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2010 Annual Report

Thomas F. Turner

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2010 Annual Report
Museum of Southwestern Biology

Thomas F. Turner, MSB Director

September 2011

**Museum of Southwestern Biology
Annual Report for 2010**

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MSB Director's Summary

Thomas F. Turner, Director and Curator of Fishes

Executive Summary

This report summarizes activities in the Museum of Southwestern Biology that consists of 10 Divisions and where seven faculty members from the Department of Biology and two non-faculty curators have developed nationally and internationally recognized curatorial programs. Most of the activities are reported during calendar year 2010, but information up to July 2011 is also reported. The Directorship of the MSB transferred from Professor and Curator Thomas Turner to Professor and Curator Joseph Cook beginning in August 2011. In early 2011, the MSB was able to hire two senior collection managers, one in the Herbarium and one in the new Division of Parasitology. This reporting period was also marked by outstanding performance in obtaining grant support for collection improvement and collections-based research and student training. Three NSF Biological Research Collections Improvement grants (Arthropods, Mammals, Parasitology) were active or funded during this time, with total amounts exceeding \$1 million. In addition, two NSF-sponsored student training and education exceeded \$1.5 million in total revenues. Finally, there was over \$1 million in new and in-force NSF-sponsored research grants in systematics and ecology. Total in-force grants and contracts for the entire MSB exceeded \$10 million. These grants provided significant leverage to secure funding for new fluid collection space in CERIA 125, and renovation funds for dry collections/microscopy space on the first floor of CERIA. Metrics for 2010 that record growth and activity of the MSB exceeded four-year averages in the following areas: (i) the number of loans granted, (ii) the number of database web hits, (iii) the number of peer-reviewed publications by MSB staff, (iv) the number of undergraduate curatorial assistants trained, and (v) the total amount of estimated F&A generated. The number of professional visitors to the collections declined in 2010, perhaps due to economic constraints on travel. Although enormously successful, the MSB faces significant challenges to future growth that include: (i) critical shortages of adequate collection space and I/T staff support, (ii) low core operating budgets from some Divisions, (iii) and lack of recognition of or compensation for significant duties of MSB faculty curators. Despite the worst economic downturn in 50 years, the MSB remains a secure and vital part of the Department of Biology, the College of Arts & Sciences, and the University of New Mexico.

Narrative

As of December 31st 2010, I completed three and one-half years as Director of the Museum of Southwestern Biology (MSB), and as of this writing in September 2011, I have completed my four-year term as Director that began in July 2007. Professor Joseph Cook, Curator of Mammals and Interim Curator of Genomic Resources was elected by unanimous vote of the MSB Executive Committee to succeed me as Director, and based on that vote, I sent a strong endorsement and recommendation to the College of Arts and Sciences Dean Brenda Claiborne and Associate Dean for Research Philip Ganderton to appoint him to the directorship at the end of my term. This was done, and we have been working together since July 2011 to transition the directorship.

During my tenure from 2007 to 2011, the MSB has made major strides in securing resources necessary to ensure the wellbeing of the collections and museum-based biological sciences at UNM. Nine of our ten divisions now have permanent collection managers and this is a major factor in our continued success as a unit. We have adopted a cohesive operational model among Divisions, as demonstrated by several major cross-divisional initiatives that have been implemented, are underway (i.e., NSF BRC for the Robert Rausch Collection in the new Division of Parasitology in collaboration with the Division of Mammals) or are planned (a Major Research Instrumentation grant for a microscopy/digital imaging system). However, curators retain autonomy of their respective collections and archives. I believe is the most effective model for the MSB because it best serves the constituencies (students, researchers, etc.) of each MSB Division. The downside of this model is that it reduces flexibility in terms of use and allocation of ever-diminishing resources, especially space. Space constraints are largely due to remarkable growth and vitality of the Divisions of the MSB as a center for study of biological diversity of New Mexico, the southwestern US, Latin America, and the world, and we will have to deal with space shortages as a museum in the very near future.

At the beginning of my directorship in 2007, the entire MSB community met to set some goals and identify objectives that we would like to accomplish together during my term. Below, I recap these objectives and the progress (or not) that was made toward meeting them:

1. Obtain funding for building management and an information technology and computer systems specialist for the MSB. We were not able to secure a full-time building manager position for the MSB. However, the Department of Biology and the MSB jointly hired a part-time position, Mr. Kevin Judd, who is directly supervised by John Cox in Biology. The justification for this position included needs in the MSB, and Mr. Judd works up to 10 hours per week in the MSB mostly on special projects. For example, Mr. Judd was instrumental in preparation for new casework in the Arthropod collection as part of the NSF-funded collections improvement grant there. Building management duties currently are performed by the MSB Administrator, Collection Managers, and work is typically performed by Mr. Judd, private contractors, PPD Area 4, or museum staff depending on the job.

The MSB is a complex facility that encompasses collection and archive storage space, electronic data storage and dissemination infrastructure, preparatory laboratories for specimens, ultracold freezer facilities, and classroom space. A number of major construction/repair projects were completed over the last four years. Major MSB-related projects include construction of a dermestid beetle colony atop Castetter Hall (completed in 2008, cost roughly \$100 K), enhanced security of loading dock and gate repair (cost unknown), repair and sealing of a major leak on the 2nd Floor of CERIA (completed in 2009, costs roughly \$5K via UNM Insurance), installation of heavy-duty specimen tank shelving in CERIA 145 (completed in 2009, costs roughly \$20K), fire-marshall compliance costs for CERIA 145 (ongoing), electrical costs associated with power outages in 2008 and 2011, security card access to CERIA switched from C-Cure to Lobocard system (costs unknown), and substandard flooring was replaced throughout the building in 2011 (costs unknown). Because CERIA was remodeled from the old UNM Bookstore, and because of substandard contracting during critical phases of remodel, the

building will continue to suffer from systemic and chronic (e.g., HVAC, electrical) problems that are difficult to solve. For example, we have lost four ultracold freezers in the Division of Genomic Resources since 2007 at a replacement cost of over \$35,000. This is unsustainable and puts an internationally significant and irreplaceable collection at risk of total loss. The new Director, Joe Cook, has made it a top priority to secure a liquid nitrogen facility that will substantially enhance the long-term viability and persistence of the Genomic Resources collection.

2. Activate and grow an internationally recognized repository and research infrastructure for host-parasite interactions. The MSB Division of Parasitology was established in January 2008 with a substantial donation of specimens from the Robert Rausch collection and ongoing research initiatives at UNM (e.g., Beringian Coevolution Project, Center for Evolutionary and Theoretical Immunology), and support of the MSB Executive Committee, the Chairman of Biology, and the A&S Dean's Office. When it was formed, we envisioned that the Division of Parasitology would be an international resource for systematics, taxonomy, identification, ecological and epidemiological research in parasitology and hosts. The Division represents development of new capacity in the MSB to address current and emerging challenges to science and society. The Division of Parasitology hired a new Senior Collection Manager, Dr. Sara Brant, in January 2011. With this demonstrated state support, Drs. Joe Cook, Sam Loker, Gordon Jarrell and I, in collaboration with Drs. Eric Hoberg and Sara Brant, were able to compete successfully for an NSF-supported Biological Research Collections Grant (\$490,000 total costs) to obtain, triage, and electronically capture the Robert and Virginia Rausch Collection and Archives of over 150,000 specimen containers and slides. This funding helped develop the Division while simultaneously offering an opportunity to preserve and maintain one of the largest private collections of helminth parasites in the world. This award also provided significant leverage for renovation monies associated with CERIA 125 and new dry collection/microscopy space for the MSB.

3. Develop new fluid collection space to help alleviate a critical shortage. In 2010, we were able to secure a commitment from UNM Administration to completely renovate CERIA 125 as small-volume fluid collection space, including compactorized shelving and fire protection and alarms. Plans for CERIA 125 renovation were completed early in 2009 in consultation with Mark Manzutto from UNM and an engineering team from Hensley Construction in Albuquerque. Fluid collection space renovation has been rolled into another planned renovation of dry collection/microscopy space on the 1st floor of CERIA. Construction awaits user input, final plan approval, New Mexico State Fire Marshal approval, and pricing of the jobs. We anticipate completion by December 2012, under Dr. Cook's directorship.

4. Work to more fully integrate Natural Heritage New Mexico into the MSB. During my directorship, I attempted to integrate Natural Heritage New Mexico Program (Heritage) more fully into the operations of the MSB in two ways. First, we made the case to UNM Administration that Heritage had been funded directly through the New Mexico State Legislature via appropriation to the Research Projects and Special Projects (RPSP) allocation for nearly 20 years. Roughly \$1.5 million has been appropriated since that time. This funding is critical to support the Heritage Director and Database Manager to perform tasks related to serving state agencies with data to inform conservation and management actions. This money also serves as matching funds for federal grants and

contracts. At the time of initial appropriation, sponsoring legislators made it clear that Heritage should and would be more fully integrated into UNM and that this financial obligation should be phased in as legislative support diminishes. We have suggested that UNM work on a plan to phase in core staff support for the Heritage Director and Database Manager – which is consistent with core staffing of all other MSB Divisions. The economic downturn made it nearly impossible to get this done. In 2010, Dr. Este Muldavin (Heritage Director) and I began working with Mark Saavedra and Tanya Giddings in UNM government relations to stem legislative cuts to Heritage, and to help develop a legislative memorial action to authorize the Heritage Program for continued legislative funding.

We also attempted to secure new MSB space in CERIA when a rumor surfaced of the imminent departure of the Cinematic Arts Department to the Mesa del Sol development south of campus. For economic and other reasons this did not happen. The rationale was to move Heritage from its current location in Marron Hall to CERIA to help build additional collaboration and integration into the MSB. Heritage remains in Marron, but is proactive in seeking collaboration with other Divisions of the MSB.

5. Work to develop and establish integrated online database systems for all Divisions of the MSB. Electronic dissemination of MSB data associated with the collections is increasing at a rapid (if not exponential) pace and nearly all collections have an online presence. However, one model does not fit well for all Divisions. As a matter of the principle of curator autonomy, it is not the purview of the Director to initiate a single system by decree. Therefore, two platforms are currently in use: the ARCTOS platform by Birds, Mammals, USGS, Parasitology, and Genomic Resources; and the SPECIFY platform used by Arthropods and the Herbarium. The Division of Fishes is planning to adopt the ARCTOS platform and is submitting a collaborative NSF-sponsored to complete georeferencing and to initiate online dissemination of collection data. It is likely that unification of the ARCTOS and SPECIFY will happen as the online museum community matures, so in the end, one system may ultimately be used by all Divisions by default.

6. Continue working to support and develop support for education of undergraduate and graduate students. One of the considerable strengths of the MSB is our focus on hands-on education and training of students at all levels from undergraduates to post-doctoral students. Each division trains students in natural history, biodiversity, specimen curation, database operations, georeferencing, and a number of other highly marketable skills. Many, if not most of our students end up going to graduate or professional school or obtaining jobs in conservation and management agencies in state and federal positions. We have two museum-centered programs that focus on student success: the Undergraduate Nurturing Opportunities (UnO) Program and the AIM – UP! Program, both directed by Dr. Joe Cook and funded by the National Science Foundation. The latter program is a planning grant to develop ways to better integrate museum specimens, archives, and databases into undergraduate courses. Both of these programs is enormously successful, but the UnO program stands out as a program that leads to high retention and graduation rates, and successful placement of our students in graduate school or professional scientific positions following their undergraduate studies. Full details about the UnO program can be found at <http://msb.unm.edu/UnO/education.html>.

Beginning in 2008, we assembled a team of UNM faculty researchers who were 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 called MSB-IGERT, with the intention of submitting a proposal to the NSF-sponsored Integrative Graduate Education Research and Training (IGERT) program. We identified 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. Although the MSB-IGERT pre-proposals submitted in 2008 and 2010 reviewed very well, the full proposals were not selected for funding in either case. Although tabled for the time being, there is considerable support among MSB curators for another attempt at an IGERT proposal in the near future.

7. Improve support for, security, and funding for MSB collections. Reports from MSB Divisions reflect uniformly high curatorial and academic standards of the museum staff. The security of the MSB as a repository is much stronger now than when the collections were housed in Caster Hall, and UNM as a whole has recognized the value of museums through the development of collections policy and formation of a university-wide Museum Council. However, specimen security, adequate and sufficient housing for collections, and space accommodation for future collections growth remain a major concern at the MSB. Divestment in higher education in New Mexico (and the nation), a trend which began in 2007 and became more severe in 2009 and 2010, also is a threat to the security of the collections.

The state-funded operational budget for the Museum of Southwestern Biology is \$53,000 for collections care, curation of new material, databasing, etc. This money is allocated to Divisions at the beginning of the state fiscal year, and does not include salaries of the Collection Managers and Museum Administrator. There is considerable disparity among divisions in operating funds. Among the best supported divisions are Mammals, the Herbarium, Fishes, and Amphibians and Reptiles, and beginning in 2010 (as part of a retention deal), Arthropods. Budget increases in these divisions have usually been negotiated as part of grant proposal packages that have a large curatorial component. The Divisions of Birds and Parasitology are inadequately supported with operating budgets that are \$3000 and \$2000 (completely from returned F&A), respectively, for the entire year (not including a 1% university-imposed tax to support computerization of contract and grant accounting, etc.). In general, total allocations to the MSB have remained static and have not kept pace with inflation over the last four years despite rising costs of curation, shipping, and electronic infrastructure and maintenance and ever-increasing regulatory compliance requirements from federal, state, and UNM agencies.

Retention and Hiring of MSB Staff - Over the last four years, the economic situation of the country, the State of New Mexico, and UNM has been among the worst in modern history and yet the MSB has managed to grow in the net number of state supported lines. I believe this speaks volumes for the support the MSB has gained from

the University, the College of Arts & Sciences, and the Department of Biology who recognize that the MSB serves a critical function to UNM's mission. When I began my directorship in 2007, the MSB was staffed with faculty curators in eight of nine divisions with two new faculty/curator lines in Arthropods and Birds, which put us in an unprecedented position of strength and potential for growth of collection-based science at UNM. However, our administrative position in this newly revitalized unit was not permanent, but rather funded by "cannibalizing" a graduate curatorial assistant position and through overhead return to Biology, the MSB, and the College of Arts and Sciences (A&S). We were able to convert our Museum Administrator position to a state-supported line beginning in 2008 and restore the GA line to the MSB. Likewise, the Division of Birds had never had a permanent collection manager. With considerable funding from a private donor and support of the UNM President's office, we were able to secure a full-time, state-supported collection manager for the Division of Birds from a somewhat recalcitrant A&S Dean's office.

UNM has always been vulnerable to raids on our faculty from other institutions, and the MSB is no exception. We were able to successfully retain two faculty curators during my tenure with the help and support of the Biology Department, especially Chairman Richard Cripps, and the College of Arts & Sciences, especially Philip Ganderton, Associate Dean for Research.

Finally, in 2010, when the fiscal crisis was at its worst, the Herbarium's long-time collection manager, Jane Mygatt, retired and a newly created Division of Parasitology was in desperate need of a collection manager. We were able to argue, based on considerable resources generated from external funds (e.g., the CETI award to Sam Loker) and with strong community support (from the Land Commissioner and State and Federal Representatives garnered by Tim Lowrey) that these positions be rehired. Early in 2011, Phil Tonne and Dr. Sara Brant were hired as Senior Collection Managers of the Herbarium and the Division of Parasitology, respectively. Apart from a permanent UNM commitment to the New Mexico Natural Heritage Program and appropriate compensation for faculty curators, the MSB is now fully staffed with permanent state supported lines.

8. Gain recognition for faculty curator workloads and obtain appropriate compensation for curatorial work during the academic year and the summer. In December 2007, the entire faculty of the Biology Department unanimously ratified a document entitled "Codifying Responsibilities for MSB Curators" which lays out the expectations and duties of faculty curators in the MSB. In 2010, the UNM Board of Regents approved policy 6410. These actions constitute important recognition that curators have duties that exceed the normal responsibilities of UNM Biology Department Faculty members. Over the course of my directorship, I met repeatedly with the chairman of Biology and the Dean of Arts and Sciences to consider reallocation of duties and summer compensation to rectify this situation. It is past time for the University to recognize and appropriately compensate faculty curators for their work. This has been made a top priority by Dr. Cook.

Museum and Collection Development: University-wide Activities

The MSB Director is a member of the University Collections Committee as stipulated by UNM Policy 6410 entitled "Museums and Collections" in the University

Business Policies and Procedures Manual. Adoption of this policy by the Board of Regents in January 2010 was a landmark that established UNM's permanent commitment to and professional standards for its collections and recognizes the responsibilities and roles of University of New Mexico (UNM) museums and collections "to increase knowledge, understanding, and appreciation of the physical, cultural, and biological world by collecting, maintaining, researching, and interpreting material objects and the contextual data associated with them". The policy clearly defines obligations of Curatorial staff, UNM Regents, the UNM President and Provost, and Cognizant Unit Heads (i.e., Deans) for adequate housing, care, dissemination and interpretation of these objects in perpetuity. It also defines standards for making these objects accessible and available to the scientific community while preserving the integrity and quality of the specimens through active stewardship. MSB Policy (found at <http://msb.unm.edu>) is consistent with, although much more detailed than, this more general guiding document.

Progress on a UNM Museum Studies Program. The MSB, in collaboration with the Maxwell Museum of Anthropology [lead], Meteoritics, and UNM Art Museums, continued to make progress on development of a graduate (MS-granting) Museum Studies Program since 2007. As of September 2011, program and curriculum forms have passed review by the UNM Registrar, the Office of Graduate Studies, the Fine Arts and A&S curriculum committees, the UNM Faculty Senate Curriculum Committee, and a full Faculty Senate Vote. The proposal awaits ratification of the UNM Board of Regents and the New Mexico Commission on Higher Education. Courses associated with the Museum Studies Program have been approved by the Faculty Senate, and a faculty coordinator for the Museum Studies Program will be hired by Spring Semester 2012. The program will be housed in the Hibben Center of the Department of Anthropology and Maxwell Museum of Anthropology. We anticipate the first Museum Studies students to arrive in Fall 2012.

MSB Productivity in support of UNM's Mission

In 2010, the MSB made substantive contributions to the education, research, teaching, and service mission of the University of New Mexico. A 6-year compilation of metrics shows that 2010 was an above-average year for performance in terms of loans granted, publications generated, undergraduate students trained, and F&A returned. The metrics in the table below were counted from Divisional reports over the last six years. A description and context for each metric is listed below the table and specific details about metrics can be gleaned from Divisional reports for 2010 in subsequent chapters of this report.

Table 1. Metrics tracked over the last four years in the Museum of Southwestern Biology. These metrics were chosen by consensus at a museum-wide retreat in 2007. Numbers are compiled from Divisional reports (2010 included in this document, other annual reports are available upon request or at <http://msb.unm.edu>).

Metric	2007	2008	2009	2010	Average Last Four Years
1. Collection growth (Specimens Cataloged)	392509	389144	136248	301268	304792
2. Loans Out	122	125	128	167	136
3. Professional Vistors to the Collections	795	795	953	692	809
4. Collection Database Web Site Hits	NR	51287	319745	298360	223131
5. RFIs Answered in Person	1167	1196	1355	1214	1233
6. Outside Publications Citing MSB Specimens	53	60	68	61	61
7. Peer-Reviewed Publications by Divisional Staff	48	54	79	72	63
8. Technical Reports	37	30	24	29	30
9. UNM Courses using the Collection	23	22	25	23	23
10. UNM Courses taught by Divisional Staff	21	22	24	22	22
11. Graduate Students	36	35	51	39	40
12. Graduate Theses/Dissertations	8	8	4	5	6
13. Undergraduate Students	54	54	91	102	75
14. Grants/Contracts in Force	87	98	94	98	94
15. Grants In Force Total Costs	\$9,825,425	\$9,444,626	\$11,239,035	\$10,741,063	\$10,312,537
16. Estimated F&A return	\$1,186,838	\$1,449,793	\$2,141,328	\$2,601,398	\$1,844,839

NR – not reported

Metric Descriptions

(1) Collection growth reported in number of specimens is a measure of growth and curatorial activity in the museum. The MSB exhibited a substantial increase in the number of specimens cataloged compared to 2009, but an average year otherwise. Years 2007 and 2008 were marked by all-out efforts to integrate USGS specimens and several major orphaned collections as detailed above, and these projects were either completed or nearing completion in 2009. Cataloging of new specimens from international expeditions and a special collection of Gila River fishes make up the bulk of 2010 specimens added. Average growth of over 300,000 cataloged specimens per year puts the MSB in a group of the fastest growing university-based natural history museums in the nation.

(2) Number of specimen loans made to outside researchers and institutions. These are specimens, groups of specimens, or tissues loaned or gifted in support of ongoing research at other institutions. Outside researchers are responsible to return loans in accordance with the terms of specimen use laid out when the request for the loan is made. A loan constitutes the total amount of specimens, data, or ancillary material sent to a researcher or institution. This metric, which is one measure of collection visibility and utility, increased dramatically in 2010 compared to the average over the last four years, indicating increased use of museum materials by outside researchers. It is possible that loans more loans are being made in lieu of scientists actually visiting the collections due to travel budget constraints, etc. (see metric 3 below).

(3) Professional Visitors to the Collections. This metric includes visiting scientists, seminar speakers, taxonomic professionals seeking to verify collection records or study morphological and/or molecular variability of organisms. It does not include members of the UNM Biology Department. The number of professional visitors was down substantially in 2010 compared to average values over the last four years, perhaps reflecting constraint on travel budgets.

(4) Collection database web hits. This metric is nearly impossible to track accurately because of wide electronic dissemination of MSB specimen and locality data. Major databases supported by the MSB are ARCTOS, the New Mexico Biodiversity Collections Consortium (NMBCC), and conservation databases of the New Mexico Natural Heritage Program. More broadly, MSB data are served by a number of outside entities including the Global Biodiversity Information Facility (GBIF). The wide dispersion of web hits suggests the impact of MSB specimens and records on the web will continue to increase at an exponential rate in the near term.

(5) Requests for information (RFIs) answered in person - Natural history collections staff also perform important advisory functions as indicated by the number of requests for information. Such requests come from academic and government scientists, natural resource management agency personnel, and/or the general public. The MSB serves as a clearing house for knowledge and expertise in the natural history of the southwestern United States. In 2010, the number of RFIs was slightly below average values over the last four years.

(6) Publications by scientists outside of the MSB -. Curatorial management does have direct impact on scholarly production through the provision of specimens and data to other researchers. In 2010, 61 publications were supported in part through materials provided by the MSB through loans and data sharing, which is the average value over the last four years. This contribution is frequently overlooked when compiling statistics of various units, but in effect, doubles the scholarly contributions of the MSB as a whole. Their time allocated to curatorial efforts produces scholarly contributions outside the normal reward system offered to university faculty and research staff.

(7) Publications by museum staff. This metric includes all publications in bona fide outlets such as books, journals, compendia, and other publications. Gray literature and quasi-public reports (e.g., technical reports, agency reports – see below) are not included. There may be some overlap among divisions as curatorial staff often co-author manuscripts and these will be counted twice in overall totals. In 2010, substantially exceeded the four-year average, but were down slightly compared to 2009.

(8) Technical reports by museum staff include reports to agencies in fulfillment of contract deliverables. Many of these reports hold primary data upon which critical management decisions are made, including endangered species status, listing decisions, biological opinions and other documents. In 2010, the number of technical reports was slightly below the four-year average. These may be under-reported because such reports are not prominently featured in tenure and promotion support files.

(9) UNM courses using specimens, data, electronic archives and other resources provided by the MSB. This number is remarkably stable over the last four years.

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

(11) Number of graduate students mentored by MSB staff per year includes graduate students who are formally trained in curatorial practices and standards of field data collection, specimen preservation, field protocols that are consistent with institutional animal care guidelines, directly by faculty and staff of the MSB. It does not include graduate enrollment in formal courses. Graduate student participation in MSB activities was very near average values over the last four years. Substantial involvement of graduate students reflects the drawing power of natural history and the MSB for graduate recruitment in Biology and A&S.

(12) Number of graduate theses/dissertations is the total per year completed by graduate students mentored by MSB staff as primary advisor or co-advisor. This number fluctuates depending on overall graduate enrollments within the Biology Department. It was slightly lower than average values over the last four years.

(13) Number of undergraduate students trained in the MSB includes undergraduate students that are employed under the Federal Work-Study program or from externally funded research grants and contracts, and special education programs like Undergraduate Research Mentoring projects like UNO and UMEB. This number is higher in 2010 than the four-year average as a result of MSB-centered undergraduate educational programs, increased grant activity for curation and integration of orphaned collections (e.g., Fishes, Mammals, USGS), and ramping up of museum-based programs in Birds and Arthropods.

(14) Number of grants and contracts in force includes all active grants and contracts that are available to specimen-based research and are being conducted by MSB staff. This number varies little from year to year, but overall funding has steadily increased with inclusion of new curatorial staff (Miller and Witt) and units (Division of Parasitology), along with sustained granting activity from other units.

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

(16) Total amount of Facilities and Administration (F&A) funds from grants/contracts in force is likewise the sum of estimated F&A. Yearly expenditures are expected to be far less than totals. Returned F&A is steadily increasing (and at its highest in 2010) because of an increasing amount of grants that return F&A at the federal negotiated rate.

A Snapshot of Activities in the MSB (2010 - 2011)

Below, we present a table that reflects the many activities that museum faculty and staff conducted over the last calendar and academic years (Table 2) that was adapted from the MSB News and Events page at <http://msb.unm.edu>. This list is by no means exhaustive, and further details can be gained by examining individual Divisional reports. However, it documents considerable emphasis on student training in research that includes travel to national and international meetings to present their research findings, and on developing new ways for museum data and objects to be incorporated in the classroom through programs like UnO and Aim-Up!. The MSB also continues to further develop collection resources through major Biological Collection Improvement Grants from the National Science Foundation and others. MSB Graduate Students are highly competitive for awards and recognition from the Department of Biology, and from disciplinary and inter-disciplinary professional societies.

Table 2. A snapshot of MSB activities from January 2010 to July 2011.

Month	Year	Award or Event	MSB Divisions or Programs Involved
January	2010	Best Paper Award to Sandy Brantley and Dave Lightfoot, Western North American Naturalist	Arthropods
February	2010	Mississippi Conservation Award to Stephen Ross	Fishes
February	2010	Smithsonian Short-term Visitor Grant to Heidi Hopkins	Arthropods
April	2010	UNM Outstanding Staff Award to Tom Giermakowski	Amphibians and Reptiles
April	2010	Golden Key Honor Society award to MJ Vargas	UnO Program
April	2010	Cocalina Memorial Scholarship to Rebecca Zalar	Arthropods
May	2010	NSF RCN Award Aim-UP! awarded to Joseph Cook	Mammals and DGR
June	2010	Brother Arsene Botanical Collection transferred to the UNM Herbarium by Tim Lowrey	Herbarium
July	2010	Colorado Plateau Cooperative Ecosystem Study Unit Meeting in Flagstaff attended by Tom Turner	Museum-Wide
August	2010	Ticul Alvarez Award for Mammalogy to David Schmidly	Mammals
August	2010	Kappa Kappa Gamma Fraternity Award to Brittany Barker	Mammals
October	2010	Inaugural AIM-Up! Symposium in Santa Fe, New Mexico	Aim-Up! Program
November	2010	NSF REV-SYS Grant to Kelly Miller	Arthropods
November	2010	Desert Fishes Council Best Student Poster Award to Jesse Trujillo	UnO Program & Fishes
March	2011	NSF Biological Research Collection Grant for the Rausch Collection	Museum-Wide
April	2011	Donald Caughan Scholarship Award to Matt Jones (Advisor: Witt)	Birds

April	2011	Grove Scholarship Award to Shane Dubay (Advisor: Witt)	Birds
April	2011	Donald Caughan Scholarship Award to Brooks Kohli (Advisor: Cook)	Mammals
April	2011	Cliff Crawford Scholarship Award to Corey Love (Advisor: Turner)	Fishes
April	2011	NMOS Research award to Bethany Abramson (Advisor: Witt)	Birds
April	2011	Sigma-Xi Grant-in-Aid-of-Research, Libby Beckman (Advisor: Witt)	Birds
May	2011	Dean's Dissertation Prize to Trevor Krabbenhoft (Advisor: Turner)	Fishes
June	2011	American Parasitology Society Meritorious Paper Award to Kayce Bell (Advisor: Cook)	Mammals
July	2011	Lex Snyder Elected to American Soc Ichthyologists and Herpetologists Board of Govs.	Fishes
July	2011	Albuquerque and UNM selected to host Joint Meeting of Ichthyologists and Herpetologists	Fishes & Amphibians and Reptiles

Ongoing 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 an I/T staff position, operational budgets, and recognition of faculty curator workload:

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 300,000 web hits and data downloads in 2010). 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, troubleshooting viruses/worms, purchasing hardware and software in highly piecemeal fashion using private contractors that vary tremendously in quality and service.
2. Fluid collection space and freezer space for genomic materials is limited or compromised by poor infrastructure. New space is subject to State Fire Marshal scrutiny, and a liquid nitrogen facility has special requirements and safety concerns that necessitate a new building.
3. We Lack Sufficient Funds for Operating Budgets for Collection Care/Improvement in the Divisions of Birds and Parasitology.
4. Faculty curators are uncompensated and unrecognized for their work during the academic year and the summer.

