 instructors), 79 other visitors.

**** Estimate of email or phone requests to Jon Dunnum and Joe Cook.

COURSES USING THE COLLECTIONS

UNM classes receiving loans of material for educational purposes (13 classes serving 1,125 students)

TERM	COURSE	TITLE	STUDENTS
Fall	BIOL 204L	Plant and Animal Form and Function	180
	BIOL 203L	Ecology and Evolution	240
	BIOL 486L	Mammalogy	19
	BIOL 386L	General Vertebrate Zoology	37
	BIOL 599	Masters Thesis	1
	BIOL 699	Dissertation	3
	NTSC 262L		36
Spring	BIOL 204L	Plant and Animal Form and Function	180
	BIOL 203L	Ecology and Evolution	240
	BIOL 386L	General Vertebrate Zoology	40
	BIOL 599	Masters Thesis	1
	BIOL 699	Dissertation	3
	NTSC 262L		53

UNM courses or programs using collection through visits or staff presentations (230 students, 18 instructors from 16 classes/programs).

TERM	COURSE	TITLE	STUDENTS
Fall	ART 141	Intro to Art and Ecology	18
	BIOL 486	Mammalogy	19
	---	UNM Biology graduate student orientation	25
Spring	ART 141	Intro to Art and Ecology	26
	ART	Drawing I	21
	---	UNM prospective grad students tour	24
Summer	ART	Drawing I	14
	SEIS	Mammals of NM/Value of Natural History Collections	9
---	BIOL 402	Aim-up Student Projects	3
	ART HIST	Student Projects	2
	BIOL 461/561	Tropical Biology	16
	ART 389/429/529	Art Studio	15
	BIOL 419/519	Nat Hist curation/techniques	18
	MUS	Studies	15

---	PREP Scholars	5
---	UNM/CNM STEM UP	1

K-12 schools and educational groups: 104 students, 26 teachers from 17 schools

Bandelier Elementary School(SEIS class)	(1 teacher)
Belen Middle School	(26 students, 4 teachers)
Desert Willow Family School	(10 students, 3 teachers)
East San Jose Elementary School	(8 students, 2 teachers)
Hawthorne Elementary School (SEIS class)	(1 teacher)
Highland High school	(2 students, 1 teacher)
Jefferson Middle school	(1 student)
Jimmy Carter Elementary School (SEIS class)	(1 teacher)
Longfellow Elementary School (SEIS class)	(1 teacher)
Manzano Day School (SEIS class)	(1 teacher)
Rwamagana Lutheran School (Rwanda)	(2 students, 1 teacher)
Sandia High School (SEIS class)	(1 teacher)
Silverton Middle/High School (CO)	(16 students, 4 teachers)
St. Pius High School (Microbiology class)	(25 students, 1 teacher)
St. Michaels Indian School (AZ)	(15 students, 2 teachers)
St. Thomas Aquinas (SEIS class)	(1 teacher)
Valley High School (SEIS class)	(1 teacher)

Visiting researchers: 32 from 19 institutions or departments

Angelo State University	(1)
Denver Museum of Nature and Science	(2)
Harvard Medical School	(1)
Jefferson Middle School	(1)
Portland State University	(1)
Louisiana State University	(1)
School of Visual Arts	(1)
Texas Tech University	(2)
Univ of Alaska-Fairbanks	(1)
Univ of Florida	(1)
Univ of Kansas/FMNH/TTU	(1)
Univ Nebraska-Kearney	(1)
UNM Anthropology	(4)
UNM Art / Art History	(3)
UNM Biology	(5)
UNM HSC (Biochemistry)	(1)
UNM non-degree	(1)
UNM Office of President	(3)
Utah State University	(1)

Other visitors: 79

Bernalillo Co. Open Space	(1)
Bernalillo Co. Master Naturalists Program	(34)
Indiana University	(2)
Sacramento State University	(1)
Texas A&M-Kingsville	(1)
La Calandria & Assoc. (for San Juan Pueblo)	(3)

National Park Service	(4)
New Mexico Dept Game and Fish	(2)
UNM Psychiatry	(2)
US Fish and Wildlife Service	(3)
US Geological Survey	(1)
USGS high school interns and mentors	(15)
West Virginia University	(1)
Dean Linda Lacey, Graduate School NMSU	(1)
Other	(9)

COURSES TAUGHT BY MSB PERSONNEL

INSTRUCTOR	TERM	COURSE	TITLE	STUDENTS
Cook, J.A.	Fall	BIOL 489	Mammalogy	19
		BIOL 502	Evolutionary Genomics	3
		BIOL 551	Research Problems	3
		BIOL 599	Masters Thesis	1
		BIOL 699	Dissertation	3
	Spring	BIOL 461	Intro Tropical Biology	16
		BIOL 402	Advanced Tropical Biology	1
		BIOL 402/502	Coevolution: Art and Biology	5
		ART 389/429/529	Art and Biology	10
		BIOL 402	UnO	12
		UHON 402	Art and Biology	1
		BIOL 502	Environmental Genetics	4
		BIOL 502	Panama Diversity Field Methods	8
		BIOL 551	Research Problems	3
		BIOL 599	Masters Thesis	1
BIOL 699	Dissertation	4		
Dunum, J.L.	Spring	BIOL 419/519	Nat Hist curation/techniques	18
		BIOL 502	Panama Diversity Field Methods	8
	Summer	SEIS	Mammals of NM and the Value of Nat Hist Coll	9
Graduate Students	Fall	BIOL 486L	Mammalogy	19
	Spring	BIOL 402	UnO	12
	Spring	BIOL 402/502	Advance Tropical Biology	1
	---	BIOL 402/502	Aim-up	---
	---	BIOL 386L	General Vertebrate Zoology Lab	---

Undergraduate Student Mentoring (35 students)

Andrea Jackson, NSF-UNO
 Sarah Garcia (BIO 499)
 Donovan Jackson, NSF-UNO
 Schuyler Liphardt, museum tech - workstudy

Diego Matek, NSF-UNO
Amber McArdle, NSF-UNO
Randle McCain, NSF-UNO
Steven Kevin McCormick, NSF-UNO
Galen Rask (3 month summer internship from Swarthmore College)
Abbie J. Reade, museum tech
Kelly Speer, NSF-UNO
Angelica Swanson, NSF-UNO
Amber Trujillo, NSF-UNO
Jocelyn Colella, undergrad volunteer
Anna Gillette, undergrad volunteer
Alanna Jornigan, volunteer, USGS
Neesha Karanth, undergrad volunteer
Sinjin Alan Leyva, undergrad volunteer
Brittany Quintana, undergrad volunteer
Rosemary Steinberg, undergrad volunteer
Heather Toman, undergrad volunteer
Andrew Vanetsky, undergrad volunteer
Sienna Wright, workstudy & NSF BRC
Alexander Clark, undergrad volunteer
Fernando Salazar, NSF-UNO
Richard Apodaca (high school intern/volunteer)
Susan Alex Shomaker (high school intern/volunteer)
Kathryn Cook (high school intern/volunteer)
Rachel Lentz (high school intern/volunteer)
Lucy Gerhart (high school intern/volunteer)
Jonathon Brearley (high school intern/volunteer)
Hannah R Johnson (volunteer)
Lila Badash (undergrad volunteer)
Brooke Rodrigues (volunteer)
Tomas Cook (volunteer)

COLLECTION MANAGEMENT

The DOM received 98 new accessions of material (~4000-5000 specimens) and added approximately 20,000 specimens to its catalogue during 2012 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
Panama Climate Change Project - STRI/Gorgas
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

The majority of staff time was spent

Development of the Arctos database
Reorganizing and relabeling of dry collections
Training student technicians and UnO students in museum work

Preparation, cataloging and installation of museum specimens
Data entry for the incoming accessions
Filling information requests
Processing loan material
Assisting with UNM courses utilizing MSB specimens and facilities

AWARDS, GRANTS, AND CONTRACTS

Bell, K.C.

Grants-in-Aid of Research, American Society of Mammalogists, \$1500
UNM CETI 454 Next Generation Sequencing voucher, \$6000

Cook, J.A.

NSF-DEB 1258010 (submitted 7/12, awarded for 3/13/13-2/28/16)
Collaborative & Integrative Inventories of Biomes of the Arctic
(with K Galbreath, Northern Michigan University & E. DeChaine,
Western Washington University) (\$450K to UNM) \$945,000

DOI-USFWS-*Zapus h. preblei* conservation (8/12-12/12) \$28,000

DOI-USGS Cooperative Agreement, Tundra Preserves (6/11-12/13) \$58,000

USDA Forest Service
ISLES—Amendment 2 (6/12-12/13) (Total \$220K) \$40,000

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

NSF-DEB 0956129 5/01/2010-4/30/2015
RCN-UBE: Advancing Integration of Museums into Undergraduate
Programs (AIM-UP!) (w/ E. Lacey, S. Edwards, S. Ickert-Bond) \$485,648

College of Arts and Sciences, Turner Ranch Research Fund \$10,000

NSF-DEB 0731350 08/01/07 - 08/01/13
URM: Undergraduate Opportunities (UNO) \$1,014,659

Dunnum, J. L.

