

Missouri Cooperative Fish and Wildlife Research Unit



Student Orientation Manual

January 2013
Craig Paukert

PREFACE

The purpose of this orientation manual is to provide an overview of the Cooperative Research Unit (CRU) Program, its policies and procedures, and the responsibilities and expectations placed upon participating graduate students. This manual was prepared in response to recommendations of former students, all of whom received their graduate degrees through a cooperative fish and wildlife research unit. Recent graduates suggested that new students would profit from a better understanding of the CRU Program and its 40 cooperative fish and wildlife research units. Although each unit has unique characteristics, all are linked by a common mission and operational style that is largely set by federal legislation. This manual is intended to provide a historical and operational context for graduate student participation in the CRU Program.

This manual explains how the national CRU Program was established, how it operates, and what the responsibilities are of unit scientists and unit students. Included in this orientation guide are appendices that highlight select topics. Below are definitions for key terms used in this manual for reference purposes:

- CRU Program versus unit program: The term “CRU Program” refers to all 40 cooperative fish and wildlife research units. “Unit program” refers to the activities of an individual cooperative research unit.
- Unit/federal scientist: An employee of the U.S. Geological Survey (USGS) who serves as either the unit leader or assistant unit leader of the cooperative fish and wildlife research unit at host universities. In this manual, unit leaders and assistant unit leaders are referred to collectively as “unit scientists.”
- Unit student: Refers to any Master’s or PhD student whose major advisor is a unit scientist
- Unit project: Any project that receives financial and/or logistical support from a cooperative fish and wildlife research unit, as approved by the unit’s Coordinating Committee.
- Principal investigator: The primary point of contact for a unit project responsible for the project’s research activities and associated information products. This may be a unit scientist or a university faculty member affiliated with the unit through projects or some other arrangement.

MISSOURI COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT

The Cooperative Research Units program is comprised of 40 Units in 38 states. Each Unit is a formal partnership among the U.S. Geological Survey, a State natural resource agency, a host university, the Wildlife Management Institute, and the U.S. Fish and Wildlife Service. The structure of the program provides Federal and State agencies access not only to Unit scientists, but also to facilities and expertise available at the cooperating universities. Because Unit scientists and university faculty members possess diverse areas of expertise, the program collectively embraces a wide variety of disciplines related to fish, wildlife, and natural resource management.

The Missouri Unit's history began in 1936 when the citizens of Missouri voted to amend the State's constitution to create a politically independent Conservation Commission. The first official act of the Conservation Commission was to establish a Cooperative Wildlife Research Unit at the University of Missouri. Objectives were settled upon quickly and were "*to conduct scientific research on the wildlife of Missouri*" and "*to educate students, both in technical phases of wildlife management and general aspects of wildlife conservation.*" We have grown by adding a Fishery Unit in 1962, consolidated by becoming a single Fish and Wildlife Unit in 1985, and moved from the U.S. Fish and Wildlife Service to the National Biological Survey to the U.S Geological Survey. But through it all we have tried to remain true to these early guiding principles.

Projects conducted by our Unit address the expressed information needs of the Missouri Department of Conservation, the U.S. Geological Survey, and other state and federal agencies. The needs of the University of Missouri, also a primary cooperator, are met by assisting with the education mission of the University at the graduate level. The Unit assists University cooperators in various ways, including sharing Unit resources and by administering USGS and other federal funds through the Research Work Order process.

The diversity of fish and wildlife resources in Missouri requires the Unit to pursue a broad focus for research studies, although waterfowl and wetland ecology, big river ecology and management, and stream fishery resources are presently being emphasized. An attempt is made to complement and strengthen existing research thrusts of state and federal agencies. The concern of all cooperators is that Unit research be productive, of high quality, and ultimately useful to the management of fish and wildlife resources of the state and region.

Permanent Unit Personnel and Contact Information

Unit Address and FAX (appropriate for all staff below):

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Unit Coordinating Committee

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MUPD Campus Police

Police, Fire

University Hospital

Environmental Health and Safety

Nights, Holidays, Weekends

Animal Care and Use Committee

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911

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ACKNOWLEDGMENTS

Without the assistance of the following individuals, the creation of this CRU student manual would not have been possible: Charles Berry, Phillip Bettoli, Clint Boal, Don Dennerline, Walt Duffy, Bill Fisher, Jim Fleming, Patrick Jodice, Chip Leslie, Joe Margraf, Patricia Mazik, Reynaldo Patiño, Kevin Pope, Charles Rabeni, Kathryn Reis, Carl Schreck, Mike Tome, and Kevin Whalen.

Additionally, we thank the following Cooperative Fish and Wildlife Research Units for allowing us to incorporate sections of their student handbook into this document: Arkansas, Kansas, Minnesota, North Carolina, and South Dakota.

DRAFT

THE COOPERATIVE RESEARCH UNITS PROGRAM

I. The Face of Past and Current Students



“My time at the Louisiana State University Coop Unit prepared me for life as a professional in more ways than I could have imagined. Because of its active relationship with the Louisiana Department of Wildlife and Fisheries and its contracts with the Army Corps of Engineers, I was able to participate in an ongoing evaluation of real life projects by providing fisheries data that was directly used in the Environmental Impact Statements for flood control projects. The professors at the Unit brought a pragmatic insight to scientific analyses that prepared me for a career with the U.S. Fish and Wildlife Service. I believe the Coop Unit System does much more than provide quality instruction in scientific principles. It provides education and experience that builds leaders for the future.”

Credit: FWS

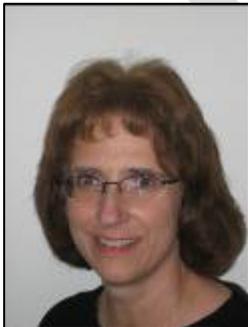
Dale Hall, Former Director of the U.S. Fish and Wildlife Service
Master’s of Science, 1979
Louisiana Cooperative Fish and Wildlife Research Unit

“My experience as a Coop Unit student at Penn State University provided me the opportunity to work side-by-side with U.S. Fish and Wildlife Service and Pennsylvania Game Commission employees. This allowed me to learn about real world wildlife management while I pursued my Ph.D. Exposure to these wildlife management professionals proved invaluable and set the stage for my career as a state and federal wildlife biologist, and now, as the President of a non-profit wildlife management organization. I would encourage all Coop Unit students to take advantage of the practical knowledge possessed by these individuals both in the classroom and in the field.”