DIVISION OF AMPHIBIANS AND REPTILES

1. DIVISION HIGHLIGHTS

During 2010, the collection has increased by 2,057 specimens to a total of 91,112 specimens. Although the number of new specimens catalogued in 2010 is slightly smaller than in 2009, it nevertheless continues an overall decade-long trend of increasing number of specimens catalogued every year. Specimens in 2010 came from several large accessions. We've catalogued over 1,000 voucher specimens and tissues of frogs from Puerto Rico and nearly 800 specimens that were collected throughout the state of New Mexico. Another two important additions to the collection this year were specimens that were part of a teaching collection at the University of Albuquerque in the early 1970's and specimens that were collected by the Wyoming Game and Fish Department as vouchers for Wyoming inventory and monitoring efforts.

The website of the division continues to see many hits on its pages. The visibility of the collection has been enhanced by many collaborative projects and the inclusion of our data on aggregator sites. MSB specimens from the division and their associated data have been used in at least 21 new publications in 2010. Many scientists and members of the general public have requested information from our division via telephone, email and directly in person. In addition to automated data responses, we hosted 18 visitors and handled nearly one hundred information requests via email and phone.

Outreach activities consisted of public presentations as well as lending of specimens for teaching purposes to University of New Mexico classes and other educational entities. The collection manager has given several tours of the collection and made a presentation on New Mexico's amphibians and reptiles to K-12 students on two occasions. We continued to work with the New Mexico Department of Game and Fish through participation on boards dedicated to species recovery. In addition, we have started collaboration with the US Geological Survey at Northern Arizona University on a project that aims to forecast changes to distribution of species. We foresee that this project, along with another project that we started in 2010 about lizards in New Mexico, will provide opportunities for at least five undergraduate students to work in biological research.

2. TABLE OF COLLECTION USE

Collection Growth	2,057
Loans	8
Research Visitors ¹	18
Outreach Visitors ¹	161
Information Requests Answered	82
Direct Website Access ² ("Hits")	9,915
Indirect Collection Access ³ ("Hits")	91,042
Downloads of Division Documents	2,423
Publications Citing/Using MSB Herpetological Specimens	21

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

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

³Indirect Collection Access represents access to data associated with our specimens via other websites such as HERPNET, NM Biodiversity, GBIF, etc.

3. COURSES USING THE COLLECTIONS

BIOL 204, Animal Form and Function, spring and fall semesters, 703 students

BIOL 386, General Vertebrate Zoology, spring and fall semesters, 42 students

BIOL 324, Natural History of Southwest, fall semester, 5 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Snell, H.L.

Spring BIOL 400 – Senior Honors Thesis, 1 student
 BIOL 499 – Undergraduate Research Problems, 3 students
 BIOL 551 – Graduate Research Problems, 2 students
 BIOL 599 – Master's thesis, 2 students
 BIOL 699 – Dissertation, 2 students

Fall BIOL 379 – Conservation Biology, 38 students
 BIOL 400 – Senior Honors Thesis, 1 student
 BIOL 499 – Research Problems, 1 student
 BIOL 599 – Master's thesis, 1 student
 BIOL 699 – Dissertation, 2 students

Poe, S.

Spring BIOL 436 – Phylogenetics, 7 students
 BIOL 499 – Undergraduate Research Problems, 1 student
 BIOL 536 – Phylogenetics, 20 students
 BIOL 551 – Graduate Research Problems, 4 students

Fall BIOL 386 – General Vertebrate Zoology, 15 students
 BIOL 551 – Graduate Research Problems, 3 students
 BIOL 699 – Dissertation, 1 student

B. Graduate Students

Latella, I.M.

BIOL 436/536 – Phylogenetics, 27 students

Schaad, E.W.

BIOL 386 – General Vertebrate Zoology, 15 students

Timmons, H.L.

BIOL 248, Anatomy and Physiology Lab, fall, 43 students

5. COLLECTION MANAGEMENT

During 2010, the collection has increased by 2,057 specimens to a total of 91,112 specimens. Specimens in 2010 came from several large accessions. We've catalogued over 1,000 voucher specimens and tissues of frogs from Puerto Rico and nearly 800 specimens that were collected throughout the state of New Mexico. Two important additions to the collection this year were specimens that were part of a teaching collection at the University of Albuquerque in the early 1970's and specimens that were collected by the Wyoming Game and Fish Department as vouchers for Wyoming inventory and monitoring efforts.

We continued our efforts to have the most precise georeferencing available for all of the specimens in the collection. In addition, a new process, "reverse georeferencing" has been added to our workflow. Many researchers provide only geographical coordinates for the deposited material and we now describe the locality based on those coordinates.

Skeletal material and frozen tissues were two types of preparation that received special attention in 2010. We now have tissue available for genetic analyses from over 600 recent specimens.

6. AWARDS, GRANTS, AND CONTRACTS

\$8,000. Evaluating the potential for climate change-induced extinction of selected New Mexican lizards. **H.L. Snell** and **J.T. Giermakowski**. New Mexico Department of Game and Fish. Dec 2010 – Jun 2011.

\$5,436. Forecasting climate impacts on wildlife of the arid southwest at regional and local scales. **H.L. Snell** and **J.T. Giermakowski**. Northern Arizona University/U.S. Geological Survey. Sep 2010 – Jun 2011.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

None.

B. Journal Articles

Crawford, A. J., **M. J. Ryan** & C. A. Jaramillo. 2010. A new species of *Pristimantis* (Anura: Strabomantidae) from the Pacific coast of the Darién Province, Panama, with a molecular analysis of its phylogenetic position. *Herpetologica* 66:192-206.

Giermakowski, J.T., C.M. Wilson & H.L. Snell. 2010. Geographic distribution: *Hyla wrightorum*. Herpetological Review. 41 (3): 375.

Lovich, R. E., T. S. Akre, **M. J. Ryan**, S. Nunez, G. Cruz, G. Borjas, N. J. Scott, R. Ford, I. R. Luque-Montes, S. Flores, W. del Cid, A. Flores, & C. Rodriguez. 2010. New herpetofaunal records for southern Honduras from Choluteca and Valle Departamentos. Herpetological Review 41:112-114.

Ryan, M.J., N.J. Blea, **I.M. Latella**, and M.A. Kull. 2010. *Leptodactylus savagei* (Smoky Jungle Frog) Antipredator defense. Natural History Note. Herp. Rev.

Ryan, M. J., K. R. Lips, **J. T. Giermakowski**. 2010. A new species of *Pristimantis* (Anura: Terrana: Strabomantinae) from lower Central America. Journal of Herpetology 44:193-200.

Ryan, M. J., J. M. Savage, K. R. Lips, **J. T. Giermakowski**. 2010. A new species of *Craugastor* (Anura: Craugastoridae) of the *rugulosus* species series from west-central Panama. Copeia 2010:405-409.

Schaad, E. W. and **S. Poe**. 2010. Patterns of ecomorphological convergence among mainland and island *Anolis* lizards. Biological Journal of the Linnean Society 101: 852-859.

C. Web-Based

None.

D. Technical Reports

Snell, H. L. and T. H. Lowrey. 2010. Biological Diversity Survey & Monitoring to Support A Wildlife Conservation Plan for Albuquerque. Submitted to Albuquerque Environmental Health Department, pg. 1-53.

E. Theses/Dissertations Completed

None.

F. Work In Progress

Poe, S., F. Ayala, **E.W. Schaad**, **I.M. Latella**, T. Kennedy, and N. Blea. Rediscovery and Redescription of *Anolis proboscis*. Breviora (in revision)

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

Aldridge, R. D., D. S. Siegel, A. P. Bufalino, S. S. Wisniewski, and B. C. Jellen. 2010. A multiyear comparison of the male reproductive biology of the brown treesnake (*Boiga irregularis*) from Guam and the native range. Australian Journal of Zoology **58**:24-32.

- Bateman, H. L., **H. L. Snell**, A. Chung-MacCoubrey, and D. M. Finch. 2010. Growth, activity, and survivorship from three sympatric parthenogenic whiptails (family Teiidae). *Journal of Herpetology* **44**:301-306.
- Buckley, L. B. 2010. The range implications of lizard traits in changing environments. *Global Ecology and Biogeography* **19**:452-464.
- Crespi, E. J., R. A. Browne, and L. J. Rissler. 2010. Taxonomic Revision of *Desmognathus wrighti* (Caudata: Plethodontidae). *Herpetologica* **66**:283-295.
- Hua, X., and J. J. Wiens. 2010. Latitudinal variation in speciation mechanisms in frogs. *Evolution* **64**:429-443.
- LaDuc, T. J., and C. J. Bell. 2010. Educating Students on the importance of Spatial and Temporal Bias in Museum Collections: An example using *Sonora semiannulata* in Texas. *Herpetological Review* **41**:292-298.
- Meik, J. M., A. M. Lawing, and A. Pires-daSilva. 2010. Body Size Evolution in Insular Speckled Rattlesnakes (Viperidae: *Crotalus mitchellii*). *PLoS One* **5**:e9524.
- Milanovich, J. R., W. E. Peterman, N. P. Nibbelink, J. C. Maerz, and J. Wright. 2010. Projected loss of a salamander diversity hotspot as a consequence of projected global climate change. *PLoS One* **5**:234-242.
- Miller, J. 2010. Species Distribution Modeling. *Geography Compass* **4**:490-509.
- Hemmings, V., J. Jaeger, M. Sredl, M. Schlaepfer, R. Jennings, C. Drost, D. Bradford, and B. Riddle. 2010. Phylogeography of declining relict and lowland leopard frogs in the desert Southwest of North America. *Journal of Zoology* **280**:343-354.
- Pineda, E., and C. A. Rodríguez-Mendoza. 2010. Distribución y abundancia de *Craugastor vulcani*: una especie de rana en riesgo de Los Tuxtlas, Veracruz, México. *Revista Mexicana de Biodiversidad* **81**:133-141.
- Pröhl, H., S. R. Ron, and M. J. Ryan. 2010. Ecological and genetic divergence between two lineages of Middle American túngara frogs *Physalaemus* (= *Engystomops*) *pustulosus*. *BMC Evolutionary Biology* **10**:1-18.
- Ray, J. W. 2010. Conservation genetics and ecological niche modeling of Kirtland's snake, *Clonophis kirtlandii*, and the Eastern Massasauga rattlesnake, *Sistrurus catenatus catenatus*. Northern Illinois University. Dissertation.
- Rödger, D. 2010. Human Footprint, facilitated jump dispersal, and the potential distribution of the invasive *Eleutherodactylus johnstonei* Barbour 1914 (Anura Eleutherodactylidae). *Tropical Zoology* **22**:205-217.
- Rödger, D., and S. Lötters. 2010. Explanative power of variables used in species distribution modeling: an issue of general model transferability or niche shift in the invasive Greenhouse frog (*Eleutherodactylus planirostris*). *Naturwissenschaften*:1-16.
- Rödger, D., and S. Lötters. 2010. Potential Distribution of the Alien Invasive Brown Tree Snake, *Boiga irregularis* (Reptilia: Colubridae). *Pacific Science* **64**:11-22.
- Urbina-Cardona, N., and R. D. Loyola. 2010. Applying niche-based models to predict endangered hylid potential distributions: are neotropical protected areas effective enough? *Tropical Conservation Science* **1**:417-445.
- Wang, I. A. N. J., and K. Summers. 2010. Genetic structure is correlated with phenotypic divergence rather than geographic isolation in the highly polymorphic strawberry poison dart frog. *Molecular Ecology* **19**:447-458.

Wooten, J. A., C. D. Camp, and L. J. Rissler. 2010. Genetic diversity in a narrowly endemic, recently described dusky salamander, *Desmognathus folkertsi*, from the southern Appalachian Mountains. *Conservation Genetics* **11**:835-854.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

JT Giermakowski

Herpetological collections: present and future challenges. Integrated Biological Inventories Class. University of New Mexico, Department of Biology. September.

Colecciones científicas en museos. Universidad Nacional Autónoma de México, Distrito Federal, México [via internet]. November.

HL Snell

Plenary Talk, Whitfield Wildlife Conservation Area Speakers Series 2010, Living in the Galapagos Islands, Whitfield Wildlife Conservation Area, 20 March 2010.

B. Contributed Talks/Posters (*presenter)

Chour, J.*, J.T. Giermakowski, H.L. Snell. Morphological variation of the Greater Earless Lizard *Cophosaurus texanus* in New Mexico. Society for Advancement of Chicanos and Native Americans in Science Annual Meeting, Los Angeles, California. September.

Massengill, L.C. *, **J.T. Giermakowski**, G.S. Weissmann, L.A. Scuderi. Bias in the terrestrial fossil record evaluated with distributions of modern species in the Chaco Plain and pantanal wetlands of South America. Geological Society of America Annual Meeting, Denver, Colorado. November.

C. Attendance at Professional Meetings

J.T. Giermakowski

US Fish and Wildlife Service Workshop on Jemez Mountain Salamanders, Albuquerque, February.

US Fish and Wildlife Service – Climate Change and Herpetological Conservation. Albuquerque, New Mexico. March.

Southwestern Partners in Amphibian and Reptile Conservation, Fort Collins, Colorado. August.

Landscape Conservation Cooperative Organizational Meeting, Bureau of Indian Affairs, Albuquerque, New Mexico. December.

HL Snell

US Fish and Wildlife Service Workshop on Jemez Mountain Salamanders, Albuquerque, 17 February.

US Fish and Wildlife Service Symposium on Climate Change and Herpetology Conservation, Albuquerque, March.

US Bureau of Land Management and US Forest Service, Landscape Conservation Cooperative Organizational Meeting, Bureau of Indian Affairs, Albuquerque, New Mexico. December.

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

None.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

J.T. Giermakowski

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

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

H.L. Snell

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

Reviewed Proposed Rule for Listing Dunes Sagebrush Lizard as Endangered. US Fish and Wildlife Service.

Member of the General Assembly, Charles Darwin Foundation for the Galapagos Islands

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.

J.T. Giermakowski.

Member of the Southwestern Partners in Amphibian and Reptile Conservation Steering Committee.

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

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

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

Invited to US Fish and Wildlife Service panel on the Jemez Mountain Salamander.

D. Journal Referee

M.J. Ryan. *Revista Biologia Tropical*

H.L. Snell. *Herpetologica*

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

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

Plenary Talk, Whitfield Wildlife Conservation Area Speakers Series 2010, Living in the Galapagos Islands, Whitfield Wildlife Conservation Area, 20 March 2010.

Work with Environmental Health Division on Urban Biodiversity, Albuquerque, NM

Work with Whitfield Wildlife Conservation Area, Belen, NM

Mapping Trails & Natural Resource Distributions, Manzano Mountains, Mountair Ranger District, Cibola National Forest, Valencia & Torrence Counties

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

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

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

M.J. Ryan

Idea Wild. \$400 equipment grant. UNM SRAC. \$475.

Grove Scholarship UNM Biology Department (2010). \$3,000.

UNM Latin American & Iberian Institute PhD Fellowship (2010). \$12,500/year

E.W. Schaad

UNM Summer SRAC award.

12. DONATIONS AND GIFTS RECEIVED

Donation of 2010 issues of the Southwestern Naturalist and Texas Journal of Science.

13. CURRENT STAFF

A. Faculty/Staff

Snell, H.L. Professor and Curator

Degenhardt, W.D., Curator and Professor Emeritus

Poe, S., Assistant Professor and Curatorial Associate

Giermakowski, J.T. Collection Manager

McInnes, T.L. Graduate Assistant (Fall)

Timmons, H.L. Graduate Assistant (Spring)

B. Graduate students

Giermakowski, J.T., Ph.D./Snell

Gray, L.N., M.S./Poe

Latella, I.M., M.S./Snell and Poe

McInnes, T.L., M.S./Snell

Pederson, N., M.S./Snell

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

Chour, Jobette. Student employee (UnO).
Gibboney, Krista. Volunteer.
Wilson, Cassandra. Student employee

14. MUSEUM ASSOCIATES

A. Curatorial Associates

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

B. Research Associates

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

DIVISION OF ARTHROPODS

1. DIVISION HIGHLIGHTS

Highlights for the Division (in conjunction with the research laboratory of KB Miller) include initiation or continuation of multiple NSF grants, a US National Park Service grant and USDA grants totaling \$2.4 million with one of these an NSF grant specifically for improvement to the Arthropod Division (\$453,444). New insect cabinets as well as other new equipment were purchased with these funds. We also made a major shift to development of a Specify database for our collection holdings. Major field campaigns for insect collecting were conducted to Costa Rica, Mexico, and Nicaragua as well as locally in the southwest producing large numbers of new specimens for the collection.

2. TABLE OF COLLECTION USE

Specimens Accessioned	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests	Publications Citing MSB Specimens
8000	6	25	25	100	6

3. COURSES USING THE COLLECTION

BIOL 485/585, Discovering Arthropods, 24 students
BIOL 371L, Invertebrate Zoology, 25 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Miller, K.B.

BIOL 485/585, Discovering Arthropods, 16 students
BIOL 203, Ecology and Evolution
BIOL 419, Field Entomology

5. COLLECTION MANAGEMENT

With more undergraduate and graduate students working in the division, we increased our efforts to curate and re-label older specimens as well as process the large numbers of new specimens. We purchased drawers and cabinets to fill our compactor space using NSF funds. Our databasing efforts have been dramatically revised as we have moved into a new database, Specify, from our existing one. We anticipate that this change will make our data considerably more accessible going forward. Fourteen undergraduate students and 6 graduate students have contributed to Arthropod Division activities in various ways in the past year.

6. AWARDS, GRANTS, AND CONTRACTS

- Joint Research on endemism at White Sands National Monument and the Cuatrociénegas Protected Area, K.B. Miller, David Lightfoot, National Park Service, \$120,000, 2010-2011, 10%.
- Identification Resource for the Ironclad and Cylindrical Bark Beetles and the Longhorned Wood Boring Beetle Tribe Onciderini, K.B. Miller, USDA-APHIS, \$85,000 + \$10,000 supplement, 2010, 10%.
- REVSYS: Multilevel Revision within the Praying Mantises (Insecta, Dictyoptera, Mantodea), G.J. Svenson, PI; K.B. Miller, NSF Systematic Biology and Biodiversity Inventories Grant #DEB-1050569, \$603,742, 2010-2012, 51%.
- Phylogenetic Revisions of South American Water Beetles (Coleoptera: Adephaga: Hydradephaga): A Model for Teaching Systematic Biology, K.B. Miller, NSF CAREER #DEB-0845984, \$675,000, 2009-2014, 51%.
- Improvements to the Division of Arthropods Collection, Museum of Southwestern Biology, K.B. Miller, Sandra Brantley and David Lightfoot, NSF Division of Biological Infrastructure Grant #DBI-0847847, \$453,444, 2009-2012, 51%.
- Survey of the Aquatic Insects of Northern Venezuela with an emphasis on Coleoptera, A.E.Z. Short, K.B. Miller, NSF Systematic Biology and Biodiversity Inventories Grant #DEB-0816904, \$500,000 (~\$60,000 to UNM), 2008-2012, 51%.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

B. Journal Articles

- Edelman, W.C., D.C. Lightfoot, & K.B. Miller.** 2010. The phylogenetic placement of the rare North American band-winged grasshopper *Shotwellia isleta* Gurney, 1940 (Orthoptera: Acrididae: Oedipodinae). *Insect Systematics & Evolution*, 41: 303-316.
- Lord, N.P., Hartley, C.S., Lawrence, J.F., McHugh, J.V., Whiting, M.F., & K.B. Miller.** 2010. Phylogenetic analysis of the minute brown scavenger beetles (Coleoptera: Latridiidae), and recognition of a new beetle family, Akalyptoischiidae fam.n. (Coleoptera: Cucujoidea). *Systematic Entomology* (2010), 35: 753-763.
- Miller, K.B. & G. Wewalka.** 2010. *Microdytes* Balfour-Browne of India with description of three new species (Coleoptera: Dytiscidae: Hydroporinae). *Zootaxa*, 2420: 26-36
- Song, H. 2010. Sheffeld, N.C., Cameron, S.L., Miller, K.B., & M.F. Whiting.** 2010. When phylogenetic assumptions are violated: base compositional heterogeneity and among-site rate variation in beetle mitochondrial phylogenomics. *Systematic Entomology*, 1-20
- Santos-Silva, A., Swift, I., & E.H. Nearn.** 2010. Division of the genus *Nothopleurus* Lacordaire, 1869 (Coleoptera, Cerambycidae, Prioninae). *Zootaxa*, 2643: 1-44.
- Swift, I., Santos-Silva, A., & E.H. Nearn.** 2010. The Genus *Trichocnemis* LeConte, 1851 (Coleoptera, Cerambycidae, Prioninae). *ZooKeys*, 61: 33-46.
- Swift, I.P., Bezark, L.G., Nearn, E.H., Solís, A. & F.T. Hovore.** 2010 Checklist of the Cerambycidae and Disteniidae (Coleoptera) of Costa Rica. *Insecta Mundi*, 0131: 1-68.
- Slipinski, A.S., N.P. Lord and J.F. Lawrence.** 10.28. Bothrideridae Erichson, 1845. Pp. 411-422 in: *Handbuch der Zoologie/Handbook of Zoology. Band/Volume IV Arthropoda: Insecta Teilband/Part 38. Coleoptera, Beetles. Volume 2. Morphology and Systematics*

(Polyphaga partim). (Eds RG Beutel, RAB Leschen and JF Lawrence). W. DeGruyter, Berlin.

C. Web-Based

D. Technical Reports

E. Theses/Dissertations Completed

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

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

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

Miller, K.B. *The phylogenetics and classification of Dytiscidae*. ESA Program Symposium An Inordinate Neglect of Dytiscids: International Endeavors to Understand the Behavior, Ecology, and Systematics of Predaceous Diving Beetles. Entomological Society of America National Meeting, Dec, 2010.

B. Contributed Talks/Posters (*presenter)

Tafoya, A.J. Searching for Subterranean Arthropods: A Comparison Between the Edwards-Trinity Aquifer of Texas and the Karst Systems of New Mexico. Undergraduate Research Presentations; Earth and Planetary Sciences Department. UNM, Albuquerque, NM (May 7)

Nearns, E.H., Swift, I.P., Ślipiński, A., Cameron, S. & K.B. Miller. Molecular phylogenetic analysis of Parandrinae and Prioninae (Coleoptera: Cerambycidae) of the world. Ten-Minute Papers, SysEB: Systematics. ESA, San Diego, CA, Dec. 2010)

Nearns, E.H., Lord, N.P. & K.B. Miller. Systematics in the 21st Century - Developing Lucid Keys to Enhance Taxonomy. Entomological Collections Network, San Diego, CA (Dec. 2010)

Hopkins, H. *A Revision of the Genus Arenivaga Rehn (Blattodea, Polyphagidae, Polyphaginae)*. Student poster presentation, runner-up award for president's prize for best student poster. Entomological Society of America Meeting, San Diego, CA. Dec 2010.

Hopkins, H. *A Revision of the Genus Arenivaga Rehn (Blattodea, Polyphagidae, Polyphaginae)*. Research Day presentation, Biology Department, UNM, Albuquerque, NM, April 2010.

Lord, N.P., Nearns, E.H., and Miller, K.B. Systematics in the 21st Century: Developing LUCID Keys to Enhance Taxonomy. Entomological Collections Network Annual Meeting, San Diego, Ca. Dec 2010.

Lord, N.P., Miller, K.B., and McHugh, J.V. Bothrideridae: The Ectoparasitic, Cocoon-Forming Beetles. SysEB Section Symposium: Systematics of the Cerylonid Series of Cucujoidea (Coleoptera). Annual Meeting of the Entomological Society of America, San Diego, Ca. December 12-15, 2010.

Gomez, R.A. *Identification and Sequencing of T Cell Receptor Delta Lotus Expressed in the Spleen of the Duckbill Platypus, Ornithorhynchus Anatinus* UNM MARC/IMSD Summer Research Symposium July 2010

Gomez, R.A. *Identification and Sequencing of T Cell Receptor Delta Lotus Expressed in the Spleen of the Duckbill Platypus, Ornithorhynchus Anatinus* SACNAS 2010, Anaheim, CA, November 2010

C. Attendance at Professional Meetings

Brantley, S. Entomological Collection Network National Meeting, San Diego, CA, 11/2010

Hopkins, H. Entomological Society of America National Meeting, San Diego, CA, 11/2010.

Hopkins, H. Entomological Collection Network National Meeting, San Diego, CA, 11/2010.

Miller, K.B. Entomological Society of America National Meeting, San Diego, CA, 11/2010.

Miller, K.B. Entomological Collection Network National Meeting, San Diego, CA, 11/2010.

Nearns, E.H. Entomological Society of America National Meeting, San Diego, CA, 11/2010.

Nearns, E.H. Entomological Collection Network National Meeting, San Diego, CA, 11/2010.

Lord, N. Entomological Society of America National Meeting, San Diego, CA, 11/2010.

Lord, N. Entomological Collection Network National Meeting, San Diego, CA, 11/2010.

Gustafson, G. Entomological Society of America National Meeting, San Diego, CA, 11/2010.

Gustafson, G. Entomological Collection Network National Meeting, San Diego, CA, 11/2010.

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

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

Miller, K.B. Subject editor (Coleoptera) Proceedings of the Entomological Society of Washington.

E. Service as Officer of Professional Society/Organization

Miller, K.B. Vice president elect, Entomological Society of America.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

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

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

D. Journal Referee

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

E. Hosting Professional Colleagues and Groups

10. SERVICE

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

B. Public Service

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS

12. DONATIONS AND GIFTS RECEIVED

Miller, K.B. 9000 specimens

13. CURRENT STAFF

A. Faculty/Staff

Kelly Miller, Assistant Professor, Curator

Manuel Molles, Professor Emeritus, Curator Emeritus

Sandra Brantley, Research Assoc. Professor, Senior Collection Manager

David Lightfoot, Research Assoc. Professor, Senior Collection Manager

B. Graduate Students

Nathan Lord, Ph.D. student

Eugenio Nearn, Ph.D. student

Michael Medrano, Ph.D. candidate

Heidi Hopkins, Ph.D. student

Karen Wetherill, Ph.D. student

Grey Gustafson, Ph.D. student

C. Undergraduate Student Workers and Volunteers

Sharyn Davidson, volunteer

Emily Hodson

Nicole Telles (UNM MARC program)

William Edelman (UNM IMSD program)

Catherine Geisik

Elizabeth Montano (honors)

Erin Fenton

Rebecca Zalar

Jessica Smith

Shelley MacNeil

Martha Lara

Amber Schwettmann

Eoghan Doyle

R. Antonio Gomez, (UNM MARC program, honors)

Nicholas Homziak, (UNM UNO program, honors)

14. MUSEUM ASSOCIATES

A. Research Associates

Ana Davidson, postdoctoral fellow, UNM and UNAM

Eric Metzler, Ohio State University, retired

Ernest Valdez, USGS

DIVISION OF BIRDS

1. DIVISION HIGHLIGHTS

- 8 field expeditions in Peru that collected over 1800 specimens.
- 8 scientific papers published
- Division participated in American Ornithologists' Union meetings in San Diego
- Field work in Southwestern US: San Diego County, CA; New Mexico: Elk Mountain, Boone's Draw,
- Completed Sandhill Crane Survey field work along the Rio Grande Valley for the Sunzia Transmission Line Project.

2. TABLE OF COLLECTION USE

Collection Growth (specimens cataloged): 963
Loans (outgoing): 8 from dry collections; 14 tissue loans
Loans (incoming): 2 for dry collections; x tissue loans received.
Visitors: 108
Information Requests: 76
Publications Citing MSB Bird Specimens: 5

3. COURSES USING THE COLLECTIONS (3)

BIOL. 386, General Vertebrate Zoology: Spring and Fall semester, 36 students per semester
BIOL 402/502, Avian Scientific Specimen Preparation: Spring Semester, 6 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers (9)

Johnson, A. B. and C. C. Witt: Spring: BIOL 402/502: Avian Scientific Specimen Preparation (6 students)

Witt:

2010: Spring: Molecular Systematics Discussion (Biology 502) (6 students)

2010: Fall: Molecular Systematics Discussion (Biology 502) (8 students)

2010: Spring: Basic Graduate Evolution (Biology 517) (~20 students)

2010: Spring: GUEST LECTURE: Tropical Biology

2010: Fall: GUEST LECTURE: Integrated Inventories

2010: Fall: Graduate research problems (Biology 551) (4 graduate students)

2010: Fall: Undergraduate research problems (Biology 499) (1 undergraduate student)

2010: Spring: Undergraduate research problems (Biology 499) (1 undergraduate student)

Wolf:

Fall: Biol. 502, Topic: Animal Physiological Ecology, 1 student

Biol. 516, Basic Graduate Ecology, 18 students (co-taught with J.H. Brown and F. Smith)

Fall: Biol. 204, Plant and Animal Form and Function, 172 students (two sections; co-taught with D.T. Hanson)

Biol. 402, Topic: Animal Physiological Ecology, 1 student

5. COLLECTION MANAGEMENT

We started 2010 in the same manner we ended 2009: camped on the side of a mountain in Peru. Our team consisting of 7 members of the bird lab and two Peruvians visited a high-elevation site in Apurímac department, where we collected data on the physiology of high-elevation adapted birds typical to that region, and also made important discoveries of populations of several globally rare species. These findings were published in the journal *Endangered Species Research* (Benham et al. 2010).

Shortly after our return from Peru, over half of our lab attended the American Ornithologists' meeting in San Diego, California, where we attended a variety of stimulating talks that proved to be reinvigorating. Closer to home, we received some very important specimens this year: A Sooty Tern found its way to New Mexico after a hurricane. This first state record was found dead in the Laguna Grande salt ponds southeast of Carlsbad. It has been archived in the collection and a note on its occurrence has been submitted to the journal *Western Birds*.