Improved housing of Mexican wolf (*Canis lupus baileyi*) specimens and its conservation in New Mexico. U.
S. Fish and Wildlife Service. Total \$7,000 (No F&A).

McLean, B.

GRAC Grant, UNM Graduate Research Allocations Committee - \$400
Research Grant, National Speleological Society - \$750
Research Grant, Prairie Biotic Research, Inc. - \$900
The Joseph Gaudin Scholarship, UNM Department of Biology - \$1000
Research Grant, T&E of New Mexico - \$2500
PDG Grant, UNM Graduate Student Professional Association - \$500

Jessica Weber

UNM PiBBs fellowship, renewed for 2012-2013 school year ~\$30,000

PUBLICATIONS

Books, Book Chapters, Edited Volumes

Cook, J.A.

Dawson, N. G. and J. A. Cook. 2012. Behind the genes: Diversification of North American marten (*Martes americana* and *Martes caurina*). Pp. 23-38 *In* Biology and Conservation of Marten, Sables and Fisher. A New Synthesis. *In* Aubry, K., W. J. Zielinski, M. G. Raphael, G. Proulx, and S. W. Buskirk, eds.

Hoberg, E., A.V.A. Koehler, and J. A. Cook. 2012. Complex host-parasite systems in *Martes*: Implications for conservation biology of endemic faunas. Accepted. *In* Biology and Conservation of Marten, Sables and Fisher. A New Synthesis. Pp. 39-57. *In* Aubry, K., W. J. Zielinski, M. G. Raphael, G. Proulx, and S. W. Buskirk, eds.

Journal Articles

Cook, J. A.

Haas, G. E., J. Kucera, S. O. MacDonald, and J. A. Cook. 2012. First flea (Siphonaptera) records for Kanuti National Wildlife Refuge and review of historical records from nearby villages, Central Alaska. *Journal of the Entomological Society of British Columbia*. 109:6-11.

Sonsthagen, S., G. Sage, M. Fowler, A. Hope, J. A. Cook, S. L. Talbot. 2012. Development and characterization of 21 polymorphic microsatellite markers for the barren-ground shrew, *Sorex ugyunak* (Mammalia: Soricidae), through next-generation sequencing, and cross-species amplification in the masked shrew, *S. cinereus*. *Conservation Genetics Resources*. Published online: 10 October 2012. DOI 10.1007/s12686-012-9792-5.

Barker, B. S., J. Rodríguez-Robles, V. S. Aran, A. Montoya, R. B. Waide, and J. A. Cook. 2012. Sea level, topography, and island diversity: phylogeography of the Puerto Rican Red-eyed Coquí, *Eleutherodactylus antillensis*. *Molecular Ecology* 21:6033-6052.

Galbreath, K. E., J. A. Cook, and E. P. Hoberg. 2012. Climate's role in polar bear past. *Science* 336:1230.

Hope, A.G., K. A. Speer, J. R. Demboski, S. L. Talbot, and J. A. Cook. 2012. A climate for speciation: rapid spatial diversification among the *Sorex cinereus* complex of shrews. *Molecular Phylogenetics and Evolution*, 64:671-684.

Hoberg, E. P., K. E. Galbreath, J. A. Cook, S. J. Kutz, and L. Polley. 2012. Northern Host-Parasite Assemblages: History and Biogeography on the Borderlands of Episodic Climate and Environmental Transition. *Advances in Parasitology*, 79:1-97.

Malaney, J.L., J. K. Frey, J. A. Cook. 2012. Lineage diversification, historical demography, and conservation genetics of an imperiled mammal, *Zapus hudsonius luteus*, in the American Southwest. *Diversity and Distributions* 18:689-703.

Dunnum, J.L.

Kryštufek, B., and J.L. Dunnum. 2012. On the history of European mammalogy. *Mammalia*76(4):351–353.

Dunnun, J.L. and J.A. Cook. 2012. Gerrit Smith Miller: his influence on the enduring legacy of natural history collections. *Mammalia* 76(4):365–373.

McLean, B.

McLean, B. S. and Emslie, S. D. 2012. Stable isotopes reflect the ecological stability of two high-elevation mammals from the late Quaternary of Colorado. *Quaternary Research* 77:408–417.

Web-Based

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

Technical Reports

Four ISLES Quarterly Reports for USDA Forest Service.

Work In Progress (Only in press and already submitted)

Cook, J.A.

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. *In Arctic Biodiversity Assessment. Conservation of Arctic Fauna and Flora Committee, Copenhagen (in press).*

Hoberg, E. P., S. J. Kutz, J. A. Cook, K. Galaktionov, V. Haukisalmi, H. Henttonen, and S. Laaksonen. 2013. Parasites in Terrestrial, Freshwater, and Marine Environments. *In Arctic Biodiversity Assessment. Conservation of Arctic Fauna and Flora Committee, Copenhagen.*

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. In press.*

Cook, J. A. and S. O. MacDonald. 2012. Island life: Coming to grips with the insular nature of North Pacific Coastal Forests. *In Conservation of North Pacific Coastal Forests, G. Orians, J. Schoen, and J. Franklin, eds. Univ. Washington Press.*

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, in press.*

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.

Dawson, N. G., M. P. Small, K. D. Stone, and J. A. Cook. In Revision. Conservation genetics and management considerations for high latitude island faunas: Marten (*Martes americana* and *Martes caurina*) along the North Pacific Coast. *Biological Conservation.*

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*

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.*

Hope, A.G., E. C. Waltari, D. C. Payer, J. A. Cook, & S. L. Talbot. Coupling evolutionary and ecological approaches to forecast tundra refugia in northern Alaska. *Nature Climate Change*

Dawson, N. G., A. G. Hope, S. L. Talbot, and J. A. Cook. Holarctic diversification of ermine (*Mustela erminea*) in response to Quaternary environments. Proc Royal Society London, B

Ho, S-H. and J. A. Cook. Submitted. Co-Evolving Pedagogies. ARID: A Journal of Desert Art, Design and Ecology.

Dunnum, J.

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'Elía, pp. xxx-xxx. The University of Chicago Press, Chicago, IL. in press.

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

Abramson, Natalia I., Tatyana V. Petrova, Nikolai E. Dokuchaev, Ekaterina V. Obolenskaya & Andrey A. Lissovsky. 2012. Phylogeography of the gray red-backed vole *Craseomys rufocanus* (Rodentia: Cricetidae) across the distribution range inferred from nonrecombining molecular markers. Russian J. Theriology 11(2): 137-156.

Andersen, John J., and Jessica E. Light. 2012. Phylogeography and subspecies revision of the hispid pocket mouse, *Chaetodipus hispidus* (Rodentia: Heteromyidae). Journal of Mammalogy 93 (4):1195-1215.

Andersen, John J., Mark A. Renshaw, Jessica E. Light. 2012. Eight novel polymorphic microsatellites in the hispid pocket mouse (*Chaetodipus hispidus*) and cross-amplification in other Perognathinae species (Rodentia: Heteromyidae). Conservation Genetics Resources.

Boric-Bargetto, Dusan, Enrique Rodríguez-Serrano, Cristián E. Hernández, Fabian M. Jaksic, R. Eduardo Palma. 2012. Temporal variation in genetic diversity during an outbreak of *Oligoryzomys longicaudatus* (Rodentia, Sigmodontinae) in a temperate forest of southern Chile. Biochemical Systematics and Ecology 44:383-389.

Briones-Salas M., M. C. Lavariega, E. I. Lira. 2012. Distribución actual del jaguar (*Panthera onca*) en Oaxaca, México. Revista Mexicana de Biodiversidad 83:236-257.

Calvert, Allen W., and Sean A. Neiswenter. 2012. Bats in Riparian-Restoration Sites Along the Lower Colorado River, Arizona. The Southwestern Naturalist 57(3):340-342.

Conroy, Chris J., Kevin C. Rowe, Karen M. C. Rowe, Pauline L. Kamath, Ken P. Aplin, Lucia Hui, David K. James, Craig Moritz, and James L. Patton. Cryptic genetic diversity in *Rattus* of the San Francisco Bay region, California. Biol Invasions DOI 10.1007/s10530-012-0323-9.

Doty, Jeffrey B., Jerry W. Dragoo, William C. Black, Barry J. Beaty, Charles H. Calisher. 2012. *Peromyscus maniculatus* in eastern Colorado: a subspecies with lower prevalence of Sin Nombre virus infection. Journal of Mammalogy 93(1):183-197.

