

Specimen and Destructive Loan Policies and Procedures of the Natural Science Research Laboratory

Collections governed by the Natural Science Research Laboratory (NSRL), Museum of Texas Tech University, serve as research and education resources. These resources are available, upon reasonable request, to approved scientists and educators. Loaned material may be used for research, exhibit, and educational purposes. The NSRL provides loans of: skins, skeletons, fluid-preserved specimens, and other ancillary materials from its Mammal and Ornithology collections; microscopic slides, dried and fluid specimens from its Invertebrate Zoology Collection; and tissue, blood, and DNA samples from its Genetic Resources Collection.

Objects considered for loan are the property of the Museum or held-in-trust and accessioned into the Museum's record. Unaccessioned or uncataloged Museum collections and other comparable objects will not be loaned. Holotype voucher specimens will not be loaned. However, at the discretion of the appropriate Curator and with approval of the Director of the NSRL, if secondary type specimens (e.g., paratypes, lectotypes) are available in sufficient numbers, the loan of a subset of secondary type specimens may be permissible.

Consideration of any loan request is based upon decisions relative to conservation of specimens and care of collections. The NSRL issues two types of loans: Specimen and Destructive. Specimen Loans are defined as the loan of a specimen in its entirety (skin and skeleton) or subset (e.g., skull, bacula, karyotype slide) for research or exhibition purposes. This type of loan stipulates that the specimen will be returned in its original condition (except for circumstances surrounding certain Invertebrate loans, e.g., extracted genitalia). A Destructive Loan is defined as a portion of a specimen designated for research purposes with the *a priori* knowledge that all or a portion of the specimen will be destroyed. Tissue loans for genetic assays or bone fragments for carbon dating are examples of Destructive Loans. Given the differences, relative to specimen conservation, between Specimen and Destructive Loans, the NSRL has developed a **General Loan Policy and Procedures** that applies to all loans (Specimen and Destructive), and a supplemental **Destructive Loan Policy and Procedures** that applies only to Destructive Loans.

General Loan Policy and Procedures

I. Loan Conditions. The following conditions must be met in advance to receiving any type of loan (Specimen or Destructive) from the NSRL. Other stipulations may be made by the NSRL, dependent upon the specifics of the loan request.

1) Loans are made only to faculty, curators, and permanent research staff at institutions with facilities to properly house and care for specimens. Students and post-docs must request loans through their major advisor or mentor and have the major advisor or mentor sign the loan form. Individuals who are not affiliated with such an institution may request a loan if they have made prior arrangements with an appropriate institution for housing of specimens, and if that institution agrees in writing (an email or PDF document will suffice in most circumstances) to receive the specimens on the researcher's behalf.

2) Once approved, loans will be processed in the order in which they are received. Although every effort will be made to process loans in a timely manner, borrowers should allow a

minimum of two weeks (three for international loans) for this process and should plan accordingly.

3) Loans generally are made for a period of six months. At the end of the loan period it is expected that the loan be returned to the NSRL. Requests for loan extensions must be made in writing to the appropriate Curator. The NSRL reserves the right to cancel or deny renewal of any loan.

4) Requests for permission to transfer specimens between institutions are handled by contacting the appropriate Curator for approval in writing and, if granted, the original loan will be closed and a new loan will be issued to the borrower at the second institution. Permission to hand-carry or ship loans to multiple institutions for comparative or collaborative research must be approved in writing.

5) Loans are made only for the specific purpose defined in the original request. If alterations to the original request are needed (e.g., sequencing a different gene or using a different method than originally proposed), then written approval must be obtained from the appropriate Curator.

6) Typically, no more than half of our holdings of a taxon from one locality will be loaned at the same time. In most cases, a request for large holdings will be divided in half, with the second loan being sent following the return of the first loan. Some loans may be further divided depending on the size, condition, and scientific value of specimens being requested. The borrower may stipulate prioritized groupings of specimens in partial shipments.

7) The borrower is responsible for providing copies of all relevant import and export permits and insurance. Copies of all permits and insurance documents are maintained by the Registrar. If permits are not necessary, that should be stipulated in writing on the request. Loans to countries where commercial delivery services are unreliable will be granted only when specimens can be hand-carried in both directions.

A) Requests from U.S. researchers for tissue of species regulated by the U.S. Department of Agriculture must be accompanied by a copy of a USDA transport permit, issued to the recipient or his/her institution.