After a ca. 30 year hiatus, field work has once again commenced at Boone's Draw. This site is a small woodland on the eastern plains of New Mexico that attracts migrant birds. Then-New Mexico Department of Game and Fish personnel John P. Hubbard and C. Gregory Schmitt (now MSB Birds associates) et al. worked at this site in the late 1970's studying migration of birds. They discovered many eastern species of birds occurred there quite commonly, although they were rarely encountered previously. In the fall of 2010, Matthew Baumann and Nick Pederson reestablished a relationship with the land owner and began resampling the site. Their work thus far has resulted in many important specimens for the collection, including the first specimen of Wood Thrush from the state, and some important series of more common species that will facilitate our understanding of migration on the eastern plains.

Another important bit of field work was that conducted by MSB Birds Personnel on Elk Mountain in the early winter. We explored this area several years ago and found it to be a good accessible site for high elevation species in New Mexico, but only started working there this fall. Of great significance was a series of Rosy Finches (*Leucosticte*) that will be used in a variety of ongoing research projects by MSB Bird students Michael Hilchey and Raymond VanBuskirk.

In the collection, a problem in the database with duplicating records has slowed cataloging

progress. We prepared many specimens this year, which reflects the growing numbers of personnel in our division and their enthusiasm for museum work.

6. AWARDS, GRANTS, AND CONTRACTS

Phred Benham:

CHAPMAN MEMORIAL FUND GRANT, \$2250. GRAC: \$400

Jonathan Schmitt:

Ryan Beaulieu Memorial Fund, \$1000.

Natalie Wright:

AOU student research grant: \$1500; UNM Bio Scholarship: \$1000

Elizabeth Beckman:

GRAC: \$400; UNM Bio Scholarship: \$500

Witt, C. C. Bird surveys on the Rio Grande for the Sunzia Transmission Line Project, Phase I; PI – C. C. Witt; Environmental Planning Group, Phoenix, AZ; \$170,000; 1 December 2009 – 31 May 2010.

Witt, C. C. Bird surveys on the Rio Grande for the Sunzia Transmission Line Project, Phase II; PI – C. C. Witt; Environmental Planning Group, Phoenix, AZ; \$147,000. June 2010.

Witt, C. C. CETI Seed Grant: Diversity and host-parasite dynamics of avian malaria along a tropical altitudinal gradient. ~1 December 2010 – 1 December 2011. PI- C. C. Witt; but subaward of NIH-CETI grant to P.I.'s E. S. Loker and R. Miller; \$40,000.

Witt, C. C. 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) No-cost extension awarded in 2010 (~\$60,000 remaining). [Award to University of California-Berkeley].

Wolf, B.O. 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; \$59,543, September 2009– September 2011.

Wolf, B.O. 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, \$65,000, April 1, 2009–February 1, 2010.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes (5)

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

Dickerman, R. W. 1950's Tabasco. *In Moments of Discovery: Natural History Narratives from Mexico and Central America* (Kevin Winker, ed.). University of Florida Press.

Dickerman, R. W. A zip trip (collecting redwings in Central America in 1968). *In Moments of Discovery: Natural History Narratives from Mexico and Central America* (Kevin Winker, ed.). University of Florida Press.

Wolf, C.J., J.M. Ramakka and B.O. Wolf. 2010. The Prairie Falcon. Pp. 461-473 in *The Raptors of New Mexico*. The University of New Mexico Press, Albuquerque.

B. Journal Articles (8)

Benham, P. M., E. J. Beckman, S. G. DuBay, M. Flores, A. B. Johnson, M. J. Lelevier, C. J. Schmitt, N. A. Wright, and C. C. Witt. 2010. Satellite imagery reveals new critical habitat for endangered bird species in the high Andes of Peru. *Endangered Species Research*, 13 (2): 145-157. (Published online before print: doi:10.3354/esr00323)

Han, K-L., E. L. Braun, R. T. Kimball, S. Reddy, R. C. K. Bowie, M. J. Braun, J. L. Chojnowski, S. J. Hackett, J. Harshman, C. J. Huddleston, B. D. Marks, K. J. Miglia, W. S. Moore, F. H. Sheldon, D. W. Steadman, C. C. Witt & T. Yuri. 2010. Are transposable element insertions homoplasy free? An examination using the avian tree of life. *Systematic Biology* 60 (published online before print: doi:10.1093/sysbio/syq100).

Johnson AB, Winker K, 2010 Short-Term Hurricane Impacts on a Neotropical Community of Marked Birds and Implications for Early-Stage Community Resilience. *PLoS ONE* 5(11): e15109.doi:10.1371/journal.pone.0015109

Kirchman, J. J., C. C. Witt, J. A. McGuire, G. R. Graves. 2010. DNA from 100-year old holotype confirms the validity of a potentially extinct hummingbird species. *Biology Letters*. 6:112-115. (Published online before print doi:10.1098/rsbl.2009.0545; popular press coverage: <http://evodiversidad.blogspot.com/2009/09/relicto-de-un-mundo-perdido-y-el-valor.html>)

McKechnie, A.E. and B.O. Wolf. 2010. Climate change increases the likelihood of catastrophic avian mortality events during extreme heat waves. *Biology Letters* 6:253-256.

Williams, S. O. III. 2010. Sixth report of the New Mexico Bird Records Committee. NMOS Bulletin 38(4): 71-81.

Williams, S. O. III. 2010. Recent AOU Check-list changes affecting the New Mexico bird list: the 51st supplement. NMOS Bulletin 38(3): 60-64.

Witt, C. C., M. S. Graus, and H. A. Walker. 2010. Molecular data confirm the first record of Long-billed Murrelet (*Brachyramphus perdix*) for New Mexico. *Western Birds*, 41:160-167. (Popular press coverage: <http://www.birdwatch.co.uk/channel/newsitem.asp?c=11&cate=10559> ; <http://aba.org/birding/v43n2p24.pdf>)

C. Web-Based

None

D. Technical Reports

Witt, C. C. and T. Valqui. 2010. Final report on work conducted under INRENA Permit No. 135-2009-AG-DGFFS-DGEFFS. Technical Report to INRENA (Peru). Submitted June 10, 2010 (in Spanish). 16pp.

Maliakal-Witt, S. and C. C. Witt. 2010. Assessment of the Potential Impacts of the SUNZIA Southwest Transmission Project on Wintering Birds: a Comparison of Four Alternative Routes across the Rio Grande. Technical Report on the Sunzia Southwest Transmission Line Project. May 12, 2010. 63pp.

E. Theses/Dissertations Completed

None

F. Work In Progress (partial list)

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

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

G. Publications/Reports Based on MSB Bird Division Specimens/Data (2)

Toomey, M. B., M. W. Butler, M. G. Meadows, L. A. Taylor, H. B. Fokidis, and K. J. McGraw. A Novel Method for Quantifying the Glossiness of Animals. *Behavioral Ecology and Sociobiology* 64: 1047 - 1055.

Berns, C.M. and D.C. Adams. 2010. Bill Shape and Sexual Shape Dimorphism between Two Species of Temperate Hummingbirds: Black-Chinned Hummingbird (*Archilochus alexandri*) and Ruby-Throated Hummingbird (*A. Colubris*). *Auk* 127: 626-635.

ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars (1)

Williams, S. O. III and J. R. Travis. Distribution and status of the Yellow-billed Cuckoo in New Mexico. New Mexico Yellow-billed Cuckoo Symposium, Albuquerque, April 2010. NMOS Bulletin 38(2): 36-37 (abstract).

B. Contributed Talks/Posters (7)

Jones, M. R., and C. C. Witt. 2010. Trachea-length scaling and formant spacing in Sandhill Cranes of New Mexico. New Mexico Ornithological Society Meeting. April 2010. Albuquerque, NM.

Witt, C. C. 2010. BIOGEOGRAPHIC HISTORY PREDICTS BLOOD OXYGEN CARRYING CAPACITY AND CELL SIZE IN HIGH-ALTITUDE BIRDS. American Ornithologists' Union Meeting, San Diego, CA, February 2010.

Whalen, D., S. Swiderek, M. Lucero, and C. C. Witt. Avian malaria across a tropical altitudinal gradient. American Ornithologists' Union Meeting, San Diego, CA, February 2010.

Witt, C. C. Avian Malaria of the Tropical Andes; in Designing informative indicators: A workshop to advance interdisciplinary geo-epidemiology; University of New Mexico, October 2010.

Jones, M. R., and C. C. Witt. Trachea-length scaling and formant spacing in Sandhill Cranes of New Mexico. UNM Biology Research Day, 2010.

Wolf, B.O. and A.E. McKechnie. 2010. Climate change increases the likelihood of catastrophic avian mortality events during extreme heat waves. Annual Meeting of the Society of Integrative and Comparative Biology, Seattle WA, January 3-7, 2010.

Wolf, B.O. and A.E. McKechnie. 2010. Climate change increases the likelihood of catastrophic avian mortality events during extreme heat waves. Global Change and Global Science: Comparative Physiology in a Changing World, American Physiological Society Intersociety Meeting, Westminster CO, August 7-14, 2010.

C. Attendance at Professional Meetings

Johnson, A. B.

New Mexico Ornithological Society Meeting Albuquerque, NM
128th Meeting of the American Ornithologists' Union, San Diego, CA, USA.

Witt, C. C.

New Mexico Ornithological Society Meeting Albuquerque, NM
128th Meeting of the American Ornithologists' Union, Philadelphia, PA, USA.

Williams, S. O. III

New Mexico Ornithological Society Meeting Albuquerque, NM
Schmitt, C. J.

New Mexico Ornithological Society Meeting Albuquerque, NM

128th Meeting of the American Ornithologists' Union, San Diego, CA, USA.

Benham, P.M.

New Mexico Ornithological Society Meeting Albuquerque, NM
128th Meeting of the American Ornithologists' Union, San Diego, CA, USA.

DuBay, S.G.

New Mexico Ornithological Society Meeting Albuquerque, NM
128th Meeting of the American Ornithologists' Union, San Diego, CA, USA.

Beckman, E.J.

New Mexico Ornithological Society Meeting Albuquerque, NM

Wolf, B.O.

Annual Meeting of the Society of Integrative and Comparative Biology, Seattle WA, January 3-7, 2010.

American Physiological Society Intersociety Meeting, Westminster CO, August 7-14, 2010.

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

None.

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.

Secretary, New Mexico Bird Records Committee.

E. Journal Referee

Johnson, A.B.

Journal of Field Ornithology (1)

Williams, S. O. III.

Reviewer for NMOS Bulletin in 2010.

Witt, C. C.

Condor (1); Cotinga (2); Journal of Field Ornithology (1); New Mexico Ornithological Society Bulletin (1); Occasional Papers of the Museum of Southwestern Biology (1)

Wolf, B.O.

American Naturalist (1); Biological Journal of the Linnean Society (1); Comparative Biochemistry and Physiology (1); Ecosphere (1); Ibis (1); Journal of Experimental Biology (1); Madrono (1); Oecologia(1); Proceedings of the National Academy of Sciences of the United States (1); The Auk (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.

Institutional Animal Care and Use Committee

Department of Biology Grad Policy Committee

Witt, C. C.

Popular press coverage of the Division and its Scientific Publications

Schmitt, C. J.

Volunteer participant in bird survey of Magdalena Mountains, Socorro County, NM for North American Migratory Bird Count day

Benham, P.M.

Migration talk at Rio Grande Nature Center "Herbfest" for International Migratory Bird Day

Wright, N.A.

MSB Birds Representative at Albuquerque Biopark for International Migratory Bird Day weekend.

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

None

12. DONATIONS AND GIFTS RECEIVED

Robert W. Dickerman: \$50,000

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

Natalie Wright, Ph.D. Student
Elizabeth Beckman, Ph.D. Student
Phred Benham, Masters' Student
Shane DuBay, Masters' Student

C. Undergraduate Student Workers and Volunteers

Student Workers, REU students, and paid undergraduates:

Alessandra Quiñonez, postbac worker (Peru)
Sheila Figeroa, Undergraduate worker (Peru)
Monica Flores, Undergraduate (Peru)
Kobie Boslough

William Talbot
Michael Hilchey
Cole Wolf
Raymond VanBuskirk
C. Jonathan Schmitt
Donna Schmitt
Gregory Schmitt
Sarah Sheldon

Sara Swiderek
Matthew Graus
Matthew Jones
Doug Whalen
Geneva Williams
Ashley Smiley
Natalie Wright
Shane Dubay

Michael Lelevier
Liana Schmader
Bethany Abrahamson
Sabrina McNew
Matt O'Donnell

Elizabeth Beckman
Phred Benham
Nick Pederson
Matthew Baumann

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

DIVISION OF FISHES

1. DIVISION HIGHLIGHTS

Currently, the MSB Division of Fishes has **85,821** catalogued lots of fishes (3,881,167 specimens). During the year, 5,773 lots of fishes (246,771 specimens) were cataloged and integrated into the main collections. Integration of the New Mexico Department of Game and Fish State Reference Collections and associated data continued throughout 2010, with a total of 5,138 lots (out of 10,447 lots) or 264,073 specimens now fully incorporated. These collections are important both geographically and historically, adding underrepresented species, drainages, and timeframes to the MSB fish collections.

\$322,105 annual funding through grants and contracts was available for ichthyological research, aquatic studies, and museum curation of fish collections, undertaken by MSB Division of Fishes staff, students, and research associates during 2010.

Dr. Stephen T. Ross, Curator Emeritus was awarded the C. A. Schultz Conservation Award in February 2010. This award is given to individuals who have demonstrated excellence in the fields of ichthyology, fisheries or aquatic ecology in terms of activities that promote conservation, sound taxonomy and/or public awareness of Mississippi's aquatic resources. Dr. Ross retired as Professor of Biological Sciences and Curator of Fishes at the University of Southern Mississippi prior to accepting the position of MSB Fishes Curator Emeritus and UNM Adjunct Professor of Biology in 2004.

Outreach Summary: Education: Received 6 buckets of Carolina Biological preserved fish specimens from St. Pius XII High School, Albuquerque and distributed to life science classes Ortiz Middle School, Santa Fe and Tierra Adentro Charter School, Albuquerque. Tours: Dine College, Tsaile AZ (25 students), University of New Mexico Biology Graduate Student Orientation (23 students), American Indian Science & Engineering Society (30 students).

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
5,773 lots 246,771	38	0	40 visitors 82 days	27 requests 21.5 hours	4

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

²Loans, gifts or tissue transfers from other institutions

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

⁴emails, letters, telephone calls (not tour groups or website "hits")

⁵publications in peer review journals

3. COURSES USING THE COLLECTIONS

BIOL. 324 Natural History of the Southwestern USA, Fall 2010, 12 students

BIOL. 386L General Vertebrate Zoology Lab, Spring 2010, 32 students

BIOL. 204L Plant and Animal Form and Function, Fall 2010, 30 students
BIOL. 496L Limnology, Spring 2010, 20 students

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers/Research Associates

Turner, T. F.

BIOL. 502 Ecology and Evolution of Fishes, Spring 2010, 5 students
BIOL. 551 Research Problems, Fall and Spring 2010, 6 students
BIOL. 599 Master's Thesis, Spring and Fall 2010, 1 student
BIOL. 651 Advanced Field Biology, Spring and Fall 2010, 1 student

B. Graduate Students

Krabbenhoft, T.J.

BIOL. 495L Limnology, Spring 2010, 7 students

5. COLLECTION MANAGEMENT

Eleven accessions of specimens were received during 2010. Primary contributors included U.S. Fish and Wildlife Service Fish and Wildlife Conservation Office, New Mexico Department of Game and Fish, the Wyoming Department of Game and Fish, Aquatic Conservation Facility in the Albuquerque BioPark, and American Southwest Ichthyological Researchers.

Five undergraduate students and one graduate student were employed as Curatorial Assistants and Research Assistant for 2010. The undergraduate students were responsible for processing specimen collections and data received from several ongoing, large scale projects in the San Juan, Gila, and Pecos Rivers in New Mexico; the Powder, Green, and Snake Rivers in Wyoming. Except for San Juan River collections, the NMDGF State Reference Collections from other NM river drainages, collected 1982 – 2008 have been completely processed and integrated, after three and half years of effort on the part of the undergraduate Curatorial Assistants (2007-2010).

Digital files, consisting of original field notes, now number 51,690 tiff files as archival backups and 18,161 .pdf files that are cleaned and hyperlinked to database for viewing.

The graduate student Research Assistant, Tyler J. Pilger was responsible for all georeferencing, editing, validation, and cleaning of subsets of MSB fish locality data. Almost one-half of the MSB fishes localities are now georeferenced and in ArcView (i.e. 18,311 out of a total of 38,249 locality records). He identified collections of fishes from the Gila River as part of the NMDGF collection integration effort and all collections received from Wyoming Department of Game and Fish.

6. AWARDS, GRANTS, AND CONTRACTS

Curation of NM Fish and Wildlife Conservation Office Collections No. 201819G905. A.M. Snyder PI and T.F. Turner Co-PI. U.S. Fish and Wildlife Service. Total award: \$130,000 1 Oct 2008 to 1 Oct 2013. Annual budget \$26,000.

Grant Agreement for Curatorial Services Between Bureau of Reclamation upper Colorado Region and the Museum of Southwestern Biology at the University of New Mexico 05-FG-40-

2411. A.M. Snyder PI and T.F. Turner Co-PI. U.S. Bureau of Reclamation. Total award: \$152,891 4 Aug 2005 to 1 March 2011. **Annual budget \$27,891.**

Accession and Integration of NMDGF Fish Collections in Museum of Southwestern Biology, Division of Fishes No. T-39-1 A.M. Snyder PI and T.F. Turner Co-PI. New Mexico Department of Game and Fish. Total award: \$60,000 1 Jul 2008 to 30 Jun 2011. **Annual budget \$20,000.**

Baseline genetic studies of fishes native to the Gila River T.F. Turner, PI and T.J. Pilger Co-PI. New Mexico Department of Game and Fish. Total award: \$11,000 1 Jul 2010 to 30 Jun 2011. **Annual budget \$11,000.**

Community responses to river drying in an arid-land ecosystem: a field and experimental study: REU supplement. PI Thomas F. Turner. National Science Foundation. Total award: \$7,500 10 May 2010 to 31 Jul 2011. **Annual budget \$7,500.**

Genetic and demographic studies to guide conservation management of bonytail chub and razorback sucker in off-channel habitats. T. Dowling PI Arizona State University and T.F. Turner Co-PI subaward. US Bureau of Reclamation. Total award: \$44,760 1 Oct 2010 to 30 Sep 2015 **Annual budget \$44,760.**

Assessment and monitoring of Rio Grande silvery minnow genetics. US Bureau of Reclamation, Middle Rio Grande ESA Collaborative Program T.F. Turner PI and M.J. Osborne Co-PI. Total Award: \$772,000 (based on annual renewals) 1 Oct 2007 to 30 Sep 2012. **Annual budget \$170,954**

Genetic Status of Arkansas River Shiner (Notropis girardi) and Evaluation of Hybridization Among Cyprinids. M.J. Osborne PI and T.F. Turner Co-PI. New Mexico Department of Game and Fish. Total Award: \$8,000 30 Aug 2009 to 30 Jun 2010 **Annual budget \$8,000**

Baseline Genetic Studies of the Chihuahua Chub (Gila nigrescens) M.J. Osborne PI and T.F. Turner Co-PI. New Mexico Department of Game and Fish. Total Award: \$6,000 30 Aug 2009 to 30 Jun 2010 **Annual budget \$6,000**

Characterization of algal pigments via high-performance liquid chromatography (HPLC). T.F. Turner PI and D. Hanson Co-PI. Sandia National Laboratories, Albuquerque NM Total Award: \$32,438 1 Jan 2010 to 30 Aug 2010. **Annual budget \$32,438 (not included in MSB Fish budget)**

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes:

Turner, T. F., T.J. Krabbenhoft, and A.S. Burdett. 2010. Reproductive timing and fish community structure in an arid-land river system. *In*: Gido, K. and D. Jackson, eds. *Community Ecology of Stream Fishes*. American Fisheries Society Symposium 73 Bethesda MD.

B. Journal Articles

Munroe T.A., T.J. Krabbenhoft. 2010. Two unusually large pre-transitional tonguefish larvae (Pleuronectiformes: Cynoglossidae: *Symphurus*) collected in Oceanic waters near the Galapagos Islands. *Bulletin of Marine Science* 86:13-31.

Osborne, M.J., S.R. Davenport, C.W. Hoagstrom, and T.F. Turner. 2010. Genetic effective size, N_e , tracks density in a small freshwater cyprinid, Pecos bluntnose shiner (*Notropis simus pecosensis*). *Molecular Ecology* 19:2832-2844.

Pilger, T.J., K.B. Gido, D.L. Propst. 2010. Diet and trophic niche overlap of native and nonnative fishes in the Gila River, USA: implications for native fish conservation. *Ecology of Freshwater Fish* 19:300-321.

Turner T.F., M.L. Collyer, T.J. Krabbenhoft. 2010. A general hypothesis-testing framework for stable isotope ratios in ecological studies. *Ecology* 91:2227-2233.

C. Web-Based

C.A. Love, A.S. Burdett, T.F. Turner. Arid Land Aquatic Food Web Ecology. 2010
<http://msb.unm.edu/fishes/aquatic.htm>

D. Technical Reports

Brandenburg, W. H. and M.A. Farrington. 2010. Colorado pike minnow and razorback sucker larval fish survey in the San Juan River during 2009. Report to the San Juan River Recovery Implementation Program USBR Salt Lake UT and the US Fish and Wildlife Service, Albuquerque NM. 60 pp.

Burdett, A.S., T.F. Turner and R.J. Bixby. 2010. Rio Grande Surveys: 2006-2010. Report submitted to Bosque del Apache National Wildlife Refuge. 20 pp.

Osborne, M.J., T.A. Diver, and T.F. Turner. 2010. Genetic status of the Arkansas River shiner (*Notropis girardi*) and evaluation of hybridization among cyprinid fish in the Pecos River, New Mexico. Final Report submitted to the New Mexico Department of Game and Fish, Santa Fe, New Mexico. 20 pp.

Osborne, M.J., A. Sharp and T.F. Turner 2010. Baseline Genetic Studies of the Chihuahua Chub (*Gila nigrescens*). Final report submitted to NM Game and Fish Share with Wildlife Program. 23 pp.

Osborne, M.J. and T.F. Turner 2010. Genetic monitoring of the Rio Grande silvery minnow (*Hybognathus amarus*): genetic status of wild and captive stocks in 2010. Report to Middle Rio Grande Endangered Species Act Collaborative Program, USBR Albuquerque NM. 30 pp.
Dudley, R.K. and S.P. Platania. 2010. Rio Grande silvery minnow (*Hybognathus amarus*) population monitoring monthly trip reports and analyses. Three reports to the Middle Rio Grande Endangered Species Act Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 90 pp.

Platania, S.P. and R.K. Dudley. 2010. Spatial spawning periodicity of Rio Grande silvery minnow during 2009. Report to the Middle Rio Grande Endangered Species Act Collaborative Program and the US Bureau of Reclamation, Albuquerque, NM. 33 pp.

Snyder, A.M. and T.F. Turner. 2010. Accession and curation of fish collections received from the USFWS New Mexico Fish and Wildlife Conservation Office by the University of New Mexico, Museum of Southwestern Biology. Contract 201819G905. Annual Report to USFWS, Albuquerque NM. 144 pp.

Snyder, A.M. and T.F. Turner. 2010. Curation of the 2009 San Juan River collections of fishes, University of New Mexico, Museum of Southwestern Biology. Contract 05-FG-40-2411. Annual Report to San Juan River Basin Recovery Implementation Program, US Bureau of Reclamation, UT. 25 pp.

Snyder, A.M. and D.L. Propst. 2010. Accession and integration of New Mexico Dept. Game and Fish State Reference Collections of fishes by the University of New Mexico, Museum of Southwestern Biology. Contract T-39-1. Annual Report to Conservation Services, NMDGF, Santa Fe NM. 4 pp.

E. Theses/Dissertations Completed **NONE for 2010**

F. Work In Progress

Burdett, A. S., J. S. Fencl, and T. F. Turner. Comparison of aquatic invertebrate sampling methods in a shallow and braided aridland river (Rio Grande, New Mexico). *The Southwestern Naturalist*. **In review.**

Israel, J. A., K. M. Fisch, T. F. Turner, and R. S. Waples. Conservation of native Bay-Delta fishes: past experience and future considerations for artificial propagation of Chinook salmon, delta smelt and green sturgeon. *San Francisco Estuary & Watershed Science*. **In Press.**

Kennedy, T. L., and T. F. Turner. River channelization reduces nutrient flow and macro-invertebrate diversity at the aquatic-terrestrial transition zone. *Ecosphere*. **In Press.**

Osborne, M. J., and T. F. Turner. Isolation and characterization of major histocompatibility class II genes in an endangered North American cyprinid fish, the Rio Grande silvery minnow (*Hybognathus amarus*). *Fish and Shellfish Immunology*. **In Press.**

Pilger, T.J. and K.B. Gido. Overlapping Unionid assemblages between streams and a reservoir with the Kansas River Basin. *American Midland Naturalist*. **In Review.**

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

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

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

Turner, T. F., and M. S. Edwards. Aquatic food web structure of the Rio Grande assessed with stable carbon and nitrogen isotopes. Journal of the North American Benthological Society. **In review**

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

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

Archdeacon, T.P. and S.R. Davenport. 2010. Predation by age-0 smallmouth bass (*Micropterus dolomieu*) on bigscale logperch (*Percina macrolepida*) in the Pecos River, New Mexico. The Southwestern Naturalist 55(1):120-122

Bestgen, K.R., B. Mefford, J.M. Bundy, C.D. Walford, and R.I. Compton. 2010. Transactions of the American Fisheries Society 1239:433-448.

Doosey, M.H., H.L. Bart, Jr., K. Saitoh, and M. Miya. 2010. Phylogenetic relationships of catostomid fishes (Actinopterygii: Cypriniformes) based on mitochondrial ND4/ND5 gene sequences. Molecular Phylogenetics and Evolution 54: 1028-1034.

Hoagstrom, C.W., W.J. Remshardt, J.R. Smith, and J.E. Brooks. 2010. Changing fish faunas in two reaches of the Rio Grande in the Albuquerque Basin. The Southwestern Naturalist 55(1):78-88

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

Osborne, M. J., and T. F. Turner. Multi-locus major histocompatibility complex class IIB and parasite diversity in the Rio Grande silvery minnow. Invited Symposium on Rio Grande silvery minnow biology. Joint meeting of North American Benthological Society and American Society of Limnology and Oceanography, Santa Fe, New Mexico, June 6th-11, 2010.

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

Bishara, R.K., A.S. Burdett, and T.F. Turner. Comparison of community structure in a controlled mesocosm experiment and natural freshwater systems in the middle Rio Grande, New Mexico. North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography), Santa Fe, NM 6-11 May 2010.

Bixby, R.J., and A.S. Burdett. Non-uniform inputs from tributaries shape periphyton patchiness in an aridland river. North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography), Santa Fe, NM. 6-11 May 2010

Brandenburg, W. H., M. A. Farrington, and S. P. Platania. Distribution, hatching period, and dispersal of larval razorback sucker in the San Juan River, NM, CO, UT: eleven years of research (1999-2009). 34th Annual Larval Fish Conference, Santa Fe, NM May 2010.

Burdett, A.S., and T.F. Turner. Biotic assemblages and wetland-river interactions in an aridland riverine system. North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography), Santa Fe, NM 6-11 May 2010.

Diver, T., Osborne, M., Turner, T. Genetic diversity of non-native fishes exceeds natives in the Pecos River, NM. Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010.

Diver, T., Osborne, M., Turner, T. Genetic diversity of non-native fishes exceeds natives in the Pecos River, NM. North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography), Santa Fe, NM 6-11 May 2010.

Johnson, E.L., A.S. Burdett, and T.F. Turner. Larval fishes as predators during river drydown: Diet and stable isotopes reveal important spatial and temporal effects on meiofauna. North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography), Santa Fe, NM. 6-11 May 2010.

Krabbenhof, T.J., S.P. Platania, and T.F. Turner. Reproductive phenology of fishes of the middle Rio Grande, New Mexico. 34th Annual Larval Fish Conference, American Fisheries Society, Early Life History Section, Santa Fe New Mexico. 30 May – 3 June 2010. *Honorable Mention for Sally Richardson Award for best student oral presentation*

Kraus, J.S., A.S. Burdett, and T.F. Turner. Aquatic food web structure in drying pools using isotope data from a mesocosm experiment and surveys in the Rio Grande, New Mexico. North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography), Santa Fe, NM. 6-11 May 2010.

Kraus, J.S., A.S. Burdett, and T.F. Turner. Aquatic food web structure in drying pools using isotope data from a mesocosm experiment and surveys in the Rio Grande, New Mexico. Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010.

Neff, N., T.J. Krabbenhof, and T.F. Turner. Evolutionary trends of opsins in cyprinid fishes. 19th Annual Research Day, Department of Biology, University of New Mexico, Albuquerque NM. April 2010.

Pilger, T.J. and T.F. Turner. Comparative Population Genetics of Two Gila River Cyprinids. Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010.

Peralta, M.F., A.S. Burdett, and T.F. Turner. The biological control of mosquito larvae populations using larvivorous fish: An eco-friendly approach. Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010.

Peralta, M.F., A.S. Burdett, and T.F. Turner. The biological control of mosquito larvae populations using larvivorous fish: An eco-friendly approach. 2010 Summer biomedical Research Symposium, University of New Mexico. 10 August 2010.