Steve Williams, President of Wildlife Management Institute;
Former U.S. Fish and Wildlife Service Director
Doctorate of Philosophy, 1986
Pennsylvania Cooperative Fish and Wildlife Research Unit



Credit: FWS



Credit: B. Bartels

“As a graduate student at Louisiana State University, the Cooperative Research Program gave me a chance to learn how to blend high quality science with accountability to the public and to develop practical skills in the field that have become the core of who I am as a professional. I learned quickly how to explain to the public – in the swamps of Louisiana – why they should care about my work on microplankton. No small feat! Believe me, your time within the Unit Program will give you that chance to be challenged academically and practically...to make mistakes, to learn, to become a skilled, knowledgeable professional. Welcome!”

Leslie Holland-Bartels, USGS Deputy Regional Director;
Director of Alaska Science Center
Master’s of Science, 1977
Louisiana Cooperative Fish and Wildlife Research Unit



“The Wyoming Coop Unit has been a perfect fit for my graduate work because my interest is in applied (management-oriented) research. The Coop Unit provides an ideal environment to pursue applied research because it considers the needs of federal and state agencies, while providing access to faculty and other academic resources at the university. The result is a research product that has both academic rigor and the information needed by agencies to improve their management of fish and wildlife resources.”

Hall Sawyer, current PhD student and former Master’s student
Wyoming Cooperative Fish and Wildlife Research Unit
Advisor, Matt Kauffman

Credit: Mark Gocke/WY Game & Fish

Hall Sawyer draws a blood sample from an elk in southwest Wyoming. For his Master’s study, he researched the habitat selection and movement patterns of wintering elk in the Green River Basin and generated the first habitat use models for elk in non-forested regions of Wyoming.

“I joined the North Carolina Coop Unit because I wanted to be associated with a program that was larger than my university during graduate school. The Coop Unit has given me the opportunity to work and interact with some of the top fisheries biologist in the field. It also has allowed me to work with state and federal agencies and has increased my possibilities of getting a job with these agencies when I graduate. I’m very satisfied with my experience with the Coop Unit and look forward to continue working with them during my professional career.”

Jessica Brewster, Master’s student
North Carolina Cooperative Fish and Wildlife Research Unit
Advisor, Tom Kwak



Credit: Patrick Cooney, NC Unit

Brewster (left) and Aya Tajiri, a high school scholar intern through American Fisheries Society, sampled the diets of flathead catfish in North Carolina’s upper Cape Fear River basin as part of a study to learn how the introduced catfish impacts select native fish populations.

“For me, Coop Units are the keystone for developing research skills and intellect as a graduate student. They offer a challenging framework for maximizing my performance as a student and a scientist. The collaborative relationship between state and federal government, academy and non-profit organizations is a practical strategy for building a network with all kinds of natural resource professionals. The Coop Unit Program demonstrates the immense value of teamwork – individuals working together to provide high quality answers to our natural resource questions.”

Rafael González, Master’s student Mississippi Cooperative Fish and Wildlife Research Unit
Advisor, Francisco Vilella

Credit: Francisco Vilella, MS Unit

To help the U.S. Fish and Wildlife Service develop a new recovery plan for the endangered Puerto Rican nightjar, González is investigating the bird’s current geographic distribution and population density in southwest Puerto Rico.



Your future is bright! From 1998 to 2006, approximately 1,000 students received a Master's of Science or Doctorate of Philosophy degree through the CRU Program: over 46% of those graduates obtained a job with either a federal or state agency, 23% worked for a university, 13% worked for a non-federal entity, 10% worked for private industry, and 8% continued their education. Students are encouraged to share their career goals with major advisors throughout the course of graduate studies. It is important for students to communicate to their major advisors what their future plans/interests may be. Know whether you are interested in pursuing a PhD, obtaining a teaching position, or landing a job with a management agency, non-profit organization, or private industry can help advisors and committee members and others keep an eye out for opportunities. Unit scientists have a personal interest in seeing their students succeed. In recent years, more than 95% of all program graduates are placed into permanent or temporary positions within one year of their completion of degree requirements.

II. Cooperative Research Units 101

A. History of the Cooperative Fish and Wildlife Research Units

The CRU Program originated in the U. S. Department of Agriculture in the mid-1930s to increase the number of trained wildlife biologists and increase research in support of wildlife management. The history of the CRU Program parallels that of modern wildlife and fisheries science and is replete with famous scientists, news-making discoveries, challenged dogma, political intrigue, unique cooperative relationships, and a parade of successful graduate students.

At the 1930 Conference of the American Game Association, Leopold chaired a policy committee that wrote a critical report about the nation's wildlife. In that report, the committee members explained how the United State's demand for wildlife was outstripping its supply; how wildlife habitat on private lands needed increased stewardship; and how the nation lacked quality trained wildlife professionals and non-politicized research data to conduct and support wildlife management. The report prompted action from an unlikely source, a cartoonist and political satirist for the *Des Moines Register* (Iowa) named J. Norwood Darling – “Ding” to his readers.

Ding Darling was an avid hunter and saw the problems of over harvest and habitat loss associated with wetland drainage and drought during his hunting trips to South Dakota. At the time, wildlife management was dominated by regulations and their highly politicized enforcement. Little science on habitat, species, or conservation existed. Consequently, Darling persuaded Iowa State College and the Fish and Game Commission to form a cooperative research and training program for wildlife biologists.

The Iowa Cooperative Wildlife Research Unit began operating in 1932, led by Dr. Paul Errington a student of Aldo Leopold. When Darling came to



Washington, DC in 1934 to head the Bureau of Biological Survey (now the U.S. Fish and Wildlife Service), he wanted to establish a national CRU Program that operated under the tripartite mission of education, research, and technical assistance. Darling managed to get a number of land-grant colleges and state wildlife departments to participate in and help fund the burgeoning program. He also got funding from the Sporting Arms and Ammunition Manufacturers through their American Wildlife Institute (now the Wildlife Management Institute, <http://www.wildlifemanagementinstitute.org>). By December 1935, cooperative wildlife research units operated in Oregon, Utah, Ohio, Iowa, Texas, Alabama, Virginia, Connecticut and Maine, with many more eventually to follow. Unit graduates began to fill many top posts in state and federal wildlife agencies.



