Request for Proposals for 2021 Catskill Research Fellowships

Purpose of RFP: The purpose of this RFP is to solicit proposals for Catskill Research Fellowships, which are student research projects that address the research needs of natural resource managers in the Catskill region, while providing a positive research experience to a student.

About the Catskill Science Collaborative: The Cary Institute of Ecosystem Studies hosts the Catskill Science Collaborative, a program funded by the NY State Environmental Protection Fund through a grant with the New York State Department of Environmental Conservation. The Catskill Science Collaborative 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. The Catskill Science Collaborative's website can be found here: www.catskillscience.org
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Catskill Research Fellowships are offered by the Catskill Science Collaborative 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 research in the Catskills.

Who can apply: College faculty with an interested student. The Fellows may be either graduate or undergraduate students. Collaboration among multiple researchers is encouraged, but one faculty member must be the lead for the project.

Number of fellowships available: 3

Funding available per fellowship: $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, and also includes an open topic for investigator-initiated ideas. All proposals should be targeted to address one of these research needs. Applicants may submit proposals for more than one topic.

Timeline:

- **Applications are due by 11:59 PM December 31st, 2020.**
- Notifications about selections will be made on or around January 24th, 2021.
- It is expected that projects will begin around the end of May 2021.
- It is hoped that the fellow will present their results at the Catskill Environmental Research and Monitoring Conference in October 2021, at a location in the Catskills TBA.
- The project must be completed and the final report submitted by December 31st , 2021.

Application: The fellowship is intended to help build relationships between resource managers and researchers, therefore applicants 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 proposal. It is expected that some refinement of the proposal may be required prior to awarding the fellowship. Proposals should contain the following:

1) Cover page including:
- Project Title
- Faculty supervisor name
- Student/Fellow name
- College or university name
- Natural resource manager contact name and agency
- Research need addressed by the proposal (from Appendix 1)
- A letter certifying that that the proposal was reviewed and approved by the institution's sponsored programs or grants office prior to submission. If obtaining the certification presents a problem, please contact us.

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) Faculty supervisor's CV

5) Student's resume

Email your preliminary proposal **as one PDF file** to deppenj@caryinstitute.org with the subject line**: Catskill Research Fellowship Proposal**.

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 faculty supervisor's expertise meets research need
- Qualifications of the student
- Safety measures

Budget stipulations:
- **Maximum award request: $15,000**
- Fellows will be awarded at least $7,000

- Faculty supervisor 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:

- The Fellow will be covered by college insurance and workers compensation.
- The Fellow will attend an orientation at the start of the field season.
- The faculty supervisor and Fellow will participate in regular check-in meetings during the field season with the resource manager and Catskill Science Collaborative 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 Catskill Science Collaborative and Fellowship program operation.
- Fellows working in locations without cell phone service will be required to have a satellite communication device for emergency contact.
- The faculty member will be the primary supervisor of the Fellow.
- The faculty supervisor will be supportive of and encourage a team culture and collaborative spirit.
- The faculty supervisor will be responsible for deliverables.
- Data generated from the fellowship will be formatted and made available for the Catskill Science Collaborative 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 Catskill Science Collaborative to help connect them to affordable housing opportunities.

Email Jamie Deppen, Catskill Science Collaborative Coordinator, at deppenj@caryinstitute.org regarding any questions.

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 faculty supervisor 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 faculty supervisor, Fellow, and Catskill Science Collaborative.

Catskill Science Collaborative/Cary Institute of Ecosystem Studies Role:

The Catskill Science Collaborative (CSC) assists in the proposal selection process and the Cary Institute of Ecosystem Studies (Cary Institute) 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

Research needs fall under the following subjects:

- stream management and restoration (research needs 1-2),
- invasive species (3-7),
- wood turtle habitat (8)
- impacts of recreation (9-10),
- community vitality (11), and
- open topic (12).

Research needs are suitable for both undergraduate and graduate students unless otherwise noted. Proposals should specify which research need is being addressed.

1. Establishing a baseline survey and assessing large wood accumulation dynamics in stony clove watershed streams

The project would be a combination of field work, remote sensing imagery analysis and establishing a network of large wood accumulations (LWA) monitoring sites in Stony Clocve watershed. Work would also include contributing sites and data to the Wood Jam Dynamics and Assessment Model (WooDDAM) - a tool designed for resource managers. LWA are fundamental components of Catskill stream ecosystems yet also can present hazards to people and stream stability. Research on dynamics can help inform resource management on the benefits and hazards presented by LWA in Catskill streams. This project would be incorporated into the ongoing long-term fluvial geomorphology research in the Stony Clove watershed led by NYCDEP, USGS, and the Ashokan Watershed Stream Management Program.