B) For foreign researchers, a copy of any import permit required by their government must be provided. If no permit is required, the borrower must state such in writing. Loan requests from foreign researchers for species regulated by the U.S. Fish and Wildlife Service (e.g., CITES-species, endangered species, marine mammals, migratory birds) will not be processed without the proper U.S. export permits; species listed only under CITES may be exported under a Certificate of Scientific Exchange if the receiving institution possesses such a certificate.

8) For typical Specimen Loans, borrowers are expected to cover return shipping costs. For large Specimen Loans, the borrower may be required to cover outgoing and return shipping costs. For Destructive Loans, the borrower is required to cover outgoing and return shipping costs. An account number for priority shipping must be provided or alternative arrangements made for shipping charges. Borrowers also may be charged for the cost of dry ice required for shipping.

9) If a borrower does not meet conditions and requirements of a loan, the NSRL reserves the right to refuse future loans to that borrower until such conditions are resolved.

10) The NSRL is not responsible for verifying the taxonomic identification of tissues or vouchers. The NSRL will assist, where possible, with identification endeavors, but the ultimate responsibility for accurate identification lies with the borrower and authors of publications using vouchers or tissues.

11) The Museum maintains proprietary rights over the object(s) loaned. Included within these proprietary rights are intellectual property rights and patents. Commercial use of material on loan is prohibited. Patenting of products discovered in NSRL specimens or ancillary materials is not allowed without the written consent of the Executive Director of the Museum of Texas Tech University.

II. Loan Requests. Prior to submitting a formal Loan Application, informal inquiries are welcome, preferably by email, addressed to the Curator of Collections at heath.garner@ttu.edu.

Loan requests should be submitted on the appropriate Loan Application form, available at <http://www.nsrl.ttu.edu/collections/Loans/index.htm>, or on institutional letterhead and should be addressed to the appropriate Curator. An electronic copy (PDF) is preferred; otherwise a hard copy may be mailed to the appropriate Curator at the correspondence address of the NSRL:

Natural Science Research Laboratory
Museum of Texas Tech University
Box 43191
Lubbock, TX 79409-3191

Requests should contain:

1) A cover letter (hard copy or electronic) outlining the request (for research or for exhibition).

2) If for research purposes, provide a brief summary of the research, including other sources of material and a justification for why samples are needed from the NSRL. This summary should address the following:

A) Objectives of the project and its potential scientific value.

B) Feasibility and time frame of the study.

C) Method(s) of analysis.

D) Qualifications of the investigator(s) to perform the research.

If applicable, also include the following:

E) Exact nature of material (e.g., skin, skull, postcranial skeleton, taxidermy) to be borrowed.

F) Use TK numbers (tissue loans) or TTU numbers (specimen loans) to request specific specimens. If specific specimens are not needed, specify the number of specimens from a given taxon or geographic location.

- 3) If for exhibition purposes, provide:
 - A) Title and a brief summary/explanation of the exhibit.
 - B) Time frame for the exhibit.
 - C) Exact description of material to be borrowed.
 - D) A statement that the Museum of Texas Tech University will be credited in the exhibit for providing the exhibit material.
- 4) A signed statement indicating compliance to all Loan conditions.

III. Review and Evaluation of Requests. Loan requests will be reviewed on a case-by-case basis according to the following criteria:

- 1) Availability and condition of the material for loan. In some instances, a researcher who has collected and deposited material in the NSRL may request a “grace period” or “no-loan period” in order to conduct his/her own research. In such circumstances, the Director of the NSRL may grant the primary collector of the material this “grace period” (up to 5 years), during which time the material is not available for loan to anyone other than the primary collector or others as approved by the collector. Such agreements must be in writing and specify the duration and conditions of the grace period; this agreement must be on file with the Curator of Collections. Upon expiration of said agreement, the material will be made available for loan in accordance with our standard loan policies unless an extension has been requested and approved.
- 2) The kind and extent of request, including whether it duplicates previous efforts.
- 3) Availability of material from wild or captive sources and efforts by the borrower to obtain such material.
- 4) Amount of material available in the NSRL collections, including consideration of rarity of the specimens (e.g., historical nature, distribution and abundance of the taxon).
- 5) Ability of the borrower to perform the research and publish the results within a timely manner.

The authority to approve a loan rests with the appropriate Curator. Once approved, loans will be processed in the order in which they are received.

Prior notification will be provided to the borrower before loans are shipped, in order to ensure safe and timely transport and receipt of the loan.

IV. Receipt of a Loan.

- 1) The borrower must contact the Curator of Collections or Curator of Invertebrate Zoology, as appropriate, by e-mail to acknowledge safe receipt of the loan.
- 2) The borrower must immediately check number and condition of specimens, noting any discrepancies or damage incurred during transit on the appropriate copy of the loan form. Specimen damage that occurs during transit should be reported immediately to the Museum

Registrar and the NSRL Curator of Collections. Sign and return a copy of the loan form to the Registrar. The borrower is liable for any damage that occurs while the material is in their possession.