Portrait of Aldo Leopold with an inscription to Missouri Unit Leader, Rudolph Bennett wishing the Missouri Unit well in its research (circa 1947).

Since 1935, the CRU Program has maintained its three-pronged focus on generating research furthering the understanding of fish and wildlife management; training future natural resource professionals; and helping natural resource managers apply scientific information. In 1960, Congress passed the Cooperative Units Act (Public Law 86-686) to authorize the program and add more wildlife units. The first fisheries units were established in Utah, Colorado, and Georgia with 22 more to follow. In 1978, Congress amended the Cooperative Units Act to authorize the CRU Program as a separate line item in the annual federal budget. During the 1980's, the fisheries units and wildlife units were combined in most states. Today, there are 40 Units in 38 states. Three states (California, Hawaii, and Tennessee) only have Cooperative Fisheries Units. Two states have separate wildlife and fisheries units, an artifact of early program history in which fish units were sometimes placed on different campuses than wildlife units.

Between 1993 and 1996, the CRU Program twice switched federal homes. First, in 1993 former Secretary of the Interior Bruce Babbitt directed the combination of all biological research programs within the Department of the Interior to create the National Biological Survey. For three years the CRU Program was housed at this new agency, but in 1995 Congress voted to transfer all National Biological Survey programs to the USGS and create the Biological Resources Discipline. Since 1996, the CRU Program has operated within the USGS. Today, USGS serves as the primary research arm for the Department of the Interior and supports four scientific disciplines: geology; geography; hydrology; and biology. The USGS employs nearly 9,000 people located in 200 field offices, which includes cooperative fish and wildlife research units.

Cooperative Research Units



B. Program Organization

The CRU Program consists of 40 university-based cooperative fish and wildlife research units and a national program office, which is located in the USGS headquarters office in Reston, Virginia. The CRU headquarters office provides the national framework and administrative support for all cooperative fish and wildlife research units. The main functions of the headquarters office include coordinating the interests of national program cooperators, representing the USGS's interest in the CRU Program by participating in coordinating committee meetings, integrating CRU Program activities with USGS initiatives, and most importantly, providing operational assistance and support to CRU staff in the field.

Each cooperative fish and wildlife research unit represents a specific university-based partnership through which the mission of the CRU Program is accomplished. All units are established through a unique cooperative agreement that defines the unit's purpose, management direction, and responsibilities and contributions of each signatory cooperator. Signatories of cooperative agreements include the unit's host university, the Wildlife Management Institute, the relevant state natural resource agency, USGS, and in many cases the USFWS.

C. Cooperator Support and Contributions to Cooperative Fish and Wildlife Research Units

Each cooperator makes a unique contribution to support a Unit's operation and management. In turn, the contributions of each program cooperator are leveraged against those of other cooperators to facilitate the sharing of financial resources, expertise, facilities, and opportunities. Through this support mechanism, units maximize their ability to achieve the individual research, education, and technical assistance goals of each program cooperator. In general, the cooperators of each unit make the following contributions.

- The **University of Missouri** provides administrative staff, office space, research and storage facilities, utilities, libraries and computer services, and a significant waiver of indirect costs associated with project funding. The university also provides unit scientists with faculty appointments.
- The **Missouri Department of Conservation** provides funding for the unit's operational expenses and permits access to equipment, personnel, and facilities as needed. Importantly, the state agency may also contribute funding for unit projects.
- The **USGS** pays the salaries and benefits for up to three federal scientists assigned to the Missouri Unit. The USGS also provides operating funds and administrative support for each unit.
- The **USFWS** provides access to its facilities; many students conduct their research on national wildlife refuges or at national fish hatcheries. The USFWS also funds specific research projects to address its management needs.
- The **Wildlife Management Institute** assists the CRU headquarters office with the coordination of cooperator interests and directing the research, education and technical assistance activities of individual units.



Former MS student Emily Tracy Smith with USGS geomorphologist Robb Jacobson giving a presentation on the Missouri River

D. Management and Direction of Cooperative Fish and Wildlife Research Units

Each cooperative fish and wildlife research unit functions within the operational systems of its cooperating university and state agency. All units receive guidance from the Coordinating Committee, which is comprised of the signatories to the cooperative agreement. This committee acts like a “board of directors” where all cooperators play a role in defining the unit's mission, establishing the unit's staffing needs, and research/technical assistance projects. In turn, the unit leader serves as the “chief executive officer” of the Unit, and he or she is responsible for executing all actions agreed to by the Coordinating Committee.

The Coordinating Committee meeting, which is typically held biannually in fall, is the focal point for cooperator review and approval of unit activities. At this meeting, cooperators examine and discuss unit activities and projects. In many cases, students are asked to participate in Coordinating Committee meetings to present research findings and give progress reports on ongoing studies. Typically, at least one representative from each cooperating entity will be present and sometimes the host university's president or dean will attend. Normally three to four people from MDC will be present to ensure all of the agency's interests in unit program activities have proper representation. The USFWS often sends personnel from its local refuge, fisheries, or ecological service office, and the unit leader generally invites all project sponsors, regardless of the sponsors' organizational affiliation. The CRU unit supervisor attends as the USGS representative and may be accompanied by regional USGS officials. Beyond these typical attendees, as many as 40 additional individuals may attend the meetings. Students are typically invited and participate, which provides excellent networking opportunities.

E. Unit Projects and Funding

Unit scientists rely on their working relationships with state and federal agencies to secure funding for research projects, ensuring that investigations conducted are relevant and of high priority to their unit program's cooperators and agency partners. A majority of research projects support graduate student education and training, which is an identified program purpose.

Unit scientists work with the funding agency(s) to develop a research contract that identifies specific products and delivery dates. These contractual obligations are important to students because they often involve project schedules, including deadlines for collecting and analyzing data, and providing deliverables, such as progress and final reports. Typically, Unit research projects directly support management and policy decisions by the sponsoring agency(s) and so data need to be collected, preserved, and analyzed appropriately to be of the highest quality. Many research projects developed by Unit scientists are based on long standing relationships with partners and sponsoring agencies. It is important for each student to understand the role that they play in conducting research projects for cooperators, which is a balance between a great professional opportunity and a significant responsibility to deliver high quality research products in a timely manner. A student's performance may influence the decision of a project sponsor to use the unit's services again in the future, or even to continue funding ongoing projects.