Osborne, M.J., S.R. Davenport, C.W. Hoagstrom and T.F. Turner. Genetic effective size tracks abundance in a small-bodied cyprinid, Pecos bluntnose shiner. Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010.

Scholle, S.D., T.F. Turner and R. J. Bixby. The effects of edges on algal biomass in the middle Rio Grande. North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography), Santa Fe, NM. 6-11 May 2010.

Sharp, A., M.J. Osborne and T.F. Turner. Conservation genetics of remnant populations of the Chihuahua chub *Gila nigrescens* (Teleostei: Cyprinidae) in New Mexico. North American Benthological Society, Santa Fe, NM. June 2010.

Trujillo, J.D., T.J. Pilger, and T.F. Turner. Microsatellite development in the spikedace, *Meda fulgida*. Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010. *Best Student Poster Presentation, Jesse Trujillo*

Turner T.F., T.J. Krabbenhoft, M.L. Collyer, C.A. Love. 2010. A new hypothesis testing framework for stable isotope ratios in ecological studies with examples from the Rio Grande. North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography), Santa Fe, NM. 6-11 May 2010.

C. Attendance at Professional Meetings

W.H. Brandenburg

- 34th Annual Larval Fish Conference, Santa Fe NM 30 May-3 June

A.S. Burdett

- North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography) Santa Fe, NM. 6-11 May 2010

T.J. Krabbenhoft

- 34th Annual Larval Fish Conference, Santa Fe NM 30 May-3 June 2010

C.A. Love

- North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography) Santa Fe, NM. 6-11 May 2010

M.J. Osborne

- Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010.
- North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography) Santa Fe, NM. 6-11 May 2010

T.J. Pilger

- Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010.

S.T. Ross

- Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010.
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A.M. Snyder

- 34th Annual Larval Fish Conference, Santa Fe NM 30 May-3 June 2010
- Joint Meetings of Ichthyologists and Herpetologists (JMIH): 26th for American Elasmobranch Society, 53rd for Society for the Study of Amphibians and Reptiles, 68th for Herpetologists' League, and 90th for American Society of Ichthyologists and Herpetologists. Providence RI. 7-12 July 2010

T.F. Turner

- North American Benthological Society 58th Annual Meeting (joint meeting with American Society for Limnology and Oceanography) Santa Fe, NM. 6-11 May 2010
- Desert Fishes Council 42nd Annual Meeting, Moab, UT. 18-21 November 2010

D. Service as Editor or on Editorial Board of a Journal**T.F. Turner**

- Contributing Editor, Aquatic Biology, Springer Scientific Publishers, 2008 – 2011.

E. Service as Officer of Professional Society/Organization**S.P. Platania**

- Member, Endowment and Finance Committee, American Society of Ichthyologists and Herpetologists, 2008-2012

T.F. Turner

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

S.T. Ross

- Member, Nominating Committee, American Society of Ichthyologists and Herpetologists 2009-2010.
- Member, Long Range Planning and Policy Committee, American Society of Ichthyologists and Herpetologists, 2007-2011.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

A.S. Burdett. Guest lecture *Stable Isotopes and Food Web Ecology*. Biol. 495 Limnology, C. Dahm, University of New Mexico. 23 April 2010

A.S. Burdett and C.A. Love. Finding nematodes: Food web ecology in the Rio Grande, New Mexico. Albuquerque BioPark. 2 October 2010

M.A. Farrington. Results of 2009 larval Colorado pikeminnow (*Ptychocheilus lucius*) and 2008 larval razorback sucker (*Xyrauchen texanus*) surveys. Presented to San Juan River Basin Recovery Implementation Program, Biology Committee, Civic Center, Farmington, New Mexico. February 2010.

T.F. Turner. Guest lecturer *Ichthyological Collections: Scope, Issues, and Potential for Integration* Integrated Inventories Course, University of New Mexico, J. Cook instructor, 25 October 2010.

T.F. Turner. Guest lecturer *Fishes of New Mexico* Natural History of the Southwest, U. Shepherd, University of New Mexico, Honors Program, 7 October 2010.

T.F. Turner. Guest lecturer *Fishes of Costa Rica* Tropical Biology, J. Cook and M. Ryan, University of New Mexico, February 2010.

T.F. Turner. *Comparative phylogeography of abundant and highly migratory prochilodontid fishes in rivers of northern South America*. Instituto de Ecología y Evolución, Universidad Austral de Chile, Valdivia, Chile. November, 2010

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

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

- Database Management System Ad Hoc Work Group, Middle Rio Grande Endangered Species Collaborative Program. April 2008 – present
- San Acacia Reach Ad Hoc Work Group, Middle Rio Grande Endangered Species Collaborative Program. September 2009 – 2010
- Invited external proposal reviewer: CALFED Delta Science Program

R.K. Dudley

- Technical Advisor, Recovery Team for Rio Grande silvery minnow (*Hybognathus amarus*), US Fish and Wildlife Service.
- Technical Advisor, Middle Rio Grande Endangered Species Act Collaborative Program, PVA Biology Group.

T.J. Krabbenhoft

- Member, Publication Reimbursement Committee, Department of Biology, University of New Mexico.
- Graduate Student Representative, Graduate Application Review Committee, Department of Biology, University of New Mexico.
- Secretary, Biology Graduate Student Association, 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.
- Invited External Proposal Reviewer: CALFED: Delta Science Program

S.P. Platania

- Member, Committee on Endangered and Threatened Fish Species, American Fisheries Society.

S.T. Ross

- Member, Peer Review Panel, San Juan River Basin Recovery Implementation Program.
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T.F. Turner

- Museum of Southwestern Biology Executive Committee (Chair)
- UNM Biology Department Space Committee
- UNM Biology Department Tenure and Promotion Committee
- UNM Biology Comparative Evolutionary Immunologist Search Committee
- UNM Biology Department Administrator Search Committee
- UNM Arts & Sciences Council of Chairs and Directors
- UNM Museum Collections Committee
- UNM Museum Studies Committee
- UNM Representative Colorado Plateau Cooperative Ecosystems Study Unit
- Invited external proposal reviewer: CALFED Delta Science Program

D. Journal Referee

T.J. Krabbenhoft Canadian Journal of Zoology (1)

M.J. Osborne Journal of Biogeography (1), Transactions of the American Fisheries Society (1), Molecular Phylogenetics and Evolution (1), Aquatic Biology (1)

T.J. Pilger Ecology of Freshwater Fish (1), Fisheries (1), Western North American Naturalist (1)

T.F. Turner Conservation Genetics (2), Evolutionary Applications (1), Limnology and Oceanography (1), Oikos (1); Grant proposal reviews National Science Foundation (2), National Science and Education Research Council-Canada (1)

E. Hosting Professional Colloquia and Groups NONE

10. SERVICE

A. Symposia, Workshops, Conferences etc. Sponsored, Organized, Held, etc. NONE

B. Public Service

A.S. Burdett

- Judge at Amy Biehl High School Science Fair
- Regional judge for Central NM Science and Engineering Research Challenge
- Judge for Research Day, UNM Biology Department
- Judge at North American Benthological Society Annual Meeting

R.K. Dudley

- Technical and scientific advisory role for the conservation and management of threatened and endangered native fishes for the New Mexico Department of Game and Fish, US Army Corps of Engineers, US. Bureau of Reclamation, and the US Fish and Wildlife Service. 1999 - present

A.M. Snyder

- Voting Member, Institutional Animal Care and Use Committee (IACUC) Main Campus University of New Mexico, June 2010 – July 2013

T.F. Turner

- Gila Trout Recovery Team Member, US Fish and Wildlife Service, 2010

- Rio Grande silvery minnow Genetics and Propagation Workgroup Member, Middle Rio Grande Endangered Species Collaborative Program, 2010
- Participant in AIM-UP! Program whose goal is to integrate natural history museum specimens and data in undergraduate education – organizational meeting in Santa Fe, 15 October 2010.

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

- **Krabbenhoft T.J.** Grove Doctoral Memorial Scholarship, Department of Biology, University of New Mexico. \$10,000

12. DONATIONS AND GIFTS RECEIVED

Six unopened buckets of Carolina Biological Supply fish specimens from St Pius XII High School, Albuquerque. Redistributed to middle school science labs.

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

Museum Research Assistants

Trevor J. Krabbenhoft, UNM Biology Ph.D. candidate

D. Scott Nacke, UNM Art Ph.D. student

Hemishilpa Kalagara, UNM Engineering Ph.D. student

MSB Fishes Graduate Students, UNM Biology

Mary A. Brandenburg, M.Sci. student

Trevor J. Krabbenhoft, Ph.D. candidate

Corey A. Love, M.Sci. student

Sierra L. Netz, M.Sci. student

Tyler J. Pilger, Ph.D. student

Steven D. Scholle, M.Sci. student

C. Undergraduate Students

Curatorial Assistants

Stephani L. Clark, A&S Biology

Kaitlin M. Hulsbos, A&S Earth and Planetary Sciences

Chanel S. Jim, A&S Biology

Kristyn M. McDonald, A&S Biology

Kylie R. Naegele, A&S Biology

Teodulo E. Ortega, A&S Biology

Undergraduate Research Students

Rebecca J. Bixby and Ayesha S. Burdett Student Mentorship

Nathan Lopez-Brody, research assistant

Jessica M. Esquibel, research assistant and senior research project:

Effects of nitrogen as a limiting resource on aquatic abundance and richness

Ayesha S. Burdett Student Mentorship

Harmony Lu (Brown University), Sevilleta summer REU student

Thomas F. Turner and Ayesha S. Burdett Student Mentorship

Raphaelita K. Bishara, UNO student

Erica L. Johnson, research assistant

Jennifer S. Kraus, research assistant

Corey A. Love, research assistant

Matthew F. Peralta, UNO student

Kayla R. Sayre, REU student and research assistant

Thomas F. Turner and Megan J. Osborne Student Mentorship

Tracy Diver, Turner Lab Research Assistant

Alana Sharp, Turner Lab Research Assistant

Thomas F. Turner and Tyler J. Pilger Student mentorship

Jesse D. Trujillo, UNO student

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 SW Ichthyological Research, Albuquerque

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

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

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

Michael Collyer, Ph.D. Stephen F. Austin State University, Nacogdoches

Thomas E. Dowling, Ph.D. Arizona State University, Tempe

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

Michael A. Farrington, American SW Ichthyological Researchers, Albuquerque

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

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

Norman Mercado Silva, Ph.D. University of Arizona, Tucson

Division of Genomic Resources

1. DIVISION HIGHLIGHTS

The Division of Genomic Resources (DGR) of the Museum of Southwestern Biology (MSB) is a centralized repository for cryogenic material from all MSB divisions at the University of New Mexico and other individuals and institutions worldwide for which archival agreements are extant. The DGR frozen tissue collection is taxonomically broad and contains multiple tissue samples from over 200,000 specimens, including Mammals, Birds, Reptiles and Fishes. The collection is ranked as one of the largest collections of its kind worldwide. In total, 18,800 new NK numbers were issued to the MSB mammal division and used to NK mammal specimens in DGR. The collection manager processed 36 outgoing loans for mammals and 5 loans for the bird division, containing 6,151 individual specimens to 19 states, 2 foreign countries, including 11 tissue loans for UNM students.

2. TABLE OF COLLECTION USE

Collection Growth (Specimens catalogued)	Outgoing Loans (loans/ specimen)	Incoming Loans (loans/specimen)	Visitors	Responses to Information Requests	Publications 2010 Citing MSB Specimens from DGR Loans
18,800/10,000	41/6151	0/0	50	100	43

3. COURSES USING THE COLLECTIONS.

UNM BIOL 386L General Vertebrate Zoology

UNM BIOL 489 Mammalogy

UNM Natural Sciences 262L

BIOL 400 (Fall) Senior Honors Thesis

BIOL 599 Master's Thesis

BIOL 699 Dissertation

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

See Mammal Division Report, Joseph Cook for specific activity.

B. Graduate Students

See Mammal Division Report, Joseph Cook for specific activity.

5. COLLECTION MANAGEMENT

This year, the DGR collection manager focused on loan processing, specimen archiving, maintaining the publication database, database record cleaning, and equipment maintenance. Publications resulting from all DGR tissue loans to date have been entered into the ARCTOS database, and associated links to GenBank are finished and available to the public.

Current projects generating specimens for DGR

Beringian Coevolution Project - NSF
Mexican wolf reintroduction – USFWS (130 blood samples, 12 whole animals)
Mongolian Vertebrate Parasite Project – NSF (800 specimens)
Chilean Hantavirus Project – ICIDR NIH
Panama Hantavirus – ICIDR NIH
Panama Climate Change Project - STRI/Gorgas
Bighorn Sheep Reintroduction Program – NMGF (18 *Puma concolor*)
ISLES
Mongolia
Western U.S.
Mammalogy Class
James Derr *Bison bison* DNA cards(5000)
Nevada Test site hantavirus project (400 specimens)
Valles Caldera National Preserve
Cook-graduate students-Frogs, Pumas, Bears
Peru Birds-Witt
Mammal & Bird Prep Room
USGS

Freezer Space:

We still have not been able to replace all of our missing freezers and still remain space challenged with no back-up freezer.

Specimens removed from the collection:

CDC decided not to take the oral swab specimens (11,577) and they are being re-archived in DGR.

Old Projects Cleaned Up by DGR

Russian specimens 250 specimens with multiple tubes.
Re-Nk of double specimens 200.
Finish NK of Bison specimens.
Archived room temperature DNA.
Bears and Mountain Lions.
NK Wolverine Tongues.

MSB specimens 2010 including 4, 184 specimens, 331 species.

Count Scientific_Name

4	<i>Abrothrix longipilis</i>	14	<i>Catharus guttatus</i>
9	<i>Abrothrix olivaceus</i>	1	<i>Catharus ustulatus</i>
2	<i>Accipiter striatus</i>	1	<i>Catherpes mexicanus</i>
2	<i>Aegolius acadicus</i>	1	<i>Certhia americana</i>
1	<i>Agelaius phoeniceus</i>	88	<i>Cervus elaphus</i>
1	<i>Aimophila cassinii</i>	88	<i>Chaetodipus formosus</i>
33	<i>Allactaga balikunica</i>	2	<i>Chaetodipus hispidus</i>
59	<i>Allactaga bullata</i>	2	<i>Chaetodipus penicillatus</i>
4	<i>Allocrietulus curtatus</i>	4	<i>Chamaea fasciata</i>
10	<i>Alticola</i>	2	<i>Chondestes grammacus</i>
13	<i>Alticola semicanus</i>	1	<i>Chrysolophus amherstiae</i>
37	<i>Ammospermophilus leucurus</i>	1	<i>Chrysolophus pictus</i>
1	<i>Amphispiza belli</i>	2	<i>Cistothorus palustris</i>
4	<i>Amphispiza bilineata</i>	21	<i>Clethrionomys rufocanus</i>
2	<i>Aphelocoma californica</i>	1	<i>Coccythraustes vespertinus</i>
1	<i>Aphelocoma ultramarina</i>	1	<i>Coccythraustes vespertinus brooksi</i>
1	<i>Ara macao</i>	1	<i>Coccythraustes vespertinus montanus</i>
2	<i>Archilochus alexandri</i>	7	<i>Colaptes auratus</i>
1	<i>Arthropoda</i>	1	<i>Colaptes auratus auratus</i>
1	<i>Asio otus</i>	2	<i>Corvus brachyrhynchos</i>
6	<i>Baeolophus inornatus</i>	3	<i>Corvus brachyrhynchos hesperis</i>
1	<i>Baeolophus ridgwayi</i>	4	<i>Cricetulus longicaudatus</i>
1	<i>Baeolophus wollweberi</i>	11	<i>Cricetulus migratorius</i>
5	<i>Bassariscus astutus</i>	1	<i>Crocidura sibirica</i>
9	<i>Blarina brevicauda</i>	7	<i>Cyanocitta stelleri</i>
3	<i>Branta canadensis</i>	1	<i>Cygnus buccinator</i>
8	<i>Bubo virginianus</i>	1	<i>Cynomys gunnisoni</i>
1	<i>Bubo virginianus pinorum</i>	1	<i>Dendroica coronata</i>
6	<i>Bufo boreas</i>	1	<i>Dendroica coronata auduboni</i>
1	<i>Buteo jamaicensis</i>	2	<i>Dendroica graciae</i>
1	<i>Buteo swainsoni</i>	2	<i>Dendroica nigrescens</i>
3	<i>Calypte anna</i>	1	<i>Dendroica pensylvanica</i>
1	<i>Campylorhynchus brunneicapillus</i>	2	<i>Dendroica townsendi</i>
3	<i>Canis lupus</i>	25	<i>Didelphis marsupialis</i>
58	<i>Canis lupus baileyi</i>	168	<i>Dipodomys merriami</i>
1	<i>Capra hircus</i>	14	<i>Dipodomys microps</i>
1	<i>Caprimulgus vociferus</i>	1	<i>Dipodomys ordi</i>
2	<i>Cardellina rubrifrons</i>	9	<i>Dipodomys spectabilis</i>
3	<i>Cardellina rubrifrons</i>	28	<i>Dipus sagitta</i>
13	<i>Cardiocranius paradoxus</i>	1	<i>Dumetella carolinensis</i>
1	<i>Carduelis pinus</i>	4	<i>Ellobius tancrei</i>
2	<i>Carpodacus cassinii</i>	2	<i>Empidonax minimus</i>
1	<i>Carpodacus cassinii vinifer</i>	1	<i>Empidonax occidentalis</i>
1	<i>Carpodacus mexicanus frontalis</i>	1	<i>Empidonax traillii</i>
12	<i>Castor canadensis</i>	4	<i>Enhydra lutris</i>
1	<i>Catharus fuscescens</i>	1	<i>Eptesicus fuscus</i>

49	<i>Eptesicus gobiensis</i>	1	<i>Marmosa canescens</i>
2	<i>Eptesicus serotinus</i>	5	<i>Marmosa robinsoni</i>
1	<i>Equus caballus</i>	1	<i>Marmosops</i>
3	<i>Euchoreutes naso</i>	4	<i>Marmosops invictus</i>
1	<i>Eudromia elegans</i>	3	<i>Marmota flaviventris</i>
2	<i>Falco columbarius</i>	2	<i>Marmota sibirica</i>
1	<i>Falco mexicanus</i>	1	<i>Martes</i>
1	<i>Falco peregrinus nesiotus</i>	16	<i>Martes americana</i>
1	<i>Falco sparverius</i>	3	<i>Martes caurina</i>
1	<i>Gazella subgutturosa</i>	2	<i>Megascops kennicottii</i>
4	<i>Gazella subgutturosa</i>	5	<i>Melanerpes formicivorus</i>
1	<i>Geococcyx californianus</i>	1	<i>Melospiza melodia</i>
16	<i>Grus canadensis</i>	1	<i>Mephitis mephitis</i>
5	<i>Grus canadensis canadensis</i>	34	<i>Meriones meridianus</i>
1	<i>Grus canadensis rowani</i>	19	<i>Meriones unguiculatus</i>
6	<i>Gulo gulo</i>	5	<i>Metachirus nudicaudatus</i>
7	<i>Hemiechinus auritus</i>	2	<i>Microtus</i>
12	<i>Heteromys desmarestianus</i>	4	<i>Microtus gregalis</i>
1	<i>Himantopus mexicanus</i>	222	<i>Microtus longicaudus</i>
1	<i>Hirundo rustica</i>	30	<i>Microtus miurus</i>
1	<i>Hylocichla mustelina</i>	121	<i>Microtus montanus</i>
2	<i>Icteria virens</i>	48	<i>Microtus oeconomus</i>
2	<i>Icterus bullockii</i>	54	<i>Microtus pennsylvanicus</i>
1	<i>Ictinia mississippiensis</i>	5	<i>Microtus richardsoni</i>
1	<i>Junco</i>	1	<i>Mniotilta varia</i>
2	<i>Junco hyemalis</i>	3	<i>Molothrus ater</i>
2	<i>Junco hyemalis caniceps</i>	8	<i>Mus musculus</i>
1	<i>Junco hyemalis dorsalis</i>	10	<i>Mustela erminea</i>
1	<i>Junco hyemalis mearnsi</i>	2	<i>Mustela frenata</i>
1	<i>Lanius ludovicianus</i>	1	<i>Mustela nivalis</i>
2	<i>Lasionycteris noctivagans</i>	3	<i>Myadestes townsendi</i>
37	<i>Lasiopodomys brandti</i>	2	<i>Myiarchus cinerascens</i>
40	<i>Lemmiscus curtatus</i>	1	<i>Myodes</i>
3	<i>Lemmus trimucronatus</i>	30	<i>Myodes gapperi</i>
11	<i>Lepus americanus</i>	112	<i>Myodes rutilus</i>
2	<i>Lepus californicus</i>	1	<i>Myotis lucifugus</i>
14	<i>Lepus tolai</i>	8	<i>Myotis mystacinus</i>
1	<i>Leucosticte atrata</i>	1	<i>Myotis volans</i>
9	<i>Leucosticte australis</i>	35	<i>Neotoma albigula</i>
4	<i>Leucosticte tephrocotis</i>	8	<i>Neotoma cinerea</i>
26	<i>Liomys adspersus</i>	14	<i>Neotoma lepida</i>
1	<i>Lontra canadensis</i>	44	<i>Neotoma mexicana</i>
2	<i>Lophura edwardsi</i>	7	<i>Neovison vison</i>
1	<i>Lophura leucomelanos williamsi</i>	6	<i>Ochotona pallasi</i>
7	<i>Loxia curvirostra</i>	5	<i>Odocoileus hemionus</i>
1	<i>Marmosa</i>	2	<i>Oligoryzomys flavescens</i>

1	<i>Oligoryzomys fulvescens</i>	2	<i>Poocetes gramineus</i>
3	<i>Oligoryzomys longicaudatus</i>	1	<i>Poecetes gramineus</i>
4	<i>Onychomys arenicola</i>	4	<i>Procyon lotor</i>
11	<i>Onychomys torridus</i>	1	<i>Proechimys semiespinosus</i>
1	<i>Onychoprion fuscatus</i>	24	<i>Proechimys semispinosus</i>
1	<i>Oporornis tolmiei</i>	7	<i>Proechimys semispinosus panamensis</i>
4	<i>Oreoscoptes montanus</i>	4	<i>Quiscalus mexicanus</i>
2	<i>Oryzomys</i>	1	<i>Rallus limicola</i>
1	<i>Oryzomys alfaroi</i>	7	<i>Rattus rattus</i>
1	<i>Oryzomys rostratus</i>	1	<i>Recurvirostra americana</i>
1	<i>Otospermophilus variegatus</i>	2	<i>Regulus calendula</i>
1	<i>Otus flammeolus</i>	1	<i>Regulus satrapa</i>
2	<i>Passer domesticus</i>	9	<i>Reithrodontomys megalotis</i>
4	<i>Perisoreus canadensis</i>	3	<i>Salpinctes obsoletus</i>
1	<i>Perognathus flavus</i>	3	<i>Salpingotus kozlovi</i>
10	<i>Perognathus parvus</i>	1	<i>Sayornis phoebe</i>
2	<i>Peromyscus</i>	1	<i>Sayornis saya</i>
17	<i>Peromyscus boylii</i>	1	<i>Scolopax minor</i>
25	<i>Peromyscus eremicus</i>	1	<i>Seiurus noveboracensis</i>
142	<i>Peromyscus keeni</i>	1	<i>Selasphorus rufus</i>
687	<i>Peromyscus maniculatus</i>	1	<i>Sialia currucoides</i>
2	<i>Peucedramus taeniatus</i>	30	<i>Sigmodon hirsutus</i>
2	<i>Phainopepla nitens</i>	5	<i>Sitta canadensis</i>
4	<i>Phalaenoptilus nuttalli</i>	1	<i>Sitta carolinensis</i>
3	<i>Pheucticus melanocephalus</i>	1	<i>Sitta pygmaea</i>
3	<i>Philander opossum</i>	17	<i>Sorex</i>
2	<i>Phodopus campbelli</i>	2	<i>Sorex (Otisorex) cinereus</i>
30	<i>Phodopus roborovskii</i>	94	<i>Sorex cinereus</i>
1	<i>Pica hudsonia</i>	5	<i>Sorex hoyi</i>
2	<i>Picoides arizonae</i>	2	<i>Sorex merriami</i>
1	<i>Picoides dorsalis</i>	15	<i>Sorex minutissimus</i>
2	<i>Picoides nuttallii</i>	222	<i>Sorex monticolus</i>
2	<i>Picoides pubescens</i>	1	<i>Sorex nanus</i>
3	<i>Picoides scalaris</i>	32	<i>Sorex palustris</i>
2	<i>Picoides tridactylus</i>	16	<i>Sorex preblei</i>
2	<i>Picoides villosus</i>	35	<i>Sorex tundrensis</i>
4	<i>Pinicola enucleator</i>	84	<i>Sorex ugyunak</i>
4	<i>Pipilo crissalis</i>	31	<i>Sorex vagrans</i>
1	<i>Pipilo fuscus</i>	3	<i>Spermophilus</i>
1	<i>Pipilo maculatus</i>	1	<i>Spermophilus beldingi</i>
1	<i>Piranga flava</i>	8	<i>Spermophilus erythrogenys</i>
7	<i>Piranga ludoviciana</i>	5	<i>Spermophilus lateralis</i>
3	<i>Piranga rubra cooperi</i>	1	<i>Spermophilus pallidicauda</i>
1	<i>Poecile</i>	2	<i>Spermophilus parryii</i>
2	<i>Poecile gambeli</i>	1	<i>Spermophilus richardsonii</i>
2	<i>Polioptila melanura</i>	25	<i>Spermophilus undulatus</i>

1	<i>Spermophilus variegatus</i>	1	<i>Transandinomys talamancae</i>
5	<i>Sphyrapicus nuchalis</i>	1	<i>Troglodytes aedon</i>
2	<i>Sphyrapicus thyroideus</i>	1	Troglodytidae
2	<i>Spizella pallida</i>	1	<i>Trogon elegans canescens</i>
1	<i>Spizella passerina</i>	5	<i>Turdus migratorius</i>
1	<i>Stelgidopteryx serripennis</i>	1	<i>Tympanuchus pallidicinctus</i>
1	<i>Stellula calliope</i>	1	<i>Tyto alba</i>
1	<i>Sturnella magna</i>	1	<i>Vermivora ruficapilla</i>
1	<i>Sturnella neglecta</i>	16	<i>Vespertilio murinus</i>
30	<i>Stylodipus andrewsi</i>	1	<i>Vireo cassinii</i>
8	<i>Sylvilagus audubonii</i>	1	<i>Vireo griseus</i>
1	<i>Sylvilagus brasiliensis</i>	17	<i>Vireo huttoni</i>
2	<i>Sylvilagus nuttallii</i>	1	<i>Vireo plumbeus</i>
1	<i>Tachycineta thalassina</i>	2	<i>Vireo solitarius</i>
1	<i>Tamias</i>	1	<i>Vormela peregusna</i>
4	<i>Tamias amoenus</i>	1	<i>Vulpes vulpes</i>
39	<i>Tamias minimus</i>	14	<i>Wilsonia pusilla</i>
20	<i>Tamias quadrivittatus</i>	1	<i>Xanthocephalus xanthocephalus</i>
4	<i>Tamiasciurus hudsonicus</i>	144	<i>Zapus princeps</i>
2	<i>Taxidea taxus</i>	1	<i>Zapus princeps princeps</i>
4	<i>Thamnophis elegans</i>	1	<i>Zenaida macroura</i>
10	<i>Thomomys bottae</i>	2	<i>Zonotrichia albicollis</i>
1	<i>Thomomys idahoensis</i>	1	<i>Zonotrichia leucophrys</i>
8	<i>Thomomys talpoides</i>	2	<i>Zonotrichia leucophrys gambelii</i>
1	<i>Thryomanes bewickii</i>	5	<i>Zonotrichia leucophrys oriantha</i>
13	<i>Thylamys elegans</i>	12	<i>Zygodontomys brevicauda</i>
2	<i>Toxostoma curvirostre</i>	3	unidentifiable
3	<i>Toxostoma redivivum</i>		

6. AWARDS, GRANTS, AND CONTRACTS

Cook, J.A.

NSF-DEB 0956129 5/01/2010-4/30/2015

RCN-UBE: Advancing Integration of Museums into Undergraduate Programs (AIM-UP!) (w/ E. Lacey, S. Edwards, S. Ickert-Bond). \$485,648

Wilburforce Foundation

A Test of Landscape Connectivity across the Sky Islands Region using Large Carnivores as Model Organisms---II (co-PI; PI is Gary Roemer, NMSU).

USDA Forest Service

ISLES—Amendment 1 (9/09-12/12)

URM: Undergraduate Nurturing Opportunities (UNO)”; JA Cook, PI; Division of Environmental Biology (DEB) 0731350, National Science Foundation; \$1,010,000, August 1, 2007–August 1, 2012, \$200,155/year (OH \$15,000).

ISLES—Island Survey to Locate Endemics”; J.A. Cook, PI; USDA Forest Service; \$100,000, September 1, 2008–September 1, 2012, \$50,000/year.

Mongolia Vertebrate Parasite Project”; S. Gardner, PI, J.A. Cook, co-PI; Division of Environmental Biology (DEB) 0717214, National Science Foundation; \$466,000, September 11, 2007–September 1, 2009, \$ 210,000/year (grant and OH to University of Nebraska).

Curation, Databasing, and Integration of the Orphaned Illinois Mammal Collection”; J.A. Cook, PI; DEB 0744025, National Science Foundation; \$259,285, February 1, 2008–February 1, 2010. No cost extension through February 2011.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

1. Cook, J. A., and V. Fedorov. 2010. Arctic genetic diversity: heavily shaped by past climate change. *In Arctic Biodiversity and Climate Change Assessment Highlights, Conservation of Arctic Fauna and Flora Committee*. Copenhagen

B. Journal Articles

Cook, J. A.