3) All skins and skeletal material must be safely stored in cases (with the exception of taxidermy specimens that are too large for cases). For taxidermy specimens and all other specimens placed on exhibit, steps must be taken to insure the physical safety of the specimen and all specimens must be protected against light, pests, dust, and excessive moisture during the entire loan period (in storage and/or on exhibit). Wet specimens are to be stored in the correct concentration of ethanol and away from light. Genetic samples must be stored appropriately (i.e., frozen tissues at -80°C or below, DNA at -20°C , tissues in ethanol at -20°C , tissues in lysis buffer at room temperature).

4) Borrowed specimens are not to be treated with pesticides (e.g., No Pest Strips, PDB) and are to be stored in cabinets free of pesticides and repellants (e.g., Naphthalene). If insect pest activity is discovered on the specimens, please immediately notify the Curator of Collections or Curator of Invertebrate Zoology, as appropriate. Our current insect pest control method is physical isolation and freezing at -10°C as an acceptable alternative to pesticide treatment.

5) Destructive procedures are not permitted without prior written permission from the Director of the NSRL. Removal of appendages, hair, organs, skin samples, or other parts for analyses are considered invasive and written permission must be obtained in advance (see policies for Destructive Loans).

6) As a result of specimen preparation conventions prior to 1970, some specimens may have been treated with arsenic or other hazardous chemicals. All users are advised to take the proper safety precautions when handling NSRL specimens.

V. Loan Return.

1) Prior to return, the borrower must email the Curator of Collections or Curator of Invertebrate Zoology, as appropriate, to verify an acceptable ship date. The actual date of shipment and a tracking number must then be provided. The NSRL has a standard moratorium on shipping loans (outgoing or return) between Thanksgiving and the end of the New Year holiday due to both staffing limitations and the unpredictability of shipping during this time period.

2) All loaned material being returned to the NSRL must be shipped to the appropriate address and contact information, as follows:

Heath Garner, Curator of Collections OR James Cokendolpher, Curator of Invertebrates
(as appropriate)

Natural Science Research Laboratory
Museum of Texas Tech University
3301 4th Street
Lubbock, TX 79415

Phone: 806-742-2486

(Note the 79415 zip code; this zip code must be used for priority parcel shipments. Do not use the 79409 zip code of the University. Do not allow “Address Verification” to automatically update the address of the Museum when completing shipping waybills online.)

Loans must not be shipped to any address other than the Museum.

3) Return the loan in the same shipping container in which it was received and via the same or superior carrier. Place address labels on inside as well as outside of package.

4) Specimens must be packed in archival materials in such a manner as to protect them from shock, moisture, or excessive heat. Specimens should be wrapped in material similar to that used in shipment to the borrower. Borrower packing materials are saved if they can be reused. If it cannot be reused, similar quality materials are used to repack the loan. Use only thin tissue paper or similar soft paper as packing for skulls. Do not use cotton batting, polyester packing, or other fibrous materials in contact with skulls, fragile specimens, or invertebrates. Samples in fluid should be sealed without large air bubbles and packaged to conform to IATA shipping regulations.

5) Returned material must be insured for the same value as the original shipment.

VI. Upon Completion of Research.

1) Specimen re-identifications, taxonomic updates, data corrections, or the assignment of any secondary numbers to the specimens must be reported to the NSRL in writing or electronically (e.g., Excel) and be associated by voucher (TTU) or tissue (TK) number by the end of the loan period or sooner. Manuscript type names will not be assigned in our electronic collection catalog or website until publication of the name. New labels may be attached to reflect proposed updates; however, original specimen tags or labels may not be modified or removed.

2) Acknowledgments and Specimens Examined. Specimens used in publications, reports, or presentations should be included in a “Specimens Examined” section and listed in the appropriate format: TTU-M 123456 for mammals; TTU-Z 123456 for invertebrate zoology; TTU-O 123456 for birds. Tissue (TK) numbers also should be included (if allowed by journal guidelines), or if no voucher exists. The NSRL should be acknowledged in any presentation, publication, or web document that results from the use of its specimens. Acknowledgment should be given as "Museum of Texas Tech University, Natural Science Research Laboratory." Two reprints of each publication (if printed) and a PDF electronic file should be sent to the Curator of Collections. In addition, the borrower is asked to provide the NSRL with digital copies, in the highest resolution available, of any NSRL specimen images or renderings taken and used in presentations or publications.