III. Unit Scientists: Their Roles and Responsibilities

Scientists directly affiliated with the unit (Craig Paukert, Amanda Rosenberger, and Lisa Webb) are federal employees of the USGS. Unit scientists serve their Unit as either a leader or assistant leader. Assistant leaders are appointed for their expertise in wildlife or fisheries science of interest to cooperators. In contrast, unit leaders have expertise in either fish or wildlife sciences and are responsible for the overall operation and administration of the unit's program and for maintaining relationships with all cooperators. The responsibilities of each Unit leader include budget, contract and personnel management; policy implementation; property maintenance; and safety supervision. Additionally, Unit leaders oversee their Unit's research program to provide a level of quality control for all projects.

Both leaders and assistant leaders have a primary responsibility for the conduct of scientific research, teaching, and technical assistance. Unit staff need to balance mission-related responsibilities of conducting research, providing support to graduate education, and technical assistance, as well as find opportunities to link these mission functions.

Unit scientists are responsible for bringing a federal science perspective to the campus of their host university. As advisors and mentors, unit scientists play a significant role in teaching students about the science practices of federal agencies, which are not always in sync with the scientific practices of academia. Unit scientists are expected to build research partnerships with state and federal agencies and conduct applied science. In other words, their research should help natural resource managers understand nuances of conservation issues and help agency officials develop natural resource policy and management options.

When appropriate, unit scientists facilitate federal and state agency access to university capabilities to help the agency address pressing natural resource issues. Examples of “university capabilities” include, but are not limited to, the expertise of a university faculty member or a state-of-the-art laboratory. In such situations, the unit scientists help the university develop and manage the resulting project’s contract.

It is important for Unit students to recognize the multiple hats worn by the unit’s federal scientists when conducting their official duties. Compared with other university faculty, unit scientists have a different set of responsibilities, and often additional responsibilities given their affiliation to the USGS and direct employment by the federal government.

IV. What It Means to Be a Unit Student

Graduate students participating in the CRU program are officially university students; units do not grant degrees. CRU students must abide by the same rules, regulations, and requirements that apply to other university graduate students. Students supported by a research or teaching assistantship are employees of the university and have specific responsibilities to fulfill as research/teaching assistants.

In many cases additional responsibilities will be conferred to Unit students through their affiliation with the Missouri Cooperative Fish and Wildlife Research Unit, the USGS, and MDC. For example, USGS has specific requirements for the conduct of science, safety training, and project reporting that will be different from those required by universities or other cooperators. Unit students are expected to assist their advisor in fulfilling federal requirements and those of other cooperators.



*Credit: J. Spurgeon
National Park Service helicopter translocating
endangered humpback chub in Grand Canyon as
part of a project at MU working with the NPS.*

Overall, one of the most important roles played by Unit students is to serve as an ambassador of the local unit and for the program in general. This is not an additional task, but is easily accomplished through adherence to professional standards, including a strong work ethic and a willingness to interact and communicate with cooperators and partners. Through customer surveys, CRU sponsoring partners often report a desire to interact more thoroughly with Unit students. Interestingly, past Unit students have identified an accompanying interest to engage more thoroughly with project sponsors and cooperators. Bridging this gap requires taking the initiative to go the extra mile to connect

with Unit cooperators and partners. Many opportunities exist for Unit students to participate in state agency reporting and planning meetings or to attend state commission meetings. Other local federal cooperators are also typically interested in Unit student activities that can be communicated by participating in regular seminar series or by volunteering to give a brown bag overview of project research.

Often such proactive communication and outreach activities are rewarded with networking opportunities and the development of professional contacts that may last a career.

It is also typically a good business practice to acknowledge unit and project sponsors when addressing colleagues at a meeting and when preparing a publication or giving a presentation. Comply with a unit scientist's request for urgent or important project updates or presentations and for seemingly less important "bean counting" information, such as the amount of gas purchased for a federal vehicle. Essentially, everything Unit students do reflects on the Unit program as a whole.

Below is a description of additional responsibilities for all Unit students. This section is not intended to be comprehensive, but is meant to help students develop awareness about the program and to elicit questions that can be discussed in further detail.

A. Student Responsibilities

Time and Attendance

Research or teaching assistantship typically requires you to work a set number of work hours each week. Like any other university employees, research and teaching assistants are entitled to time off during official university holidays (typically 10 to 12 days per year). However, depending on the rigor and sampling intensity of research projects, vacation time from research may or may not be advisable. Generally, requests for a vacation from research activities need to be cleared with your major advisor.

Permits

There are a variety of requirements to conduct research, including acquiring necessary permits to handle and collect fish and wildlife. It is important to always know what permits are needed for trapping animals, collecting data, and accessing property (private and federal). Permits, especially collectors' permits for animal capture, need to be up to date carried at all times when working in the field or laboratory.

- A Missouri Department of Conservation Collector's permit is required for collecting aquatic and/or terrestrial biota. See Collector's Application, etc. at <http://mdc4.mdc.mo.gov/applications/MDCLibrary/MDCLibrary2.aspx?NodeID=236>
- In addition to state collector permits, the Fish and Wildlife Service requires permits for the capture, banding and take of migratory birds. See the Migratory Bird Program Office website (administered through the U.S. Fish and Wildlife Service) for more information.
- A Federal Endangered Species Collection permit is required for collecting federally threatened or endangered species. Contact the appropriate U. S. Fish and Wildlife Service's Regional Office for further information.
- ACUC approvals are needed for live animals, but others may also be necessary. Check with your advisor for more details.
- Addition site-specific permit may be needed, depending on our sampling sites. For example, the National Park Service requires permits to sample on their lands.

Property

Units acquire and maintain a number of items for field and laboratory research and office work. Although these items are listed on the unit's property inventory, they may belong to the federal or state government or the university. Unit property is typically available for research activities and in some cases for teaching *but not for personal business or use*. Many pieces of equipment (boats and ATVs) may serve multiple projects making it a good business practice for students to acquire a thorough understanding of how the unit checks out equipment, and apportion equipment to projects based on need. Students should not lend Unit equipment to others; such requests are appropriately directed to the Unit leader. Students are responsible for keeping unit property in good working order and securing property in an identified safe location. Unit leaders should be made aware of any concerns about safe property storage. Equipment or items found to be malfunctioning, broken, or lost should be recorded and one of the unit scientists should be immediately notified.

