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2008 Annual Report

Thomas F. Turner

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Museum of Southwestern Biology

Thomas F. Turner, MSB Director

September 2009

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Annual Report for 2008

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MSB Director's Summary

The Museum of Southwestern Biology is different from a typical Research Center! The Museum of Southwestern Biology performs and supports scientific research and is a nucleus for new and integrative research and education opportunities at UNM. It is important to recognize, however, that curators and staff are obliged to serve as stewards for extensive natural history collections and all the materials entailed therein, including (but not limited to) animal and plant specimens, field notes, other archival materials, and electronic archives and inventories. Our curators and staff routinely obtain research funding for special projects, but it is nearly impossible to generate sustained extramural funding for maintenance and preservation of a natural history collection. Thus, UNM has taken on a great responsibility to preserve and protect this priceless resource in perpetuity. In contrast, research centers are designed to be short-lived and are, at least in principle, self-sustaining. There is thus a fundamental difference between UNM Science Museums like the MSB and research centers in the time frame and expected level of extramural support of activities, and the significant duties related to collection growth and maintenance that are outside the mission of a typical research center.

In recognition of the unique role that UNM museums play in the research, outreach, and education missions of UNM, President Schmidly appointed the directors of UNM's museums to the UNM Collections Committee. This committee was charged with developing general policies for UNM Museums and Collections. An additional charge was to develop an inventory of objects held in UNM's museums and collections. The committee largely completed these tasks in 2008. The resulting policy document addresses general issues of insurance, inventory, security, responsibility and stewardship. UNM Regents approval is expected in 2009, and subsequent inclusion of major findings and recommendations of the policy document are expected to be included in Big Red thereafter.

MSB Highlights: A Snapshot – As of December 31st 2008, MSB Director Turner completed his second year as Director of the Museum of Southwestern Biology. During calendar year 2008, the MSB continued with major initiatives, as discussed in an open forum (the MSB Retreat was held October 31st 2008) and agreed upon by the MSB Executive Committee that consists of the MSB curators, a collection manager representative, and a representative from the Department of Biology. In 2008, we achieved some important milestones and achieved good progress in the following areas:

- Created the ***MSB Division of Parasitology*** with the approval and assistance of the Biology Department and A&S. Activation of the Division is ongoing, and we remain in negotiations to move the US National Parasite Collection to the MSB as a cornerstone of an integrative research and education program in host-parasite interactions. We are seeking ways to fund positions, infrastructure, and an operating budget.
- Finalized an agreement for a full time I&G-supported line for ***a senior collection manager*** in the Division of Birds in March 2008. The position will take effect in FY 2010.
- ***Curated and integrated major federal, state, and "orphaned" university collections*** into the MSB, resulting in the addition of 300,000 specimens, data, and electronic archives. Activities included integration of the USGS collections into the Divisions of Amphibians and Reptiles (100% complete), Birds (100% complete), Fishes (80% complete), and Mammals (20% complete). The USGS collections will be fully integrated by 2010.
- ***Completed the demestid beetle facility*** with funding from the MSB, Biology, and the UNM Provost's Office. The facility is now fully operational.
- ***Designed and obtained a complete set of drawings for CERIA 125*** renovation for new fluid collection space to alleviate critical shortfalls and a potential fire hazard.
- Undertook a ***major review and inventory of hazardous materials*** in a report to UNM Safety and Risk Management. We also conducted a detailed inventory of space and usage in CERIA.
- Reviewed and renewed all applicable ***federal, state, and local permits*** for MSB activities.
- ***Sponsored and participated in intra- and extramural education and outreach activities***. In 2008, we hosted an undergraduate-organized Sustainability Symposium in August 2008, conducted tours for special educational programs (i.e., MARC, PREP, UnO), hosted several departmental seminars and distinguished guests, and helped organize a tour with UNM Alumni as part of a program developed by Bill Uher and the UNM Foundation. The MSB routinely conducts tours for K-12 education, and a variety of UNM courses.
- ***Compiled and completed a 10-year Program Review*** of the Museum of Southwestern Biology as part of the Department of Biology review. MSB staff met with the review panel. A special panelist was selected by the MSB, Dr. David Wake from the Museum of Vertebrate Zoology at Berkeley, but Dr. Wake was unable to attend the review because of unanticipated health problems and this diminished the impact of recommendations focused solely on improving the MSB.

- ***Developed and completed the MSB Strategic Plan*** (available upon request).
- ***Participated in an invitation-only workshop at the National Museum of Natural History*** in Washington DC that examined the collection, deposition, and curation of materials associated with the NSF-sponsored National Ecological Observatory Network (NEON). About 25 private, federal, and university museum directors developed a plan for specimen collection and curation for this 30-year project. A report of our activities is available upon request.
- ***Represented UNM to the Colorado Plateau Cooperative Ecosystems Study Unit*** meeting, held in Phoenix, Arizona. This group includes federal and state partners and is designed to facilitate contracts and grants between partners. There is an important role for museums as repositories for natural history and archaeological studies on federal lands on the Colorado Plateau. A 5-year renewal of the federal charter for this group was recently signed and UNM remains a member in good standing. More information can be found on the group's web site http://www.cefns.nau.edu/Orgs/CPCESU/.

Significant Accomplishments in support of the College Mission

In 2008, the MSB made substantive contributions to the education, research, and service missions of the College of Arts and Sciences and the University of New Mexico in the following areas:

Graduate and Undergraduate Training

1) MSB faculty and staff directly mentored and ***individually trained 35 graduate students and 54 undergraduate*** students in 2008. The MSB provides high quality, hands-on, student research training, research, and curatorial experience. Hands-on experience with conservation, field biology, and biological research translates into placement into jobs for our students in the academic, government, and non-government (NGO) sectors in biology, ecology, evolution, natural resource management and conservation, and natural history museum management.
2) In 2008, MSB faculty and staff continued to develop and recruit students for our museum-centered and NSF-funded undergraduate training grant entitled "URM, Undergraduate Opportunities at UNM). Students from underrepresented groups are the target of this program and in 2008 we trained African-American, Hispanic, and Native American students in the program. In total, ***17 undergraduate students were funded and mentored in natural history research*** and attended a weekly seminar on how to succeed in graduate school. Retention rates in this program are over 95%, well above UNM's average.
3) The MSB led a consortium of researchers in A&S, COE, and HSC that led to submission of an invitation-only proposal to the NSF aimed at ***developing an Integrative Graduate Education and Research Training (IGERT) program***. Of 100 full proposals received by the NSF, the MSB-IGERT received good reviews and was placed in the 'high priority' for funding category, but unfortunately, the full proposal was not funded. We intend to

strengthen this proposal and resubmit in 2009 - 2010. If funded, this museum-centered IGERT will be the first program of its kind in the nation to our knowledge and will strengthen graduate programs in A&S Biology, Earth and Planetary Sciences, Geography, and Mathematics and Statistics. It will also strengthen our connections to the UNM School of Pathology thereby helping to bridge the Lomas gap.

4) The MSB has been instrumental in working with the Maxwell Museum of Anthropology and other UNM Museums to ***reinvigorate the Museum Studies program at UNM***. A full proposal for a Graduate Degree in Museum Studies was prepared during 2008. We intend to fully vet this proposal with multiple colleges on campus to implement this important program.

Classroom Teaching and Support

5) ***MSB faculty and staff taught 21 full courses at UNM and contributed specimens to 22 courses across the UNM campus.*** Students consistently rate inclusion of biological specimens highly in their undergraduate coursework. The MSB offers the only undergraduate certification in Conservation Biology in the state of New Mexico. This program provides training and know-how to tackle environmental issues that face New Mexico and the world.

Research Productivity, Grant Support, and Facilitation

6) MSB Faculty and Staff ***published 54 scientific papers*** (up from 50 in 2007) in peer-reviewed scientific journals in 2008. ***MSB specimens were cited in 60 scientific papers*** by scientists outside of UNM, which more than doubles the impact of specimen-based research productivity supported by the MSB. Although the number of specimen and tissue loans were down slightly in 2008 (125 compared to 140 in 2007), MSB personnel personally answered 1196 requests for information (up 50% from 2007). Web site hits of MSB databases exceeded 50,000 in 2008 reflecting increased dependence on web-based data by the international scientific and resource management community, and emphasizing growing demands on cyber-infrastructure in the MSB.

7) ***MSB Faculty and Staff garnered $9.4 million*** in new and in-force grants and contracts from a variety of agencies including the NIH and NSF, and generated roughly $1.5 million in facilities and administration (F&A) dollars. The MSB is the primary UNM liaison to state and federal natural resource management agencies in research and advisory capacities, and serves a special role in open space planning in the City of Albuquerque. The MSB Director serves as the UNM representative to the Colorado Plateau Cooperative Ecosystem Study Unit (CPCESU), which facilitates grants and contracts between Federal Partners and UNM Departments of Anthropology, Architecture, Biology, Economics, and Native American Studies among many other units on campus.

Collections and Natural History Resources Development

8) The MSB cataloged over 389,000 new specimens and continued to ***integrate three 'orphaned' collections from University of Illinois, the US Fish and Wildlife Service, and the New Mexico Department of Game and Fish into the MSB collections.*** Integration is supported by ongoing grants from NSF (to Division of Mammals), and USFWS and NMDGF (to Division of Fishes). Acquisition of these collections further enhances the MSB role as an internationally recognized repository for natural history collections. ***Major research expeditions to Africa and Central and South America were mounted by MSB personnel*** in the Divisions of Amphibians and Reptiles, Arthropods, Birds, and Mammals. These activities substantially increased the geographic scope of our impact.
9) Through a ***cooperative agreement with the US Geological Survey***, the MSB has nearly completed integration of internationally known and historically important federal collections, making these specimens and associated data more visible and available to the scientific community. Cindy Ramotnik, the USGS collection manager, spearheaded this effort in consultation with MSB collection managers.
10) In 2008, the MSB and the College of Arts and Sciences ***formally established a new Division of Parasitology***, dedicated to the concept of 'integrated' research collections that simultaneously provide information of pathogens, parasites, and hosts for comprehensive study of epidemiology, pathology, ecology and co-evolution of infectious diseases and hosts. This is an emerging area of research that will undoubtedly generate enormous student and researcher development at UNM and in New Mexico.

Major Initiatives of the MSB

At our annual retreat held in October 2008, and at a number of MSB executive committee meetings throughout the year, we identified a number of goals, programs and key resources we will strive to accomplish over the next five years. They are:

1. Activate and grow an internationally recognized repository and research infrastructure for host-parasite interactions: In response to continued and unprecedented environmental change and the ongoing emergence and resurgence of infectious diseases, we have initiated the new Division of Parasitology in the Museum of Southwestern Biology. National and international research agendas aimed at elucidating the dynamic linkages between hosts, parasites, environmental change and human health will be pursued, leveraging existing strengths, strengthening intra-university relationships. We envision the Division of Parasitology along with other Divisions at the MSB as an international resource for systematics, taxonomy, identification, ecological and epidemiological research in parasitology and hosts and will diversify and leverage UNM's continued leadership in these research arenas. The new Division of Parasitology represents the development of new capacity to address current and emerging challenges to science and society. As a recognized leader in collections-based research and biodiversity informatics, the MSB is uniquely positioned to bridge existing gaps between collection-based research and environmental and biomedical science: resources of the MSB have been critical for policy makers, natural resource managers, and government and business leaders

because they support investigations and decisions related to human health, climate change, conservation, and land management. Moreover, the Division of Parasitology will move UNM to the leading edge of efforts to understand and combat emerging infectious diseases by facilitating efforts to assess the complex and dynamic linkages between hosts and parasites in a changing world. The Division of Parasitology was established in January 2008 with a substantial donation of specimens from the Rausch collection and ongoing research initiatives at UNM (e.g., Beringian Coevolution Project, Center for Evolutionary and Theoretical Immunology)
We are continuing work to relocate and transfer the US National Parasite Collection (USNPC) from Beltsville, Maryland to the MSB. Relocation, transition and consolidation of the USNPC will involve five critical components represented by (1) curation and integration of liquid and dry specimens collections; (2) developing cyber-infrastructure and catalogues; (3) housing literature resources including an extensive reprint collection extending back to the 1800's; (4) historical catalogues documenting diverse global collections of parasites since the late 1800's; and (5) critical instrumentation. As part of this package, we propose temporary reassignment for USDA curatorial staff to the MSB for 5 years to ensure a timely and effective transition of the collection.

Significant resources are required to implement this vision. We are working to put together the following infrastructure with the help of the College of Arts & Sciences, the VPR's office, the UNM President's office, our congressional delegation, and leveraging from grants and contracts. Along with the commitment of USDA staff, the following elements are essential to make a successful transition and a thriving collection:

1) An endowed Professor-Curator position in Parasitology
2) Two full time I&G supported Collection Managers in the Division of Parasitology
3) Renovation of Fluid Collection Space in CERIA 125 (estimated cost $500,000)
4) Assistance to obtain office space and dry collection space for the Division including housing for a senior USDA-supported position to help move and integrate the collection into the MSB.
5) A graduate assistant dedicated to curation in the Division of Parasitology.
6) A Cryopreservation Facility that will serve as repository for host and pathogen specimens that can be assayed genetically.
7) An annual operating budget for collection maintenance
8) A permanent line for Information/Technology Support that would work with all Divisions of the MSB to help integrate parasite and host information into a common electronically accessible framework.

2. Develop and launch an MSB-centered Conservation Division: a special role for Natural Heritage New Mexico. A second major area for growth in the MSB addresses a critical need for historical data in conservation of endangered species and ecosystems and natural resource management. We seek to develop a **Conservation Division**, which is a program charged with maximizing the visibility and utility of our extensive specimen-based databases and to enhance development of a number of initiatives at the state and federal level involved with conservation issues. There are major policy issues at stake. For example, the development of alternative energy has potentially significant impact on native plants and animals. Scoping and siting new wind and solar energy projects will depend on distributional and historical data of

plants and animals. Thus, we envision the Conservation Division as a centralized, core resource that serves the UNM community at large but is based in the MSB. We will seek to obtain funding, perhaps through the UNM Foundation for a Faculty Curator and a database/collection manager for the Conservation Division.

The full-time I/T systems administrator we propose below will forge critical links between the Conservation Division and other Divisions of the MSB. One challenge is to implement and connect database systems into a seamless server for conservation and management data that will be accessible by local, state, and federal resource managers. Our plan is to leverage this full time museum-wide position through programmatic grant proposals like the proposed NSF IGERT grant.

3. Work to develop and establish integrated online database systems for all Divisions of the MSB. This will require substantial planning and collaboration among divisions and success will depend heavily on a new I/T systems administrative hire. This goal emerges naturally from the previous goal of establishing a formal informatics program in the MSB.

4. Further develop and support our undergraduate training program afforded by NSF-funded UnO - Undergraduate Research Mentoring Program: Our progress so far has been excellent, 16 students are currently participating in the program. Seven students from the first cohort graduated and five are either enrolled in graduate school or are graduate-school bound. Details about students, research projects, and faculty mentors can be found at http://msb.unm.edu/mammals/UNO.html.

4. Refine, further develop, and resubmit a museum-centered interdisciplinary graduate training program through development of an NSF-IGERT proposal: In 2007, we assembled a team of faculty researchers at the University of New Mexico (Table 1) who are interested in developing a museum-centered graduate training proposal aimed at documenting and understanding how abiotic and biotic systems change from molecular to ecosystem scales. There are three major underlying research areas: (i) identifying and understanding relationships of environmental change and host-pathogen interactions focusing both on human and wildlife diseases (ii) using museum collections to uncover evolutionary and ecological change in biota that results from landscape and water use and global climate change in the American Southwest over decadal time scales and (iii) developing informatics and modeling approaches to both create and use integrated relational databases that link specimens, environmental, molecular and geographic information.

We are continuing to develop and hone our MSB-IGERT program so that it will prepare students to meet substantial environmental challenges and for the job market by providing a strong grounding in their respective disciplines but also by providing a culture and infrastructure to allow them to tackle environmental and biotic changes in novel, integrative, and multidisciplinary ways. Most importantly, through our program, students will be equipped to bring time series data to bear on evaluating and predicting responses to environmental change over decadal time scales. Use of natural history collection specimens, data and materials will undoubtedly motivate new uses and ways of integrating databases in a reciprocally illuminating process that is likely to spark renewed interest in resources available in natural history collections.

5. Work to revitalize the museum studies program at UNM through MSB collaborations with other UNM Museums (e.g., Maxwell, Meteorite, and UNM Art

Museums). The College of Arts & Sciences has recently hired a new director in the UNM Maxwell museum who is charged with revitalizing the Museum Studies program at UNM. The College has contributed significant resources including a new faculty position in addition to the new Director to coordinate this effort.

Major Challenges to Growth and Development of the MSB

We face a number of challenges to implementation of our goals that mainly revolve around a general lack of resources for staffing and operational budgets. We address the following challenges below, and propose some solutions:

1. We Lack Critical Information Technology Support: The MSB is sorely lacking information technology support, and it is our top priority to staff an IT Technologist/Systems Administrator position to help develop, grow, and maintain our overtaxed cyber-infrastructure (Over 50,000 web hits and data downloads in 2008). At present, our database management plan is ***reactive*** rather than ***proactive***; we deal with problems involving data security, data backup/management, systems maintenance, IT innovation, trouble shooting viruses/worms, purchasing hardware and software in highly piecemeal fashion using private contractors that vary tremendously in quality and service.

IT/Systems Administrator rationale and proposed solution: So much of the potential and promise for development of the MSB relies on enhancing our visibility and accessibility through electronic media such as the world-wide-web. We have enormous potential to provide integrated databases that could serve as tools to address questions of great societal import regarding emergence of pathogens and natural resource abundance and distribution. Our progress in this area has been seriously hampered by lack of personnel in computer systems administration. At minimum, we will seek to hire one full-time IT/ Systems Administrator to manage and implement database and server systems. Our plan is to leverage this position through programmatic grant proposals like the proposed NSF IGERT grant, and UNM legislative priorities like relocation and integration of the US National Parasite collection.

2. We lack assistance and funding in building management. Cathy Osborn, the Museum Administrator, currently coordinates and is responsible for management of the CERIA, despite the fact that the building is occupied and used by the Sevilleta LTER program, the LTER Network Office, the Fine Arts Cinematic Arts Department and office space for the Arts Technology Center. The MSB receives minimal support and no funding for building management. Building management in CERIA is not an insignificant task. Cathy estimates that building and security issues occupy about 15 to 20 hours per week of her time. In 2008, a building management committee was developed to identify problems with the entire facility. The committee is comprised of all the collection managers of the MSB and representatives from the LTER Network office, the Sevilleta LTER program and Cinematic Arts. The average cost to maintain the physical aspects of the security system is approximately $1000 per year, with the MSB shouldering the entire amount. Other associated costs for the security system (software, partition maintenance) totaling an additional $1000 are also solely funded by the MSB.

Proposed Solution: We propose that the Department of Biology hire a part-time assistant who reports to John Cox, but who would have significant duties in CERIA (roughly 10 hours per week). Cathy would consult with John to identify recurring and new tasks to be conducted by this person.

3. Critical Limitations on Fluid Collection Space: Since the 2003 occupation of the renovated old UNM bookstore by the Museum of Southwestern Biology (MSB), all of the MSB divisions

have acquired additional collections not originally factored into the estimated growth figures of 1998-99 when designing collection storage space for the Museum. Especially for invertebrates and vertebrates there have been unanticipated acquisitions of specimens. Important additions to the MSB collections include a large backlog of ethanol-preserved New Mexico insect collections taken from pitfall sampling and an increasing number of collections from South America and Africa since the hire of a Curator of Arthropods. There is also the Rausch Collections of Parasites acquired by the Division of Mammals and strong support both within and outside of the MSB to acquire the US National Parasite Collections, currently located in Beltsville MD. All of these collections increase the importance of the MSB as a national and international resource for scientific research in ecology, systematics, molecular systematics, population studies, and emerging disease research. Currently, there are rooms/areas within the Museum facility that have been identified as potential collections space for the Museum. These areas, if minimally renovated, would make a big difference in specimen access and if important collections could be accepted (or not) by the MSB. ***The UNM Fire Marshal has mandated new collection space for fluid-preserved materials in the MSB, which makes this a health and safety issue.***

Proposed Solution: CERIA 125 conversion from classroom space to fluid collection space: To alleviate shortfalls of fluid collections space, we propose a two phase plan. For **Phase I**, we propose that Room 125, a classroom on the lower level of CERIA Building 83, be used as a temporary storage area for select collections currently housed in the main fluid collection room, Room 145. These select collections include: large containers holding large specimens of fishes, reptiles, and mammals that are blocking the exit pathways, 165 boxes of a newly acquired collection of fishes from the New Mexico Department of Game and Fish in the main hallway of lower floor of CERIA Building 83, and jars of specimens that must be removed from select mobile carriages so that these units can be retrofitted for pull out tank shelves. Once these collections are stored in Room 125, the reconstruction of Room 145 can begin. This phase will add 45 roll out shelves, manufactured to hold stainless steel tanks ("coffins") for large specimens of vertebrates, to the lowest shelf spaces on 3 of the mobile carriages currently holding collections specimens in jars. A stationary unit of roll out shelves and linear shelving will also be built along the south wall in the back of Room 145. **Phase II** construction will involve the complete reconstruction of Room 125 to accommodate fluid-preserved specimens. This reconstruction will involve bringing the room up to code for storage of specimens in 70% ethanol. The room is already equipped with an emergency sprinkler system. With other infrastructure in place, the renovation of the floor, walls, and HVAC system can be done in a cost effective manner.

4. Operating Budgets for Collection Care/Improvement: The operational budget for the Museum of Southwestern Biology is just under $50,000 for collections care, curation of new material, databasing, etc. This money is allocated to divisions at the beginning of the state fiscal year. There is considerable disparity among divisions in operating funds. Among the best supported divisions are Mammals, the Herbarium, Fishes, and Amphibians and Reptiles. Budget increases in these divisions have usually been negotiated as part of grant proposal packages that have a large curatorial component. The divisions of Arthropods and Birds are inadequately supported with operating budgets that are $2000 and $3000, respectively, for the entire year (not including a 1% university-imposed tax to support computerization of contract and grant accounting, etc.). Both divisions are headed up by new, highly motivated curators who are preparing research grants, and we plan to request budget increases commensurate with scholarly and curatorial activity in these divisions as a part of grant proposal packages. In general, total

allocations to the MSB have remained static and have not kept pace with inflation over the last five years despite rising costs of curation, shipping, and electronic infrastructure and maintenance.

5. **Faculty Curator Credit/Compensation –** In December 2007, the entire faculty of the Biology Department ratified a document entitled "Codifying Responsibilities for MSB Curators" which lays out the expectations and duties of faculty curators in the MSB. This constitutes important recognition that faculty curators have duties that exceed the normal responsibilities of UNM Biology Department Faculty members. We have yet to consider reallocation of teaching responsibilities and summer compensation for faculty curators. The MSB will work with the chairman of Biology and the Dean of Arts and Sciences to consider reallocation of duties and summer compensation to rectify this situation. The codification of curator duties document also requires that each faculty curator meet the general expectations of the MSB laid out there. Curators will be assessed each year by the Director in a letter to the Biology Department Chair that indicates whether faculty curators meet these standards. ***We propose that 0.25 FTE for faculty curators reside in a museum line (resulting in a one course per year reduction in teaching), and that faculty curators receive special administrative compensation (SAC) for work in summer.***

DIVISION OF AMPHIBIANS AND REPTILES

1. DIVISION HIGHLIGHTS

During 2008 the collection has increased by a total of 15,155 specimens. This large increase in holdings was due to the integration of the United States Geological Survey Collection (12,530 specimens). While these specimens and their care remain the responsibility of the federal government, the specimens greatly add to the regional value of the MSB collection and are physically integrated into the main collection. Staff at the division has also completed the incorporation of all digital data associated with the USGS collection. In addition, a two-year project funded by the New Mexico Department of Game and Fish was completed, which in addition to manuscripts, has contributed over 500 voucher specimens to the collection. Total number of specimens at the end of the year stood at 86,602.

Scientists and members of the general public have requested information from our division in similar rates to previous years. However, the website of the division has seen a significant increase in traffic (over 60% from last year). This is likely attributable to increased visibility of the collection due to data being available via other sites (HERPNET, INRAM, GBIF, etc). While staff handled 174 information requests via email and phone, hits to data online averaged circa 3,000 per month. Several new publications based on specimens have been added to our growing reference library, in addition to donations of important journals from the Southwest (Southwestern Naturalist, Texas Journal of Science).

Outreach activities included many tours of the collection and accompanying presentations on the importance of specimens and their associated data stored in the collection. Nearly 200 people have toured the collection with the collection manager. We have also continued to work closely with the New Mexico Department of Game and Fish through participation on boards dedicated to species recovery. A new project with the City of Albuquerque that focuses on Urban Biological Diversity has started in 2008 and will continue in 2009. The project provides opportunities for several undergraduate students to work in biological research and complements the mission of the division.

2. TABLE OF COLLECTION USE

Collection Growth	15,155
Loans	5
Research Visitors[1]	24
Outreach Visitors[1]	180
Information Requests Answered	174
Direct Website Access[2] (“Hits”)	8,300
Indirect Collection Access[3] (“Hits”)	32,200
Downloads of Division Documents	1,900
New Publications Citing MSB Herpetological Specimens	6

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

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

[3]Indirect Collection Access represents access to data associated with our specimens via other websites such as HERPNET, INRAM, GBIFF, etc.

3. COURSES USING THE COLLECTIONS

BIOL. 204, Animal Form and Function, Spring and Fall semesters, 321 students
BIOL. 324, Natural History of the Southwest, Fall semester, 5 students
BIOL. 386, General Vertebrate Zoology, Spring and Fall semesters, 72 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Snell, H.L.

Spring BIOL. 379 – Conservation Biology, 36 students.
BIOL. 699 – Dissertation, 2 students
BIOL. 551 – Research Problems, 1 student

Fall BIOL. 402/502 – Conservation Biology Field Seminar, 9 students
BIOL. 551 – Research Problems, 1 student
BIOL. 699 – Dissertation, 2 students

Poe, S.

BIOL. 386 General Vertebrate Zoology, 36 students
Fall semester sabbatical

B. Graduate Students

Phillips, R.B.
BIOL. 203, Ecology and Evolution Lab, spring, 47 students (2 sections)

Ryan, M.J.
BIOL 461/561, Intro to Tropical Biology, spring, 13 students
BIOL 124, Bio-Health Sci Lab, fall, 66 students (3 sections)

Schaad, E.W.
BIOL 386, General Vertebrate Zoology Lab, spring, 36 students (2 sections)
BIOL 386, General Vertebrate Zoology Lab, fall, 36 students (2 sections)

Timmons, H.L.
BIOL 247, Anatomy and Physiology Lab, fall, 84 (3 sections)

5. COLLECTION MANAGEMENT

During 2008, 21 accessions resulted in 2,625 new specimens added to the main collection. A large portion of these new specimens came from our divisional project aimed at increasing knowledge of the distribution of New Mexico amphibians and reptiles through the New Mexico Department of Game and Fish (see Awards section below). In addition, an agreement with USGS resulted in nearly 12,530 specimens added to the MSB collection. We completed the integration of those specimens in November 2008.

Staff at the division spent significant amounts of time doing intensive field work as well as cataloging the incoming specimens. Following the integration of the USGS collection, we have started a project that will cross-reference the herpetological tissues available at the Division of Genomic Resources.

