Cary Institute of Ecosystem Studies

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Catskill Science Collaborative

Request for Proposals for 2024 Catskill Research Fellowships

Purpose of RFP: The purpose of this RFP is to solicit proposals for *Catskill Research Fellowships.* The Fellowships are student research projects mentored by a professor, or other scientist, that address both the research needs of natural resource managers in the Catskill region and provide a positive research experience to the Fellow.

About the Catskill Science Collaborative: The Cary Institute of Ecosystem Studies hosts the Catskill Science Collaborative (CSC), a program funded by the NY State Environmental Protection Fund through a grant from the New York State Department of Environmental Conservation and with further support for research from the New York City Department of Environmental Protection and private donors. The CSC facilitates and communicates environmental science in the Catskill region through sharing science with the public, promoting science-informed resource management, and enabling data- and idea-sharing among scientists working in the Catskills. More information about the CSC can be found on our website: : www.catskillscience.org

Catskill Research Fellowships are offered by the CSC to generate scientific information to inform natural resource management, while providing students applied scientific training in an experiential learning environment. More broadly, the program is intended to strengthen relationships between natural resource managers and researchers and to attract new scientists to conduct research in the Catskills.

Who can apply: College professors and other professional scientists in collaboration with a student interested in conducting research in the Catskills, who will be the Fellow. Fellows may be either graduate or undergraduate students but preference is given to more experienced applicants.

Number of fellowships available: A minimum of three Fellowships will be awarded. More Fellowships may be awarded , depending on funding availability.

Funding available per fellowship: A maximum of $15,000 -- see budget stipulations below. Please note that fellowship awards are contingent on available funding.

Research Needs: Appendix 1 lists research needs that have been identified by natural resource managers. All proposals should be targeted to address one of these research needs. Professors and sponsoring scientists may submit more than one proposal and sponsor more than one student, recognizing that the mentor plays a critical role in supervising and overseeing the field research conducted by the Fellow.

Timeline:

- **Applications are due by Wednesday, January 17, 2024.**

- Notifications about selections will be made in late January 2024.
- It is expected that projects will begin around the end of May 2024.
- Past Fellows have presented their results at the Catskill Environmental Research and Monitoring Conference (CERM) in October 2022 and in a public webinar in October 2023. We hope and expect future fellows will present at one of these forums in the future.
- The project must be completed and the final report submitted by December 31st, 2024.

Application: The fellowship is intended to help build relationships between resource managers and researchers. **Academic supervisors are primarily responsible for oversight of research and facilitating coordination with Managers.** Therefore professors/sponsoring scientists are required to contact the resource manager associated with their research need of interest, as noted in Appendix 1. The purpose of this contact is to gather more information and collaborate on developing a preliminary proposal. It is expected that some refinement of the preliminary proposal may be required prior to awarding the fellowship. Preliminary proposals should contain the following:

1) Cover page including:
- Project Title
- Professor/sponsoring scientist's name
- Student/Fellow name
- College or University Name
- Natural resource manager contact name and agency
- Research need addressed by the proposal (from Appendix 1)
- Certification that the proposal was reviewed and approved by the institution's sponsored programs or grants office prior to submission

2) Proposal narrative (maximum 4 pages) including:
- Background on research question
- Goals and objectives
- Methods
- Outcomes and Deliverables
- Timeframes for data collection, analysis and written report (see Timeline and Expectations/Stipulations)

3) Budget with line items for allowable budget categories as discussed in "Budget Stipulations" below. Please also include a budget narrative to describe proposed expenses, fringe benefits rates, etc.

4) Professor/Sponsoring scientist's CV

5) Student's Resume

Applications are made to the Catskill Science Collaborative, not to the managers directly. Please email your proposal **as a single PDF file** to damonj@caryinstitute.org, copied to ginsbergj@caryinstitute.org, with the subject line: **Catskill Research Fellowship Proposal**. We

encourage discussion with targeted managers, but please note that **CSC runs the application review process.** Projects for successful candidates will be contracted with the University or Research Institution, not the Fellow or advisor directly.