Unit vehicles have their own set of administrative rules for use and borrowing. Use of a unit vehicle assumes that students will comply with basic rules like keeping the vehicle as clean as possible, and ensuring that it is running properly at all times, recording all necessary maintenance information relevant to the field/business trip. **In addition, anyone riding in a Unit vehicle must fill out a USGS volunteer form, even if they are just riding along for a day.** Also, documentation (e.g., gas and oil purchases, miles traveled), must be submitted (including purchase receipts) to Niki Fuemmeler. Unit students are often assigned a vehicle for their field research and it is the student's responsibility to maintain the vehicle and report all mileage, repairs, and gas to Niki. If the vehicle breaks down during a field trip, contact one of

the unit scientists or the unit administrative assistant as soon as possible. Depending on the unit, some or all types of vehicular repairs may need prior authorization.

Similar common sense rules apply to the use of watercraft. If you will be operating a motorboat (65 feet or less in length) when conducting your research, **you must complete the Motorboat Operator Certification Course (MOCC)**. Certification is valid for 5 years; re-certification is available online and in the classroom. In general, this policy does not apply to individuals who are employed by a USGS cooperator or have their work directed entirely by a cooperating entity (e.g., state natural resource agency). However, these individuals must complete MOCC training if they intend to borrow a USGS-owned watercraft. The only time at which a non-certified individual can operate a watercraft is when he or she is operating the boat to gain experience for motorboat certification. This individual must have a certified motorboat operator overseeing him or her at all times. Personal floatation device (blaze orange) must be worn at all times when operating a boat. These must be international orange and US Coast Guard Certified.

Some basic safety items include (before and after trip) inspection of the boat and trailer to confirm the trailer lights are working properly; trailer bearings are greased; the towing vehicle can accommodate the tongue weight of the trailer; the hull of the boat is safe; and the boat motor (if applicable) is in good operating condition. Providing a float plan to your major advisor before departing on a water-based research excursion is a good safety practice. Make sure all state-required equipment is on the boat. In addition, make sure all invasive species procedures are followed to NOT spread invasive species!

Budgetary Matters

Unit projects have specific research accounts to cover the cost of various equipment, supplies, and services needed to conduct specific research duties. It is strongly recommended that students understand the unit's purchasing and documentation protocols. Adherence to established protocols will minimize the time required to obtain needed items. Below is a list of general steps to follow when planning the acquisition of any item or service; Niki Fuemmeler should be contacted for more specific guidance.

1. Always discuss purchasing needs with your major advisor; without his or her approval, funds cannot be drawn from your research account.
2. Plan purchases well in advance to allow time for processing and delivery. Depending on the item to be purchased, this may be days, weeks or even months.
3. Check with Niki to identify approved vendors for the item(s) you need.
4. Provide Niki with purchasing requests and all of the information needed to complete the purchase order and other forms the approved vendor may require.
5. Submit all purchase receipts to Niki (or Laura if using a purchase card).

6. Make every attempt to not pay cash for any item without prior authorization; reimbursements for unapproved purchases are not guaranteed (including emergency purchases).

Travel

Whenever travel is required for official research activities or a professional society meeting, it is necessary to get this approved by your advisor. It is important to obtain official travel status before embarking on your trip, which protects you from tort claims and makes you eligible for worker's compensation should an accident occur.

It is also a good business practice to provide Niki with a copy of a trip plan for all field research activities. This plan should identify the sites where work will occur along with the date/times of planned departure and return to campus. This simple heads up with a few critical details of the work location enables unit staff to appropriately respond should emergency services be needed.

Professional Meeting Attendance

The unit encourages graduate student participation in professional society meetings. Attending professional society conferences provides excellent opportunities to visit with other students and biologists who share research interests, gather new information about fisheries and wildlife conservation and management, and establish contacts with potential employers. Approval is required to attend a professional meeting well in advance of the conference. Typically, presenting research results is a prerequisite for justifying the use of a portion of project funds to cover travel expenses and conference registration fees. Check with your advisor for approval. It is important to maintain a record of all expenditures during the trip so that travel reimbursements can be expeditiously processed. Given the limited funding generally available to support student travel, be prepared to help reduce your personal travel costs by traveling with and sharing lodging with fellow students. Unit scientists will approve transportation to professional meetings in a unit vehicle on a case-by-case basis.

Information Security: Protection of Research Records and Documentation

Research records and documentation are usually in the form of field and laboratory notebooks, data sheets, and electronic data files such as field data recorders, maps, and reports that are stored on your computer. Regardless of the type of records you maintain during your graduate training, it is the student's responsibility to maximize the security of those records when they are in the student's control.

Loss of data and documentation can be costly as you pursue your research degree and to the university when it addresses contractual requirements for project sponsors. Damages to data integrity and unauthorized data use can create problems for management agencies if they have to defend use of student data when formulating a management decision. And, data sets that contain personal information (e.g., social security numbers and medical records) or politically sensitive information concerning a policy, decision, regulation, or sensitive species must be managed with

extreme care; for example, if data sets reveal where an endangered species is located, unauthorized access to that information may jeopardize protection of that species.

Ask your major advisor for specific recommendations and requirements regarding data security. The following recommendations represent a few commonly applied protocols.

- Back up computer files regularly to an external storage device, such as an external hard drive, a network drive, CD, and/or a flash drive.
- Copy field notes and laboratory notebooks and store duplicate copies in a different locations.
- Use logical controls on software and data, such as passwords, firewalls, and data encryption, to monitor and control access to information and computing systems.
- Physically control your workplace environment and computing facilities by locking doors and limiting access to your office, lab, and computing facility.
- Practice reasonable personal security to prevent theft of data and equipment containing data from your home, office, hotel room, car, etc.
- Restrict access to data records, whether electronic or in hard copy, to only those individuals needing access.
- Store files in multiple locations as a precaution against fire or theft, etc.

It is imperative that the integrity of project information be preserved; not just for each student's personal use, but for the research sponsor and future students and investigators who may use the data to study a related question. "Integrity" means that the project's data, documentation, and records remain under the direct control of the investigative team until the team decides to release the project's information to other scientists, natural resource managers, or the general public. Moreover, no one can create, alter, or delete any aspect of the project's information without the investigative team's explicit authorization. Until it is time to release research information, all data, records, and documentation must be securely protected at all times. It is each student's responsibility to protect all project information from unauthorized access and use, disclosure, loss, destruction, modification, or disruption. If incident of theft or vandalism of data occurs, report it immediately to the unit scientists, and they will inform campus security.