6. AWARDS, GRANTS, AND CONTRACTS

$15,000. New Mexico Department of Game & Fish, Share with Wildlife Program. Banner #048817. Distribution of New Mexico's Amphibians and Reptiles. **H.L. Snell** PI and **J.T. Giermakowski** co-PI. May 2007 – Jun 2008. $15,000 (F&A, $1,364).

$41,892. Development of a Wildlife Conservation Plan for the City of Albuquerque. **H.L. Snell** and T. Lowrey. City of Albuquerque. August 2007 – July 2008.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

None.

B. Journal Articles

Bateman, H.L., A. Chung-MacCoubrey, D.M. Finch, **H.L. Snell**, and D.L. Hawksworth. 2008. Impacts of non-native plant removal on vertebrates along the Middle Rio Grande (New Mexico). Ecological Restoration 26(3):193-195.

Bateman, H., A. Chung-MacCoubrey, **H.L. Snell.** 2008. Impact of non-native plant removal on lizards in riparian habitats in the southwestern U.S.A. Restoration Ecology 16: 180-190.

Jordan, M. A., J. L. Hollis, P. A. Stone, **H.L. Snell**. 2008. Habitat as a source of intrapopulational variation of ornament size in Galápagos lava lizards (Microlophus albemarlensis complex). Amphibia – Reptilia 29(2): 278-283.

Jordan, M. A., **H.L. Snell**. 2008. Historical fragmentation of islands and genetic drift in populations of Galápagos lava lizards (Microlophus albemarlensis complex). Molecular Ecology 17(5):1224-1237.

Poe, S., C. Y. Miranda, E. Lehr. 2008. Notes on variation in *Anolis boettgeri* Boulenger 1911, assessment of the status of *A. albimaculatus* Henle and Ehrl 1991, and description of a new *Anolis* (Squamata: Iguania) similar to *A. boettgeri*. *Journal of Herpetology* 42:251-9.

Poe, S. and C. Y. Miranda. 2008. Another new species of green *Anolis* from the eastern Andes of Peru. *Journal of Herpetology* 42:564–571.

Suzán G., E. Marcé, **J.T. Giermakowski**, B. Armién, J. Pascale, J. Mills, G. Ceballos, A. Gómez, A. Aguirre, J. Salazar-Bravo, A. Armién, R. Parmenter, T. Yates. 2008. The Effect of Habitat Fragmentation and Species Diversity Loss on Hantavirus Prevalence in Panama. Animal Biodiversity and Emerging Diseases: Prediction and Prevention: Annals of the New York Academy of Science 1149: 80–83.

Tzika, A. C., S. F. P. Rosa, A. Fabiani, **H.L. Snell**, H. M. Snell, C. Marquez,¶ W. Tapia, K. Rassmann, G. Gentile and M. C. Milinkovitch. 2008. Population genetics of Galápagos land iguana (genus Conolophus) remnant populations. Molecular Ecology 17, 4943–4952.

C. Web-Based

None.

D. Technical Reports

None.

E. Theses/Dissertations Completed

Hulebak, Erik. 2008. Evolution of the *Anolis limifrons* species group [M.Sc. Thesis]. Albuquerque: University of New Mexico, Dept. of Biology.

F. Work In Progress

Poe, S., J. Velasco, E. E. Williams. Accepted pending revision. New or problematic *Anolis* from Colombia VIII: Descriptions of two nomen nudum species. ***Breviora***.

Schaad, E. and **S. Poe**. In review. Evolution of venom toxicity in pitvipers. ***Journal of Herpetology***.

Poe, S., J. T. Giermakowski, E. W. Schaad, I. Latella, E. P. Hulebak, M. J. Ryan. in review. Ancient colonization predicts recent naturalization in *Anolis* lizards. ***Evolution***.

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

Cudia, C. & Painter, C. W. 2008. Geographic distribution. *Hyla arenicolor*. USA:NM: San Miguel Co. *Herpetological Review* **39**: 478.

Devitt, T., LaDuc, T. & McGuire, J. 2008. The Trimorphodon biscutatus (Squamata: Colubridae) Species Complex Revisited: A Multivariate Statistical Analysis of Geographic Variation. *Copeia* **2008**: 370-387.

Gray, R. L. & Painter, C. W. 2008. Geographic distribution. *Pantherophis emoryi*. USA:NM: Sierra Co. *Herpetological Review* **39**: 486.

McInnes, T. L., Currylow, A. F., Painter, C. W. & Stuart, J. N. 2008. Geographic distribution. *Lithobates catesbeianus*. USA:NM: Mora Co. *Herpetological Review* **39**: 479.

Mulcahy, D. 2008. Phylogeography and species boundaries of the western North American Nightsnake (Hypsiglena torquata): Revisiting the subspecies concept. *Molecular Phylogenetics and Evolution* **46**: 1095-1115.

Poe, S. & Yañez-Miranda, C. 2008. Another New Species of Green Anolis (Squamata: Iguania) from the Eastern Andes of Peru. *Journal of Herpetology* **42**: 564-571.

Stuart, J. N. & Roberts, A. Q. 2008. Geographic distribution. *Sistrurus catenatus edwardsii*. USA:NM:Santa Fe Co. *Herpetological Review* **39**: 112.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

None.

B. Contributed Talks/Posters (*presenter)

Conrad P.* and **Giermakowski J.T.** Herpetofauna regulations in the Southwest. Oral presentation. Southwestern Partners in Amphibian and Reptile Conservation. Austin, TX. June.

C. Attendance at Professional Meetings

None.

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

H.L. Snell, Chair of the Museum of Southwestern Biology Publications Committee

E. Service as Officer of Professional Society/Organization

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

None.

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

H.L. Snell
Represented UNM Faculty Senate at 2008 sessions of New Mexico Legislature.

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

H.L. Snell.
New Mexico Department of Game & Fish Species Recovery Board.

Conservation Fellow of the Saint Louis Zoo.

Member of the General Assembly of the Charles Darwin Foundation.

Reviewed 1 NSF Proposal.

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

Chair of Survey Subcommittee for the American Society of Ichthyologists and Herpetologists.

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

Collection Manager Representative to the Museum of Southwestern Biology Executive Committee.

D. Journal Referee

S. Poe. *Proceedings of the Royal Society of London (1); Journal of Herpetology (2); Copeia (1).*

H.L. Snell. *Galapagos Research (2).*

E. Hosting Professional Colloquia and Groups

None.

10. SERVICE

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

None.

B. Public Service

H.L. Snell
Work with New Mexico Department of Game & Fish on Species Recovery issues.

Reader at UNM 2008 Spring Commencement

Mentored 1 undergraduate Biology Honor's Program student.

Service with the City of Albuquerque Councilors and City administrators on Urban Biological Diversity initiatives.

Worked with Japanese television production company reviewing & advising on Galapagos programming.

R.B. Phillips
Judge for the 2008 Intel International Science and Engineering Fair.

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

H.L. Snell
ICES median scores for Conservation Biology above Departmental norms at 5.5, 5.6, & 5.5

12. DONATIONS AND GIFTS RECEIVED

Donation of 31 different titles of printed journals, including complete series of the Southwestern Naturalist and Texas Journal of Science.

13. CURRENT STAFF

A. Faculty/Staff

Snell, H.L. Professor and Curator

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

Giermakowski, J.T. Collection Manager

Latella, I.M. Graduate Research Assistant

B. Graduate students

Giermakowski, J.T., Ph.D./Snell
Latella, I.M., M.S./Snell and Poe
Phillips, R.B., Ph.D./Snell
Ryan, M.J.,Ph.D./Poe

Schaad, E., Ph.D./Poe
Timmons, H., M.S./Snell

C. Undergraduate Student Workers and Volunteers

Lorraine McInnes. Volunteer.
Gabriel Joachim. High school intern and volunteer.

14. MUSEUM ASSOCIATES

A. Curatorial Associates

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

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

DIVISION OF ARTHROPODS

1. DIVISION HIGHLIGHTS

Highlights for the Division (in conjunction with the research laboratory of KB Miller) include acquisition of an NSF Biological Surveys and Inventories grant titled *Survey of the Aquatic Insects of Northern Venezuela with an emphasis on Coleoptera* ($500,000, Miller, coPI) which is already producing thousands of specimens that will be deposited in the MSBA. Several collecting trips were conducted by MSBA students and staff in 2008 including to Costa Rica, Madagascar and Mexico which resulted in many specimens which will be processed in the MSBA.

2. TABLE OF COLLECTION USE

Specimens Accessioned	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests	Publications Citing MSB Specimens
8000	4	15	100	200	10

3. COURSES USING THE COLLECTION

BIOL. & HONORS 324L, Natural History of the Southwest, 12 students
BIOL 485/585, Entomology, 16 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Miller, K.B.
BIOL 485L, Entomology, 16 students
BIOL 203, Ecology and Evolution

5. COLLECTION MANAGEMENT

With more undergraduate and graduate students working in the division, we increased our efforts to curate and relabel older specimens. We purchased drawers to accommodate the newly processed specimens but continue to be limited by lack of cabinet space. We databased another 1000 specimens from the alcohol collection and expanded its shelf space. Karen Wetherill's continuing research on New Mexico bees resulted in representatives of 36 species donated to the American Museum of Natural History, and loans of Nomada specimens to the Smithsonian Institution and of Lasioglossum specimens to York University for phylogenetic studies.

6. AWARDS, GRANTS, AND CONTRACTS

$500,000. NSF BSI. *Survey of the Aquatic Insects of Northern Venezuela with an emphasis on Coleoptera.* A.E.Z. Short, PI; **K.B. Miller, coPI.**

$5,000. USGS/BRD contract order #06FTSA0059. Continuation of long-term monitoring of ground-active arthropods at Bandelier National Monument. **S.L. Brantley and D.C. Lightfoot.** 07/06-06/07 $5,000 (F&A $0).

$5,000. Universidad Autonoma de Mexico / University of New Mexico. **Ana Davidson**. Separate and combined effects of prairie-dogs and cattle on a desert grassland in northern Mexico. Ground-arthropod and grasshopper component managed by **D.C. Lightfoot** and **S.L. Brantley**. 08/07-08/08 (F&A $0).

7. PUBLICATIONS
A. Books, Book Chapters, Edited Volumes

Cartron, J.-L. E., **D.C. Lightfoot**, J.E. Mygatt, **S.L. Brantley** and T.K. Lowrey. 2008. A field guide to the plants and animals of the middle Rio Grande Bosque. University of New Mexico Press, Albuquerque, NM.

B. Journal Articles

Davidson, A.D. and **D.C. Lightfoot.** 2008. Burrowing rodents increase landscape heterogeneity in a desert grassland. Journal of Arid Environments 72: 1133-1145.

Lightfoot, D.C., S.L. Brantley and C.D. Allen. Geographic patterns of ground-dwelling arthropods across multiple ecoregion transitions in the North American Southwest. Western North American Naturalist 68(1): 83-102.

Miller, K.B. 2008. Review of the genus *Odontembia* Davis, 1939 (Embioptera: Embiidae) with description of a new species. Zootaxa, 1723: 63-68.

Miller, K.B. & J.S. Edgerly. 2008. Systematics and natural history of the Australian genus *Metoligotoma* Davis (Embioptera: Australembiidae). Invertebrate Systematics, 22: 329–344.

Miller, K.B., P. Mazzoldi, & Q. Wheeler. 2008. An unusual new species of Gyrinidae (Coleoptera), *Orectochilus orbisonorum* n. sp., from India. Zootaxa, 1712: 65-68.

Miller, K.B. & P.J. Spangler. 2008. *Fontidessus* Miller and Spangler, a new genus of Bidessini from Venezuela (Coleoptera: Dytiscidae: Hydroporinae) with three new species. Zootaxa, 1827: 45-52.

Miller, K.B. & Q.D. Wheeler. 2008. A new species of *Agaporomorphus* Zimmermann from Venezuela, and a review of the *A. knischi* species group (Coleoptera: Dytiscidae: Copelatinae). Zootaxa, 1859: 63-68.

Nearns, E.H. 2008. Description of the male of *Plectromerus michelii* Nearns & Branham, 2008 (Coleoptera: Cerambycidae). Insecta Mundi, 0038: 1-2.

Nearns, E.H. & M.A. Branham. 2008 Revision and phylogeny of the tribes Curiini LeConte and

Plectromerini Nearns & Branham, new tribe (Coleoptera: Cerambycidae: Cerambycinae). Memoirs of the American Entomological Society, 47: 1-117.

Shockley, F.W., M.D. Ulyshen, & **N.P. Lord**. 2008. New state records and natural history notes for *Micropsephodes lundgreni* Leschen and Carlton (Coleoptera: Endomychidae). The Coleopterists Bulletin, 62(3): 350-352.

Thomas, M.C. & **E.H. Nearns**. 2008. A new genus of telephanine Silvanidae (Coleoptera: Cucujoidea), with a diagnosis of the tribe and key to the genera. Insecta Mundi, 0048: 1-14.

Weissman, D.B and **D.C. Lightfoot**. 2008. Techniques for the field capture and captive rearing of Jerusalem crickets. Sonoran Arthropod Studies Insititute, 2007 Invertebrates in Captivity Conference proceedings, pp.22-29.

C. Web-Based

None.

D. Technical Reports

Brantley, S.L. and D.C. Lightfoot 2008. Long-term studies of ground-dwelling arthropod biodiversity at Bandelier National Monument. Submitted to USGS, Jemez Mountains Field Station.

E. Theses/Dissertations Completed

None.

F. Work in Progress (<u>Only</u> *in press* and already submitted)

Pendleton, R.L., B.K. Pendleton, **K.R. Wetherill**, & T. Griswold. Reproductive Biology of *Larrea tridentata:* A Preliminary Comparison between Core Shrubland and Isolated Grassland Plants at the Sevilleta National Wildlife Refuge, New Mexico. In: Kitchen, Stanley L.; Pendlton, Rosemary L.; Monaco, Thomas A., comps. 2007. Shrublands Under Fire: Disturbance and Recovery in a Changing World; 2006 June 6-8; Cedar City, UT. Proceedings RMRS-P-xx. Fort Collins, CO; U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. (In Press).

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

None.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

Brantley, S.L.*, J.T. Martin, S. Moquin, C.A. Tarleton, & U.L. Shepherd. 2008. Now you see it, now you don't: the microarthropod community in biotic crusts in the arid southwestern US. Reno, American Acarological Society, oral presentation, invited talk.

Lord, N.P. 8/2008. "Systematics within the Cerylonid Series." Invited talk, CSIRO Divisional Seminar Series 2008, Division of Entomology, Canberra, Australia.

Lord, N.P. 7/2008. "Predation and parasitism among insects." Entomology for Teachers (ENTO 5730/7730), invited lecture, the University of Georgia Department of Entomology.

B. Contributed Talks/Posters (*presenter)

Brantley, S.L. * 6/2008. Spiders and El Nino events: 15 years and 3 elevations in the New Mexico Jemez Mountains. Berkeley, American Arachnological Society, oral presentation.

Brantley, S.L.* & **D.C. Lightfoot**. 11/2008. The Museum of Southwestern Biology: introducing a growing regional collection. Reno, Entomological Collections Network, oral presentation.

Edelman, W.* 11/2008. The phylogeny of the *Chortophaga* genus group of Band-Winged Grasshoppers (Orthoptera: Acrididae:Oedipodinae), including the rare and imperiled North American grasshopper, *Shotwellia isleta* (Gurney), ESA 2008, poster presentation.

Grzymala, T.L.* & **K.B. Miller**. 11/2008. "Preliminary Morphological Analysis for Systematic Revision of the Longhorned Beetle Genus *Elytroleptus* Dugés (Coleoptera: Cerambycidae: Cerambycinae: Trachyderini)", Student Competition Presentation; Section SysEB Entomological Society of America, Reno, NV.

Grzymala, T.L.* & **K.B. Miller**. 4/2008. "Preliminary Morphological Findings for Revision of the Longhorned Beetle Genus *Elytroleptus* Dugés (Coleoptera: Cerambycidae: Cerambycinae: Trachyderini)", Student Competition Presentation; UNM Department of Biology Research Day, Albuquerque, NM.

Hodson, A.M.* & **K.B. Miller**. 11/2008. "A Tale of Two Species: Parthenogenetic and Sexual Populations of the Genus *Haploembia* Verhoeff Found in California," Student Competition Presentation; Section SysEB. ESA, Reno, NV.

Hodson, A.M.* & **K.B. Miller**. 5/2008. "A Tale of Two Species: Parthenogenetic and Sexual Populations of the Genus *Haploembia* Verhoeff Found in California," Annual Collaborators' Conference on the Biology of Embioptera Motte Rimrock Reserve, Perris, CA.

Hodson, A.M.* & **K.B. Miller**. 4/2008. "A Tale of Two Species: Parthenogenetic and Sexual Populations of the Genus *Haploembia* Verhoeff Found in California," Student Competition Poster, UNM Department of Biology Research Day, Albuquerque, NM.

Kennedy, T.L.* and T.F. Turner. 4/2008. Effects of Channelization of Macroinvertebrate Communities in a Semi-arid Riverscape. Student Oral Presentation, UNM Department of Biology Research Day, Albuquerque, NM.

Lord, N.P.* 4/2008. "A taxonomic revision of the genus *Deretaphrus* Newman (Coleoptera: BothrideridaeSt)." E. Broadus Browne Research Award Competition for the College of Agriculture and Environmental Sciences, University of Georgia, Athens, Ga.

Lord, N.P. 4/2008. "Bothrideridae: Some of the coolest beetles you've never heard of, with a revision of the genus *Deretaphrus* Newman." Student Oral Presentation Competition at the Annual Meeting of the Georgia Entomological Society, Cordele, Ga.

Lord, N.P.* 3/2008. "Bothrideridae: Some of the coolest beetles you've never heard of, with a revision of the genus *Deretaphrus* Newman." Student Oral Presentation Competition at the H.O. Lund Entomology Conference, Department of Entomology, University of Georgia, Athens, Ga.

Lord, N.P.* 3/2008. "Bothrideridae: Some of the coolest beetles you've never heard of, with a revision of the genus *Deretaphrus* Newman." M.S. Student Paper Competition at the Southeastern Branch of the Entomological Society of America Annual Meeting, Jacksonville, Fl.

Lord, N.P.*, Shields, J.P., & McHugh, J.V. 11/2008. "Analytical microscopy methods reveal new morphological characters and physiological properties in beetle mandibles." Annual Meeting of the Entomological Society of America, Reno, Nv.

Lord, N.P.*, Shields, J.P., & McHugh, J.V. 4/2008. "Analytical microscopy methods reveal new morphological characters and physiological properties in beetle mandibles." Southeastern Microscopy Society (SEMS), Pensacola Beach, Fl.

Lord, N.P.*, Shields, J.P., & McHugh, J.V. 4/2008. "Analytical microscopy methods reveal new morphological characters and physiological properties in beetle mandibles." Student Poster Competition at the Annual Meeting of the Georgia Entomological Society, Cordele, Ga.

Lord, N.P.*, Shields, J.P., & McHugh, J.V. 3/2008. "Analytical microscopy methods reveal new morphological characters and physiological properties in beetle mandibles." Student Poster Competition at the H.O. Lund Entomology Conference, Department of Entomology, University of Georgia, Athens, Ga.

Nearns, E.H.* & M.A. Branham. 11/2008. "Biogeography of two genera of longhorned beetles occurring in the Caribbean," Student Competition Poster; Section SysEB. ESA, Reno, NV.

Nearns, E.H.* & **K.B. Miller**. 4/2008. "A preliminary morphological study of *Oncideres cingulata* (Say) (Coleoptera: Cerambycidae: Lamiinae: Onciderini)," University of New Mexico, Student Competition Poster, UNM Department of Biology Research Day, Albuquerque, NM.

Nearns, E.H.*, Miller, K.B., Swift, I.P., **Grzymala, T.L.,** & **A.J. Tafoya**. 11/2008. "On the longhorned beetles of the world: a phylogeny based on molecular data," Student Competition Presentation; Section SysEB. ESA, Reno, NV.

C. Attendance at Professional Meetings

Brantley, S.L. Entomological Society of America National Meeting, Reno, Nevada, 11/2008.

Grzymala, T.G. Entomological Society of America National Meeting, Reno, Nevada, 11/2008.

Hodson, A.M. Entomological Society of America National Meeting, Reno, Nevada, 11/2008.

Nearns, E.H. Entomological Society of America National Meeting, Reno, Nevada, 11/2008.

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

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

E. Service as Officer of Professional Society/Organization

None.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

October 2008. Cartron, J.-L. E., D.C. Lightfoot, J.E. Mygatt, S.L. Brantley, and T.K. Lowrey. Presentation to accompany the publication of the Field Guide to the Plants and Animals of the Middle Rio Grande. New Mexico Museum of Natural History and Science, Albuquerque.

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

None.

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

Larkin. L.L. 2008. UNM Department of Biology Research Day poster judge.

D. Journal Referee

Brantley, S.L. 2008. Reviewed paper for Biology Letters. May.

Miller, K.B. Reviews for Cladistics, Coleopterists Society, Zootaxa, Molecular Phylogenetics and Evolution.

E. Hosting Professional Colleagues and Groups

None.

10. SERVICE

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

B. Public Service

Brantley, S.L. and D.C. Lightfoot. 2008. Public talk on diviersity of New Mexico insects and spiders for the Sunset Lecture Series at Elena Gallegos City Open Space, Albuquerque, N.M.

Wetherill, K. Festival of the Cranes, Bosque del Apache NWR, Socorro, NM. Guest speaker on Native Bees. November 19, 2008.

Wetherill, K. Garden Party, La Montanita Co-op, Albuquerque, NM. Educational booth to teach the public about native bees. April 5th, 2008.

Wetherill, K. Youth Forum, Sevilleta National Wildlife Refuge, Bernardo, NM. K-12 educational field trip. Taught a group of school students different insect collecting and preserving techniques. April 18-20th, 2008.

Wetherill, K. Earth Day, Nobb Hill, Albuquerque, NM. Educational booth to teach the public about native bees. April 27th, 2008.

Wetherill, K. Bio Park, Botanic Gardens, Albuquerque, NM. Educational booth to teach the public about native bees. June 28th, 2008.

Wetherill, K. OASIS (non-profit for the education of mature adults) Albuquerque, NM. Guest speaker on Native Bees of New Mexico. July 14th 2008.

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS

None

12. DONATIONS AND GIFTS RECEIVED

Lightfoot, D.C., 1000 specimens

13. CURRENT STAFF

A. Faculty/Staff

Kelly Miller, Assistant Professor, Curator
Manuel Molles, Professor Emeritus, Curator Emeritus
Clifford Crawford, Professor Emeritus, Curator Emeritus
Sandra Brantley, Research Assoc. Professor, Senior Collection Manager

David Lightfoot, Research Assoc. Professor, Senior Collection Manager

B. Graduate Students
Julieta Bettinelli, Ph.D. student
Lauren Cleavall, Master's student
Karen Gaines, Ph.D. candidate
Nathan Lord, Ph.D. student
Eugenio Nearns, Ph.D. student
Traci Grzymala, Master's student
Tom Kennedy, Ph.D. candidate
Ondrea Linderoth-Hummel, Ph.D. candidate
Julie McIntyre, Ph.D. candidate
Michael Medrano, Ph.D. candidate

C. Undergraduate Student Workers and Volunteers
Sharyn Davidson, volunteer
Sergio Douglas, undergraduate
William Edelman, undergraduate
Alicia Hodson, undergraduate
Emily Hodson, undergraduate
Zachary Phillips, volunteer
April Tafoya, undergraduate
Nicole Telles, undergraduate

14. MUSEUM ASSOCIATES

A. Research Associates
Ana Davidson, postdoctoral fellow, UNM and UNAM
Leah Larkin, Research Asst. Professor
Eric Metzler, Ohio State University, retired
Karen Wetherill, Research Scientist II, Sevilleta LTER

DIVISION OF BIRDS

1. DIVISION HIGHLIGHTS

We conducted five field expeditions to Peru and collected over 1500 specimens. Two imports of Peruvian specimens were added to MSB, totalling 2396 specimens, representing over 300 species, of which over 90% are new taxa for the MSB collection. We held open house to display Peruvian Collection 15 November 2008, with over 75 visitors.

2008 was a year of 'firsts', the division started its first annual MSB Birds Newsletter mailing the newsletter to more than 200 recipients. The division also established the first Bird specimen Preparation course and Michael Lelevier was hired as the first MSB Bird Graduate Student under Curator Chris Witt. The 'firsts' did not end there. A juried publication came out with the description of a new subspecies of Great Horned Owl from New Mexico.

The division of birds made the front-page in the Albuquerque Journal featuring the diversity of the research involving the collection. The avian tissue collection jumped from 19th to 15th largest in the world and Division Associate Sandy Williams commenced work on a comprehensive book on "The Birds of New Mexico."

2. TABLE OF COLLECTION USE

Collection Growth (specimens cataloged): 518
Loans (outgoing): 5
Loans (incoming):2
Visitors: 37
Information Requests: 22
Publications Citing MSB Bird Specimens: 9

3. COURSES USING THE COLLECTIONS (3)

BIOL. 386, General Vertebrate Zoology: Fall semester, 36 students
BIOL 402/502, Avian Scientific Specimen Preparation: Spring Semester, 4 students
BIOL 402/502, Ornithological Field Expedition: Summer, 6 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers (18)
Johnson, A. B. and C. C. Witt: Spring Semester: BIOL 402/502: Avian Scientific Specimen Preparation, 4 enrolled students, 8 participants.
Johnson, A. B. and C. C. Witt: Summer 2008: Ornithological Field Expedition, 6 students.
Witt, C. C.: Molecular Systematics Discussion Group – Spring 2008 (6 students enrolled)
Witt, C. C.: Molecular Systematics Discussion Group – Fall 2008 (3 students enrolled)
Witt, C. C.: Graduate Student Orientation (ca. 20 grad students, Fall 2008)
Witt, C. C.: Evolution – BIOL300 – Spring 2008 (37 undergrads)
Witt, C. C.: General Vertebrate Zoology – BIOL386 – (36 undergrads) Fall 2008

Witt, C. C.: Undergraduate Problems (BIOL 499, 1credit, 1 undergrad, fall 2008)
Witt, C. C.: GUEST LECTURE* Tropical Biology, BIOL461L, Spring 2008 (15 students)
Witt, C. C.: GUEST LECTURE* Biology Discoveries and Innovations (Fall 2008) (12 students)
Witt, C. C.: GUEST LECTURE* People and Animals (Univ. Honors 222, Apr. 17, 2008) (24 students)
Witt, C. C.: GUEST LECTURE* Undergraduate Nurturing Opportunities (Fall 2008) (12 students)
Wolf, B. O.: Biol. 502, T/Animal Physiological Ecology, 3 students (team-taught with J.H. Brown and F.A. Smith)
Wolf, B. O.: Biol. 503, Topics in Interdisciplinary Biology and Biological Sciences (TIBBS), 8 students (team-taught with J.H. Brown, R.R. Parmenter (Biology), S. Nelson (Anthropology) S. Forrest (Computer science), N. Kenkre (Physics).
Wolf, B. O.: Biol. 502, T/Evolutionary Medicine, 6 students (J. Alcock, M.D., primary instructor)
Wolf, B. O.: Biol. 402, T/Animal Physiological Ecology, 5 students (team-taught with J.H. Brown and F.A. Smith)
Wolf, B. O.: Biol. 502, T/Physiological Ecology, 10 students
Wolf, B. O.: Biol. 516, Basic Graduate Ecology, 11 students
Wolf, B. O.: Biol. 402, T/Animal Physiological Ecology, 3 students (team-taught with J.H. Brown and F.A. Smith)
Wolf, B. O.: Biol. 204, Plant & Animal Form & Function, 174 students (two sections) (co-taught with D.T. Hanson)
Wolf, B. O.: Biol. 402, T/Evolutionary Medicine, 19 students (J. Alcock, M.D., primary instructor)
Wolf, B. O.: Biol. 402, T/Animal Physiological Ecology, 1 student (team-taught with J.H. Brown and F.A. Smith)
Wolf, B. O.: Biol. 402, T/Physiological Ecology, 4 students

5. COLLECTION MANAGEMENT

This year emphasis was heavy on field work in Peru, with three different expeditions involving 6 staff and volunteers from MSB Birds. The field work included January work in Lima and Huánuco collecting data on hypoxia resistance in hummingbirds, and collecting specimens for Andean phylogeography projects. in June and July, we mounted an expedition to previously-unsurveyed mountain just south of the North Peruvian Low, formed by the dry valley of the Rio Maranon that divides contiguous wet andean forest and serves as a biogeographic barrier to many bird taxa. Here we set up a camp and conducted a biological inventory of the birds, and collected more data on hummingbird hypoxia resistance. In October, we conducted a third expedition to the dry west slope of southern Lima, collecting birds for studies of physiological adaptation to elevation. The January and October expeditions included exports of large accessions of specimens that we have been curating in preparation for cataloging into the Arctos Database. We offered the June-July expedition as a class through UNM entitled Ornithological Field Expedition to give qualified students an opportunity to participate in a unique field experience. Our enrollees included students from UNM, Peru, and Muhlenberg College in Pennsylvania. United States field work this year took us to all corners of New Mexico. We received specimens from 25 accessions this year. We are beginning to keep track of each time

we receive specimens as an accession to organize our specimens in the database better. Most of our specimens, as usual, coming from wildlife rehabilitators in the state. These are received from Kathleen Ramsay, of The Wildlife Center, Espanola, Penny Elliston of Wildlife Rescue, Inc, Albuquerque, and from Shirley Kendall, Corrales. Other major accessions were frozen pheasants received from the Kalij Conservatory and two imports of Peruvian specimens.