Destructive Loan Policy and Procedures

The NSRL houses a collection (Genetic Resources Collection, GRC) of tissues and blood samples, primary from mammals but with limited samples from birds and invertebrates. The majority of samples are associated with vouchers in the NSRL’s Mammal Collection; some are from vouchers housed at other institutions. Most tissues are stored frozen (-80°C or -190°C), although some are stored in lysis buffer or ethanol.

Unlike traditional loans, tissue loans and destructive sampling (e.g., skin, toe, or ear clip, hair sample) can deplete or cause damage to the specimen; therefore, all loan requests must follow not only the requirements listed under the General Loan Policy and Procedures, but the borrower must follow stringent guidelines to ensure that tissue loans and destructive sampling do not exhaust these limited resources.

Philosophy Governing Destructive Loans

Historically, Destructive Loans were made to researchers affiliated with other museums. This system functioned exceptionally well as researchers collected and deposited specimens in museum collections. These researchers provided loans to each other through agreements and reciprocity. This process served the needs of the researchers and, equally as important, functioned to help collections replace material depleted by loans and even allowed collections to continue to grow. Under this system, museum collections absorbed costs associated with Destructive Loans because of this process of reciprocity. Recently, this paradigm has shifted as loan requests have increased from researchers not affiliated with museums and without an appreciation for, or involvement in, traditional fieldwork and museum philosophies and concepts. In fact, many requests now come from researchers who have never collected a specimen or who never have deposited a specimen in an accessible museum.

Given that Destructive Loans deplete the amount of archived material in the NSRL, to ensure the long-term value of the collection, requests for Destructive Loans require additional guidelines and are evaluated and scrutinized more thoroughly than traditional loans. In developing the guidelines for Destructive Loans, consideration was given to policies instituted by curators at other major museums relative to their tissue collections, destructive loans, and long-term management of the collections. The overall goal is to enhance and preserve the value of the collections for scientific investigators. Researchers may request samples of tissue, skin, hair, feathers, toe pads, bone, or other parts from traditional specimens for DNA, isotope, or other analyses; however, because our collections are finite, one of our primary responsibilities is to protect these holdings to ensure that they are available for use by future generations of researchers and as new technologies become available. Major considerations are summarized below.

- 1) Availability of material may dictate loan approval.
 - A) Secondary type specimens (e.g., paratypes, lectotypes) or rare specimens may be loaned only under exceptional circumstances.
 - B) Loans involving taxa that are underrepresented in our collection may be restricted.
 - C) In general, the last subsample of a tissue or taxon is not loaned.
 - D) Loans of tissues containing known etiological agents, ecotoxins, or radioactive isotopes may be restricted.
- 2) A request for a loan of NSRL tissues or specimens is an explicit acknowledgment that the borrower supports legitimate scientific collecting, and that he/she values the time, effort, and costs associated with collecting, preparing, archiving, databasing, and maintaining museum

collections. In exchange for granting these loans for scientific study, the NSRL may ask borrowers to provide verbal or written support of scientific collecting and our collections.

3) The NSRL will provide Destructive Loans to qualified researchers. We emphasize that Destructive Loans are intended to supplement materials obtained from other sources, not to replace primary data collection efforts (i.e. field sampling) by borrowers. Implicit in the loan agreement is the understanding that borrowers will abide by certain requirements. In turn, the NSRL will absorb the costs associated with obtaining, housing, cataloging, databasing, and maintaining these samples. Although we strongly encourage collections-based research, our obligation is to protect the NSRL's holdings; therefore, if these requirements are not met, the NSRL may deny specific requests for Destructive Loans.

4) It is expensive to maintain, replace, and grow research collections associated with Destructive Loans. The NSRL has born such costs with minimal NIH or NSF funding; it is a misconception that federal funding supports day-to-day activities and that loans and services are provided free of charge. Most financial support for the NSRL is provided through TTU, a state line-item, donors, and research activities of the curators. Therefore, providing Destructive Loans produces additional costs and burdens to the NSRL and its personnel. For example:

A) Cost of collecting voucher specimens, tissues, and associated data is expensive and may include: travel, salaries of field personnel, per diem, field equipment, traps, nets, prep and archival supplies, and other expenses. For mammals, Bradley et al. (2012) estimated an average cost per specimen of \$41 for those collected locally or regionally and \$74 for those collected internationally.