1. Kang HJ, Arai S, Hope AG, Cook JA, Yanagihara R. 2010. Novel Hantavirus in the Flat-Skulled Shrew (*Sorex roboratus*). *Vector Borne Zoonotic Diseases*. 2010 Apr 28. [Epub ahead of print]
2. Cook, J. A., A. A. Eddingsaas, J. L. Loxterman, S. Ebbert, and S.O. MacDonald. 2010. Insular ground squirrels of the North Pacific: Indigenous or Exotic? *Journal of Mammalogy* 91:1401-1412.
3. Gonzalez, P., Y. E. Sawyer, M. Avila, A. Armien, B. Armien, J. A. Cook. 2010. Variation in Cytochrome-b Haplotypes Suggests a New Species of *Zygodontomys* (Rodentia: Cricetidae) on Isla Coiba, Veraguas, Panama. *Zoologia* 27:660-665.
4. Hope, A. G., E. Walatari, N. E. Dokuchaev, S. Abramov, T. Dupral, H. Henttonen, S. O. MacDonald, and J. A. Cook. 2010. Diversification of the Eurasian least shrew and Alaska tiny shrew (Soricidae) at high latitudes. *Journal of Mammalogy*. 91:1041-1057.
5. Torres-Pérez, F., M. Acuna-Retamar, J. A. Cook, A. Bacigalupo, A. García, P. E. Cattán. 2010. Statistical phylogeography and population dynamics of Chagas disease vector *Triatoma infestans*: testing biogeographic hypotheses of dispersal. *Infection, Genetics, and Evolution*. 11:167-174.
6. Matsumoto, K., J. A. Cook, H. K. Goethert, and S. R. Telford, III. 2010. *Bartonella* sp. infection of voles trapped from an Interior Alaskan site where ticks are absent. *Journal of Wildlife Diseases* 46:173-178.
7. Esteva, M., F. A. Cervantes, S. V. Brant, and J. A. Cook. 2010. Molecular phylogeny of long-tailed shrews (genus *Sorex*) from México and Guatemala. *Zootaxa* 2615:47-65.

8. Weckworth, B., S. Talbot, J. A. Cook. 2010. Phylogeography of wolves (*Canis lupus*) in the Pacific Northwest. *Journal of Mammalogy*. 91:363-375.
9. Torres-Pérez, F., R. E. Palma, M. Ferres, B. Hjelle, J. A. Cook. 2010. Andes virus infection in the rodent reservoir and in humans varies across contrasting landscapes in Chile. *Infection, Genetics and Evolution*. 10:820-825.

A. Web-Based

All MSB publications are available via the web.

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: 2010 Annual Report. Joseph A. Cook & Cheryl A. Parmenter.

C. Theses/Dissertations Complete

1. Crawford, Dolly. 2010. The role of spatial and genetic modeling to biogeography. Ph.D. dissertation. University of New Mexico.
2. De La Sancha, Noe. 2010. Effects of habitat fragmentation on non-volant small mammals of the interior atlantic forest of eastern Paraguay. PhD dissertation, Texas Tech University.
3. Indorf, Jane Leah. 2010. Phylogeography of the Marsh Rice Rat (*Oryzomys palustris*) in Wetlands of the Southeastern United States. Ph.D. dissertation, University of Miami.
4. Malone, Margaret E. 2010. Increasing the Use and Value of Collections: Finding DNA. Master's thesis, Baylor University.
5. Mantooth, Stacy James. 2010. From the valleys to the mountains: The biographic history of antelope squirrels, bats, and chipmunks in Western North America. Ph.D. dissertation, University of Nevada Las Vegas.

F. Work In Progress

Projects

See Mammal Division Report, Joseph Cook for specific activity.

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

1. Ana Paula Cutrera, Eileen A. Lacey, Matias S. Mora, Enrique P. Lessa. 2010. Effects of contrasting demographic histories on selection at major histocompatibility complex loci in two sympatric species of tuco-tucos (Rodentia: Ctenomyidae). *Biological Journal of the Linnean Society* 99:260-277.
2. Anna A. Bannikova, Nikolai E. Dokuchaev, Eugenia V. Yudina, Anatoly V. Bobretzov, Boris I. Sheftel, Vladimir S. Lebedev. 2010. Holarctic phylogeography of the tundra

- shrew (*Sorex tundrensis*) based on mitochondrial genes. *Biological Journal of the Linnean Society* 101:721-746.
3. Brian Hjelle and Fernando Torres-Perez. 2010. Hantaviruses in the Americas and Their Role as Emerging Pathogens 2:2559-2586.
 4. Charlotte Lindqvist, Stephan C. Schuster, Yazhou Sun, Sandra Talbot, Ji Qi, Aakrosh Ratan, Lynn P. Tomsho, Lindsay Kasson, Eve Zeyl, Jon Aars, Webb Miller, Olafur Ingolfsson, Lutz Bachmann, Oystein Wiig. 2010. Complete mitochondrial genome of a Pleistocene jawbone unveils the origin of polar bear. *Proceedings of the National Academy of Sciences of the United States of America* 107(11):5033-5057.
 5. Eduardo Eizirik, William J. Murphy, Klaus Koepfli, Warren E. Johnson, Jerry W. Dragoo, Robert K. Wayne, Stephen J. O'Brien. 2010. Pattern and timing of diversification of the mammalian order Carnivora inferred from multiple nuclear gene sequences. *Molecular Phylogenetics and Evolution* 56:49-63.
 6. Eliecer E. Gutierrez, Sharon A. Jansa, Robert S. Voss. 2010. Molecular Systematics of Mouse Opossums (Didelphidae: Marmosa): Assessing Species Limits using Mitochondrial DNA Sequences, with Comments on Phylogenetic Relationships and Biogeography. *American Museum Novitates* 3692:1-22.
 7. Enrique P. Lessa, Guillermo D'Elia, Ulyses F. J. Pardinas. 2010. Genetic footprints of late Quaternary climate change in the diversity of Patagonian-Fuegian rodents. *Molecular Ecology* 19:3031-3037.
 8. J. Delton Hanson, Jane L. Indorf, Vicki J. Swier, Robert D. Bradley. 2010. Molecular divergence within the *Oryzomys palustris* complex: evidence for multiple species. *Journal of Mammalogy* 91(2):336-347.
 9. Jacob A. Esselstyn and Carl H. Oliveros. 2010. Colonization of the Philippines from Taiwan: a multi-locus test of the biogeographic and phylogenetic relationships of isolated populations of shrews. *Journal of Biogeography* 37(8):1504–1514.
 10. John P. Maher, Christine Ellis, Kenneth L. Gage, Russell Enscoe, A Townsend Peterson. 2010. Rangewide Determinants of Plague Distribution in North America. *American Journal of Tropical Medicine and Hygiene* 83(4):736-742.
 11. Jorge Salazar-Bravo, Julieta Vargas, Agustin Jimenez-Ruiz, Jay M. Savage. 2010. A new record of *Atractus boettgeri* (Serpentes: Colubridae), with notes on taxonomy and natural history. *Revista Mexicana de Biodiversidad* 81:925-929.
 12. Juliana Notarnicola, F. Agustin Jimenez-Ruiz, Scott L. Gardner. 2010. Litomosoides (Nemata: Filarioidea) Of Bats From Bolivia With Records For Three Known Species And The Description Of A New Species. *Journal of Parasitology* 96(4):775-782.
 13. Kayce C. Bell, David J. Hafner, Philip Leitner, Marjorie D. Matocq. 2010. Phylogeography of the ground squirrel subgenus *Xerospermophilus* and assembly of the Mojave Desert biota. *Journal of Biogeography* 37:363-378.
 14. Martha Esteva, Fernando A. Cervantes, Sara V. Brant, Joseph A. Cook. 2010. Molecular phylogeny of long-tailed shrews (genus *Sorex*) from Mexico and Guatemala. *Zootaxa* 2615:47-65.
 15. Sean Neiswenter and Brett R. Riddle. 2010. Diversification of the *Perognathus flavus* species group in emerging arid grasslands of western North America. *Journal of Mammalogy* 91(2):348-362.

16. Sergio E. Bermudez C., Publio Gonzalez-Dominguez, Mario Avila, Roberto Miranda, Anibal Armien, Blas Armien. 2010. Parasitism of *Cuterebra* sp. (Diptera: Oestridae s.l.) on rodents of Central Panama. *Revista Mexicana de Biodiversidad* 81:57-60.
17. Zachary P. Roehrs, Justin B. Lack, and Ronald A. Van Den Bussche. 2010. Tribal phylogenetic relationships within Vespertilioninae (Chiroptera: Vespertilionidae) based on mitochondrial and nuclear sequence data. *Journal of Mammalogy* 91(5):1073-1092.
18. Justin B. Lack, Zachary P. Roehrs, Craig E. Stanley Jr., Manuel Ruedi, and Ronald A. Van Den Bussche. 2010. Molecular phylogenetics of *Myotis* indicate familial-level divergence for the genus *Cistugo* (Chiroptera). *Journal of Mammalogy* 91(4):976-992.
19. Carola Cañón, Guillermo D'Elía, Ulyses F. J. Pardiñas, and Enrique P. Lessa. 2010. Phylogeography of *Loxodontomys micropus* with comments on the alpha taxonomy of *Loxodontomys* (Cricetidae: Sigmodontinae). *Journal of Mammalogy* 91(6):1449-1458.
20. Dana N. Lee, Russell S. Pfau, and Loren K. Ammerman. 2010. Taxonomic status of the Davis Mountains cottontail, *Sylvilagus robustus*, revealed by amplified fragment length polymorphism. *Journal of Mammalogy* 91(6):1473-1483.
21. R. Eduardo Palma, Ricardo A. Cancino, and Enrique Rodríguez-Serrano. 2010. Molecular systematics of *Abrothrix longipilis* (Rodentia: Cricetidae: Sigmodontinae) in Chile. *Journal of Mammalogy* 91(5):1102-1111.
22. Thomas C. Giarla, Robert S. Voss, and Sharon A. Jansa. 2010. Species Limits and Phylogenetic Relationships in the Didelphid Marsupial Genus *Thylamys* Based on Mitochondrial DNA Sequences and Morphology. *Bulletin of the American Museum of Natural History* Number 346:1-67.
23. Rogério V. Rossi, Robert S. Voss, and Darrin P. Lunde. 2010. A Revision of the Didelphid Marsupial Genus *Marmosa* Part 1. The Species in Tate's 'Mexicana' and 'Mitis' Sections and Other Closely Related Forms. *Bulletin of the American Museum of Natural History* Number 334:1-83.
24. Terry R. Haverkost and Scott L. Gardner. 2010. New Species in the Genus *Monoecocestus* (Cestoda: Anoplocephalidae) From Neotropical Rodents (Caviidae and Sigmodontinae). *Journal of Parasitology* 96(3):580-595.
25. Justin B. Lack, Jeremy E. Wilkinson and Ronald A. Van Den Bussche. 2010. Range-Wide Population Genetic Structure of the Pallid Bat (*Antrozous pallidus*) -Incongruent Results from Nuclear and Mitochondrial DNA. *Acta Chiropterologica* December 2010:401-413
26. Luca Fontanesi, Lionel Forestier, Daniel Allain, Emilio Scotti, Francesca Beretti, Séverine Deretz-Picoulet, Elena Pecchioli, Cristiano Vernesi, Terence J. Robinson, Jason L. Malaney, Vincenzo Russo and Ahmad Oulmouden. 2010. Characterization of the rabbit agouti signaling protein (*ASIP*) gene: Transcripts and phylogenetic analyses and identification of the causative mutation of the nonagouti black coat colour. *Genomics* 95(3):166-175.
27. Krithi K. Karanth, James D. Nichols, K. Ullas Karanth, James E. Hines and Norman L. Christensen, Jr. 2010. The shrinking ark: patterns of large mammal extinctions in India. *Proc. R. Soc. B* 277, 1971-1979.
28. Leslie N. Carraway. 2010. Fossil History of *Notiosorex* (Soricomorpha: Soricidae) Shrews with Descriptions of New Fossil Species. *Western North American Naturalist* 70(2):144-163.

29. Sergio Solari. 2010. A molecular perspective on the diversification of short-tailed opossums (Monodelphis: Didelphidae). *Mastozoología Neotropical* 17(2):317-333.
30. Luis Ignacio Ferro, Juan Jose Martinez, Ruben M. Barquez. 2010. A new species of *Phyllotis* (Rodentia, Cricetidae, Sigmodontinae) from Tucuman province, Argentina. *Mammalian Biology* 75(6):523-537.
31. Kurt E. Galbreath, David J. Hafner, Kelly R. Zamudio and Kelly Agnew. 2010. Isolation and introgression in the Intermountain West: contrasting gene genealogies reveal the complex biogeographic history of the American pika (*Ochotona princeps*). *Journal of Biogeography* 37, 344–362.
32. Diego Astua. 2010. Cranial sexual dimorphism in New World marsupials and a test of Rensch's rule in Didelphidae. *Journal of Mammalogy* 91(4):1011–1024.
33. Megan M. Friggens, Robert R. Parmenter, Michael Boyden, Paulette L. Ford, Kenneth Gage, and Paul Keim. 2010. Flea abundance, diversity, and plague in Gunnison's prairie dogs (*Cynomys gunnisoni*) and their burrows in montane grasslands in northern New Mexico. *Journal of Wildlife Diseases* 46(2):356–367.
34. Joshua W. Campbell, Michael T. Mengak, Steven B. Castleberry and Jason D. Mejia. 2010. Distribution and Status of Uncommon Mammals in the Southern Appalachian Mountains. *Southeastern Naturalist* 9(2):275-302.

8. ACTIVITIES IN LEARNED SOCIETIES.

A. Invited or plenary talks

J.A. Cook "Molecular genetic perspectives on the Arctic". Gilleje, Denmark. Arctic Biodiversity Workshop, Conservation of Arctic Fauna and Flora. March 2010.

B. Contributed Talks/Posters

1. Kang, Hae Ji, W. Stanley, J. Esselstyn, S. N. Bennett, J. A. Cook, R. Yanagihara. Expanded Framework of Hantavirus Evolution from Newly Identified Myosoricine Shrew Hosts in Tanzania. American Society of Tropical Medicine and Hygiene, Atlanta. November 2010.
2. Galbreath, K., J. A. Cook, A. Eddingsaas, E. G. DeChaine. Colonization and climate in Beringia: Multilocus tests of paleodistribution models reveal deep and shallow histories for arctic ground squirrels. American Society of Mammalogists annual meeting, Laramie, Wyoming June 2010.
3. Hope, A., N. Takebayashi, S. L. Talbot, and J. A. Cook. Comparative phylogeography of small mammals across Beringia. American Society of Mammalogists annual meeting, Laramie, Wyoming June 2010.
4. Malaney, J. and J. Cook. Statistical phylogeography of the western jumping mouse (*Zapus princeps*): Testing alternative hypotheses. American Society of Mammalogists annual meeting, Laramie, Wyoming June 2010.
5. Kang, H-J, A. G. Hope, J. A. Cook, and R. Yanagihara. Molecular Phylogeny of Newfound Hantaviruses in the Laxmann's Shrew (*Sorex caecutiens*) and Flat-skulled Shrew (*Sorex roboratus*) in Russia. American Society of Virology, Bozeman, May 2010. Kang, H-J, S. N. Bennett, A. G. Hope, L. Dizney, L. A. Ruedas, J. A. Cook, and R. Yanagihara. Multiple sympatric and syntopic *Sorex* species in North America harbor Jemez Springs Virus. International Hantavirus Congress, Athens May 2010

D. Attendance at professional meetings. Contributed talks or posters

Cook, J.A.

American Society of Mammalogists, Annual Meeting, Laramie, Wyoming, June 2010

D. Service as editor or on editorial board of a journal.

Cook, J.A.

Zoologia, September 1, 2008–September 1, 2012.

E. Service as officer of professional society or organization.

Cook, J.A.

Member, Board of Directors, American Society of Mammalogists (elected) 2007-2010.

9. OTHER PROFESSIONAL ACTIVITIES.

A. Colloquium Presentations.

See Mammal Division Report, Joseph Cook for specific activity.

B Presentation to General Audience in a Scholarly Capacity.

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

None.

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

Cook, J.A.

Grant Review Panel, National Science Foundation, 2010.

NSF RCN Oversight Panel NSF, 2010

Member, MSB Executive Committee

Editorial Board, MSB Publications Series

Member, Resolutions Committee, American Society of Mammalogists

Chair, Latin American Scholarship Committee, American Society of Mammalogists

E. Journal Referee.

Cook, J.A.

Journal of Mammalogy (1)

Evolution (1)

Hosting Professional Colleagues and Groups

42 visiting academics and professionals from 25 outside institutions or departments visited the collections for research purposes.

Cook personally hosted the following individuals:

Dr. Enrique Lessa, Universidad Nacional, Montivideo, Uruguay

Dr. Eric Hoberg, National Parasite Lab, Beltsville.

10. SERVICE.

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

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. Answered all division emails and telephone calls.

Visitors:

Biology New Graduate Students tour. August 2010.

Dr. Robert Baker

Dr. Gary Simpson

Dr. Robert Parmenter

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

See Mammal Division Report for specific activity.

12. DONATIONS AND GIFTS RECEIVED.

None.

13. CURRENT STAFF.

Faculty:

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

Staff:

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

Students:

Jessica Weber: **Graduate Assistant** .05FTE. Fall and Winter semesters.

13. MUSEUM ASSOCIATES.

A. Curatorial Associates

None

B. Research Associates

Robert J. Baker
Troy L. Best

The Museum, Texas Tech University, Lubbock, TX
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 contained more than 123,522 accessioned specimens of vascular and non-vascular plants at the end of 2010.

Interpretive activities or Collections-related Outreach including tours for UNM students and the Native Plant Society of New Mexico and maintaining the Herbarium webpage.

The Herbarium continues to provide the leadership for the statewide collection database, New Mexico Biodiversity Consortium (NMBCC), which serves natural history specimen data via the World Wide Web.

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
4517	20/759	11/475	245	120	

3. COURSES USING THE COLLECTIONS

Bio 463- Flora of New Mexico- Fall 2010

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Manager

Hanson, D.

Biol. 578L- Plant Physiology – 2 Graduate Students

Bio 478L: Plant Physiology - 14 undergrads

BIO 204L: Plant and Animal Form and Function - 175 students

Lowrey, T.K.

Biol. 499, Research Problems.

Biol. 463- Flora of New Mexico- 13 students

B. Graduate Students/Associates

Bixby, R.J.

BIOL 495 – Limnology

5. COLLECTION MANAGEMENT

Herbarium staff processed and added 4517 new acquisitions to the collection. The UNM Herbarium received 35 gifts of specimens, totaling 4517 specimens. The majority of specimens were collected from New Mexico.

The herbarium logged more than 247 visits from the botanical community as well as group visits by schools and organizations. We average 2-3 information requests per week by e-mail and/or phone, and the Biodiversity website receives many hits per month for herbaria in the state.

Accessions for 2010:

- 2010.01 NHNM, Yvonne Chauvin, 115 specimens, Parkinson Ranch –Roosevelt County.
- 2010.02 NHNM, Yvonne Chauvin, 24 specimens
- 2010.03 R. Sivinski, 1 specimen
- 2010.04 Jim McGrath, 136 specimens
- 2010.05 Mike Howard, 9 BLM vouchers for Seeds of Success
- 2010.06 NHNM, Yvonne Chauvin, 14 specimens
- 2010.07 Tim Lowrey, 2 *Townsendia* by R.A. Denham
- 2010.08 Bill Martin (27 Nov. 1923 – 18 Jan. 2010), 93 specimens found in Bill's office.
- 2010.09R. Sivinski 2009 collections, 320 sheets.
- 2010.10IS TC. Steve Okane. One Isotype of *Physaria scrotiformis*.
- 2010.11 Joanne Schleger, NY, 16 specimens Ateraceae and Urticaceae.
- 2010.12 BRY- 24 specimens sent on exchange.
- 2010.13 Jim Nellessen 34 Specimens.
- 2010.14 ASC, Flagstaff. 82 specimens from Ecological Restoration Institute Sites
- 2010.15 College of Santa Fe, 3000 Herbarium specimens - flowering plants and bryophytes.
- 2010.16 Julie Korb, ASC, Flagstaff. 8 exotics from National Parks.
- 2010.17 Sevilleta – found 8 grasses in cabinet.
- 2010.18 Laird McIntosh, 41 old specimens from the Gray Ranch.
- 2010.19 Tim Lowrey's Medicinals, 45 Various from Tim.
- 2010.20 NHNM, Yvonne Chauvin, 161 1992 collections.
- 2010.21 NHNM, Yvonne Chauvin, 93 Riparian and Playa Specimens
- 2010.22 Steve Reed. 11 specimens plus dupes (*Erigeron hessii* and *Townsendia* spp.)
- 2010.23 University of North Dakota, 261 incoming *Sphaeralcea* – John La Duke. (Return 165). Return of Isotype of *S. polychroma*.
- 2010.24 Bill Dunn, UNM graduate student, 2 *Juncus* from Colorado.
- 2010.25 Bob Merkel. 1 *Streptanthella longirostris*.
- 2010.26 Chick Keller. 6 specimens from Northern New Mexico.
- 2010.27 Jack Carter, Silver City. 54 Specimens.
- 2010.28 Rocky Mountain Herbarium (RM). 6 specimens from Guy Nesom and Ron Hartman
- 2010.29 Jane Mygatt. 17 Nettles from California.
- 2010.30 Ellen DeBruin. 33 specimens from the Gray Ranch in Dave Bleakley's Cabinet.

- 2010.31 Ben Legler. RM. 60 *Botrychium* spp. and 27 various taxa.
 2010.32 Gene Jercinovic. 27 specimens from Luna County.
 2010.33 Matt Brooks. 28 specimens with Excel file.
 2010.34 Mark Kalin. 125 Fungal Specimens.
 2010.35 Mike Howard. 56 Seeds of Success Vouchers.

6. AWARDS, GRANTS, AND CONTRACTS

Awarded:

\$382,503 (\$126,921 for 2009-2010). Effects of nutrient availability of periphyton biomass and diversity in the Middle Rio Grande: top-down and bottom-up factors “(P.I.), Middle Rio Grande Endangered Species Act Collaborative Program, Bureau of Reclamation, 2007-2010: **R. Bixby**

\$480,000 (360,000 to UNM). Collaborative Research: Light enhanced ¹³C enrichment of dark respired CO₂: Implications for leaf internal CO₂ 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

\$20,909. *From Benchtop to Raceway: Dynamic biological processes in algal communities*: Sandia National Laboratory subcontract, 06/01/10-09/31/10. David T. Hanson (on subcontract).

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Lowrey, T.K. 2010. An introduction to New Mexico’s Floristic Zones and Vegetation Communities. In *Raptors of New Mexico*, J.L. Cartron, Ed. Albuquerque, NM: UNM Press.

B. Journal Articles

Bickford, C.P., **D.T. Hanson**, N.G. McDowell. Influence of diurnal variation in mesophyll conductance on modeled ¹³C discrimination: results from a field study. *Journal of Experimental Botany*; 61(12):3223-3233; 2010

***journal cover article**

Bixby, R.J. and E.C. Zeek. 2010. A simple method for calculating valve curvature. *Proceedings of the Academy of Natural Sciences, Philadelphia* 160:73-81.

Boykin, L.M., L.S. Kubatko, and **T.K. Lowrey**. . Comparison of methods for rooting phylogenetic trees: A case study using Orcuttieae (Poaceae: Chloridoideae). *Molecular Systematics and Evolution* 54: 687-700; 2010.

Cervantes, S.D., **P.C. Tonne**, R. Govindarajulu, P. Alexander, and C. D. Bailey. 2010. Population genetic analysis of *Argemone pleiacantha* subsp. *pinnatisecta* (Sacramento Prickly Poppy, Papaveraceae) and re-evaluation of its taxonomic status. Botanical Research Institute of Texas.

Graham, L.E., M. E. Cook, **D.T. Hanson**, K. Pigg & J. M. Graham. Rolled liverwort mats explain major Prototaxites features: Response to commentaries. *American Journal of Botany*; 97: 1079-1086; 2010

Graham, L.E., M. E. Cook, **D.T. Hanson**, K. Pigg & J. M. Graham. Structural, physiological, and stable carbon isotopic evidence that the enigmatic Paleozoic fossil *Prototaxites* formed from rolled liverwort mats. *American Journal of Botany*; 97(2):268-275; 2010

***journal cover article**

Lowrey, T. 2010. Plant distribution reports: First New Mexico record of *Malacothrix coulteri*. *The New Mexico Botanist* 51:3.

Powers, H. H., J. Hunt, **D.T. Hanson**, and N.G. McDowell. A dynamic soil chamber system coupled with a tunable diode laser for online measurements of $d^{13}C$, $d^{18}O$, and efflux rate of soil respired CO_2 . *Rapid Communications in Mass Spectrometry*; 24:243-253; 2010

Sivinski, R. 2010. *Ephedra coryi* in Central New Mexico? *New Mexico Botanist* 52:1-2.

Sivinski, R. and P. Tonne. 2010. Plant distribution reports: First New Mexico record of *Hypericum mutilum*. *The New Mexico Botanist* 53:4.

Sivinski, R. 2010. Plant distribution reports: *Ephedra coryi* verified for New Mexico. *The New Mexico Botanist* 53:4.

Zavada, M.S., and **T.K. Lowrey.** Comparative pollen morphology of *Brachylena*, *Tarchananthus* and two species of *Tubulifloridites* (Asteraceae) from the Eocene, Knysna Lignite of South Africa. *Review of Palaeobotany and Palynology*; 162(2010) 183-192.

C. Web-Based / Curriculum Development

D. Technical Reports

Johnson, K., J. Smith, and **P. Tonne.** 2010. Habitat evaluation and surveys for listed plant and animal species at Pecos National Historical Park Pigeon's Ranch and Cañoncito Subunits. Natural Heritage New Mexico Publ. No.10-GTR-348. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM. 25 p.

Snell, H.L., and **T.K. Lowrey.** 2010. Biological Diversity Survey & Monitoring to Support A Wildlife Conservation Plan for Albuquerque.

Tonne, P. 2010. Status report for Chihuahua Scurf pea (*Pediomelum pentaphyllum*; Fabaceae). Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM.

Tonne, P. 2010. Pollination Ecology of the Todsens Pennyroyal (*Hedeoma todsenii*) in the San Andres and Sacramento Mountains. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM.

Tonne, P. 2010. Surveys for the Chihuahua Scurf Pea (*Pediomelum pentaphyllum*; Fabaceae) within an area of proposed use for Border Patrol Operations and Facilities on Federal Lands. BLM – Las Cruces District Office. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM.

E. Theses/Dissertations Completed

F. Work In Progress

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

Lowrey, T. 2010. Plant distribution reports: First New Mexico record of *Malacothrix coulteri*. The New Mexico Botanist 51:3.

Sivinski, R. 2010. *Ephedra coryi* in Central New Mexico? New Mexico Botanist 52:1-2.

Sivinski, R. and P. Tonne. 2010. Plant distribution reports: First New Mexico record of *Hypericum mutilum*. The New Mexico Botanist 53:4.

Sivinski, R. 2010. Plant distribution reports: *Ephedra coryi* verified for New Mexico. The New Mexico Botanist 53:4.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

B. Contributed Talks/Posters

Bixby, R.J., A.S. Burdett, and N. Lopez-Brody. 2011. Role of turbidity in shaping algal communities in an aridland river. North American Benthological Society, Providence, Rhode Island.

Bixby, R.J. and A.S. Burdett. 2010. Nutrient and water quality influences on periphyton biomass and community composition in an aridland river. 21st International Diatom Symposium, St. Paul, MN.

C. Attendance at Professional Meetings

Hanson, D. T. American Society of Plant Biologists; Montreal, Canada; July 2010

Lowrey, T.K. SEINet Workshop, Arizona State University, Tucson AZ, May 2010.

Lowrey, T.K. Annual Board Meeting, Flora North America, St. Louis MO, October 2010.

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.

Vice-Chair/Chair, Gordon Research Conference on CO₂ Assimilation in Plants, August 30, 2008–August 30, 2014 (elected). Secretary, UNM Chapter of Sigma Xi, August 1, 2008–August 1, 2011 (appointed).

Lowrey, T.K.

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

9. OTHER PROFESSIONAL ACTIVITIES

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

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

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

Hanson, D.T.

Grant Reviewer, National Science Foundation 2010

Panel Member, National Science Foundation 2010

Grant Reviewer, SWISS National Science Foundation 2010

Lowrey, T.K.

Member, New Mexico Rare Plant Technical Council

Member, Native Plant Society of New Mexico

Mygatt, J.

Member, New Mexico Rare Plant Technical Council

Member, Native Plant Society of New Mexico

Sivinski, R.

Member, New Mexico Rare Plant Technical Council

Member, Native Plant Society of New Mexico

Tonne, P.C.

Member, New Mexico Rare Plant Technical Council.

D. Journal Referee

Bixby, R.J.

Botany (1), Journal of the North American Benthological Society (1)

Hanson, D.T.

Acta Oecologia 2

BMC Plant Biology 1

Canadian Journal of Forest Research 2

ISMEJ 1

New Phytologist 2

Plant, Cell and Environment 2

Physiologia Plantarum 2

Lowrey, T.K.

International Journal of Plant Science (1)

Madrono (3)

Systematic Botany (1)

E. Hosting Professional Colloquia and Groups

10. SERVICE

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

B. Public Service

Lowrey, T.K.