6. AWARDS, GRANTS, AND CONTRACTS

(1) REU Supplement: The Phylogenetic and Biogeographic History of High Altitude Adaptationin Hummingbirds: Selection on Hemoglobin Proteins as a Function of Oxygen Supply andDemand; (2) J. A. McGuire, (written and carried out by Christopher C. Witt); (3) NationalScience Foundation; (4) $7540. [Award to University of California-Berkeley].

(2) The Phylogenetic and Biogeographic History of High Altitude Adaptation in Hummingbirds: Selection on Hemoglobin Proteins as a Function of Oxygen Supply and Demand; (2) J. A.McGuire, (written and carried out by Christopher C. Witt);

(3) National Science Foundation DEB-0543556; (4) $100,340 awarded in 2008. [Award to University of California-Berkeley].

(3) Desert Tortoises as Walking Tree Rings: Evaluating the Effects of Climate and Resource Variability on Tortoise Growth and Survival Using Stable Isotopes; I. Murray and B.O. Wolf, co-PIs; Arizona Game and Fish Department; $59,5439, 2008–09, 2010

(4) Use of Wildlife Water Developments by the Bird and Bat Community on the KOFA National Wildlife Refuge, Arizona; B.O. Wolf, PI; Arizona Game and Fish Department, $74,9994, January 30, 2008–February 1, 2009.

(5) A Preliminary Investigation of the Use of Wildlife Water Developments by the Bird and Bat Community on the Kofa National Wildlife Refuge; Arizona Game and Fish Department; $55,900, June 1, 2007–February 1, 2008.

(6) Linking Nutrient Flux in a Desert Food Web to the Allocation Dynamics in Lizards: Combining Stable Isotopes and Ecological Stoichiometry; R. Warne and B.O. Wolf, co-PIs; Doctoral Dissertation Improvement Grant, Division of Environmental Biology 0710128, National Science Foundation; $11,987, June 15, 2007–May 31, 2009.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

None.

B. Journal Articles (9)

Williams, S.O., III, and D. J. Krueper 2008. The changing status of the Gray Hawk in New

Mexico and adjacent areas. Western Birds 39: 202-208.

Kimball, R. T., E. L. Braun, F. K. Barker, R. Bowie, M. J. Braun, J. L. Chojnowski, S. J. Hackett, K.-L. Han, J. Harshman, V. Heimer-Torres, W. Holznagel, C. J. Huddleston, B. D. Marks, K. J. Miglia, W. S. Moore, S. Reddy, F. H. Sheldon, J. V. Smith, C. C. Witt, & T. Yuri. 2008. A well-tested set of primers to amplify regions spread across the avian genome. Molecular Phylogenetics and Evolution 50:654-660; published online 6 December 2008; doi:10.1016/j.ympev.2008.11.018.

McGuire, J. A., C. C. Witt, J. V. Remsen, Jr., R. Dudley, & D. L. Altshuler. 2008. A higher-level taxonomy for hummingbirds. Journal of Ornithology.

Harshman, J., E. L. Braun, M. J. Braun, C. J. Huddleston, R. C. K. Bowie, J. L. Chojnowski, S. J. Hackett, K.-L. Han, R. T. Kimball, B. D. Marks, K. J. Miglia, W. S. Moore, S. Reddy, F. H. Sheldon, D. W. Steadman, S. J. Steppan, C. C. Witt, & T. Yuri. 2008. Phylogenomic Evidence for Multiple Losses of Flight in Ratite Birds. Proceedings of the National Academy of Sciences, USA 105:13462-13467.

Hackett, S. J., R. T. Kimball, S. Reddy, E. L. Braun, M. J. Braun, W. A. Cox, J Harshman, C. J. Huddleston, R. C. K. Bowie, J. L. Chojnowski, K.-L. Han, B. D. Marks, K J. Miglia, W. S. Moore, F. H. Sheldon, D. W. Steadman, C. C. Witt, and T. Yuri. 2008. Phylogenomics rewrites the evolutionary history of birds. Science 320: 1763-1768.

Johnson, A. B. and K. Winker 2008. Autumn stopover near the Gulf of Honduras by Nearctic-Neotropic Migrants. The Wilson Journal of Ornithology 120: 277-285.

Dickerman, R. W. and A. B. Johnson 2008. Wing-tail measurements of Bubo virginianus from Texas. Southwestern Naturalist 53: 128-129.

Williams, S. O. III and W. H. Howe 2008. Black Skimmer occurrences in New Mexico, including a high elevation record. Western Birds 39: 31-32.

Dickerman, R. W. and A. B. Johnson 2008. Notes on Great Horned Owls nesting in the Rocky Mountains, with a description of a new subspecies. Journal of Raptor Research 42: 20-28.

Gilman, C.A., E.C. Toolson and B.O. Wolf. 2008. Effects of temperature on the behavior of *Trimerotropis pallidipennis* (Orthoptera, Arcrididae). The Southwestern Naturalist 53:162-168.

C. Web-Based

None.

D. Technical Reports (1)

Witt, C. C. & T. Valqui. 2008. Informe final a INRENA (Lima-Peru) del proyecto con título: “Variación en la capacidad de transportar el oxígeno en la sangre de las aves del Perú”.

Authorización No 87-2007-INRENA-IFFS-DCB.

E. Theses/Dissertations Completed (3)

Boyer, A. G. 2008. Avian Macroecology: Organization of Avifaunas in Evolutionary Time and Geographic Space. University of New Mexico Dissertation.

Lease, H. M. 2008. Does Size Matter? The Scaling of Respiration, Energy Reserves, and Support Structures in Arthropods. University of New Mexico Dissertation.

Warne, R. 2008. Rain, Resources and Reproduction: Linking Resource Dynamics in Ecological Communities to Life History Trade-offs in Lizards. University of New Mexico Dissertation.

F. Work In Progress (partial list)

Dickerman, R. W. Great-Horned Owl. in Raptors of New Mexico, Jean-Luc Cartron, ed. in Press, University of New Mexico Press.

Dickerman, R. W., A. B. Johnson, and J. D. Ligon. Elf Owl. in Raptors of New Mexico, Jean-Luc Cartron, ed. in Press, University of New Mexico Press.

Dickerman, R. W. Notes of the Elf Owls of western Texas, adjacent Coahuila, and southeastern New Mexico. Western Birds target journal.

Dickerman, R. W. 1950's Tabasco, A zip trip (collecting redwings in Central America in 1968). in A fleeting moment of perfect flavor: Biological explorations in Middle America (Kevin Winker, ed.). in press, University of Florida Press.

Williams, S. O. III, P. Mehlhop and D. A. Zimmerman, Birds of New Mexico.

G. Publications/Reports Based on MSB Bird Division Specimens/Data (10)

Barker,F. K., A. J. Vandergon, S. M. Lanyon 2008. Assessment of species limits among yellow-breasted meadowlarks (Sturnella spp.) using mitochondrial and sex-linked markers. Auk 126: 869-879.

Yuri, T. A., R. T. Kimball, E. L. Braun, M. J. Braun 2008. Duplication of accelerated evolution and growth hormone gene in passerine birds. Molecular Biology and Evolution 25:352-361.

Dove, C. J., N. C. Rotzel, M. Heacker, L. A. Weigt 2008.Using DNA barcodes to identify bird species involved in birdstrikes. Journal of Wildlife Management72:1231-1236.

Powell, A. F. L. A., F. K. Barker, S. M. Lanyon 2008. A Complete species-level phylogeny of the grackles (*Quiscalus* spp.), including the extinct Slender-billed Grackle, inferred from mitochondrial DNA. Condor 110: 718-728.

Hackett, S. J., R. T. Kimball, S. Reddy, E. L. Braun, M. J. Braun, W. A. Cox, J Harshman, C. J. Huddleston, R. C. K. Bowie, J. L. Chojnowski, K.-L. Han, B. D. Marks, K J. Miglia, W. S. Moore, F. H. Sheldon, D. W. Steadman, C. C. Witt, and T. Yuri. 2008. Phylogenomics rewrites the evolutionary history of birds. Science 320: 1763-1768.

Harshman, J., E. L. Braun, M. J. Braun, C. J. Huddleston, R. C. K. Bowie, J. L. Chojnowski, S. J. Hackett, K.-L. Han, R. T. Kimball, B. D. Marks, K. J. Miglia, W. S. Moore, S. Reddy, F. H. Sheldon, D. W. Steadman, S. J. Steppan, C. C. Witt, & T. Yuri. 2008. Phylogenomic Evidence for Multiple Losses of Flight in Ratite Birds. Proceedings of the National Academy of Sciences, USA 105:13462-13467.

Kimball, R. T., E. L. Braun, F. K. Barker, R. Bowie, M. J. Braun, J. L. Chojnowski, S. J. Hackett, K.-L. Han, J. Harshman, V. Heimer-Torres, W. Holznagel, C. J. Huddleston, B. D. Marks, K. J. Miglia, W. S. Moore, S. Reddy, F. H. Sheldon, J. V. Smith, C. C. Witt, & T. Yuri. 2008. A well-tested set of primers to amplify regions spread across the avian genome. Molecular Phylogenetics and Evolution 50:654-660; published online 6 December 2008; doi:10.1016/j.ympev.2008.11.018.

Dickerman, R. W. and A. B. Johnson 2008. Wing-tail measurements of Bubo virginianus from Texas. Southwestern Naturalist 53: 128-129.

Williams, S. O. III and William H. Howe 2008. Black Skimmer occurrences in New Mexico, including a high elevation record. Western Birds 39: 31-32.

Dickerman, R. W. and A. B. Johnson 2008. Notes on Great Horned Owls nesting in the Rocky Mountains, with a description of a new subspecies. Journal of Raptor Research 42: 20-28.

ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars (2)

Witt, C. C. 2008. Evolucioìn en los Andes: Filogenia y Fisiologiìa Respiratoria Comparada en Picaflores. Invited seminar, Universidad Peruana Cayetana-Heredia – Lima, Perú, 17 October 2008. [in Spanish]

Wolf, B. O. 2008. Pulsed Resources and Carbon Flow Through a Desert Food Web: the Influence of Short and Long-term Climate Variability," Division of Biology, Kansas State University, Manhattan KS, September.

B. Contributed Talks/Posters (16)

Willliams, S. O. III 2008. Trends in breeding Northern Beardless-Tyrannulets in Guadalupe Canyon, New Mexico: results of an 18-year study. New Mexico Ornithological Society Meeting, Albuquerque, NM.

Witt, C. C. 2008. RESISTANCE TO ENVIRONMENTAL HYPOXIA BY HUMMINGBIRDS

ALONG AN ALTITUDINAL GRADIENT. New Mexico Ornithological Society Meeting, Albuquerque, NM.

Witt, C. C., A. B. Johnson, J. A. Castillo, J. A. McGuire, & R. Dudley. 2008. Evolution of hypoxia resistance in Andean hummingbirds. 126th Meeting of the American Ornithologists' Union, Portland, Oregon, USA.

Warne, R.W., E.L. Charnov and B. O. Wolf. 2008. Reproductive allometry and the size/number trade-off for lizards. Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.

Lease, H.M. and B.O. Wolf. 2008. Exoskeletal isometry in adult terrestrial insects. Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.

Gilman, C.A. and B.O. Wolf. 2008. The burden of gravidity in lizards: Changes in cardo-respiratory function associated with reduced lung volume (preliminary results). Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.

Wolf, B.O., R.W. Warne, A.D. Pershall and S. Engel. 2008. Climate change, ecosystem productivity, and tracking resources through consumers and food webs. Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.

Pershall, A.D., R.W. Warne and B.O. Wolf. 2008. Small mammal utilization of pulsed resources quantified through stable isotope analysis. Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.

Murray, I.W. and B.O. Wolf. 2008. Tracking the dietary history of chelonians via stable isotope analyses. Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.

Mathiasen, C.C., I.W. Murray, B.O. Wolf and F.A. Smith. 2008. Using portable ultrasonography to examine the dynamics of reproduction in Neotoma lepida in Death Valley, CA. Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.

Engel, S., N.G. McDowell and B.O. Wolf. 2008. The utilization of pulsed resources by a grasshopper community as quantified from breath *13C using tunable diode laser absorption spectroscopy. Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.

Murray, I.W. and B.O. Wolf. 2008. Tracking the nutritional ecology and dietary history of chelonians via stable isotope analyses. 33rd Annual Symposium of the Desert Tortoise Council, Las Vegas NV, February 22-25.

Murray, I.W. and B.O. Wolf. 2008. Tracking the nutritional ecology and dietary history of chelonians via stable isotope analyses. Regional Long Term Ecological Research (LTER) Symposium, Albuquerque, NM, July 11-13.

Pershall, A.D., R.W. Warne and B.O. Wolf. 2008. Small mammal utilization of pulsed resources quantified through stable isotope analysis. Regional Long Term Ecological Research (LTER) Symposium, Albuquerque NM, July 11-13.

Warne, R.W., A.D. Pershall and B.O. Wolf. 2008. Quantifying the resource dynamics of a Sevilleta LTER lizard community: Coupling abiotic drivers and ecosystem productivity. Regional Long Term Ecological Research (LTER) Symposium, Albuquerque NM, July 11-13.

Warne, R.W., A.D. Pershall and B.O. Wolf. 2008. Linking pulsed precipitation and C3–C4 primary production to resource dynamics in higher trophic level consumers. Isotope Ecology VI Conference, Honolulu HI, August 24-29.

C. Attendance at Professional Meetings

Johnson, A. B.
New Mexico Ornithological Society Meeting Albuquerque, NM
Witt, C. C.
New Mexico Ornithological Society Meeting Albuquerque, NM
126th Meeting of the American Ornithologists' Union, Portland, Oregon, USA.
Wolf, B. O.
New Mexico Ornithological Society Meeting Albuquerque, NM
Annual Meeting of the Society of Integrative and Comparative Biology, San Antonio TX, January 2-6.
Regional Long Term Ecological Research (LTER) Symposium, Albuquerque, NM, July 11-13.
Williams, S. O. III
New Mexico Ornithological Society Meeting Albuquerque, NM

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

Williams, S. O. III
New Mexico Editor, North American Birds (USA).
Editor, New Mexico Ornithological Society Field Notes
Wolf, B. O.
Associate Editor, Oecologia (USA)

E. Service as Officer of Professional Society/Organization

None.

9. OTHER PROFESSIONAL ACTIVITIES

A. Colloquium Presentations

None.

B. Presentation to General Audience in a Scholarly Capacity

Witt, C. C. How high can a hummingbird fly? Adaptations to high altitude in the most extreme vertebrate animal. Educational talk for the general public and zoo staff, Rio Grande Zoo, Albuquerque, NM. October 2 and October 4, 2008.

Witt, C. C. "How Hummingbirds Thrive in the High Andes of South America." Mesilla Valley Audubon Society, Las Cruces, NM. July 16, 2008.

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

None.

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

Witt, C. C. Panel member and reviewer for Environmental Health Signature Program (EHSP) Pilot grant program at UNM Health Sciences Center (Lovelace Respiratory Research Institute, Matthew Campen, panel chair, December 2008).

Wolf, B. O.: Invited participant, Rapid Directional Environmental Change
Workshop, National Science Foundation, December

E. Journal Referee

Johnson, A. B.
The Auk (1)

Williams, S. O. III
Western Birds (1)
Wilson Journal of Ornithology (1)
New Mexico Ornithological Society Bulletin (1)

Witt, C. C.
Ecography (1)
Ornitología Colombiana (2)
The Auk (2)
Genome Research (1)
Review of grant proposal for National Science Foundation, Population and Evolutionary Processes Cluster, Division of Environmental Biology, February 2008.
Reviewer for textbook "Evolutionary Analysis", 4th Edition, Freeman Herron.

Wolf, B.O.
Bioscience (1)

Ecology (1)
Isoscapes (1)
The Auk (2)
The Condor (1)

10. SERVICE

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

B. Public Service
Williams, S.O. III

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

Wolf, B.O.

Coordinator, Searchable Ornithological Research Archive (SORA)
Institutional Animal Care and Use Committee

Witt, C. C.

Faculty Mentor to UNM Birding Club (18 active members, monthly meetings, field trip to Rio Grande Nature Center).

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

None

12. DONATIONS AND GIFTS RECEIVED
Robert W. Dickerman: $48,470.45, pickup truck for field work
Jessica Eberhard and Kyle Harms: $50
Thomas and Loretta Witt: $250
Ms. Nancy Rinebold: $1000

13. CURRENT STAFF

A. Faculty/Staff
Christopher C. Witt, Curator of Birds
Andrew B. Johnson, Collection Manager
Blair O. Wolf, Associate Curator

B. Graduate students
Alison Boyer, Ph.D. Graduate Assistant
Michael Lelevier, Ph.D Graduate Assistant

C. Undergraduate Student Workers and Volunteers
Student Workers, REU students, and paid undergraduates:
Keith Adams, Work Study
Dora Susanibar, Undergraduate worker (PERU)
Miriam Torres, Undergraduate worker (PERU)
Jano Nuñez, Undergraduate worker (PERU)
C. Jonathan Schmitt, Summer 2008 NSF REU
Stacey Peters
Monica Lucero
Sarah Sheldon
Geneva Williams
Brielle Archuleta
Douglas Whalen
Alessandra Quiñonez

Volunteers:
William A. Talbot
Raymond VanBuskirk
Cole Wolf
Michael Hilchey
Charlotte Jutila
Matthew Baumann
Kimberly Villescas
C. Jonathan Schmitt
Robert Driver
Nicholas Pederson

14. MUSEUM ASSOCIATES

A. Curatorial Associates
Robert W. Dickerman
John P. Hubbard

B. Research Associates
Sartor O. Williams, III
Hira A. Walker
C. Gregory Schmitt*
Donna C. Schmitt*
Mary Alice Root
J. David Ligon*

*New associates in 2008

DIVISION OF FISHES

1. DIVISION HIGHLIGHTS

In 2008, 10,340 lots of fishes (317,228 specimens) were cataloged into the Museum of Southwestern Biology (MSB) Division of Fishes. These totals include the 4,683 lots of USGS Biological Survey of Fort Collins collections, which became fully integrated by March 2009 into the MSB fish collections. (See USGS Division report)

Currently, there are **73,581** catalogued lots of fishes (3,743,539 specimens). Integration of the New Mexico Department of Game and Fish State Reference Collections, which began in July 2007, continued throughout 2008. When complete, this collection will add an estimated 9,000 lots to the fish collection.

$646,018 in grants and contracts was available for ichthyological and aquatic studies undertaken by MSB Division of Fishes staff, students, and associates during 2008.

The Collections Manager (Snyder) and the Associate Curator (Platania) attended the 22nd Annual National Archives Preservation Conference: *The ABCs of Modern Fire Suppression in Cultural Institutions*, Washington D.C., 10 Mar 2008. They also toured the renovated facilities for storage of the fluid-preserved collections at the National Museum of Natural History, American Museum of Natural History, and the Museum of Comparative Zoology, Harvard University. The Curator of Fishes (Turner) served on a national committee hosted at the Smithsonian Institution, National Museum of Natural History in October 2008 to identify curatorial priorities for the National Ecological Observatory Network (NEON) Project.

Outreach Summary: Tours of collections and lab were conducted for the incoming 2008 UNM Biology graduate students, three families of student employees in the Division, the Albuquerque Convention and Visitors Bureau, and four Biology seminar speakers.

2. TABLE OF COLLECTION USE

Collection Growth	Loans-out[1]	Loans-in[2]	Visitors- number & days[3]	Information Requests[4]	Publications Citing MSB Specimens[5]
317,228	15	11	26 / 52 days	51	6

[1]Specimen loans, return of loans, gifts, exchanges, and tissue (consumptive) transfers
[2]Loans, gifts or tissue transfers from other institutions
[3]research, accessing specimens, or info exchange (not tour groups)/number of visitor days
[4]emails, letters, telephone calls (not tour groups or website "hits")
[5]publications in peer review journals

3. COURSES USING THE COLLECTIONS

BIOL. 204L Plant and Animal Function and Form: Spring 2008, 32 students

BIOL. 386L General Vertebrate Zoology: Fall 2008, 37 students

ASIR Workshop. American Southwest Ichthyological Researchers (ASIR), Monitoring protocols for the Pueblo of Santa Ana: *Methodology and fish identification workshop for the Pueblo of Santa Ana's Dept. of Natural Resources*. 7 July – 11 July 2008

BIOL. 324 Honors: Natural History of the Southwestern USA: Fall 2008, 12 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers/Research Associates

Turner, T. F.
BIOL. 502 Ecology and Evolution of Fishes, Spring 2008, 4 graduate students

Platania, S.P., R.K. Dudley, W.H. Brandenburg, and M.A. Farrington
ASIR Workshop. Monitoring protocols for the Pueblo of Santa Ana: *Methodology and fish identification workshop for the Pueblo of Santa Ana's Dept. of Natural Resources*. Summer 2008, 11 agency biologists

B. Graduate Students

Scholle, S.D.
BIOL 203L Ecology and Evolution, Fall 2008, 33 undergraduate students

5. COLLECTION MANAGEMENT

Twenty-one accessions of specimens were received during 2008. Contributors included U.S. Fish and Wildlife Service-Fishery Research Office, New Mexico Department of Game and Fish, the Wyoming Department of Game and Fish, New Mexico Environment Department, and American Southwest Ichthyological Researchers. A total of 1,410 lots or 66,274 specimens of Gila River collections (1982-1985) have been integrated into the MSB collections. The complete collection of San Juan River drift net and seine data sheets (1991-2001) have been digitized and linked with the MSB fish database. That represents 5,455 pages of data, digitized and the images "cleaned," and all saved in three file formats (pdf, jpg, tiff). Four undergraduate students worked as Curatorial Assistants for the 2008 spring, summer, and fall semesters. They were primarily responsible for the complete curation of the San Juan River projects, the Wyoming Dept. of Game and Fish collections, and the Pecos River Fish community and habitat study collections received from the USFWS New Mexico Fisheries Research Office. This work also includes data entry and management of these collections' locality and specimen information.

AWARDS, GRANTS, AND CONTRACTS

CAREER: *Museum-based Approaches to Ecology and Evolution of Aquatic Systems: An Integrated Research and Educational Program.* PI Thomas F. Turner. National Science Foundation. Total award: $500,000. 1 May 2002 to 30 Apr 2008. **Annual expenditure: $100,000**

Local adaptation and gene flow in a fragmented host system: Crepidostomum farionis (Digenea) and Oncorhynchus clarkii virginalis (Salmonidae) in New Mexico. PI Thomas F. Turner Co-PI Wade D. Wilson. National Science Foundation. Total award: $11,958. 30 May 2006 to 30 Apr 2008. **Annual expenditure: $6,000**

Assessment of diversity at the major histocompatability complex in the Rio Grande silvery minnow (Hybognathus amarus). PI Megan J. Osborne, Co-PI Thomas F. Turner. US Fish & Wildlife Service. Total award: $103,948 21 Sep 2006 to 30 Aug 2009. **Annual expenditure: $47,811**

REU Supplement to CAREER: *Museum-based Approaches to Ecology and Evolution of Aquatic Systems: An Integrated Research and Educational Program.* PI Thomas F. Turner. National Science Foundation. Total award: $12,000.
15 May 2007 to 30 Apr 2008. **Annual expenditure: $12,000**

Community responses to river drying in an arid-land ecosystem: a field and experimental study. PI Thomas F. Turner. National Science Foundation. Total award: $345,000.
15 Aug 2007 to1 Aug 2010. **Annual expenditure $115,000.**

Effects of nutrient availability on periphyton growth and diversity in the Middle Rio Grande: top-down and bottom-up factors. PI Rebecca J. Bixby, Co-PI Ayesha S. Burdett. US Bureau of Reclamation. Total Award: $126,077. 1 Jul 2007 to 30 Dec 2008. **Annual expenditure: $126,077**

Genetic monitoring of the threatened Pecos Bluntnose shiner (Notropis simus pecosenis). PI Megan J. Osborne, Co-PI Thomas F. Turner. New Mexico Department of Game and Fish. Total Award: $24,000. 1 Jan 2006 to 30 Jun 2009. **Annual expenditure: $8,000**

Assessment and monitoring of Rio Grande silvery minnow genetics. PI Thomas F. Turner, Co-PI Megan J. Osborne. US Bureau of Reclamation, Middle Rio Grande ESA Collaborative Program. Total award: $772,000. Oct 2007 to 30 Sep 2012. **Annual expenditure: $144,544**

Survey of aquatic community structure and food web constituents at the Bosque del Apache NWR. PI Ayesha S. Burdett, Co-PI Thomas F Turner. Tetra Tech, Inc.
Total award: $33,769. 1 Jul 2008 to 30 Dec 2009**. Annual expenditure: $22,513**

Conservation genetics of Pantosteus discobolus yarrowii, Zuni bluehead sucker.
PI Thomas F. Turner. New Mexico Department of Game and Fish. Total award: $15,340 1 Aug 2008 to 30 Jun 2009. **Annual expenditure: $15,340**

Curatorial services at the Museum of Southwestern Biology for the San Juan River Recovery Implementation Program Collections. US Bureau of Reclamation, Upper Colorado Regional Office. PI Alexandra M. Snyder Co-PI Thomas F. Turner. Total award: $125,000 1 Aug 2005 to 30 Sep 2010. **Annual expenditure: $24,943**

Accession and integration of the New Mexico Dept. of Game and Fish collections in the Museum of Southwestern Biology, Division of Fishes, University of New Mexico. NM Dept. Game and Fish, Santa Fe. PI Alexandra M. Snyder, Co-PI Thomas F. Turner. Total award: $60,000 Date: 21 Oct 2008 to 30 Jun 2011. **Annual expenditure: $17,000**

The effects of pollution in the Rio Grande on fathead minnow gene expression. PI Trevor J. Krabbenhoft. High Priority Grant, Graduate Research and Development Fund, University of New Mexico. 2008. **Annual expenditure: $4,990**

American Society of Ichthyologists and Herpetologists Travel Award. Trevor J. Krabbenhoft. **Annual expenditure: $300**

University of New Mexico, Department of Biology Crawford Grant. Thomas L. Kennedy. **Annual expenditure: $1,500**

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

B. Journal Articles

McPhee, M.V., M. J. Osborne, and T. F. Turner. Genetic diversity, population structure and demographic history of the Rio Grande sucker, *Catostomus plebeius*, in New Mexico. *Copeia* 2008: 189-197, 2008

Krabbenhoft T.J., F.C. Rohde, A.N. Leibman, and J.M. Quattro. 2008. Concordant mitochondrial and nuclear DNA partitions define evolutionarily significant units in the imperiled pinewoods darter, *Etheostoma mariae* (Pisces:Percidae). Copeia 2008:910-916.