Application Evaluation Criteria: Applications will be evaluated based on the following criteria:

- Degree to which research design meets the research need
- Evidence of partnership with resource management agency
- Potential for positive research experience for student
- Feasibility of project within the time frame specified
- Degree to which professor's expertise meets research need
- Qualifications of the student
- Safety measures (e.g. field work safety)

Budget stipulations:

- **Maximum award request: $15,000**
- Fellows will be awarded at least $7,000
- Professor compensation allowed up to $2,000
- Indirect costs capped at 20% of total direct costs
- Other allowable budget categories include: Fringe benefits at rates approved by the submitting institution, supplies, travel, communications

Other stipulations:

- Contracts for the Fellowship will be made with the institution, not the student.
- The Fellow will be covered by college/institutional insurance and workers compensation.
- The Fellow will attend an orientation.
- The Professor/sponsoring scientist and Fellow will participate in monthly check-in meetings during the field season with the resource manager and CSC in person, by video conference, or by phone to promote a team culture and ensure all parties are informed about the progress of the project.
- The Fellow will regularly check email and voice messages to facilitate communication between the CSC and Fellowship program operation.
- Fellows working in locations without cell phone service will be required to have a satellite communication device for emergency contact.
- Data generated from the fellowship will be formatted and made available for the CSC to place on the Catskill Data Portal (https://www.uvm.edu/femc/catskill#home), pending data sensitivity and data sharing policies of resource management agencies.
- Fellows will be required to find their own housing, though every effort will be made by the natural resource manager and CSC to help connect them to affordable housing opportunities.

Email the CSC Coordinator at damonj@caryinstitute.org regarding any questions.

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Roles & Repsonsibilities

Fellow Role

Fellows will participate in monthly check-in meetings during the field season with the resource manager and CSC in person, by video conference, or by phone to promote a team culture and ensure all parties are informed about the progress of the project. The Fellow should set the agenda for these meetings and share a progress update, which could include data collection progress and preliminary findings.

Professor/Sponsoring Scientist Role

The professor/sponsoring scientist will be the primary supervisor of the Fellow and will be supportive of and encourage a team culture and collaborative spirit. The professor/sponsoring scientist will be responsible for deliverables. They are expected to attend an orientation and presentation of the Fellow's work. They are also expected to participate in regular check-in meetings with the fellowship team.

As part of the responsibility for deliverables, the professor/sponsoring scientist will ensure that all members of the research team are appropriately credited for their contributions. If publications are derived from a fellowship, and long-term datasets provided by the manager or agency are used, the professor/sponsoring scientist will ensure that these data are properly credited and that the manager is offered co-authorship on the paper.

Natural Resource Manager Role:

Natural resource managers are expected to participate in the study design and refinement process. They are expected to be available throughout the study to answer questions that the professor and Fellow may have. They will provide any necessary and agreed upon agency or organizational resources for the study. They will provide an orientation to the Fellow and introduce them to others they may work with. Past Fellows have remarked on the value of meeting and working with professionals in their field and that it was a highlight of their fellowship. Depending on the project, it may be helpful for the resource manager to occasionally visit the Fellow to check in on fieldwork. Resource managers are expected to attend an orientation and presentation of the Fellow's work. They are also expected to participate in regular check-in meetings with the professor, Fellow, and CSC.

CSC/Cary Institute of Ecosystem Studies Role:

The CSC assists in the proposal selection process and the Cary Institute of Ecosystem Studies Grants Office awards the contract to the College or University. The CSC coordinates events and meetings for the Catskill Research Fellowship to ensure communication between all parties and ensure a positive learning experience for the Fellow.