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New York City Department of Environmental Protection

2. Instrumenting, measuring and modeling stream channel coupled hillslope mass wasting in the Stony Clove watershed

The work would be a combination of field work and data analysis. Field work would include selecting 2-3 sites to investigate and instrument with piezometers to measure shallow groundwater conditions, slope monitoring using a stake and cable method. Work would also include characterizing the geology/sediment composition of the hillslope. Data analysis would include testing available models to simulate mass wasting processes induced by hydraulic erosion and slope hydrology. A sponsoring professor would need to have a background in hydrology and/or geomorphology and computer modeling of geomorphic process. *A prospective*

student would need to have some familiarity with fluvial geomorphology field methods and preferably some experience with R.

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3. Modeling of susceptibility of Catskill waterbodies to invasion

Modeling the risk of aquatic invasive species to Catskills lakes, ponds and streams using water body and landscape patterns to characterize risk. The Catskills provide 90% of the drinking water supply for 10 million people. This subject is timely due to an increase in *Hydrocharis morsus-ranae, Cabomba caroliniana,* and*Trapa natans* in the Catskills region. The expansion of the CRISP Watershed Steward Program, administered through SUNY Oneonta, has been expanded to post Watershed Stewards at 25 boat launches, but are the Stewards at the most vulnerable water bodies?

Shaker, R.R., Yakubov, A.D., Nick, S.M., Vennie-Vollrath, E., Ehlinger, T.J. and Forsythe, K.W. 2017. Predicting aquatic invasion in Adirondack lakes: a spatial analysis of lake and landscape characteristics. Ecosphere, 8(3):e01723. 10.1002/ecs2.1723.

Contact:
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4. Vulnerability of Catskill waterbodies to the Northern Snakehead

Northern Snakehead (*Channa argus*), an invasive fish native to Asia, was first reported in the Upper Delaware River on 7/31/2020. The northern snakehead is a voracious predator and has the potential to reduce or even eliminate native fish populations and alter aquatic communities. It prefers to live in shallow ponds or swamps and since backwater habitats, that it prefers, are limited in the main stem of the Delaware, it is anticipated that they may not have a major impact on the main stem of the Delaware. But will this invader migrate up tributaries, as the American shad and eel do, to find its preferred habitats? Could the snakehead jeopardize fisheries in the birthplace of American fly fishing? What is the vulnerability of these tributaries and adjacent waterbodies to invasion from the northern snakehead and what might be the implications?

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5. The vulnerability of Catskill waterbodies to Waterwheel

Waterwheel (*Aldrovanda vesiculosa*) was introduced in NY State in 1999 into a pond in the Town of Deerpark. It has spread from one cove to the entire pond since that time. It has not been detected downstream, but does the lack of detection nearby indicate that the species is not able colonize other ponds in the Catskills? Research questions include: what are the ecological impacts of waterwheel in a pond? What is its potential for spread in the Catskills?

Lamont, E.E., Sivertsen R., Doyle, C., and Adamec, L. 2013. Extant populations of *Aldrovanda vesiculosa* (Droseraceae) in the New World. Journal of the Torrey Botanical Society 140(4):517-522.

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6. Interactions between invasive plants, Asian jumping worms (Megascolecidae) and deer browse in Catskill forests

Reports of jumping worms have increased and are often found in areas that have Japanese Stiltgrass (*Microstegium vimineum*) and evidence of heavy deer browse. In 2019, green stink worm (*Amynthas hupeiensis*) was found in the Catskills for the first time. What is the interaction between deer browse, invasive worms and invasive plants?

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7. Assessing the risk of invasive plant introductions at trailheads in the Catskill Park

Catskill trails and trailheads have experienced unprecedented levels of use as a result of the Covid-19 pandemic during the summer of 2020. Many visitors travel to the Catskills during the summer months when the risk of invasive species transfer is the highest. An analysis of trail register sign in data coupled with early detection and monitoring fieldwork at selected trailheads could prove valuable in managing future invasive plant infestations associated with increased visitation.

Additional information on the susceptibility of certain trailheads to future invasive plant infestations would also be useful for land managers from a planning and resource allocation perspective. This research project design would incorporate the methodology used in a previous study that was undertaken in the Adirondack Park by the Forest Ecosystem Monitoring Cooperative and adapt that to suit Catskill research questions. The study is available at:

https://www.uvm.edu/femc/data/archive/project/adktrailheads

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8. Determine where wood turtles reside in Catskill streams to better understand if any protections to habitat should be put in place or possibly created (nesting areas).