Peters, M. B., and T. F. Turner. 2008. Genetic variation of the major histocompatibility complex (MHC class II β) in the threatened Gila trout, *Oncorhynchus gilae gilae*. *Conservation Genetics* 9: 257-270, 2008

C. Web-Based

Slack, W. T., and S. T. Ross. 2008. *Etheostoma rubrum* – Bayou darter, page 13. In: The desperate dozen: Fishes on the brink. Southeastern Fishes Council Scientific Report, 2008 Edition.

D. Technical Reports

Bixby, R. J. and A.S. Burdett. 2008. Effects of nutrient availability on periphyton growth and diversity in the Middle Rio Grande: top-down and bottom-up factors. Annual report to the U. S. Bureau of Reclamation. 60 pp.

Brandenburg, W. H. and M.A. Farrington. 2008. Colorado pikeminnow and razorback sucker larval fish survey in the San Juan River during 2008. Report to the San Juan River Recovery Implementation Program and the US Fish and Wildlife Service. 56 pp.

Brandenburg, W. H., S.P. Platania, and M.A. Farrington. 2008. Bureau of Land Management's Black River Recreational Area ichthyofaunal survey, Black River, New Mexico 2008. Report to the Bureau of Land Management, Pecos Las Cruses District. 39 pp.

Brandenburg, W. H., D.A. Helfrich, S.P. Platania, and M.A. Farrington. 2008. Delaware River Ichthyofaunal Survey, New Mexico, 2008. Report to the Bureau of Land Management, Pecos Las Cruses District. 52 pp.

Dudley, R.K. and S.P. Platania. 2008a. Rio Grande silvery minnow (*Hybognathus amarus*) population monitoring monthly trip reports and analyses. Nine reports to the Middle Rio Grande Endangered Species Act Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 30 pp.

Dudley, R.K. and S.P. Platania. 2008b. Rio Grande silvery minnow (*Hybognathus amarus*) population monitoring program results from December 2006 to October 2007. Report to the Middle Rio Grande Endangered Species Act Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 159 pp.

Dudley, R.K., G.C. White, S.P. Platania, and D.A. Helfrich. 2008. Rio Grande silvery minnow (*Hybognathus amarus*) population estimation program results from October 2007. Report to the Middle Rio Grande Endangered Species Act Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 88 pp.

Farrington, M.A., W.H. Brandenburg, and S.P. Platania. 2008. Population monitoring of Pecos pupfish, *Cyprinodon pecosensis*, in the Bureau of Land Management's Overflow Wetlands Wildlife Habitat Area, New Mexico 2007 – 2008. Report to the Bureau of Land Management, Pecos Las Cruses District. 62 pp.

Osborne, M. J. and T.F. Turner. 2008. Baseline genetic survey of the threatened Pecos bluntnose shiner (*Notropis simus pecosensis*). Interim Report submitted to the New Mexico Department of Game and Fish, Santa Fe, New Mexico.

Platania, S.P. and R.K. Dudley. 2008. Spatial spawning periodicity of Rio Grande silvery minnow during 2008. Report to the Middle Rio Grande Endangered Species Act Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 34 pp.

Turner, T. F. and M.J. Osborne. 2008. Genetic monitoring of the Rio Grande silvery minnow: genetic status of wild and captive stocks in 2008. Annual report submitted to the U. S. Bureau of Reclamation.

Turner, T. F. and A.S. Burdett. 2008. Community responses to river drying in an arid-land ecosystem: a field and experimental study. Annual report submitted to the National Science Foundation. 10pp.

E. Theses/Dissertations Completed

F. Work In Progress

Burdett, A.S. and Watts, R. J. (2009) Modifying living space: An experimental study of the influences of vegetation on aquatic invertebrate community structure. Hydrobiologia.

Heise R. J., R. B. Bringolf, R. Patterson, W. G. Cope, and S. T. Ross. Plasma vitellogenin and estradiol of adult Gulf sturgeon in the Pascagoula River drainage (MS, USA). Transactions of the American Fisheries Society.

Kennedy, T.L., D.S. Gutzler, and R.L. Leung. Predicting future threats to the long-term survival of Gila Trout using a high-resolution simulation of climate change. *Climatic Change*

Kennedy, T.L. Decreasing range size of the Limpkin (*Aramus guarauna*) in Florida. *Florida Scientist*

Kennedy, T.L., L. Horth, and D. Carr. The effects of nitrate loading on the invasive macrophyte *Hydrilla verticillata* and two common, native macrophytes in Florida. *Aquatic Botany*

Krabbenhoft, T.J., M.L. Collyer, and J.M. Quattro. Comparative morphological divergence across phylogenetically and ecologically disparate taxa: evolution of endemic fishes of Lake Waccamaw, North Carolina. Biological Journal of the Linnean Society.

Moyer, G. R., R.A. Remington, and T.F. Turner. Incongruent gene trees, complex evolutionary processes, and the phylogeny of a group of North American minnows (*Hybognathus* Agassiz 1855). Molecular Phylogenetics and Evolution.

Munroe, T.A. and T.J. Krabbenhoft. Two unusually large pre-transitional tonguefish larvae (Pleuronectiformes: Cynoglossidae: *Symphurus*) collected in Oceanic waters near the Galapagos Islands. Bulletin of Marine Science. Submitted.

Osborne, M.J. and T. F. Turner. Genetic monitoring in a threatened freshwater fish, Pecos bluntnose shiner. Molecular Ecology.

Renshaw M.A., E.W. Carson, A. Hanna, C.E. Rexroad III, T.J. Krabbenhoft, and J.R. Gold. 2009. Microsatellite markers for species of the genus *Dionda* (Cyprinidae) from the American southwest. Conservation Genetics. Online First.

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

Ross, S T., W. T. Slack, R. J. Heise, M.A. Dugo, H. Rogillio, B.R. Bowen, P. Mickle, and R.W. Heard. Estuarine and coastal habitat use of Gulf sturgeon (*Acipenser oxyrinchus desotoi*) in the north-central Gulf of Mexico. Estuaries and Coasts.

Ross, S.T. Native fishes. In: Mississippi Encyclopedia. C.R. Wilson (ed). University Press of Mississippi.

Ross, S.T. Ecology of North American Freshwater Fishes. Textbook. In preparation. University of California Press.

Snelson F.F., T.J. Krabbenhoft, and J.M. Quattro. *Elassoma gilberti*: a new species of pygmy sunfish from Florida. Bulletin of the Florida Museum of Natural History.

Stevens, M.M., A.S. Burdett, E.M. Mudford, and S. Helliwell. Influence of food provision on the acute toxicity of fipronil to *Simocephalus elizabethae* and *Polypedilum nubiferum*.

Turner T.F., T.J. Krabbenhoft, and A.S. Burdett. Reproductive timing and fish community structure in an arid-land river system, the Rio Grande in New Mexico. Transactions of the American Fisheries Society Special Publications.

Turner, T.F., T. Dowling, M.J. Osborne, M.V. McPhee, R. Broughton, and J.R. Gold. Microsatellite markers for the endangered razorback sucker, *Xyrauchan texanus*, are widely applicable to genetic studies of other catostomine fishes. Conservation Genetics.

Wilson, W.D. and T.F. Turner. A phylogenetic analysis of the Pacific salmon and trout (*Oncorhynchus*: Salmonidae) based on partial ND4 sequence: A closer look at the highly fragmented inland species. Molecular Phylogenetics and Evolution.

Wilson, W.D. and T.F. Turner. Comparative analysis of the MHC DAB in *Oncorhynchus*: Functional patterns in the peptide binding pockets. Molecular Biology and Evolution.

Wilson, W.D. and T.F. Turner. Twelve microsatellite markers from the salmonid trematode *Crepidostomum farionis* (Trematoda: Allocreadiidae). Molecular Ecology Notes.

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

Brandenburg, W. H. 2008. Scientific color illustrations of New Mexico native fishes. mottled sculpin *Cottus bairdi*, black bullhead *Ameiurus melas*, flathead chub *Platygobio gracilis*, speckled dace *Rhinichthys osculus*, Gila topminnow *Poeciliopsis occidentalis occidentalis*, Gila chub *Gila intermedia*, creek chub *Semotilus atromaculatus*, suckermouth minnow *Phenacobius mirabilis*, flannelmouth sucker *Catostomus latipinnis*, bluehead sucker *Catostomus discobolus*, Chihuahua chub *Gila nigrescens*, roundtail chub *Gila robusta*, Rio Grande sucker *Catostomus plebius*, large mouth bass *Micropterus salmoides*, beautiful shiner *Cyprinella formosa*. New Mexico Department of Game and Fish: 15 illustrations.

Davenport, S.R. and W.J. Remshardt. 2008. Range extensions for *Pimephales vigilax* and *Percina macrolepida* in the Rio Grande, New Mexico. The Southwestern Naturalist 53(1):127-130

Hoagstrom, C.W., J.E. Brooks, and S.R. Davenport. 2008. Spatiotemporal population trends of *Notropis simus pecosensis* in relation to habitat conditions and the annual flow regime of the Pecos River, 1992-2005. Copeia (1): 5-15.

McPhee, M.V., M.J. Osborne, and T.F. Turner. 2008. Genetic diversity, population structure, and demographic history of the Rio Grande sucker, *Catostomus* (*Pantosteus*) *plebeius*, in New Mexico. Copeia (1): 191-199

Remington, R. K. 2008. Ph. D. Dissertation: Ecology and evolution of turbid water adaptations in fishes. University of Oklahoma, Norman.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

Turner, T. F., M. B. Peters, W. D. Wilson. *The conservation genetic status of Gila trout.* Invited Symposium: Truchas Mexicanas. Desert Fishes Council 40th Annual Meeting, Cuatro Ciénegas, Coah. Mexico, 12-16 November 2008.

Turner, T. F., T. J. Krabbenhoft, and A. S. Burdett. *Reproductive timing and the assembly of larval fish communities in a highly variable river system, the Rio Grande in New Mexico.* Invited Symposium: Community Ecology of Stream Fishes: Concepts, Approaches, and Techniques. American Fisheries Society, Ottawa, Ont. Canada, 17-21 August 2008

Turner, T. F., and M. J. Osborne. *Genetic management of the federally endangered Rio Grande silvery minnow.* Invited workshop presenter: The use of artificial propagation as a tool for native fish conservation in the western US: what we need to know for the preservation of Central Valley salmonids, delta smelt, and longfin smelt. CalFED, Sacramento, California, 24 July 2008.

B. Contributed Talks/Posters

Bixby, R.J., A.S. Burdett, and N. Daves-Brody. *Preliminary diatom biodiversity in an arid-land river, Southwestern United States.* International Diatom Symposium, Dubrovnick, Croatia. 7-13 September 2008

Bixby, R.J., A.S. Burdett, and N. Daves-Brody. *Nutrient availability on periphyton biomass and diversity in the Middle Rio Grande.* North American Benthological Society 56th Annual Meeting, Salt Lake City, UT 25-30 May 2008

Burdett, A.S, T.F. Turner, and M.K. Tellez. *Community responses to variable flows in an arid-land river*. North American Benthological Society 56th Annual Meeting, Salt Lake City, UT 25-

30 May 2008.

Daves-Brody, N., R.J. Bixby, and A.S. Burdett. *Seasonal effects on water chemistry and algal growth and diversity in the Rio Grande.* University of New Mexico Third Annual Student Water Symposium, Albuquerque, NM 28 March 2008.

Daves-Brody, N., R.J. Bixby, and A.S. Burdett. *Seasonal effects on water chemistry and algal growth and diversity in the Rio Grande.* North American Benthological Society 56th Annual Meeting, Salt Lake City, UT 25-30 May 2008.

Kennedy, T. L., and Thomas F. Turner. *Effects of channelization on macroinvertebrate communities in a semi-arid riverscape.* North American Benthological Society 56th Annual Meeting, Salt Lake City, UT 25-30 May 2008.

Osborne, M.J., T.A. Diver, and T.F. Turner. *Patterns of Genetic Diversity in a Community of Freshwater Fish (Family Cyprinidae) in the Pecos River, New Mexico.* Society for the Study of Evolution Annual Meeting, Minneapolis, MN 20-25 June 2008.

Osborne, M.J., T.A. Diver, and T.F. Turner. *Patterns of Genetic Diversity in a Community of Freshwater Fish (Family Cyprinidae) in the Pecos River, New Mexico.* Desert Fishes Council, Cuatro Cienegas, Mexico. 15th-18th November 2008.

Tellez, M. K., Burdett, A.S, and Turner, T. F. *Length-mass relationships for freshwater macroinvertebrates in the Middle Rio Grande, New Mexico.* University of New Mexico Third Annual Student Water Symposium, Albuquerque, NM 28 March 2008.

Tellez, M. K., A.S. Burdett, and T.F. Turner. *Length-mass relationships for freshwater macroinvertebrates in the Middle Rio Grande, New Mexico.* North American Benthological Society 56th Annual Meeting, Salt Lake City, UT 25-30 May 2008.

Turner, T. F., A.S. Burdett, and M.S. Edwards. *A comparative stable isotope study of fish communities in the Rio Grande and Murray-Darling basins: What are the effects of intensive river regulation?* North American Benthological Society 56th Annual Meeting, Salt Lake City, UT 25-30 May 2008.

Turner, T.F., T.J. Krabbenhoft, and A.S. Burdett. *Reproductive timing and fish community structure in an arid-land river system, the Rio Grande in New Mexico*. American Fisheries Society 138th Annual Meeting, Ottawa, Canada, 17-21 August 2008.

Wilson, W.D. and T.F. Turner. 2008. *Microsatellite variation in the salmonid trematode Crepidostomum farionis.* American Society of Parasitologists Annual Meeting, Arlington, TX, 27-30 June 2008.

C. Attendance at Professional Meetings

A.S. Burdett

University of New Mexico Third Annual Student Water Symposium, Albuquerque, NM 28 March 2008

North American Benthological Society 56th Annual Meeting, Salt Lake City, UT 25-30 May 2008

University of New Mexico Annual Fall Water Forum, Albuquerque, NM 5 October 2008

Festival of the Cranes Research Day, Bosque del Apache National Wildlife Refuge, 19 November 2008

M.J. Osborne
Middle Rio Grande Endangered Species Collaborative Program State of the Science Symposium. US Bureau of Reclamation. November 19th 2008.

Society for the Study of Evolution Annual Meeting, Minneapolis, MN 20-25 June 2008.

Desert Fishes Council 40th Annual Meeting, Cuatro-Cienegas, Coah. Mexico. 15-18 November 2008.

S.T. Ross
Desert Fishes Council 40th Annual Meeting. Cuatro Cienegas, Coah. Mexico 12-16 November 2008

American Society of Ichthyologists and Herpetologists 88th Annual Meeting, Montreal, Canada, July 23-28 2008

A.M. Snyder
Desert Fishes Council 40th Annual Meeting. Cuatro Cienegas, Coah. Mexico 12-16 November 2008

T.F. Turner
North American Benthological Society 56th Annual Meeting, Salt Lake City, UT 25-30 May 2008.

Desert Fishes Council 40th Annual Meeting, Cuatro Ciénegas, Coah. Mexico, 12-16 November 2008.

American Fisheries Society, Ottawa, Ont. Canada, 17-21 August 2008.

CalFED Workshop, The use of artificial propagation as a tool for native fish conservation in the western US: what we need to know for the preservation of Central Valley salmonids, delta smelt, and longfin smelt. Sacramento, CA 24 July 2008.

D. Service as Editor or on Editorial Board of a Journal
T.F. Turner
Contributing Editor, Aquatic Biology, Springer Publishers
Editorial Board, Occasional Papers of the Museum of Southwestern Biology

E. Service as Officer of Professional Society/Organization
S.T. Ross
Chair, Endowment and Finance Committee, American Society of Ichthyologists and Herpetologists, 2007-2009.
Member, Executive Committee, American Society of Ichthyologists and Herpetologists, 2007-2009.
Member, Long Range Planning and Policy Committee, American Society of Ichthyologists and Herpetologists, 2007-2009.

9. OTHER PROFESSIONAL ACTIVITIES
A. Presentation to General Audience in a Scholarly Capacity

Dudley, R.K. and S.P. Platania. *Monitoring long-term population trends of Rio Grande silvery minnow, 1993-2008 (highlights from the Bosque del Apache National Wildlife Refuge).* Festival of the Cranes at the Bosque del Apache National Wildlife Refuge, San Antonio, New Mexico, 18-23 November 2008

M. J. Osborne, and T. F. Turner. *Long-term genetic studies in the Rio Grande silvery minnow: An examination of the effects of population decline and supportive breeding.* Middle Rio Grande Endangered Species Collaborative Program, State of the Science Symposium. US Bureau of Reclamation. 19 November 2008.

Tellez, M. K., A.S. Burdett, and T.F. Turner. *Length-mass relationships for freshwater macroinvertebrates in the Middle Rio Grande, New Mexico.* University of New Mexico Third Annual Student Water Symposium, Albuquerque, NM 28 March 2008.

Daves-Brody, N., R.J. Bixby, and A.S. Burdett. *Seasonal effects on water chemistry and algal growth and diversity in the Rio Grande.* University of New Mexico Third Annual Student Water Symposium, Albuquerque, NM 28 March 2008.

Tellez, M. K., A.S. Burdett, and T.F. Turner. *Length-mass relationships for freshwater macroinvertebrates in the Middle Rio Grande, New Mexico.* University of New Mexico, Department of Biology Student Research Day Albuquerque, NM. 11 April 2008.

Daves-Brody, N., Bixby, R.J., and A.S. Burdett. *Seasonal effects on water chemistry and algal growth and diversity in the Rio Grande.* University of New Mexico, Department of Biology Student Research Day Albuquerque, NM. 11 April 2008.

Burdett, A.S, Turner, T. F., Tellez, M. K. and Fencl, J.S. *Aquatic food web studies at Bosque del Apache.* Festival of the Cranes at the Bosque del Apache National Wildlife Refuge, San Antonio, New Mexico, 18-23 November 2008

Bixby, R.J., A.S. Burdett, and N. Daves-Brody. *Preliminary diatom biodiversity in an aridland river, Southwestern United States.* Festival of the Cranes at the Bosque del Apache National Wildlife Refuge, San Antonio, New Mexico, 18-23 November 2008

Llewellyn, D., D. Hathaway, W. Kuhn, M. Marcus, B. Bussetter, T. Caplan, T., C. Jones, T.F. Turner, and A.S. Burdett. *Should we move the Rio Grande?* Festival of the Cranes at the Bosque del Apache National Wildlife Refuge, San Antonio, New Mexico, 18-23 November 2008

Burdett, A.S. BIOL. 203 Ecology and Evolution, *Stable Isotopes and Food Web Ecology* Lecture, 5 November 2008.

B. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.
None

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

R.K. Dudley
Technical Advisor, 2008 Recovery Team for Rio Grande silvery minnow (*Hybognathus amarus*), U.S. Fish and Wildlife Service.

Technical Advisor, 2008 Middle Rio Grande Endangered Species Act Collaborative Program, PVA Biology Group.

M. A. Farrington
Member, Advisory Committee for Restoration of roundtail (*Gila robusta*) and Gila chub (*Gila nigra*).

T.J. Krabbenhoft
Member, Publication Reimbursement Committee, Department of Biology, University of New Mexico.

M.J. Osborne
Member, Rio Grande silvery minnow (*Hybognathus amarus)* Propagation and Genetics Workgroup. US Fish and Wildlife Service, Albuquerque NM.

Member, Population viability analysis of Rio Grande silvery minnow (*Hybognathus amarus)* US Fish and Wildlife Service, Albuquerque NM.

S.P. Platania
Member, Committee on Endangered and Threatened Fish Species, American Fisheries Society.

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

S.T. Ross
Member, Peer Review Panel, San Juan River Basin Recovery Implementation Program.

T.F. Turner
Member, Gila Trout Recovery Team since 2004

Advisor, Apache Trout Recovery Team since 2002

Member, Captive Propagation and Genetics Workgroup, Rio Grande silvery minnow, Middle Rio Grande Endangered Species Collaborative Program

Invited workshop participant "The Use of Artificial Propagation as a Tool for Central Valley Salmonid and Delta Smelt Conservation" Cal-Fed Science Program, Sacramento California, 24 July 2008.
UNM - MSB Representative, Colorado Plateau Cooperative Ecosystems Study Unit, Durango, CO, 10-12 April, 2008.

Invited Panelist, NSF Bio-Ed Conversation on Undergraduate Education in the Sciences, co-sponsored by AAAS and NSF, Denver CO, 28 March 2008.

Invited Panelist, Technical Proposal Evaluation Committee, US Bureau of Reclamation, Middle Rio Grande ESA Collaborative Program, February 2008

Invited Participant NMNH-NEON Workshop: Curation of Biological Specimens, Physical Samples and Associated Data, National Museum of Natural History, Smithsonian Institution, October 20 – 22, 2008.

W.D. Wilson
Representative, University of New Mexico, Department of Biology Graduate Policy Committee (2007-2008)
Full member, Sigma Xi

D. Journal Referee

T.J. Krabbenhoft, *Copeia* (2), *Integrative Zoology* (1), *Journal of Morphology* (1), *Zootaxa* (1).

M.J. Osborne, *Fish and Fisheries* (1)

T.F. Turner, *Animal Conservation* (1), *Conservation Biology* (1), *Journal of Applied Ecology* (1), *Molecular Ecology* (2), *Transactions of the American Fisheries Society* (1)

E. Hosting Professional Colloquia and Groups
None

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

B. Public Service
A.S. Burdett
Ad hoc reviewer: *NSF Ecosystem Science Cluster* (1)
Judge at 2008 Central NM Science and Engineering Research Challenge

Judge at UNM Biology 16th Annual Research Day, 11 Apr 2008
Judge at North American Benthological Society 55th Annual Meeting, May 2008

T.F. Turner
MSB Executive Committee 1998 – present
A&S Council of Chairs & Directors
A&S Student Access Committee
Science Subcommittee, UNM Museum Collection Management Committee
Tenure and Promotion outside referee (2 packets reviewed)
Reviewer, National Science Foundation, 7 grant proposals
Reviewer/panelist, US Bureau of Reclamation, 1 grant proposal
Invited Outside Reader, Ph.D. dissertation by Joel Huey, Griffith University, Nathan Campus, Queensland, Australia.

W.D. Wilson
Representative, Biology Department Graduate Policy Committee (2007-2008)

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.
None.

12. DONATIONS AND GIFTS RECEIVED
None

13. CURRENT STAFF
A. Faculty/Staff
Ayesha S. Burdett, Postdoctoral Research Associate
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

B. Graduate students
Thomas L. Kennedy, Ph.D. candidate
Trevor J. Krabbenhoft, Ph.D. student
Wade D. Wilson, Ph.D. candidate
Steven D. Scholle, M.Sci. student

C. Undergraduate Students
Chanel S. Jim, MSB Curatorial Assistant
Alicia M. Hodson, MSB Curatorial Assistant
Kaitlin M. Hulsbos, MSB Curatorial Assistant
Dan Quan MSB Curatorial Assistant
Cynthia Rivera, MSB Curatorial Assistant
John Skillman, MSB Curatorial Assistant

<u>Megan J. Osborne Student Mentorship</u>

Tracy Diver, Turner Lab Research Assistant
Sierra Netz, Turner Lab Research Assistant
Alana Sharp, Turner Lab Research Assistant

Ayesha S. Burdett Student Mentorship
Monica K. Tellez, UNO student
Jane S. Fencl, REU student & undergraduate research assistant
Nathan Daves-Brody, undergraduate research assistant
Lauren Kelbe, undergraduate research assistant

14. MUSEUM ASSOCIATES

A. Curatorial Associates

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

B. Research Associates

W. Howard Brandenburg, American Southwest Ichthyological Researchers, Albuquerque
James E. Brooks, U.S. Fish and Wildlife Service, Albuquerque
Brooks M. Burr, Ph.D. Southern Illinois University, Carbondale
Robert K. Dudley, Ph. D. American Southwest Ichthyological Researchers, Albuquerque
Michael A. Farrington, American Southwest Ichthyological Researchers, Albuquerque
Astrid Kodric-Brown, Ph.D. University of New Mexico, Albuquerque

DIVISION OF GENOMIC RESOURCES

1. DIVISION HIGHLIGHTS

The Division of Genomic Resources (DGR) of the Museum of Southwestern Biology (MSB) is a centralized repository for cryogenic material from all MSB divisions at the University of New Mexico and other individuals and institutions worldwide for which archival agreements are extant. The DGR frozen tissue collection is taxonomically broad and contains multiple tissue samples from approximately 148,701 specimens. The collection is ranked as one of the largest collections of its kind worldwide and is the largest wild mammal collection period. In total, 17,499 new NK numbers were issued to researchers for the year from the division of Genomic Resources. We archived 3,677 new individual specimens, comprised of 402 bird specimens, 3,137 mammal specimens and 138 DGR specimens (about 13, 904 tubes). We processed 41 outgoing loans containing 1,057 individual specimens to 16 states and 1 foreign country. One of the loans was for the Bird Division and 40 loans were for the Mammal Division. We received our last installment of 3,500 Bison FTA cards and will soon be able to archive these specimens that now comprise the largest archive of this species. We also made significant progress tracking down publications resulting from all DGR tissue loans to date and these have been entered into the ARCTOS database.

2. TABLE OF COLLECTION USE

Collection Growth (Specimens catalogued)	Outgoing Loans (loans/ specimen)	Incoming Loans (loans/ specimen)	Visitors	Responses to Information Requests	Publications in 2008 Citing MSB Specimens
3677/138	41/1057	0/0	80	>50	18

3. COURSES USING THE COLLECTIONS.

See Mammal Division Report, Joseph Cook for specific activity.

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

See Mammal Division Report, Joseph Cook for specific activity.

B. **Graduate Students**

Andrew Hope-Mammalogy.

5. COLLECTION MANAGEMENT

This year, DGR personnel focused on loan processing, specimen archiving and entering historic specimen-related data into ARCTOS. All museum tissue loan data (specimens and publications) were entered from 1994 to present. When possible individual specimen records were linked to each loan and all agent names and data were updated. When applicable, records were also linked to GenBank. These records are now available in ARCTOS. Cheryl

also began locating all “double” specimen tubes in the freezers. That effort will continue in 2009.

6. AWARDS, GRANTS, AND CONTRACTS.

See Mammal Division Report, Joseph Cook for specific activity.

7. PUBLICATIONS

The following18 publications were based on tissue loans, processed from the Division of Genomic Resources. All publications are mammal based, and will also be listed in the Division of Mammals annual report as well.

