

Catskill Science Collaborative

Request for Proposals for 2023 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](https://www.catskillscience.org) hosts the [Catskill Science Collaborative](https://www.catskillscience.org) (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, or more, depending on availability of funding.

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 Friday, January 6, 2023.**
- Notifications about selections will be made in late January, 2023.
- It is expected that projects will begin around the end of May 2022.

- Fellows are presenting their results at the Catskill Environmental Research and Monitoring Conference (CERM) in October 2022, and we hope and expect future fellows will present at the bi-annual CERM Conference.
- The project must be completed and the final report submitted by December 31st 2023.

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 goodalea@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 Ava Goodale, CSC Coordinator at goodalea@caryinstitute.org regarding any questions.

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.

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. Field investigation to study dissolved organic carbon sources in the Neversink watershed

Recent synoptic monitoring and analysis of long-term monitoring data shows that the export of dissolved organic carbon (DOC), a precursor for disinfection byproducts (DBPs) in drinking water, varies among tributaries of the Neversink watershed of the NYC water supply. However, the cause of these observed spatial differences is not clearly understood in this predominantly forested watershed. Investigation of the influence of land cover (e.g., deciduous vs evergreen forest), soil physical (e.g., bulk density) and chemical (e.g., soil pH) properties, and topographic and drainage factors may help identify land and watercourse management strategies. Such factors may explain the observed differences in stream DOC concentrations by impacting DOC transformation processes such as its rate of decomposition, oxidation, and soil adsorption. The sponsoring professor would need to have a background in Soil Science, Forest Hydrology and/or Biogeochemistry and have access to portable field equipment and a laboratory facility for soil and water sample analysis. A prospective student should have an interest in soil chemistry, forest hydrology, water quality monitoring and field research, and expect to gain experience in soil and water sampling, and data analysis.

Contact Rajith Mukundan RMukundan@dep.nyc.gov and Karen Moore KarenMoore@dep.nyc.gov, New York City, Department of Environmental Protection

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

3. Impact of Human Visitation on Breeding Bird Populations

The Catskill High Peaks are a very popular hiking destination and levels of use and popularity of the peaks increase annually. More research is needed on whether bird populations (particularly at-risk species such as Bicknell's Thrush) are negatively affected by current levels of human visitation. Data on breeding bird abundance on peaks with different levels of human use could help inform future recreational management decisions. Existing data from Mountain Birdwatch and DEC's trail use database could be supplemented with bird surveys on peaks not covered by Mountain Birdwatch. This project is suitable for a graduate student.

Contact Sara Hart, New York State Department of Environmental Conservation: Sara.Hart@dec.ny.gov and Jason Hill, Vermont Center for Ecostudies: jhill@vtcostudies.org

4. 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 Sarah Coney, Catskill Center for Conservation and Development: sconey@catskillcenter.org; Cathy McGlynn, New York State Department of Environmental Conservation: catherine.mcglynn@dec.ny.gov; and Steve Pearson, New York State Department of Environmental Conservation: steven.pearson@dec.ny.gov

5. 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, US Geological Survey: bbaldigo@usgs.gov

6. 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 to 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 and advance efforts to build and maintain more sustainable trails. It would also lay the groundwork for long-term trail monitoring.

Contact: Alicia Sullivan, New York State Department of Environmental Conservation:
alicia.sullivan@dec.ny.gov

7. **Recreational Impacts to the Environment: Formerly Trail-less Catskill Peak Monitoring Project**

In 2019, the first baseline data collection effort was undertaken on the informal trail networks on the formerly trail-less Catskill peaks over 3,500'. The objective of the effort was to begin to document the spatial extent and distribution of the informal trail networks on "trail-less" peaks in the Catskill Forest Preserve. The conditions and visitation patterns that have been documented on these mountain summits over the past four years are used to make data-driven management decisions to enhance sustainable recreation and natural resource protection efforts. There are two components of the 2023 phase of this monitoring project. The first objective of this project is to continue the data collection effort within the study area to assess the visitation patterns and levels of use that have occurred since 2022. The 2023 data that is collected in the field will be used to determine if management interventions are required to prevent future adverse impacts from occurring. One of the current limitations of this monitoring effort is that it is not clear how representative the Strava heat map activity is of the actual levels of visitation to the trail-less peaks as it only reflects the hiking activity of people that use the app. Agencies across the country are beginning to combine traditional trail counter information with novel data sources such as strava, cell phone data, Instagram etc. to develop increasingly accurate and predictive statistical estimates for visitation. The second objective of the 2023 phase of this project is to develop a better understanding of how novel data sources could be integrated into this monitoring effort to increase the accuracy of current and future visitation estimates in the formerly trail-less areas. This project will require frequent and strenuous hiking, data collection, familiarity with survey 123, GPS and GPS work and preferably completed coursework in Statistics or Research Methods in Environmental Studies

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

8. **Using machine-learning algorithms to map turbidity source geology as a function of landscape features**

NYCDEP is collaborating with USGS to research turbidity production in the Stony Clove Creek watershed. Research methods include mapping erosional connectivity with a set of geologic mappable sediment categories: alluvium (AL), glacial lake sediment (LS), and glacial till (GT). Between 2018 - 2021, NYCDEP collected 1603 point observations of bank and bed erosional connectivity, converted to 783 feature length and area observations in the 83 km² watershed. The spatial data can be combined with mapping and measuring landscape feature components/features (e.g., terraces, mass-wasting scarps, hillslopes) to investigate potential for geologic composition inference for different landscape features and component configurations. Being able to combine an aerial assessment of actual and potential turbidity source sediment connectivity with suspended sediment flux monitoring, and targeted morphologic monitoring would complete the input for improved conceptual and quantitative modeling of turbidity production and potential reduction through changing source and morphology conditions.

Contact: Dany Davis, New York City Department of Environmental Protection:
DavisD@dep.nyc.gov

9. Monitoring geomorphic change using pole-mounted cameras

Agencies involved in stream management practices to reduce turbidity in Esopus Creek in the south-central and eastern Catskill Mountains, would all benefit from more research into stream reach scale turbidity production sourced by erosion into glacial legacy sediment. NYCDEP funds implementation of stream sediment turbidity reduction projects (STRPs) that target disconnecting stream channels from silt and clay-enriched Pleistocene glacial lake sediment (LS) and various forms of glacial till (GT). NYSDEC permits the STRP construction and NYSDOH is the state agency that has primacy in approving NYCDEP's proposed STRPs to meet a drinking water filtration avoidance determination (FAD). NYCDEP seeks an opportunity for a collaborative pilot research project to test pole-mounted camera methods used to obtain three-dimensional data for stream channel morphology monitoring. Optimizing channel morphology assessments to improve STRP site selection and implementation could increase the efficacy of the STRP approach to turbidity reduction. A successful project would include repeat surveys at two to three different stream reaches expected to be undergoing rapid channel adjustment. Repeat surveys would include duplicate surveys to test repeatability and accuracy, and if possible include a survey following any runoff event capable of forcing some geomorphic change. A final report would include details on methods, results and a discussion on how this technology might influence stream management practices to reduce turbidity.

Contact: Dany Davis, New York City Department of Environmental Protection:
DavisD@dep.nyc.gov