Dunnum, Jonathan L., and Joseph A. Cook. 2012. Gerrit Smith Miller: his influence on the enduring legacy of natural history collections. Mammalia 76(4): 365-373

Esselstyn, J. A., B. J. Evans, J. L. Sedlock, F. A. Anwarali Khan, L. R. Heaney. 2012. Single-locus species delimitation: a test of the mixed Yule-coalescent model, with an empirical application to Philippine roundleaf bats. Proceedings of the Royal Society B: Biological Sciences 279(1743):3678-3686.

Fernández, Jesús A. 2012. Phylogenetics and biogeography of the microendemic rodent (Perote ground squirrel) in the Oriental Basin of Mexico. Journal of Mammalogy 93(6):1431-1439.

- Geluso Kenneth N., and Keith Geluso. 2012. Effects of environmental factors on capture rates of insectivorous bats, 1971–2005. *Journal of Mammalogy* 93(1):161-169.
- Gonçalves, Gislene L., Hopi E. Hoekstra, Thales R. O. Freitas. 2012. Striking coat colour variation in tuco-tucos (Rodentia: Ctenomyidae): a role for the melanocortin-1 receptor? *Biological Journal of the Linnean Society* 105(3):665-680.
- Graham, Zebadiah R., Keith Geluso, Russell A. Benedict. 2012. Notes on the Distribution of Bailey's Eastern Woodrat (*Neotoma Floridana Baileyi*) in Nebraska. *Western North American Naturalist* 72(2):252-256.
- Gunderson, A. M., H. C. Lanier, and L. E. Olson. 2012. Limited phylogeographic structure and genetic variation in Alaska's arctic and alpine endemic, the Alaska marmot. *Journal of Mammalogy* 93(1):66-75.
- Han, G.-Z. and M. Worobey. 2012. Endogenous Lentiviral Elements in the Weasel Family (Mustelidae). *Molecular Biology and Evolution* 29(10):2905-2908.
- Harding Larisa E., and Jerry W. Dragoo. 2012. Out of the tropics: a phylogeographic history of the longtailed weasel, *Mustela frenata*. *Journal of Mammalogy*, 93(4):1178-1194.
- Holbrook, Joseph D., Randy W. DeYoung, Jan E. Janecka, Michael E. Tewes, Rodney L. Honeycutt, John H. Young. 2012. Genetic diversity, population structure, and movements of mountain lions (*Puma concolor*) in Texas. *Journal of Mammalogy* 93(4):989-1000.
- Hope, Andrew G., Kelly A. Speer, John R. Demboski, Sandra L. Talbot, Joseph A. Cook. 2012. A climate for speciation: Rapid spatial diversification within the *Sorex cinereus* complex of shrews. *Molecular Phylogenetics and Evolution* 64(3):671-684.
- Hope, Andrew G., Naoki Takebayashi, Kurt E. Galbreath, Sandra L. Talbot and Joseph A. Cook. 2012. Temporal, spatial and ecological dynamics of speciation among amphi-Beringian small mammals. *Journal of Biogeography*.
- Hornsby, Angela D., and Marjorie D. Matocq. 2012. Differential regional response of the bushy-tailed woodrat (*Neotoma cinerea*) to late Quaternary climate change. *Journal of Biogeography* 39(2):289-305.
- Irwin, Nancy R., Michaela Bayerlová, Olivier Missa, Natália Martínková. 2012. Complex patterns of host switching in New World arenaviruses. *Molecular Ecology* 21(16):4137–4150.
- Jiménez, F. Agustín, Scott L. Gardner, Graciela Navone,Guillermo Ortí . 2012. Four events of host switching in Aspidoderidae (Nematoda) involve convergent lineages of mammals. *Journal of Parasitology* 98(6): 1166-1175.
- Kalkvik, Håkon M., I. Jack Stout, Christopher L. Parkinson. 2012. Unraveling natural versus anthropogenic effects on genetic diversity within the southeastern beach mouse (*Peromyscus polionotus niveiventris*). *Conservation Genetics* 13(6):1653-1664.
- Kalkvik, Håkon M., I. Jack Stout, Terry J. Doonan, Christopher L. Parkinson. 2012. Investigating niche and lineage diversification in widely distributed taxa: phylogeography and ecological niche modeling of the *Peromyscus maniculatus* species group. *Ecography* 35(1):54-64.
- Light, Jessica E., John C. Hafner, Nathan S. Upham, Emily Reddington. 2012. Conservation Genetics of Kangaroo Mice, Genus *Microdipodops*. *Journal of Mammalian Evolution*.
- Longtin, Sara B. and Robert K. Rose. 2012. Unusually high body mass in Virginia meadow voles. *Journal of Mammalogy* 93(3):743-750.

Makarikov, Arseny, Scott Gardner, and Eric Hoberg. 2012. New species of *Arostrilepis* (Eucestoda:Hymenolepididae) in members of Cricetidae and Geomyidae (Rodentia) from the western nearctic. *Journal of Parasitology*, 98(3):617-626.2012

Malaney, Jason L., Jennifer K. Frey, and Joseph A. Cook. 2012. The biogeographic legacy of an imperilled taxon provides a foundation for assessing lineage diversification, demography and conservation genetics. *Diversity and Distributions* (2012)18, 689-703.

Martínez, Juan J., Luis I. Ferro, Marcos I. Mollerach, Rubén M. Barquez. 2012. The phylogenetics relationships of the Andean swamp rat genus *Neotomys* (Rodentia, Cricetidae, Sigmodontinae) based on mitochondrial and nuclear markers. *Acta Theriologica* 57(3):277-287.

Thomas J. McDonough and Aaron M. Christ. 2012. Geographic variation in size, growth, and sexual dimorphism of Alaska brown bears, *Ursus arctos*. *Journal of Mammalogy* 93(3):686-679.

Melo-Ferreira, J., P. Boursot, M. Carneiro, P. J. Esteves, L. Farelo, P. C. Alves. 2012. Recurrent Introgression of Mitochondrial DNA Among Hares (*Lepus* spp.) Revealed by Species-Tree Inference and Coalescent Simulations. *Systematic Biology* 61(3):367-381.

Notarnicola, Juliana, F. Agustín Jiménez, Scott L. Gardner. 2012. A New Species of (Nematoda: Onchocercidae) in Bolivian Rodents and Emended Description of Bain, Petit, and Diagne, 1989. *Journal of Parasitology* 98(6):1200-1208.

Palma, R. Eduardo, Dusan Boric-Bargetto, Fernando Torres-Pérez, Cristián E. Hernández, Terry L. Yates, Sergios-Orestis Kolokotronis. 2012. Glaciation Effects on the Phylogeographic Structure of *Oligoryzomys longicaudatus* (Rodentia: Sigmodontinae) in the Southern Andes. *PLoS ONE* 7(3):e32206.

Parada, Andres, Agustina Ojeda, Solana Tabeni & Guillermo D'elía. 2012. The population of *Ctenomys* from the Ñacuñán Biosphere Reserve (Mendoza, Argentina) belongs to *Ctenomys mendocinus* Philippi, 1869 (Rodentia: Ctenomyidae): molecular and karyotypic evidence. *Zootaxa* 3402: 61–68.

Pine, Ronald H., Robert M. Timm, Marcelo Weksler. 2012. A newly recognized clade of trans-Andean Oryzomyini (Rodentia: Cricetidae), with description of a new genus. *Journal of Mammalogy* 93(3):851-870.

Reid, Noah, John R. Demboski, Jack M. Sullivan. 2012. Phylogeny Estimation of the Radiation of Western North American Chipmunks (*Tamias*) in the Face of Introgression Using Reproductive Protein Genes. *Systematic Biology*. 61(1):44-62.

Sonsthagen, S. A., G. K. Sage, M. Fowler, A. G. Hope, J. A. Cook, S. L. Talbot. 2012. Development and characterization of 21 polymorphic microsatellite markers for the barren-ground shrew, *Sorex ugyunak* (Mammalia: Soricidae), through next-generation sequencing, and cross-species amplification in the masked shrew, *S. cinereus*. *Conservation Genetics Resources*.

Sumibcay, Laarni, Blaise Kadjo, Se Hun Gu, Hae Ji Kang, Burton K Lim, Joseph A Cook, Jin-Won Song, Richard Yanagihara. 2012. Divergent lineage of a novel hantavirus in the banana pipistrelle (*Neoromicia nanus*) in Côte d'Ivoire. *Virology Journal* 9(1):34.

Voss, Robert S., Ronald H. Pine, and Sergio Solari. 2012. A New Species of the Didelphid Marsupial Genus *Monodelphis* from Eastern Bolivia. *American Museum Novitates*, (3740):1-14.

Theses and Dissertations

Larm, Ashley. 2012. Investigation of the Evolutionary Origin and History of a Newly Identified Transposable Element in Rodents. *Senior Honors Theses*. Eastern Michigan University. Paper 309.