Arai, Satoru, Shannon N. Bennett, Laarni Sumibcay, Joseph A. Cook, Jin-Won Song, Andrew G. Hope, Cheryl A. Parmenter, Vivek R. Nerurkar, Terry L. Yates, Richard Yanagihara. 2008. Phylogenetically distinct hantaviruses in the masked shrew (*Sorex cinereus*) and dusky shrew (*Sorex monticolus*) in the United States American. Journal of Tropical Medicine and Hygiene, 78(2):338-351.

Bradley, Robert D., Dallas D. Henson, Nevin D. Durish. 2008. Re-evaluation of the *Sigmodon hispidus* complex based on mitochondrial DNA sequences. The Southwestern Naturalist, 53(3):301-310.

Braun, Janet K., Brandi S Coyner, Michael A. Mares, Ronald A. Van Den Bussche. 2008. Phylogenetic relationships of South American grass mice of the *Akodon varius* group (Rodentia, Cricetidae, Sigmodontinae) in South America. Journal of Mammalogy, 89(3):768-777.

Crowl, Todd A., Thomas O. Crist, Robert R. Parmenter, Gary Belovsky, Ariel E. Lugo. 2008. The spread of invasive species and infectious disease as drivers of ecosystem change. Frontiers in Ecology and the Environment, 6(5):238-246.

D'Elia, Guillermo, Ulyses F. J. Pardinas, J Pablo Jayat, Jorge Salazar-Bravo. 2008. Systematics of Necromys (Rodentia, Cricetidae, Sigmodontinae): species limits and groups, with comments on historical biogeography. Journal of Mammalogy, 89(3):778-790.

Geluso, Keith, Jason P. Damm, Ernest W. Valdez. 2008. Late-seasonal activity and diet of the evening bat (*Nycticeius humeralis*) in Nebraska**.** Western North American Naturalist, 68(1):21-24.

Gonzalez-Ittig, Raul E, Jorge Salazar-Bravo, Jaime J Polop, Cristina N Gardenal. 2008. Isolation and characterization of microsatellite markers in *Oligoryzomys longicaudatus* (Muridae, Sigmodontinae, Oryzomini)**,** the natural reservoir of genotype Andes hantavirus. Molecular Ecology Resources, 8(6):1466-1468.

Hoffman, Justin D., Hugh H. Genoways. 2008. Characterization of a contact zone between two subspecies of the big brown bat (*Eptesicus fuscus*) in Nebraska**.** Western North American Naturalist, 68(1):36-45.

Koepfli, Klaus, Kerry A. Deere, Graham J. Slater, Colleen Begg, Keith Begg, Lon Grassman, Mauro Lucherini, Geraldine Veron, Robert K. Wayne. 2008. Multigene phylogeny of the Mustelidae: Resolving relationships, tempo and biogeographic history of a mammalian adaptive radiation. BioMed Central Biology, 6(1).

Koepfli, Klaus. 2008. Establishing the foundation for an applied molecular taxonomy of otters in Southeast Asia. Conservation Genetics, 9:1589-1604.

Mullen, Lynne M., Hopi Hoekstra. 2008. Natural selection along an environmental gradient: a classic cline in mouse pigmentation. Evolution, 62(7):1555-1570.

Mares, Michael A., Janet K. Braun, Brandi S Coyner, Ronald A. Van Den Bussche. 2008. Phylogenetic and biogeographic relationships of gerbil mice Eligmodontia (Rodentia, Cricetidae) in South America, with a description of a new species**.** Zootaxa, 1753:1-33.

Rodriguez-Serrano, Enrique, Cristian E. Hernandez, R. Eduardo Palma. 2008. A new record and an evaluation of the phylogenetic relationships of *Abrothrix olivaceus markhami* (Rodentia: Sigmodontinae). Mammalian Biology, 73:309-317.

Rodriguez-Serrano, Enrique, R. Eduardo Palma, Cristian E. Hernandez. 2008. The evolution of ecomorphological traits within the Abrothrichini (Rodentia:Sigmodontinae): A bayesian phylogenetics approach. Molecular Phylogenetics and Evolution, 48:473-480.

Suzan, Gerardo, Anibal Armien, James N. Mills, Erika Marce, Gerardo Ceballos, Mario Avila, Jorge Salazar-Bravo, Luis A. Ruedas, Blas Armien, Terry L. Yates. 2008. Epidemiological considerations of rodent community composition in fragmented landscapes in Panama**.** Journal of Mammalogy, 89(3):684-690.

Suzan, Gerardo, Erika Marce, J. Tomasz Giermakowski, Blas Armien, Juan M Pascale, James N. Mills, Gerardo Ceballos, Andres Gomez, A Alonso Aguirre, Jorge Salazar-Bravo, Anibal Armien, Robert R. Parmenter, Terry L. Yates. 2008. The Effect of habitat fragmentation and species diversity loss on hantavirus prevalence in Panama. Annals of the New York Academy of Science, 1149:80-83.

Triant, Deborah A., J. Andrew DeWoody. 2008. Molecular analyses of mitochondrial pseudogenes within the nuclear genome of arvicoline rodents**.** Genetica, 132:21-33.

Wisely, Samantha M., Rachel M. Santymire, Travis M. Livieri, Sara A. Mueting, JoGayle Howard. 2008. Genotypic and phenotypic consequences of reintroduction history in the black-footed ferret (*Mustela nigripes*). Conservation Genetics, 9:389-399.

Books, Chapters, Edited Volumes

See Mammal Division Report, Joseph Cook for specific activity.

A. Web-Based
See Mammal Division Report, Joseph Cook for specific activity.

B. **Books, Chapters, Edited Volumes**
See Mammal Division Report, Joseph Cook for specific activity.

D. Technical Reports
University of New Mexico, Museum of Southwestern Biology, Division of Genomic Resources: 2008 Annual Report. **Joseph A. Cook & Cheryl A. Parmenter.**

C. Theses/Dissertations Complete
See Mammal Division Report, Joseph Cook for specific activity.

F. Work In Progress
Projects
See Mammal Division Report, Joseph Cook for specific activity.

G. Publications and reports based on museum specimens by researchers excluding Museum staff, students and Associates.
See above list of publications.

8. ACTIVITIES IN LEARNED SOCIETIES.

A. Invited or plenary talks
See Mammal Division Report, Joseph Cook for specific activity.

B . Attendance at professional meetings. Contributed talks or posters.
Joseph Cook:
See Mammal Division Report, Joseph Cook for specific activity.

Cheryl A. Parmenter:
93rd Annual Meeting of The Ecological Society of America, Milwaukee, Wisconsin 2008.

D. **Service as editor or on editorial board of a journal**.
Joseph Cook:
See Mammal Division Report, Joseph Cook for specific activity.

E. **Service as officer of professional society or organization**.
Joseph Cook:
Professor of Biology, University of New Mexico.
See Mammal Division Report, Joseph Cook for specific activity.

9. OTHER PROFESSIONAL ACTIVITIES.
A. **Colloquium Presentations.**

Joseph Cook:
See Mammal Division Report, Joseph Cook for specific activity.

B Presentation to General Audience in a Scholarly Capacity.

Joseph Cook:
See Mammal Division Report, Joseph Cook for specific activity.

C. **Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.**
Joseph Cook:
See Mammal Division Report, Joseph Cook for specific activity.

D. **Service in a Scholarly Capacity as a Member of a Local, State, Regional or National Committee, Panel etc.**
See Mammal Division Report, Joseph Cook for specific activity.

Joseph Cook:
See Mammal Division Report, Joseph Cook for specific activity.

E. Journal Referee.
Joseph Cook:
See Mammal Division Report, Joseph Cook for specific activity.

10. SERVICE.

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

Joseph Cook:
See Mammal Division Report, Joseph Cook for specific activity.

B. Public Service

Joseph Cook:
See Mammal Division Report for specific activity.
Cheryl Parmenter:
Division tours – provided educational tours and assistance for visitors.
Visitors:
Dr. James Derr, Texas A&M University
Dr. Greg Glass Johns Hopkins University-Infectious Disease Class (8 students).

Biology New Graduate Students tour

MSB Mammal Division personnel

MSB Bird Division personnel

Dr. Robert Baker, Texas Tech University and students.

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

Joseph Cook:

See Mammal Division Report for specific activity.

Cheryl Parmenter, Ecological Society of America, 2008 Science Sustainability Award Received at the ESA Annual meeting in Milwaukee Wisconsin.

12. DONATIONS AND GIFTS RECEIVED.

No donations or gifts.

13.CURRENT STAFF.

Faculty:

Joseph A. Cook**: Interim Curator** of Genomic Resources, Curator of Mammals Museum of Southwestern Biology and Professor the Department of Biology.

Staff:

Cheryl Parmenter: **Collection manager** 1.0FTE.

Students:

Andrew Hope **Graduate Assistant** .5FTE fall & spring, .25FTE summer 2008.
Comparative Phylogeography of the Sorex Cinereus Complex: PhD in progress.

13. MUSEUM ASSOCIATES.

A. Curatorial Associates

None

B. **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 Preserve- Chief Scientist
James L. Patton	Museum of Vertebrate Zoology,University of California
Luis Ruedas	Portland State University, Portland, Oregon
Jorge-Salazar Bravo	Texas Tech University, Lubbock, TX

HERBARIUM

1. DIVISION HIGHLIGHTS

- The UNM herbarium contains more than 115,200 accessioned specimens of vascular and non-vascular plants
- Development and maintenance of digital relational databases
- The New Mexico Biodiversity Consortium Database contains 350,000 specimens from 4 university collections in NM. More than 100,000 of these are georeferenced: http://nmbiodiversity.org
- Interpretive activities or Collections-related Outreach including tours for UNM students and the Native Plant Society of New Mexico and maintaining the Herbarium webpage
- Collections Improvement Funding, Grant Applications/Awards: $6000 for Database improvement-UNM and $1000 from New Mexico Native Plant Society
- Tim Lowrey and Jane Mygatt co-authored *A Field Guide to the Plants and Animals of the Middle Rio Grande* which was published by UNM Press in August 2008. Awarded: Southwest Book of Year by Tucson-Pima County Library; **Bronze Award** in the 2009 PubWest Book Design Awards Guide / Travel category.

2. TABLE OF COLLECTION USE

Collection Growth (specimens catalogued & entered in collection)	Loans/# specimens (outgoing)	Loans (incoming)	Visitors (not including tour groups)	Information Requests Personally Responded to	Publications Citing MSB Specimens
3507	21/1432	14/328	186	130	11

3. COURSES USING THE COLLECTIONS

Biol 502- Plants and People- 5 students
Biol 402- Plants and People-1 student
Anthro 450- Plants and People- 12 students
Biol 463- Flora of New Mexico- 18 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Manager

Hanson, D.
Biol 204- 160 students
Biol 204- 171 students

Lowrey, T.K.
Biol 502, Plants and People- 5 students
Biol. 402-Plants and People-1 student
Anthro. 450- Plants and People- 12 students
Biol. 463- Flora of New Mexico- 18 students

B. Graduate Students/Associates
Bixby, R.J.
Biol 514- Ecosystem Studies- 9 students

Frazier, C.
Bio 360L- Botany lab

5. COLLECTION MANAGEMENT
Herbarium staff processed and added 3507 new acquisitions to the collection. The UNM Herbarium received 30 gifts and 1 exchange of specimens, totaling 4291 specimens. The majority of specimens were collected from New Mexico.

The herbarium logged more than 186 visits from the botanical community. We average 2-3 information requests per week by e-mail and/or phone, and the Biodiversity website receives many hits per month for herbaria in the state. We continue georeferencing the collections using part time graduate student assistance. In addition, we continue to image specimens in the collection, and to-date have imaged our Type specimens, the state's threatened and endangered taxa, New Mexico collections in the Cactaceae (2676 specimens), and work continued imaging the Asteraceae.

Accessions for 2008:

2008.01	Chick Keller, Los Alamos, 3 specimens
2008.02	Bob Sivinski, NM State botanist, 46 NM specimens
2008.03	Jack Carter, Silver City, 47 tree and shrub specimens
2008.04	NHNM, 330 El Malpais National Monument plants
2008.05	NMC (NMSU), 1 Paratype
2008.06	NHNM, 1 *Liatris* from Colorado
2008.07	Don Hazlett 78 Southwest collections
2008.08	Robert King, 30 Bryophytes and Cryptogams of CO and Nova Scotia
2008.09	ASU, 1 *Brassica tournefortii*
2008.10	Mt. West Envir. Herb, 2 specimens, including 1 Isotype
2008.11	ASC,10 specimens in exchange
2008.12	SD, 2 *Brassica tournefortii*
2008.13	ARIZ, 13 collections by Thornber
2008.14	Dave Lightfoot, 1 *Isocoma* from the Middle Rio Grande
2008.15	Dean Taylor, 26 various CA specimens
2008.16	Jack Carter, 21 various trees and shrubs
2008.17	NHNM- 1 T&E specimen
2008.18	NHNM- 1 *Verbena hastata* from the Bosque
2008.19	Chick Keller, Los Alamos, 2 specimens

2008.20 William Degenhardt, 1 specimen
2008.21 Michael Schiebout, 1943 Thesis specimens
2008.22 Ottawa, Ontario, 3 *Salix*
2008.23 Joanne Schlegel, 10 Urticaceae from NY
2008.24 David Bleakly, 62 specimens
2008.25 ASC, 888 State Parks specimens collected by Glenn Rink
2008.26 Chick Keller, Los Alamos, 3 specimens
2008.27 Lolly Jones, 8 specimens from Sandoval County
2008.28 Gene Jercinovic, 34 specimens from Luna County
2008.29 Paula Rebert and Phil Melnick, 30 various specimens
2008.30 Karen Wetherill, 5 Sevilleta specimens
2008.31 NMNH, 690 National Park specimens

6. AWARDS, GRANTS, AND CONTRACTS
Awarded:

Bixby, R.J.
$127,791. ($382,503 over 3 years) Effects of nutrients on periphyton growth and diversity in the Middle Rio Grande: top-down and bottom-up effects**. R. Bixby.** Bureau of Reclamation

$35,329. Survey of Aquatic Community Structure and Food Web Constituents at the Bosque del Apache NWR. Middle Rio Grande Endangered Species Act Collaborative Program, Bureau of Reclamation and TetraTech. **R. Bixby**, A.S. Burdett and T.F. Turner. 2008-2009

Hanson, D.T.
$480,000 (360,000 to UNM). Collaborative Research: Light enhanced ^{13}C enrichment of dark respired CO_2: Implications for leaf internal CO_2 conductance and respiration in the light. **D.T. Hanson**, Nate McDowell, and Todd Rosenstiel (Portland State University). National Science Foundation Integrative Organismal Biology Environmental and Structural Systems Cluster. Award period: 08/15/2007 - 06/30/2010

$350,000 ($64,000 to UNM). Integrated Bioenergy Processing System for Productive Use of NM Dairy Industry Waste Streams. R. Pate, P. Pohl, K. Hoodenpyle, **D.T. Hanson**, V. Cabrera, S. Deng. New Mexico Technology Research Collaborative. Award period: 02/15/2007 - 1/19/2009

Lowrey, T.K.
$125,000. New Mexico Biodiversity Collections Consortium. P.I.: Timothy Lowrey. New Mexico Minerals, Energy, and Natural Resources Department. 07/15/08-06/30/09.

$55,000. Development of a Wildlife Conservation Plan for Albuquerque. CO-P.I.s: Howard Snell and Timothy Lowrey. 05/01/08-06/30/09.

$25,000. Effect Of Medicinal Plants Used By Tribes On Cancer And Bacteria. P.I. **Timothy Lowrey**. Subcontract from NMIMT. National Institute of Health. 05/01/08-06-01-09.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Cartron, J-L., D.C. Lightfoot, **J.E. Mygatt**, S.L. Brantley, and **T.K. Lowrey**. 2008. A Field Guide to the Plants and Animals of the Middle Rio Grande Bosque. UNM Press. Albuquerque. 375 pp.

Frazier, C.K., Wall, J., and S. Grant. 2008. Initiating a Natural History Collection Digitisation Project. Global Biodiversity Information Facility, Copenhagen, Denmark. 75 pp. ISBN: 87-92020-05-4. Available on the web at: http://www.gbif.org/GBIF_org/GBIF_Publications/GBIF%20Booklet%20-%20Initiating%20a%20Collection%20Digitisation%20Project.pdf

B. Journal Articles

Connelly, S., C.M. Pringle, **R.J. Bixby**, R. Brenes, M.R. Whiles, K.R. Lips, S. Kilham, and A.D. Huryn. 2008. Changes in stream primary producer communities resulting from loss of tadpoles: Can small-scale experiments predict effects of large-scale catastrophic amphibian declines? *Ecosystems* 11: 1262-1276.

Gardiner, N., Sutherland, A., **R.J. Bixby,** M.C. Scott, J.L. Meyer, G. Helfman, F. Benfield, C.M. Pringle, P.V. Bolstad, and D.N. Wear. 2008 (online). Linking stream and landscape trajectories in the southern Appalachians. *Environmental Monitoring and Assessment*.

Melim, L.A., Northup, D.E., Spilde, M.N., Jones, B., Boston, P.J., and **R.J. Bixby**. 2008. Reticulated filaments in cave pool speleothems: Microbe or mineral? *Journal of Cave and Karst Studies* 70: 135-141

Rice, S., L. Aclander, and **D.T. Hanson**. Do bryophyte shoot systems function like vascular plant leaves or canopies? Functional trait relationships in *Sphagnum* mosses (Sphagnaceae). *American Journal of Botany*; 95(11):1366-1374; 2008

Uehlein, N., B. Otto, **D.T. Hanson**, M. Fischer, N.G. McDowell, and R. Kaldenhoff. Function of *Nicotiana tabacum* aquaporins as chloroplast gas pores challenges the concept of membrane CO_2 permeability. *Plant Cell*; 20:648-657; 2008
*highlighted with an "In Brief" article written by the journal editor for that issue.
*rated "Must Read 6.0" by the Faculty of 1000

McDowell, N., D. Baldocchi, M. Barbour, C. Bickford, M. Cuntz, **D. Hanson**, A. Knohl, H. Powers, T. Rahn, J. Randerson, B. Riley, C. Still, K. Tu, A. Walcroft. Measuring and modeling the stable isotope composition of biosphere-atmosphere CO_2 exchange: where are we and where are we going? *EOS*, 89(10):94-95; 2008

Boykin, L. W. Pockman, and **T.K. Lowrey**. 2008. Leaf anatomy of Orcuttieae (Poaceae; Chloridoideae): More evidence of C4 photosynthesis without Kranz anatomy. Madrono 55: 143-150.

Porras-Alfaro, A., J. Herrera, R. L. Sinsabaugh, K. J. Odenbach, **T.K. Lowrey**, and D. O. Natvig. 2008. Novel root fungal consortium associated with a dominant desert grass. Applied and Environmental Microbiology 74:2805-2813.

Sigstedt SC, Hooten CJ, Callewaert MC, Jenkins AR, Romero AE, Pullin MJ, Kornienko A, **Lowrey T.K.**, Slambrouck SV, Steelant WF. 2008. Evaluation of aqueous extracts of *Taraxacum officinale* on growth and invasion of breast and prostate cancer cells. Int J Oncology. 32(5):1085-90.

Mygatt, J. 2008. Plant Distribution Reports *Carex tahoensis* Smiley. The New Mexico Botanist. No. 46.

C. Web-Based

None

D. Technical Reports

Bixby, R.J. and A.S. Burdett. 2008. Preliminary annual report: Effect of nutrients on periphyton growth and diversity in the Middle Rio Grande: top-down and bottom-up effects. Middle Rio Grande Endangered Species Act Collaborative Program, Bureau of Reclamation.

E. Theses/Dissertations Completed

Lowrey, T.K.
Joanna Redfern, Ph.D. Phylogeny and Phylogeography of the Fouquieriaceae. Fall 2008.

F. Work In Progress

Bixby, R.J.
Bixby, R.J., M.B. Edlund, and N. Soninkhishig. In review. An Asian biodiversity hotspot: taxonomy and morphology of the diatom genus *Hannaea* (Bacillariophyceae) in the Baikal Rift Zone. Submitted to *Phycologia*.

Pringle, C.M., E. P. Anderson, M. Ardón, **R.J. Bixby**, 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. pp. 000-000.

Kappelle, M. and J. Gomez, eds. Costa Rican Ecosystems. The Nature Conservancy.

Lowrey, T.K.
IGERT: The Museum of Southwestern Biology as a nexus for interdisciplinary graduate research, education and training (MSB-IGERT). P.I.: Thomas Turner. National Science Foundation. 6/01/09. $2,808032.

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

Dorn, R. 2008. Plant Distribution Reports. *Salix nigra* Marshall. The New Mexico Botanist. No. 43

Jercinovic, E. 2008. Charlotte Ellis of the Sandia Mountains. The New Mexico Botanist. No. 42.

Nesom, G.L. 2008. Taxonomic review of *Solidago petiolaris* and *S. wrightii* (Asteraceae: Astereae). Phytologia 90(1):21-35.

J. M. Egger. Nomenclatural changes and selected lectotypifications in *Castilleja* (Orobanchaceae). Phytologia 90(1):63-82.

Sivinski, R. 2008. Some Observations on the Dry, Dehiscent-fruited Yuccas in New Mexico. The New Mexico Botanist. No. 43.

Schneider, A., P. Lyon, and G. Nesom. 2008. Gutierrezia elegans sp. Nov. (Asteraceae: Asterae), a shale barren endemic of southwestern Colorado. Journal Bot. Res. Inst. Texas 2(2) 771-774.

Ronald L. Hartman and Richard K. Rabeler. 2008. *Minuartia macrantha* (Alsinoideae: Caryophyllaceae): morphological circumscription, geographical range, and phylogenetic affinities. Journal Bot. Res. Inst. Texas 2(2) 1225-1233.

Sivinski, R. 2008. The Genus *Nama* in New Mexico. The New Mexico Botanist. No. 46.

Alexander, P.J. 2008. *Heuchera woodsiaphila* (Saxifragaceae), a new species from the Capitan Mountains of New Mexico. J. Bot. Res. Inst. Texas 2(1):447-453

8. ACTIVITIES IN LEARNED SOCIETIES
A. Invited/Plenary Talks and/or Seminars

Hanson, D.T.
High frequency field measurements of diurnal carbon isotope discrimination and internal conductance in a semi-arid species, Juniperus monosperma. C. P. Bickford, N. G. McDowell, E. B. Erhardt, D. T. Hanson. American Geophysical Union annual meeting, Biogeosciences section, San Francisco, December 2008

An open chamber system coupled with a tunable diode laser for measurement of delta ^{13}C, delta ^{18}O, and efflux rate of soil respired CO_2. H. Powers, J. Hunt, D. T. Hanson, and N. McDowell. American Geophysical Union annual meeting, Biogeosciences section, San Francisco, December 2008

Lowrey, T.K.
Herbarium Networking in New Mexico and Arizona. Invited presentation. Workshop on Virtual Herbaria. Botany 2008 International Meeting. University of British Columbia, Vancouver, Canada. July 2008.

B. Contributed Talks/Posters

Bixby, R.J., A.S. Burdett, and Daves-Brody, N. Nutrient availability on periphyton biomass and diversity in the Middle Rio Grande. North American Benthological Society 56th Annual Meeting (Salt Lake City, UT; 25-30 May 2008)

Bixby, R.J., M.B. Edlund and N. Soninkhhishig. 2008. An Asian biodiversity hotspot: taxonomy and morphology of the diatom genus *Hannaea* (Bacillariophyceae) in the Baikal Rift Zone. International Diatom Symposium, Dubrovnik, Croatia, 7-13 September 2008.

Daves-Brody, N., **Bixby, R.J**., and A.S. Burdett. Seasonal effects on water chemistry and algal growth and diversity in the Rio Grande. UNM Third Annual Student Water Symposium (Albuquerque, NM; 28 March 2008)

Daves-Brody, N., **Bixby, R.J.,** and A.S. Burdett. Seasonal effects on water chemistry and algal growth and diversity in the Rio Grande. Department of Biology Student Research Day (Albuquerque, NM; 11 April 2008)

Daves-Brody, N., **Bixby, R.J**., and A.S. Burdett. Seasonal effects on water chemistry and algal growth and diversity in the Rio Grande. North American Benthological Society 56th Annual Meeting (Salt Lake City, UT; 25-30 May 2008)

Bixby, R.J., A.S. Burdett, and N. Daves-Brody. Preliminary diatom biodiversity in an arid land river, Southwestern United States. 20th International Diatom Symposium (Dubrovnik, Croatia; 7-13 September 2008)

Bixby, R.J., A.S. Burdett, and N. Daves-Brody. 2008. Preliminary diatom biodiversity in an aridland river, Southwestern United States. Festival of the Cranes Research Day, Bosque del Apache NWR.

DeLong, J. P. and **D.T. Hanson**. Metabolic Theory in Protists: Why we should look within to find a role for metabolic rate in ecology. Graduate Research Seminar; Metabolic Basis of Ecology 2008; Gordon Research Conference, Biddeford, ME; July 2008

DeLong, J. P. and **D.T. Hanson.** Density-dependent individual and population-level metabolic rates in a suite of single celled eukaryotes. Metabolic Basis of Ecology 2008; Gordon Research Conference, Biddeford, ME; July 2008

Bickford, C. P., N. G. McDowell, E. B. Erhardt, **D.T. Hanson**. High frequency field measurements of diurnal carbon isotope discrimination and internal conductance in a semi-arid

species, *Juniperus monosperma*. CO_2 Assimilation 2008: Gene to Biome, Gordon Research Conference, Biddeford, ME; August 2008

J. Redfern, D. Hafner, and **T.K. Lowrey**. Phylogeny of the Fouquieriaceae. Botany 2008. University of British Columbia. Vancouver, B.C. July 2008.

C. Attendance at Professional Meetings
Bixby, R.J.
UNM Third Annual Student Water Symposium (Albuquerque, NM; 28 March 2008).

North American Benthological Society 56th Annual Meeting (Salt Lake City, UT; 25-30 May 2008).

Annual Fall UNM Water Forum (Albuquerque, NM; 5 October 2008).

20th International Diatom Symposium, Dubrovnik, Croatia (7-13 September 2008).

Hanson, D.T.
CO_2 Assimilation 2008: Gene to Biome, Gordon Research Conference, Biddeford, ME; August 2008.

Lowrey, T.K.
Botany 2008 International Meeting. University of British Columbia, Vancouver, Canada. July 2008.

New Mexico Rare Plant Technical Council, Univ. of New Mexico, November 2008.

Mygatt, J.
New Mexico Rare Plant Technical Council, Univ. of New Mexico, November 2008

D. Service as Editor or on Editorial Board of a Journal
Bixby, R.J.
Editorial Board, *Diatom Research*, 2005-present

Lowrey, T.K.
Co- Editor, Madrono, Journal of the California Botanical Society, Nov. 2008 to present.

E. Service as Officer of Professional Society/Organization
Hanson, D.T.
Elected by the 2008 conference members to serve as vice-Chair of the 2011 Gordon Conference on CO_2 Assimilation in Plants and as Chair of the 2014 conference

Lowrey, T.K. Chair, Collections Committee, American Society of Plant Taxonomists (appointed).

9. OTHER PROFESSIONAL ACTIVITIES

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

Bixby, R.J.
Guest lecture for Biol 495 Limnology – 28 March 2008

***Lowrey, T.K. and J. Mygatt**
Presentation: Field Guide to the Plants and Animals of the Middle Rio Grande Bosque. Section on Plants of the Middle Rio Grande Bosque. For the Albuquerque Chapter, Native Plant Society of New Mexico, Nov. 2008, NM Museum of Natural History

***Cartron, J-L., *D. Lightfoot**, **J. Mygatt, ***S. Brantley and ***T.K. Lowrey**
Presentation: Field Guide to the Plants and Animals of the Middle Rio Grande Bosque. The New Mexico Museum of Natural History, Dec. 2008.