It is very important to understand the origin of data used, particularly of this was data obtained by a resource agency, database, or other mechanism where you did not physically collect the data. Often agencies that provide you with data have very specific rules regarding data sharing, particularly with endangered species. *Do not share data you obtained from other sources without checking with your advisor and the appropriate resource management agency.*

Students must adhere to the scientific principles of quality control and/or peer-review when releasing data. Management agencies and the general public must be assured that scientific information reported is of the highest quality.

Upon graduation and prior to leaving the unit, you should transfer to your advisor all data, field notes, and reports in either electronic or hard copy form, whichever is appropriate. The USGS requires that research record files be maintained by the unit and/or transferred to the management agency that funded the investigation. However, students typically retain copies of

study data and records to prepare research publications or for other purposes, as long as permission is received from the appropriate authority.

Personal Conduct

Unit students represent all unit cooperators when doing research. The public will probably see unit students as “university” students conducting unit business and research projects, which is entirely appropriate. The CRU program is working well when unit-sponsored students are seamlessly connected to the larger population of university students. It is not uncommon for the general public to identify unit students as state or federal employee because of vehicle license plates (state or federal) and associated decals.

The Missouri Unit cooperative agreements states that students are employees of the university; therefore, the university is responsible for student actions and behavior. Universities have a student code of conduct that is the basic guideline reflecting university-student relations and defines expected behavior, conduct, and judicial procedures.

Unit scientists join with the university in taking a strong and clear stand on matters of academic dishonesty. Plagiarism and cheating on tests, assignments, research papers, theses/dissertations, or other academic activities are unacceptable. The issue of plagiarism in particular can be confusing. Plagiarism is the act of presenting another person's ideas as your own. When incorporating thoughts and hypotheses of other authors into your own writings, always cite the source of your borrowed ideas. It is unethical to present the work of someone else as your original hypothesis, data interpretation, conclusion, or recommendation. Visit the site below to learn more about MU policies on plagiarism:

<http://mulibraries.missouri.edu/guides/plagiarism.htm>

Unit scientists also join with the university in taking a strong stand against sexual harassment. Sexual harassment represents unwelcome sexual advances or any other verbal or physical conduct of a sexual nature. Harassment is a particularly harmful and illegal form of discrimination that violates expectations of fair and respectful treatment.

The CRU Program joins with all cooperators in a commitment to provide equal opportunity for education and employment of all persons without regard for age, race, religion, gender, sexual preference, national origin, or disability. Additionally, the program sponsors cultural diversity initiatives for students who want to explore career options in the natural resources field; see minority programs at <http://www.coopunits.org> for more information.

Graduate assistantships can be terminated. Termination is usually at the discretion of the major advisor within the regulations of the university. A student can be terminated for violating the “student code” regarding honesty, sexual harassment, and discrimination. A student also can be terminated because of his or her low work ethic or inability to perform required duties. The unit scientist may terminate a student’s stipend or resign as his or her advisor if the student is not performing at a desired level, fails to complete reports, or does not collect required data.

Evaluation of personal conduct begins in the corridors of the Fisheries and Wildlife Sciences. A research group of faculty and students is like an extended family, dependent on one another. Throughout the graduate training experience, students interact with unit scientists, student peers, and departmental staff and faculty. Individuals are judged by how hard and intelligently they work, the quality of research efforts and scientific presentations, the talent or skill contributed to the department, and a student's conduct toward others. Please be aware that you are interacting on a daily basis with people you may be asking for reference letters in the near future, as well as future colleagues and conduct your behavior accordingly.

Conduct of Science

Unit students typically participate in research projects that are designed to provide managers of federal and state agencies and leaders of non-government organizations with the critical information they need to make resource use and/or conservation decisions. The CRU Program places a high value on meeting the expectations of its funding partners, which many times also are the same expectations of the program's cooperators. It is each student's responsibility to conduct high-quality research that generates defensible data and objective interpretation of the results, whatever they may be. Part of the defensibility of research will be determined through scientific peer-review, which will become increasingly critical as research project results take form, mature, and become finalized. The peer-review process will assess many of the features of each student's graduate project that advising committees address early on, including experimental or study design, research scope, sampling procedures, and associated methodologies.

While scientific peer-review provides an independent assessment of the defensibility of research, the most critical driver of science quality rests with you and how you and your technicians behave in the field. Many graduate projects are field intensive, requiring a significant physical and mental investment to collect data. It is at those times when conditions are most challenging, when it is critically important to adhere to approved protocols for sampling or collecting data. Shortcuts are the bane of defensibility. Although it is hard to imagine how research results will be used by others, reflect on whether you could reasonably defend to others what has been done and how it was done.

Ethics

Ethics represent a set of values that guide the actions of a person or group. Ethics include concepts of right and wrong and responsibility. The purpose of this discussion is to make students aware of professional ethics and associated responsibilities to practice ethical science.

Unit scientists are federal government employees who, by law, are held to a high standard of ethics. They are reminded of their ethical responsibilities during required annual training classes. Unit scientists must practice ethical conduct to ensure that every citizen can have complete confidence in the integrity of the Federal Government. They must respect and adhere to the fundamental principles of ethical service. There are 14 principles of ethical service for

government employees. Your major advisor can provide extensive counsel on the subject of ethics.

Students and major advisors alike also follow professional “codes of ethic.” In becoming a member of a professional society expectations will exist to accept the responsibility of managing natural resources for the benefit of those resources and for the public. Additionally, societies will provide their specific set of conduct guidelines. Many of the principles reflect common sense, and differ little among fish and wildlife.

An example of professional conduct guidelines for the American Fisheries Society is available online at

http://www.fisheries.org/afs/certification/cert_standardsprofessionalconduct.

- Use proper scientific methodology; document your conclusions and interpretations.
- Speak for yourself and not for your university or unit without explicit approval.
- Acknowledge the professional work of other scientists when building on their ideas.
- Treat your colleagues in a just and fair manner.
- Serve your employer professionally, “without prejudice or conflict of interest.”
- Present your professional qualifications in a truthful manner.
- Make a clear distinction between your stated opinions and accepted knowledge or facts.