O'Neill, Mark Bryan. 2012. Cytochrome-b variation in shrews: Application in systematics and conservation. MS Thesis, Texas Tech University.

Rinkevich, Sarah E. 2012. An assessment of abundance, diet, and cultural significance of Mexican Gray wolves in Arizona. PhD Dissertation. University of Arizona.

Schwalm, Donelle L. 2012. Understanding functional connectivity in shortgrass and mixedgrass prairies using the swift fox as a model organism. Ph.D. Dissertation. Texas Tech University.

Tipps, Teresita Marie. 2012 Morphological and Molecular Variation in Townsend's Big-Eared Bat (*Corynorhinus Townsendii*) in West Texas. Masters Thesis. Angelo State University.

Winslow, Frederic S. 2012. Effects of translocation and climatic events on the population genetic structure of black bears in New Mexico. M.S. Thesis. University of New Mexico.

ACTIVITIES IN LEARNED SOCIETIES

Invited/ Plenary talks

Cook, J.A.

Integrated inventories shed new light on the role of Beringia in the diversification of high latitude species. Texas Tech University, Lubbock, May 2, 2012.

Beringia: A molecular perspective on mammals and parasites. University of Alberta, Edmonton, April 4, 2012.

Contributed Talks and Posters

Bell, K.C.

Bell, K., D. Matek, J. Malaney, J. Demboski, J. Cook. June 2012. Untangling Lousey Chipmunk Relationships. American Society of Mammalogists, Reno, NV.

Chavez, A.

Poster, American Society of Mammalogists 92nd Annual Meeting, Reno, NV, June 2012

Cook, J.A.

Espinoza, C., K. Bell, N. Batsaikhan, D. Damdinbaza, and J. A. Cook. 2012. Species limits and phylogeography of Mongolian pika. Annual Meeting of the American Society of Mammalogists, Reno, NV. June

Cook, J.A. 2012. VertNet. Annual Meeting of the American Society of Mammalogists, Reno, NV. June.

Bell, K. C. D. J. Matek, J. L. Malaney, J. R. Demboski, J. A. Cook. 2012. Untangling lousey chipmunk relationships. Annual Meeting of the American Society of Mammalogists, Reno, NV. June.

Speer, K., Brooks Kohli and Joseph Cook. 2012. Clarifying the Diversity of Mountain Voles (Genus *Alticola*) in Mongolia. 21st Annual Research Day UNM, Albuquerque, NM.

McCain, R. D., Jason L Malaney, Jon L Dunnum, Adrienne L Raniszewski, and Joseph A Cook. 2012. Archival observatory for the endangered Mexican gray wolf (*Canis lupus baileyi*). UNM Wolf Fest, Albuquerque, NM. April.

Speer, K., Brooks Kohli, N. Batsaikhan, D. Damdinbaza, and J. A. Cook. 2012. Clarifyng the diversity of mountain voles in Mongolia. Annual Meeting of the American Society of Mammalogists, Reno, NV. June

Cook, J.A. 2012. VertNet. Annual Meeting of the American Society of Mammalogists, Reno, NV. June

Dunnum, J.L.

McCain, R. D., Jason L Malaney, Jon L Dunnum, Adrienne L Raniszewski, and Joseph A Cook. 2012. Archival observatory for the endangered Mexican gray wolf (*Canis lupus baileyi*). UNM Wolf Fest, Albuquerque, NM. April.

Malaney, J.

Historical biogeography informs conservation – (Mayr award symposium) 2012 Evolution Meetings.

Historical biogeography informs conservation – American Society of Mammalogists meeting

McLean, B.

Inferring geographic modes of speciation in ground-dwelling sciurids. American Society of Mammalogists 92nd Annual Meeting, poster presentation (July 2012).

Reade, A.

Animal Behavior Society/Human Behavior and Evolution Society, at UNM June 2012, poster, Differences in Body Shape in a Sympatric Species Flock of Pupfish.

UNM Research Day 2012, poster, Differences in Body Shape in a Sympatric Species Flock of Pupfish.

Swanson, A.

UNM Research Day 2012, poster, *Niche Space and Freezing Tolerance in Hylidae*.

Speer, K.

Poster. American Society of Mammalogists 92nd Annual Meeting, Reno, NV, June 2012

Attendance at Professional Meetings

Reade, A.

Animal Behavior Society/Human Behavior and Evolution Society, June 2012

Bell, K.C.

American Society of Mammalogists 92nd Annual Meeting, Reno, NV, June 2012

Cook, J.A.

American Society of Mammalogists 92nd Annual Meeting, Reno, NV, June 2012

Dunnum, J.L.

American Society of Mammalogists 92nd annual meeting, Reno, NV, June 2012
Arctos database Advisory meeting, Reno, NV 21-22 June 2012

Kohli, B.

American Society of Mammalogists 92nd Annual Meeting, Reno, NV, June 2012
Evolution meetings, Montreal, June 2012

Malaney, J.

American Society of Mammalogists 92nd Annual Meeting, Reno, NV, June 2012
Evolution meetings, Montreal, June 2012

Speer, K.

American Society of Mammalogists 92nd Annual Meeting, Reno, NV, June 2012

Chavez, A.

American Society of Mammalogists 92nd Annual Meeting, Reno, NV, June 2012

Service as Editor or on Editorial Board of a Journal

Cook, J.A.

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

Occasional Papers, Texas Tech University, Guest Editor, *Cost of Collecting and Preparing Mammal Voucher Specimens*, R. D. Bradley et al. 2112. 313:1-14.

Service as Officer or Professional Society/Organization

Bell, K

Graduate student representative, Board of Directors, American Society of Mammalogists 2010-2013.

Cook, J.A.

Board of Directors, American Society of Mammalogists, Member, 2011-2014

McLean, B.

UNM Graduate Student Professional Association Representative, Biology Department (Fall 2012)

OTHER PROFESSIONAL ACTIVITIES

Presentations to General Audience in a Scholarly Capacity

Malaney, J.

JL Malaney and JA Cook (2012) Incomplete sampling leads to erroneous conservation assessment (again): a significant range expansion for the federally "endangered" Preble's jumping mouse – (Invited Seminar) Smithsonian Tropical Research Institute, Panama City, Panama, March

JL Malaney (2012) Incomplete sampling leads to erroneous conservation assessment (again): a significant range expansion for the federally "endangered" Preble's jumping mouse – UNM Brownbag, February

Speer, K.

Presentation on Mexican wolf conservation. Wolf Day at UNM 2012

Swanson, A.

Junior Scientist Outreach Program, Summer 2012

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

Cook, J.A.

External Reviewer, Doctoral Dissertation Committee, Aaron Shafer, University of Alberta, Edmonton, April, 2012

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

2008-2012, Convener and Lead, Genetic Resources, Arctic Biodiversity Assessment, Conservation of Arctic Fauna and Flora (CAFF)

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 Memorandum of Understanding with New Mexico State Land Office and Museum of Southwestern Biology.

Developed and Established Memorandum of Understanding with New Mexico Museum of Natural History.

Dunnum, J.L.

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

Weber, J.

Graduate Policy Representative for the UNM BGSA

Swanson, A.

Board of Directors, Junior Scientist Outreach Program, Summer 2012

Journal Referee

Bell, K.C.

Ad hoc reviewer for *Journal of Mammalogy*

Cook, J.A.

Journal of Mammalogy (2 ms)

Molecular Phylogenetics and Evolution (1 ms)

Dunnum, J.L. (7 total in 2012)

Checklist (1 manuscript)

Journal of Zoo and Wildlife Medicine (1 manuscript)

Mastozoologia Neotropical (1 manuscript)

Mammalia (3 manuscripts)

Occasional Papers, Museum of Southwestern Biology (1 manuscript)

Hosting Professional Colleagues and Groups

We hosted 32 visiting academics and professionals from 19 outside institutions or departments and they primarily visited the collections for research purposes.

Joe Cook personally hosted three Visiting Artists invited to UNM based on their work in integrating biology with themes and practices in contemporary art in Spring 2012. Each Visiting Artist delivered a lecture at UNM that was free and open to the public and then led a two-day workshop.

Brandon Ballengée (New York), *Cataloguing Wonder*

Suzanne Anker (New York), *Fluid Taxonomy*

Brian Conley (San Francisco), *Morphology and Evolution*

SERVICE

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

Cook, J.

Organizer, AIM-UP! Education and Museums Workshops, Fairbanks, AK Feb. 2012 (3 day workshop, 22 participants)

Participant and Writing Committee, Implementation workshop for the Network Informatics Biodiversity Alliance, Reston, VA Sept 17-19, 2012.

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.

Cook, J. A.

Divisional tours and presentations – provided educational tours and information for over many visitors and several school groups (e.g., New Graduate Student Orientation 14 Aug 2012; Dean of Graduate School, NMSU)

Organized and hosted 12 Staff and the Director of the NM Museum of Natural History in tour and meet and greet (25 Sept 2012).