Plant Identification for the general public in the UNM Herbarium.

Mygatt, J.

Webmaster of the Native Plant Society of New Mexico website. <http://npsnm.unm.edu>

C. University and Departmental Committees

Hanson, D. T.

Biology Department Seminars Committee

Greenhouse Committee

Seminars Committee

Lowrey, T.K.

Policy Committee, UNM Faculty Senate

Committee on Governance
Biology Dept. Space Committee

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

12. DONATIONS AND GIFTS RECEIVED

\$500 annually. 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

Murphy, K.R. (Spring and Fall 2009)

C. Undergraduate Student Workers and Volunteers

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 10,416 specimens to its catalogue during 2010 and now contains over 210,000 specimens. DGR records are currently being converted to DOM records as they are catalogued into the DOM. When mammal specimens from the DGR and DOM are combined, the MSB holds over 240,000 mammal specimens (3rd largest collection in the Western Hemisphere).

The collection remains among the fastest growing in the world. The continued exceptional growth is the result of a number of important facets of our operation:

a. Specimen growth through fieldwork

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

b. Specimen growth through donation

- i.** A well-developed network of researchers and agencies worldwide which are now heavily invested in the strength of the DOM and continue to deposit their material here.
- ii.** Donations of personal collections from individual researchers.

The fact that we continue to grow as a repository for research material points to the strength and good standing of the collection in the greater scientific community.

- B. Training in specimen based research and curation.** Training remains one of the integral goals of the DOM. Students are involved in all activities of the division. During 2010, 29 students worked in the division at some point (3 graduate students, 21 undergraduates and 2 high school interns, 3 volunteers. Of these, 19 were females, 10 males, and 10 from under-represented groups. Students gain experience in bioinformatics, natural history collection preparation and curation, and field and laboratory based research.
- C. Publications citing MSB DOM specimens.** The DOM collection continues to be utilized heavily in wide range of integrated disciplines. During 2010 our specimens were cited in 42 studies published in a wide range of journals including: Vector Borne Zoonotic Diseases, Zoologia, Journal of Wildlife Diseases, Infection, Genetics and Evolution, Journal of Zoological Systematics and Evolutionary Research, Molecular Ecology, Journal of Virology, Biological Journal of the Linnean Society, Proceedings of the National Academy of Sciences of the United States of America, Molecular Phylogenetics and Evolution, American Museum Novitates, Molecular Ecology,

American Journal of Tropical Medicine and Hygiene, Journal of Biogeography, Zootaxa, Revista Mexicana de Biodiversidad, Journal of Mammalogy, Bulletin of the American Museum of Natural History, Journal of Parasitology, Acta Chiropterologica, and Genomics.

D. Arctos database and collection accessibility. The Arctos database is a cutting-edge relational database that continues to provide an invaluable resource for researchers worldwide. Arctos is web-accessible and greatly enhances the visibility of the MSB. Since 2008, we saw an increase from 35,000 site visits to Arctos to 155,000 in 2010, demonstrating that usage continues to climb. Importantly, 5,745 (3.70%) visits came through referrals from the NCBI website. Additionally, 64% of our visitors were new, suggesting a good balance of new and return users. Access from foreign countries also increased from 187 visits to 208. Further resources would improve accessibility of our website, especially the front end interface where the majority of our interactions with the community lie.

E. NSF BRC Improvement grant – “Curation, Data Basing and Integration of the Orphaned Illinois Mammal Collection”. *UIMNH Collection Integration:* The integration of the 32,746 specimens from the UIMNH collection was completed and all data and specimens are now available. All records with sufficient locality data have been accurately georeferenced (27,778 of 32,742).

Student training in UIMNH project: This project was instrumental in helping to convey the historical and future value of specimens to the next generation of environmental scientists. A total of 26 students (5 Graduate students, 19 undergraduate students, 2 high school interns) were trained in techniques of database development and specimen preservation and curation (including 9 minority students and 14 females).

F. Integration of USGS Collection. Great progress was made during 2010 in terms of integrating the USGS Biological Surveys collection (25,000 specimens) with 100% of the collection now fully integrated.

2. COLLECTION USE

Collection Growth (specimens cataloged)	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests Personally Responded to	Publications Cited (MSB, DOM, Specimens)
10,416*	17(197) / 36(61)	6	341**	>500***	42

* Currently the fastest growing mammal collection worldwide.

** Loans originating in DOM / loans of mammal tissue originating in DGR
Combined total of 53 loans of 6151 specimens of traditional voucher specimens, mammalian parasites, and tissue samples.

*** 43 visiting researchers from 25 institutions, 11 school group tours (185 people), 8 UNM classes (94 students), 19 other visitors.

**** Estimate of email or phone requests to Jon Dunnun and Joe Cook. Web visits to the DOM searchable database (ARCTOS) tracked via Google analytics = 155,309 visits (from 208 countries (3.7% (5,745) visitors referred to our site from GenBank).

3. COURSES USING THE COLLECTIONS

Classes receiving loans of material for educational purposes

UNM BIOL 204L - Plant and Animal Form and Function. Spring

BIOL 204L - Plant and Animal Form and Function. Fall

UNM BIOL 386L General Vertebrate Zoology. Spring

UNM BIOL 489 Mammalogy. Fall

UNM NTSC 262L Spring

UNM NTSC 262L Fall

UNM Courses using collection

BIOL 461/561 Tropical Biology (12 students)

BIOL 489L Mammalogy (15 students)

Drawing I

Freshman Learning LLC (15 students)

ART 387 (Photo interior spaces) (2 students)

BIOL 599 Master Thesis (2 student)

BIOL 699 Dissertation (6 students)

Visiting researchers: 43 from 25 institutions or departments

Alpine Archeology Inc.

Bat Conservation International

Centro de Investigaciones Biologias (Mexico)

Florida Museum of Natural History

Ft. Hayes University

Indiana University

Instituto de Ecologia A.C. & Asociacion

Mexicana de Mastozoologia (Mexico)

Louisiana State University

New Mexico Dept. Game and Fish

New Mexico Museum of Natural History

Pueblo of Santa Ana

US Geological Survey

Rotterdam Natural History Museum

US Forest Service

Univ California- Riverside

Univ Central Oklahoma

Univ Nebraska-Lincoln

Univ North Carolina-Chapel Hill

The Wilderness Society

Texas Tech University

UNM Anthropology

UNM Center for Global Health

UNM Maxwell Museum

UNM Office of Contract Archeology

UNM Biology

UNM Art & Ecology

UNM Art History

Educational tours

UNM Classes: 94 students from 8 classes

Paleoecology Lab

Tropical Biology
Museum Studies
Photography (387?) Interior Spaces class
Freshman LLC Class
AISES
Drawing I Class
UNM Valencia campus

K-12 schools and educational groups: 185 students from 11 groups

Johns Hopkins
Dine College
APS under-represented groups afterschool program((25 students)
Escuela del Sol Montessori School
Highland High School Anatomy and Physiology class (18 students)
Mesa Middle School (Mora, NM)
National Museum of Nuclear Science and History
– Awesome Anatomy, Science is Everywhere
Summer camp
Rio Rancho Headstart
St. Pius High School microbiology class
Summer Majik
Zia Elementary School

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Cook, J. A.

Spring: Biol. 461/561, Introduction to Tropical Biology, 12 students

Fall: Biol. 489, Mammalogy, 15 students

Student Mentoring

Undergraduates

1. Vani Aran, Honor's student, January 1–December 31, 2010.
2. David Banks-Richardson, UnO Program, worked in molecular genetics lab and museum, January 1–August 1, 2010.
3. Hiyatsi Bassett, UnO Program, museum project, January 1–December 31, 2010.
4. Randle McCain, UnO Program, worked in museum and fieldwork in Alaska, January 1–December 31, 2010.
5. Kelly Speer, UnO Program, worked in museum and molecular genetics lab, January 1–December 31, 2010.
6. Justin Pichardo, UnO Program,
7. Diego Joshua Matek, UnO Program, worked in museum, June-Dec 2010.
8. Sophia Thompson, UnO Program, worked in museum and molecular lab, May-Dec 2010.

9. Ashley Smiley, UnO Program, worked in museum and SE Alaska fieldwork, May-Dec 2010.
10. Kate Cauthen, UnO Program, worked in museum, June-August 2010.
11. Jackson Sabol, UnO Program, worked in museum, Sept-Dec 2010.
12. Andrea Jackson, UnO Program, worked in museum, Sept-Dec 2010.

High school interns

1. Shane Wilder, June-August 2010
2. Dana Jarigese, June-August 2010

B. Graduate Students (labs, etc.)

BIOL 489L – Mammalogy Lab

BIOL 386L - General Vertebrate Zoology Lab

5. COLLECTION MANAGEMENT

The DOM received 65 new accessions of material (over 10,000 specimens) and added approximately 10,000 specimens to its catalogue during 2010. DGR records are currently being converted to DOM records as they are catalogued into the DOM.

Current projects generating specimens for DOM

- Beringian Coevolution Project - NSF
- Mexican wolf reintroduction – USFWS (130 blood samples, 12 whole animals)
- Mongolian Vertebrate Parasite Project – NSF (550specimens)
- Chilean Hantavirus Project – ICIDR NIH
- Panama Hantavirus – ICIDR NIH
- Panama Climate Change Project - STRI/Gorgas
- Bighorn Sheep Reintroduction Program – NMGF (18 *Puma concolor*)
- ISLES---USDA Forest Service
- Jackson Whitman carnivore collection (800 small mammals ID, AK)
- James Derr *Bison bison* DNA cards(5000)
- Nevada Test site hantavirus project (400 specimens)

The majority of staff time was spent:

1. Integration of USGS and UIMNH material into the main collection.
2. Development of the Arctos database.
3. Reorganizing and relabeling of dry collections.
4. Training student technicians and UnO students in museum work.
5. Preparation, cataloging and installation of museum specimens.
6. Data entry for the incoming accessions.
7. Filling information requests.
8. Processing loan material.
9. Assisting with BIOL 489 – Mammalogy and other courses.

6. AWARDS, GRANTS, AND CONTRACTS

Bell, K.C.

1. Biology Graduate Students Association, University of New Mexico (2010).

2. Lloyd David and Carlye Cannon Wattis Foundation Internship Program for Zoology, Denver Museum of Nature & Science (2010, 2011).

Cook, J.A.

1. NSF-DEB 0956129 5/01/2010-4/30/2015
RCN-UBE: Advancing Integration of Museums into Undergraduate Programs (AIM-UP!) (w/ E. Lacey, S. Edwards, S. Ickert-Bond). \$485,648
2. Wilburforce Foundation
A Test of Landscape Connectivity across the Sky Islands Region using Large Carnivores as Model Organisms---II (co-PI; PI is Gary Roemer, NMSU).
3. USDA Forest Service
ISLES—Amendment 1 (9/09-12/12)
4. “URM: Undergraduate Nurturing Opportunities (UNO)”; JA Cook, PI; Division of Environmental Biology (DEB) 0731350, National Science Foundation; \$1,010,000, August 1, 2007–August 1, 2012, \$200,155/year (OH \$15,000).
5. “ISLES—Island Survey to Locate Endemics”; J.A. Cook, PI; USDA Forest Service; \$100,000, September 1, 2008–September 1, 2012, \$50,000/year.
6. “Mongolia Vertebrate Parasite Project”; S. Gardner, PI, J.A. Cook, co-PI; Division of Environmental Biology (DEB) 0717214, National Science Foundation; \$466,000, September 11, 2007–September 1, 2009, \$ 210,000/year (grant and OH to University of Nebraska).
7. “Curation, Databasing, and Integration of the Orphaned Illinois Mammal Collection”; J.A. Cook, PI; DEB 0744025, National Science Foundation; \$259,285, February 1, 2008–February 1, 2010. No cost extension through February 2011.

Dunnun, J. L.

1. Curation, Databasing, and Integration of the Orphaned Illinois Mammal Collection. NSF-DEB 0744025 (Dunnun, Co-PI, Cook, PI,) 2/01/2008-2/01/2010. Total \$ 259,285, yearly \$130,000 (F&A \$50,052). No cost extension through February 2011.
2. Improved housing of Mexican wolf (*Canis lupus baileyi*) specimens and its conservation in New Mexico. U. S. Fish and Wildlife Service. Total \$7,000 (No F&A).

Hope, A

1. Biology Department Gaudin Scholarship-UNM - Spring 2010: Simultaneous divergence of small mammals across Beringia.

Rearick, J.

1. 2nd year of 3-year National Science Foundation Graduate Fellowship.

Malaney, J

1. \$5,000 – Cryptic lineages, phylogeography, and conservation genetics of the endangered *Zapus hudsonius luteus* and *Zapus princeps princeps* in the Southwest – UNM Graduate Research Development grant

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Cook, J.A.

2. Cook, J. A., and V. Fedorov. 2010. Arctic genetic diversity: heavily shaped by past climate change. *In Arctic Biodiversity and Climate Change Assessment Highlights, Conservation of Arctic Fauna and Flora Committee*. Copenhagen

Dragoo, J.

27. R. Rosatte, K. Sobey, J. W. Dragoo, S. Gehrt. 2010. Striped Skunks and Allies. *In Urban Carnivores: Ecology, Conflict, and Conservation* (S.D. Gehrt, S.P.D. Riley, B.L. Cypher, eds.).

B. Journal Articles

Bell, K.C.

1. Bell, K. C., D. J. Hafner, P. Leitner, and M. D. Matocq. 2010 Phylogeography of the ground squirrel subgenus *Xerospermophilus* and assembly of the Mojave Desert biota. *Journal of Biogeography* 37 (2): 363-378.
2. Bell, K.C. and M.D. Matocq. 2010 Development and characterization of polymorphic microsatellite loci in the Mohave ground squirrel (*Xerospermophilus mohavensis*). *Conservation Genetics Resources* 2 (1): 197-199.

Cook, J. A.

10. Kang HJ, Arai S, Hope AG, Cook JA, Yanagihara R. 2010. Novel Hantavirus in the Flat-Skulled Shrew (*Sorex roboratus*). *Vector Borne Zoonotic Diseases*. 2010 Apr 28. [Epub ahead of print]
11. Cook, J. A., A. A. Eddingsaas, J. L. Loxterman, S. Ebbert, and S.O. MacDonald. 2010. Insular ground squirrels of the North Pacific: Indigenous or Exotic? *Journal of Mammalogy* 91:1401-1412.
12. Gonzalez, P., Y. E. Sawyer, M. Avila, A. Armien, B. Armien, J. A. Cook. 2010. Variation in Cytochrome-b Haplotypes Suggests a New Species of *Zygodontomys* (Rodentia: Cricetidae) on Isla Coiba, Veraguas, Panama. *Zoologia* 27:660-665.
13. Hope, A. G., E. Waltari, N. E. Dokuchaev, S. Abramov, T. Dupral, H. Henttonen, S. O. MacDonald, and J. A. Cook. 2010. Diversification of the Eurasian least shrew and Alaska tiny shrew (Soricidae) at high latitudes. *Journal of Mammalogy*. 91:1041-1057.
14. Torres-Pérez, F., M. Acuna-Retamar, J. A. Cook, A. Bacigalupo, A. García, P. E. Cattán. 2010. Statistical phylogeography and population dynamics of Chagas disease vector *Triatoma infestans*: testing biogeographic hypotheses of dispersal. *Infection, Genetics, and Evolution*. 11:167-174.
15. Matsumoto, K., J. A. Cook, H. K. Goethert, and S. R. Telford, III. 2010. *Bartonella* sp. infection of voles trapped from an Interior Alaskan site where ticks are absent. *Journal of Wildlife Diseases* 46:173-178.
16. Esteva, M., F. A. Cervantes, S. V. Brant, and J. A. Cook. 2010. Molecular phylogeny of long-tailed shrews (genus *Sorex*) from México and Guatemala. *Zootaxa* 2615:47-65.
17. Weckworth, B., S. Talbot, J. A. Cook. 2010. Phylogeography of wolves (*Canis lupus*) in the Pacific Northwest. *Journal of Mammalogy*. 91:363-375.
18. Torres-Pérez, F., R. E. Palma, M. Ferrer, B. Hjelle, J. A. Cook. 2010. Andes virus infection in the rodent reservoir and in humans varies across contrasting landscapes in Chile. *Infection, Genetics and Evolution*. 10:820-825.

Dunnum, J.L.

1. Dunnum, Jonathan L. and Jorge Salazar-Bravo. 2010. Molecular systematics, taxonomy and biogeography of the genus *Cavia* (Rodentia: Caviidae). *Journal of Zoological Systematics and Evolutionary Research* 48(4):376–388.
2. Dunnum, Jonathan L. and Jorge Salazar-Bravo. 2010. Phylogeny, evolution, and systematics of the *Galea musteloides* complex (Rodentia: Caviidae). *Journal of Mammalogy* 91(1):243-259.

Hope, A.G

1. Kang HJ, Bennett SN, Hope AG, Cook JA, Yanagihara R (2011). Shared ancestry of a newfound mole-borne hantavirus and hantaviruses harbored by Cricetid rodents. *Journal of Virology*, 85, 7486-7593.
2. Hope AG, Waltari E, Dokuchaev NE, Abramov S, Dupal T, MacDonald SO, Henttonen H, Cook JA (2010). New perspectives on biotic diversification at high latitudes provided by the Eurasian least shrew and Alaskan tiny shrew (Soricidae). *Journal of Mammalogy*, 91, 1041-1057.
3. Kang HJ, Arai S, Hope AG, Cook JA, Yanagihara R (2010). Novel hantavirus in the flat-skulled shrew (*Sorex roboratus*). *Vector-Borne and Zoonotic Diseases*, 10, 593-597.

Malaney, J.L.

1. Luca Fontanesi, Lionel Forestier, Daniel Allain, Emilio Scotti, Francesca Beretti, Séverine Deretz-Picoulet, Elena Pecchioli, Cristiano Vernesi, Terence J. Robinson, Jason L. Malaney, Vincenzo Russo and Ahmad Oulmouden. 2010. Characterization of the rabbit agouti signaling protein (*ASIP*) gene: Transcripts and phylogenetic analyses and identification of the causative mutation of the nonagouti black coat colour. *Genomics* 95(3):166-175.

C. Web-Based

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

D. Technical Reports

ISLES-Mammal and Parasite Inventory of the Tongass National Forest, 2010.

E. Theses/Dissertations Completed

1. Crawford, Dolly. 2010. The role of spatial and genetic modeling to biogeography. Ph.D. dissertation. University of New Mexico.
2. De La Sancha, Noe. 2010. Effects of habitat fragmentation on non-volant small mammals of the interior atlantic forest of eastern Paraguay. PhD dissertation, Texas Tech University.
3. Indorf, Jane Leah. 2010. Phylogeography of the Marsh Rice Rat (*Oryzomys palustris*) in Wetlands of the Southeastern United States. Ph. D. dissertation, University of Miami.
4. Malone, Margaret E. 2010. Increasing the Use and Value of Collections: Finding DNA. Master's thesis, Baylor University.

5. Mantooth, Stacy James. 2010. From the valleys to the mountains: The biographic history of antelope squirrels, bats, and chipmunks in Western North America. PhD D dissertation, University of Nevada Las Vegas.
6. Kelly A. Speer. A relict population of shrews in New Mexico illustrates phylogeographic diversification in response to environmental change. Senior Honors Thesis, University of New Mexico.

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

Bell, K.C.

1. Bell, K.C. and M.D. Matocq. 2011. Regional genetic subdivision in the Mohave ground squirrel: evidence of historic isolation and ongoing connectivity in a Mojave Desert endemic. *Animal Conservation* 14 (4): 371-381.

Cook, J. A.

1. Weckworth, B.V., N. G. Dawson, S. L. Talbot, M. J. Flamme, J. A. Cook. 2011. Going coastal: Shared evolutionary history between coastal British Columbia and Southeast Alaska wolves (*Canis lupus*). PLoS One
2. Barker, B. R., R. Waide, and J. A. Cook. 2011. Deep intra-island divergence of a montane forest endemic: phylogeography of the Puerto Rican frog *Eleutherodactylus portoricensis* (Anura: Eleutherodactylidae). *Journal of Biogeography*.
3. Galbreath, K. E., J. A. Cook, A. A. Eddingsaas, E. G. DeChaine. 2011. Multi-locus tests of paleodistributional models reveal different facets of the complex demographic history of arctic ground squirrels in Beringia. *Evolution*.
4. Hope, A.G., E. Waltari, V. B. Fedorov, A. V. Goropashnaya, S. L. Talbot, and J. A. Cook. In press. Persistence and diversification of the Holarctic shrew, *Sorex tundrensis* (Family Soricidae), in response to climate change. *Molecular Ecology*.
5. Kang, H. J., S. N. Bennett, A. G. Hope, J. A. Cook, R. Yanagihara. 2011. Shared Ancestry Between a Newfound Mole-Borne Hantavirus and Hantaviruses Harbored by Cricetid Rodents. *Journal of Virology* 85:7496-7503.

Dunnum, JL

1. Dunnum, J. L. Family Caviidae, in *Mammals of South America vol. II Rodents* (James Patton, ed.). University of Chicago Press. Accepted.

Hope, A

1. Hope AG, Waltari E, Fedorov VB, Goropashnaya AV, Talbot SL, Cook JA (2011). Persistence and diversification of the Holarctic shrew, *Sorex tundrensis* (Family Soricidae), in response to climate change. *Molecular Ecology, In Press*.

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

1. Ana Paula Cutrera, Eileen A. Lacey, Matias S. Mora, Enrique P. Lessa. 2010. Effects of contrasting demographic histories on selection at major histocompatibility complex loci in two sympatric species of tuco-tucos (Rodentia: Ctenomyidae). *Biological Journal of the Linnean Society* 99:260-277.

2. Anna A. Bannikova, Nikolai E. Dokuchaev, Eugenia V. Yudina, Anatoly V. Bobretzov, Boris I. Sheftel, Vladimir S. Lebedev. 2010. Holarctic phylogeography of the tundra shrew (*Sorex tundrensis*) based on mitochondrial genes. *Biological Journal of the Linnean Society* 101:721-746.
3. Brian Hjelle and Fernando Torres-Perez. 2010. Hantaviruses in the Americas and Their Role as Emerging Pathogens 2:2559-2586.
4. Charlotte Lindqvist, Stephan C. Schuster, Yazhou Sun, Sandra Talbot, Ji Qi, Aakrosh Ratan, Lynn P. Tomsho, Lindsay Kasson, Eve Zeyl, Jon Aars, Webb Miller, Olafur Ingolfsson, Lutz Bachmann, Oystein Wiig. 2010. Complete mitochondrial genome of a Pleistocene jawbone unveils the origin of polar bear. *Proceedings of the National Academy of Sciences of the United States of America* 107(11):5033-5057.
5. Eduardo Eizirik, William J. Murphy, Klaus Koepfli, Warren E. Johnson, Jerry W. Dragoo, Robert K. Wayne, Stephen J. O'Brien. 2010. Pattern and timing of diversification of the mammalian order Carnivora inferred from multiple nuclear gene sequences. *Molecular Phylogenetics and Evolution* 56:49-63.
6. Eliecer E. Gutierrez, Sharon A. Jansa, Robert S. Voss. 2010. Molecular Systematics of Mouse Opossums (*Didelphidae*: *Marmosa*): Assessing Species Limits using Mitochondrial DNA Sequences, with Comments on Phylogenetic Relationships and Biogeography. *American Museum Novitates* 3692:1-22.
7. Enrique P. Lessa, Guillermo D'Elia, Ulyses F. J. Pardinás. 2010. Genetic footprints of late Quaternary climate change in the diversity of Patagonian-Fuegian rodents. *Molecular Ecology* 19:3031-3037.
8. J. Delton Hanson, Jane L. Indorf, Vicki J. Swier, Robert D. Bradley. 2010. Molecular divergence within the *Oryzomys palustris* complex: evidence for multiple species. *Journal of Mammalogy* 91(2):336-347.
9. Jacob A. Esselstyn and Carl H. Oliveros. 2010. Colonization of the Philippines from Taiwan: a multi-locus test of the biogeographic and phylogenetic relationships of isolated populations of shrews. *Journal of Biogeography* 37(8):1504–1514.
10. John P. Maher, Christine Ellis, Kenneth L. Gage, Russell Ensore, A Townsend Peterson. 2010. Rangelwide Determinants of Plague Distribution in North America. *American Journal of Tropical Medicine and Hygiene* 83(4):736-742.
11. Jorge Salazar-Bravo, Julieta Vargas, Agustin Jimenez-Ruiz, Jay M. Savage. 2010. A new record of *Atractus boettgeri* (Serpentes: Colubridae), with notes on taxonomy and natural history. *Revista Mexicana de Biodiversidad* 81:925-929.
12. Juliana Notarnicola, F. Agustin Jimenez-Ruiz, Scott L. Gardner. 2010. Litomosoides (Nemata: Filarioidea) Of Bats From Bolivia With Records For Three Known Species And The Description Of A New Species. *Journal of Parasitology* 96(4):775-782.
13. Kayce C. Bell, David J. Hafner, Philip Leitner, Marjorie D. Matocq. 2010. Phylogeography of the ground squirrel subgenus *Xerospermophilus* and assembly of the Mojave Desert biota. *Journal of Biogeography* 37:363-378.
14. Martha Esteva, Fernando A. Cervantes, Sara V. Brant, Joseph A. Cook. 2010. Molecular phylogeny of long-tailed shrews (genus *Sorex*) from Mexico and Guatemala. *Zootaxa* 2615:47-65.
15. Sean Neiswenter and Brett R. Riddle. 2010. Diversification of the *Perognathus flavus* species group in emerging arid grasslands of western North America. *Journal of Mammalogy* 91(2):348-362.

16. Sergio E. Bermudez C., Publio Gonzalez-Dominguez, Mario Avila, Roberto Miranda, Anibal Armien, Blas Armien. 2010. Parasitism of *Cuterebra* sp. (Diptera: Oestridae s.l.) on rodents of Central Panama. *Revista Mexicana de Biodiversidad* 81:57-60.
17. Zachary P. Roehrs, Justin B. Lack, and Ronald A. Van Den Bussche. 2010. Tribal phylogenetic relationships within Vespertilioninae (Chiroptera: Vespertilionidae) based on mitochondrial and nuclear sequence data. *Journal of Mammalogy* 91(5):1073-1092.
18. Justin B. Lack, Zachary P. Roehrs, Craig E. Stanley Jr., Manuel Ruedi, and Ronald A. Van Den Bussche. 2010. Molecular phylogenetics of *Myotis* indicate familial-level divergence for the genus *Cistugo* (Chiroptera). *Journal of Mammalogy* 91(4):976-992.
19. Carola Cañón, Guillermo D'Elía, Ulyses F. J. Pardiñas, and Enrique P. Lessa. 2010. Phylogeography of *Loxodontomys micropus* with comments on the alpha taxonomy of *Loxodontomys* (Cricetidae: Sigmodontinae). *Journal of Mammalogy* 91(6):1449-1458.
20. Dana N. Lee, Russell S. Pfau, and Loren K. Ammerman. 2010. Taxonomic status of the Davis Mountains cottontail, *Sylvilagus robustus*, revealed by amplified fragment length polymorphism. *Journal of Mammalogy* 91(6):1473-1483.
21. R. Eduardo Palma, Ricardo A. Cancino, and Enrique Rodríguez-Serrano. 2010. Molecular systematics of *Abrothrix longipilis* (Rodentia: Cricetidae: Sigmodontinae) in Chile. *Journal of Mammalogy* 91(5):1102-1111.
22. Thomas C. Giarla, Robert S. Voss, and Sharon A. Jansa. 2010. Species Limits and Phylogenetic Relationships in the Didelphid Marsupial Genus *Thylamys* Based on Mitochondrial DNA Sequences and Morphology. *Bulletin of the American Museum of Natural History* Number 346:1-67.
23. Rogério V. Rossi, Robert S. Voss, and Darrin P. Lunde. 2010. A Revision of the Didelphid Marsupial Genus *Marmosa* Part 1. The Species in Tate's 'Mexicana' and 'Mitis' Sections and Other Closely Related Forms. *Bulletin of the American Museum of Natural History* Number 334:1-83.
24. Terry R. Haverkost and Scott L. Gardner. 2010. New Species in the Genus *Monoecocestus* (Cestoda: Anoplocephalidae) From Neotropical Rodents (Caviidae and Sigmodontinae). *Journal of Parasitology* 96(3):580-595.
25. Justin B. Lack, Jeremy E. Wilkinson and Ronald A. Van Den Bussche. 2010. Range-Wide Population Genetic Structure of the Pallid Bat (*Antrozous pallidus*) -Incongruent Results from Nuclear and Mitochondrial DNA. *Acta Chiropterologica* December 2010:401-413
26. Luca Fontanesi, Lionel Forestier, Daniel Allain, Emilio Scotti, Francesca Beretti, Séverine Deretz-Picoulet, Elena Pecchioli, Cristiano Vernesi, Terence J. Robinson, Jason L. Malaney, Vincenzo Russo and Ahmad Oulmouden. 2010. Characterization of the rabbit agouti signaling protein (*ASIP*) gene: Transcripts and phylogenetic analyses and identification of the causative mutation of the nonagouti black coat colour. *Genomics* 95(3):166-175.
27. Krithi K. Karanth, James D. Nichols, K. Ullas Karanth, James E. Hines and Norman L. Christensen, Jr. 2010. The shrinking ark: patterns of large mammal extinctions in India. *Proc. R. Soc. B* 277, 1971-1979.
28. Leslie N. Carraway. 2010. Fossil History of *Notiosorex* (Soricomorpha: Soricidae) Shrews with Descriptions of New Fossil Species. *Western North American Naturalist* 70(2):144-163.