Appendix I
Natural Resource Manager Research Needs

1. **Baseline data on natural resources and recreation**

Collect baseline data either for recreational use, visitor experience, or natural resources, focusing on how these fields of observation impact each other. Fellowship projects can be narrowed down to a specific recreational hotspot or ecological component. For example, if researchers are interested in selecting a specific recreational type or hotspot, DEC staff would ask that they focus on the visitor experience and/or the impact of that recreation on the natural resources of the area. Similarly, if they are interested in researching specific plants, animals, natural communities, water quality, etc., we ask that they focus on the impact of recreation on those natural resources, or how the condition of those natural resources impacts visitor experience or recreational activities. Being managers of recreational use as well as stewards of the Catskill Park, DEC staff would find most helpful the type of research that provides baseline data for our visitor use management efforts. We also ask that proposed research projects target areas outside of the Kaaterskill Clove, since that spot is getting enough research attention right now.

Contact: Sara Hart, sara.hart@dec.ny.gov, New York State Department of Environmental Conservation

2. **Economic and ecological impacts of aquatic invasive species**

NYSDEC has invested millions of dollars to implement its aquatic invasive species management plan. These efforts include spread prevention and control/management of select infestations. We are seeking a researcher to help us assess both ecological and economic impacts of aquatic invasive species in the aquatic habitats found in the Catskill Region. Specifically, we would like to learn more about the ecological impacts of northern snakehead in the Delaware River drainage, and we would like to understand better the economic costs of controlling versus not controlling water chestnut in select waterbodies throughout the region. Additionally, the quagga mussel is a species of interest in the Susquehanna watershed. Our goal is to prioritize management strategies and craft outreach messaging based on these findings.

Contact: Cathy McGlynn, catherine.mcglynn@dec.ny.gov, New York State Department of Environmental Conservation

3. **Modeling the effects of climate change on stream temperatures, discharge, and fish populations**

Climate-driven changes in air temperature and precipitation patterns across New York are expected to alter stream temperature and discharge regimes in the short and long terms. Associated changes in physical habitat and in the magnitude, timing, and duration of extreme flows will progressively affect the health of cold-water fish species, the distribution of their populations, and entire aquatic ecosystems. Adaptation of current resource-management practices to climate change will require a greater understanding of potential changes in water temperatures, species distributions, biological communities, physical habitat, and hydrologic regimes under various climate scenarios. Therefore, calibrated precipitation-runoff, groundwater, and air and water temperature models (employing existing data) are urgently needed to accurately predict impacts

on stream temperatures and flow under different climate scenarios. Such models could also be related to existing fisheries and discharge records to predict how various climate-change scenarios would affect reservoir recharge, fish habitat, or the health of resident fish populations and communities at different scales and timesteps.

Contact: Barry Baldigo, bbaldigo@usgs.gov, US Geological Survey

4. **Trail Condition and Sustainability Assessments for Formal Trails in the Catskill Forest Preserve**

A notable data gap in the Catskills is the baseline documentation of the visitation-related impacts occurring on formal trails in the Catskills. While condition monitoring is an important component of effective land management, data collection and analysis requires a significant investment of time which is a limiting factor for many land managers. The 2020 report titled "Improving the Sustainability of the Appalachian Trail: Trail and Recreation Site Conditions and Management" by Marion, Wimpey, Arredondo, and Meadema, outlines field research protocols which evaluate formal trails for factors that influence trail condition and sustainability against visitation-related impacts such as trail soil loss, trail muddiness, and trail widening. This project could be replicated and applied to the stretch of the Long Path that co-aligns with Catskill Forest Preserve trails. Field seasons could be broken out by Forest Preserve Unit (e.g. Kaaterskill Wild Forest, Indian Head Wilderness, etc.). This project would provide land managers with the foundational information necessary to effectively implement adaptive management strategies, advance efforts to build and maintain more sustainable trails, and lay the groundwork for long-term trail monitoring.