***Cartron, J-L., *D. Lightfoot, J. Mygatt, *S. Brantley and *T.K. Lowrey**
Presentation: Field Guide to the Plants and Animals of the Middle Rio Grande Bosque. Bookworks Bookstore, Albuquerque, NM. Dec. 2008.

B. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.
Lowrey, T.K.
Invited Presentation- New Mexico Board of Regents, February 2008, University of New Mexico

C. Scholarly Service as a Member of a Local/State/Regional/National Committee, Panel, etc.
Bixby, R.J.
Judge at UNM Biology 16th Annual Research Day – April 11 2008
Judge at NABS 55th Annual Meeting – 25-30 May 2008

Hanson, D.T.
National Science Foundation proposal reviewer

Lowrey, T.K.
Member, New Mexico Rare Plant Technical Council

Mygatt, J.
Member, New Mexico Rare Plant Technical Council

D. Journal Referee
Bixby, R.J.
Hydrobiologia (2), Journal of Cave and Karst Studies (1), Phycologia (1)

Hanson, D.T.
Reviewed textbook chapter in *Biology* published by McGraw-Hill (1), Aquatic Botany (1), Functional Ecology (1)

Lowrey, T.K.
Systematic Botany (1), Molecular Ecology (1), New Zealand Journal of Botany (1), Taxon (3), Molecular Phylogeny and Evolution (1), American Journal of Botany (2), Journal of Biogeography (1), Sida (2), University of New Mexico Press (1)

Mygatt, J.
J. Bot. Res. Inst. Texas (1), UNM Press (1)

E. Hosting Professional Colloquia and Groups

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

Lowrey, T.K.
Field Botany Course for K-12 Teachers, Science Education Institute of the Southwest, Sevilleta Field Station, June 2008

B. Public Service
Bixby, R.J.
Meeting participation, Middle Rio Grande Endangered Species Act Collaborative Program, Science Working Group

Lowrey, T.K.
Plant Identification for the general public in the UNM Herbarium.

Mygatt, J.
Maintenance of the Native Plant Society of New Mexico website. http://nmsnm.unm.edu

C. University and Departmental Committees:
Hanson, D. T.
Biology Department Seminars Committee, UNM *sole member
Greenhouse Committee, UNM
External Advisory Board Member, UNM Mass Spectrometry Center; 2003-present

Lowrey, T.K.
Biology Dept. Tenure and Promotion Committee
Academic Freedom and Tenure Committee (Chair)
Policy Committee, UNM Faculty Senate
Library Committee, UNM Faculty Senate

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS, ETC.
Hanson, D.T.
Nominated for the 2007-2008 Outstanding Teacher of the Year Award at the University of New Mexico

Elected by the 2008 conference members to serve as vice-Chair of the 2011 Gordon Conference on CO_2 Assimilation in Plants and as Chair of the 2014 conference

12. DONATIONS AND GIFTS RECEIVED

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

13. CURRENT STAFF (List Faculty/Staff, Students and Volunteers)
A. Faculty/Staff
Lowrey, T.K., Curator
Mygatt, J., Collection Manager

B. Graduate students
Nonaka, Etsuko
Medieros, Juliana

C. Undergraduate Student Workers and Volunteers
Bottone, S., Undergraduate
Jones, L., Volunteer

14. MUSEUM ASSOCIATES
A. Curatorial Associates
Hanson, D.T., UNM Faculty (Curator of Bryophytes)
Sivinski, R., New Mexico State Botanist

B. Research Associates
Bixby, R.J. UNM Research Associate, 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
Tonne, P., Natural Heritage New Mexico, Rare Plant Botanist

DIVISION OF MAMMALS

1. DIVISION HIGHLIGHTS.

A. Collection Growth.
The DOM added over 36,000 specimens to the collection and currently contains over 180,000 catalogued specimens. When mammal specimens from the DGR are included, the MSB holds over 225,000 mammal voucher specimens (3rd or 4th largest collection in the Western Hemisphere---now comparable in size to UC Berkeley). This exceptional growth was the combined result of incorporation of the UIMNH collection, successful fieldwork in a wide variety of projects spanning the Western Hemisphere, eastern Asia, and collaborations with state and federal resource agencies in the western US. Work was primarily sponsored by the National Science Foundation, National Institutes of Health, USDA Forest Service and US Fish and Wildlife Service.

B. Arctos database and collection accessibility.
The use of the Arctos database continues to provide an invaluable resource for researchers worldwide and is serving to greatly enhance the visibility of the MSB. As tracked by Google analytics, 35,495 visits from 157 countries were made to Arctos during 2008. Of these, 16% (5,550) were referred to our site from GenBank, demonstrating the power of utilizing integrated and relational databases.

C. Publication Productivity.
DOM specimens supported 25 peer-reviewed publications in 2008 making this facility one of the most productive at UNM.

D. Extramural Support:

1) NSF collections improvement grant. The first year of the NSF grant "Curation, Databasing, and Integration of the Orphaned Illinois Mammal Collection" is completed and resulted in a significant upgrade to our facilities. We are slightly ahead of schedule with 50 new museum cases, 400 drawers and several thousand new specimen trays purchased and installed. The entire 33,000 specimens have been uploaded and catalogued into the DOM electronic database, allowing worldwide access to this important historic collection. About 80% of the specimens have been recurated and are awaiting integration in the main collection. The Didelphimorphia, Soricomorpha, Chiroptera, and Lagomorpha, are fully integrated already. This resource provides critical infrastructure, especially for retrospective studies of environmental conditions in Arizona and more generally southwestern North America.

2) **Beringia Coevolution Project (BCP) II** focused on biodiversity of mammals and associated parasites in Beringia including remote sites in Siberia, Canada, and Alaska. Substantial logistical support was leveraged from agencies that manage lands in Alaska. We were supported by staff from U of Saskatchewan, Institute of Biological Problems of the North (Russian Academy of Sciences-Magadan), and Finnish Forest Institute, Vantaa Research Centre-Finland. Specimens under multiple methods of preservation (e.g., frozen tissues, numerous parasite preparations) have stimulated a diverse spectrum of investigations of high-latitude organisms. Together with their associated databases the studies include the assessment of regional and inter-hemispheric diversity. The major objectives of previous research were to: 1)

provide a detailed and geographically widespread resource of museum specimens from key high-latitude areas that had not been inventoried; 2) *develop a comparative framework for Beringia to examine the history of host-parasite systems that are phylogenetically and ecologically disparate* providing the basis for detailed studies in coevolution and historical biogeography; 3) *explore forces that have structured high-latitude biomes,* including drivers of biotic exchange across the northern continents; and 4) *build a spatial and temporal foundation for investigations of Arctic biodiversity* by identifying regions of endemism and contact zones between divergent lineages and exploring fundamental mechanisms that structured diversity of complex biotic systems across Beringia. A crucial foundation is emerging for basic research and conservation in the face of changing climate and increasing anthropogenic impacts at high latitudes. In 10 years, a diverse set of publications, theses and manuscripts (131 total as of December 2008) have been based on BCP collections and have addressed themes related to high-latitude biogeography, transcontinental biotic exchange, climate induced pathogen emergence, and host/parasite coevolution Due to concerns related to rapid climate warming at high latitudes, there has been increasing interest in these specimens. In addition to peer-reviewed articles, keys and monographs to this boreal fauna were written that are accessible to the general public, wildlife managers and scientists including the first comprehensive review of *The Recent Mammals of Alaska* (MacDonald and Cook).

3) State and Federal Agency Grants and Agreements (e.g., USDA Forest Service) for resource management supported large scale inventories in New Mexico and Alaska. DOM continues to be heavily involved with wildlife management on the Tongass National Forest.

4) NIH funded projects (ICIDR and Fogarty Training grants) related to emerging pathogen discovery in Panama and Chile continue to support field work and produce large series of specimens.

E. Integration of USGS Collection. The integration of the USGS collection with the main DOM is progressing quickly. Didelphimorphia, Primates, Soricomorpha, Chiroptera, and Lagomorpha are now complete.

F. Student Training:

a) We graduated one doctoral student and one master's student in 2008.

b) UNO-Undergraduate Opportunities training grant continues in second of five years project ($1,015,000 total). DOM had a leadership role in undergraduate training in museum-based science at UNM. The National Science Foundation's undergraduate training grant is now hosting 15 undergraduate students from underrepresented groups in various research projects in eight different faculty labs in the Biological Sciences at UNM.

G. New Dermesterium completed. Located on the roof of Castetter Hall, the new dermesterium is a 2 room temperature controlled facility housed in a modified transportable building shell. One room is maintained at 88 degrees F for maximum dermestid productivity and the other (processing room) is set at 75 degrees to minimize strain of freezer compressors and allow for comfortable conditions for workers.

H. Reaccreditiation of the DOM collection. Official documentation of our reaccreditation has been received from the American Society of Mammalogists Systematic Collections Committee.

2. COLLECTION USE

Collection Growth (specimens catalogued)	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests Personally Responded to	Publications Citing MSB DOM Specimens
36681*	25(773) / 41(1057)**	3	162***	>400****	23

* Currently the fastest growing collection in the western hemisphere.

** Loans originating in DOM / loans of mammal tissue originating in DGR Combined total of 66 loans of 1830 specimens of traditional voucher specimens, mammalian parasites, and tissue samples.

*** 21 visiting researchers, 8 school group tours (125 people), 16 other visitors.

**** Estimate of email or phone requests. Web visits to the DOM searchable database (ARCTOS) tracked via Google analytics = 35,495 visits (from 157 countries (16% (5,550) visitors referred to our site from GenBank).

3. COURSES USING THE COLLECTIONS

<u>Educational tours</u>
Bosque School (12 students + 2 adults)
SY Jackson Elementary School (23 students + 8 sdults)
Highland High School Honors class (10 students + 1 adult)
Truman Middle School MESA program (20 students + 2 adults)
<u>Loans for educational lectures</u>
Montezuma Elementary School - mammal lecture (Bill Gannon)
Truman Middle School – Evolution and Adaptation (Suzy Dunnum)
<u>UNM Courses</u>
UNM Advocacy for Animals class (20 students)
UNM Drawing II class (10 students)
UNM Freshman Learning Communities class (20 students)
ART/ART HIST Museum Studies class (12 students)
UNM BIOL K-12 education Program
BIOL 204L Plant and Animal Form and Function
BIOL 324L – Natural History of the SW (12 students)
BIOL 402/502 Advanced Field Mammalogy
BIOL 386 General Vertebrate Zoology
BIOL 489 (Fall)-Mammalogy (12 students)
BIOL 502 Speciation
BIOL 400 (Fall) Senior Honors Thesis- (1 student)
BIOL 599 Masters Thesis—(1 student)

BIOL 699 Dissertation—(3 students)

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Cook, J. A.
BIOL 489 – Mammalogy, (12 students)
BIOL 402/502 - Advanced Field Methods in Tropical Mammalogy (2 students)
BIOL. 461L, Tropical Biology, Spring, 19 students + 2 faculty
BIOL 502 (Spring)—Multilocus Approaches to Phylogeny—6 students
BIOL 517 Basic Grad Evolution (1/4) –12 students
BIOL 561 (Spring)---Tropical Biology –4 students
BIOL 502 (Fall) Spatial Genetics –6 students
BIOL 599 Masters Thesis—1 student
BIOL 699 Dissertation—3 students

Gannon, W. L.
BioMed 555 - Research BioEthics, Fall 2008, 15 students

Student Mentoring

Vani Aran-- BIOL 400 (Fall) Senior Honors Thesis
Kelly Speer---Regents' Scholar
Ashley Montoya –NSF-UNO
Elisha Song---NSF-UNO
Randle McCain---NSF-UNO
Justin Pichardo---NSF-UNO

B. Graduate Students (labs, etc.)

BIOL 489L – Mammalogy Lab
BIOL 386L - General Vertebrate Zoology Lab

5. COLLECTION MANAGEMENT

The DOM received 88 accessions in 2008 (~10,000 specimens). The majority of specimens were generated by the Beringian Coevolution Project (consisting mainly of carnivore, soricomorph, lagomorph, and rodent material from Alaska, Canada and Siberia) and the International Center for Infectious Diseases Research (NIH) and Fograty Training projects (large series of rodent specimens from Chile, Panama). The DOM continues its collaboration with state and federal agencies (e.g., serving as repository for both mountain lion taken by the NMGF, and Mexican wolves from the federal reintroduction program).

The majority of staff time was spent:

1. Reorganizing and relabeling of dry collections.
2. Integration of USGS and UIMNH material into the main collection.
3. Processing the large volume of material that was loaned in 2008.

4. Training student technicians and UnO students in Museum work.
5. Preparation, cataloging and installation of museum specimens.
6. Assisting with Biology courses such as Mammalogy, GVZ, and BIOL 203..
7. Data entry for the incoming accessions.
8. Filling information requests.
9. Permit Maintenance: All applicable permits up to date with 7 state permits, 2 provincial (Canada), USDA, USFWS Import (multiple-Russia, Canada, Chile, Mexico), CITES

6. AWARDS, GRANTS, AND CONTRACTS

Cook, J.A.

A Test of Landscape Connectivity across the Sky Islands Region using Large Carnivores as Model Organisms (JA Cook, co-PI; PI is Gary Roemer, NMSU).
Wilburforce Foundation.
Total $25,000 (F&A to NMSU)

Curation, Databasing, and Integration of the Orphaned Illinois Mammal Collection.
NSF-DEB 0744025 2/01/2008-2/01/2010
Total $ 259,285 Yearly $130,000 (F&A $50,052)

URM: Undergraduate Nurturing Opportunities (UNO); (JA Cook, PI)
NSF-DEB 0731350 08/01/07 - 08/01/12
Total $1,010,000, yearly $116,155 (F&A $15,000)

Mongolia Vertebrate Parasite Project (S. Gardner, PI; JA Cook, Co-PI)
NSF-DEB0717214 09/11/07 -9/01/09
Total $466,000, yearly $210,000 (Grant and F&A to University of Nebraska)

Fogarty International Training Grant
Project Title: Training in Hantavirus Ecology, Virology & Clinical Investigation in the Americas. NIH- 2 D43 TW001133-06A1 (G Mertz, PI-Medical School; JA Cook, Co-PI)
07/01/1999 - 03/31/2011
Total $510,000, yearly $132,133 (F&A to Med School)

Molecular Genetics of Endemics; (JA Cook, PI)
US Fish and Wildlife Service, Juneau (Supplement ongoing to 12/08)
One year $75,000 (F&A $25,000)

Mammals of Alaska, (JA Cook, PI)
US National Park Service (DOI) 9/1/07-9/1/08
Total one year $14,100 (F&A $2,100)

National Science Foundation, Beringia Coevolution Project II (JA Cook, PI)
NSF0415668Funded 2004-2008
Total $610,000, yearly $165,000 (F&A $55,000)

NFIM Mammal Monitoring and Inventorying of the Tongass National Forest
USDA Forest Service 6/2007-7/2008
Total $40,000 (2 awards) (F&A imputed)

ISLES
USDA Forest Service 8/2008-8/2012
Total $100,000 (F&A imputed)

KUIU Marten, Alaska Department of Fish and Game, 8/07-6/09
$20,000 (4,000 F&A)

New Mexico Department of Game and Fish, 9/08-6/09
Swift Fox Identification $ 20,100

Initiated the Terry Yates Endowment for Field Mammalogy
UNM Foundation Account $ 102,000

Dunnum, J. L.
Curation, Databasing, and Integration of the Orphaned Illinois Mammal Collection.
NSF-DEB 0744025 (Dunnum, Co-PI, Cook, PI,) 2/01/2008-2/01/2010
Total $ 259,285, yearly $130,000 (F&A $50,052)
Gannon, W.L.
Curation, Databasing, and Integration of the Orphaned Illinois Mammal Collection.
NSF-DEB 0744025 (Gannon, Co-PI, Cook, PI) 2/01/2008-2/01/2010
Total $ 259,285, yearly $130,000 (F&A $50,052)

URM: Undergraduate Nurturing Opportunities (UNO); (Gannon, Co-PI, Cook, PI)
NSF-DEB 0731350 08/01/07 - 08/01/12
Total $1,010,000, yearly $116,155 (F&A $15,000)
Improved housing of wolf (*Canis lupus baileyi*) specimens and its conservation in New Mexico. U. S. Fish and Wildlife Service.
Total $5,000 (No F&A)

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

B. Journal Articles

Cook, J. A.

1. Arai, S., S. Bennett, L. Sumibacay, J. A. Cook, J. Song, A. Hope, C. Parmenter, V. R. Nerurkar, T.L. Yates, and R. Yanagihara. 2008. Phylogenetically distinct hantaviruses in the masked shrew (*Sorex cinereus*) and montane shrew (*Sorex monticolus*) in the United States. In Press. American Journal of Tropical Medicine and Hygiene.

2. Fedorov, V. B., A. V. Goropashnaya, G. G. Boeskorov and J. A. Cook. 2008. Comparative phylogeography and demographic history of the wood lemming (*Myopus schisticolor*): implications for late Quaternary history of the taiga species in Eurasia.
3. Baker, R. J., D. J. Schmidly, J. A. Cook, J. S. Bravo, H. Genoways. 2008. Obituary: Terry Lamon Yates 1950-2007. Journal of Mammalogy 89:1557-1569.

C. Web-Based

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

D. Technical Reports

E. Theses/Dissertations Completed

Frances, Jose. 2008. Spatial genetic structure and demographic history of the wolverine in North America. Master's Thesis, University of New Mexico. Summer.

Dawson, N. G. 2008. Vista Norteña: Tracking historical diversification and contemporary structure in high latitude mesocarnivores. Doctoral Dissertation, University of New Mexico. Fall

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

J. A. Cook

1. Torres-Pérez, F., R. E. Palma, M. Ferres, B. Hjelle, J. A. Cook. Andes virus infection in the rodent reservoir and in humans varies across contrasting landscapes in Chile. Infection, Genetics and Evolution. Accepted.

2. Kang, H. J., S. Bennett, L Sumbicay, S. Arai, A. G. Hope, G. Mocz, J-W. Song, J. A. Cook, and R. Yanagihara. 2009. Evolutionary Insights from a Genetically Divergent Hantavirus Harbored by the European Common Mole (*Talpa europaea*). PLOS ONE

3. Medina, R. A., F. Torres-Perez, H. Galeno, M. Navarrete, P. A.Vial, R. E. Palma, M. Ferres, J. A. Cook, and B. Hjelle. 2009. Ecology, Genetic Diversity and Phylogeographic Structure of Andes virus in humans and rodents in Chile. Journal of Virology. 83:2446-2459.

4. Runck, A., M. Matocq, and J. A. Cook. 2009. Historic hybridization and persistence of a novel mito-nuclear combination in red-backed voles (genus *Myodes*). BMC Evolutionary Biology 9:114.

5. MacDonald, S. O., E. Waltari, R. Nofchissey, Y. Sawyer, and J. A. Cook. In Press. First records of deermice in southcentral Alaska. Northwestern Naturalist.

6. Koehler, A. V. A., E. P. Hoberg, N. E. Dokuchaev, N. A. Tranbenkova, J. S. Whitman, D. W. Nagorsen, and J. A. Cook. 2009. Phylogeography of a Holarctic nematode, *Soboliphyme baturini* among mustelids: Climate change, episodic colonization, and diversification in a complex host-parasite system. Biological Journal of the Linnaean Society. 96:651-663.

7. Koehler Anson V. A., Eric P. Hoberg, Fernando Torres-Pérez and Joseph A. Cook. 2009. A molecular view of the superfamily Dioctophymatoidea (Nematoda). Comparative Parasitology 76:100-104.

Torrez-Perez, F.

1. Hjelle B. & Torres-Pérez F. Rodent Borne-Viruses. In: Clinical Virology Manual. Specter S., Hodinka R., Wiedbrauk D., & Young S (Eds). American Society for Microbiology. (Book Chapter).

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

1. Astua, D., and N.O. Leiner. 2008. Tooth eruption sequence and replacement pattern in woolly opossums, genus *Caluromys* (Didelphimorphia: Didelphidae). Journal of Mammalogy 89(1):244–251.
2. Bradley, Robert D., Dallas D. Henson, Nevin D. Durish. 2008. Re-evaluation of the *Sigmodon hispidus* complex based on mitochondrial DNA sequences. The Southwestern Naturalist, 53(3):301-310.
3. Braun, Janet K., Brandi S Coyner, Michael A. Mares, Ronald A. Van Den Bussche. 2008. Phylogenetic relationships of South American grass mice of the *Akodon varius* group (Rodentia, Cricetidae, Sigmodontinae) in South America. Journal of Mammalogy, 89(3):768-777.
4. Conroy, Chris J., and Jennifer L. Neuwald. 2008. Phylogeographic study of the California vole, *Microtus californicus.* Journal of Mammalogy, 89(3):755–767.
5. Crowl, Todd A., Thomas O. Crist, Robert R. Parmenter, Gary Belovsky, Ariel E. Lugo. 2008. The spread of invasive species and infectious disease as drivers of ecosystem change. Frontiers in Ecology and the Environment, 6(5):238-246.
6. D'Elia, Guillermo, Ulyses F. J. Pardinas, J Pablo Jayat, Jorge Salazar-Bravo. 2008. Systematics of Necromys (Rodentia, Cricetidae, Sigmodontinae): species limits and groups, with comments on historical biogeography. Journal of Mammalogy, 89(3):778-790.
7. Frey, J.K., M.T. Hill, B.L. Christman, J.C. Truett, and S.O. MacDonald. 2008. Distribution and habitat of the Arizona gray squirrel (*Sciurus arizonensis*) in New Mexico. The Southwestern Naturalist 53(2): 248-255.
8. Geluso, Keith, Jason P. Damm, Ernest W. Valdez. 2008. Late-seasonal activity and diet of the evening bat (*Nycticeius humeralis*) in Nebraska**.** Western North American Naturalist, 68(1):21-24.
9. Gonzalez-Ittig, Raul E, Jorge Salazar-Bravo, Jaime J Polop, Cristina N Gardenal. 2008. Isolation and characterization of microsatellite markers in *Oligoryzomys longicaudatus* (Muridae, Sigmodontinae, Oryzomini)**,** the natural reservoir of genotype Andes hantavirus. Molecular Ecology Resources, 8(6):1466-1468.
10. Haukisalmi, V., Hardman, L.M., Hardman, M., Rausch, R.L. & Henttonen, H. 2008. Molecular systematics of the Holarctic *Anoplocephaloides variabilis* (Douthitt, 1915) complex, with the proposal of *Microcephaloides* n. g. (Cestoda: Anoplocephalidae). Syst. Parasitology 70: 15-26.

11. Hoffman, Justin D., Hugh H. Genoways. 2008. Characterization of a contact zone between two subspecies of the big brown bat (*Eptesicus fuscus*) in Nebraska. Western North American Naturalist, 68(1):36-45.
12. Hoofer, Steven R., William E. Flanary, Robert J. Bull, and Robert J. Baker. 2008. Phylogenetic relationships of vampyressine bats and allies (Phyllostomidae: Stenodermatinae) based on DNA sequences of a nuclear intron (*TSHB-I2*). Molecular Phylogenetics and Evolution 47:870–876.
13. Hoofer, Steven R., Sergio Solari, Peter A. Larsen, Robert D. Bradley, and Robert J. Baker. 2008. Phylogenetics of the fruit-eating bats (Phyllostomidae: Artibeina) inferred from mitochondrial DNA sequences. Museum of Texas Tech University Occasional Papers 277:1-16.
14. Koepfli, Klaus, Kerry A. Deere, Graham J. Slater, Colleen Begg, Keith Begg, Lon Grassman, Mauro Lucherini, Geraldine Veron, Robert K. Wayne. 2008. Multigene phylogeny of the Mustelidae: Resolving relationships, tempo and biogeographic history of a mammalian adaptive radiation. BioMed Central Biology, 6(1).
15. Koepfli, Klaus. 2008. Establishing the foundation for an applied molecular taxonomy of otters in Southeast Asia. Conservation Genetics, 9:1589-1604.
16. Lynch, A. and D.W. Duszynski. 2008. Species of Coccidia (Apicomplexa: Eimeriidae) in Shrews from Alaska, U.S.A., and Northeastern Siberia, Russia, with Description of Two New Species. Journal of Parasitology 94:883-888.
17. Mares, Michael A., Janet K. Braun, Brandi S Coyner, Ronald A. Van Den Bussche. 2008. Phylogenetic and biogeographic relationships of gerbil mice Eligmodontia (Rodentia, Cricetidae) in South America, with a description of a new species. Zootaxa, 1753:1-33.
18. Mullen, Lynne M., Hopi Hoekstra. 2008. Natural selection along an environmental gradient: a classic cline in mouse pigmentation. Evolution, 62(7):1555-1570.
19. Rodriguez-Serrano, Enrique, Cristian E. Hernandez, R. Eduardo Palma. 2008. A new record and an evaluation of the phylogenetic relationships of *Abrothrix olivaceus markhami* (Rodentia: Sigmodontinae). Mammalian Biology, 73:309-317.
20. Rodriguez-Serrano, Enrique, R. Eduardo Palma, Cristian E. Hernandez. 2008. The evolution of ecomorphological traits within the Abrothrichini (Rodentia:Sigmodontinae): A bayesian phylogenetics approach. Molecular Phylogenetics and Evolution, 48:473-480.
21. Suzan, Gerardo, Anibal Armien, James N. Mills, Erika Marce, Gerardo Ceballos, Mario Avila, Jorge Salazar-Bravo, Luis A. Ruedas, Blas Armien, Terry L. Yates. 2008. Epidemiological considerations of rodent community composition in fragmented landscapes in Panama. Journal of Mammalogy, 89(3):684-690.
22. Suzan, Gerardo, Erika Marce, J. Tomasz Giermakowski, Blas Armien, Juan M Pascale, James N. Mills, Gerardo Ceballos, Andres Gomez, A Alonso Aguirre, Jorge Salazar-Bravo, Anibal Armien, Robert R. Parmenter, Terry L. Yates. 2008. The Effect of habitat fragmentation and species diversity loss on hantavirus prevalence in Panama. Annals of the New York Academy of Science, 1149:80-83.
23. Triant, Deborah A., J. Andrew DeWoody. 2008. Molecular analyses of mitochondrial pseudogenes within the nuclear genome of arvicoline rodents. Genetica, 132:21-33.
24. Wisely, Samantha M., Rachel M. Santymire, Travis M. Livieri, Sara A. Mueting, JoGayle Howard. 2008. Genotypic and phenotypic consequences of reintroduction history in the black-footed ferret (*Mustela nigripes*). Conservation Genetics, 9:389-399.