Invited Research Lecture to Honor's Program (31 Jan. 2012)

Dunnum, J. L.

Divisional tours and presentations – provided educational tours and information for over 400 visitors and school groups including New Graduate Student Orientation 14 Aug 2012.

2012 BIO Blitz – Served as mammal expert and gave presentation and walking tour at the Sandia Mountain Natural History Center and NMMNH sponsored annual event.

Presentation on mammalian skulls, teeth, and evolution and adaptations – Longfellow Elementary School.

Volunteer coach for Duke City Soccer Organization. U14 girls.

Swanson, A.

Junior Scientist Outreach Program, Summer 2012

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

DONATIONS AND GIFTS RECEIVED

Robert and Virginia Rausch marine mammal specimens (20)
Bruce Hayward endowment/photograph collection (\$220,000)

CURRENT STAFF

Faculty and Staff

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

Graduate Students

Barker, Brittany. Received Ph.D. degree. 2012. Landscape genetics of two frogs from Puerto Rico: *Eleutherodactylus antillensis* and *E. portoricensis*. (co-advised with R. Waide)

Bell, Kayce. 2nd year Ph.D. student. Systematics and phylogeography of chipmunk lice.

Escobedo, Yadeeh. 6th year Ph.D. Linkage corridors along the North Pacific Coast.

Malaney, Jason. Defended Ph.D. dissertation Dec 2012. *Zapus*

Rearick, Jolene. 6th year Ph.D. Phylogeography and molecular evolution of freeze tolerance in *Lithobates sylvaticus*.

Brooks Kohi. Defended M.S.thesis. Nov. 2012. Phylogeography of high latitude *Myodes*.

Jessica Weber. 2nd year Ph.D student. Hypoxia tolerance and adaptive responses in Caviomorph rodents.

Undergraduate Student Workers and Volunteers

Undergraduate Workers

Andrea Jackson
Sarah Garcia (BIO 499)
Donavan Jackson
Schuyler Liphardt
Diego Matek
Amber McArdle
Randle McCain
Steven Kevin McCormick
Galen Rask (internship)
Abbie J. Reade
Kelly Speer

Angelica Swanson
Amber Trujillo

Undergraduate Volunteers

Jocelyn Colella
Anna Gillette
Alanna Jornigan
Neesha Karanth
Sinjin Alan Leyva
Brittany Quintana
Rosemary Steinberg
Heather Toman
Andrew Vanetsky
Sienna Wright
Alexander Clark
Amber McArdle
Schuyler Liphardt
Donavan Jackson
Fernando Salazar

High School Volunteers

Richard Apodaca
Susan Alex Shomaker
Kathryn Cook
Rachel Lentz
Lucy Gerhart
Jonathon Brearley

Other Volunteers

Hannah R Johnson (possible grad student)
Lila Badash (Master Naturalist)
Steven Allen (Master Naturalist)
Brooke Rodrigues
Tomas Cook

Total volunteer hours: ~745

MUSEUM ASSOCIATES

Curatorial Associates

James H. Brown, UNM Department of Biology
Jerry W. Drago, UNM Department of Biology
William Gannon, UNM Research Ethics

Research Associates

J. Scott Altenbach, UNM Department of Biology
Sydney Anderson, American Museum of Natural History, New York
Robert J. Baker, The Museum, Texas Tech University, Lubbock, TX
Troy L. Best, Department of Biology, Auburn University
M. Scott Burt, San Angelo State
Fernando Cervantes, UNAM, Mexico City, Mexico
Paul J. Cryan, Ft. Collins, Colorado
John Demboski, Denver Museum of Science and Nature, Denver, Colorado

Eugene Fleharty, retired, Ft. Hayes University, Kansas
Melissa Fleming, Poulsbo, Washington
Jennifer K. Frey, Las Cruces, New Mexico
Scott L. Gardner, Dept. Nematology, Curator, University Nebraska
Keith Geluso, Albuquerque, New Mexico
Ken Geluso, Lincoln, Nebraska
Sarah B. George, Director, Utah State Museum
Gary L. Graham, Texas Parks and Recreation Division
David J. Hafner, New Mexico Museum Nat. History
Art Harris, University of Texas, El Paso, Texas
Heikki Henttonen, Finland
Edward J. Heske, Illinois Biological Survey
Erik Hoberg, Beltsville, Maryland
R. Dewitt Ivey, Retired. Active in Botany, mammals
Clyde Jones, The Museum Texas Tech University
Sue Kutz, Saskatoon, Saskatchewan
Enrique Lessa, Montevideo, Uruguay
Stephen MacDonald, Silver City, New Mexico
Michael Mares, Norman, Oklahoma
Pablo Marquet, Valdivia, Chile
Rodrigo Medillín, UNAM, Mexico City, Mexico
Tony R. Mollhagen, Lubbock, Texas
Gary Morgan, New Mexico Museum Natural History, New Mexico
Dwight W. Moore, Emporia State University
Michael J. O'Farrell, Jr., Las Vegas, Nevada
Thomas J. O'Shea, Ft. Collins, Colorado
Eduardo Palma, Valdivia, Chile
Robert Parmenter, Valles Caldera, Jemez, New Mexico
James L. Patton, Museum of Vertebrate Zoology, Berkeley, California
Paul J. Polechla, Albuquerque, New Mexico
Robert Rausch, University of Washington, Seattle
Brett R. Riddle, University of Nevada, Las Vegas, NV
Jorge Salazar Bravo, Texas Tech University, Lubbock, Texas
C. Greg Schmitt, Farmington, New Mexico
Richard E. Sherwin, Christopher Newport University, Virginia
Fred Szalay, Los Ranchos de la Rio Grande, New Mexico
Sandy Talbot, Molecular Ecology Lab- USGS Anchorage, Alaska
Ernie Valdez, Tijeras, New Mexico
Alasdair Veitch, Department of Renewable Resources, Norman Wells, NWT, Canada
Jack Whitman, Alaska Department of Fish and Game – Fairbanks, Alaska
Don E. Wilson, Smithsonian, Washington, DC
Nyamsuren Batsaikhan, National University of Mongolia, Ulaan Baatar

Natural Heritage New Mexico Division

1. DIVISION HIGHLIGHTS

In 2012, 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 initiated a collaborative project with the NM Department of Game and Fish (NMDGF) to build a Crucial Habitat Assessment Tool (CHAT) for the state that 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 beta version WGA in October and we are continuing to work on the final version for rollout in 2013. In addition, we implemented 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.

The Ecology Group (Esteban Muldavin, Lead; Elizabeth Milford, Riparian Ecologist; Yvonne Chauvin, Senior Botany Tech; Hannah Varani, Senior Ecology Tech, and Paul Arbetan, Ecologist) we the development of a comprehensive “New Mexico Rapid Assessment Method” (NMRAM) for New Mexico’s wetlands and riparian areas in collaboration with New Mexico Environment Department (NMED). In 2012, we concentrated on the 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. To complement the NMRAM, we developed a Vegetation Index of Biological Integrity (VIBI) that provides an assessment of wetland status based on plant species in a similar way to IBIs that are based on aquatic macroinvertebrates. With respect to our upland projects, we completed vegetation classifications and maps for El Malpais National Monument, Pecos National Monument, and Fort Davis National Monument, and we continued work on Guadalupe Mountains National Park. The 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 2012, we completed year four of a four-year, multi-scale habitat modeling study of pinyon-juniper birds on three Department of Defense installations, in conjunction with a three-year study of Pinyon Jays and their habitats at Kirtland Air Force Base. We completed a study of habitat use by grassland birds at Holloman Air Force Base (HAFB). We created the HAFB avian protection plan, which is designed to reduce bird mortalities and power outages caused by avian-powerline interactions. At the Lake Holloman Wetland Complex Area, we surveyed migrating and breeding wetland birds and completed a monitoring plan for aquatic macroinvertebrates. In collaboration with experts at the NMDGF, USFWS, and Texas A&M University, we began work on a habitat map and model for the dunes sagebrush lizard, a sensitive lizard of southeastern New Mexico. We performed a trend analysis on Lesser Prairie-chicken data from the NMBiotics database and submitted the results to the USFWS listing review for the species.

For the Botany Group (Temporary Lead and Esteban Muldavin). Working with the Bureau of Land Management (BLM), we participated in the five-year review of the endangered Kuenzler’s hedgehog cactus and conducted a range-wide survey of in the Sacramento and Guadalupe Mountains to assess population trends among the major population centers. We also initiated a project jointly with the BLM and Robert Sivinski to model the distribution of the rare Tharps’s bluestar (*Amsonia tharpii*) to guide surveys in 2013. Lastly, are working with the state Botanist, Daniela Roth, at the NM Energy, Minerals, and Natural Resources Department to integrate rare plant species database between the department and the division.