Contact: Alicia van der Veur alicia.vanderveur@dec.ny.gov, New York State Department of Environmental Conservation

5. **Precision of Crowdsourced Recreational Activity Data from Strava**

The purpose of this project is to conduct a comparison between STRAVA metro data and trailhead sign in information at some of the Catskill Parks most popular trailheads to develop a more comprehensive understanding of what recreational visitation inferences can be derived from this new novel data source. Information is lacking in the current understanding of how representative STRAVA app use among hikers. Qualifications: Graduate student coursework in research methods in environmental studies and statistics preferred. A remote internship option is available for this project.

Contact: Pine Roehrs, Pine.Roehrs@dec.ny.gov, New York State Department of Environmental Conservation

6. **Catskill First Growth Forest Mapping Project**

This project involves the creation of GIS layer file which will depict the distribution and extent of First Growth Forest in the Catskills. "First Growth" refers to forest which has never been logged, cleared, or otherwise disturbed by human activities. The data used to create the GIS polygon layer will consist of hand drawn maps by forest historian Mike Kudish which will be imported into ArcGis Pro and geo-referenced by the student. Geographic coordinates and other data attributes (elevation, date collected) will be derived from Kudish field notes. Deliverables from the project will include GIS shapefiles, with appropriate metadata, showing boundaries of first growth forest tracts in the Catskills. Qualifications: Graduate student coursework in Arc Pro

applications preferred. A remote internship option is available for this project.

Contact: Pine Roehrs, Pine.Roehrs@dec.ny.gov, New York State Department of Environmental Conservation

7. **Catskill Research Forest Siting Study Update**

In 2013 a comprehensive analysis of watersheds within the Catskill High Peaks Ecoregion and the NYC West of Hudson Watershed boundary was conducted to assess which watersheds contained preferential attributes that would make them suitable sites for potential Research Forest designation in the Catskills. In comparison to the Adirondacks, the Catskills lack a designated area where research infrastructure and collaborative research between agencies can take place. The purpose of this project will be to provide updates to the original siting study to include new acquisitions and reflect updated preferential and exclusionary criteria that will be applied to watershed entirely within the boundary of the study area. The siting study will identify top candidate watersheds for potential research forest designation. Qualifications: Graduate Student Preferred. Experience in ArcPro necessary. A remote internship option is available for this project.

Contact: Pine Roehrs, Pine.Roehrs@dec.ny.gov, New York State Department of Environmental Conservation

8. **Reptile Distribution of Habitat Use**

The student would be conducting presence/absence reptile surveys in appropriate habitat including stream systems and ridge areas in the Catskills following appropriate survey protocols. Focal species may include wood turtle and rattlesnake/copperhead. Survey locations will be determined in consultation with DEC staff. Additional surveys of wood turtle and rattlesnake habitat characteristics in study areas would also be collected in hopes of generating occupancy models and maps of important habitat features. Information collected during the organized survey efforts could also be used to update State HERP Atlas data, and help put management recommendations in the Species Regional Conservation plans to work.

Contact: Lisa Masi, lisa.masi@dec.ny.gov, New York State Department of Environmental Conservation

9. **Traditional Ecological Knowledge on Native Plants**

The Rondout Neversink Stream Program (RNSP) is seeking to expand the application of traditional ecological knowledge about native plants to stream restoration and education. This educational research project is designed to foster a deeper ecological connection by spending time with plants at different stages of their life, recovering and learning the Munsee names for plants and related meanings and implications, and traditional knowledge about plants and plant management systems. The project may have a field internship or service work component with the RNSP installing plants on restoration projects, managing a native plant nursery, and/or collecting seed from the watershed. Academic partners and the student Fellow may propose variations on this project that meet student and indigenous community needs.

Contact: Stacie Howell, showell@rondoutneversink.org & Brenden Wagner, bwagner@rondoutneversink.org, Rondout Neversink Stream Program, Sullivan County Soil and Water Conservation District

10. **Role of Riparian Vegetation in Forested Watersheds**

Riparian vegetation is identified as a nature-based solution for climate change adaptation

in watersheds with multiple co-benefits. In addition to providing water quality benefits by reducing the amount of nutrients and sediment entering waterways, riparian vegetation provides wildlife habitat and has the potential to regulate stream temperature. Reported co-benefits also include enhanced biodiversity and ecosystem services such as carbon sequestration by riparian forest buffers.