29. Sergio Solari. 2010. A molecular perspective on the diversification of short-tailed opossums (Monodelphis: Didelphidae). *Mastozoología Neotropical* 17(2):317-333.
30. Luis Ignacio Ferro, Juan Jose Martinez, Ruben M. Barquez. 2010. A new species of *Phyllotis* (Rodentia, Cricetidae, Sigmodontinae) from Tucuman province, Argentina. *Mammalian Biology* 75(6):523-537.
31. Kurt E. Galbreath, David J. Hafner, Kelly R. Zamudio and Kelly Agnew. 2010. Isolation and introgression in the Intermountain West: contrasting gene genealogies reveal the complex biogeographic history of the American pika (*Ochotona princeps*). *Journal of Biogeography* 37, 344–362.
32. Diego Astua. 2010. Cranial sexual dimorphism in New World marsupials and a test of Rensch's rule in Didelphidae. *Journal of Mammalogy* 91(4):1011–1024.
33. Megan M. Friggens, Robert R. Parmenter, Michael Boyden, Paulette L. Ford, Kenneth Gage, and Paul Keim. 2010. Flea abundance, diversity, and plague in Gunnison's prairie dogs (*Cynomys gunnisoni*) and their burrows in montane grasslands in northern New Mexico. *Journal of Wildlife Diseases* 46(2):356–367.
34. Joshua W. Campbell, Michael T. Mengak, Steven B. Castleberry and Jason D. Mejia. 2010. Distribution and Status of Uncommon Mammals in the Southern Appalachian Mountains. *Southeastern Naturalist* 9(2):275-302.

8. ACTIVITIES IN LEARNED SOCIETIES

J.A. Cook

“Molecular genetic perspectives on the Arctic”. Gilleje, Denmark. Arctic Biodiversity Workshop, Conservation of Arctic Fauna and Flora. March 2010.

B. Contributed Talks/Posters

Bell, K.C.

1. Bell, K. 20 November 2010. Diversity within: Do pinworms tell the chipmunk tale? Lloyd David and Carlye Cannon Wattis Foundation Internship Research Symposium, Denver, CO.
2. Bell, K., N. Reid, J. Sullivan, and J. Demboski. 14 June 2010. Phylogenetic complexity within western North American chipmunks. American Society of Mammalogists Annual Meeting, Laramie, WY.

Cook, J.A.

6. Kang, Hae Ji, W. Stanley, J. Esselstyn, S. N. Bennett, J. A. Cook, R. Yanagihara. Expanded Framework of Hantavirus Evolution from Newly Identified Myosoricine Shrew Hosts in Tanzania. American Society of Tropical Medicine and Hygiene, Atlanta. November 2010.
7. Galbreath, K., J. A. Cook, A. Eddingsaas, E. G. DeChaine. Colonization and climate in Beringia: Multilocus tests of paleodistribution models reveal deep and shallow histories for arctic ground squirrels. American Society of Mammalogists annual meeting, Laramie, Wyoming June 2010.
8. Hope, A., N. Takebayashi, S. L. Talbot, and J. A. Cook. Comparative phylogeography of small mammals across Beringia. American Society of Mammalogists annual meeting, Laramie, Wyoming June 2010.

9. Malaney, J. and J. Cook. Statistical phylogeography of the western jumping mouse (*Zapus princeps*): Testing alternative hypotheses. American Society of Mammalogists annual meeting, Laramie, Wyoming June 2010.
10. Kang, H-J, A. G. Hope, J. A. Cook, and R. Yanagihara. Molecular Phylogeny of Newfound Hantaviruses in the Laxmann's Shrew (*Sorex caecutiens*) and Flat-skulled Shrew (*Sorex roboratus*) in Russia. American Society of Virology, Bozeman, May 2010.
Kang, H-J, S. N. Bennett, A. G. Hope, L. Dizney, L. A. Ruedas, J. A. Cook, and R. Yanagihara. Multiple sympatric and syntopic *Sorex* species in North America harbor Jemez Springs Virus. International Hantavirus Congress, Athens May 2010

Hope, A.

1. Hope AG, Takebayashi N, Galbreath KE, Talbot SL, Cook JA. June 2010. Trans-Beringian comparative phylogeography of small mammals. Society for the Study of Evolution Annual Meeting, Portland, Oregon. Poster.
2. Hope AG, Takebayashi N, Galbreath KE, Talbot SL, Cook JA. June 2010. Comparative phylogeography of small mammals across Beringia. American Society of Mammalogists Annual Meeting, Laramie, Wyoming. Poster.
3. Hope AG. February 2010. Holarctic phylogeography: Diversification in response to fluctuating climate. Departmental Seminar, Department of Biology, University of New Mexico, Albuquerque. Research Talk.

Malaney, J.

1. **Jason L. Malaney**, Lena A. Moffitt, Chris Conroy, Harmony D. Spoonhunter, Jim Patton, Joseph A. Cook. Cryptic Lineages and phylogeography of *Zapus princeps* in western North America. American Society of Mammalogists, June 2010.
2. **Jason L. Malaney**, Andrew G. Hope, Yadeeh Sawyer, Steve MacDonald, and Joseph A. Cook. Comparative phylogeography and historical demography highlight biogeographic processes for boreal mammals in western North America. Evolution Meetings

C. Attendance at Professional Meetings

Bell, K.C.

American Society of Parasitologists, Colorado Springs, CO

American Society of Mammalogists, Laramie, WY

Cook, JA.

American Society of Mammalogists, Laramie, Wyoming, June 2010

Dunnum, J.L.

American Society of Mammalogists, Laramie, Wyoming, June 2010

Hope, A. G.

American Society of Mammalogists, Laramie, Wyoming, June 2010.

Society for the Study of Evolution, Portland, Oregon, June 2010.

Malaney, J.

American Society of Mammalogists, Laramie, Wyoming, June, 2010.

Society for the Study of Evolution, Portland, Oregon, June 2010.

NM/AZ chapter of the Wildlife Society, Gallup, New Mexico, February 2010

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

Cook, J.A.

Zoologia, September 1, 2008–September 1, 2012.

E. Service as Officer or Professional Society/Organization

Cook, J.A.

Member, Board of Directors, American Society of Mammalogists (elected) 2007-2010.

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentations to General Audience in a Scholarly Capacity

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.

Cook, J.A.

Grant Review Panel, National Science Foundation, Fall 2010.

Member, MSB Executive Committee

Editorial Board, MSB Publications Series

Member, Resolutions Committee, American Society of Mammalogists

Chair, Latin American Scholarship Committee, American Society of Mammalogists

D. Journal Referee

Cook, J.A.

Journal of Mammalogy (1)

Evolution (1)

Dunnun, J.L.

AMNH Novitates (1)

Journal of Mammalogy (1)

Genetics and Molecular Biology (1)

Journal of Experimental Zoology (1)

Hope, A

Journal of Biogeography (1)

Northeastern Naturalist (1)

Malaney, J

Southwestern Naturalist (1)

E. Hosting Professional Colleagues and Groups

42 visiting academics and professionals from 25 outside institutions or departments visited the collections for research purposes.

Cook personally hosted the following individuals:

Dr. Enrique Lessa, Universidad Nacional, Montivideo, Uruguay

Dr. Eric Hoberg, National Parasite Lab, Beltsville.

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. Faculty Sponsor, UNM NM Wilderness Alliance, Student Organization

Dunnum, J. L.

1. Division tours – provided educational tours and information for visitors and school groups. 341 visitors to collection.
2. Presentation on evolution and adaptations – Truman Middle School.
3. Volunteer coach for American Youth Soccer Organization. U9 girls and U12 girls.

12. DONATIONS AND GIFTS RECEIVED

Lackey Collection

B. J. Hayward Fund established, \$15,000

13. CURRENT STAFF

A. Faculty/Staff

J.A. Cook, Curator

J.L. Dunnum, Collection Manager

C.A. Ramotnik, USGS Collection Manager

M.A. Bogan, Emeritus Curator

J.S. Findley, Emeritus Curator

Stephen O. MacDonald, Curator II

Gordon Jarrell, Cyber Coordinator
Sylvia Brunner, UnO Coordinator

B. Graduate students

Barker, Brittany. 5th year Ph.D. student. Landscape genetics of two frogs from Puerto Rico: *Eleutherodactylus antillensis* and *E. portoricensis*.

Escobedo, Yadeeh. **4th year Ph.D. Linkage corridors along the North Pacific Coast.**

Kavanaugh, John. 2nd year Master's student.

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

Malaney, Jason. **5th Ph.D. student. Zapus and Lepus historical biogeography and plant herbivore coevolution.**

Rearick, Jolene. **4th year Ph.D. Phylogeography and molecular evolution of freeze tolerance in *Lithobates sylvaticus*.**

Thomas, Jason Andrew. **5th year Ph.D. student. Phylogeography of the Sin Nombre virus, */Peromyscus maniculatus/* a coevolutionary relationship.**

Brooks Kohi. 1st year Master's student. Phylogeography of high latitude *Myodes*.

C. Undergraduate Student Workers and Volunteers

22 undergraduate students

Jamie Raines	Elizabeth Glenn
Randle McCain	Kate Cauthen
Justin Pichardo	Andrea Kartchner
Kyle Crossey	Jackson Sabol
Hiyatsi Bassett	Sienna Wright
Melissa Picchione	Kelly Speer
Audrey Chismar	Sadie Yurista
Joanna Johnson	Sienna Wright
Diego Joshua Matek	Eudora Claw
Sophia Thompson	David Banks Richardson
Ashley Smiley	Andrea Jackson

2 Volunteers

Loren Ortiz
Sonia Peterson
Aja King

2 high school interns

Dana Jarigese
Shane Wilder

14. MUSEUM ASSOCIATES

A. Curatorial Associates

James H. Brown, UNM Department of Biology
Jerry W. Drago, UNM Department of Biology
William Gannon, UNM Research Ethics
Gabor R. Racz, UNM Department of Biology

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, México City, México
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 Cruces, New Mexico
Scott L. Gardner, Dept. Nematology, Curator, University Nebraska
Keith Geluso, Albuquerque, New Mexico
Ken Geluso, Lincoln, Nebraska
Sarah B. George, Director, Utah State Museum
Gary L. Graham, Texas Parks and Recreation Division
David J. Hafner, New Mexico Museum Nat. History
Art Harris, University of Texas, El Paso, Texas
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
Stephen MacDonald, Silver City, New Mexico
Michael Mares, Norman, Oklahoma
Pablo Marquet, Valdivia, Chile
Rodrigo Medillín, UNAM, Mexico City, Mexico
Tony R. Mollhagen, Lubbock, Texas

Gary Morgan, New Mexico Museum Natural History, New Mexico
Dwight W. Moore, Emporia State University
Michael J. O'Farrell, Jr., Las Vegas, Nevada
Thomas J. O'Shea, Ft. Collins, Colorado
Eduardo Palma, Valdivia, Chile
Robert Parmenter, Valles Caldera, Jemez, New Mexico
James L. Patton, Museum of Vertebrate Zoology, Berkeley, California
Paul J. Polechla, Albuquerque, New Mexico
Robert Rausch, University of Washington, Seattle
Brett R. Riddle, University of Nevada, Las Vegas, NV
Jorge Salazar Bravo, Texas Tech University, Texas
C. Greg Schmitt, Farmington, New Mexico
Richard E. Sherwin, Christopher Newport University, Virginia
Fred Szalay, Los Ranchos de la Rio Grande, New Mexico
Sandy Talbot, Molecular Ecology Lab- USGS Anchorage, Alaska
Ernie Valdez, Tijeras, New Mexico
Alasdair Veitch, Department of Renewable Resources, Norman Wells, NWT, Canada
Jack Whitman, Alaska Department of Fish and Game – Fairbanks, Alaska
Don E. Wilson, Smithsonian, Washington, DC
Nyamsuren Batsaikhan, National University of Mongolia, Ulaan Baatar

Natural Heritage New Mexico Division

1. DIVISION HIGHLIGHTS

In 2010, the Natural Heritage New Mexico Division continued to work with agencies and private partners to conduct a suite of conservation science projects and build its conservation information data systems. Within the division, there are four working groups: Conservation Data Center, Conservation Ecology, Zoology, and Botany.

As part of our service role in the museum to provide conservation information to the broader public as well as for research, the Conservation Data Center Group (Rayo McCollough, Lead; Teri Neville, GIS manager) worked on projects to make conservation data more readily available via the web. We have helped facilitate improvements in the NMBCC (New Mexico Biodiversity Collections Consortium), <http://nmbiodiversity.org/>. We are continuing our work with the U.S. Fish and Wildlife Service, U.S. Forest Service, Bureau of Land Management, NM Department of Game and Fish, NM Energy, Minerals and Natural Resources Department to gather, enter, and quality control data on the State's sensitive species and to build tools for dissemination of that information via a the web.

The Conservation Ecology Group (Esteban Muldavin, Lead; Elizabeth Milford, Riparian Ecologist; and Paul Arbetan, Assoc. Ecologist). In collaboration with New Mexico Environment Department (NMED), we completed the first version of the "New Mexico Rapid Assessment Method" (NMRAM) for New Mexico's wetlands and riparian areas. The goal of the NMRAM was to develop a tool of easily applied landscape, biotic, and abiotic metrics to evaluate and rank the ecological condition and function of wetlands for conservation, restoration, and management. The outcome was a manual and field guide to be used by a broad spectrum of agencies and NGOs that are now available on the NMED and NHNM websites. As part of the Collaborative Forest Restoration Program (USFS) grant at a post-fire riparian restoration site in the Middle Rio Grande near Belen restoration, we completed the initial sampling as part of a multi-group monitoring for the project that includes Middle Rio Grande Conservancy District, Inter-state Stream Commission, Hawks Aloft, Inc., and the Bosque Ecosystem Monitoring Program (BEMP). In cooperation with the U.S. Army Corps of Engineers, we continued the data acquisition and entry of a legacy dataset of the middle Rio Grande Hink and Ohmart ecological studies from the early 1980s, and completed the re-establishment and rereading of a set of their transects as the foundation for an analysis of ecosystem change over the last 40 years in the middle Rio Grande. Working with the Bureau of Land Management (BLM), we completed another year of monitoring and analysis of vegetation response following removal of grazing in an Area of Critical Environmental Concern (ACEC) in the lower reach of the Santa Fe River. With respect to our upland projects, we completed vegetation classifications and maps for Capulin Volcano National Monument and White Sands National Monument. We continued work on similar maps for El Malpais National Monument, Guadalupe Mountains National Park, Pecos National Monument, and Fort Davis National Monument. The data collected on national parks will provide a valuable reference dataset for comparing the potential conservation value of other sites around the state. We continued providing biological monitoring and assessment for New Mexico Army National Guard lands. We participated in a multi-state Integrated Landscape Analysis Project (ILAP) sponsored by the U.S. Forest Service that included the acquisition and

databasing of vegetation data from USFS and BLM lands across New Mexico and Arizona and the development of vegetation dynamics models for target ecosystems to support wall-to wall spatial models of ecosystem change across the two states. We continued our research and monitoring work in pinyon-juniper ecosystems with an on-going analysis of the effects of planned and unplanned fires in pinyon-juniper woodlands of the USFWS San Andres National Wildlife Refuge in south-central New Mexico, and on BLM lands in the Wild Rivers Recreation along the Rio Grande in north-central New Mexico.

The Zoology Group conducts field research and modeling of the habitats of animal species of conservation concern in New Mexico. In 2010, we cooperated with the National Park Service to complete Natural Resource Condition Assessments for Pecos National Historical Park and Fort Union National Monument. We finished year two of a three-year, multi-scale habitat modeling study of pinyon-juniper birds on three DOD installations. We conducted a second year of monitoring grassland birds and raptors at Holloman Air Force Base. We surveyed migrating and breeding wetland birds and completed a revised operational plan for constructed wetland management at the Lake Holloman Wetland Complex Area. Finally, we created a web map interface of Gunnison’s prairie dog occurrence data for the NM Department of Game and Fish.

For the Botany Group (Phil Tonne, Lead), our focus was on two key sensitive species in the state: the Chihuahua scurf pea and Holy Ghost Ipomopsis. We have focused on documenting the sole New Mexico population (one of two recorded globally in recent history) and informing public agencies of its conservation needs. For Holy Ghost Ipomopsis, we partnered with the State Forestry Division and U.S. Forest Service to implement critical forest-thinning projects in Holy Ghost Canyon, the only natural population of this rare plant. Documenting and implementing management needs such as forest thinning is critical to understanding the habitat needs of this endangered plant.

2. TABLE OF COLLECTION USE

Collection Growth (specimens catalogued)	Loans (outgoing)	Loans (incoming)	Visitors	Info Requests Personally Responded	Publications Cited MSB Specimens
7,898 new records, 9,457 updated records	NA	NA	9,455 to web site	143 personally, 42,403 pubs downloaded	UNKNOWN

3. COURSES USING THE COLLECTIONS

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

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 2010 the Conservation Data Management Group worked on several initiatives to add to our conservation information. We added over 2,000 records and updated another 570 to our NMBiotics database, and 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 to build our conservation database (see Section 1). As an outcome of our database activities, we completed 141 information requests.

6. AWARDS, GRANTS, AND CONTRACTS

NHNM AWARDS:

\$66,150. NM Military Affairs Dept. Banner #048897. Rare, protected, and endangered and threatened species survey for Roswell WETS. **Paul Arbetan**, PI. 10/07-12/10. \$33,864 (F&A \$5,690).

\$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. 10/07-12/10. \$21,450 (F&A \$3,575).

\$47,000. NM Military Affairs Dept. Banner #04800S. Aplomado falcon habitat survey. **Paul Arbetan**, PI. 02/09-12/10. \$30,625 (F&A \$5,104).

\$49,000. NM Military Affairs Dept. Banner #04800T. Environmental assessment, grey vireo monitoring, Gunnison's prairie dog survey. **Paul Arbetan**, PI. 02/09-12/10. \$30,287 (F&A \$5,048).

\$81,238. NM Military Affairs Dept. Banner #04805F. Integrated Natural Resources Management Plan Revision. **Paul Arbetan**, PI. 10/10-3/12. \$0 (F&A \$0).

\$48,020. Animas Biological Studies. Banner #04804Z. Management of pinyon juniper woodlands at Kirtland AFB. **Kristine Johnson**, PI. 07/10-12/11. \$3,327 (F&A \$686).

\$50,000. Army Corps of Engineers. Banner #04800V. Pinyon jay surveys at Kirtland AFB. **Kristine Johnson**, PI. 03/09-12/10. \$26,839 (F&A \$3,397).

\$40,000. Dept. of Defense. Banner #04800C. Raptor surveys at Holloman AFB. **Kristine Johnson**, PI. 01/09-09/11. \$19,514 (F&A \$4,503).

\$85,000. Dept. of Defense. Banner #04800D. Grassland bird surveys at Holloman AFB. **Kristine Johnson**, PI. 01/09-09/11. \$29,966 (F&A \$6,915).

\$117,494. Dept. of Defense. Banner #04800P. Habitat use by pinyon-juniper birds. **Kristine Johnson**, PI. 03/09-09/10. \$42,157 (F&A \$6,279).

\$110,000. Dept. of Defense. Banner #04801C. Management, wetlands/floodplain. **Kristine Johnson**, PI. 04/09-04/12. \$13,449 (F&A \$3,103).

\$85,000. Dept. of Defense. Banner #04803X. Grassland bird surveys at Holloman AFB. **Kristine Johnson**, PI. 05/10-03/12. \$2,538 (F&A \$571).

\$40,000. Dept. of Defense. Banner #04803Y. Raptor surveys at Holloman AFB. **Kristine Johnson**, PI. 05/10-12/11. \$5,918 (F&A \$1,330).

\$110,000. Dept. of Defense. Banner #04803Z. Management wetlands/floodplains. **Kristine Johnson**, PI. 05/10-03/12. \$9,905 (F&A \$2,227).

\$199,292. Dept. of Defense. Banner #04804I. Habitat use at multiple scales by pinyon-juniper birds. **Kristine Johnson**, PI. 08/10-12/11. \$92,248 (F&A \$33,212).

\$47,900. NPS. Banner #048918. Indicator species at Pecos Nat'l. Historic Park. **Kristine Johnson**, PI. 04/08-07/10. \$11,649 (F&A \$1,742).

\$94,340. NPS. Banner #048962. Natural resource condition assessment for Pecos Nat'l. Historic Park. **Kristine Johnson**, PI. 09/08-11/10. \$52,459 (F&A \$4,812).

\$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. 07/07-03/10. \$11,529 (F&A 42,379).

\$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. \$27,099 (F&A \$4,517).

\$49,950. NM Dept. of Game and Fish. Banner #04803W. Gunnison's prairie dog surveys. **Kristine Johnson**, PI. 05/10-02/11. \$4,321 (F&A \$720).

\$54,452. T.E. Parkinson Ranch. Banner #048840. Wildlife habitat improvement of the Parkinson Ranch. **Kristine Johnson**, PI. 07/07-03/10. \$4,557 (F&A \$0).

\$9,999. NatureServe. Banner #04802T. Handheld field inventory and mapping tools. **Rayo McCollough**, PI. 10/09-8/10. \$9,536 (F&A \$1,968).

\$15,000. BLM. Banner #04804D. Biological resources data collection and storage 2010. **Rayo McCollough**, PI. 10/09-09/12. \$5,330 (F&A \$794).

\$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. \$24,099 (F&A \$4,016).

\$16,700. NM Dept. of Game and Fish. Banner #04801K. Abstracts for species of greatest conservation need. **Rayo McCollough**, PI. 05/09-05/10. \$6,337 (F&A \$1,056).

\$13,000. NM Dept. of Game and Fish. Banner #04805D. Organizing federally listed species information. **Rayo McCollough**, PI. 11/10-10/11. \$1,646 (F&A \$274).

\$13,744. NM Dept. of Game and Fish. Banner #04806O. Organizing federally listed species information (BISON-M). **Rayo McCollough**, PI. 11/10-10/11. \$0 (F&A \$0).

\$18,000. NM Environment Dept. Banner #04801W. NM rapid assessment database – final requirements. **Rayo McCollough**, PI. 07/09-10/10. \$9,248 (F&A \$1,541).

\$25,000. BLM. Banner #04802Q. Santa Fe River vegetation map. **Esteban Muldavin**, PI. 10/09-09/12. \$8,957 (F&A \$1,334).

\$30,000. BLM. Banner #04802P. Pinyon-juniper woodlands and bird diversity in Wild Rivers Recreation Area. **Esteban Muldavin**, PI. 10/09-10/11. \$20,399 (F&A \$3,038).

\$20,000. BLM. Banner #04806N. Pediomelum pentaphyllum surveys **Esteban Muldavin**, PI. 10/09-09/12. \$0 (F&A \$0).

\$91,453. Middle Rio Grande Conservancy District. Banner #048980. Post-fire bosque restoration in the middle Rio Grande: a landscape-scale approach towards revitalization of an ecosystem. **Esteban Muldavin**, PI. 10/08-06/11. \$10,457 (F&A \$951).

\$31,500. NPS. Banner #048623. White Sands Nat'l. Monument vegetation map accuracy assessment. **Esteban Muldavin**, PI. 07/05-6/10. \$10,783 (F&A \$1,407).

\$323,547. NPS. Banner #048637. Guadalupe Mountains Nat'l. Park vegetation map and classification. **Esteban Muldavin**, PI. 07/05-07/10. \$57,671 (F&A \$7,522).

\$152,363. NPS. Banner #048721. Vegetation map for Petroglyphs Nat'l Monument. **Esteban Muldavin**, PI. 06/06-03/11. \$3,407 (F&A \$444).

\$16,000. NPS. Banner #048842. Map tamarisk park-wide – White Sands Nat'l. Monument. **Esteban Muldavin**, PI. 09/07-01/10. \$477 (F&A \$71).

\$69,928. NPS. Banner #048847. Monitoring long-term vegetation dynamics in Big Bend Nat'l. Park. **Esteban Muldavin**, PI. 09/07-12/10. \$6,076 (F&A \$905).

\$65,472. NPS. Banner #048819. Vegetation mapping at Capulin Volcano NM & Pecos NHP. **Esteban Muldavin**, PI. 05/07-04/10. \$20,968 (F&A \$3,123).

\$31,206. NPS. Banner #048957. Vegetation classification and map of Ft. Davis Nat'l. Historic Site. **Esteban Muldavin**, PI. 08/08-06/10. \$19,420 (F&A \$2,892).

\$7,020. NPS. Banner #048969. Preliminary GIS hearth maps for White Sands Nat'l Monument. **Esteban Muldavin**, PI. 10/08-07/10. \$1,106 (F&A \$165).

\$16,000. NPS. Banner #048842. Map tamarisk park-wide – White Sands Nat'l. Monument. **Esteban Muldavin**, PI. 09/07-01/10. \$477 (F&A \$71).

\$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. \$974 (F&A \$127).

\$14,900. NPS. Banner #04801H. Plant species inventory and herbarium specimen verification, Petroglyph Nat'l. Monument. **Esteban Muldavin**, PI. 05/09-01/12. \$3,293 (F&A \$490).

\$2,475. NPS. Banner #04802G. Supplemental work to improve vegetation mapping for three SOPN parks. **Esteban Muldavin**, PI. 07/09-06/10. \$1,185 (F&A \$177).

\$61,425. NPS. Banner #04802H. Pinyon-juniper restoration monitoring. **Esteban Muldavin**, PI. 10/09-09/12. \$15,096 (F&A \$2,248).

\$31,164. NPS. Banner #04802J. Development of vegetation classification and map for Ft. Davis Nat'l. Historic Site. **Esteban Muldavin**, PI. 09/09-01/12. \$8,519 (F&A \$1,267).

\$30,000. NPS. Banner #04802P. Pinyon-Juniper woodlands and bird diversity in Wild Rivers Recreation Area. **Esteban Muldavin**, PI. 10/09-10/11. \$21,617 (F&A \$3,038).

\$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. \$97,228 (F&A \$0).

\$99,258. NM Environment Dept. Banner #04805P. Wetland vegetation index for riverine wetland on the upper Rio Grande. **Esteban Muldavin**, PI. 12/10-12/11. \$0 (F&A \$0).

\$167,065. Pueblo of Santa Ana. Banner #04803Q. Rio Jemez corridor vegetation monitoring for Santa Ana Pueblo. **Esteban Muldavin**, PI. 5/10-6/11. \$72,472 (F&A \$14955).

\$44,874. U.S. Army Corps of Engineers. Banner #04803G. Hink and Ohmart vegetation analysis. **Esteban Muldavin**, PI. 02/10-05/11. \$25,890 (F&A \$5,820).

\$32,970. U.S. Fish & Wildlife Service. Banner #048893. Middle Rio Grande bosque initiative web page database and GIS. **Esteban Muldavin**, PI. 09/07-09/10. \$11,306 (F&A \$2,333).

\$119,933. U.S. Forest Service. Banner #04803U. Nonforest ecological modeling for Arizona and New Mexico. **Esteban Muldavin**, PI. 04/10-12/13. \$27,544 (F&A \$4,102).

\$25,000. U.S. Geological Service. Banner #04804Y. Protected Areas Database for New Mexico. **Esteban Muldavin**, PI. 09/10-07/11. \$3,175 (F&A \$655).

\$10,000. BLM. Banner #04802R. Pediomelum pentaphyllum surveys. **Phil Tonne**, PI. 10/09-10/11. \$9,998 (F&A \$1,489).

\$16,800. NM Energy, Minerals & Natural Resources Dept.. Banner #04801Z. Holy Ghost Ipomopsis 2009-10. **Phil Tonne**, PI. 08/09-06/10. \$9,056 (F&A \$1,059).

\$9,000. NM Energy, Minerals & Natural Resources Dept.. Banner #04802W. Endangered plants recovery. **Phil Tonne**, PI. 12/09-06/10. \$8,982 (F&A \$1,497).

\$9,320. NM Energy, Minerals & Natural Resources Dept.. Banner #04804T. Holy Ghost Ipomopsis recovery. **Phil Tonne**, PI. 09/10-12/10. \$9,139 (F&A \$1,523).

\$12,500. NM Energy, Minerals & Natural Resources Dept.. Banner #04804R. Holy Ghost Ipomopsis recovery. **Phil Tonne**, PI. 09/10-12/10. \$12,501 (F&A \$2,084).

\$25,800. U.S. Forest Service. Banner #048972. Development of native plant materials program. **Phil Tonne**, PI. 09/08-09/13. \$0 (F&A \$0).

PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

B. Journal Articles

C. Web-Based

D. Technical Reports

Johnson, K., L. Wickersham, J. Wickersham, T. Neville, J. Smith, M. Baumann, and C. Finley. 2010. Habitat use at multiple scales by Pinyon-Juniper Birds I: Landscape Scale. Natural Heritage New Mexico Publ. No.10-GTR-360. Natural Heritage New Mexico, Univ

Johnson, K., T. Neville, B. Kramer, and B. Flores. 2010. Monitoring black-tailed prairie dog towns in Eastern New Mexico using remote sensing. Natural Heritage New Mexico Publ. No. 10-GTR-359. Natural Heritage New Mexico, University of New Mexico, Albuquerque

Johnson, K., M. Baumann, C. Wolf, T. Neville, and J. Smith. 2010. Management of pinyon-juniper woodlands at Kirtland Air Force Base: Pinyon Jay summer and winter home ranges and habitat use. Natural Heritage New Mexico Publ. No. 10-GTR-353.