A special responsibility for fish and wildlife students is strict compliance with game and fish laws and regulations. However, CRU expects its student participants to go beyond basic adherence to fish and wildlife regulations, by setting positive examples in your outdoor activities. As a hunter, do you count “un-retrieved harvest” as part of the bag? As an angler, do you adhere to practices that reduce pain in fish? **Do you hunt or fish at your research site, where you may have unique knowledge of habitat and populations? Is that “fair chase”?** As a hiker, biker, river runner, or camper, do you minimize your footprint?

Many ethical codes for professional societies are about science practices. In their article entitled “Ethical Problems in Academic Research,” Judith P. Swazey, Melissa S. Andersen and Karen Seashore Louis reported that 44% of the graduate students and 50% of the faculty members they surveyed in 1993 had been exposed to two or more types of misconduct and questionable research practices (*American Scientist* 81: 542-553). According to this finding, students will observe activities that challenge the integrity of academic science every day. The CRU Program expects unit students to respond appropriately to these challenges using a professional code of ethics as a guide.

Safety

The following discussion addresses safety responsibilities for unit students. A comprehensive list of reference safety material is provided under separate cover in the Cooperative Research Units Policy and Procedures Manual. Treated here are some general rules and safety guidelines for students and technicians when conducting research. Safety programs for unit activities are shared by unit cooperators. Universities provide safety programs and

guidance for most student activities. These are supplemental to USGS safety programs in certain specialty areas that go beyond those typically address by university safety programs

It is the goal of the CRU Program and its cooperators to provide an enjoyable and safe working environment for all faculty, staff, and students; however, the very nature of field and laboratory research in fisheries and wildlife involves elements of personal safety risk. **Although Unit students are technically university employees, unit students are expected to comply with the safety policies and training requirements of USGS as well as those of the host university. USGS safety requirements must be complied with because research will be conducted under the supervision of a federal unit scientist. And as an advisee of a federal scientist, students must complete the same safety training programs applying to major advisors.**

Students and major advisors are expected to work together to ensure that students complete the necessary training requirements and abide by all USGS and university safety policies that pertain to unit activities including research projects. This starts with a Job Hazards Analysis through the Digital measures website for the Coop Units. See your advisor for details. It is the responsibility of each major advisor to help students determine what safety training is needed and how to get it. Major advisors also make sure that students receive proper safety awareness for other issues (e.g., vaccinations). It is the student's responsibility to develop a plan and time schedule with their advisor for completing all safety and health training requirements and to submit proper documentation of training completions to the major advisor.

Each unit student will have unique training needs; hence, it is impossible for anyone external to the student and major advisor to track whether necessary training requirements have been completed. Failure to receive the necessary safety training could result in dire consequences for students and advisors should an accident occur. Typically, a review of training records is part of the procedure in completing an accident report. Deficiencies in training records could result in the forfeiture of tort coverage under the federal government making individuals personally liable for all damages. Clearly, the student and advisor share responsibility to conduct a hazard assessment of work to be done, and to obtain and document completion of appropriate training. This is a significant responsibility that should be taken very seriously.

To maintain a safe working environment for everyone, it is imperative that safety violations and issues be immediately reported to your major advisor. All accidents need to be reported (and documented) to the unit leader, whether or not someone is injured.

Insurance and Personal Liability

As a participant in the CRU Program, and being recognized as a student and employee of the university (and as a volunteer of USGS), the host university has primary responsibility for insuring student health and safety. This includes affording students with liability protection should they be injured or involved in an accident while conducting degree program activities. Each state and university offers students its own set of accident, health, and liability protection.

Major advisors should be consulted to learn what set of benefits and protection is available to students during their degree program.

In addition to the above medical/liability package, students may receive protection under the Federal Torts Claim Act if their activities are being conducted to help USGS achieve its mission, and if they have USGS volunteer status. To obtain “USGS volunteer” status, students must provide unit administrative staff with a signed copy of the Individual Volunteer Services Agreement before project activities are initiated. This form will be evaluated and approved by the unit leader or assistant unit leader. This form is required for non-federal employees to participate in federal activities and/or to operate federal vehicles, boats, etc.

Because students are entitled to medical and liability protection from multiple sources (i.e., the university and federal government), assignment of responsibility is determined on a case-by-case basis. Consequently, students should view the above information as general guidance and not as legal opinion. With that said, when involved in a unit activity after receiving appropriate training and filing the proper forms, students should receive accident/medical/liability protection from one or all of the unit cooperators. Bear in mind that the university and state and federal governments will deny coverage if their stated rules are disregarded when carrying out unit activities. Examples of actions that could cause students to lose accident and liability coverage are:

- Driving a university or government vehicle in the course of your work while under the influence of alcohol or drugs.
- Driving a university or government vehicle for non-work or non-approved work activities (e.g., driving the vehicle home for lunch or using it pick up a friend at the airport).
- Operating a university or government vehicle in a reckless manner, including failure to obey traffic regulations.
- Operating specialized equipment without required training.
- Failure to abide by Occupational Health and Safety regulations during the conduct of your work.

APPENDIX I

Student Selection and Financial Support

A. Student Selection

The Cooperative Research Units Program and its individual cooperative fish and wildlife research units were designed to provide advanced academic training for graduate students in fisheries, wildlife and other natural resource fields. Because each unit is affiliated with a university, unit students are selected through the normal application process for each host university. There is no federal application process, and there is no set number of students accepted each year. At MU, a final acceptance is made the by the Department of Fisheries and Wildlife Sciences and the Graduate School.

B. Types of Student Support

Most unit students receive financial assistance when entering graduate school, but the type and amount of support varies by prevailing circumstances. Regardless of which type you received (or hope to receive), make sure you understand all of the conditions associated with your financial assistance package. Some examples include:

- What expenses (e.g., tuition/fees, living stipend, and equipment purchases) does your financial award cover?
- Is the money already deposited into an account; if not, when will the money be received?
- What deliverables must you produce to keep the financial assistance?
- Will the financial award expire before your expected graduation date?

It is your responsibility to understand and accept all of the conditions relevant to your financial award. Remain mindful of your projected graduation date, as determined by your advisory committee, *because if you do not complete your degree requirements on time you may not receive additional financial support.* A description of the most common financial awards for graduate students is provided below.