Dissertations and Theses completed utilizing MSB DOM specimens

1. **Dawson, N. G. 2008**. Vista Norteña: Tracking historical diversification and contemporary structure in high latitude mesocarnivores. Doctoral Dissertation, University of New Mexico.
2. **Frances, Jose. 2008.** Differentiation of peripheral populations of wolverine. Master's Thesis, University of New Mexico.
3. **Galbreath, K**. 2008. Of pikas and parasites: historical biogeography of an alpine host-parasite assemblage. Doctoral Dissertation, Cornell University.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

B. Contributed Talks/Posters

1. Hae Ji Kang, Shannon N. Bennett, Laarni Sumibcay, Satoru Arai, Andrew G. Hope, Joseph A. Cook, Jin-Won Song, Richard Yanagihara. Emerging concepts about the evolutionary history of hantaviruses. European Congress of clinical Microbiology and Infectious Diseases. Helsinki, Finland. December 2008.
2. Torres-Pérez, F, R. E. Palma, B. Hjelle, Joseph A. Cook. Contrasting Spatial Genetics and Co-differentiation Patterns in Hantavirus and Associated Rodent Host. MEEGID IX, UC Irvine, October 2008.
3. Yanagihara, R, J-W Song, S. Arai, S. N. Bennett, L. Sumibcay, H. J Kang, A. G. Hope, V. R. Nerurkar, J. A. Cook. Evolutionary origins of newly identified soricid-borne hantaviruses. International Congress for Tropical Medicine and Malaria. Korea. September, 2008.
4. Richard Yanagihara, Satoru Arai, Jin-Won Song, Shannon N. Bennett, Laarni Sumibcay, Hae Ji Kang, Andrew G. Hope, Vivek R. Nerurkar, Joseph A. Cook. Opportunistic Observations about the Evolutionary Origins of Hantaviruses. US-Japan Viral Diseases Panels, Nagasaki, May, 2008.
5. Malaney, J. and J. A. Cook. Cryptic lineages and phylogeography of *Zapus princeps* in western North America. Minneapolis, June 2008.
6. Dawson, N. and J. A. Cook. Pleistocene refugia and post glacial expansion along the North Pacific Coast; genetic signatures in Mustelidae. Minneapolis, June 2008.
7. Brittany Barker, M. Farrah, R. Waide, J. A. Cook. Dispersal, habitat doffrences, and comparative phylogeography f two frogs. UNM Biology Research Day presentation. April 2008.
8. Song, E., S. Brant, J. A. Cook. Island biogeography of a Holarctic nematode in Southeast Alaska. UNM Biology Research Day presentation. April 2008.

C. Attendance at Professional Meetings

Cook, J. A.
American Society of Mammalogists, Vermillion, South Dakota, June 2008.

Society for the Advancement of Chicanos and Native Americans in Science, Salt Lake City, October, 2008
Dawson, N.
American Society of Mammalogists, Vermillion, South Dakota, June 2008.
Gannon, W. L.
American Society of Mammalogists, Vermillion, South Dakota, June 2008.
Hope, A. G.
American Society of Mammalogists, Vermillion, South Dakota, June 2008.
Society for the Study of Evolution, Minneapolis, MN, June 2008.
Malaney, J.
American Society of Mammalogists, Vermillion, South Dakota, June 2008.
Society for the Study of Evolution, Minneapolis, MN, June 2008.
Thomas, J. A.
Guild of Rocky Mountain Ecologists and Evolutionary Biologists.
Dawson, Natalie
Society for the Study of Evolution, Minneapolis, MN, June 2008.

D. Service as Editor or on Editorial Board of a Journal
Cook, J. A.
International Advisory Board, Revista Brasileira de Zoologia, 2008-

Gannon, W.L.
Associate Editor, Book Reviews, *Journal of Mammalogy* (2005-present)

E. Service as Officer or Professional Society/Organization

Cook, J.A.
Board of Directors, American Society of Mammalogists (elected) 2007-2010.
Chair, Latin American Awards Committee, American Society of Mammalogists (2008-)

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentations to General Audience in a Scholarly Capacity

Cook, J.A.
Presentation in UNM Freshman Learning Class, Advocating for Animals

B. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.
Cook, J. A.
One week workshop on Tongass National Forest Conservation June 2008

Arctic Researcher & Mentor at SACNAS Conference for International Polar Year Event. October 2008, Salt Lake City, UT

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

Cook, J .A.
Presentation Interagency Working Group in Juneau, AK July 2008 (Alaska Department of Fish and Game, USDA Forest Service, US Fish and Wildlife Service, National Park Service).

Cook, J.A.
Chair, Biology Tenure and Promotion Committee (2007-2008)
Member, MSB Executive Committee
Editorial Board, MSB Publications Series, (1 manuscript managed/edited)
Member, Resolutions Committee, American Society of Mammalogists
Member, Systematic Collections Committee, American Society of Mammalogists

D. Journal Referee

Cook, J.A.

Molecular Ecology-1

Journal of Mammalogy-1

National Science Foundation, ad hoc reviewer (3 proposals)

National Science Foundation, Panel Member, URM Conference, October 2008

Gannon, W.L.
Journal of Mammalogy

Torrez-Perez, F.
Revista de Biología Tropical

E. Hosting Professional Colleagues and Groups

We hosted the following individuals:
Dr. Heikki Henttonen, Finnish Forest research Institute.
Dr. Eric Hoberg, Curator, US National Parasite Lab.
Dr. Enrique Lessa, Professor of Evolution, Universidad de la Republica.

10. SERVICE

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

B. Public Service

General

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

Cook, J. A.

1. Visited Gallup Branch of UNM and Diné Tribal College in Tsalie AZ and Shiprock NM to recruit Navajo students to UNM Biology Program and establish collaborative ties.
2. Peer Evaluation of Promotion File for Dr. Winston P Smith, USDA Forest Service.
3. Peer Evaluation of Promotion File for Dr. Sandy Talbot, DOI USGS.
4. External Peer Review for Promotion of Ernest P. Keeley, Idaho State University.
5. External Review of Dr. Robert Wayne, Promotion to Distinguished Professor, UCLA.
6. Faculty Sponsor, UNM Wild, NM Wilderness Alliance Student Organization

Dawson, N.

1. Wildfriends (a program working with underprivileged youth in New Mexico in the sciences and public policy) volunteer science advisor and co-developer of "Wild Side of Ecology" curriculum for 5^{th}-12^{th} grade students.

Dunnum, J. L.

1. Division tours – provide educational tours and information for visitors and school groups.

Thomas, J. A.

1. Laguna Middle School Science Fair Judge, EMERG GK12 Summer camp for middle school students held at the Sevilleta National Wildlife Reserve.

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

Yadeeh Escobedo Sawyer, Hertel Scholarship and Gaudin Scholarship

Andrew Hope Grove Scholarship

Brittany Barker, Grove Scholarship

Jason Malaney, Share with Wildlife grant $5000

12. DONATIONS AND GIFTS RECEIVED

200 Mammal Specimens and reference books from Robert L. and Virginia R. Rausch.

13. CURRENT STAFF

A. Faculty/Staff

J.A. Cook, Curator

J.L. Dunnum, Senior Collection Manager
C.A. Ramotnik, USGS Collection Manager
M.A. Bogan, Emeritus Curator
J.S. Findley, Emeritus Curator
Fernando Torres, Post-Doctoral Associate
S. O. MacDonald, Curatorial Associate II

B. Graduate students

Barker, Brittany. 4th year Ph.D. student. Landscape genetics of two frogs from Puerto Rico: *Eleutherodactylus antillensis* and *E. portoricensis.*

Dawson, Natalie. Ph.D. 2008. Endemism, conservation genetics, and insular biogeography of 3 carnivores of the Tongass National Forest.

Escobedo, Yadeeh. 2nd year Ph.D. Linkage corridors along the North Pacific Coast.

Francis, Jose. MS. 2008. Phylogeography of the wolverine (*Gulo gulo*) with an emphasis on Southeast Alaska.

Hope, Andrew. 4th year Ph.D. student. Comparative phylogeography of trans-Beringian *Sorex*: a tool for investigating geographic and genetic responses to climate change.

Malaney, Jason. 3rd Ph.D. student. Snowshoe hare historical biogeography and plant herbivore coevolution.

Rearick, Jolene. 2nd year Ph.D. Phylogeography and molecular evolution of freeze tolerance in *Lithobates sylvaticus*.

Thomas, Jason Andrew. 3rd year Ph.D. student. Phylogeography of the Sin Nombre virus, /*Peromyscus maniculatus*/ a coevloutionary relationship.

C. Undergraduate Student Workers and Volunteers

Randle McCain, NSF-UNO
Elisha Song, NSF-UNO
Scarlett Swanson
Jamie Raines
Dave Banks-Richardson, NSF-UNO
Ashley Montoya, NSF-UNO
Eudora Claw, NSF—UNO

High School Students/Volunteers

Victoria Corvino, Highland High School

14. MUSEUM ASSOCIATES

A. Curatorial Associates

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

B. 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, Kirksville, Missouri
Fernando Cervantes, UNAM, Mexico City, Mexcio
Paul J. Cryan, Ft. Collins, Colorado
John Demboski, Denver Museum of Science and Nature, Denver, Colorado
Eugene Fleharty, Oklahoma
Melissa Fleming, Poulsbo, Washington
Jennifer K. Frey, Las Curces, 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
Bruce Hayward, Silver City, New Mexico
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
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, Valdavia, Chile
Robert Parmenter, Valles Caldera, Jemez, New Mexcio
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, 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
Don E. Wilson, Smithsonian, Washington, DC
Ric Yanagihara, University of Hawaii

NATURAL HERITAGE NEW MEXICO

1. DIVISION HIGHLIGHTS

In 2008, Natural Heritage New Mexico continued to expand its conservation science activities as well as build its conservation information dissemination capacity. With respect to animals, the Zoology Group completed the seventh year of research on the water needs of endangered Southwestern Willow Flycatchers at the Pueblo of Isleta. In cooperation with the Navajo Nation and the Hopi Tribe, we completed the image analysis portion of a remote-sensing survey of Gunnison's prairie dog towns on their lands. We also began the ground-truthing phase of the project and analysis of the field data. In cooperation with the National Park Service, we evaluated habitat for threatened and endangered bird species and conducted riparian bird surveys at Pecos National Historical Park. We began work on a natural resource condition assessment for Pecos NHP and Fort Union National Monument.

For plants, our focus was on two key sensitive species in the state: Sacramento Prickly Poppy and Holy Ghost Ipomopsis. Sacramento Prickly Poppy is endangered and we submitted results of a three-year study targeting the biology and conservation status of the species. It is the central document to all interagency management decisions and discussion. For Holy Ghost Ipomopsis, we established the monitoring protocol and surveyed the sole natural and three experimental populations remaining for the species. Surveys targeted areas that had been ignored for years and revealed new locations and habitat conditions in Holy Ghost Canyon. This information is critical to understanding the biological parameters of this endangered plant.

The Ecology Group initiated a new project in collaboration with New Mexico Environment Department to develop a "New Mexico Rapid Assessment Method" (NMRAM) for New Mexico's wetlands and riparian areas. The goal of the NMRAM is to develop a tool (handbook) of easily applied metrics to evaluate and rank the ecological condition and function of wetlands for conservation, restoration, and management. In addition, we received funding from the Collaborative Forest Restoration Program (USFS) to help establish a monitoring program for a major riparian restoration project in the Middle Rio Grande. Also in the Rio Grande, we completed river bar vegetation maps for the Isleta and Belen reaches for the Middle Rio Grande Bosque Initiative (USFWS). With respect to our upland projects, we continued the development of vegetation classification and maps for national parks in the state and west Texas. We initiated a first year of sampling and monitoring to evaluate prairie chicken habitat on a private ranch in eastern New Mexico. This was unique public-private ventures funded through the state Landowner Incentive Program of the NM Game & Fish Department.

As part of our service role in the museum to provide conservation information to the broader public as well as for research, the Data Management Group worked on projects to make conservation data more readily available via the web. We made major improvements and additions to the NMBCC (New Mexico Biodiversity Collections Consortium), http://nmbiodiversity.org/. This included updating data, making it available via an international data discovery service, Digir, adding security and administrative functions so collection managers/curators can upload data and change security settings, and adding two different data mapping options. We worked with NatureServe to make our data available via LandScope, a

media-rich website that promotes conservation across the USA. We also worked with NatureServe on designing an internet data delivery tool to make Heritage conservation data available to agencies while protecting sensitive data.

As an outcome of our database activities, we answered 134 information requests and assisted NM Department of Game and Fish with their species characterization database Bison-M. We linked our two databases by adding hyperlinks to our online data that allows users to link to NMDGF species information when they query our databases.

2. TABLE OF COLLECTION USE

Collection Growth (specimens catalogued)	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests Personally Responded to	Publications Citing MSB Specimens
3,034 new records, 1,169 updated records	NA	NA	7,492 visitors to web site	134 personally, 27,235 publications downloaded	UNKNOWN

3. COURSES USING THE COLLECTIONS

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Johnson, K. ARSC 198, Experience the Natural World, Fall 2008, 19 students

B. Staff

None.

5. COLLECTION MANAGEMENT

As part of our service role in the museum to provide conservation data to the broader public as well as for research, in 2008 the Conservation Data Management Group worked on several initiatives to add to our conservation information. In addition to adding over 3,000 records and updating another 1,100 to our NMBIotics database, we added over 1,100 records to our new Web data entry database. These combined conservation data sets were made available to partners via the updated web mapping website for data discovery and analysis. We created an online data entry website so authorized biologists can enter data from anywhere they have an internet

connection. We also worked on several initiatives/contracts to build our conservation sites database.

The group also worked on projects to make conservation data more readily available via the web. We made major improvements and additions to the NMBCC (New Mexico Biodiversity Collections Consortium), http://nmbiodiversity.org/. This included updating data, making it available via an international data discovery service, Digir, adding security and administrative functions so collection managers/curators can upload data and change security settings, and adding two different data mapping options. We worked with NatureServe to make our data available via LandScope, a media-rich website that promotes conservation across the USA. We also worked with NatureServe on designing an internet data delivery tool to make Heritage conservation data available to agencies while protecting sensitive data.

In terms of service by the Museum, the outcome of our database activities is that we answered 134 information requests and assisted NM Department of Game and Fish with their species characterization database Bison-M. We linked our two databases by adding hyperlinks to our online data that allows users to link to NMDGF species information when they query our databases.

6. AWARDS, GRANTS, AND CONTRACTS

NHNM AWARDS:

$36,591. NM Military Affairs Dept. Banner #048763. Biological resource support NMARNG – Invasive species 2006. **Paul Arbetan,** PI. 09/06-06/08. $8,032 (F&A $1,339).

$73,409. NM Military Affairs Dept. Banner #048770. Biological resource support NMARNG – Protected, threatened, endangered species 2006. **Paul Arbetan,** PI. 09/06-06/08. $32,581 (F&A $5,430).

$36,591. NM Military Affairs Dept. Banner #048762. Biological resource support NMARNG – Invasive species 2007. **Paul Arbetan,** PI. 09/06-06/08. $36,591 (F&A $6,099).

$64,234. NM Military Affairs Dept. Banner #048765. Biological resource support NMARNG – Protected, threatened, endangered species 2007. **Paul Arbetan,** PI. 09/06-06/09. $29,971 (F&A $4,995).

$60,000. NM Military Affairs Dept. Banner #048772. Biological resource support NMARNG – Protected, threatened, endangered species. **Paul Arbetan,** PI. 09/06-06/09. $59,999 (F&A $10,000).

$25,000. NM Military Affairs Dept. Banner #048896. Rare, protected, and endangered and threatened species survey for Camel Tracks Training Site; Species monitoring for Grey Vireo. **Paul Arbetan,** PI. 10/07-06/09. $0 (F&A $0).

$66,150. NM Military Affairs Dept. Banner #048897. Rare, protected, and endangered and threatened species survey for Roswell WETS. **Paul Arbetan,** PI. 10/07-06/09. $0 (F&A $0).

$50,000. NM Military Affairs Dept. Banner #048898. Rare, protected, and endangered and threatened species survey for Black Mtn. Training Site; Night-blooming Cereus monitoring & surveys. **Paul Arbetan,** PI. 10/07-06/09. $0 (F&A $0).

$143,915. Navajo Nation. Banner #048821. DOQ survey of Gunnison's prairie dog towns on the Navajo Nation & Reservation of the Hopi Tribe. **Kristine Johnson,** PI. 07/07-03/09. $54,012 (F&A $11,145).

$50,000. DOD. Banner #048793. Pinyon jays and pinyon pines at White Sands Missile Range. **Kristine Johnson**, PI. 02/07-12/08 $6,009 (F&A $1,240).

$120,436. Bureau of Reclamation. Banner #048710. Water requirements for SW willow flycatcher habitat and nesting at the Pueblo of Isleta. **Kristine Johnson**, PI. 05/06-04/09. $44,772 (F&A $9,239).

$54,452. T.E. Parkinson Ranch. Banner #048840. Wildlife habitat improvement of the Parkinson Ranch. **Kristine Johnson**, PI. 07/07-12/09. $20,549 (F&A $0).

$47,900. NPS. Banner #048918. Indicator species at Pecos Nat'l. Historic Park. **Kristine Johnson**, PI. 04/08-07/10. $1,538 (F&A $207).

$72,400. NM Dept. of Game and Fish. Banner #048960. Remote-sensing monitoring of black-tailed prairie dogs. **Kristine Johnson**, PI. 08/08-06/10. $4,751 (F&A $792).

$94,340. NPS. Banner #048962. Natural resource condition assessment for Pecos Nat'l. Historic Park. **Kristine Johnson**, PI. 09/08-11/10. $402 (F&A $60).

$10,000. BLM. Banner #048894. Biological resource data collection and storage. **Rayo McCollough**, PI. 09/07-09/08. $10,000 (F&A $1,489).

$10,000. BLM. Banner #048974. Biological resource data collection and storage 08-09. **Rayo McCollough**, PI. 09/08-10/09. $0 (F&A $0).

$62,443. NM Dept. of Game and Fish. Banner #048946. Information for species of greatest conservation need project. **Rayo McCollough**, PI. 07/08-06/10. $15,908 (F&A $2,651).

$224,097. NPS. Banner #048546. Vegetation map for El Malpais Nat'l. Monument. **Esteban Muldavin**, PI. 08/04-09/09. $25,640 (F&A $3,344).

$31,500. NPS. Banner #048623. White Sands Nat'l. Monument vegetation map accuracy assessment. **Esteban Muldavin**, PI. 08/05-909. $5,257 (F&A $686).

$323,547. NPS. Banner #048637. Guadalupe Mountains Nat'l. Park vegetation map and classification. **Esteban Muldavin**, PI. 07/05-06/10. $112,772 (F&A $14,709).

$152,363. NPS. Banner #048721. Vegetation map for Petroglyphs Nat'l Monument. **Esteban Muldavin**, PI. 06/06-03/10. $45,865 (F&A $5,981).

$40,400. NPS. Banner #048628. Carlsbad Caverns Nat'l. Park vegetation map accuracy assessment. **Esteban Muldavin**, PI. 07/05-3/09. $2,005 (F&A $261).

$8,008. NPS. Banner #048646. Photo map and initiation of a vegetation map for Ft. Davis Nat'l. Historic Site. **Esteban Muldavin**, PI. 09/05-12/07. $677 (F&A $88).

$20,000. NPS. Banner #048831. Vegetation mapping accuracy assessment – Bandelier and Salinas Mission. **Esteban Muldavin**, PI. 07/07-12/08. $2,409 (F&A $359).

$16,000. NPS. Banner #048842. Map tamarisk park-wide – White Sands Nat'l. Monument. **Esteban Muldavin**, PI. 09/07-01/10. $11,751 (F&A $1,750).

$69,928. NPS. Banner #048847. Monitoring long-term vegetation dynamics in Big Bend Nat'l. Park. **Esteban Muldavin**, PI. 09/07-12/09. $30,549 F&A $4,550).

$65,472. NPS. Banner #048819. Vegetation mapping at Capulin Volcano NM & Pecos NHP. **Esteban Muldavin**, PI. 05/07-04/09. $7,983 (F&A $1,122).

$94,674. NPS. Banner #048697. Capulin Volcano NM & Pecos NHP vegetation mapping. **Esteban Muldavin**, PI. 04/06-06/09. $36,338 (F&A $4,738).

$31,206. NPS. Banner #048957. Vegetation classification and map of Ft. Davis Nat'l. Historic Site. **Esteban Muldavin**, PI. 08/08-06/10. $0 (F&A $0).

$7,020. NPS. Banner #048969. Preliminary GIS hearth maps for White Sands Nat'l Monument. **Esteban Muldavin**, PI. 10/08-07/10. $0 (F&A $0).

$16,000. NPS. Banner #048842. Map tamarisk park-wide – White Sands Nat'l. Monument. **Esteban Muldavin**, PI. 09/07-01/10. $11,751 (F&A $1,750).

$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. $0 (F&A $0).

$131,547. US Fish & Wildlife Service. Banner #048660. River bar biodiversity studies, 08-08. **Esteban Muldavin**, PI. 08/03-08/08. $12,518 (F&A $2,583).

$116,700. US Fish & Wildlife Service. Banner #048783. River bar vegetation mapping, 03-04. **Esteban Muldavin**, PI. 09/03-08/08. $33,082 (F&A $6,826).

$13,250. US Fish & Wildlife Service. Banner #048893. Middle Rio Grande bosque initiative web page database and GIS. **Esteban Muldavin**, PI. 09/07-09/10. $9,780 (F&A $2,018).

$15,000. BLM. Banner #048895. Santa Fe River aquatic macroinvertebrate sampling. **Esteban Muldavin**, PI. 09/07-12/08. $11,991 (F&A $1,786).

$20,000. BLM. Banner #048945. Pecos River riparian monitoring study. **Esteban Muldavin**, PI. 07/08-10/09. $5,872 (F&A $1,212).

$10,000. BOR. Banner #048855. Albuquerque overbank project monitoring. **Esteban Muldavin**, PI. 09/07-09/11. $1,614 (F&A $240).

$2,000. NM Environment Dept.. Banner #048968. NM rapid assessment database – draft requirements. **Esteban Muldavin**, PI. 09/08-12/08. $1,766 (F&A $294).

$199,957. NM Environment Dept. Banner #048929. Rapid assessment of riverine wetlands in the upper Rio Grande watershed. **Esteban Muldavin**, PI. 05/08-09/11. $74,028 (F&A $0).

$25,778. Santa Fe County. Banner #048961. Galisteo Watershed: Wetlands for the Santa Fe Growth Management Strategy. **Esteban Muldavin**, PI. 08/08-06/09. $7,606 (F&A $1,569).

$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. 10/08-06/11. $1,670 (F&A $152).

$28,000. NM Energy, Minerals & Natural Resources Dept.. Banner #048951. Endangered plants survey and recovery. **Phil Tonne**, PI. 07/08-06/09. $5,102 (F&A $850).

$25,800. U.S. Forest Service. Banner #048972. Development of native plant materials program. **Phil Tonne**, PI. 09/08-06/10. $0 (F&A $0).

$10,000. BLM. Banner #048954. Kuenzler surveys. **Phil Tonne**, PI. 09/08-06/10. $0 (F&A $0).

PUBLICATIONS

A. Books, Book Chapters, Edited Volumes
None.

B. Journal Articles

Muldavin, E.H., D.I. Moore, S.L. Collins, K.R. Wetherill, and D.C. Lightfoot. 2008. Aboveground net primary production dynamics in a northern Chihuahuan Desert ecosystem. Oecologia 155:123–132

Yanoff, S. and **E. Muldavin**. 2008. Grassland– shrubland transformation and grazing: A century-scale view of a northern Chihuahuan Desert grassland. Journal of Arid Environments 72: 1594– 1605

C. Web-Based

D. Technical Reports

Chauvin, Y., E. Muldavin, and S. Sacher. 2008. A playa survey for the Bureau of Land Management Carlsbad Resource Area, New Mexico. Natural Heritage New Mexico Publ. No. 08-GTR-333. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM. 61 p.

Faber-Langendoen, D. G. Kittel, K. Schulz, **E. Muldavin**, M. Reid, C. Nordman, Pat Comer. 2008. Assessing the Condition of Lands Managed by the U.S. Army Corps of Engineers: Level 1 Ecological Integrity Assessment. NatureServe, Arlington, VA.

Faber-Langendoen, D., G. Kudray, C. Nordman, L. Sneddon, L. Vance, E. Byers, J. Rocchio, S. Gawler, G. Kittel, S. Menard, P. Comer, **E. Muldavin**, M. Schafale, T. Foti, C. Josse, J. Christy. 2008. Ecological Performance Standards for Wetland Mitigation based on Ecological Integrity Assessments. NatureServe, Arlington, VA + Appendices.

Johnson, K. and J. Smith. 2008. Pinyon jays and pinyon pines at North Oscura Peak, 2007 Final Report. Natural Heritage New Mexico Publ. No. 08-GTR-328. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM. 18 p.

Milford, E., E. Muldavin, and T. Neville. 2008. Middle Rio Grande river bar vegetation map III Belen to San Acacia. Natural Heritage New Mexico Publ. No. 08-GTR-334. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM 32 p. + appendices.

Milford, E., E. Muldavin, and T. Neville. 2008. Middle Rio Grande river bar vegetation map III Belen to San Acacia. Natural Heritage New Mexico Publ. No. 08-GTR-334. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM 32 p. + appendices.

Muldavin, E., and T. Neville. 2008. Fort Davis National Historic Site Photo Map. Natural Heritage New Mexico Publ. No. 08-GTRmap-330. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM.

Neville, T. and P. Neville. 2008. GIS of potential breeding habitat for the Bank Swallow in portions of its range. Natural Heritage New Mexico Publ. No. 08-GTRgis-332. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM.

Smith, J. and K. Johnson. 2008. Water requirements for Southwestern Willow Flycatcher habitat and nesting at the Pueblo of Isleta. Natural Heritage New Mexico Publ. No. 08-GTR-329. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM. 45 p.

E. Theses/Dissertations Completed

F. Work In Progress

William H. Romme, C. D. Allen, J. D. Bailey, W. L. Baker, B. T. Bestelmeyer, P.M. Brown, K. S. Eisenhart, M. L. Floyd Hanna, D.W. Huffman, B. F. Jacobs, R. F. Miller, **E. H. Muldavin**, T.W. Swetnam, R. J. Tausch, P. J. Weisberg. Historical and Modern Disturbance Regimes, Stand Structures, and Landscape Dynamics in Piñon--Juniper Vegetation of the Western U.S.

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

R. McCollough: Internet Data Delivery Project. NatureServe West Regional Conference, Lake Tahoe CA.

Muldavin, E.H., S. Wondzell, and J.A. Ludwig. Fifty years of vegetation change in a desert grassland in Big Bend, Texas: Will shrubs take over? Ecological Society of America- Milwaukee 2008 Annual meeting.

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

E. Muldavin: Ecological Society of America- Milwaukee 2008 Annual meeting.

R. McCollough: NatureServe West Regional Conference at Lake Tahoe; Bioneers Conference, San Rafael, CA.

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

None

E. Service as Officer of Professional Society/Organization

None

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

P. Tonne: Poster presentation at the Rio Grande Botanic Garden for Earth Day.

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: Collaborative Forest Restoration Program Federal Advisory Board Ecological Society of America Vegetation Panel
K. Johnson: Gray Vireo State Working Group, NM Prairie Dog Working Group
P. Tonne: Rare Plant Technical Council
E. Milford: New Mexico Wetlands Roundtable

D. Journal Referee

K. Johnson: Journal of Field Ornithology
E. Muldavin: Ecosystems

E. Hosting Professional Colloquia and Groups

10. SERVICE

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

B. Public Service

P. Tonne: Docent training in rare plant conservation, Rio Grande Botanic Garden, Albuquerque, NM.

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

12. DONATIONS AND GIFTS RECEIVED

13. CURRENT STAFF

A. Faculty/Staff

Paul Arbetan, Research Assistant Professor
Yvonne Chauvin, Sr. Research Tech/Life Sciences
Charles Jackson, Research Tech/Life Sciences
Kristine Johnson, Research Associate Professor
Rebecca Keeshen, Office Administrator
Amanda Kennedy, Sr. Research Tech/Life Sciences
Rayo McCollough, Database Administrator
Elizabeth Milford, Research Scientist II
Esteban Muldavin, Research Associate Professor
Teri Neville, GIS Analyst
Sandy Sacher, Research Tech/Life Sciences

Jacqueline Smith, Sr. Research Tech/Life Sciences
Phil Tonne, Sr. Research Scientist I

B. **Graduate students**

Brandon Lee Drake, M.S.
William Dunn, Ph.D.
Kevin Wesley, M.F.A.