2. TABLE OF COLLECTION USE

Collection Growth (specimens catalogued)	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests Personally Responded to	Publications Citing MSB Specimens
6,038 new records, 17 updated records	NA	NA	9712 visitors to web site	124 personally, 146818 publications downloaded	UNKNOWN

3. COURSES USING THE COLLECTIONS

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

E. Muldavin: BIOL419/519 NATURAL HISTORY COLLECTIONS CURATORIAL TECHNIQUES

B. Staff

None.

5. COLLECTION MANAGEMENT

As part of our service role in the museum to provide conservation data to the public and researchers, in 2012 the Conservation Data Management Group worked on several initiatives to add to our conservation information. We were able to hire a new assistant data manager to update and improve our data entry process.

We implemented a one-of-a-kind program to database Section 10 and section 6 reports from USFWS, which have valuable current data on federally listed species. We began working with NMDGF to host their BISON-M database and collaborate 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 124 formal information requests, and 146,818 publications and data downloads were obtained from our website.

6. AWARDS, GRANTS, AND CONTRACTS

NHNM AWARDS:

\$81,238. NM Military Affairs Dept. Banner #04805F. Integrated Natural Resources Management Plan Revision. **Paul Arbetan**, PI. 10/10-03/12. \$37,893 (F&A \$6463).

\$16,210. NM Military Affairs Dept. Banner #04807S. NMARNG species monitoring. **Paul Arbetan**, PI. 09/11-09/12. \$16,155 (F&A \$2691).

\$139,414. NM Military Affairs Dept. Banner #0480B6. Endangered and threatened species surveys. **Paul Arbetan**, PI. 10/12-09/13. \$6,538 (F&A \$1,090).

\$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. \$0 (F&A \$0).

\$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. \$24,980 (F&A \$2,271).

\$43,852. Ecosphere Environmental Services. Banner #04808B. Pinyon Jay surveys at Kirtland AFB. **Kristine Johnson**, PI. 12/11-03/13. \$41,629 (F&A \$8,590).

\$110,000. Dept. of Defense. Banner #04801C. Management, wetlands/floodplain. **Kristine Johnson**, PI. 04/09-04/12. \$33,885 (F&A \$7,820).

\$85,000. Dept. of Defense. Banner #04803X. Grassland bird surveys at Holloman AFB. **Kristine Johnson**, PI. 05/10-12/12. \$64,595 (F&A \$14,521).

\$40,000. Dept. of Defense. Banner #04803Y. Raptor surveys at Holloman AFB. **Kristine Johnson**, PI. 05/10-12/12. \$28,048 (F&A \$6,305).

\$110,000. Dept. of Defense. Banner #04803Z. Management wetlands/floodplains. **Kristine Johnson**, PI. 05/10-12/12. \$89,423 (F&A \$20,103).

\$85,000. Dept. of Defense. Banner #04808Z. Grassland bird surveys at Holloman AFB. **Kristine Johnson**, PI. 03/12-12/13. \$12,665 (F&A \$2,847).

\$40,000. Dept. of Defense. Banner #04809A. Raptor surveys at Holloman AFB. **Kristine Johnson**, PI. 03/12-03/13. \$13,888 (F&A \$3,122).

\$110,000. Dept. of Defense. Banner #04809B. Management, wetlands/floodplain. **Kristine Johnson**, PI. 03/12-09/13. \$19,307 (F&A \$4,340).

\$99,554. Dept. of Defense. Banner #0480AS. Habitat use at multiple scales by pinyon-juniper birds. **Kristine Johnson**, PI. 08/12-03/14. \$3,109 (F&A \$463).

\$26,909. NM Dept. of Game and Fish. Banner #04807A. Black-tailed prairie dog web map. **Kristine Johnson**, PI. 7/11-06/12. \$24,996 (F&A \$4,166).

\$15,000. BLM. Banner #04804D. Biological resources data collection and storage 2010. **Rayo McCollough**, PI. 10/09-09/12. \$8,497 (F&A \$500).

\$50,000. BLM. Banner #04807L. Biological resources data collection and storage 2011. **Rayo McCollough**, PI. 10/09-12/12. \$47,127 (F&A \$7,017).

\$79,840. NM Dept. of Game and Fish. Banner #04806K. Endangered herp data project. **Rayo McCollough**, PI. 4/11-06/12. \$32,651 (F&A \$5,442).

\$6,827. NM Dept. of Game and Fish. Banner #0480B8. BISON-M document management web page. **Rayo McCollough**, PI. 10/12-01/13. \$0 (F&A \$0).

\$275,000. NM Dept. of Game and Fish. Banner #0480A1. BISON-M database management . **Rayo McCollough**, PI. 06/12-05/17. \$11,173 (F&A \$1,016).

\$120,000. NM Dept. of Game and Fish. Banner #0480A2. NM crucial habitat tool (CHAT). **Rayo McCollough**, PI. 05/12-09/14. \$31,477 (F&A \$2,862).

\$7,000. NM Dept. of Game and Fish. Banner #0480A3. NMGDF permits and documents database. **Rayo McCollough**, PI. 06/12-06/13. \$0 (F&A \$0).

\$124,000. NM Dept. of Game and Fish. Banner #0480A5. Organizing federally listed species information. **Rayo McCollough**, PI. 06/12-10/15. \$7,375 (F&A \$670).

\$25,000. NM Environment Dept. Banner #04807B. NM rapid assessment methodology phase 3. **Rayo McCollough**, PI. 07/11-11/12. \$24,123 (F&A \$4,021).

\$20,000. BLM. Banner #04806N. Pediomelum pentaphyllum surveys **Esteban Muldavin**, PI. 10/09-09/12. \$4,547 (F&A \$677).

\$75,000. BLM. Banner #0480B0. Tharp's bluestar inventory. **Esteban Muldavin**, PI. 10/12-09/17. \$0 (F&A \$0).

\$30,000. BLM. Banner #0480BR. Santa Fe River vegetation and channel morphology monitoring. **Esteban Muldavin**, PI. 10/12-09/17. \$0 (F&A \$0).

\$91,453. Middle Rio Grande Conservancy District. Banner #048980. Post-fire bosque restoration in the middle Rio Grande: a landscape-scale approach towards revitalization of an ecosystem. **Esteban Muldavin**, PI. 10/08-03/12. \$32,915 (F&A \$2,992).

\$31,920. NPS. Banner #048963. Evaluating vegetation response to prescribed fire at San Andres Nat'l. Wildlife Refuge. **Esteban Muldavin**, PI. 09/08-09/12. \$5,309 (F&A \$692).

\$14,900. NPS. Banner #04801H. Plant species inventory and herbarium specimen verification, Petroglyph Nat'l. Monument. **Esteban Muldavin**, PI. 05/09-07/12. \$11,607 (F&A \$1,729).

\$61,425. NPS. Banner #04802H. Pinyon-juniper restoration monitoring. **Esteban Muldavin**, PI. 10/09-09/12. \$43,196 (F&A \$6,433).

\$31,164. NPS. Banner #04802J. Development of vegetation classification and map for Ft. Davis Nat'l. Historic Site. **Esteban Muldavin**, PI. 09/09-12/12. \$17,144 (F&A \$2,553).

\$35,000. NPS. Banner #04808X. Assess impacts of Las Conchas fire and suppression activities on park vegetation. **Esteban Muldavin**, PI. 03/12-12/14. \$10,734 (F&A \$1,599).

\$22,600. NPS. Banner #0480AH. Carlsbad Caverns post-fire monitoring. **Esteban Muldavin**, PI. 07/12-06/13. \$8,227 (F&A \$1,225).

\$99,258. NM Environment Dept. Banner #04805P. Wetland vegetation index for riverine wetland on the upper Rio Grande. **Esteban Muldavin**, PI. 12/10-12/11. \$81,803 (F&A \$0).

\$185,000. NM Environment Dept. Banner #04809Z. Rapid assessment of wetlands in the Gila watershed. **Esteban Muldavin**, PI. 06/12-10/14. \$64,970 (F&A \$5,906).

\$119,933. U.S. Forest Service. Banner #04803U. Nonforest ecological modeling for Arizona and New Mexico. **Esteban Muldavin**, PI. 04/10-09/13. \$31,140 (F&A \$4,638).

\$25,800. U.S. Forest Service. Banner #048972. Development of native plant materials program. **Esteban Muldavin**, PI. 09/08-09/13. \$6,216 (F&A \$565).

\$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. \$13,744 (F&A \$0).

PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

B. Journal Articles

C. Web-Based

D. Technical Reports

Freehling, M. and K. Johnson. 2012. Lake Holloman Wetland Complex Area invertebrate monitoring plan. Natural Heritage New Mexico Publication No. 12-GTR 367.