Johnson, K., J. Smith, and P. Tonne. 2010. Habitat evaluation and surveys for listed plant and animal species at Pecos National Historical Park Pigeon's Ranch and Cañoncito Subunits. Natural Heritage New Mexico Publ. No.10-GTR-348.

Johnson, K., T. Neville, D. Mikesic, and D. Talayumptewa. 2010. Distributional analysis of Gunnison's Prairie Dog (*Cynomys gunnisoni*) on the Navajo Nation and Reservation of the Hopi Tribe. Natural Heritage New Mexico Publ. No. 10-GTR-357.

Muldavin, E., T. Neville, L. Arnold, and Y. Chauvin. A map of salt cedar distribution on White Sands National Monument. Natural Heritage New Mexico Publ. No. 10-GTR-356. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM. 10 p.

Muldavin, E., Y. Chauvin, T. Neville, A. Fettes, and P. Neville. In Press. A Vegetation Classification and Preliminary Map: White Sands National Monument. Natural Resource Technical Report NPS/CHDN/NRTR–201X/00X, National Park Service, Fort Collins, Colorado.

Neville, T., E. Muldavin, and L. Arnold. 2010. Preliminary prehistoric hearth maps for White Sands National Monument. Natural Heritage New Mexico Publ. No. 10-GTR-358. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM. 10 p.

Teel, W., E. Muldavin, K. Johnson, T. Neville, Y. Chauvin, and P. Neville. 2010. Wildlife habitat improvement of the Parkinson Ranch, Milnesand, New Mexico. Natural Heritage New Mexico Publ. No. 10-GTR-354.

E. Theses/Dissertations Completed

F. Work In Progress

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

Muldavin, E., A. Kennedy, C. Jackson, T. Neville, P. Neville, K. Schultz, and M. Reid. 201x. A Vegetation Classification and Map Report: Bandelier National Monument. Natural Resource Technical Report NPS/SPCN/NRTR–201x/00X, National Park Service, Fort Collins, Colorado.

Muldavin, E., Y. Chauvin, A. Kennedy, T. Neville, P. Neville, K. Schultz, and M. Reid. 201x. A Vegetation Classification and Map: Salinas Pueblo Missions National Monument. Natural Resource Technical Report NPS/SCPN/NRTR–201X/00X, National Park Service, Fort Collins, Colorado.

Muldavin, E., Y. Chauvin, T. Neville, P. Arbetan, A. Kennedy, and P. Neville. 201X. A Vegetation Classification and Map, Capulin Volcano National Monument. Natural Resource Technical Report NPS/SOPN/NRTR–200X/00X, National Park Service, Fort Collins, Colorado.

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

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

B. Contributed Talks/Posters

S. Wondzell, E. Muldavin,, and J.A. Ludwig. 2009. Fifty Years of Community Change in a Chihuahuan Desert Ecosystem Using the U.S. National Vegetation Classification to link the past to the future. Organized Oral Session (OOS), Ecological Society of America-Albuquerque, NM 2010 Annual meeting, Pittsburgh, PA.

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

E. Muldavin: Ecological Society of America-Albuquerque, NM 2010 Annual meeting. Pittsburgh, PA

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

E. Service as Officer of Professional Society/Organization

None

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

E. Milford. Progress report on New Mexico Rapid Assessment Methodology for the New Mexico Wetlands Roundtable.

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

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

E. Muldavin: Ecological Society of America Vegetation Panel, New Mexico Rare Plant Council
K. Johnson: NM Prairie Dog Working Group
P. Tonne: Rare Plant Technical Council
E. Milford: New Mexico Wetlands Roundtable
R. McCollough: Jemez mountains salamander recovery team; Dune Sagebrush Lizard GIS Group

D. Journal Referee

K. Johnson: Auk
E. Muldavin: Madrono, Oecologia

E. Hosting Professional Colloquia and Groups

10. SERVICE

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

New Mexico Rapid Assessment Training Workshop, Santa Fe New Mexico October 1, 2010

Habitat Use by Pinyon-Juniper Birds Workshop. University of New Mexico October 15, 2010

B. Public Service

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

12. DONATIONS AND GIFTS RECEIVED

13. CURRENT STAFF

A. Faculty/Staff

Paul Arbetan, Research Assistant Professor
Lisa Arnold, GIS Analyst
Stephanie Baker, Research Tech/Life Sciences
Matthew Baumann, Research Tech/Life Sciences
Yvonne Chauvin, Sr. Research Tech/Life Sciences
Anthony Fettes, Research Tech/Life Sciences
Charles Jackson, Research Tech/Life Sciences
Kristine Johnson, Research Associate Professor
Rebecca Keeshen, Unit Administrator I
Rayo McCollough, Database Administrator
Elizabeth Milford, Research Scientist III
Esteban Muldavin, Research Associate Professor
Teri Neville, GIS Analyst
Jacqueline Smith, Sr. Research Tech/Life Sciences
Phil Tonne, Sr. Research Scientist I
Hannah Varani, Sr. Field Research Tech

B. Graduate students

Keith Woodell, M.A.

C. Undergraduate Student Workers and Volunteers

Matthew Baumann
Katie Carillo
Bryant Flores
Rachel Grey
Jeff Hess
Phillip Houk
Hugh Hulse
Brian Kramer

Eric Lindahl
Natalie Sommer
Adam Summers
Eugene Upston
Matthew Wilder
Cassandra Wilson
Cole Wolf

14. MUSEUM ASSOCIATES

None

DIVISION OF PARASITES

1. DIVISION HIGHLIGHTS

Establishing the Division as an official division of the MSB, curating the Rausch collection

2. TABLE OF COLLECTION USE

Specimens Accessioned	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests	Publications Citing MSB Specimens
1	0	0	2	1	1

3. COURSES USING THE COLLECTION

None

4. COURSES TAUGHT BY MSB PERSONNEL

A. Faculty/Collection Managers

Loker, E.S. Evolutionary Immunology

5. COLLECTION MANAGEMENT

This division is still in its development stages. A student was hired to stabilize the Rausch collection

6. AWARDS, GRANTS, AND CONTRACTS

Brant SV NSF award DEB #1021427 COLLABORATIVE RESEARCH-REVSYS:
Phylogenetic and revisionary systematics of a diverse clade of avian schistosomes
(Platyhelminthes: Schistosomatidae) Co-PIs E.S. Loker and V. V. Tkach (University of North
Dakota). Sept 2010 – Aug 2013.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Loker, E.S. 2010. Gastropod immunobiology. In: Söderhall, K., ed., Invertebrate Immunity.
Austin/New York: Landes Bioscience/Springer., pp. 17-43.

B. Journal Articles

Adema CM, Hanington PC, Lun CM, Rosenberg GH, Aragon AD, Stout BA, Richard MLL,
Gross, PS, Loker ES. 2010. Differential transcriptomic responses of *Biomphalaria
glabrata* (Gastropoda, Mollusca) to bacterial and metazoan parasites *Schistosoma
mansoni* and *Echinostoma paraensei* (Digenea, Platyhelminthes). Molecular
Immunology 47 :849-860.

- Brant SV**, Cohen AN, James D, Hui L, Hom A, **Loker ES**. (2010). Cercarial dermatitis transmitted by an exotic marine snail. *Emerging Infectious Diseases* 16: 1357-1365.
- Esteva M, Cervantes FA, **Brant SV**, Cook JA. (2010). Molecular phylogeny of long-tailed shrews (genus *Sorex*) from Mexico and Guatemala. *Zootaxa* 2615: 47-65.
- Hanington PC, Forys MA, Dragoo JW, Zhang SM, Adema CM, **Loker ES**. 2010. Role for a somatically diversified lectin in resistance of an invertebrate to parasite infection. *Proceedings of the National Academy of Sciences* 107: 21087-21092.
- Hanington PC, Lun CM, Adema CM, **Loker ES**. 2010. Time series analysis of the transcriptional responses of *Biomphalaria glabrata* throughout the course of intramolluscan development of *Schistosoma mansoni* and *Echinostoma paraensei*. *International Journal for Parasitology* 40: 819-831.
- Hanelt B, Mwangi IN, Kinuthia JM, Maina GM, Agola LE, Mutuku MW, Steinauer ML, Agwanda BR, Digo L, Mungai BN, **Loker ES**, Mkoji GM. 2010. Schistosomes of small mammals from the Lake Victoria Basin, Kenya: new species, familiar species, and implications for schistosomiasis control. *Parasitology* 137: 1109-1118.
- Hathaway JJM, Adema CM, Stout BA, Mobarak CD, **Loker ES**. 2010. Identification of protein components of egg masses indicates parental investment in immunoprotection of offspring by *Biomphalaria glabrata*. *Developmental and Comparative Immunology* 34:425-435.
- Lotfy WM, **Brant SV**, Ashmawy KI, Devkota R, Mkoji GM, **Loker ES**. (2010). A molecular approach for identification of paramphistomes from Africa and Asia. *Veterinary Parasitology* 174: 234-240.

C. Web-Based

None.

D. Technical Reports

None.

E. Theses/Dissertations Completed

None.

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

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

None.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

Brant SV. 2010. Evolution and diversity in avian schistosomes (cercarial dermatitis: is there really happiness in having a scratch for every itch?). Otago University, New Zealand.

Hosts: Robert Poulin and Anson Koehler

B. Contributed Talks/Posters (*presenter)

Brant SV, Loker ES. (2010). Diversification of schistosomes: a search for patterns. American Society of Parasitologists 22-25 June Colorado Springs Colorado.

C. Attendance at Professional Meetings

Loker, E. S.

June 2010 American Society of Parasitologists, Colorado Springs, Colorado

September 2010 Rocky Mountain Conference of Parasitologists, Cedar Point, Nebraska

Brant, S.V.

June 2010 American Society of Parasitologists, Colorado Springs, Colorado

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

None.

E. Service as Officer of Professional Society/Organization

Vice-President (president elect), American Society of Parasitologists

9. OTHER PROFESSIONAL ACTIVITIES

A. Presentation to General Audience in a Scholarly Capacity

E.S. Loker : UNM Global Health Program ^ lecture on helminths of global public health concern, 14 Jan

E.S. Loker: Grand rounds seminar on global health , gave talk on African schistosomiasis, 21 Jan 2010

E.S. Loker: 26 February, Macroevolutionary Immunology. Southeastern Louisiana University

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.

D. Journal Referee

Loker, E. S. **Journal of Helminthology, Journal of Parasitology, PLoS NTD, Developmental and Comparative Immunology, International Journal of Parasitology**

Brant, S. V. **Biochemical Systematics and Ecology, Comparative Parasitology, Journal of Parasitology, Journal of Helminthology, Journal of Mammalogy, Parasitology Research, and US Fish and Wildlife Service publication**

E. Hosting Professional Colleagues and Groups

E.S. Loker: Mike Strand, University of Georgia, 11 March, 2010

E.S. Loker: External Advisory Committee meeting, NIH COBRE program, March, 2010.

10. SERVICE

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

E.S. Loker:

External Advisory Committee meeting, NIH COBRE program, March, 2010

NIH study section, NCCR centers of biomedical research excellence program, 16-18 March, 2010, Washington, DC

Schistosomiasis consortium for operational research and evaluation (score), funded by Bill and Melinda Gates foundation, harmonization meeting, 16-19 February, 2010.

B. Public Service

None.

11. ADVANCED STUDY, HONORS, AWARDS, FELLOWSHIPS

None.

12. DONATIONS AND GIFTS RECEIVED

13. CURRENT STAFF

A. Faculty/Staff

Eric S. Loker, Regent's Professor, Curator

Sara Brant, Research Assoc. Professor, Collection Manager

B. Graduate Students

Ramesh Devkota

Alex Bochte

C. Undergraduate Student Workers and Volunteers

Candice Espinoza

14. MUSEUM ASSOCIATES

A. Research Associates

U.S. GEOLOGICAL SURVEY

1. DIVISION HIGHLIGHTS

Integration of the U.S. Geological Survey (USGS) collection of dry mammals into the MSB Division of Mammals is nearing completion thanks to efforts led by long-term employee Adrienne Raniszewski. In 2010 over 41,000 mammal specimens of skins and skeletons were reorganized; specimen records were updated in the database; and case and drawer labels were updated and reprinted. USGS and the divisions of fishes, amphibians and reptiles, birds, and mammals share curatorial responsibility by jointly reviewing and processing specimen loans and information requests. In addition, the Curator Emeritus and collection manager attend numerous MSB meetings throughout the year.

As a Federal agency that manages museum property and has expertise with natural history collections, USGS is responsive to other federal Department of Interior (DOI) agencies. USGS staff routinely responds to National Park Service requests on annual inventories and loan agreement renewals, and provides technical assistance to DOI on collection issues such as integrated pest management, specimen deposition, and museum supplies. Cindy Ramotnik, Museum specialist, is an active member on the Department of Interior and USGS museum property committees, and serves on a DOI subcommittee that is currently revising the departmental policies on managing Federal museum property. In addition, her participation on the New Mexico Endemic Salamander Team has increased in 2010 due to recent actions to list the Jemez Mountains salamander as federally endangered and because of loss of habitat from wildfire and drought.

Ernie Valdez, a USGS wildlife biologist and Research Associate of MSB, conducted an assessment of the FWS threatened Mariana fruit bat (*Pteropus mariannus mariannus*) on the Pacific Islands of Anatahan, Sarigan, Guguan, Alamagan, Pagan, Agrihan, Asuncion, and Maug during the summer of 2010. This study represents current information that was compared against earlier assessments conducted over 10 years ago. These findings were written as an administrative report. In the autumn, Valdez assisted Joe Cook by teaching 6 lectures in mammalogy, where he focused on Chiroptera and Lagomorpha, as well as the history of mammalogy and its role within the USGS and other DOI-related agencies. In addition to these lectures, Valdez made presentations on bat-related topics to San Antonito Elementary School, UNM Biology Department, and Region 3 Forest Service biologists. He also represented USGS at a DOI-wide program, held at the Southwestern Indian Polytechnic Institute, which promoted diversity within the federal agency. The effort resulted in hiring a recent SIPI graduate for the summer to work in the USGS collections. Valdez reviewed manuscripts for *Acta Theriologica*, *Animal Behaviour*, and *The Northeast Naturalist*. He also reviewed the New Mexico and Arizona's WNS response state plans. Valdez continues his studies on bats of the Southwest and Pacific, with two of four manuscripts being accepted for publication. Valdez serves on the Fort Collins Science Center Fleet Vehicle Panel as a representative for biologists in the field.

Janet Ruth, a USGS Research Ecologist/Ornithologist, was the lead author on a USGS Open-File Report on a three-year project with a Co-Principal Investigator from the University of Southern Mississippi that used NEXRAD radar data to document bird migration patterns and stopover

habitat in the Southwest. Ruth conducted the second year of fieldwork on the breeding ecology of the Arizona Grasshopper Sparrow (*Ammodramus savannarum ammoregus*) in the Sonoita Valley of southeastern Arizona. Ruth presented at the BLM's *A Decade of Discovery NLCS Science Symposium* in Albuquerque and later reprised her presentation at the Science in the Sonoita Plains Symposium in Elgin, AZ. She continued work on her USGS Quick Response Program to synthesize information about birds in semi-desert grasslands and pine-oak woodlands. The project is conducted in collaboration with the Sonoran Joint Venture, the Rio Grande Joint Venture, the Playa Lakes Joint Venture, and the Intermountain West Joint Venture. Ruth serves as the Partners in Flight (PIF) Coordinator for USGS and was a co-author on an international PIF publication. She also participated in a PIF Symposium on tri-national bird conservation at the Joint COS/AOU/SCO annual meetings in San Diego. She attended national meetings of the PIF Implementation Committee and the PIF Federal Agency Committee. Ruth was also the lead author on a chapter about White-tailed Kite in the book *Raptors of New Mexico*.

Mike Bogan, Curator Emeritus of the USGS collection, and Tony Mollhagen, MSB Research Associate, resumed their work on mammals of the Henry Mountains of south-central Utah during 2010. Specimens from this study are deposited in the MSB collection. They also continued to verify identifications of vespertilionid bats in the MSB collection and Bogan assisted the integration effort by verifying identifications of additional mammals in the collection. In 2010, Bogan and Mollhagen submitted their Final Report on a resurvey of the bats of Dinosaur National Monument. This effort compared current information on numbers of species and individuals of bats with historic data on bats from their original survey in the 1980s. The work was funded by the National Park Service with funds administered by the NPS Colorado Plateau Cooperative Ecosystems Studies Unit to the University of New Mexico. Bogan continued to serve on the MSB Executive Board during 2010.

2. TABLE OF COLLECTION USE

Specimens cataloged	Loans (outgoing)	Loans (incoming)	Visitors	Information Requests	Publications Cited (MSB-USGS Specimens)
845	5	0	See MSB Website	65	2

3. COURSES USING THE COLLECTIONS

See MSB Divisions.

4. COURSES TAUGHT BY MSB/USGS PERSONNEL

A. Faculty/Collection Managers

Valdez, E.W. (gave 6 lectures)

BIOL 489 Mammalogy, Fall 2010, 18 students

B. Graduate Students

None.

5. COLLECTION MANAGEMENT

The USGS cataloged 1,085 specimens of fishes, amphibians and reptiles, birds, and mammals, including 146 lots of fishes in 2010. The fishes included important collections of endangered species of Colorado pike minnows, humpback chubs, and roundtail chubs from the upper Colorado River Basin in the southwest United States. Staff accessioned 10 collections (637 specimens) and 2 legacy collections of bird eggs and fish skeletons that date from the 1920s. The specimens are associated with the establishment of the Denver Food Habits Laboratory, which formed the nucleus of the Biological Surveys Collection. Staff reviewed 28 mammal tissue requests and 4 specimen requests for loans of birds, amphibians, and mammals. Staff responded to numerous requests for information on specimens, and to over 40 requests for technical information on pest control, specimen identification, and museum supplies. Staff assisted 20 researchers with use of the collections and personally provided 6 tours, ranging from 2-20 individuals, and included preschoolers, high school students, undergraduates, and the public. Federal specimens were included in 5 outgoing loans: 3 mammal tissue loans and 2 loans of voucher specimens (birds and amphibians).

Integration of Federal mammals into the MSB Division of Mammals progressed steadily through August under the direction of USGS employee Adrienne Raniszewski, who works with MSB staff to simultaneously integrate the Federal collection and a collection of 32,700 specimens of mammals formerly at the University of Illinois Museum of Natural History. During 2010 approximately 41,000 specimens of skins and skeletons were reorganized; mammal drawer and case labels were updated, and vial and box labels for USGS specimens were printed and installed. Adrienne updated specimen records in the database Arctos to reflect changes in taxonomy and specimen disposition. Ramotnik and MSB collection manager Tom Giermakowski updated the herpetological community on the integration of USGS and MSB amphibians and reptiles with a note to *Herpetological Review*.

Integration was postponed after August, to await the arrival of case drawers, and collection efforts were redirected. During the remainder of the year we processed several fish accessions and conducted routine collection management activities such as responding to loans and information requests, conducting integrated pest management activities, and updating or entering new specimen records into the Arctos database.

As a Federal agency that manages museum property and has expertise with natural history collections, USGS staff is responsive to other federal Department of Interior (DOI) agencies. We routinely respond to NPS requests on annual inventories and loan agreement renewals; and provide technical assistance to DOI on requests for integrated pest management, specimen disposition, and museum supplies. Ramotnik is an active member on the DOI and USGS museum property committees, and serves on a DOI subcommittee that is revising the departmental manual on managing federal museum property.

In 2010 we hired a recent graduate from the Southwestern Indian Polytechnic Institute (SIPI), Tanya Velarde. She learned of the opportunity at a DOI job fair held at SIPI in April 2010 where she met Ernie Valdez. Tanya got firsthand experience working with natural history collections: she prepared scientific specimens of birds, organized mammal skins and skulls, and worked with

fluid-preserved specimens of amphibians, reptiles, and fishes, including a collection of endangered fishes from the upper Colorado River

Ramotnik attended numerous meetings with MSB collection managers throughout the year to share information on integration, databases, website development, and museum policy. She also participated in fire extinguisher training at MSB and a half-day UNM shipping course.

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.

\$25,000. USGS Quick Response Program, Reston, VA. Avian research, monitoring and conservation work in southwestern semi-desert grasslands and pine-oak woodlands – a synthesis. **J.M. Ruth**, P.I. 10/09 – 9/11. \$25,000.

\$25,000. Bureau of Land Management, National Landscape Conservation System program, Washington, D.C. Breeding ecology of the Arizona Grasshopper Sparrow (Year 1), **J.M. Ruth**, P.I. 7/09 – 6/10. \$25,000.

\$111,000.00 Population Assessment of the Mariana Fruit Bat (*Pteropus mariannus mariannus*) on Anatahan, Sarigan, Guguan, Alamagan, Pagan, Agrihan, Asuncion, Maug, and Uracus. 5/10-5/11. \$108,000.00 **E. W. Valdez**, P.I.

\$40,000.00 Review of “State of Texas Mine: A Comparison of 2010 Modified Cupola and Cable-net Video Surveys” and Supporting Data. 10/10-5/11. \$2,000.00 **E.W. Valdez**, P.I.

7. PUBLICATIONS

A. Books, Book Chapters, Edited Volumes

Ruth, J.M., and D.J. Krueper. 2010. White-tailed kite (*Elanus leucurus*). Pp. 107-119 in Raptors of New Mexico (J-L. E. Cartron, ed.). University of New Mexico Press, Albuquerque.

B. Journal Articles

None.

C. Web-Based

Ruth, J.M. Ongoing. Serves as the content webmaster for the following websites:

Partners in Flight – U.S. website (national) <http://www.partnersinflight.org>

New Mexico Ornithological Society <http://www.nmbirds.org>

D. Technical Reports

Adrian, B.M., B.J. Buczkowski, L.M. Bybell, J.R. Childs, J.L. Coleman, M.L. Coombs, J.J. Hagerty, D.E. Moore, **C.A. Ramotnik**, J.L. Schneider, J.L. Slate, S.M. Smith, and B.R. Wardlaw. 2010. The USGS Geologic Collections Management System (GCMS): A Master Catalog and Collections Management Plan for USGS Geologic Samples and Sample Collections. A Report by the Geologic Materials Repository Working Group. July 28, 2010.

Bogan, M.A. and T.R. Mollhagen. 2010. Resurvey for bats (Chiroptera) at Dinosaur National Monument, Colorado/Utah, 2008-2010. Final Report submitted to National Park Service, Dinosaur National Monument, Dinosaur, CO 81610.

O'Shea, T. J., P. M. Cryan, E. A. Snider, **E. W. Valdez**, L. E. Ellison, and D. J. Neubaum. 2010. Bats of Mesa Verde National Park, Colorado: Faunal Composition, Reproduction, and Roosting Habits. Final report to NPS.

Ruth, J.M., R.K. Felix, Jr., and R.H., Diehl. 2010. Bird migration patterns in the arid southwest – final report. U.S. Geological Survey Open-File Report 2010-1271, 51 p.

E. Theses/Dissertations Completed

None.

F. Work In Progress

Jones, C., M.W. Lockwood, T.R. Mollhagen, F.D. Yancey, II, and **M.A. Bogan**. Mammals of the Chinati Mountains State Natural Area, Texas. Museum of Texas Tech University, Occasional Papers.

O'Shea, T. J., P. M. Cryan, E. A. Snider, **E. W. Valdez**, L. E. Ellison, and D. J. Neubaum. Bats of Mesa Verde National Park, Colorado: Composition, Reproduction, and Roosting Habits. Monographs of the Western North American Naturalist.

Ruth, J.M., T.R. Stanley, and C.E. Gordon. Wintering bird-habitat associations in Arizona semi-desert and plains grasslands. Journal of Wildlife Management.

Ruth, J.M., R.H. Diehl, and R.K. Felix, Jr. Bird migration and stopover habitat use in the southwestern United States. The Auk.

Valdez, E.W. Population assessment of the Mariana fruit bat (*Pteropus mariannus mariannus*) on Anatahan, Sarigan, Guguan, Alamagan, Pagan, Agrihan, Asuncion, and Maug; 15 June-10 July 2010: Fort Collins, Colorado, U.S. Geological Survey, Administrative report to U.S. Fish and Wildlife Service.

Valdez, E.W., and P.M. Cryan. Feeding habits and mortality of the hoary bat at wind turbine facilities.

Valdez, E.W., G. J. Wiles, and T. J. O'Shea. Diets of the sympatric Pacific sheath-tailed bat (*Emballonura semicaudata rotensis*) and Mariana swiftlet (*Aerodramus bartschi*) on Aguiguan, Mariana Islands. Pacific Science.

Wiles, G.J., T.J. O'Shea, D.J. Worthington, J.A. Esselstyn and **E.W. Valdez**. Status and natural history of the last known population of *Emballonura semicaudata rotensis*. Acta Chiropterologica.

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

Buckley, L.B. 2010. The range implications of lizard traits in changing environments. Global Ecology and Biogeography 19:452-464.

Hua, X., and J. J. Wiens. 2010. Latitudinal variation in speciation mechanisms in frogs. Evolution;64:429-443.

8. ACTIVITIES IN LEARNED SOCIETIES

A. Invited/Plenary Talks and/or Seminars

Valdez, E.W. 2010. Emergence of white-nose syndrome (WNS). Talk presented to USDA Region 3 Forest Service biologists. February 2010.

Valdez, E.W. 2010. Aspects of guano. UNM brown bag seminar series. March.

B. Contributed Talks/Posters

Jarrell, G. H., **C. Ramotnik**, and D. L. McDonald. 2010. ARCTOS: A relational database relating specimens, specimen-based science, and archival documentation. Oral presentation by Jarrell at the Geological Society of America annual meeting, Denver, CO, 31 October 31 – 3 November 2010.

Ruth, J.M. 2010. Ten years of research on grassland birds in Arizona. Science on the Sonoita Plain 2010. Sonoita Valley Planning Partnership, Elgin, AZ. August 2010.

Ruth, J.M. 2010. Ten years of research on grassland birds in Arizona, including BLM's Las Cienegas National Conservation Area. A Decade of Discovery. Bureau of Land Management National Landscape Conservation System, Albuquerque, NM. May 2010.

Ruth, J.M., C. Arizmendi, K.V. Rosenberg, and P.J. Blancher. 2010. Information gaps on limiting factors and other critical research needs for landbird conservation. Joint meeting of the Cooper Ornithological Society, American Ornithologists' Union, and the Society of Canadian Ornithologists, San Diego, CA. February 2010. (Presented by J.M. Ruth)

Valdez, E.W. 2010. Food habits of the Pacific sheath-tailed bat and Mariana swiftlet from Aguiguan. Oral presentation at the 2010 North American Society for Bat Research (NASBR), Denver, October 2010.

C. Attendance at Professional Meeting

Ramotnik, C.A. Climate Change and the Conservation of Native Amphibians and Reptiles, hosted by the Southwest Region, U.S. Fish & Wildlife Service, Albuquerque, March.

Ruth, J.M. Joint meeting of the Cooper Ornithological Society, American Ornithologists' Union, and the Society of Canadian Ornithologists, San Diego, CA. February 2010; annual meeting of the New Mexico Ornithological Society, Albuquerque, NM, April.

Valdez, E.W. North American Society for Bat Research (NASBR), Denver, October.

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).

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 the following standing committees: Documentation, Membership, and Publication.

Ruth, J.M. New Mexico Ornithological Society, Board Member.

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

None.

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.

Bogan, M.A. Member, MSB Executive Committee.

Ramotnik, C.A. Member, Department of Interior Museum Property Committee and 411 DM Subcommittee; Member, USGS Museum Property Committee; Member, USGS Geologic Discipline Geologic Materials Working Group; Member, New Mexico Endemic Salamander Team; and USGS Arid Lands Field Station representative for Combined Federal Campaign.

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. The Southwestern Naturalist (1), Western North American Naturalist (2), and Journal of Mammalogy (1).

Ramotnik, C.A. The Southwestern Naturalist (1) and USGS series (1).

Ruth, J.M. MSB (1); Conservation Genetic Resources (1).

Valdez, E.W. Acta Theriologica (1); Animal Behaviour (1); The Northeast Naturalist (1); and the New Mexico and Arizona's white-nose syndrome response state plans.

F. Hosting Professional Colleagues and Groups

N/A

10. SERVICE

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

Valdez, E.W. Represented USGS at a Department of Interior job fair to promote diversity within the federal agency; Southwestern Indian Polytechnic Institute, Albuquerque.

B. Public Service

Bogan, M.A. Member, Corrales Bosque Advisory Commission, Corrales, NM.

England, A.E. Member, UNM Building Space Committee, Research Day Committee, and Biology Graduate Students Association.

England, A.E. Graduate Research Allocations Committee (GRAC) grants reader, Spring 2009.

Ramotnik, C.A. Participated in the Albuquerque Christmas Bird Count.

Ruth, J.M. Participated in the Albuquerque and Five Points (Sevilleta NWR) Christmas bird counts. Annually conducts/ participates in two Breeding Bird Survey routes – Counselors, NM and Fence Lake, NM.

Ruth, J.M. Member, Technical Advisory Group and Member, Corrales Bosque Advisory Commission, Corrales, NM.

Valdez, E.W. Served as Science Fair judge at San Antonito Elementary School. April.

Valdez, E.W. Presented a talk on bats at San Antonito Elementary School. October.

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.

Ramotnik, C.A. Received Star Award from USGS for participation on USGS-GD Geologic Materials Repository Working Group.

12. DONATIONS AND GIFTS RECEIVED

None.

13. CURRENT STAFF

A. Faculty/Staff

Michael A. Bogan – Curator Emeritus

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

Tanya Velarde – museum technician (undergraduate)

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.