Graduate Research Assistantships

Research assistantships are the most common form of financial assistance among Missouri Unit students. More times than not, a unit scientist is able to advise a graduate student because a government agency and/or private entity asked the unit to investigate a specific natural resource issue. As agreed to in the research contract, the project sponsor provides funds that cover all or some of the graduate student's school expenses plus additional funds and/or in-kind support for specific research activities. The unit must generate specific products (e.g., final report, database) that the project sponsor requests to address its natural resource problem. Consequently, if you have a research assistantship, you need to know what the specific objectives and timelines are for your contracted research products and services. You should visit

with your major advisor to learn how this assistantship links to your thesis/dissertation research project. **Although the contracted research project and the degree project are typically one and the same, this is not always the case.**

Unit students on a research assistantship receive a stipend, out-of-state tuition waiver, and health insurance. Therefore, the student will only need to pay fees (about \$300-400/semester). The student likely also have a research account that supports the purchase of research related equipment and supplies and limited travel compensation for project related business (e.g., attending a professional meeting to present research findings for your contracted project). Meet with your major advisor to learn what your compensation and benefits are under your research assistantship. Additionally, discuss what is expected of you so you can maintain your assistantship. Typically a research assistant must work at least 20 hours per week on the contracted research project (not including taking classes, teaching, or helping with other projects). However, unit students typically work more than the required minimum because they are expected to interweave their own research interests and degree requirements with the assigned research project. Student can assume that between their research, coursework, service and other activities related to their project will be at least a full time job and often required more than 40 hours per week.

Graduate Teaching Assistantships

MU occasionally employs graduate students to assist faculty members with the instruction of laboratory classes and other courses. Generally, these assistantships are arranged by graduate students and their major advisor through discussions with university departments and programs. For most students at MU, the teaching assistantship is a voluntary assignment that temporarily supplants the individual's research assistantship. For others, assisting an instructor is a required responsibility during his or her graduate training (i.e., in addition to the research assistantship). Regardless of why you may receive a teaching assistantship, view this position as an opportunity to learn by teaching and to make the transition from being a student who seeks advice to a professional who shares his or her knowledge with others. Make sure you understand what compensation (e.g., living stipend), hours expected to work as a GTA, and other benefits (e.g., tuition/fee waiver, health insurance) go with your teaching assistantship and remember that no teaching assistantship will provide funding for the operational aspects of your research project.

Fellowships

Fellowships are scholarship awards that offer students great freedom in their academic studies and intellectual pursuits. A variety of organizations (such as the university, Environmental Protection Agency, and National Science Foundation) administer fellowship programs to support scholarly work by a master's or doctoral student, but each program differs in purpose, funding, and expectations. Unlike research and teaching assistantships, fellowships tend to not stipulate the fulfillment of specific duties or delivery of required products, but this is not always the case. Thus, if you have a fellowship, make sure you understand the benefits, duration, and expectations of your award. To learn more about fellowship opportunities, consult your major advisor or other officials at the university.

Federal Appointments

Many federal agencies hire students through Student Educational Support Programs (Formerly SCEP and STEP). These appointments are somewhat rare. More information can be found at:

<https://www.opm.gov/employ/students/intro.asp>.

C. Types of Project Support

In most cases, unit scientists raise financial and logistical support for graduate research projects in the CRU Program. Before any agreed upon funds can be transferred to a unit and before research activities can commence, the unit scientist, MU, and funding agency must develop a research contract that specifies what type of research services and information products the agency will receive and the unit research team will provide. In some cases, PhD candidates and post-doctoral fellows either help a unit scientist identify information needs and solicit project funding, or they lead this entrepreneurial activity with minimal oversight from a unit scientist. Product expectations and delivery deadlines are associated with each research contract, and as a member of a research project team, you are obligated to stipulations in the research contract. Failure to meet those contractual obligations can lead to termination of project funding.

Depending on which entity is contributing funds to your research project, money is transferred from the sponsoring agency to the unit and university in one of two ways. For projects receiving financial support from a federal agency, the project sponsor must use legislative authorities, such as the Economy Act (<http://www.thecre.com/fedlaw/legal25/economy-act.htm>), to transfer money to USGS. After USGS has access to the designated project funds, staff in the headquarters office for the CRU Program issues the university a Research Work Order (RWO). This RWO has a finite life and budget and identifies what the objectives and requested deliverables are for the contracted research project. **All RWOs must support research and all must incorporate a graduate student on the research team.**

State agencies and other funding organizations use different contracting mechanisms to acquire research and other services from the unit. *Regardless of how the money from these funding entities reach the unit, the university typically serves as the research account's administrator because the money is sent directly to the university.*

APPENDIX I



USGS Code of Scientific Conduct

1. I will act in the interest of the advancement of science and contribute the best, highest quality scientific information for the U.S. Geological Survey and the Department of the Interior.
2. I will conduct, process data from, and communicate the results of scientific activities honestly, objectively, thoroughly, and expeditiously.
3. I will be responsible for the resources entrusted to me, including equipment, funds, my time, and my employees' time. I will promptly and accurately collect, use, and report all financial resources under my control; and promptly, thoroughly, and accurately report all scientific work.
4. I will fully disclose all research methods used, available data, final reports, and publications consistent with applicable laws and policy.
5. I will respect, to the fullest extent permitted by law, confidential and proprietary information provided by communities, Indian tribes, and individuals whose interests and resources are studied or affected by scientific activities or the resulting information.
6. I will maintain scientific integrity and will not engage in fabrication, falsification, or plagiarism in proposing, performing or reviewing scientific activities and their products.
7. I will welcome constructive criticism of my scientific activities, will welcome and participate in appropriate peer-reviews, and will critique others' work respectfully and objectively. I will substantiate comments that I make with the same care with which I report my own work.
8. I will be diligent in creating, using, preserving, documenting, and maintaining collections and data.
9. I will adhere to established quality assurance and quality control programs.
10. I will follow the Department's records retention policies and comply with Federal law and agreements related to use, security, and release of confidential and proprietary data.
11. I will adhere to appropriate standards for reporting the results of scientific activities and will respect the intellectual property rights of others.
12. I will, to the extent possible and practical, differentiate among facts, opinions, hypotheses, and professional judgment in reporting the results of scientific activities to others, including scientists, decision makers, and the public.

13. I will be responsible for the quality of any data I collect or any interpretations I make, and for the integrity of conclusions I draw in the course of my scientific activities.
14. I will place quality and objectivity of scientific activities and reporting of their results ahead of personal gain or allegiance to individuals or organizations.

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