Riparian buffer planting is part of NYC's watershed protection program with the goal of reducing the amount of sediment, nutrients (phosphorus and nitrogen), and pathogens from entering streams and reservoirs in the NYC water supply system. Currently, riparian buffer planting is active in farmland (cropland and pasture) and non-agricultural riparian (streamside) forested areas in NYC watersheds. However, information on configuration, design, and distances for targeted placement of buffer strips to locations where the greatest benefits can be derived is lacking. This study will include a comprehensive literature review on design considerations for riparian buffers and geospatial analysis and field verification of the riparian corridor in NYC watersheds to identify areas that could be targeted for conservation and management strategies to minimize carbon, nutrients and sediment entering streams along with other ecosystem benefits.

The sponsoring professor will have a background in Environmental Science, Ecology, Environmental Engineering or Forest Hydrology. A prospective student should have an interest in environmental science and field research, and expect to gain experience in GIS, data analysis, scientific writing, and presentation.

Contact: Interested researchers should contact Rajith Mukundan for additional information as they develop their proposals (rmukundan@dep.nyc.gov; 845-340-7791)

11. Remote Sensing Products for Application in Climate Change, Forest Monitoring, and Water Resources Modeling Studies

This study will examine the current state of remote sensing products and their applications in these fields with an aim to provide insights into how these technologies and products can contribute to informed decision-making and sustainable resource management. Variables of interest include and are not limited to those that relate to land surface temperature, primary productivity of forests, and components of the hydrologic cycle (e.g., evapotranspiration).

The selected research fellow will conduct a comprehensive review of literature and perform an analysis with application of remote sensing products in NYC's west-of Hudson watersheds to detect trends in climate, changes in forest phenology and/or changes in forest productivity. Results of this analysis are expected to provide natural resources managers valuable information related to climate related changes in forested landscapes with management implications.

The sponsoring professor will have a background in Environmental Science, Ecology, Environmental Engineering or Forest Hydrology. A prospective student should have an interest in environmental science and GIS, and expect to gain experience in spatial analysis, data analysis, scientific writing, and presentation.

Contact: Interested researchers should contact Rajith Mukundan for additional information as they develop their proposals (rmukundan@dep.nyc.gov; 845-340-7791)

12. Understanding of the relationship between forest land cover and water quality in forested watersheds for improved management outcomes

Forested watersheds have long been associated with the production of high-quality water when compared to other land covers. Forest management decisions intended to improve forest cover condition through increases in forest resilience, resistance, or adaptation must be planned so that cumulative effects have no negative impact on water quality delivered from collection reservoirs. Nearly twenty years have passed since a comprehensive literature review on the subject was completed for the New York City Water Supply Watershed, creating a need to consider new concerns and information as the NYC Bureau of Water Supply (BWS) develops its next Watershed Forest Management Plan. Several broad categories of knowledge require updating to ensure that BWS forest management operations remain consistent with current scientific understanding. This study would include an evaluation of existing research into:

1. Forest hydrology of the northeast US informing the basis for links between forested land cover and production of high-quality water, especially related to water metrics of total suspended solids (TSS), dissolved organic carbon (DOC), and nutrient loads;
2. A description of forest characteristics that contribute to the quality of water produced, with details focusing on multiple layers of forest structure and the ability to influence water and carbon cycling;
3. Impact of forest disturbance on basin-scale water quality through multiple natural and anthropogenic mechanisms at various scales and temporal intervals;
4. Forest resilience and capacity to modify (maintain or improve) forest resilience through deliberate action.

Contact: Interested researchers should contact Charlie Laing, Forestry Program Manager, for additional information as they develop their proposals (CLaing@dep.nyc.gov; 845-340-7218).