Johnson K. and J. Smith. 2012. Grassland/shrubland raptor surveys at Holloman Air Force Base, 2009-2011. Natural Heritage New Mexico Publication No. 12-GTR-372.

Johnson, K., L. Wickersham, T. Neville, G. Sadoti, J. Smith, J. Wickersham, and C. Finley. 2012. Habitat use at multiple scales by pinyon-juniper birds on Department of Defense lands II: Nest and territory/colony scale. Natural Heritage New Mexico Publication 12-GTR-366.

Muldavin, E., Y. Chauvin, L. Arnold, T. Neville, P. Arbetan and P. Neville. 2012. Vegetation classification and map: Petroglyph National Monument. Natural Resource Technical Report NPS/SCPN/NRTR—2012/627. National Park Service, Fort Collins, Colorado.

Muldavin, E., Y. Chauvin, P. Neville, T. Neville, L. Arnold, P. Arbetan, and A. Fettes. 2012. A vegetation classification and map: Pecos National Historical Park. Natural Resource Technical Report NPS/SOPN/NRTR—2012/601. National Park Service, Fort Collins, Colorado.

Ruppert, J.C. A. Holm, S. Miede, E. Muldavin, H. A. Snyman, K. Wesche, and A. Linstadter. 2012. Meta-analysis of ANPP and rain-use efficiency confirms indicative value for degradation and supports non-linear response along precipitation gradients in drylands *Journal of Vegetation Science* 23: 1035–1050

Smith, J and K. Johnson. 2012. Grassland/shrubland bird surveys at Holloman Air Force Base, 2009-2011. Natural Heritage New Mexico Publication No. 12-GTR-371.

E. Theses/Dissertations Completed

F. Work In Progress

Johnson, K., G. Sadoti, M. East, and R. McCollough. Ms. in prep. Lesser prairie-chicken population decline in New Mexico, 1971-2012.

Johnson, K., G. Sadoti, and J. Smith. Ms. In prep. Pinyon jay behavioral response to declining pinyon condition.

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

Muldavin, E., Y. Chauvin, T. Neville, P. Arbetan, A. Kennedy, and P. Neville. 201X. A Vegetation Classification and Map, Fort Davis National Monument. Natural Resource Technical Report NPS/CHDN/NRTR–200X/00X, National Park Service, Fort Collins, CO.

Muldavin, E., Y. Chauvin, T. Neville, P. Arbetan, A. Kennedy, and P. Neville. 201X. A Vegetation Classification and Map, Fort Davis National Monument. Natural Resource Technical Report NPS/CHDN/NRTR–200X/00X, National Park Service, Fort Collins, CO. Sadoti, G., K. Johnson, and J. Smith. Ms. In prep. Four season habitat use by Chihuahuan Desert grassland and shrubland birds.

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

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, E. B. Henderson, and M. Creutzburg. 2012. Modeling vegetation dynamics among Chihuahuan Semi-desert Grassland ecological groups as part of the Integrated Landscape Assessment Project (ILAP). Poster. Ecological Society of America, 2012 Annual Meeting, Portland OR.

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

E. Muldavin: Biodiversity without Boundaries, NatureServe Network annual meeting. Portland, OR

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

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

E. Service as Officer of Professional Society/Organization

None

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

E. Milford. Progress report on New Mexico Rapid Assessment Methodology for the New Mexico Wetlands Roundtable.

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

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

P. Tonne: Rare Plant Technical Council

E. Milford: New Mexico Wetlands Roundtable

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

D. Journal Referee

K. Johnson: Southwestern Naturalist

E. Muldavin: Journal of Arid Environments

E. Hosting Professional Colloquia and Groups

10. SERVICE

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

New Mexico Rapid Assessment Training Workshop, Santa Fe New Mexico October 1, 2011

B. Public Service

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

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

Anthony Fettes, 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
Phil Tonne, Sr. Research Scientist I
Hannah Varani, Sr. Field Research Tech

B. Graduate students

Keith Woodell, M.A.

C. Undergraduate Student Workers and Volunteers

Katherine Carillo
Jeff Hess
Hugh Hulse
Natalie Sommer
Adam Summers
Matthew Wilder

14. MUSEUM ASSOCIATES

None

DIVISION OF PARASITES

DIVISION HIGHLIGHTS

Obtained the remaining life collection of Robert L. and Virginia R. Rausch. This included 40,000 slides, ~2000 vials/jars of alcohol specimens, journal and reprint collection, various binders and boxes with notes related to specimens.

Renovations of the new division were completed. This \$500,000 renovation with state funds encompasses about 1800 sq ft and includes: a) a wet prep area for dissections, staining, working with worms in fluids, and specimen preparation, to name a few. It has a fume hood, point exhaust for microscope work with chemicals, a deep stainless steel sink and counter for dissections. It has lab top area for at least 5 people, and an area dedicated to preparing worms for slides. b) a dry prep area that will include a microscope set up with computer and camera for imaging, another large table set up for compound and dissecting scope work with space to spread out slides, papers, make drawings. There are also 3 spots for people to sit. c) a slide storage room that has limited access to protect the valuable slides that include types and vouchers. This space can hold approximately 150,000 slides. d) A new wet storage facility dedicated to fluid collections that will be shared with the Arthropod Division. The room will hold at minimum about 300,000 storage vials and is near completion.

Year 2 of the NSF Collection Improvement Grant for the Robert L. and Virginia R. Rausch Collection: (1) continued to capture primary ledger data, (2) through a workshop held in October, made specific conceptual and programming progress in fitting these data into the emerging (web-accessible) bioinformatics infrastructure (Arctos), and (3) accessioned important new Rausch material.

We are now up to 14,629 catalogued records, and of these 14,372 are linked relationally to hosts in Arctos. For example:

some of the Rausch material (including linking to other parasite collections)

New Mexico fox parasite collection, about 171 vials. This series of fox parasites is the first to include specimens deposited at all three national parasite collections: the MSB, the US National Parasite Collection, and the Harold W. Manter Laboratory of Parasitology, U Nebraska at Lincoln. All have host vouchers in MSB Mammals. This is the first complete parasite collection that is linked to the host vouchers in MSB Mammals.

Sevilleta Long-term Ecological Research (LTER) mammal monitoring and experimental webs at the Sevilleta National Wildlife Refuge in 1989 through 1998, about 6,752 parasite specimens.

redescription of a cestode genus *Arostrilepis* linked with host records

Major field collections for parasites conducted in South Africa (collaborative with Division of Birds), Kenya, China, and around the US (with a focus on New Mexico parasites). We collected about 100 specimens. Our specimens will be linked with the hosts in Division of Birds.

COLLECTION USE SUMMARY

Specimens Accessioned	8300
Loans - outgoing	0
Loans - incoming	0
Research Visitors	3
Information Requests Answered	20
Publications Citing/Using MSB Parasite Specimens	5

COURSES USING THE COLLECTION

TERM	COURSE	TITLE	STUDENTS
Spring	BIOL 419/519	Museum Techniques	

COURSES TAUGHT BY MSB PERSONNEL

INSTRUCTOR	TERM	COURSE	TITLE	STUDENTS
Loker, E.S.	Fall	BIOL 371	Invertebrate Biology	---
	Fall and Spring	BIOL 499	Undergraduate Research Problems	1
	Fall and Spring	---	Host-Parasite Interactions Seminar	---
	---	BIOL 490	Biology of Infectious Organisms	---
	---	BIOL 582/482	Parasitology	---
	---	BIOL 699	Dissertation	2
Brant, S.V.	Fall	BIOL 699	Dissertation	1
	Fall and Spring	BIOL 499	Undergraduate Research Problems	2
	Spring	BIOL 419/519	Museum Techniques	---
Devkota, R	Fall and Spring	BIOL 201L	Cell Biology	---
Gendron, E	Fall and Spring	BIOL 203L	Ecology and Evolution	---

COLLECTION MANAGEMENT

Continued work with the Rausch collection NSF Improvement grant

Ongoing development and refinement of the data entry page (and associated codes, taxonomy) specific for parasites for Arctos database. The long term benefit of this effort will be the informatics level retrieval of parasite AND host data

Entering the Rausch collection ledger-stabilized the Rausch wet collection

Time was spent working with Parasitologist on campus and involving our community of Parasitologist through the American Society of Parasitologists to gain recognition for the new division and also best serve the community of parasitologists who wish to preserve and use the collections.

S. V. Brant and Mariel Campbell traveled to Beltsville, Maryland to spend time at the US National Parasite Collection, as well as work with the curator Dr. E. Hoberg and the collections manager, Ms. P. Plitt. The goals was both to learn the practices of the museum as well as to collate data on where there are Rausch specimens, so that we can make such notation in Arctos – thus linking the major parasite holdings for Bob Rausch. This is a goal we will have for all our collections. For example, we have done this as well with the fox parasite data, with specimens housed at the Manter Collection in Nebraska.