C. Undergraduate Student Workers and Volunteers

Nicholas Baker
Chelsie Claus
Mitchell Dunaway
Eric Lindahl
Vy Nguyen
Kari Paustian
Jamie Ruiz
Sandy Sacher
Keith Woodell
Mary Alice Root, Volunteer

14. MUSEUM ASSOCIATES

None

DIVISION OF PARASITES

1. DIVISION HIGHLIGHTS

Establishing the Division as an official division of the MSB

2. TABLE OF COLLECTION USE

Specimens Accessioned	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests	Publications Citing MSB Specimens
5	0	0	0	0	2

3. COURSES USING THE COLLECTION

None

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Loker, E.S. 490 Biology of infectious organisms

5. COLLECTION MANAGEMENT

This division is still in its development stages. We spent most of the year forming the Parasite Division as an official new division of the MSB. We spent time acquiring space and accommodations for the Robert Rausch Collection and working with curators and collections managers to help integrate our new collection.

6. AWARDS, GRANTS, AND CONTRACTS

Loker, E. S. National Institutes of Health- Loker (PI) 7/01/08-6/30/2011Evo-epidemiology of Schistosoma mansoni in children in Kenya. Role: PI

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

None.

B. Journal Articles

Lotfy, W., **Brant, S.V**.,, DeJong, R.J., Le, T.H., Demiaszkiewicz, A., Rajapakse, J., Perera, V., Laursen, J.R., **Loker, E.S**. (2008). Evolutionary origins, diversification and biogeography of liver flukes (Digenea, Fasciolidae). American Journal of Tropical Medicine and Hygiene. 79: 248-255.

Steinauer, M.L, L.E. Agola, L.E., Mwangi, I.N., Mkoji, G.M., and **Loker, E.S**. 2008. Molecular Epidemiology of *Schistosoma mansoni*: a robust, high-throughput method to assess multiple microsatellite markers from individual miracidia. Infection Genetics and Evolution 8: 68-73.

Steinauer, Michelle L. Hanelt, Ben; Mwangi, Ibrahim N.; Maina, Geoffrey M.; Agola, Lelo E.; Kinuthia, Joseph M.; Mutuku, Martin W.; Mungai, Ben N.; Wilson, Wade D.; Mkoji, Gerald M.; **Loker, Eric S.** 2008. Introgressive hybridization of human and rodent schistosome parasites in western Kenya. Molecular Ecology 17:5062-5074.

Steinauer, M.L., G. Maina, I.N. Mwangi, J. Kinuthia, M. Matuku, G.M. Mkoji, & **E.S. Loker**. 2008. Interactions between natural populations of human and rodent schistosome parasites in the Lake Victoria region of Kenya: a molecular epidemiological approach. PLoS Neglected Tropical Diseases 2: 1-11.

Zhang, S-M., Zeng, Y., and **Loker, E.S.** (2008). Expression profiling and binding properties of fibrinogen-related proteins (FREPs), plasma lectins from the schistosome snail host *Biomphalaria glabrata*, revealed by antibodies raised from recombinant FREPs. *Innate Immunity* 14,175-189.

C. Web-Based

None.

D. Technical Reports

None**.**

E. Theses/Dissertations Completed

None.

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

None.

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

None.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars
Loker, E. S. May 2008. University of Alberta

B. Contributed Talks/Posters (*presenter)

Brant, S.V., Loker, E. S.* (2008) Surprises among the avian schistosomes: unknown lineages and new challenges for understanding their diversification. European Multicolloquium of Parasitology, Paris, France.

Brant, S.V.*, Loker, E. S. (2008) Diversification of avian schistosomes: evidence for adaptive speciation? Evolution Meetings, Minneapolis, MN.

C. Attendance at Professional Meetings

Loker, E. S. Aug 2008 Xth European Multicolloquium of Parasitology, Paris, France

Brant, S.. V. June 2008. Society for the Study of Evolution. Minneapolis, MN USA

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

None**.**

E. Service as Officer of Professional Society/Organization

None.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

None.

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

None.

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

Loker, E. S. Jan 2008. University of Kansas Medical Center, Kansas City. National Institutional Development Award (IDEA) Advisory Meeting

Loker, E. S. Feb 2008. Vector Biology Study Section, National Institutes of Health, San Francisco, CA

Loker, E. S. Aug 2008. Biennial Institutional Development Award Program. Washington D.C.

D. Journal Referee

Loker, E. S. Journal of Helminthology

Brant, S. V. Comparative Parasitology, Journal of Invertebrate Pathology, Journal of Wildlife Disease, Journal of Parasitology, and ZooTaxa

E. Hosting Professional Colleagues and Groups

None.

10. SERVICE

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

None.

B. Public Service

None.

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS

None.

12. DONATIONS AND GIFTS RECEIVED

UNM LTER Sevilletta Parasite collections

13. CURRENT STAFF
A. Faculty/Staff

Eric S. Loker, Regent's Professor, Curator
Sara Brant, Research Assoc. Professor, Collection Manager

B. Graduate Students

None.

C. Undergraduate Student Workers and Volunteers
None.

14. MUSEUM ASSOCIATES
A. Research Associates

U.S. GEOLOGICAL SURVEY

1. DIVISION HIGHLIGHTS

On a sad note we would like to preface the "highlights" by noting the passing of Dr. Robert B. Finley, Jr., in early January. Bob was our first curator emeritus and one of the last of the direct Grinnell descendents by way of E. Raymond Hall, his dissertation advisor at the University of Kansas. Bob will forever be remembered for his 1958 dissertation "The wood rats of Colorado*:* distribution and ecology" (University of Kansas Publications Museum of Natural History Vol. 10, No. 6, pp. 213-552) in which he first displayed his expertise for pure descriptive zoology. During Bob's tenure (1975-1982) as curator of the Biological Surveys Collection, he doubled the size of the mammal collection, acquired the Genelly collection of California birds, oversaw the addition of amphibians and reptiles, and obtained a valuable collection of endangered fishes from the upper Colorado River drainage. In addition, he instituted the use of permanent hand ledgers for recording specimen information.

A milestone for the U.S. Geological Survey (USGS) collection was the integration of all Federal specimens of amphibians and reptiles (12,530 specimens) into the Museum of Southwestern Biology (MSB) Division of Amphibians and Reptiles. This tremendous effort was completed in June, on time and below the projected budget, and provided us the opportunity to conduct a 100% inventory, upgrade the taxonomy of scientific names, improve the physical storage condition, and ensure that all Federal specimens are now individually cataloged and labeled (several thousand specimens were previously lot-cataloged). The work was completed by 2 full-time USGS contractors with oversight by the MSB amphibian and reptile and USGS collection managers. We are nearing 90% completion of the integration of Federal fishes (260,000 specimens) into the MSB Division of Fishes and expect to complete this effort in early 2009. Approximately 20% of our mammal specimens have been integrated into the MSB, and we anticipate completion of this activity in 2009-2010.

During 2008 we were able to convert a full-time contractor position for Adrienne Raniszewski into a term appointment with the USGS. She is now a full-time USGS museum technician working with Museum Specialist Cindy Ramotnik on integration efforts, and on a variety of collection activities within four of the MSB divisions. For example, Adrienne completed cataloging a large collection of reptiles from the Nevada Test Site and numbered the bones of several hundred mammal skeletons. The USGS cataloged 2,020 specimens into the collection in 2008, including several collections of mammals, amphibians and reptiles from National Parks. The USGS shared curatorial responsibility with the divisions of mammals, and amphibians and reptiles, by reviewing and processing specimen loans and information requests; and attended numerous meetings with MSB staff to discuss design and implementation of integration plans. The USGS provided service to Department of Interior agencies on museum issues by way of museum tours, giving oral and written technical assistance on museum issues, responding to annual National Park Service museum inventories, participating in a special meeting of the DOI Solicitors Forum on natural history collections, and complying with an audit of the collection by the Office of the Inspector General. As a member of the New Mexico Endemic Salamander

Team, Cindy Ramotnik attended meetings, conducted three site visits, and provided technical assistance by evaluating forest activities that impact salamanders.

Ernie Valdez, a USGS wildlife biologist and Research Associate of MSB, together with biologists from the USGS Fort Collins Science Center (FORT) and Pacific Island Ecosystems Research Center (PIERC) assessed the current status and natural history of the Pacific sheath–tailed bat on the islands of Aguiguan and select areas of Tinian, both administered by the U.S. Commonwealth of the Northern Mariana Islands. From this assessment, they were able to determine the current status and use of caves by the bat, and establish a baseline survey of activity patterns and foraging habitat use through echolocation detectors and site-occupancy models. They also determined if bats move among roosts and foraging regions, established baseline information on insects in the bat's diet; and collected additional data and biological samples to increase understanding of the natural history of the bat.

In early August, Ernie Valdez and USGS biologist Paul Cryan of FORT, continued assessment of movement and cave use by two endangered nectar-feeding bats (*Leptonycteris nivalis* and *L. yerbabuenae*) in the southwestern corner of New Mexico. They investigated movements using radio-tracking methods that included ground tracking as well as establishing a temporary, automatic radio-receiver tower on top of the Big Hatchet Mountains.

Ernie serves as co-chair of the New Mexico Bat Working Group and assisted in the development of the New Mexico Bat Conservation Plan. He also maintains a bat news and information website for the New Mexico Bat Working Group. Ernie continues his studies on ectoparasites, food habits, and morphology of bats of the region.

Janet Ruth, a USGS Research Ecologist/Ornithologist, was the lead Associate Editor on Studies in Avian Biology (SAB) No. 37 – *Birds of the US-Mexico Borderlands: Distribution, Ecology, and Conservation* published in 2008; co-associate editors were from USFWS and University of Texas – Pan American. She was also an author and co-author of two other manuscripts within the SAB volume; and co-authored a USFWS Biological Technical Report – "Molt and aging criteria for four North American grassland passerines". Ruth concluded the final year of a three-year project with the University of Southern Mississippi that used NEXRAD radar data to document bird migration patterns and stopover habitat in the Southwest. As the coordinator of an interagency collaborative program on the use of radar technology for addressing wildlife issues, Ruth developed a website on radar applications (www.fort.usgs.gov/radar/), and co-authored a Fact Sheet for managers on the uses of long-range surveillance radars for wildlife applications. Ruth attended national meetings of the Partners in Flight (PIF) Implementation Committee as the USGS Coordinator for PIF. In addition, she attended meetings at the international PIF Science Committee in Jalisco, Mexico and Ithaca, NY, and worked on a tri-national document on conservation of landbirds for PIF.

Mike Bogan, Curator Emeritus of the USGS collection, and Tony Mollhagen, MSB Research Associate, reorganized and verified the identifications of several thousand specimens of vespertilionid bats in the MSB collection. They also noted changes needed in the MSB database so all specimen information would be current. Bogan and Mollhagen are also resurveying the bats of Dinosaur National Monument in northwestern Colorado. This effort is aimed at

acquiring current information on numbers of species and individuals by mist-netting at historic localities so that current and historic data on bats from the original survey in the 1980s can be compared. The work is funded by the National Park Service with funds administered by the NPS Colorado Plateau Cooperative Ecosystems Studies Unit to the University of New Mexico.

2. TABLE OF COLLECTION USE

Specimens catalogued	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests	Publications Citing MSB-USGS Specimens
2,020	9	1	See MSB	See MSB	5

3. COURSES USING THE COLLECTIONS

See MSB Divisions.

4. COURSES TAUGHT BY MSB/USGS PERSONNEL

A. Faculty/Collection Managers

None.

B. Graduate Students

A.E. England

BIOL 112L – Genetics Lab, Spring 2008, 64 students.
BIOL 324 – Natural History of the Southwest Lab, Fall 2008, 14 students.

5. COLLECTION MANAGEMENT

One hundred and thirteen Federal specimens were included in 9 outgoing loans that included: 6 tissue loans (36 mammal specimens); 2 voucher loans (76 mammals); and 1 permanent loan to the U.S. National Museum (16 *Sceloporus magister* ova). A loan return of 20 fish specimens of *Hybognathus* was processed.

Activities in the amphibian and reptile collection were focused on completing integration of the 12,530 Federal specimens, which was accomplished on time and under budget in June. The primary benefit of the integration was to facilitate maintenance by museum staff and availability of the specimens to users. While the specimens will remain property of the U.S. Department of the Interior, and primary responsibility for their care and management will rest with USGS, integration of the specimens and databases with those of UNM will facilitate the use of the specimens and their associated data by the greater scientific community. Additional benefits of the integration included conducting a 100% inventory of the USGS specimens, proofing all specimen data against the specimen tag, and improving the storage condition of all Federal specimens by transferring them to new standard jars, printing and installing new thermal labels, and replacing all alcohol in jars and tanks with fresh solutions of alcohol. To comply with fire

code regulations, we moved 41 tanks and 20 oversized glass jars from the wet collection area to temporary storage in CERIA Room 125.

We initiated integration of the USGS fish collection on 16 June by reviewing and correcting the USGS electronic database and reformatting locality data. After the taxonomies were updated by the MSB collection manager and the database was converted into Microsoft Access, we began physical integration on 25 August. At the end of the year we have inventoried and installed 90% of the USGS fish holdings into new jars. New labels have been printed on a thermal printer and inserted as specimens are installed in new jars.

Approximately 20% of USGS mammal specimens are currently physically integrated with MSB specimens. In addition to routine collection management activities such as cleaning and numbering skeletons, and entering specimen data into the Arctos database, we continued to work on integration activities by attaching new MSB tags to USGS skins and replacing old vial labels with new ones. We worked with the MSB mammal collection manager to design new box and vial labels, and to reconfigure the dimensions of museum trays.

6. AWARDS, GRANTS, AND CONTRACTS
Faculty and Staff:

$23,400. National Park Service, Dinosaur NM. A resurvey of the bats of Dinosaur National Monument. **M.A. Bogan** and T.R. Mollhagen, Co-PIs. 05/08-05/10. $11,700.

$25,500. USGS, Fort Collins Science Center. Integration of USGS vertebrate collections. **C.A. Ramotnik**, PI. 7/07-4/08. $12,500.

$3,000. USGS Museum Property Program, Reston, VA. Funds for museum supplies. **C.A. Ramotnik**, P.I.

$12,000. Department of Interior Museum Property Program, Washington, DC. Funds for museum internship. **C.A. Ramotnik**, P.I. 11/07-6/08. $8,560.

$12,000. Sonoran Joint Venture. # 201814N766. Bird migration patterns in the arid Southwest, **J.M. Ruth,** PI [R. Diehl (USM) Co-P.I.]. 03/05-02/08. $12,000.

$10,000. Lannan Foundation. Bird migration patterns in the arid Southwest, **J.M. Ruth**, PI (R. Diehl (USM) Co-P.I.). 03/05-02/08. $3,000.

$15,000. FWS, Region 2, Migratory Bird Office. # 201814N766. Bird migration patterns in the arid Southwest, **J.M. Ruth,** PI (R. Diehl (USM) Co-P.I.). 03/05-02/08. $9,100.

$89,000. USGS Science Support Program. Bird migration patterns in the arid Southwest, **J.M. Ruth,** PI (R. Diehl (USM) Co-P.I.). 03/05-02/08. $15,200.

$20,000. USGS Headquarters, Reston, VA. Funds for radar workshop and subsequent publications and activities of the collaborative. **J.M. Ruth,** P.I. 02/06-09/09. $10,000.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Felix Jr., R. K. R. H. Diehl, and **J. M. Ruth**. 2008. Seasonal passerine migratory movements over the arid Southwest. Pp. 126-137 *in* Birds of the US-Mexico Borderlands: distribution, ecology, and conservation (J. M. Ruth, T. Brush, and D.J. Krueper, eds). Studies in Avian Biology Volume No. 37.

Fitzgerald, J.A., W.E. Thogmartin, R. Dettmers, T. Jones, C. Rustay, **J.M. Ruth**, F.R. Thompson, III, and T. Will. 2008. Application of models to conservation planning for terrestrial birds in North America. Pp. 593-624 *in* Models for planning wildlife conservation in large landscapes (J.M. Millspaugh and F.R. Thompson, III (eds.). Burlington, MA. Academic Press.

Ruth, J.M. 2008. Distribution and abundance of breeding Arizona Grasshopper Sparrow (*Ammodramus savannarum ammolegus*) in the Southwestern United States: Past, Present, and Future. Pp. 113-124 *in* Birds of the US-Mexico Borderlands: distribution, ecology, and conservation (J.M. Ruth, T. Brush, and D.J. Krueper, eds). Studies in Avian Biology Volume No. 37.

Ruth, J., T. Brush, and D. Krueper (eds.). 2008. Birds of the US-Mexico borderlands: distribution, ecology and conservation. Studies in Avian Biology no. 37:1-165.

Ruth, J.M., T. Brush, and D.J. Krueper. 2008. Preface. Pp. 1-9 *in* Birds of the US-Mexico Borderlands: distribution, ecology, and conservation (J.M. Ruth, T. Brush, and D.J. Krueper, eds). Studies in Avian Biology Volume No. 37.

Ruth, J., T. Brush, and D. Krueper (Assoc. Eds.). 2008. Literature Cited. Pp. 146-165 *in* Birds of the US-Mexico borderlands: distribution, ecology, and conservation (J.M. Ruth, T. Brush, and D.J. Krueper, eds). Studies in Avian Biology no. 37.

B. Journal Articles

Benson, L., H. Taylor, K. Peterson, B. Shattuck, and **C.A. Ramotnik,** and J.R. Stein. 2008. Development and evaluation of geochemical methods for the sourcing of archaeological maize. Journal of Archaeological Science 35(4):912-921.

Geluso, K., J.P. Damm, and E.W. Valdez. 2008. Late-seasonal activity and diet of the evening bat (*Nycticeius humeralis*) in Nebraska. Western North American Naturalist 68(1):21-24.

C. Web-Based

Ruth, J.M. 2008. Radar technology--a tool for understanding migratory "aerofauna". http://www.fort.usgs.gov/radar/.

D. Technical Reports

Bogan, M.A. and T.R. Mollhagen. 2008. A resurvey of the bats of Dinosaur National Monument. Annual Report submitted to the National Park Service.

England, A.E. and J. McIntyre. 2008. *Agave havardiana* survey in Ash Spring / Vernon Bailey foothills area. Investigator's Annual Report to National Park Service.

O'Shea, T. J., and **E. W. Valdez**. 2008. Assessment for Pacific sheath-tailed bats (*Emballonura semicaudata rotensis*) on Aguiguan, Commonwealth of the Northern Mariana Islands: Fort Collins, Colorado, U.S. Geological Survey Fort Collins Science Center, Administrative Report to U.S. Fish and Wildlife Service.

O'Shea, T. J., P.M. Cryan, L.E. Ellison, and **E.W. Valdez**. 2008. Bat use of coniferous forests at Mesa Verde National Park: Year 2 Progress Report. Administrative Report submitted to USGS Natural Resources Preservation Program and National Park Service. 168 pp.

Pyle, P., S.L. Jones, and **J.M. Ruth**. 2008. Molt and aging criteria for four North American grassland passerines. Biological Technical Publication, BTP-R6011-2008. Fish and Wildlife Service. 19 pp.

Ruth, J.M., J.J. Buler, R.H. Diehl, and R.S. Sojda. 2008. Management and research applications of long-range surveillance radar data for birds, bats, and flying insects: U.S. Geological Survey Fact Sheet 2008-3095. 4 pp.

E. Theses/Dissertations Completed
None.

F. Work In Progress

Ruth, J.M. and K.V. Rosenberg. Partners in Flight research needs assessment summary. *In* Proceedings of the Partners in Flight 4th International Conference, Feb. 2008, McAllen, TX.

Smith, F.A., D. Crawford, L. Harding, H.M. Lease, I.W. Murray, **A. Raniszewski**, and K.M. Youberg. A tale of two species: evolution, extirpation and range expansion during the late Quaternary in an extreme environment. Global Ecology and Biogeography.

Valdez, E.W. Variation in cranial morphology and feeding ecology of *Myotis occultus* (Chiroptera: Vespertilionidae) along a latitudinal gradient. Acta Chiropterologica.

Valdez, E.W. and P.M. Cryan. Food habits of the hoary bat (*Lasiurus cinereus*) in New Mexico during spring migration. The Southwestern Naturalist.

Valdez, E. W., C. M. Ritzi, and J. O. Whitaker, Jr. Ectoparasites of the occult bat, *Myotis occultus* (Chiroptera: Vespertilionidae). Western North American Naturalist.

Valdez, E.W., K. Geluso, J. Foote, G. Allison-Kosior, and D. Roemer. Spring and winter records of the eastern pipistrelle (*Perimyotis subflavus*) in southeastern New Mexico. Western North American Naturalist.

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

Frey, J.K., M.T. Hill, B.L. Christman, J.C. Truett, and S.O. MacDonald. 2008. Distribution and habitat of the Arizona gray squirrel (*Sciurus arizonensis*) in New Mexico. The Southwestern Naturalist 53(2): 248-255.

Geluso, K., J.P. Damm, and E.W. Valdez. 2008. Late-seasonal activity and diet of the evening bat (*Nycticeius humeralis*) in Nebraska. Western North American Naturalist 68(1):21-24.

Hoffman, J.D. and H.H. Genoways. 2008. Characterization of a contact zone between two subspecies of the big brown Bat (*Eptesicus fuscus*) in Nebraska. Western North American Naturalist 68(1): 36–45.

Mulcahy, D.G. 2008. Phylogeography and species boundaries of the western North American night snake (*Hypsiglena torquata*): Revisiting the subspecies concept. Molecular Phylogenetics and Evolution 46: 1095–1115.

Wisely, S.M., M.J. Statham, and R.C. Fleischer. 2008. Pleistocene refugia and Holocene expansion of a grassland-dependent species, the black-footed ferret (*Mustela nigripes*). Journal of Mammalogy 89(1):87-96.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

None.

B. Contributed Talks/Posters

England, A.E. Birds of the Southwest. 2008. Guest lecture to Bio 324 Natural History of the Southwest class, University of New Mexico, October.

England, A.E. Mammals of the Southwest. 2008. Guest lecture to Bio 324 Natural History of the Southwest class, University of New Mexico, October.

England, A.E. Key Ecological Processes of the Southwest. 2008. Guest lecture to Bio 324 Natural History of the Southwest class, University of New Mexico, November.

Ramotnik, C.A. 2008. Effect of wildfire on abundance, detection probability, and arthropod prey base of Sacramento Mountain salamanders (*Aneides hardii*). Poster presented at Fire in the Southwest: Integrating Fire into Management of Changing Ecosystems, Regional Conference, Tucson, AZ, January.

White, C.S., and **C.A. Ramotnik**. 2008. The Scott Able Fire: Effects on select soil parameters within Sacramento Mountain habitat. Poster presented at Fire in the Southwest: Integrating Fire into Management of Changing Ecosystems, Regional Conference, Tucson, AZ, January.

C. Attendance at Professional Meeting

Ramotnik, C.A. Joint annual meeting of the Society for the Preservation of Natural History Collections and Natural Science Collections Alliance, Oklahoma City, OK, May.

Ruth, J.M. Annual meeting of the New Mexico Ornithological Society, Albuquerque, April.

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

Ramotnik, C.A. Associate Editor, Collection Forum (Society for the Preservation of Natural History Collections).

Ruth, J.M., T. Brush, and D.J. Krueper. Associate Editors. 2008. Birds of the US-Mexico Borderlands: distribution, ecology, and conservation. Studies in Avian Biology,Volume No. 37.

E. Service as Officer of Professional Society/Organization

Ramotnik, C.A. Society for the Preservation of Natural History Collections (SPNHC): Conservation Committee (Chair, Resources Subcommittee); member of Documentation, Membership, and Publication committees; and a Publications sessional committee to boost manuscripts to Collection Forum.

Ruth, J.M. New Mexico Ornithological Society, Board Member.

Valdez, E.W. Co-Chair of New Mexico Bat working Group.

9. OTHER PROFESSIONAL ACTIVITIES (List division personnel alphabetically and in **bold** with list of other professional activities under each)

A. Colloquium Presentations
None.

B. Presentation to General Audience in a Scholarly Capacity

Ruth, J.M. 2008. Bird Conservation Initiatives. Presentation on Partners in Flight, North American Waterfowl Management Plan, U.S. Shorebird Conservation Plan, and Waterbird Conservation for the Americas. General Meeting of New Mexico Avian Conservation Partners, Bosque del Apache NWR, January.

C. Presentations in a Scholarly Capacity at Hearings, Workshops, Legislative Committees, etc.
None.

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

Ramotnik, C.A. Member, New Mexico Endemic Salamander Team.

Ruth, J.M. USGS Partners in Flight (PIF) Coordinator; Chair of PIF National Research Working Group; Member of PIF Science Committee and PIF Implementation Committee. Steering Committee Member, New Mexico Avian Conservation Partners.

E. Journal Referee

Bogan, M.A. American Society of Mammalogists (2), The Southwestern Naturalist (2), and Western North American Naturalist (3).

Ramotnik, C.A. Northwestern North American Naturalist (1).

Ruth, J.M. New Mexico Ornithological Society Bulletin (1)

Valdez, E.W. Western North American Naturalist (1), The Southwestern Naturalist (1).

10. SERVICE

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

England, A. Research Day Committee, 17th Annual Research Day, Department of Biology, University of New Mexico, Albuquerque.

Ruth, J.M. Participated on the Planning Team for the 4th PIF International Conference to be held in McAllen, TX in February 2008.

B. Public Service

England, A. Building Space Committee. Biology Graduate Students Association, University of New Mexico.

England, A. Graduate Research Allocations Committee (GRAC) proposal reviewer. Biology Graduate Students Association, University of New Mexico.

Ramotnik, C.A. Participated in the Albuquerque Christmas Bird Count.

Ruth, J.M. Participated in the Albuquerque Christmas Bird Count, Five Points Christmas Bird

Count (Sevilleta NWR), and Clayton Christmas Bird Count. Annually conducts/ participates in two Breeding Bird Survey routes – Counselors, NM and Fence Lake, NM.

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

Bogan, M.A. Served as Faculty Co-Advisor for one doctoral candidate in the Department of Biology, UNM.

12. DONATIONS AND GIFTS RECEIVED

None.

13. CURRENT STAFF

A. Faculty/Staff

Michael A. Bogan – Curator Emeritus
Sarah Manor – Museum technician, student service contractor
Cindy A. Ramotnik – Museum Specialist (Zoology)
Adrienne Raniszewski – Museum Technician
Janet M. Ruth – Research Ecologist (Ornithology), Adjunct Assistant Professor (UNM)
Ernest W. Valdez—Wildlife Biologist, Adjunct Assistant Professor (UNM)

B. Graduate students

Angela E. England—Wildlife Biologist, Ph.D. candidate

C. Undergraduate Student Workers and Volunteers

Jobette Chour, volunteer

14. MUSEUM ASSOCIATES

A. Curatorial Associates

None.

B. Research Associates

Paul Cryan, Ph.D., USGS wildlife research biologist, Ft. Collins, CO.
Keith Geluso, Assistant Professor, University of Nebraska-Kearney, NE.
Tony R. Mollhagen, Ph.D., emeritus professor, Texas Tech Univ., Lubbock, TX.
Tom O'Shea, Ph.D., USGS wildlife research biologist, Ft. Collins, CO.
Ernest Valdez, Ph.D., USGS wildlife research biologist, Albuquerque, NM.