B) Cost of curating, installing, documenting and databasing, and long-term care for voucher specimens and tissues is expensive and may include: salaries of museum personnel, archival supplies, freezer replacement, data management, and other expenses. For mammals, Baker et al. (2014) estimated an average cost per specimen of \$17.51 for these expenses and an additional \$0.25 per specimen per year for long-term care.

C) Costs outlined in A and B above do not include many costs related to infrastructure (e.g., buildings, museum cases, freezers, electricity), nor does it include costs associated with filling information and loan requests.

D) Costs outlined in A and B above do not include the loss of academic productivity (time that could have been spent on manuscripts, grant proposals, theses, dissertations) to faculty and students while they were in the field collecting specimens or were performing curatorial duties. Although Curators at the NSRL embrace the museum concept, they and their students are placed at a competitive disadvantage relative to a significant portion of the scientific community who do not participate in the activities outlined in A and B above.

Specific Destructive Loan Requirements

1) The borrower must demonstrate equal reciprocity relative to the Destructive Loan request. The borrower can meet this stipulation by completing any of the following:

A) Deposit research material (e.g., specimens, tissues) deemed of equal scientific value in an accessible museum collection. Deposition of specimens in a museum not accredited by an

appropriate scientific society (e.g., American Society of Mammalogists) or other professional entity (e.g., American Alliance of Museums) must meet the approval of the Curators or Director of the NSRL.

B) Provide research material (of equal value) to the NSRL for material borrowed from the NSRL collections. These may include vouchered samples for permanent disposition in the NSRL or loans of tissues to our university researchers.

C) Provide funding towards NSRL fieldwork to replace material associated with the Destructive Loan.

D) For Destructive Loans, applicants who cannot fulfill one of A-C, above, may be charged a replacement and service fee to help defray the cost of acquiring and maintaining the collection, as well as the handling, subsampling, and packaging of the loan. This fee will range from \$25 to \$100 per sample, and will be determined on a case-by-case basis to be commensurate with the rarity of the specimen and the extent of the services provided. This range is based in part on estimates determined by Bradley et al. (2012) and Baker et al. (2014) for the cost of collecting, preparing, curating, cataloging, and maintaining mammal specimens, and extended to the Invertebrate Zoology and Bird Collections. We encourage all researchers to include reimbursement costs for such Destructive Loan service fees when preparing grant proposals.

2) Borrowers should provide evidence that they have experience with the appropriate methodological procedures and that the proposed studies are likely to generate useable data.

3) Requests for a Destructive Loan must contain compelling reasons why the project cannot be completed without the destructive use of museum specimens. This includes evidence that the research question being addressed is explicitly historical and thus requires the use of archived museum specimens or that the taxa of interest cannot be sampled directly from the field.

4) Indicate desired method of transport (e.g., frozen, 95% ethanol). Tissues will be shipped in 95% ethanol if method of transport is not specified. Borrowers are expected to cover all shipping costs. A priority shipping account number should be provided to cover shipping charges.

5) Borrowers must store frozen tissues in an ultra-cold facility (-80°C freezer or liquid nitrogen).

6) Unused portions of tissues and resulting products (e.g., DNA) must be returned promptly (by the end of the loan period) to the NSRL by overnight shipping.

A) Place a copy of the loan form inside the shipping container. Insure loan and shipment for the same value as the original shipment.

B) For frozen tissues, use an amount of dry ice sufficient for two days (e.g., at least 5 pounds for up to 50 samples). For large return shipments, consult the Curator of Collections for guidance. Tissues should be double bagged in plastic to prevent leakage and placed inside a protective box inside the cooler.

C) Ethanol-preserved tissues may be shipped overnight in a secure container at room temperature (following current regulations for the shipment of hazardous materials).

D) DNA may be shipped in a secure container at room temperature.

7) Destructive sampling of voucher specimens to remove specimen parts (e.g., feather, skin clips, toe or ear clips, reproductive organs, stomach contents) normally will be performed by NSRL staff at TTU unless other arrangements have been formally made in writing. If permission is granted to the borrower to remove parts of a voucher specimen, parts must be labeled with the TTU catalog number by the borrower and returned with the specimens. Any slide preparations (e.g., SEM stubs, histological, karyological) are to be returned properly labeled.

8) Sequences obtained from NSRL tissues or traditional specimens should be deposited in GenBank so that they are accessible to other researchers. These sequences must be referenced to the TTU or TK number. GenBank numbers, or any associated numbers from public research databases in which NSRL specimen data is deposited, should be provided in writing to the NSRL in a timely manner.

For further information or to submit a loan request, contact the appropriate Curator or the Curator of Collections. Contact information is provided on the NSRL website: <http://www.nsrl.ttu.edu/contact/index.html>.