AWARDS, GRANTS, AND CONTRACTS

Awarded: S. Brant (PI) NSF REU Supplemental for NSF DEB-1021427 Phylogenetic and Revisionary Systematics of a Diverse Clade of Avian Schistosomes (Platyhelminthes: Schistosomatidae) \$7,500

Awarded: 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)

Submitted: 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

Submitted: S. Brant (PI), D. Jouet, H. Ferte NSF Systematics: Biodiversity and diversification of a clade of the avian blood fluke genus *Trichobilharzia*: host switching and population structure.

Submitted: E. Loker (PI), S. Brant, NSF Physiological and Structural Systems-Symbiosis, Defense and Self-Recognition: Revealing the mechanistic basis of host switching, a pervasive process among parasites

Ongoing: S. Brant (PI) NSF DEB-1021427 REVSYS: Phylogenetic and Revisionary Systematics of a Diverse Clade of Avian Schistosomes. 09/01/2010 – 08/31/2013 \$60,000 (annual direct cost).

Ongoing: E. S. Loker (PI) NIH/NCR *COBRE: Center for Evolutionary and Theoretical Immunology*. 9/30/2003 – 5/31/2014 \$1.4M (annual direct cost)

PUBLICATIONS

Books, Book Chapters, Edited Volumes

Horak P, Schets FM, Kolarova L, Brant SV. 2012. Chapter 42. *Trichobilharzia*. Molecular Detection of Human Parasitic Pathogens, Dongyou Lui, ed. New South Wales, Australia RCPA Biosecurity QAP. 895 pp.

Journal Articles

Brant SV, Pomajbikova K, Modry D, Petrzelkova KJ, Todd A, Loker ES. 2012. Molecular phylogenetics of the elephant schistosome, *Bivitellobilharzia loxodontae* (Trematoda: Schistosomatidae) from the Central African Republic. *Journal of Helminthology*.

Devkota R, Brant SV, Thapa A, Loker ES. 2012. Sharing schistosomes: the elephant schistosome *Bivitellobilharzia nairi* also infects the greater one-horned rhinoceros (*Rhinoceros unicornis*) in Chitwan National Park, Nepal. *Journal of Helminthology*.

Begay, A., A. Schmidt-Rhaesa, M.G. Bolek, and B. Hanelt. 2012. Two new *Gordionus* species (Nematomorpha: Gordiida) from the southern Rocky Mountains. *Zootaxa*. 3406: 30-38. (TWO HOLOTYPE)

McAllister, C.T., Bolek, M.G., and B. Hanelt. 2012. The horsehair worm, *Paragordius varius* (Nematomorpha: Gordiida): New to the fauna of Oklahoma. *Southwestern Naturalist*. In press.

Hanelt, B., M.G. Bolek, A. Schmidt-Rhaesa. 2012. Going Solo: Discovery of the first parthenogenetic Gordiid (Nematomorpha: Gordiida). *PLoS ONE*. (PARATYPE)

Looney, C., B. Hanelt, and R.S. Zack. 2012. New records of nematomorph parasites (Nematomorpha: Gordiida) of ground beetles (Coleoptera: Carabidae) and camel crickets (Orthoptera: Rhabdophoridae) in Washington state. *Journal of Parasitology*. 98: 1-6. (HOLOTYPE)

ACTIVITIES IN LEARNED SOCIETIES

Contributed Talks and Posters (*presenter)

Gendron ET*, Malone D, Loker, ES, Brant SV. (2012). Illuminating schistosome diversity. Research Day Department of Biology, University of New Mexico. 30 March 2012.

Hudgell, MA*, Forsys MA, **Loker ES**. (2012). Revealing the mechanistic determinants of host specificity: using the parasite *Schistosoma mansoni* and the snail *Biomphalaria obstructa* as a model system. POSTER. Research Day Department of Biology, University of New Mexico. 30 March 2012.

Devkota R*, **Brant SV**, Thapa A, **Loker ES**. (2012). Sharing of schistosomes: The elephant schistosome *Bivittellobilharzia nairi* also infects the greater one-horned rhinoceros (*Rhinoceros unicornis*) in Chitwan National Park, Nepal. POSTER. Research Day Department of Biology, University of New Mexico. 30 March 2012.

Gendron ET*, **Malone D**, **Loker, ES**, **Brant SV**. (2012). Do intermediate hosts play a role in parasite population structure? A phylogeographic study of *Trichobilharzia querquedulae*. Southwestern Association of Parasitologists 12-14 April Lake Texoma, Oklahoma.

Malone D*, **Brant S**, Bochte C, Leonard J, **Loker ES**. (2012). Observations on the morphology, behavior and phylogenetic position of three large tailed cercariae from planorbid snails in New Mexico. POSTER. Southwestern Association of Parasitologists 12-14 April Lake Texoma, Oklahoma.

Brant SV*, **Loker ES**. (2012). Introducing a new museum for parasites – the Parasite Division of the Museum of Southwestern Biology at the University of New Mexico in Albuquerque. POSTER. Southwestern Association of Parasitologists 12-14 April Lake Texoma, Oklahoma.

Devkota R*, **Brant SV**, **Loker ES**. (2012). Schistosomiasis in Nepal. Nepal Academy of Science and Technology, June 6-8 Kathmandu, Nepal.

Brant SV*, **Loker ES**. (2012). Introducing a new museum for parasites – the Parasite Division of the Museum of Southwestern Biology at the University of New Mexico in Albuquerque. POSTER. American Society of Parasitologists 13-16 July Richmond, Virginia.

Hudgell MA*, Forsys MA, **Loker ES**. (2012). Revealing the mechanistic determinants of host specificity: using the parasite *Schistosoma mansoni* and the snail *Biomphalaria obstructa* as a model system. American Society of Parasitologists 13-16 July Richmond, Virginia.

Buddenborg SK*, Agola LE, Mwangi IN, Mkoji GM, **Loker ES**. A new approach for monitoring and measuring schistosomiasis transmission in Africa: exposure of sentinel mice coupled with genotyping of recovered adult worms. American Society of Parasitologists 13-16 July Richmond, Virginia.

Gendron ET*, **Malone D**, **Loker, ES**, **Brant SV**. (2012). Do intermediate hosts play a role in parasite population structure? A phylogeographic study of *Trichobilharzia querquedulae*. American Society of Parasitologists 13-16 July Richmond, Virginia.

Devkota R*, **Brant SV**, Thapa A, **Loker ES**. (2012). Schistosome sharing: The elephant schistosome *Bivittellobilharzia nairi* also infects the greater one-horned rhinoceros (*Rhinoceros unicornis*) in Chitwan National Park, Nepal. POSTER. American Society of Parasitologists 13-16 July Richmond, Virginia.

Attendance at Professional Meetings

Loker, E. S.

June 2012 American Society of Parasitologists, Richmond, Virginia
November 2012 Tropical Medicine and Hygiene

Brant, S.V.

April 2012 Southwestern Association of Parasitologists, Lake Texoma, Oklahoma.
June 2012 American Society of Parasitologists, Richmond, Virginia

Devkota, R.

June 2012 Nepal Academy of Science and Technology, Kathmandu Nepal

Gendron, E. T.

April 2012 Southwestern Association of Parasitologists, Lake Texoma, Oklahoma.

June 2012 American Society of Parasitologists, Richmond, Virginia

Service as Officer of Professional Society/Organization

E.S. Loker, President of the American Society of Parasitologists

OTHER PROFESSIONAL ACTIVITIES

Journal Referee

Loker, E. S. Journal of Helminthology, International Journal for Parasitology,
Brant, S. V. Comparative Parasitology, Journal of Invertebrate Pathology, Journal of Wildlife Disease,
Journal of Parasitology, Parasite International, and ZooTaxa

Hosting Professional Colleagues and Groups

Dr. Bill Font, Southeastern Louisiana State University
Dr. Jean-Pierre Pointier, Université de Perpignan, France
Dr. Sean Locke, Environment Canada, Montreal

SERVICE

Public Service

S. V. Brant – voting member of the Institutional Animal Care and Use Committee (IACUC) on Main Campus

ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS

E. S. Loker, Curator, Distinguished Professor at UNM

DONATIONS AND GIFTS RECEIVED

The life collection of Robert L. and Virginia R. Rausch. This included 40,000 slides, ~2000 vials/jars of alcohol specimens, journal and reprint collection, various binders and boxes with notes related to specimens

CURRENT STAFF

Faculty/Staff

Eric S. Loker, Distinguished Professor, Curator
Sara Brant, Research Asst. Professor, Senior Collection Manager Parasite Division

Graduate Students

Mr. Ramesh Devkota/Loker
Ms. Erika Gendron/ Brant and Loker

Undergraduate Student Workers and Volunteers

Ms. Eva Zawadzki volunteer

Ms. D'Eldra Malone paid student
Mr. Randle McCain (UnO)