The student would be conducting presence/ absence surveys in stream systems in the Catskills following appropriate survey protocols. Survey locations will be determined in consultation with DEC staff. Additional surveys of wood turtle 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 HERP Atlas data, and help put management recommendations in the Regional Conservation plans to work.

For reference, there is a regional conservation plan for wood turtles and survey protocols established through a regional partnership available here:

http://www.northeastturtles.org/uploads/3/0/4/3/30433006/woodturtleplan_2018_final_v2.2.pdf

There are records of wood turtles in the Catskills (see the HERP Atlas information https://www.dec.ny.gov/animals/44399.html).

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9. Recreational and environmental impacts on at-risk bird species in the Catskills

The Catskill High Peaks are very popular hiking destination and levels of use and popularity of the peaks increases annually. More research is needed on whether bird populations (specifically at-risk species such as Bicknell's Thrush) are significantly impacted by current levels of human visitation. Additional information on possible impacts that acid rain may be having on the nesting success of songbirds, particularly at high elevations would be of interest. Acid rain can kill snails, whose shells provide a source of calcium needed for egg production in birds; it can also kill trees, thereby degrading songbird habitat. A detailed inventory and standardized monitoring effort for these species could be useful in informing future recreational management decisions.

Suitable for a graduate student.

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Projects 10 a-c. Responding to overuse of Catskill trails.

Some Catskill trails have experienced increasing visitation in recent years, leading to excessive wear and damage to adjacent forest land. One possible response is to encourage visitors to use other, less frequented trails. Another response is to modify the heavily–used trails to accommodate more hikers without incurring damage. Several different types of information are needed, including the topics below.

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10a. Feasibility of trail modifications. In this project, the student will survey some of the more heavily-used trails in the Catskills and determine what trail modifications would be needed

to support increased use, whether the modifications could be done with material on-site or would require material to be brought in, whether such modifications pose a threat to any threatened or endangered species or wetlands, whether tree cutting would be required, and to what extent the modifications would impact the user's experience.

10b. Visitor attitudes regarding intensive trail use. This project would involve surveying visitors to Catskill trails to determine their attitudes and expectations with regard to such topics as encountering crowds, experiencing solitude, using "hardened" trail surfaces, being asked or required to go to less crowded areas, and their perceptions of what is crowded vs. not crowded.

10c. Ecological impacts of intensive trail use. Intensive use of trails may affect wildlife adjacent to those trails. This project would survey both heavily and lightly used trails to determine if a relationship exists between trail use and presence/absence of wildlife species or habitat quality for those species. The species of focus would be determined by the proposer in consultation with natural resource managers. This project could be combined with #9.

11. Analyses of Community Vitality

A 2020 report (http://nap.edu/25851) from the National Academies of Sciences, Engineering, and Medicine reviewing the NYC Watershed Protection Program (WPP) recommended that the WPP would benefit from additional analyses of community vitality. The authors suggested that comprehensive social and economic analyses are needed to update earlier work, test working hypotheses, fill critical gaps in knowledge, and establish baseline conditions to provide a foundation for understanding future programmatic effects.

We propose a study of the impact of the NYCDEP Stream Management Program on the economic vitality and community well-being of the Towns of Denning and Neversink, within the watersheds of the Rondout and Neversink Reservoirs. Methods would include development of an open-ended survey for structured interviews with key stakeholders, and analysis and summary of published reports produced by NYCDEP on program accomplishments since 2008. The metrics developed specifically for this study might include, but would not necessarily be limited to, measures of 1) community disaster resilience, specifically related to flood hazards; 2) community vitality and well-being (for a description of possible metrics, see e.g., Canadian Council on Social Development, 2010); and 3) fiscal and economic valuation of programmatic impacts.

Suitable for a graduate student, though a good-fitting undergraduate student will be considered.

Canadian Council on Social Development. 2010. Community Vitality: A Report of the Canadian Index of Wellbeing. Waterloo, Ontario: University of Waterloo.

National Academy of Sciences. 2012. Disaster Resilience: A National Imperative. Washington, DC: The National Academies Press.

Zweig, Brian. 2019. Economic Valuation Study for Public Lands in the Central Catskills: Economic Impact from Outoor Recreational Activities. Margaretville, New York: Catskill Center for Conservation and Development.

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Rondout Neversink Stream Program

12. Open topic.

If you have an idea for a research project that you think would benefit natural resource management in the Catskills, you may submit a proposal on that subject. Please contact the Catskill Science Collaborative before writing the proposal so that we may evaluate the relevance of the idea. Your proposal should discuss why you think the issue is relevant, what you plan to do, and how you would connect with natural resource managers to ensure that the information is used.